ISSN 0021–0382

F—502

IONOSPHERIC DATA IN JAPAN

FOR OCTOBER 1990

VOL. 42 NO. 10

CONTENTS

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TOKYO, JAPAN

INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

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

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

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C	artificial accident,
S	propagational accident,
U	inaccurate.

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

N	normal,
U	unstable,
W	disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

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

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

b. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF FOF2 AT WAKKANAI

OCT. 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	60	56	50	52	51	56	77	84	98	107	102	107	107	104	97	105	102	94	87	76	64	N	52	58
2	58	54	53	56	53	58	80	86	94	106	100	107	102	106	110	103	103	100	88	68	70	66	64	66
3	62	64	65	64	62	63	87	105	112	116	100	112	112	110	114	100	106	109	95	87	74	73	64	66
4	71	66	62	65	64	66	84	110	128	121	120	116	122	106	108	112	108	112	96	87	80	63	65	66
5	64	59	59	65	68	61	88	110	108	122	130	133	124	123	121	109	111	102	90	86	74	65	68	53
6	62	58	62	60	63	65	85	107	111	131	128	131	124	114	108	111	110	107	91	78	85	65	67	66
7	67	59	51	51	52	54	86	89	100	112	133	128	124	127	116	111	103	85	71	64	63	58	58	57
8	56	45	51	51	52	44	66	88	100	110	114	121	123	122	112	110	106	101	86	72	68	58	64	63
9	62	58	59	54	46	60	78	88	112	124	131	122	121	120	111	106	110	104	92	82	66	65	65	58
10	62	58	64	52	45	44	64	94	128	136	128	119	124	123	122	108	122	110	98	87	66	72	80	64
11	58	58	63	62	53	61	87	114	122	140	135	130	128	114	116	115	111	100	87	72	66	65	60	58
12	58	61	54	47	41	44	66	90	100	138	132	136	128	127	116	123	121	108	96	82	64	58	58	56
13	41	62	52	51	44	36	67	97	107	101	121	137	124	117	124	121	117	100	85	80	73	65	67	62
14	54	43	44	54	52	51	63	101	118	136	136	135	128	126	130	125	122	101	90	87	86	73	67	59
15	61	53	51	A	52	52	80	102	126	134	132	133	134	128	125	123	117	108	90	82	77	67	66	54
16	54	52	52	48	43	56	86	122	117	135	154	137	136	130	120	127	114	101	91	66	74	64	58	52
17	52	51	56	56	54	54	80	110	124	139	135	133	132	120	121	128	121	107	95	84	78	64	64	58
18	54	52	58	55	54	54	70	108	121	134	134	137	133	127	127	126	122	112	94	82	65	63	57	57
19	51	54	55	55	52	61	85	123	125	134	136	138	142	140	138	133	131	113	90	84	82	64	63	58
20	63	62	57	56	60	56	73	110	137	149	140	131	132	121	124	129	128	118	93	85	76	62	65	66
21	62	57	54	53	62	58	63	97	100	100	125	124	113	118	122	121	112	99	81	68	66	52	50	42
22	53	52	47	51	49	46	66	109	132	134	136	131	120	111	115	110	114	99	81	71	64	65	62	N
23	51	42	50	45	48	42	63	88	127	126	130	132	126	120	121	118	98	97	78	64	64	68	54	59
24	54	48	38	50	43	54	64	89	122	128	136	123	116	122	127	123	113	105	87	77	73	66	64	63
25	64	54	62	61	60	52	65	98	122	129	137	132	133	124	123	114	122	94	71	56	60	66	58	58
26	51	51	56	49	54	48	67	88	113	131	140	138	133	121	118	120	115	90	65	64	63	57	58	46
27	41	47	48	41	48	50	66	96	111	131	127	133	132	117	122	125	111	97	78	66	57	58	56	57
28	54	50	41	42	44	43	64	108	122	124	130	129	140	125	121	125	115	93	65	61	63	57	52	51
29	42	42	44	48	42	48	60	88	109	133	132	134	130	116	115	125	98	83	60	57	54	53	47	51
30	52	45	43	38	42	46	68	97	111	127	132	132	132	128	142	140	121	92	74	64	67	64	64	62
31	50	48	48	51	52	50	66	105	129	131	126	128	132	126	124	128	110	90	68	65	66	57	58	54
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	30
MED	56	54	53	52	52	54	68	98	117	131	132	131	128	121	121	121	113	101	87	76	66	64	63	58
U Q	62	58	59	56	54	58	84	109	125	134	136	134	132	126	124	125	121	108	92	84	74	66	65	63
L Q	52	48	48	49	45	46	65	89	108	121	126	123	122	116	115	110	108	94	78	65	64	58	58	54

HOURLY VALUES OF FES AT WAKKANAI

OCT. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	37	28	G	G	G	G	G	G	G	G	G	63	34	30	37	29	28	27	G	G
2	G	G	G	G	G	G	G	G	G	G	G	55	46	44	G	G	57	G	29	36	40	G	27	G
3	G	G	G	G	G	G	G	G	46	53	54	61	57	58	69	66	37	G	35	38	30	G	26	32
4	27	26	27	G	G	11	G	G	G	G	G	53	G	46	55	58	56	50	42	G	44	59	G	31
5	G	G	G	G	G	G	G	G	46	54	44	G	G	G	G	G	G	28	33	28	G	28	30	G
6	G	G	G	32	33	G	G	34	G	G	G	G	G	G	G	G	G	G	G	44	24	G	G	28
7	G	28	27	G	G	G	G	G	43	58	48	59	G	G	G	G	G	G	G	G	32	28	27	29
8	27	G	27	G	G	G	G	G	43	G	59	G	G	G	G	G	G	G	G	G	G	33	31	28
9	G	28	28	26	29	G	G	G	G	46	G	G	G	G	G	G	G	G	G	G	G	G	G	36
10	28	G	29	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
11	29	34	34	32	29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	36	44	46	G	G	G	G	G	G	G	37	70	54	32	32	29	52
13	51	32	31	27	G	G	G	G	G	46	G	G	G	G	G	38	35	32	28	33	G	24	27	32
14	24	32	29	33	32	25	G	G	48	60	G	52	53	48	44	43	61	39	47	32	G	G	G	G
15	G	G	G	30	58	32	G	G	G	G	G	G	G	G	G	G	G	G	44	30	28	G	G	G
16	G	G	G	G	30	34	65	62	51	G	G	G	G	G	G	G	G	G	G	29	28	G	G	G
17	G	G	G	28	30	G	28	37	G	G	G	59	G	G	G	G	50	37	30	G	G	40	30	G
18	32	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	G	G	G	G	G	G	G	33
19	G	G	24	27	26	25	G	G	G	G	G	G	G	61	G	G	G	G	G	G	G	G	G	27
20	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	36	32	44	35	34	45	30	32
21	27	27	G	24	23	G	G	40	G	G	G	50	59	G	G	G	G	G	33	44	58	29	31	34
22	G	G	G	G	G	G	27	36	G	G	41	63	45	G	G	37	30	G	G	G	G	G	32	G
23	33	26	28	29	38	35	G	34	46	47	62	G	G	G	G	G	G	G	G	46	G	28	G	G
24	G	G	31	40	31	26	28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	32
25	29	G	28	G	G	G	G	G	G	50	G	G	G	G	G	G	G	G	34	38	29	32	G	G
26	G	27	29	28	28	G	45	G	G	G	47	41	41	G	G	G	30	30	32	44	G	29	30	31
27	G	38	G	G	G	G	G	G	G	79	53	50	G	G	G	37	G	G	47	90	G	38	31	G
28	32	40	28	31	32	29	G	G	G	49	50	55	42	61	66	58	29	30	G	36	31	36	54	31
29	33	27	G	28	25	G	G	G	G	43	46	G	G	G	G	G	46	46	59	38	G	28	27	G
30	G	G	G	G	G	G	G	G	42	72	G	G	G	G	G	G	G	G	G	G	G	G	G	30
31	59	41	46	30	37	30	32	32	G	46	G	45	58	G	G	G	28	34	28	29	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	G	G	G	G	25	G	G	G	G	G	G	G	G	G	G	G	G	G	28	29	G	24	26	27
U Q	29	28	28	29	31	25	G	32	43	49	46	52	41	G	G	37	35	32	37	38	30	32	30	32
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

OCT. 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	15	15	16	14	16	21	18	20	24	26	38	26	24	23	20	17	17	17	17	16	16	17	18
2	16	15	15	16	17	16	20	17	20	23	27	29	28	33	24	18	17	20	18	17	17	16	18	15
3	15	17	15	16	15	17	17	20	20	28	26	34	34	24	23	23	17	20	17	17	17	18	18	18
4	18	17	16	14	15	15	23	27	23	30	41	28	27	26	24	20	22	20	16	17	15	18	18	20
5	18	17	15	17	16	16	23	17	20	24	26	40	38	35	24	23	20	21	17	17	17	18	17	15
6	17	16	17	18	17	15	20	18	20	21	24	24	38	35	33	20	24	20	16	15	16	15	17	16
7	14	15	17	14	15	17	21	27	23	26	24	33	36	24	24	20	24	18	15	15	15	17	15	17
8	16	15	15	15	14	17	18	20	22	23	23	36	24	24	23	21	18	18	17	17	16	16	17	17
9	16	16	16	15	16	15	21	18	23	22	28	39	36	35	23	23	24	18	15	16	16	17	17	15
10	16	15	16	14	15	16	21	28	22	23	27	39	36	34	23	22	26	18	16	16	15	16	16	15
11	16	16	15	16	15	15	21	28	33	35	36	27	35	23	33	30	21	18	16	17	17	16	15	17
12	17	17	18	15	16	16	21	23	22	22	38	34	26	28	24	21	24	18	17	18	18	16	17	17
13	17	16	16	18	18	16	21	28	20	32	23	29	33	23	22	20	20	17	17	15	18	16	16	16
14	15	17	16	16	15	15	21	28	20	32	29	24	28	27	26	21	24	16	16	16	16	15	16	16
15	16	20	16	18	16	16	21	17	21	21	27	32	38	24	21	23	17	17	15	18	17	15	15	17
16	16	20	15	16	14	16	18	22	23	22	23	29	28	36	24	18	24	17	17	16	18	16	16	16
17	18	16	15	15	16	14	16	18	32	22	28	35	36	27	23	21	22	18	18	17	17	18	18	16
18	18	15	15	15	15	18	20	18	20	23	38	24	24	23	21	20	24	17	16	15	16	16	17	18
19	20	17	15	14	16	17	21	20	20	22	28	24	38	21	21	22	20	17	17	17	16	16	16	17
20	16	17	18	15	14	15	18	18	20	24	33	24	38	27	28	18	17	14	18	17	15	16	18	15
21	17	15	16	15	15	15	20	18	21	22	27	27	26	36	20	29	18	16	17	14	17	17	17	14
22	17	15	16	15	16	16	18	17	21	20	30	32	23	35	33	18	20	15	17	15	17	15	18	16
23	17	18	17	17	15	16	16	17	20	21	24	23	38	24	22	18	24	18	16	17	17	17	16	17
24	17	17	18	18	15	16	18	27	18	23	22	27	38	35	20	21	22	16	18	18	17	15	17	17
25	17	18	16	16	15	15	18	24	21	22	24	26	26	22	23	18	23	16	20	20	20	17	15	16
26	14	15	18	15	16	18	18	27	33	34	28	23	23	22	22	27	17	18	17	17	15	17	17	15
27	16	16	15	20	17	17	16	18	21	22	24	24	24	24	22	18	23	15	21	18	16	17	17	16
28	17	17	16	18	18	20	18	24	23	23	35	35	23	23	21	18	20	17	16	17	20	16	16	16
29	17	18	14	16	15	16	17	23	20	21	22	23	40	33	22	22	20	17	18	17	15	18	15	17
30	15	15	15	16	14	16	17	24	18	22	22	34	23	22	20	21	21	15	18	15	15	15	16	17
31	18	15	15	14	16	16	17	18	30	26	29	30	29	22	21	22	21	17	16	17	15	17	15	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	17	16	16	16	15	16	20	20	21	23	27	29	29	24	23	21	21	17	17	17	16	16	17	16
U Q	17	17	16	17	16	17	21	27	23	26	29	34	38	34	24	22	24	18	18	17	17	17	17	17
L Q	16	15	15	15	15	15	18	18	20	22	24	24	26	23	21	18	18	16	16	16	15	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT AKITA

OCT. 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	65	60	53	55	50	46	53	88	98	106	96	108		112	105	107	110	110	94	50	54	52	54	52
2	57	53	54	54	52	53	79	94	98	108	104	104	115	107	108	114	106	110	93	54	70	52	56	52
3	50	54	52	58	53	59	87	102	107	103	108	111	112	116	110	110	108	114	109	79	67	64	63	52
4	54	53	53	63	61	57	85	110	110	117	112	112			106	110	107	110	106	87	68	52	64	66
5	54	52	51	59	57	54	86	103	112	117	117	131	134	122	119	121	120	114	94	82	78	66	54	52
6	56	59	52	52	48	53	82	109	123	112	115	111	120	119	108	108	113	110	105	85	86	52	62	38
7	53	51	50	48	47	50	81	120	122	122	125	133	127	124	121	116	112	96	80	66	52	51	60	26
8	50	51	52	53	50	48	68	88	112	112	124	127	131	133	123	120	111	110	89	77	64	58	53	52
9	53	53	59	58	55	63	84	112	110	116	116	123	119	118	108	117	114	106	87	76	64	67	66	67
10	53	53	52	49	40	47	62	111	125	126	117	120	124	122	128	118	111	112	108	87	66	65	78	84
11	63	61	50	70	61	64	85	116	134	122	137	135	126	116	112	111	110	103	84	79	75	66	58	61
12	N	54	53	59	49	50	68	111	114	137	137	131	130	123	128	130	126	113	102	79	67	54	64	A
13	65	A	60	54	50	53	81	112	126	135	132	136	136	128	132	128	117	111	85	76	67	68	52	60
14	67	54	53	55	49	60	72	113	130	137	137	138	134	135	132	133	124	104	88	86	84	79	66	58
15	51	54	53	54	49	52	81	106	124	132	136	135	130	132	126	120	115	110	90	85	80	52	57	53
16	52	52	54	54	45	54	86	128	137	137	137	138	136	133	130	127	116	110	90	84	67	66	63	52
17	53	62	57	53	57	51	81	112	121	128	134	134	121	117	119	130	118	110	96	87	78	52	52	59
18	51	A									133	132	135	135	132	134	120	111	90	80	67	N	58	N
19	59	53	51	57	54	62		111	131	127	134	135	137	134	137	137	134	122	87	85	79	66	67	54
20	63	54	54	54	53	58	78	122	140	138	135	130	129	126	117	130	128	120	92	83	74	79	52	79
21	49	66	53	59	69	67	71	110	135	133	134	134	134	126	133	130	111	90	82	77	62	52	52	25
22	44	52	52	49	51	50	76	111	131	135	118	124	132	114	118	120	118	108		79	54	53	54	67
23	52	42	48	50	31	47	61	102	116	127	120	116	123	126	121	118	111	86	86	79	74	56	52	54
24	52	54	49	51	51	47	71	90	128	122	122	120	112	120	124	122	111	104	82	76	77	54	60	60
25	56	54	54	58	56	49	73	108	122	133	129	132	126	126	128	118	111	91	74	54	60	52	65	55
26	48	47	52	50	54	42	69	100	121	111	122	134	131	122	120	118	116	97	66	64	52	N	65	59
27	30	49	54	52	49	53	78	105	N	122	128	131	128	123	119	128	116	104	77	53	A	58	58	58
28	52	54	38	40	40	42	67	106	124	125	131	134	121	116	122	120	124	99	78	54	58	64	52	26
29	47	46	44	48	48	40	53	90	121	130	130	121	122	121	112	112	120	78	53	53	A	54	50	47
30	48	53	44	40	42	44	62	89	104	134	130	138	124	130	135	139	123	91	70	74	72	30	67	62
31	46	46	35	49	A	46	68	94	118	116	123	120	131	121	116	121	118	94	68	67	67	58	58	52
	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	30	30	29	30	29	30	29	30	31	31	29	30	31	31	31	31	30	31	29	29	31	29
MED	52	53	52	54	50	52	76	108	122	126	128	131	128	122	121	120	116	110	88	79	67	56	58	54
U Q	56	54	54	58	54	57	81	112	129	133	134	134	133	128	128	130	120	111	94	84	76	66	64	60
L Q	50	51	50	50	48	47	68	100	112	116	117	120	121	118	112	116	111	97	80	66	63	52	53	52

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

OCT. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	33	24	31	34	57	39	44	46	G	G		54	42	G	40	43	61	57	49	32	30	G
2	G	G	28	G	G	G	G	G	39	51	G	51	51	50	51	G	G	G	27	60	G	G	G	G
3	G	26	G	G	31	G	G	42	61	70	84	59	65	63	53	G	G	29	25	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G			42	54	44	58	49	42	49	29	30	29
5	41	38	29	G	G	G	G	49	G	G	G	G	G	G	G	G	G	29	26	G	G	36	G	33
6	30	30	32	30	G	G	G	G	G	44	G	G	G	G	43	G	G	G	G	G	40	31	30	54
7	G	G	G	G	G	G	G	38	G	G	82	G	G	G	G	G	G	G	G	G	G	30	38	34
8	34	G	G	31	G	G	G	37	G	G	70	G	G	G	G	G	G	G	30	30	G	32	G	G
9	G	G	G	G	G	25	G	G	39	G	44	G	G	G	G	G	G	G	G	G	G	G	G	26
10	31	25	G	G	G	32	40	G	G	G	43	G	G	G	G	G	37	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	39	52	54	G	G	G	G	G	G	33	32	37	G	38	G	G
12	G	G	25	G	G	G	G	G	G	50	G	G	57	G	41	G	40	39	41	38	G	59	47	33
13	32	36	24	30	32	G	G	G	G	G	49	59	G	G	50	42	39	50	34	33	28	29	30	32
14	24	G	G	G	G	G	32	33	G	G	G	51	47	G	G	G	G	G	G	27	G	G	G	G
15	G	G	G	G	G	G	G	G	53	61	G	G	G	G	G	G	G	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	49	G	G	G	G	G	G	G	28	26	G	39	34	G
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	G	30	32	30	41	G	29	41
18	37	32									G	G	G	G	44	41	54	G	34	G	26	26	G	24
19	G	G	G	G	G	G	G	33	40	G	56	G	G	G	G	G	40	32	G	29	G	G	G	G
20	G	G	G	G	G	G	30	33	G	G	G	G	G	G	G	57	38	29	37	40	27	26	G	G
21	G	G	G	G	G	G	G	39	47	G	46	G	G	G	G	G	40	37	37	38	G	G	G	58
22	27	G	29	G	G	G	G	G	58	G	G	G	G	44	40	53	80	79	91	39	28	G	G	G
23	G	32	32	26	37	40	28	G	38	42	G	G	G	57	50	40	51	G	G	G	G	32	G	26
24	G	G	29	26	24	26	G	37	G	G	61	G	G	G	G	G	G	27	G	G	G	G	G	G
25	G	G	40	34	G	G	G	40	G	48	G	48	G	G	44	G	G	G	30	32	40	48	34	58
26	39	29	G	G	G	G	G	G	G	G	53	48	84	56	G	G	G	32	42	48	37	G	G	G
27	30	G	G	G	G	G	G	32	41	46	57	57	74	47	G	G	G	G	48	114	91	47	41	G
28	G	G	25	33	30	G	26	G	44	44	47	48	48	G	G	38	G	30	40	G	33	49	36	44
29	32	G	G	33	31	32	G	G	G	44	46	55	46	G	G	37	54	G	30	33	46	35	G	G
30	32	G	G	G	G	24	G	G	40	58	42	G	G	G	G	G	37	34	G	G	44	37	G	27
31	G	G	32	40	48	29	28	G	G	51	74	79	70	54	G	48	44	53	46	34	32	27	30	26
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	30	30	30	30	30	30	31	31	29	30	31	31	31	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	G	G	43	G	G	G	G	G	G	29	30	30	G	29	G	G
U Q	31	25	29	26	24	24	G	37	40	48	54	48	47	44	42	38	40	34	40	38	40	36	30	33
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

OCT. 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	17	17	15	15	15	15	15	16	16	17	22	21		16	15	18	17	15	15	16	15	16	16	16
2	15	15	16	20	15	15	21	16	18	23	24	35	24	30	21	17	18	22	16	15	16	16	15	16
3	15	16	15	15	16	16	16	17	17	22	26	29	24	29	22	21	16	15	15	15	15	15	15	15
4	15	16	15	16	16	16	23	18	20	21	23	28			22	18	16	15	15	15	15	16	16	17
5	15	16	16	16	15	15	17	16	18	22	26	36	23	23	21	18	16	21	15	16	16	15	16	15
6	15	15	15	15	16	15	22	15	17	18	21	24	22	20	20	16	17	21	15	15	15	15	16	15
7	15	15	15	15	16	15	17	17	18	21	23	22	42	26	23	17	18	21	15	16	17	15	15	15
8	15	17	15	15	15	16	21	15	22	20	22	22	24	17	21	22	18	21	15	15	16	16	16	17
9	15	15	15	15	15	15	22	18	22	22	22	33	27	23	21	18	17	22	15	16	16	16	15	16
10	15	16	17	15	16	15	15	17	17	20	20	39	24	22	22	16	17	20	15	15	15	16	16	15
11	15	17	16	15	15	15	16	16	16	18	21	23	21	23	18	16	18	16	16	16	16	15	15	15
12	15	15	15	15	15	15	21	18	16	18	22	46	22	38	22	18	16	16	15	15	15	15	15	15
13	15	15	15	15	15	15	20	16	17	18	23	22	23	21	20	20	16	15	15	16	15	17	15	15
14	16	15	15	15	16	15	16	16	16	20	20	24	17	17	18	18	17	20	16	17	16	15	15	16
15	15	15	15	16	15	15	21	16	20	22	23	44	24	23	21	18	18	21	15	17	16	16	15	15
16	17	15	15	15	15	15	22	16	16	23	21	26	24	38	35	22	18	18	16	16	16	16	15	15
17	15	15	15	17	15	16	22	15	18	21	22	24	23	40	40	20	17	16	16	15	17	15	18	16
18	16	16									38	26	27	23	21	17	17	18	15	16	16	15	15	16
19	16	15	16	15	16	15	20	16	18	20	22	23	23	23	21	20	18	16	15	15	16	15	16	15
20	17	15	15	15	15	15	21	16	17	21	22	44	24	23	27	18	23	16	15	15	16	17	16	15
21	15	15	16	16	15	15	18	16	18	21	22	23	27	24	21	36	16	16	15	15	16	16	15	16
22	16	15	15	15	16	16	16	17	17	22	21	24	22	18	20	18	20	16	15	18	17	17	16	15
23	15	16	16	15	15	15	16	16	20	18	23	22	26	17	16	15	16	20	16	15	16	15	15	16
24	17	15	15	15	15	15	18	16	15	18	18	18	16	17	16	18	16	18	16	17	16	16	15	16
25	16	15	15	15	15	15	17	18	18	21	21	22	28	20	18	17	20	16	16	17	16	15	15	16
26	15	15	16	16	15	15	18	16	18	18	21	18	21	21	20	20	24	15	17	16	15	15	16	15
27	15	16	16	16	16	16	17	16	18	21	24	21	20	20	20	22	24	17	15	16	15	15	17	15
28	15	15	16	15	15	15	17	16	20	20	21	21	21	20	17	16	16	16	16	15	15	16	15	15
29	15	16	15	15	15	15	17	17	21	20	22	23	28	24	20	17	16	17	15	16	15	15	16	17
30	16	15	16	15	16	18	17	15	17	16	18	24	22	24	17	17	15	15	16	15	15	15	15	16
31	16	15	16	15	15	16	15	16	18	21	18	21	21	20	17	16	16	15	15	15	15	15	16	18
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	30	30	30	30	30	30	31	31	29	30	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	18	16	18	20	22	24	23	23	21	18	17	16	15	16	16	15	15	15
U Q	16	16	16	16	16	16	21	17	18	21	23	29	25	24	22	20	18	20	16	16	16	16	16	16
L Q	15	15	15	15	15	15	16	16	17	18	21	22	21	20	18	17	16	16	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

OCT. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	68	66	57	50	48	41	68	97	117	A			121	115	113	115	114		98	69	57	60	61	64
2	68	N	57	55	53	48	76	92	110	108	101	110	117	116	108	121	123	118	104	82	66	66	64	66
3	57	N	59	59	52	53	88	102	110	111	111	113	125	121	116	110	114	121	111	91	65	60	63	62
4	66	58	54	55	55	54	80	114	122	110	109	118	117	120	111	112	110	118	110	89	71	60	62	66
5	66	57	54	61	56	53	82	104	117	111	126	138	133	136	126	128	125	128	114	86	78	69	71	70
6	67	58	57	57	53	54	86	115	126	116	111	114	120	124	122	123	123	125	117	87	86	78	82	70
7	66	58	48	48	48	50	84	120	118	118	113	137	142	129	128	124	121	118	93	72	67	68	64	58
8	49	52	53	49	47	44	71	98	134	118	124	137	139	141	138	131	124	120	94	70	68	64	58	55
9	54	52	52	50	52	51	86	115	128	115	105	122	123	121	124	121	117	112	94	71	70	70	65	68
10	54	54	57	57	48	41	66	122	131	118	111	129	124	126	124	118	111	113	103	98	76	77	78	87
11	66	62	58	65	68	58	86	113	140	134	132	138	123	127	118	108	112	109	90	78	85	72	63	63
12	60	60	55	52	52	51	66	117	134	140	140	130	128	128	136	130	127	120	102	80	64	77	70	70
13	74	68	64	51	54	54	85	111	131	130	136	141	142	141	138	133	122	116	100	84	77	70	65	71
14	71	63	56	56	56	54	79	108	136	145	140	144	140	141	138	135	125	113	104	91	88	76	59	63
15	64	57	54	52	52	54	88	115	129	134	133	140	138	130	131	126	116	113	105	90	78	68	63	64
16	56	55	61	58	54	58	84	126	145	147	141	144	146	145	142	136	126	120	103	88	68	70	68	64
17	64	64	64	56	56	53	75	110	126	134	130	134	122	120	123	124	127	112	88	81	73	72	66	58
18	60	51	58	63	60	61	89	131			128	126	135	142	142	138	128	118	87	79	71	66	64	65
19	60	57	52	57	54	58	85	102	124	131	132	138	145	146	145	141	141	136	108	87	86	79	74	72
20	68	70	68	57	52	57	85	102	134	135	134	132	124	126	126	128	128	116	92	81	79	83	79	84
21	86	72	54	54	82	63	76	108	142	142	134	133	138	134	137	133	125	112	97	82	77	75	63	57
22	57	54	52	51	55	49	79	127	135	140	133	127	133	140	135	134	133	122	85	88	87	86	78	79
23	78	51	52	51							130	122	123	128	124	120	117	107	88	87	80	76	67	58
24	54	53	52	53	47	42	66	98	119	127	124	122	121	125	130	122		108	86	76	78	69	65	59
25	63	52	57	64	54	47	73	105	124	129	124		134	123	130	126	108	96	54	73	61	63	64	58
26	48	50	50	51	52	41	64	100	117	131	138	135	135	132	120	120	117	105	80	65	66	65	61	56
27	54	48	54	53	47	54	74	114	123	127	123	135	130	133	126	128	124	106	78	74	65	58	A	56
28	58	54	A	N	69	69	68	110	118	120	126	140	130	126	128	118	126	108	81	63	62	64	68	46
29	46	50	48	45	47	37	54	94	119	132	124	124	126	126	117	112	112	90	67	56	52	55	54	49
30	52	45	42	39	40	42	67	83	101	124	137	138	132	131	142	138	117	87	74	71	71	76	72	52
31	45	44	50	48	30	38	64	98	105	118	127	125	128	129	125	119	124	97	72	72	73	58	56	52
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	29	30	30	30	30	30	30	29	28	30	29	31	31	31	31	30	30	31	31	31	31	30	31
MED	60	55	54	54	52	53	78	109	124	128	128	133	130	128	126	124	123	113	94	81	71	69	64	63
U Q	67	61	57	57	55	54	85	115	134	134	134	138	138	136	137	133	126	120	104	87	78	76	70	70
L Q	54	51	52	51	48	44	68	100	117	118	123	123	123	124	122	119	116	108	85	72	66	64	63	57

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

OCT. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	28	34	32	49	29	28	58	55	45	54	G	G	47	58	44	41		30	44	59	51	36	32
2	29	G	G	G	G	G	G	38	72	49	46	52	51	51	G	41	44	58	37	30	56	29	25	26
3	G	26	G	G	G	G	G	G	49	51	48	G	G	44	50	40	39	32	G	G	G	G	G	G
4	G	G	G	G	G	G	31	G	39	G	46	46	53	G	G	52	37	G	24	G	G	25	35	30
5	G	G	G	33	26	G	29	40	61	47	G	G	G	G	G	G	G	30	27	G	G	G	G	40
6	30	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	G	G	G	G	24	31	36
7	30	31	G	G	G	G	G	G	72	44	G	G	G	G	G	G	G	28	26	G	G	G	27	34
8	32	25	G	25	G	G	G	38	44	43	47	G	G	48	G	G	G	37	G	44	38	G	29	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	G	G	G	G	G	32	43	G	G	G	G	G	G	G	G	37	31	G	G	G	G	G	G
11	G	G	G	G	G	G	28	G	47	53	62	55	50	G	48	47	34	47	44	49	30	33	34	31
12	28	G	25	24	G	G	G	59	G	48	54	51	51	G	46	79	54	G	35	32	24	40	41	30
13	32	24	G	G	G	G	G	G	44	49	54	50	49	52	G	G	43	37	62	44	27	25	28	25
14	G	G	G	G	G	G	G	34	G	46	G	50	48	58	48	52	44	30	30	36	31	26	24	24
15	G	G	G	G	G	G	G	G	G	43	G	G	G	G	56	G	G	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	G	47	49	46	G	G	G	G	G	G	25	38	27	28	40	34
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	32	30	54	G	G	G	28
18	G	26	G	G	G	G	G	48			48	G	G	46	45	40	G	29	29	29	29	26	G	G
19	G	G	28	G	G	G	G	34	41	44	G	G	G	51	G	38	34	29	55	G	G	G	G	G
20	31	G	G	32	G	G	G	34	41	G	G	G	53	G	G	G	35	32	29	G	26	35	29	G
21	24	G	G	G	G	G	G	G	47	41	62	46	G	G	G	G	G	36	37	G	G	G	G	G
22	48	36	34	31	30	G	G	G	G	G	50	50	G	44	56	92	175	35	43	58	30	29	29	G
23	G	G	G	29	95	44					48	46	G	58	47	G	62	47	40	G	G	G	G	G
24	G	24	G	G	G	G	G	35	55	48	55	47	G	G	G	G		G	G	G	G	G	G	G
25	G	G	G	G	30	24	G	50	38	47	50		G	52	G	43	46	72	91	49	28	44	G	G
26	47	G	G	G	26	G	G	G	G	46	60	55	G	G	G	48	59	G	G	G	36	34	33	30
27	G	G	24	30	28	G	G	G	G	44	56	78	79	G	G	G	34	39	61	G	33	56	59	32
28	G	G	26	G	G	G	G	34	G	47	56	50	54	59	G	G	G	G	G	29	G	G	30	38
29	33	29	30	31	G	G	G	G	G	46	46	46	G	G	G	G	35	G	G	G	24	35	50	35
30	27	G	G	G	G	G	G	53	44	G	48	G	G	43	G	41	G	33	24	29	G	G	G	G
31	G	G	G	G	46	33	G	G	G	55	58	62	G	G	G	G	G	30	26	30	32	27	28	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	30	30	29	29	31	30	31	31	31	31	30	30	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	39	45	48	46	G	G	G	G	34	30	27	G	24	25	27	24
U Q	30	24	G	25	26	G	G	38	47	47	54	50	49	48	46	43	43	36	37	38	30	33	33	32
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY. JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

OCT. 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	16	15	15	14	14	14	15	16	17	21	22	14	18	18	20	18	17		15	14	15	15	15	15
2	15	15	14	15	15	15	16	15	16	18	20	30	30	22	20	18	16	15	15	15	15	15	14	16
3	15	15	15	14	15	15	15	16	18	24	24	24	40	24	22	18	16	15	15	16	16	16	16	15
4	15	14	14	15	15	16	15	15	16	20	29	26	29	28	21	18	16	21	15	16	14	15	15	15
5	16	15	16	14	14	15	15	16	18	22	21	21	39	24	20	18	17	14	15	15	15	16	15	15
6	14	15	15	15	15	15	22	15	17	20	22	40	23	22	20	16	17	22	15	14	15	16	15	15
7	15	14	15	15	16	15	22	15	16	18	20	39	20	23	23	18	16	14	15	16	16	16	16	14
8	15	15	16	16	15	15	22	15	18	20	21	46	30	22	17	15	16	16	15	14	15	16	15	17
9	16	15	15	15	14	16	21	17	20	21	23	39	26	29	23	20	17	20	15	14	15	15	15	15
10	15	15	15	14	15	15	15	16	16	18	20	39	39	22	20	16	16	15	15	16	16	15	15	15
11	15	14	14	15	15	15	16	15	17	20	20	22	21	38	14	15	16	16	14	15	15	15	15	15
12	15	15	15	14	14	15	22	15	18	18	18	21	38	20	18	16	16	20	15	14	16	15	15	15
13	14	15	15	14	14	15	22	16	20	18	21	21	36	20	20	16	15	14	16	15	15	15	15	15
14	15	15	15	15	15	15	20	16	18	20	24	40	23	18	17	17	16	15	16	16	14	14	15	16
15	15	15	14	14	16	15	21	16	20	20	20	40	42	23	20	18	16	18	16	15	15	15	15	16
16	16	15	15	14	14	15	16	15	16	18	20	26	39	39	23	20	16	20	15	15	15	16	15	15
17	16	15	14	15	15	15	21	15	17	20	21	23	40	40	18	16	14	15	15	15	15	15	15	16
18	15	15	15	15	16	15	21	20			26	17	33	26	21	17	15	15	14	15	15	15	14	14
19	15	14	15	15	14	15	21	15	17	21	21	28	26	32	20	18	15	14	15	17	16	16	16	16
20	15	16	15	15	15	15	15	16	17	20	22	26	29	27	38	22	17	15	14	14	14	14	16	15
21	14	16	15	15	15	15	21	16	17	20	20	23	23	28	21	36	16	15	16	14	16	15	15	15
22	15	14	15	14	14	15	18	15	15	20	29	34	41	26	23	17	20	14	15	15	14	15	16	16
23	16	14	15	15	15	15					22	27	26	26	17	20	15	16	15	15	16	15	15	16
24	15	15	15	16	16	16	20	16	16	17	20	18	20	16	16	15		17	15	15	15	15	16	15
25	15	15	17	15	14	16	20	15	17	20	21		24	23	20	16	14	15	15	14	15	15	16	15
26	16	16	16	17	14	16	18	16	18	21	21	20	20	24	17	18	15	17	15	15	15	15	15	15
27	16	16	16	15	15	16	17	15	18	20	18	18	21	20	22	18	14	14	15	17	15	15	15	15
28	15	15	16	16	17	16	18	16	16	17	22	23	21	18	23	20	17	17	15	16	16	15	16	15
29	15	15	14	15	14	15	17	17	16	18	18	21	42	28	20	18	15	17	16	16	16	15	14	15
30	16	16	15	16	16	15	17	15	15	18	18	18	22	21	17	16	15	15	16	15	16	15	16	16
31	16	15	15	14	18	20	17	15	16	18	20	22	23	29	21	16	15	15	15	14	16	15	15	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	30	30	29	29	31	30	31	31	31	31	30	30	31	31	31	31	31	31
MED	15	15	15	15	15	15	18	16	17	20	21	24	26	24	20	18	16	15	15	15	15	15	15	15
U Q	16	15	15	15	15	16	21	16	18	20	22	34	39	28	22	18	16	17	15	16	16	15	16	16
L Q	15	15	15	14	14	15	16	15	16	18	20	21	22	21	18	16	15	15	15	14	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

OCT. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2					54											134								
3									97	111					162		145							
4				63						122									133					
5											126								132	88		89		
6				64					121						135				136			110		
7				50																	88			
8			55									133	147	162	172	172	161	158	142	110	109	112	86	85
9	84	76	50	47	50	47	52	90	121	121	100	116	134	139	146	141	127	122	111	87	88	86	108	85
10	86	70	62	72	47	47	52	105	127	99	107	127	134	137	132	130	123	125	121	111	88	85	86	85
11	66	57	61	63	57	54	64	106	125	141	137	132	140	134	138	120	124	129	122	105	90	88	82	78
12	75	84	66	52	59	59	53	88	126	132	128	128	128	138	145	144	134	134	120	109	87	90	88	84
13	82	82	69	61	60	52	61	88	122	133	138	146	147	151	147	145	136	136	127	115	88	88	85	84
14	88	86	64	64	58	53	60	88	131	144	141	141	145	144	147	138	138	135	132	115	107	86	76	64
15	70	64	64	54	51	56	62	89	116	140	141	142	138	142	140	135	126	118	127	94	84	89	78	78
16	77	67	62	59	55	60	64	89	141	157	142	142	156	157	159	150	141	135	134	112	87	85	87	86
17	86	85	75	78	74	54	50	90	119	130	138	127	121	134	138	132	136	124	108	88	85	84	66	63
18	67	63	61	63	64	50	50	98	110	123	132	124	132	148	160	153	146	136	128	108	118	110	84	84
19	86	73	64	62	61	52	52	86	108	131	150	142	146	N	161	160	156	157	146	138	133	128	86	106
20	109	128	87	78	66	60	66	96	105	130	135	126	127	137	140	137	129	126	116	104	103	144	109	86
21	86	76	60	59	79	58	48	86	128	138	128	131	151	146	146	147	139	141	132	110	104	106	90	83
22	76	71	63	68	62	51	61	103	130	137	145	139	147	155	152	146	145	148	144	142	144	146	145	137
23	128	88	78	84	63	53	61	86	108	121	130	123	126	126	135	126	128	118	111	109	108	89	86	78
24	60	59	58	56	58	43	42	85	114	126	135	130	127	N	145	137	126	123	122	87	87	87	85	76
25	76	76	51	64	66	59	57	87	116	128	141	136	144	145	146	133	120	116	110	91	86	86	78	82
26	58	58	54	62	67	46	39	82	104	120					136	133	123	124	107	96	87	96	86	71
27	74	56	52	63	49	54	61	98	122	126	128	137	142	146	145	146	140	136	124	109	104	97	84	74
28	68	60	31	36	37	44	49	80	106	132	138	137	127	133	140	131	138	130	122	109	89	108	86	66
29	57	53	48	40	48		37	80	112	114	120	127	133	133	130	126	122	113	101	86	86	80	72	66
30	54	56	36	36	36	36	42	78	83	106	144	144	124	132	144	147	130	108	101	88	89	89	85	63
31	53	50	58	56	54	30	50	77	94	103	133	131	132	132	133	132	127	132	108	88	88	82	73	69
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	24	26	24	22	23	23	25	25	23	23	23	21	26	25	25	24	27	25	25	26	24	24
MED	76	70	61	62	58	52	52	88	116	128	135	132	134	139	145	137	134	130	122	108	88	89	86	80
U Q	86	82	64	64	63	56	61	96	125	135	141	141	146	147	147	146	140	136	132	110	105	108	86	85
L Q	66	58	53	54	50	47	49	85	107	120	128	127	127	133	138	132	126	122	111	88	87	86	80	70

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

OCT. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2					G											G								
3									38	G					G		G							
4				G						44									58					
5											G								G	G		G		
6				G					G						G				G			G		
7				G																	G			
8			G									G	G	G	G	G	G	G	28	G	G	G	G	G
9	G	G	G	G	G	G	G	32	38	G	G	G	G	G	G	G	G	35	G	G	G	G	G	G
10	G	G	G	G	G	G	G	38	G	G	G	G	G	G	G	G	44	59	33	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	50	56	66	62	55	G	G	48	83	60	41	25	26	G	G
12	G	G	G	G	G	G	G	34	G	G	50	59	55	56	56	63	45	33	43	58	49	33	29	29
13	G	G	G	G	G	G	G	G	G	47	52	66	53	G	56	52	46	50	36	33	34	31	33	33
14	29	G	G	G	G	G	G	G	39	G	G	G	G	45	50	62	46	56	G	36	40	32	30	26
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	43	38	36	33	41	58	44	32
16	G	G	G	G	G	G	G	33	39	45	G	G	G	G	G	G	G	G	G	40	40	38	33	32
17	G	G	G	G	G	G	G	33	50	G	G	G	G	G	G	G	G	76	51	56	34	39	36	G
18	G	G	G	G	G	G	G	G	40	G	G	G	G	G	50	46	39	48	58	40	33	26	G	G
19	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
20	G	26	G	G	G	G	G	G	G	40	G	G	G	G	G	46	G	G	30	G	G	G	G	G
21	G	G	G	G	G	G	G	33	38	64	G	G	G	G	G	G	G	40	33	58	24	28	G	G
22	G	G	G	30	29	G	28	G	G	G	48	G	G	G	54	52	66	58	46	37	28	G	G	G
23	G	G	G	G	G	30	G	31	G	G	G	G	G	G	G	50	64	57	40	32	32	G	G	G
24	G	G	G	G	G	G	G	32	G	48	50	50	G	G	G	G	38	G	G	38	32	G	G	G
25	38	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	49	53	47	G	33	G	G	G
26	G	G	G	G	G	G	G	G	78	G					G	G	40	36	30	29	G	G	G	37
27	G	G	G	G	G	G	G	G	41	51	48	50	48	71	82	43	58	36	42	32	42	G	36	45
28	G	G	G	G	G	G	G	G	G	43	46	G	51	50	43	44	G	37	31	G	G	G	G	G
29	32	24	G	G	G		G	G	G	43	45	46	G	G	G	G	48	37	30	40	G	G	G	G
30	G	G	G	G	G	G	G	G	40	44	G	G	G	G	G	G	G	38	28	G	G	G	G	G
31	G	G	G	G	G	G	G	32	G	G	G	46	G	G	50	G	41	32	G	48	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	24	26	24	22	23	23	25	25	23	23	23	23	26	25	25	24	27	25	25	26	24	24
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	38	31	33	25	G	G	G
U Q	G	G	G	G	G	G	G	32	39	44	48	46	G	G	50	46	47	54	43	40	34	28	29	27
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

OCT. 1990

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

OCT. 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	140	127	90	78	40	29	34	81	95	105	111	136	158	167	163	167	167	162	157	162	146	145	141	146
2	138	136	110	88	54	42	50	84	106	105	105	122	138	N	167	177	189	189	168	164	143	91	111	90
3	86	75	77	80	52	34	37	88	90	105	122	136	160	170	177	175	173	170	162	159	158	141	142	130
4	128		108	87	81	46	36	84	101	122	113		144	161		157	146	147	150	136	141	111	119	108
5	90	87	83	85	62	38		92	96		134	155	158		170	169	170		146	145	146	145	142	128
6	109	85	99	109	66	52	52	96	119	120	122	127	122	141	156	169	170	170	174	167	168	189	144	108
7	111	103	77	60	53	43	37	108	112	119	144	160	164	177	176	186	186	192	187	176	164	163	135	127
8	122	91	86	84	53	38	43	88	125	112	120	132	158	178	176	186	181	177	170	162	168	170	161	142
9	138	126	96	85	78	53	43	90	117	110	121	129	154	176	190	194	170	164	158	161	161	168	177	160
10	139	90	90	110	86	51	63	104	134	103	104	141	146	148	147	146	146	144	145	144	146	108	88	85
11	86	66	69	64	66	54	62	101	126	142	144	145	138	145	157	146	146	146	146	145	146	145	129	90
12	110	110	71	51	54	43	43	88	122	128	132	121	121	144	151	146	146	143	140	143	144	145	142	N
13	109	109	90	82	53	34	53	88	110	130	146	147	152	161	160	164	155	154	146	145	155	145	146	165
14	140	144	86	85	84	55	48	83	126	145	151	145	145	159	166	161	161	164	160	161	167	172	145	119
15	136	110	90	83	61	54	58	96	110	140	145	144	156	162	168	163	156	145	141	138	146	144	141	110
16		85	88	86	66	54	66	86	142	164	160	152	164	172	102	175	165	162	164	162	160	166	145	160
17	179	162	130	110	83	62	58	90	109	137	138	132	132	146	163	155	143	134	121	104	110	107	108	88
18	111	82	78	81	63		38	88	107	121	138	132	132	146	163	155	143	134	121	104	110	107	108	88
19	111	82	78	81	63		38	88	107	121	147	147	154	N	178	184	175	175		170	178	176	165	169
20	182	166	144	110	80	57	62	97	107	122	138	138	133	146	152	147	143	139	142	139	146	174	170	141
21	93	86	76	72	78	52	42	90	110	121	130	138	151	162	163	156	154	161	162	160	160	170	162	128
22	110	110	88	84	76	54	54	90	120	142	147	160	166	178	180	185	177	177	179	176	188	202	187	N
23	144	147	110	110	88	66	74	105	108	130	141	147	126	140	151	146	147	144	145	144	145	166	146	109
24	86	87	89	86	73	46	34	77	107	129	147	144	136	145	158	144	142	144	143	134	135	132	108	88
25	86	80	77	83	87	46	43	88	122	136	141	159	147	164		160	157	164	166	146	144	146	128	110
26	96	88	84	89	88	42	33	82	105	122	137	146	126									146	142	93
27	107	85	76	85	84	66	78	106	122	134	142	145	145	164	165	166		170	172	170	179	179	163	129
28	125	88	74	52	54	54	53	76	104	126	146	152	137	143	160	165	160	167	N	181	197	178	166	90
29	81	77	62	67	50	24	30	81	108	107	116	136	128	134	146	144	136	130	133	130	126	108	90	97
30	84	79	49	54	46	37	37	63	96	105	151	146	126	142	163	158	133	127	131	136	119	128	108	85
31	68	71	54	75	64	25	32	79	92	108	138	150	132	146	147	155	145	157	146	144	145	146	108	108
	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	31	31	31	29	30	31	31	30	31	30	31	27	28	30	29	29	28	30	30	31	31	29
MED	110	88	86	84	66	46	43	88	109	122	138	144	145	159	163	162	156	161	148	146	146	146	142	110
U Q	138	110	90	87	81	54	58	96	122	134	146	147	156	167	169	175	170	170	165	162	164	170	161	135
L Q	90	82	76	75	54	38	37	83	105	110	122	136	132	145	154	155	145	144	142	139	144	132	111	90

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

OCT. 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	23	G	G	G	G	G	G	30	56	45	64	47	G	G	47	45	52	G	G	44	37	G	G	G
2	G	G	G	G	G	G	G	32	40	44	G	49	G	G	62	69	G	G	32	29	G	G	G	G
3	G	G	G	G	G	G	G	39	45	44	44	G	G	G	G	G	G	G	27	G	G	G	G	G
4	G		G	G	G	G	G	34	39	44	69		52	G		44	80	72	68	92	67	G	G	G
5	G	G	G	23	28	G		35	38		G	G	G		G	43	G		32	26	G	G	G	29
6	G	G	G	G	G	G	G	32	G	G	G	51	53	57	G	43	70	50	39	40	28	24	G	G
7	G	24	G	G	G	G	G	G	39	G	G	G	G	G	G	G	G	57	40	30	G	27	G	G
8	G	G	G	G	G	G	G	32	G	44	47	66	58	54	58	54	46	42	27	29	25	G	G	G
9	G	G	G	G	G	G	G	30	39	43	G	G	G	G	G	49	56	54	29	25	G	41	32	G
10	G	G	G	G	G	G	G	G	42	44	58	59	54	52	65	G	51	46	39	44	30	28	30	G
11	G	G	G	G	G	G	G	30	41	G	54	66	86	132	114	57	48	56	38	37	65	24	G	G
12	G	G	G	G	G	G	G	31	42	49	56	62	58	64	69	66	57	51	48	46	29	34	31	44
13	G	G	G	G	G	G	G	31	40	50	53	85	G	G	50	44	40	43	39	36	24	G	24	G
14	G	G	G	29	25	G	G	30	40	G	61	G	52	G	G	43	43	G	G	G	G	G	25	30
15	28	28	G	G	28	G	G	30	42	44	46	G	G	G	45	52	80	62	63	58	29	25	G	G
16		30	33	G	G	G	G	34	37	G	G	46	48	54	G	G	G	33	62	69	32	25	30	27
17	G	G	G	G	G	G	G	34	39	G	51	56	71	G	G	43	58	50	48	36	45	38	33	32
18	27	25	G	G	G		G	G	38	46	51	56	71	G	G	43	58	50	48	36	45	38	33	32
19	27	25	G	G	G		G	G	38	46	51	48	G	G	G	44	43	G	26	G	G	G	G	G
20	G	G	G	G	24	25	25	G	G	G	G	G	G	G	G	46	43	34	25	24	24	G	G	25
21	30	26	28	25	G	G	G	33	43	50	64	58	57	G	G	G	G	50	44	40	28	29	G	G
22	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	37	58	G	G	G	G
23	G	G	G	G	23	G	G	32	36	46	47	G	82	46	53	44	39	39	50	G	23	32	29	G
24	G	G	G	G	G	G	G	28	40	68	53	58	64	50	47	63	69	92	72	72	27	29	G	G
25	G	G	G	G	G	G	G	34	39	46	50	55	G	63	65	G	39	68	32	24	30	40	30	33
26	G	G	G	G	G	G	G	G	G	40	48	52	G									G	G	G
27	G	G	G	G	G	G	G	G	42	55	137	70	85	58	63	77	68	60	27	G	G	37	33	33
28	27	32	27	G	G	G	G	30	39	47	143	96	76	64	58	47	G	G	G	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	G	70	G	58	G	53	57	44	36	32	30	G	G	G
30	G	G	G	G	G	G	G	45	G	58	47	56	G	G	G	47	G	57	G	35	28	G	G	G
31	G	G	G	G	G	G	G	G	39	42	45	51	G	G	48	G	43	41	29	G	31	30	G	27
	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	31	31	31	29	30	31	31	30	31	30	31	29	29	30	30	29	30	30	30	31	31	31
MED	G	G	G	G	G	G	G	30	39	44	48	52	G	G	G	44	43	46	36	34	28	24	G	G
U Q	G	G	G	G	G	G	G	33	41	46	56	59	58	55	58	52	57	56	48	44	30	30	30	27
L Q	G	G	G	G	G	G	G	G	36	G	G	G	G	G	G	G	G	33	27	24	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

OCT. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	15	18	23	29	27	27	28	28	26	22	28	15	15	15	15	15	15
2	15	15	15	15	15	15	15	15	15	17	23	32	29	27	28	23	17	15	15	15	16	15	15	15
3	15	15	15	15	15	15	15	15	15	26	27	33	33	33	29	26	26	15	15	15	15	15	15	15
4	15		15	15	15	15	15	15	18	26	29		30	32		26	21	16	14	15	15	15	15	15
5	15	15	15	15	15	15		15	16		26	28	30		29	27	18		15	16	15	15	16	15
6	16	15	15	15	15	15	15	15	16	23	26	27	32	29	38	22	22	16	15	15	15	15	15	15
7	15	15	15	15	15	15	15	15	15	26	26	40	33	46	33	24	23	16	15	16	15	16	16	16
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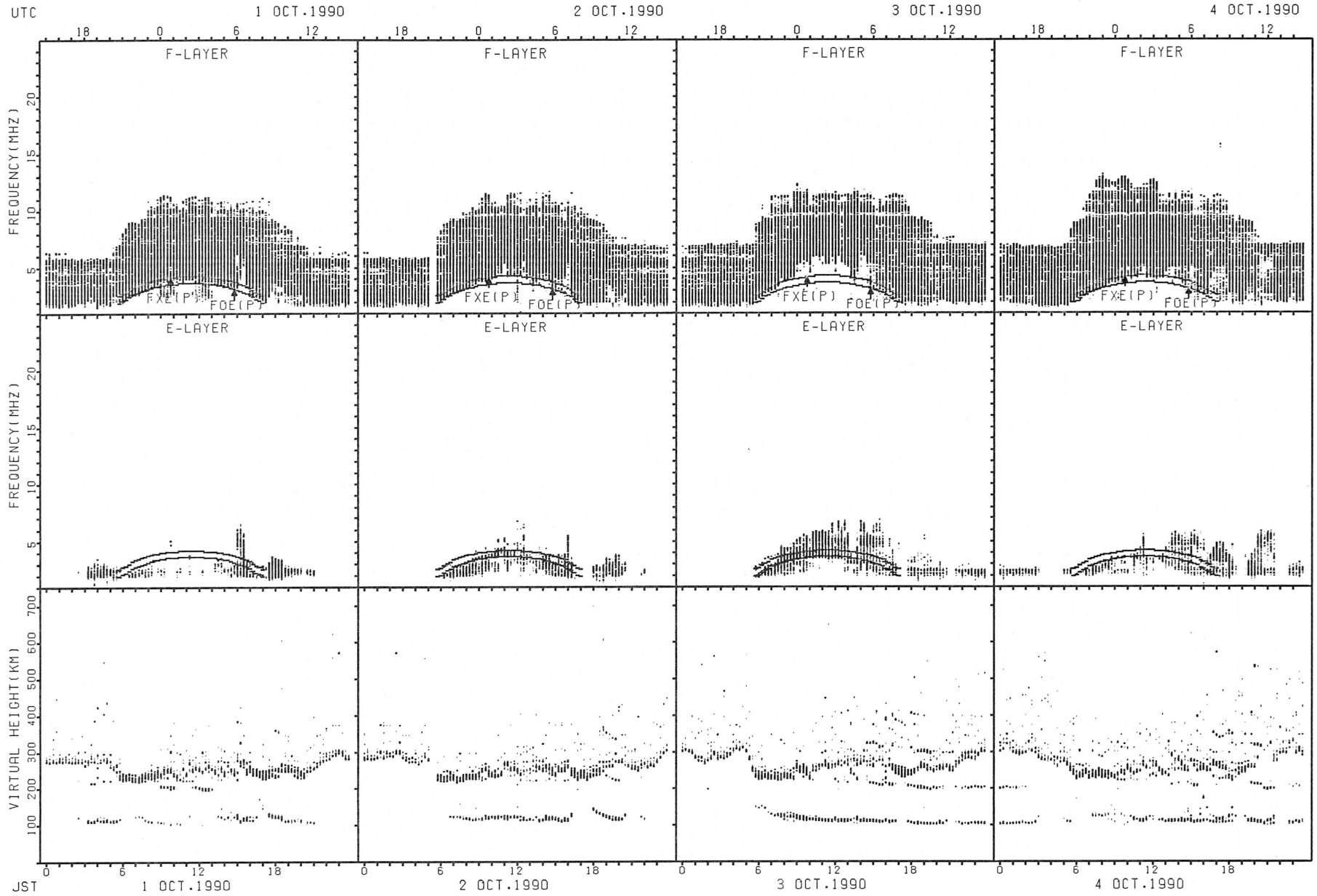
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	31	31	31	28	30	31	31	30	31	30	31	29	29	30	30	29	30	30	30	31	31	31
MED	15	15	15	15	15	15	15	15	16	22	26	29	29	29	28	26	21	16	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	15	17	26	27	32	33	33	29	27	23	16	15	15	15	15	15	15
L Q	15	15	15	15	15	15	15	15	15	21	24	27	28	27	27	23	18	15	14	15	15	15	15	15

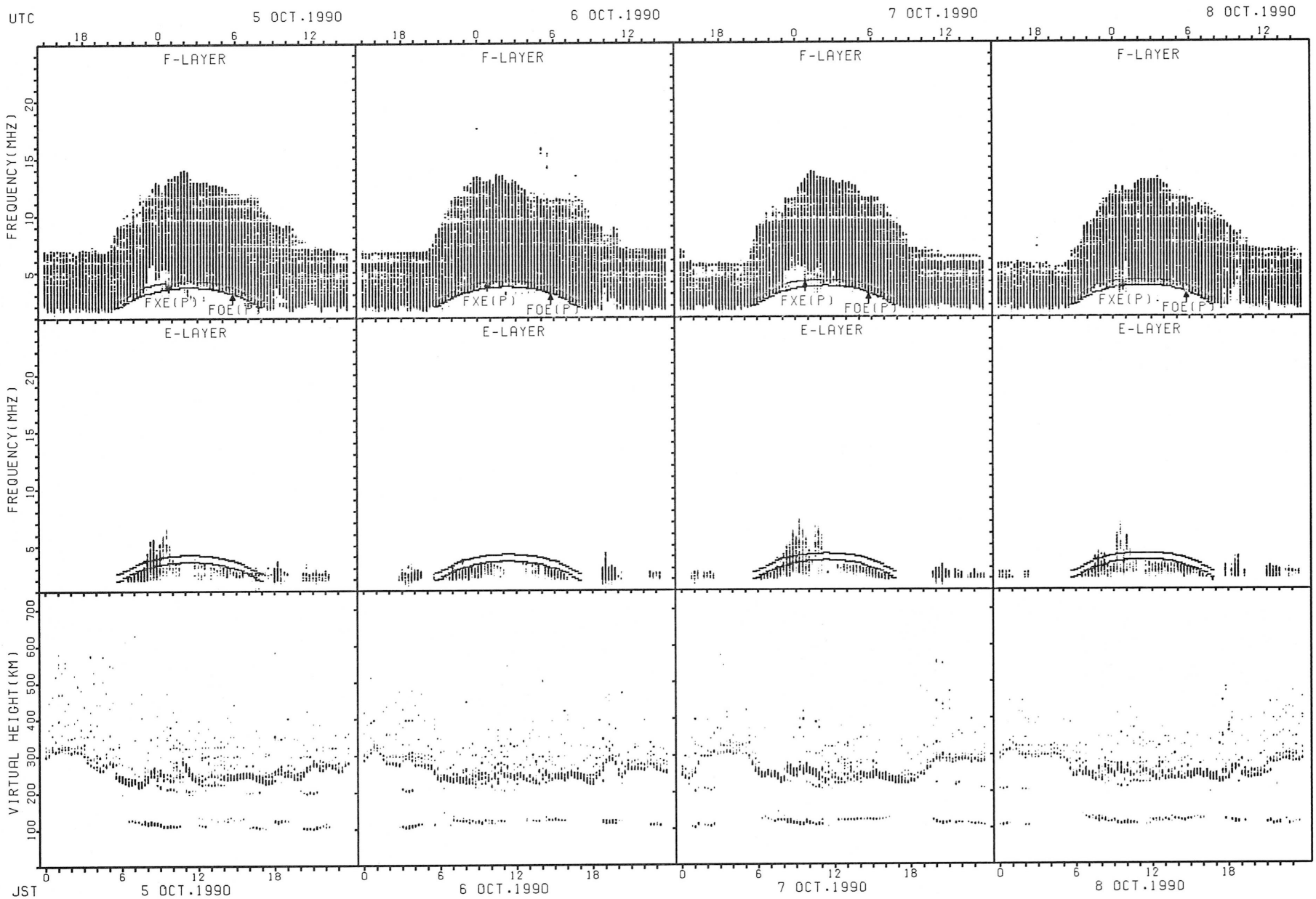
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

SUMMARY PLOTS AT WAKKANAI

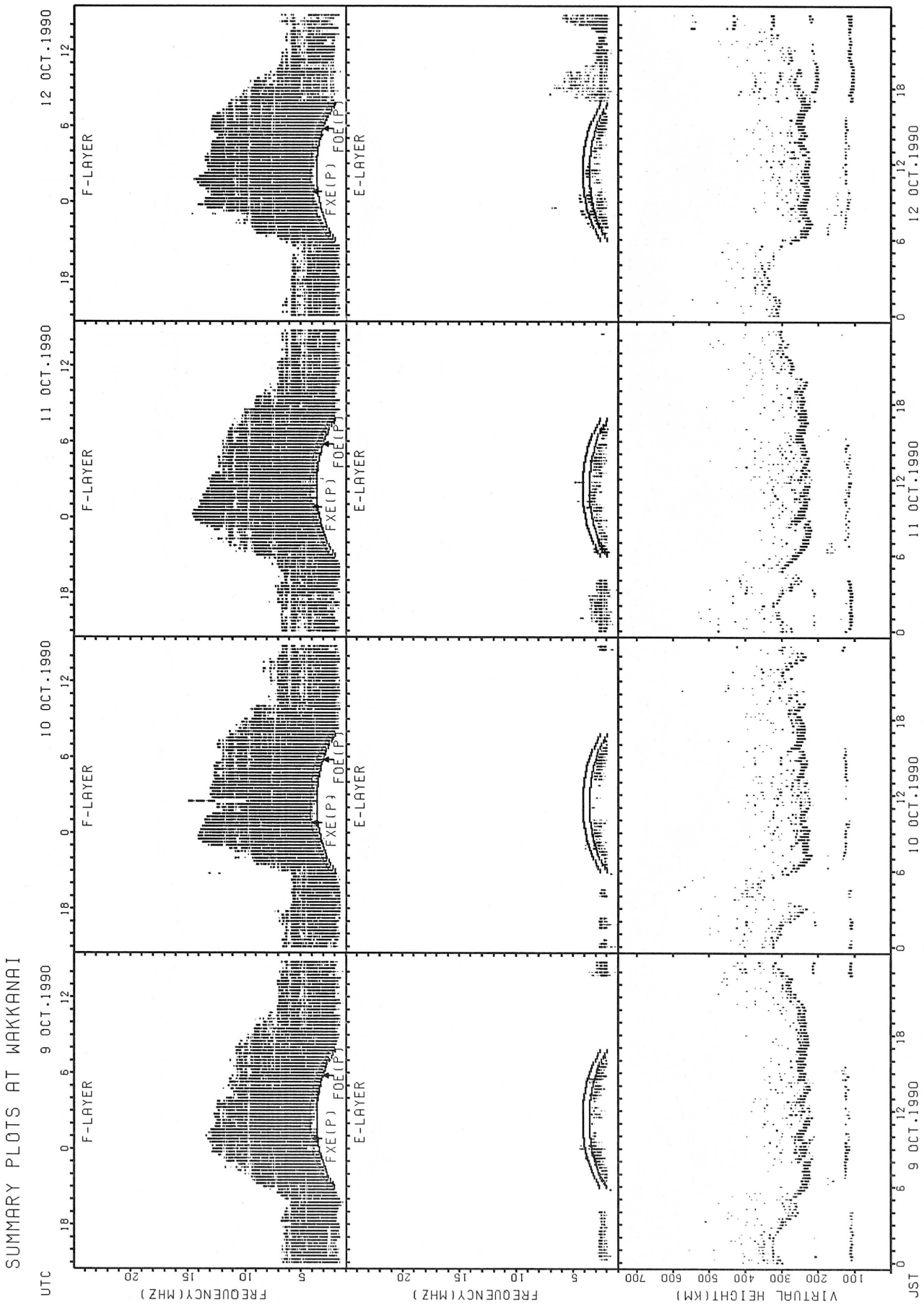


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

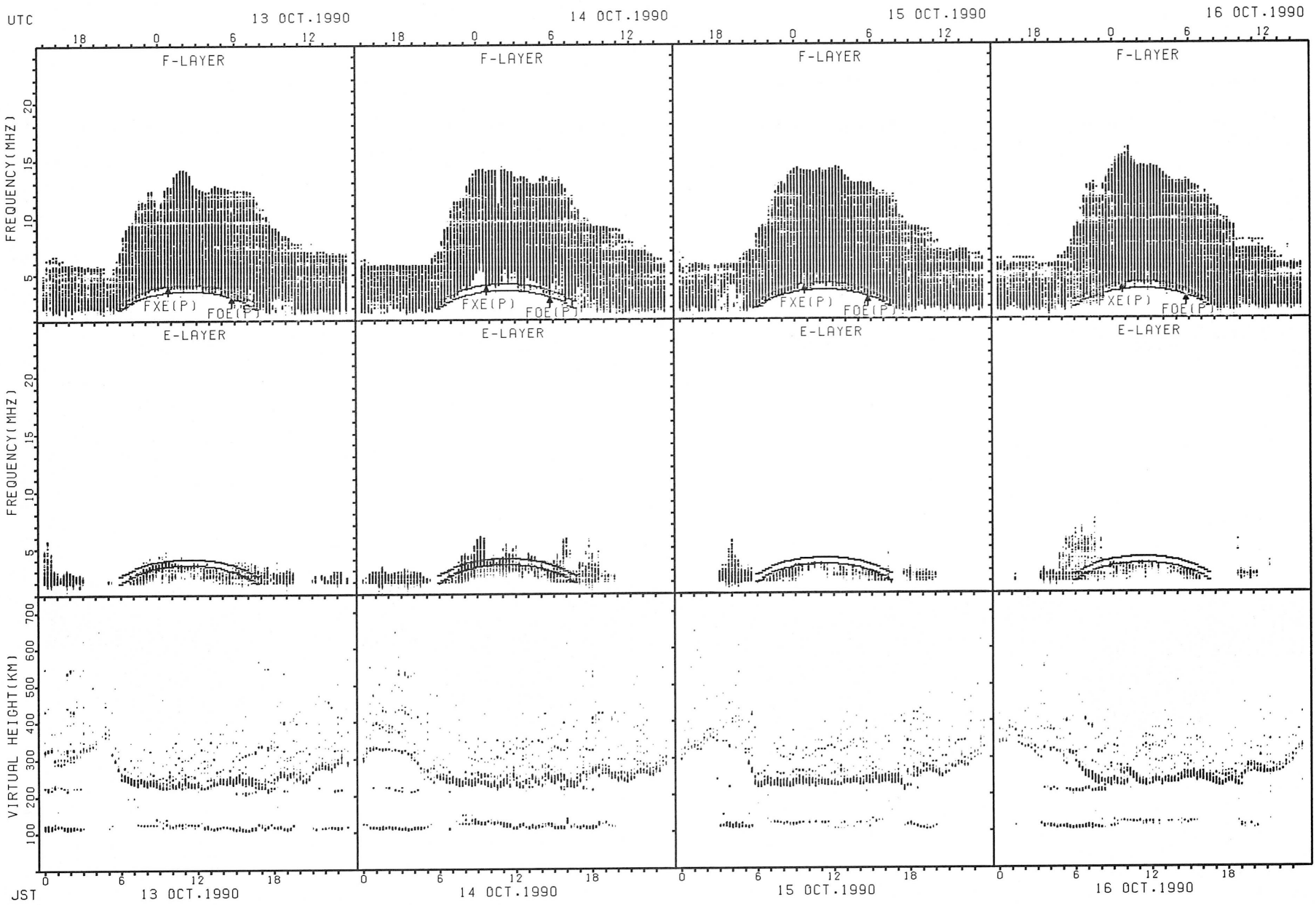
SUMMARY PLOTS AT WAKKANAI



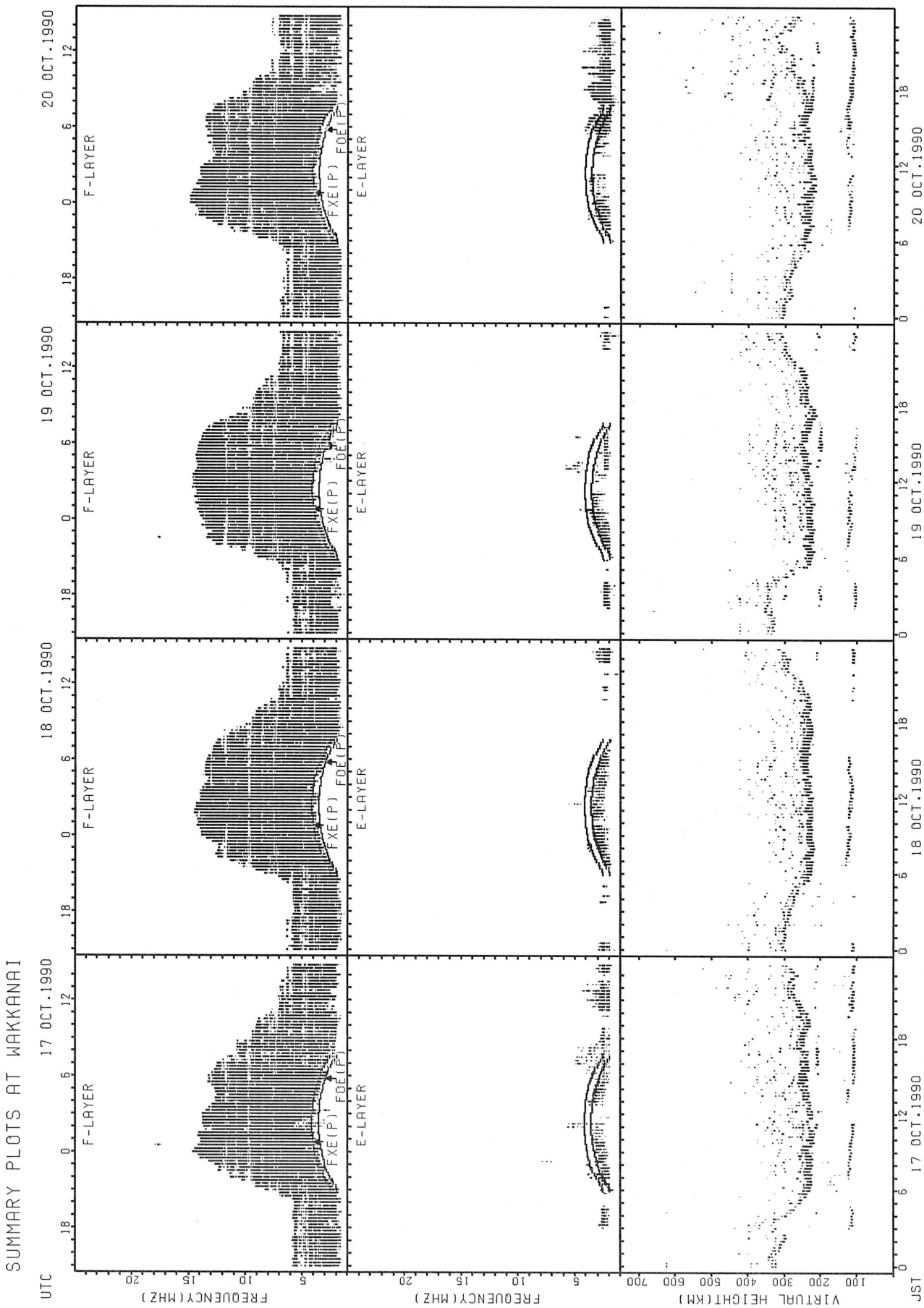
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

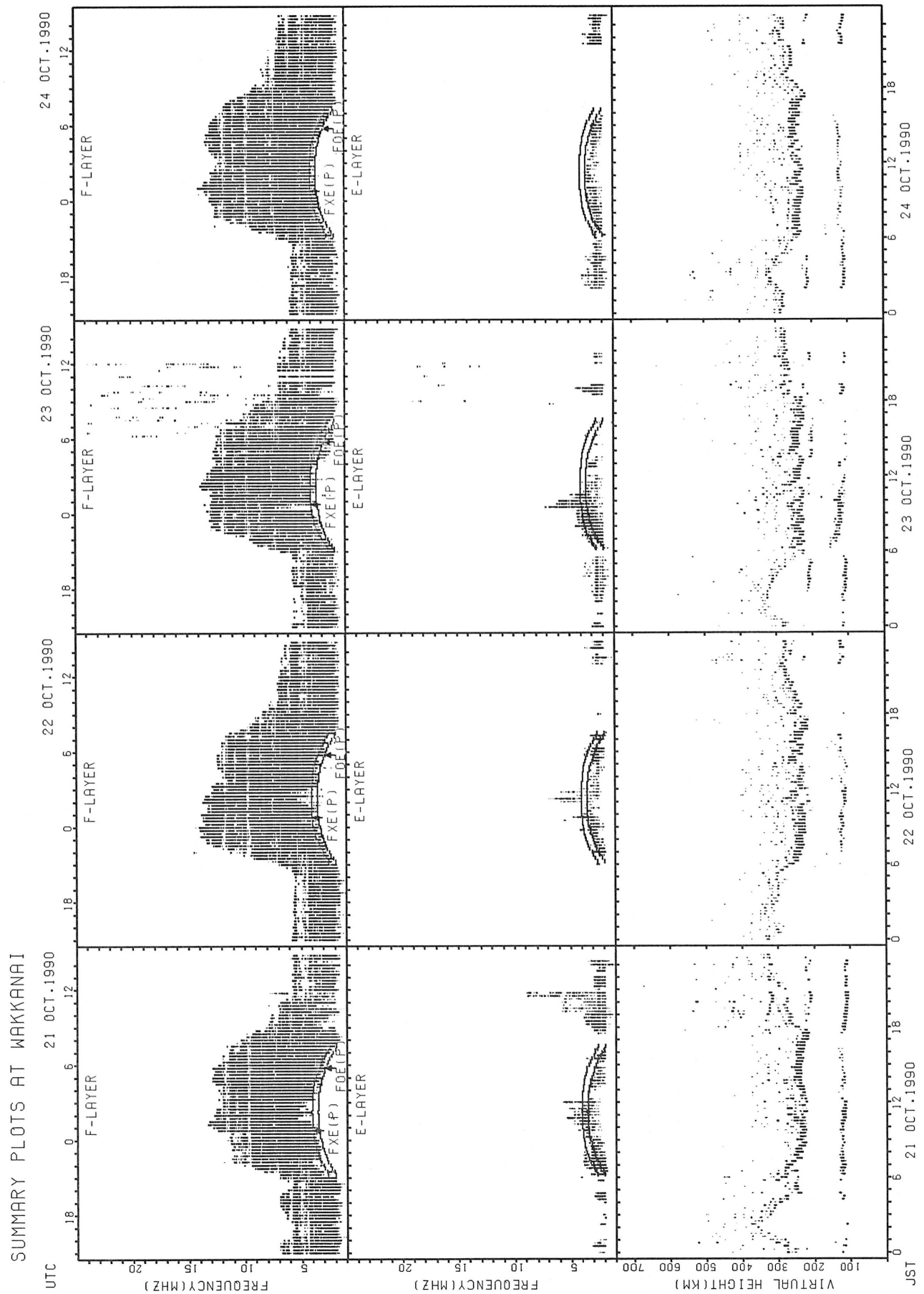

SUMMARY PLOTS AT WAKKANAI
UTC
JST
9 OCT.1990
10 OCT.1990
11 OCT.1990
12 OCT.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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


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


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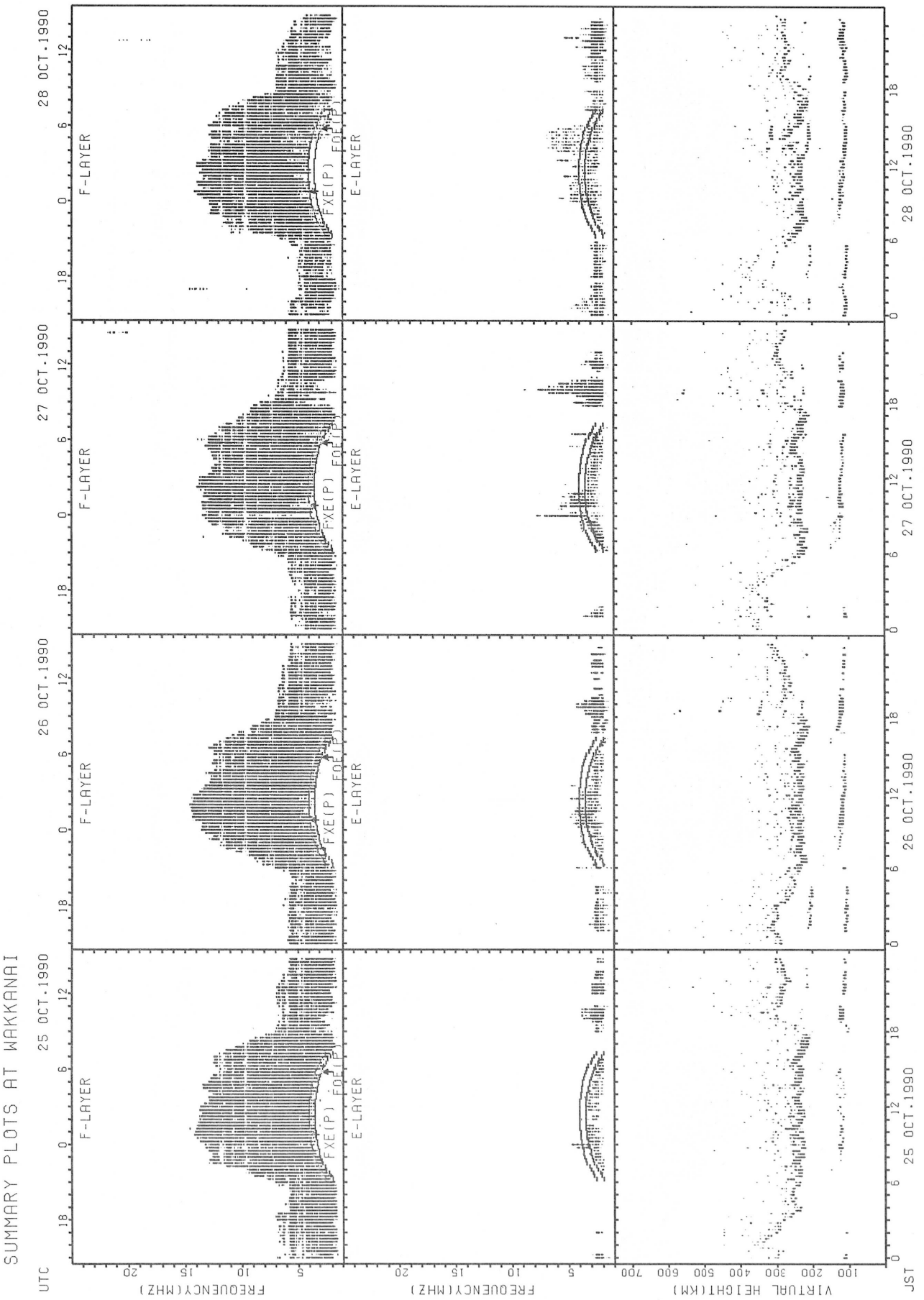
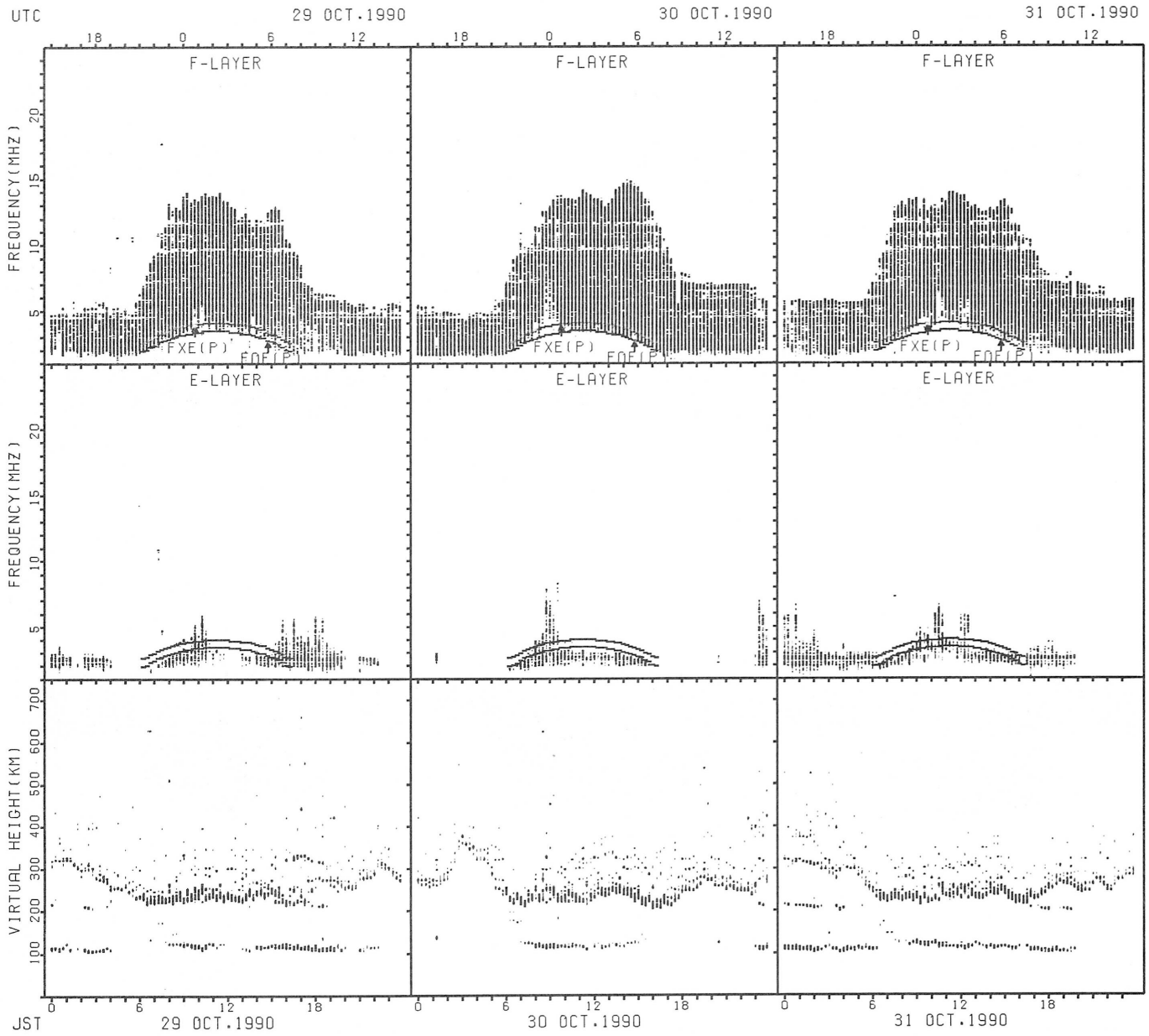
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

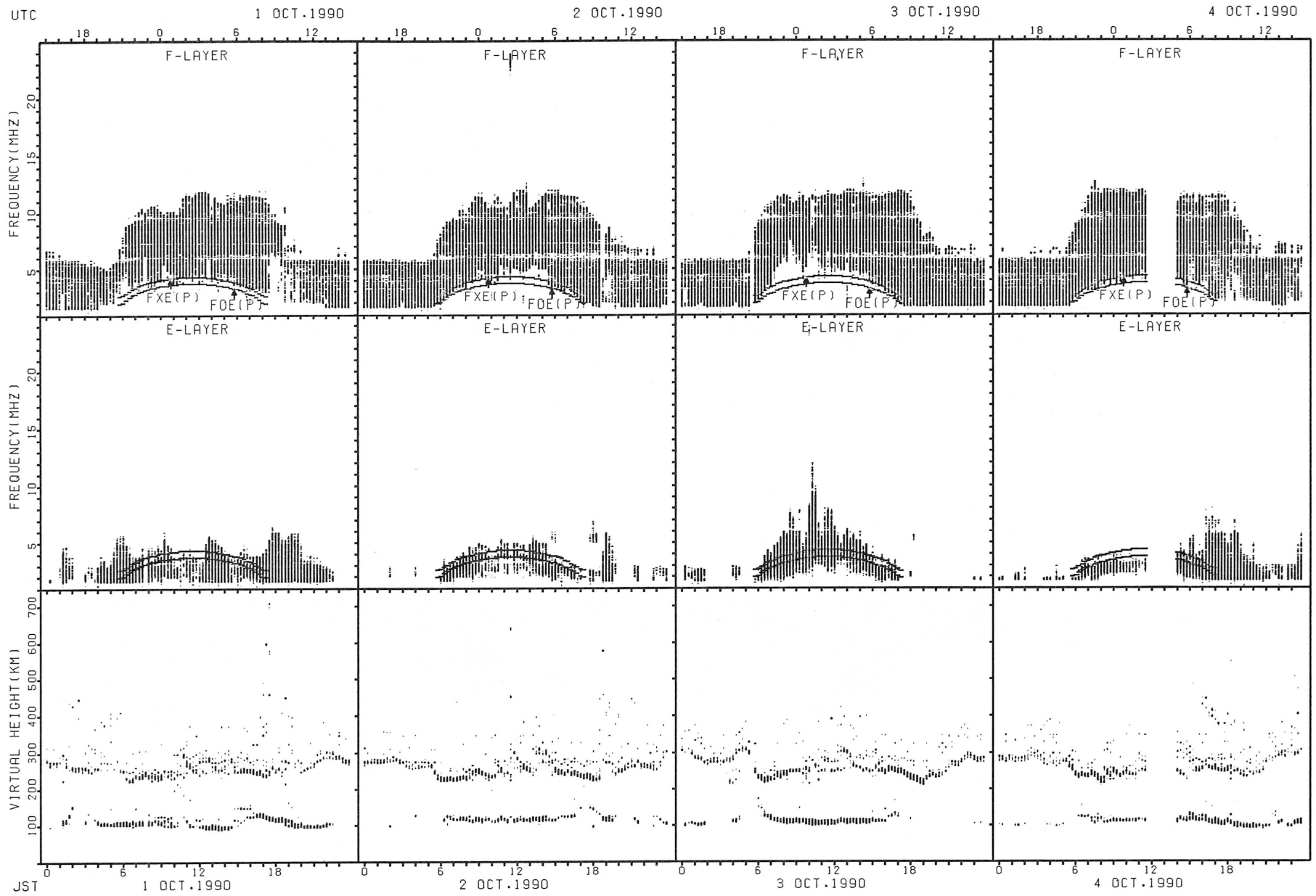

SUMMARY PLOTS AT WAKKANAI
UTC
25 OCT.1990
26 OCT.1990
27 OCT.1990
28 OCT.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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

SUMMARY PLOTS AT AKITA



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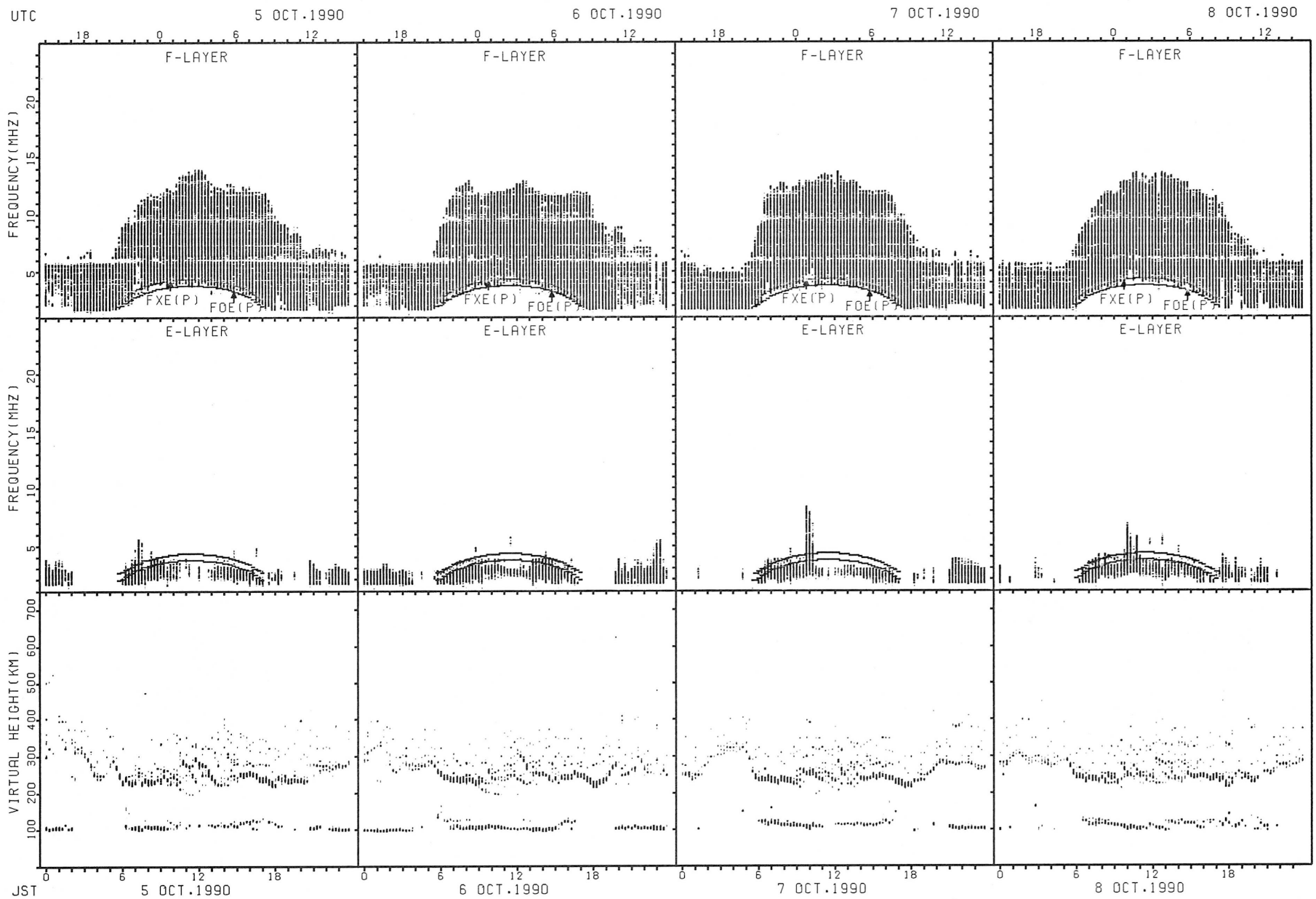
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



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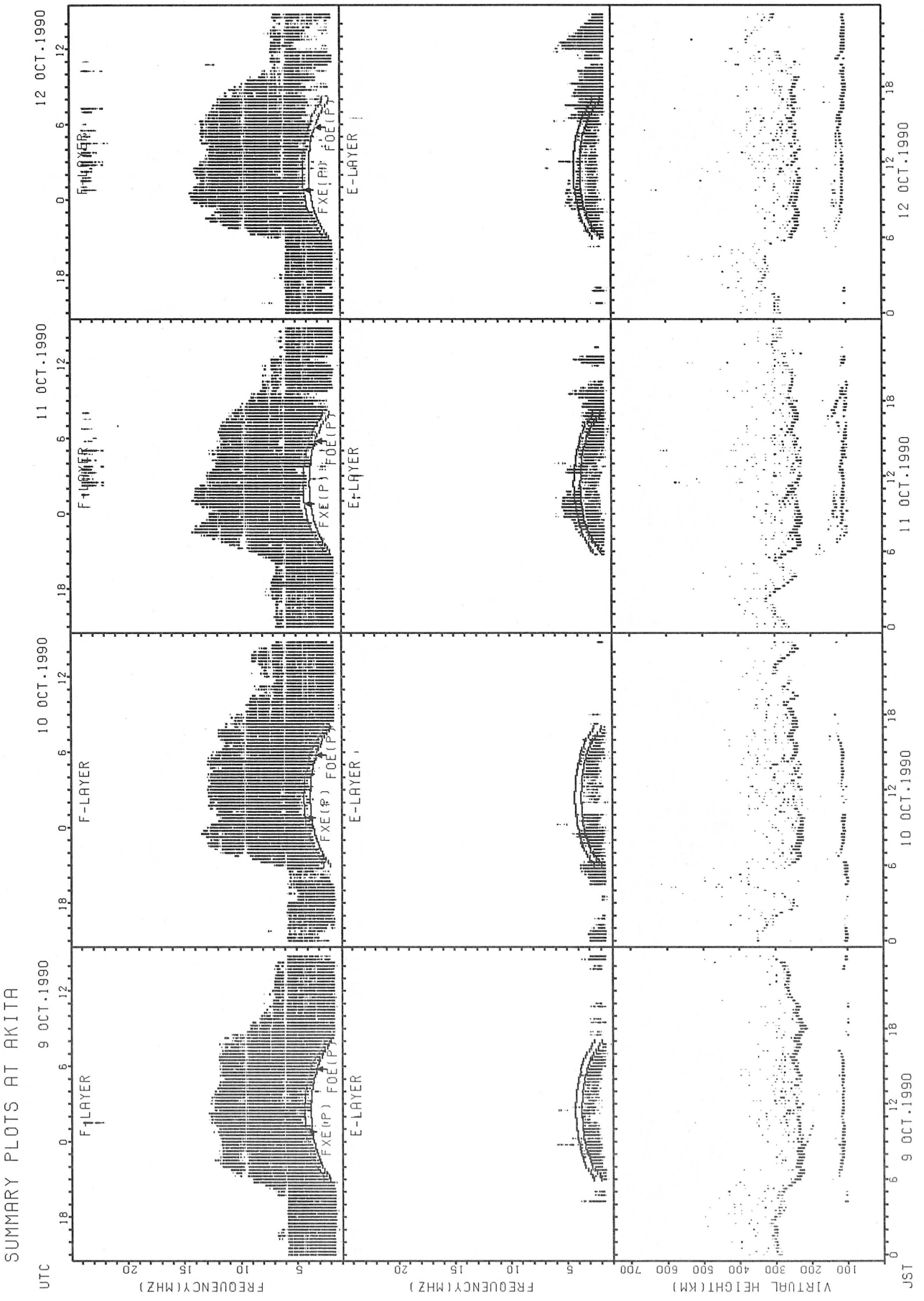
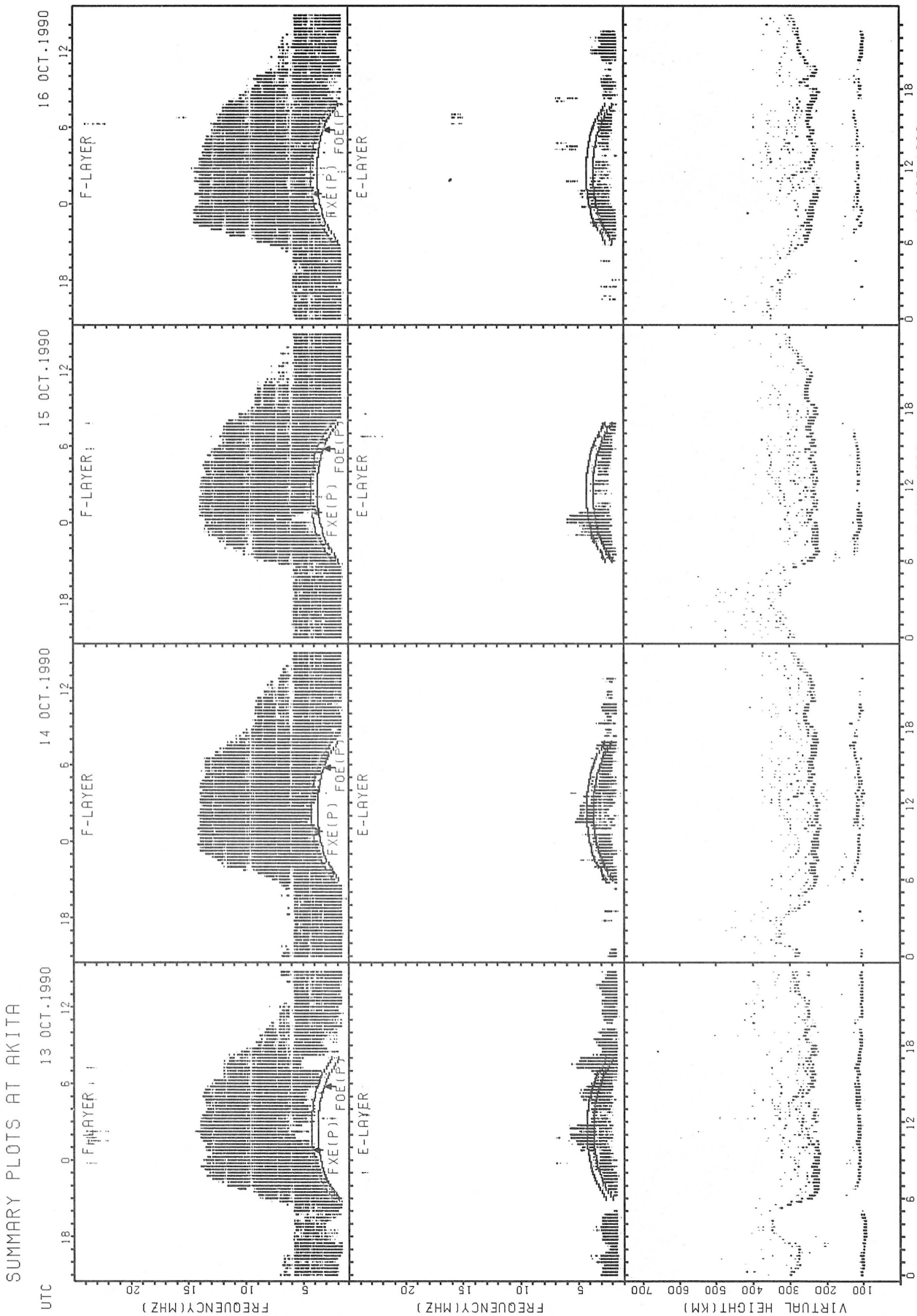
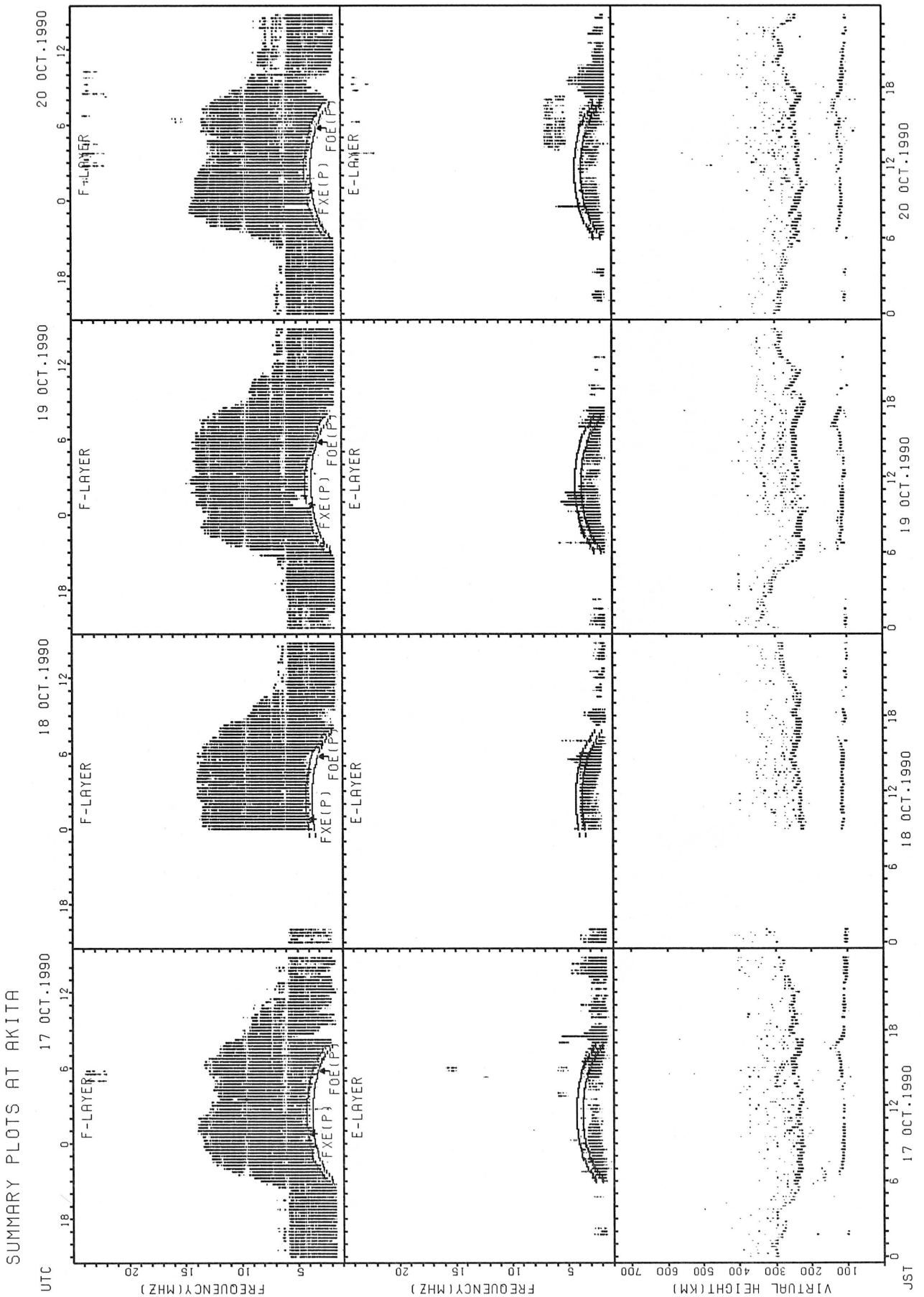
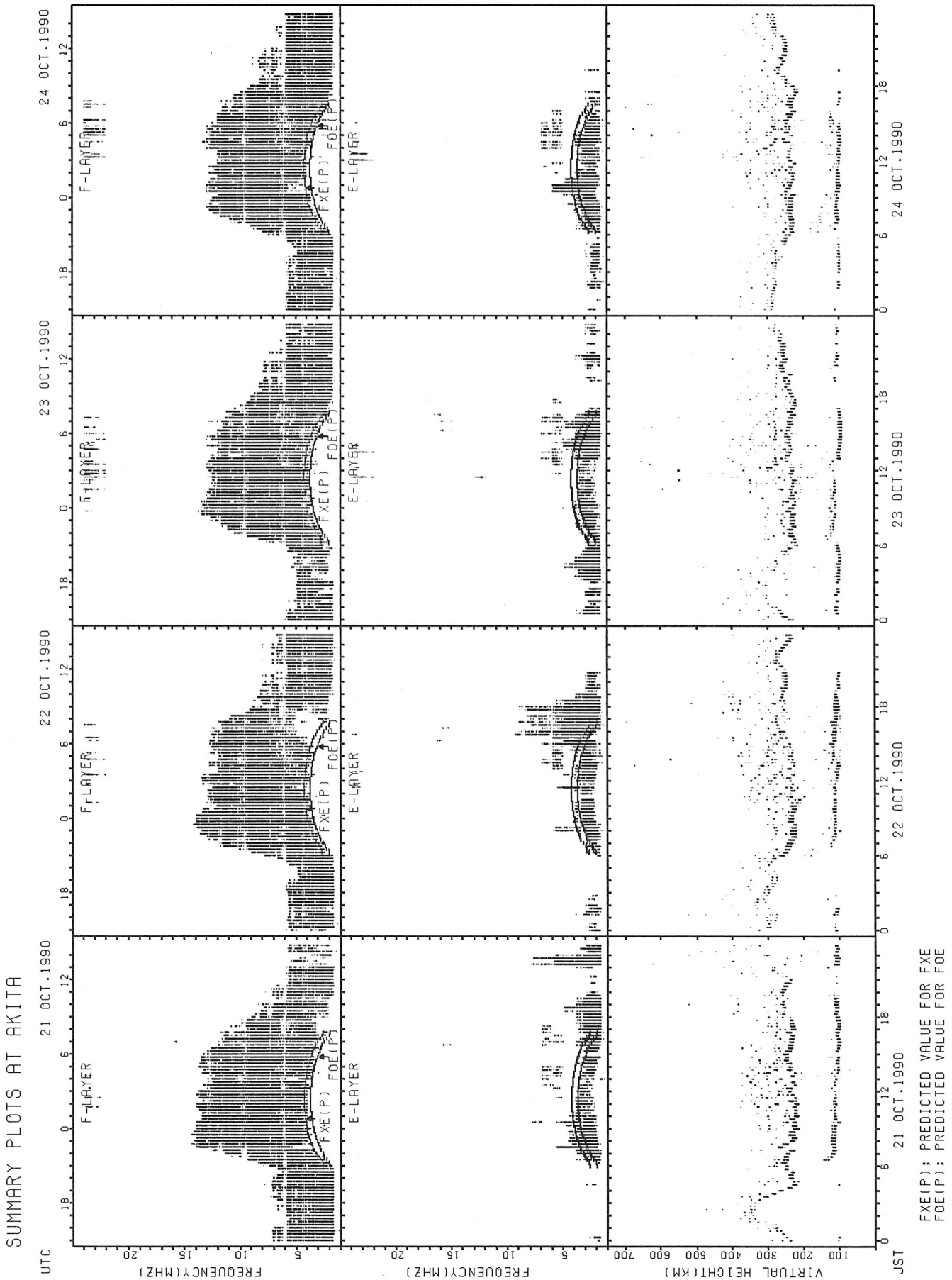
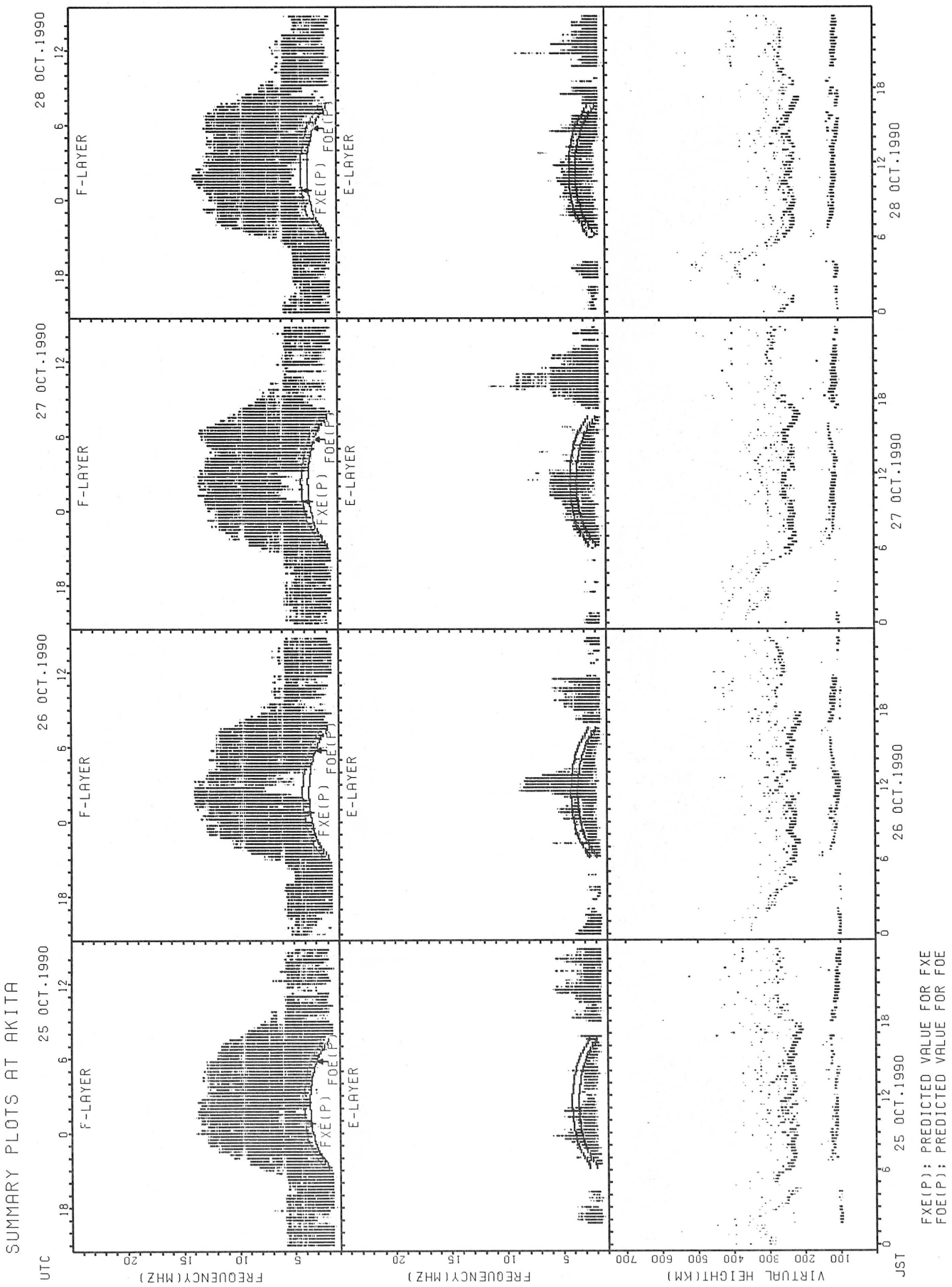
FOE(P): PREDICTED VALUE FOR FOE

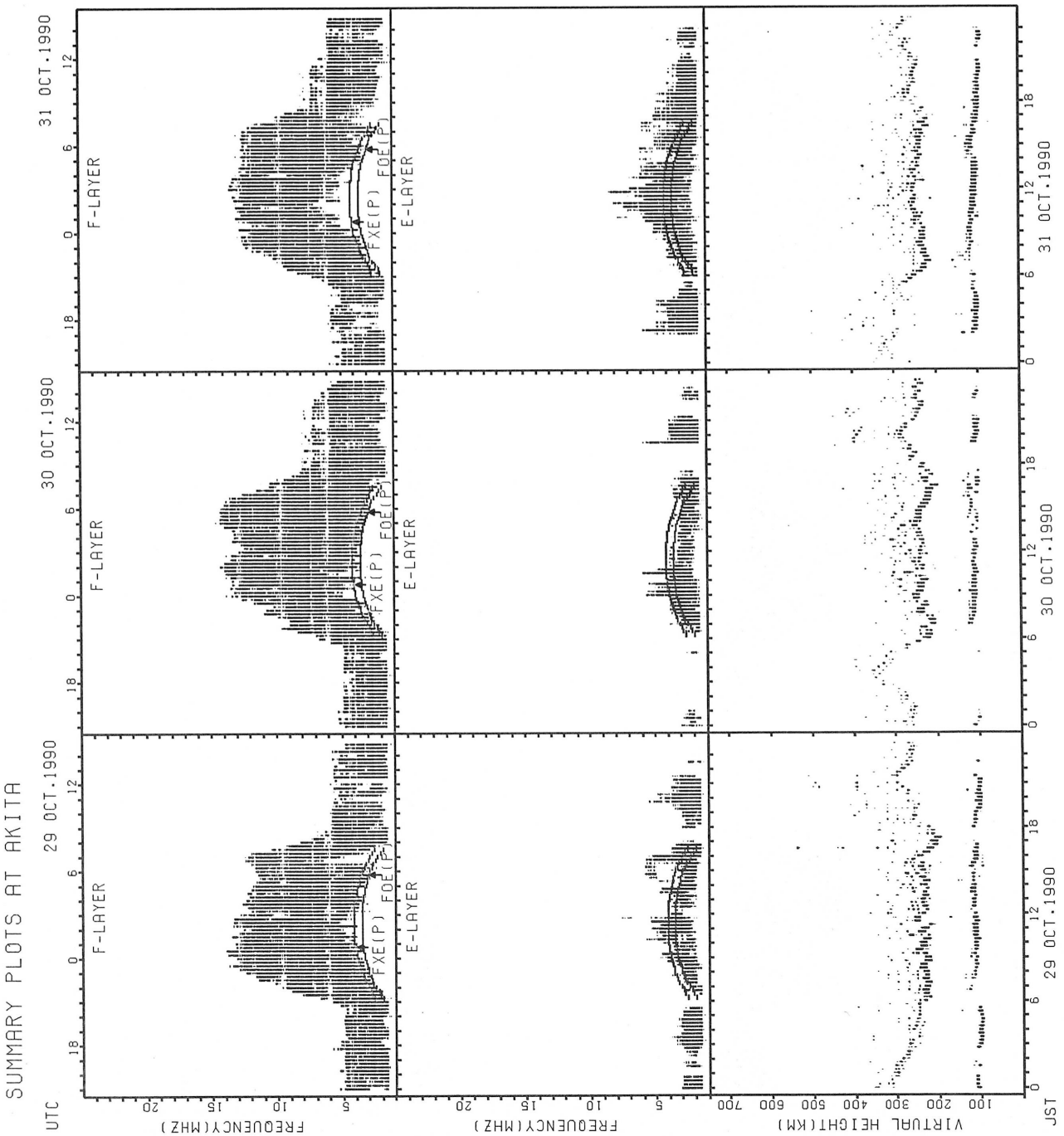

SUMMARY PLOTS AT AKITA
UTC
JST
9 OCT.1990
10 OCT.1990
11 OCT.1990
12 OCT.1990
F1-LAYER
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P) FOE(P)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

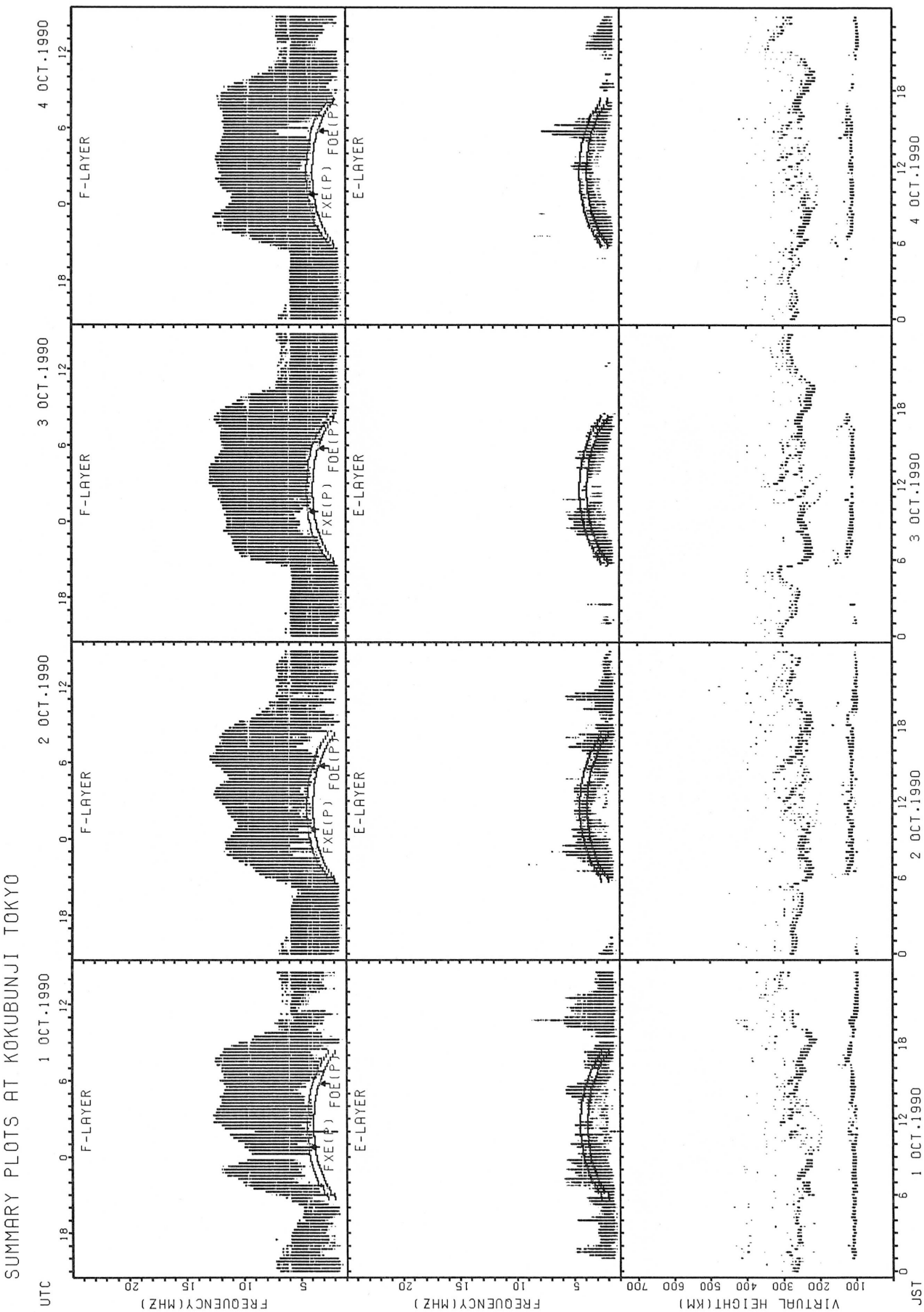

SUMMARY PLOTS AT AKITA
UTC
13 OCT.1990
14 OCT.1990
15 OCT.1990
16 OCT.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

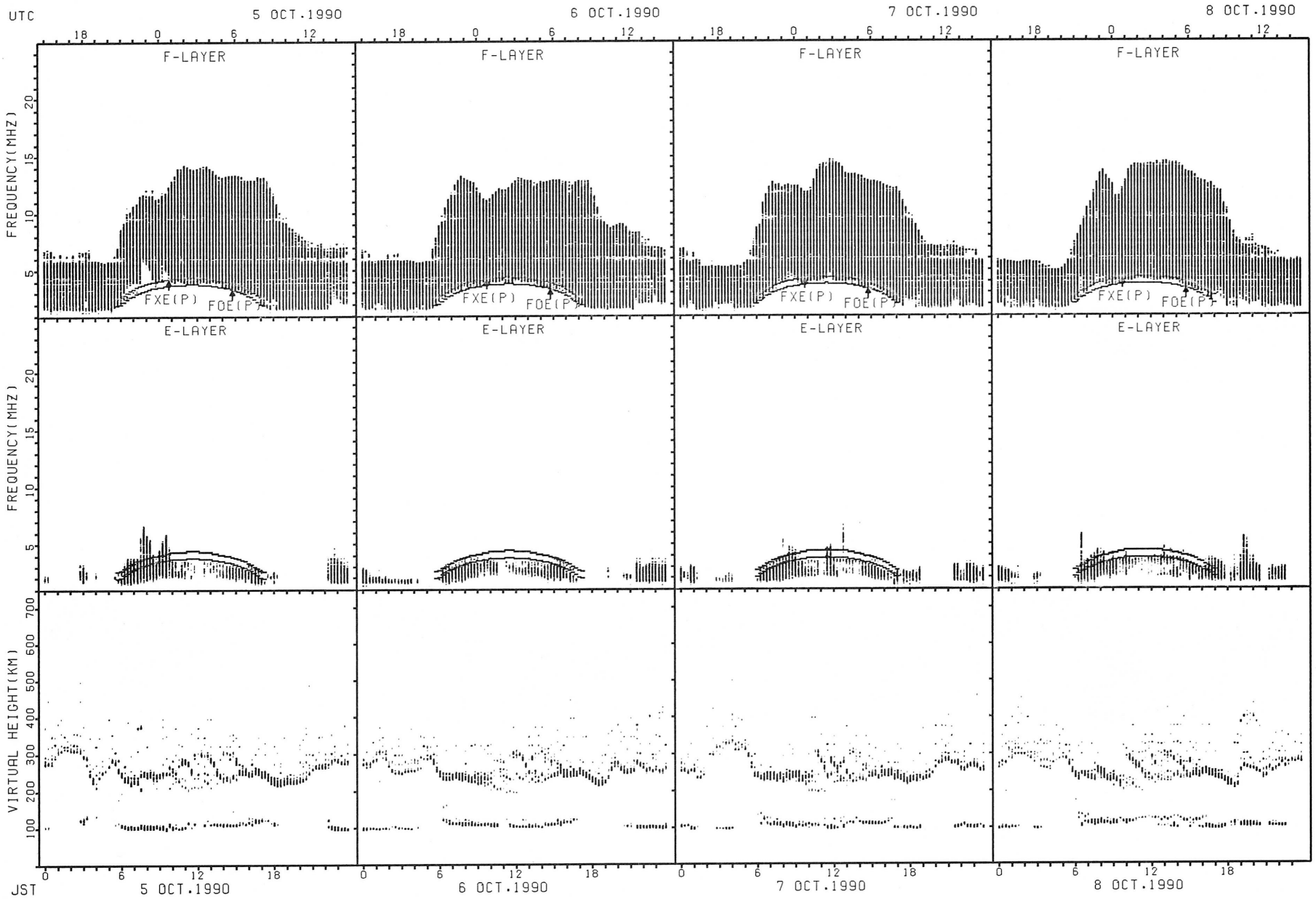

SUMMARY PLOTS AT AKITA
UTC
JST
21 OCT.1990
22 OCT.1990
23 OCT.1990
24 OCT.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
25 OCT.1990
26 OCT.1990
27 OCT.1990
28 OCT.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
29 OCT.1990
30 OCT.1990
31 OCT.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

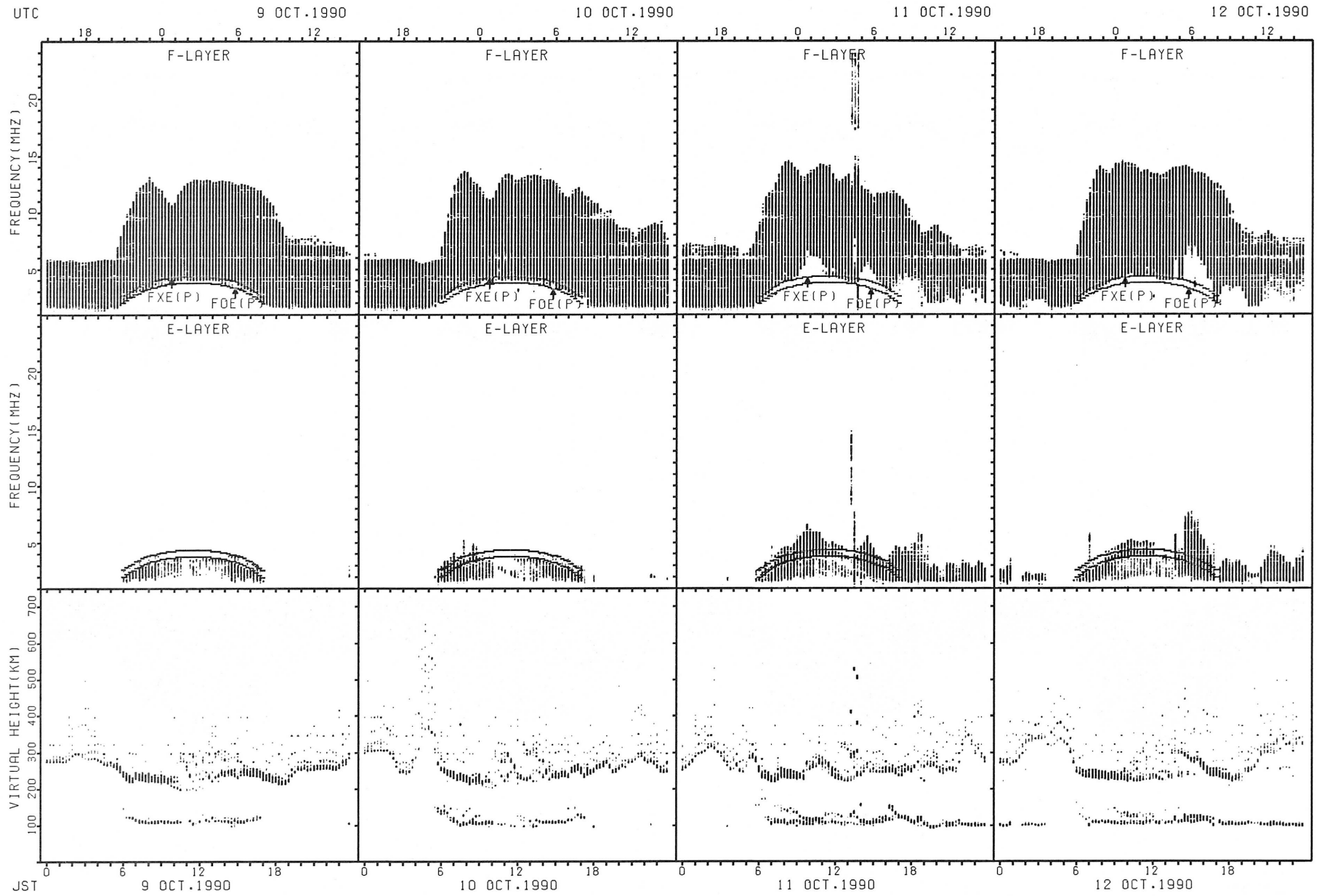

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 OCT.1990
2 OCT.1990
3 OCT.1990
4 OCT.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



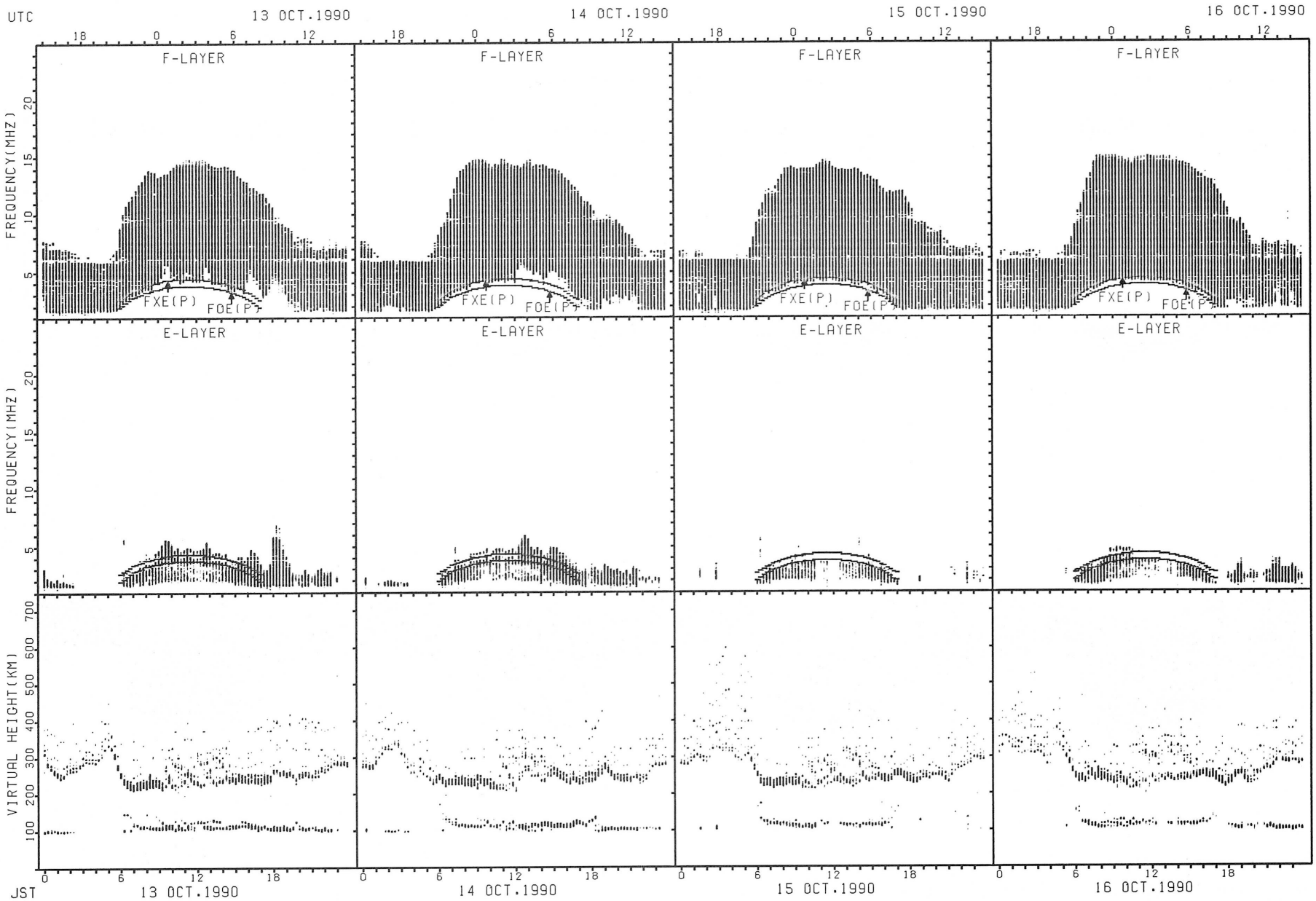
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



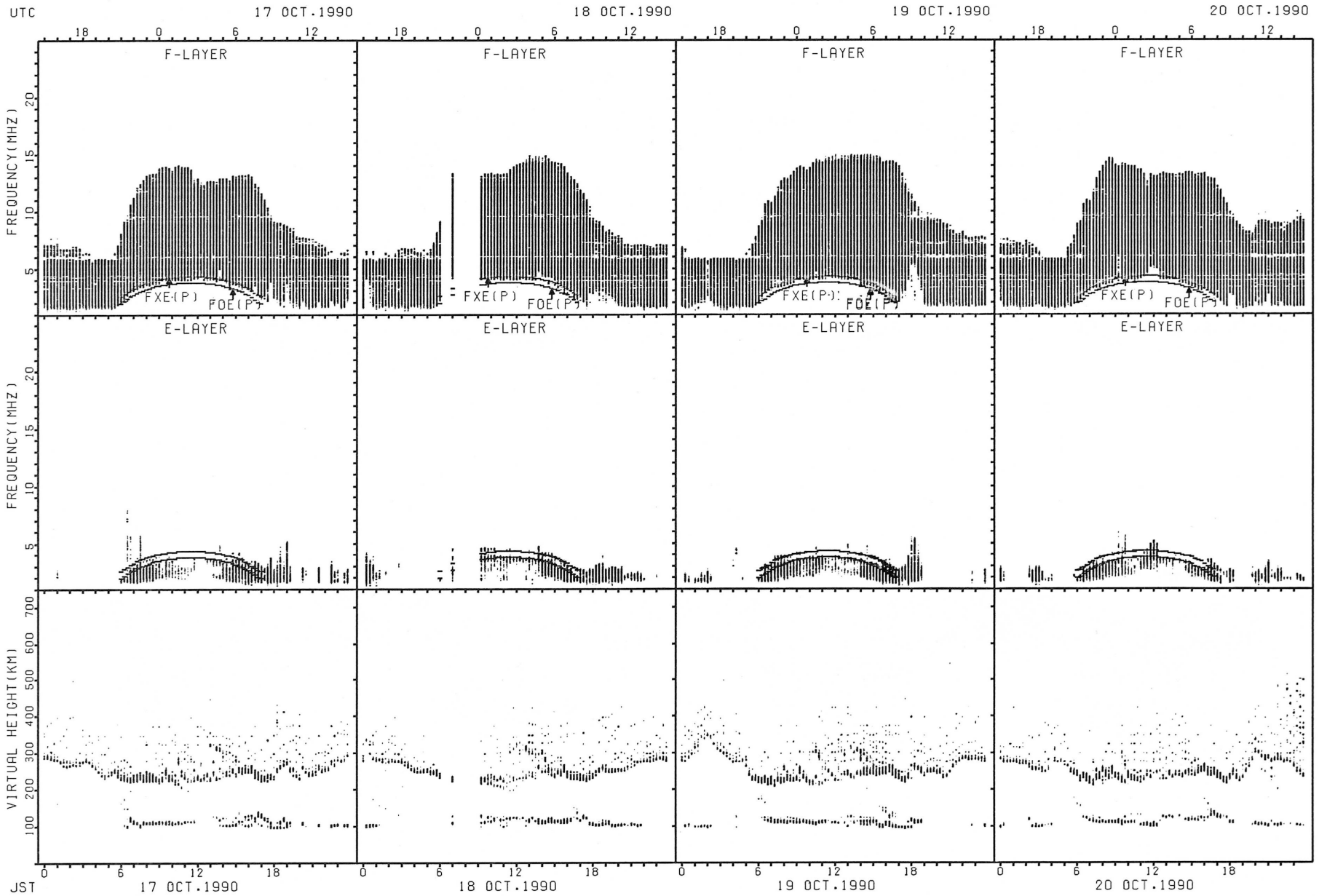
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



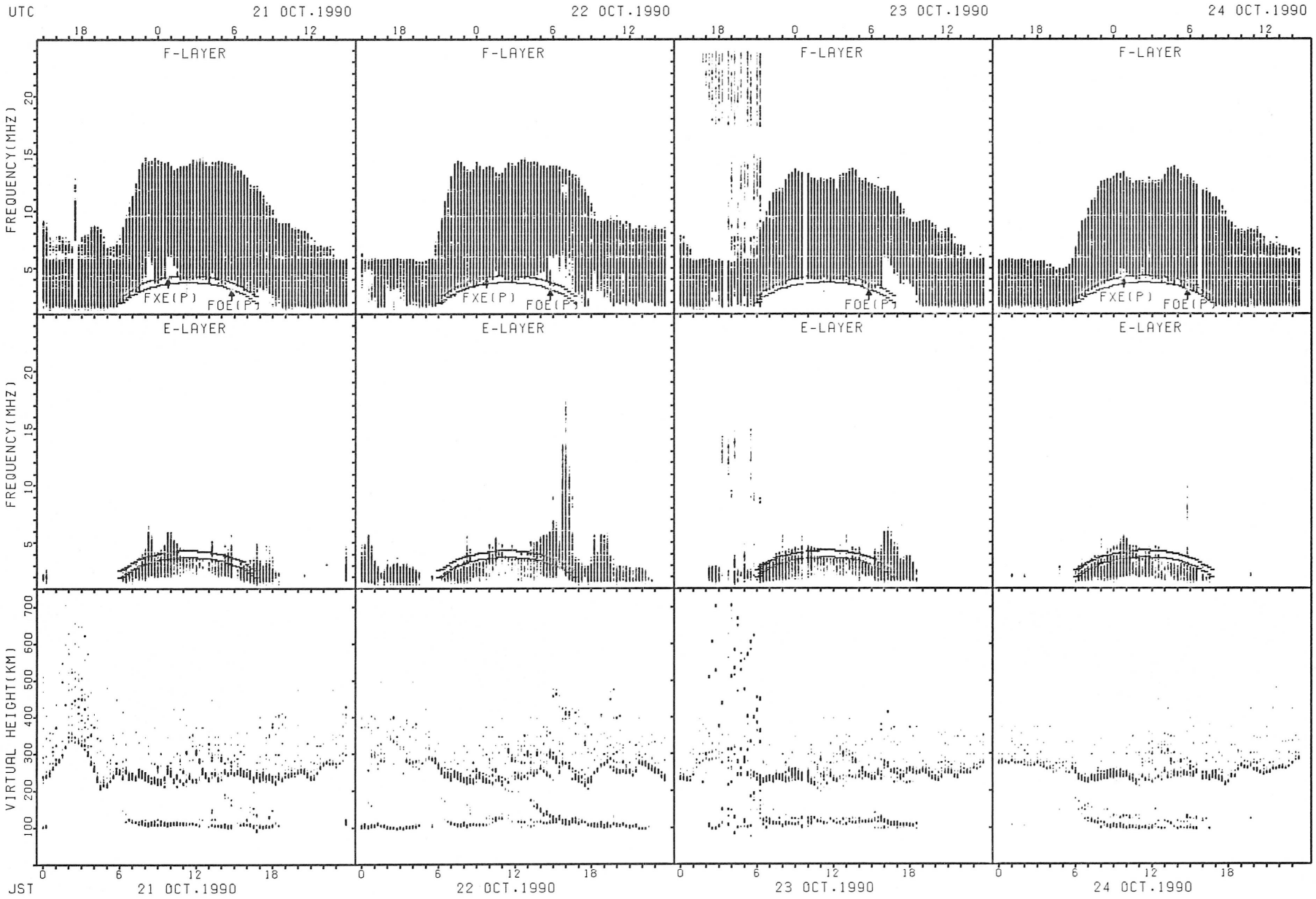
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

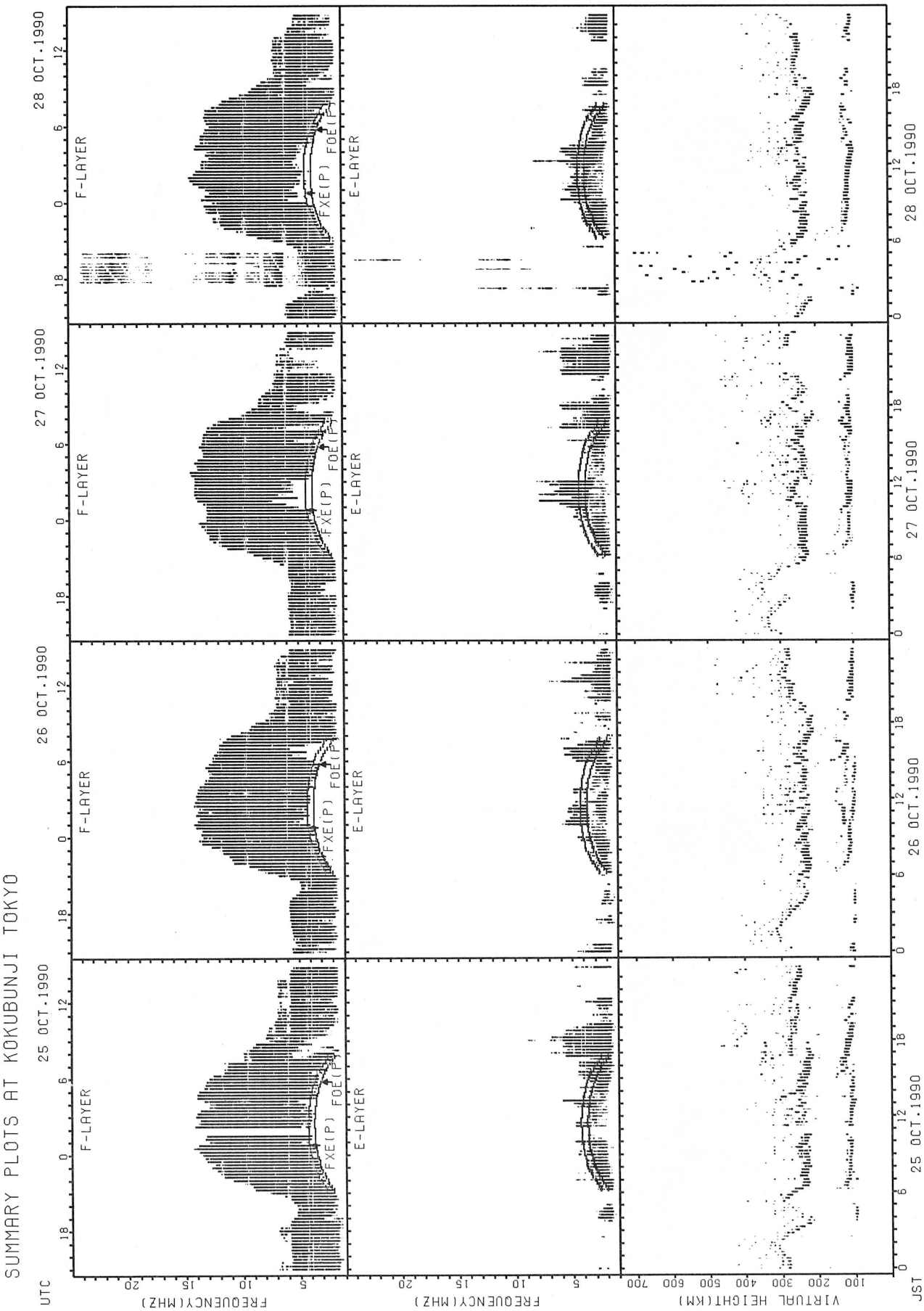


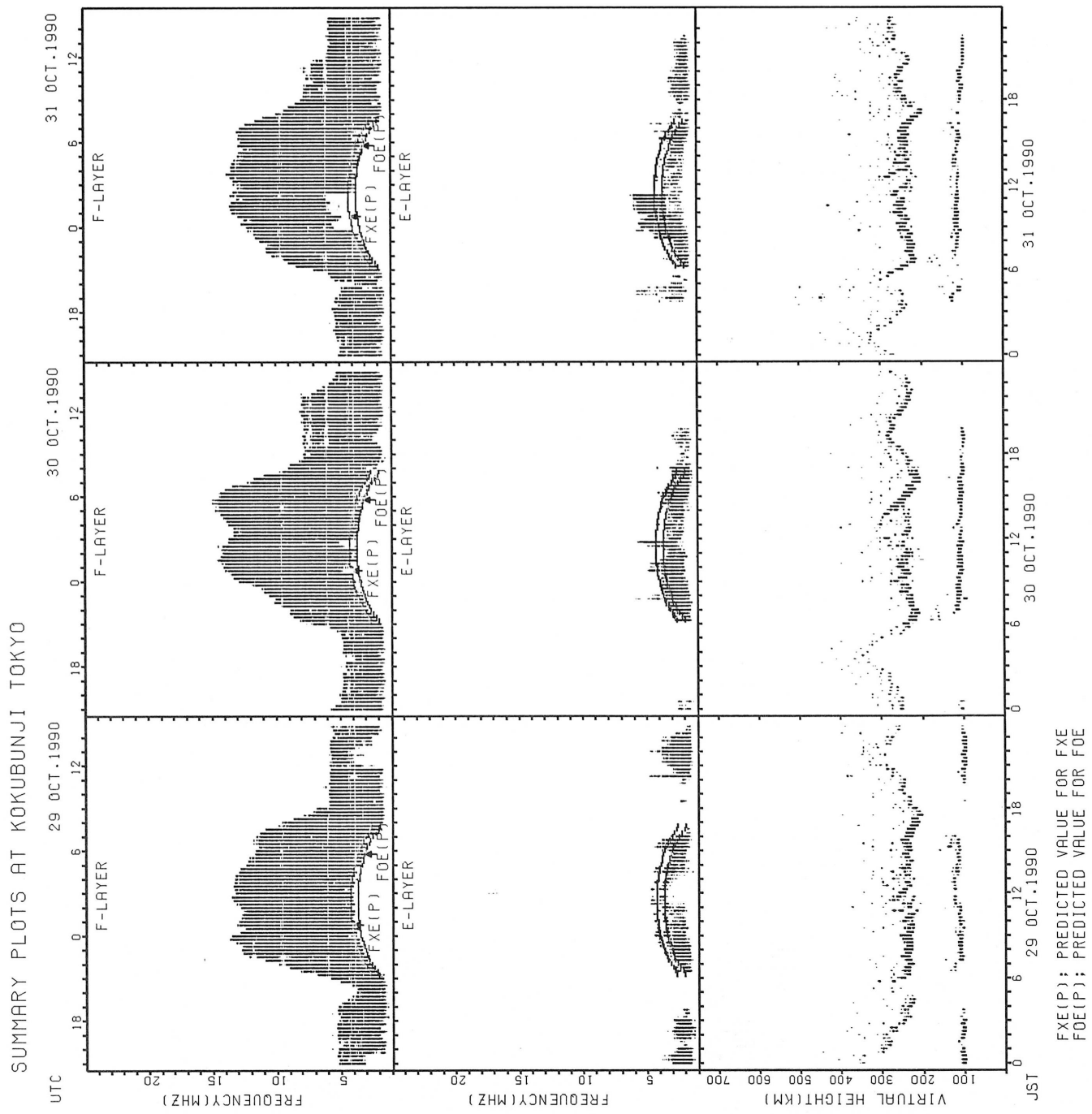
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

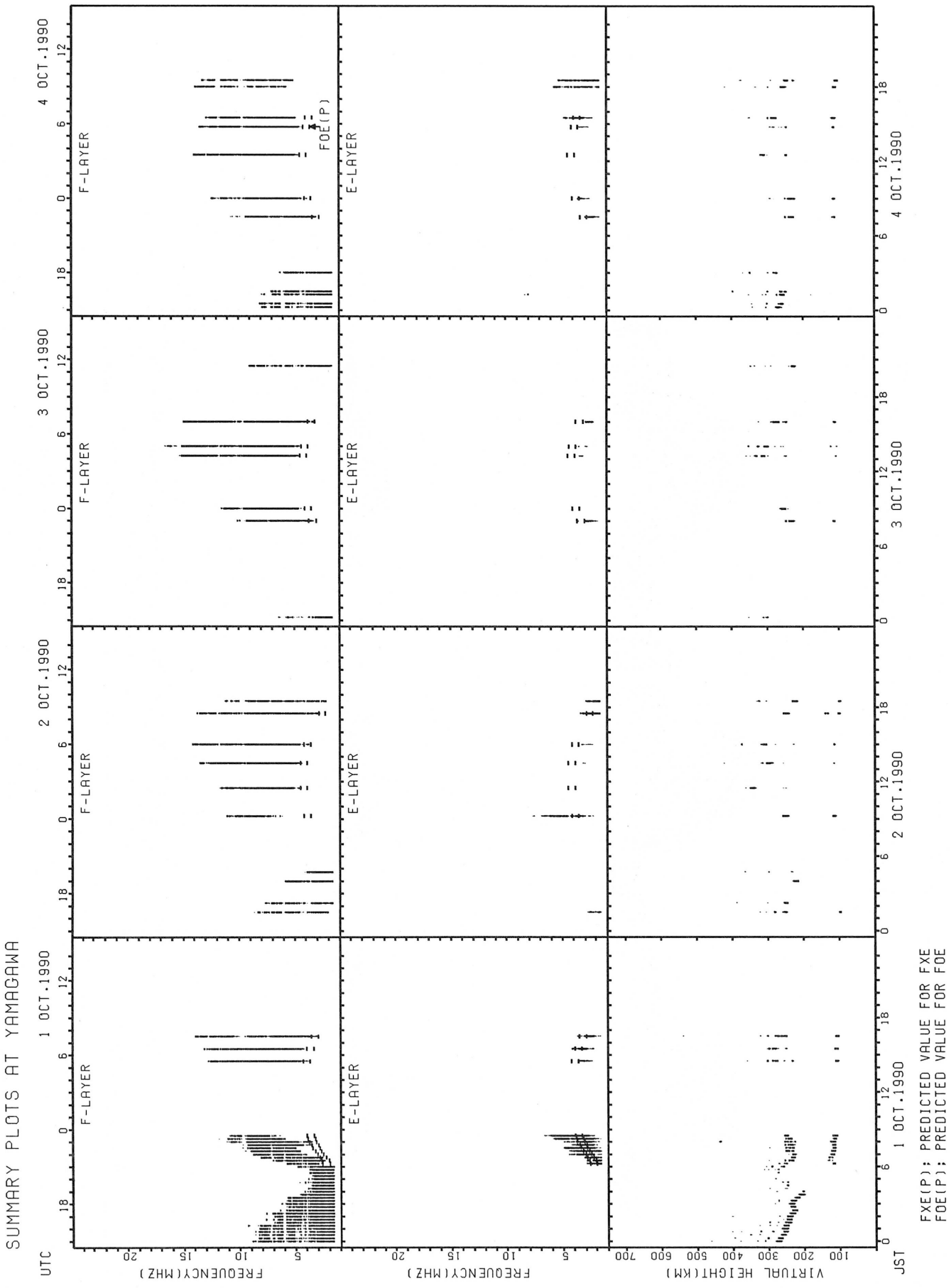
SUMMARY PLOTS AT KOKUBUNJI TOKYO

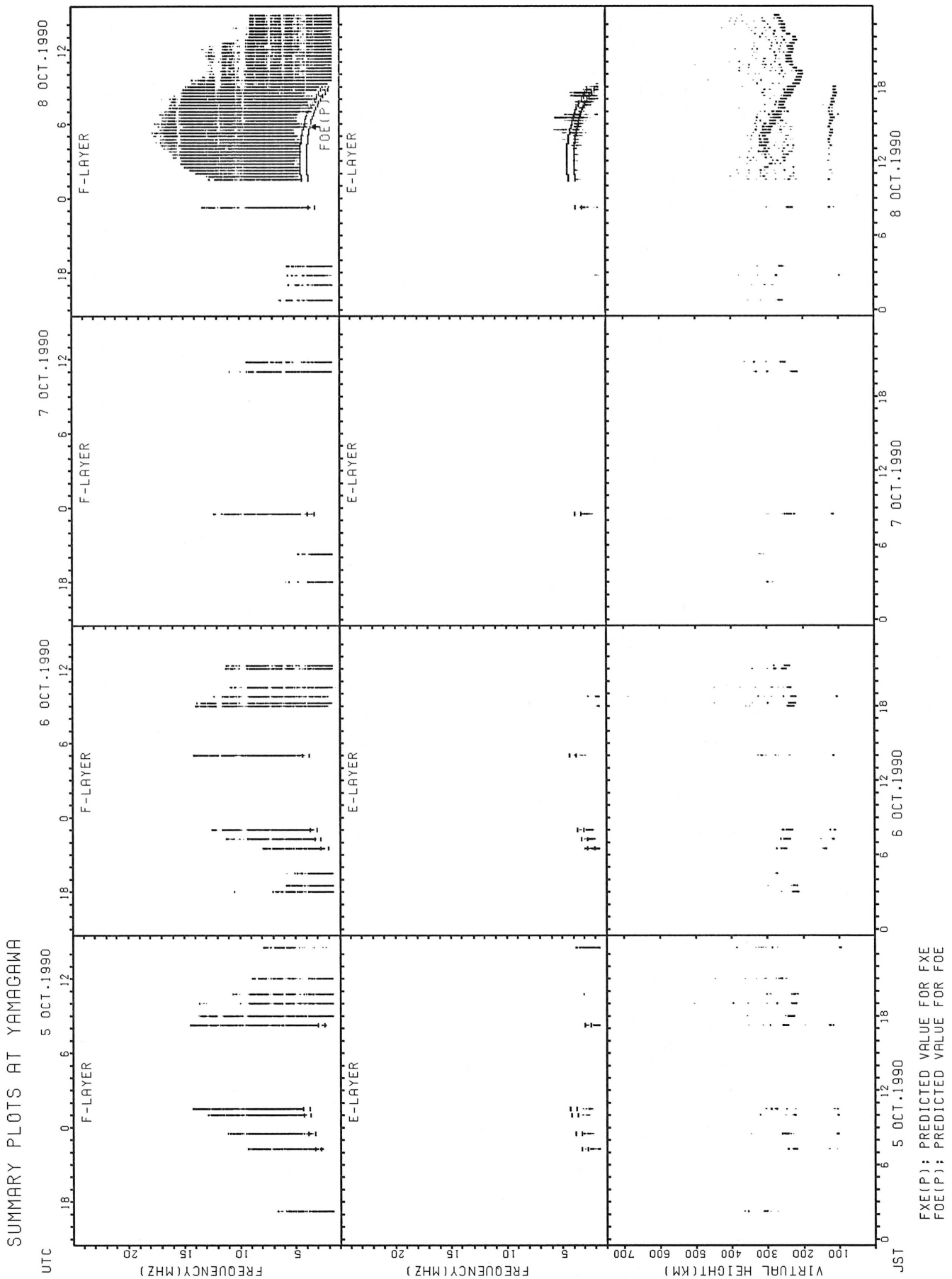


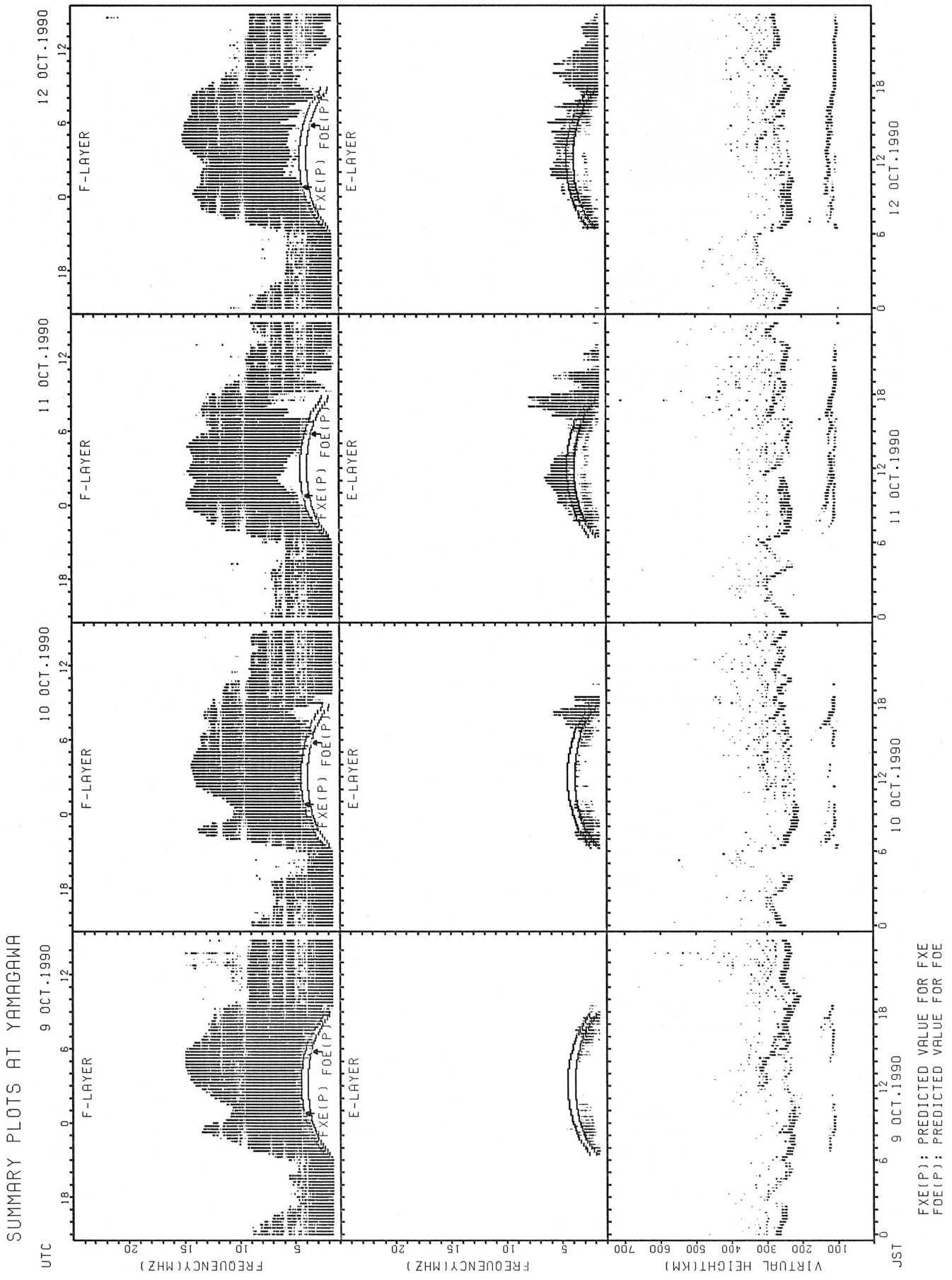
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

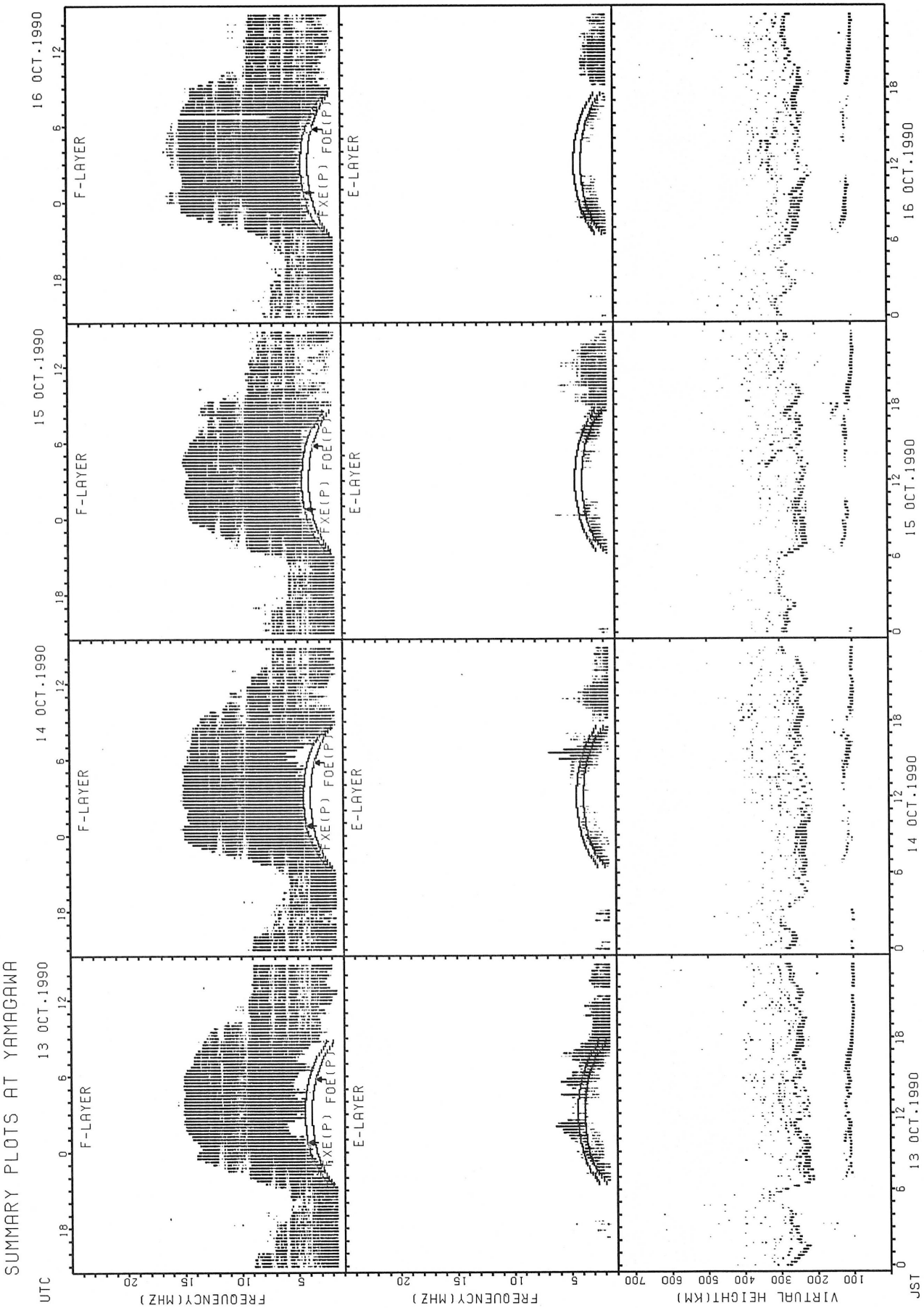

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 OCT.1990
26 OCT.1990
27 OCT.1990
28 OCT.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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


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


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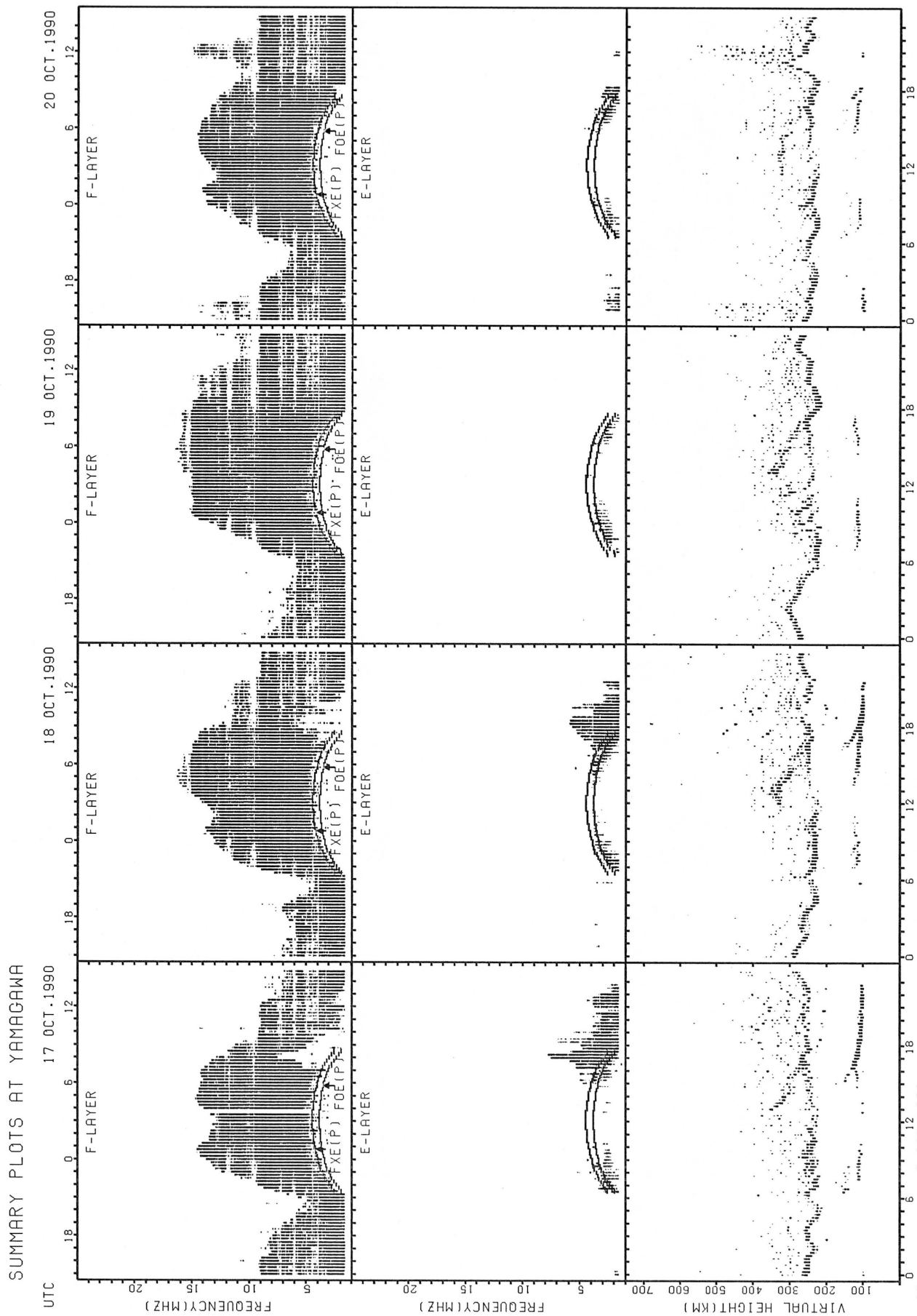
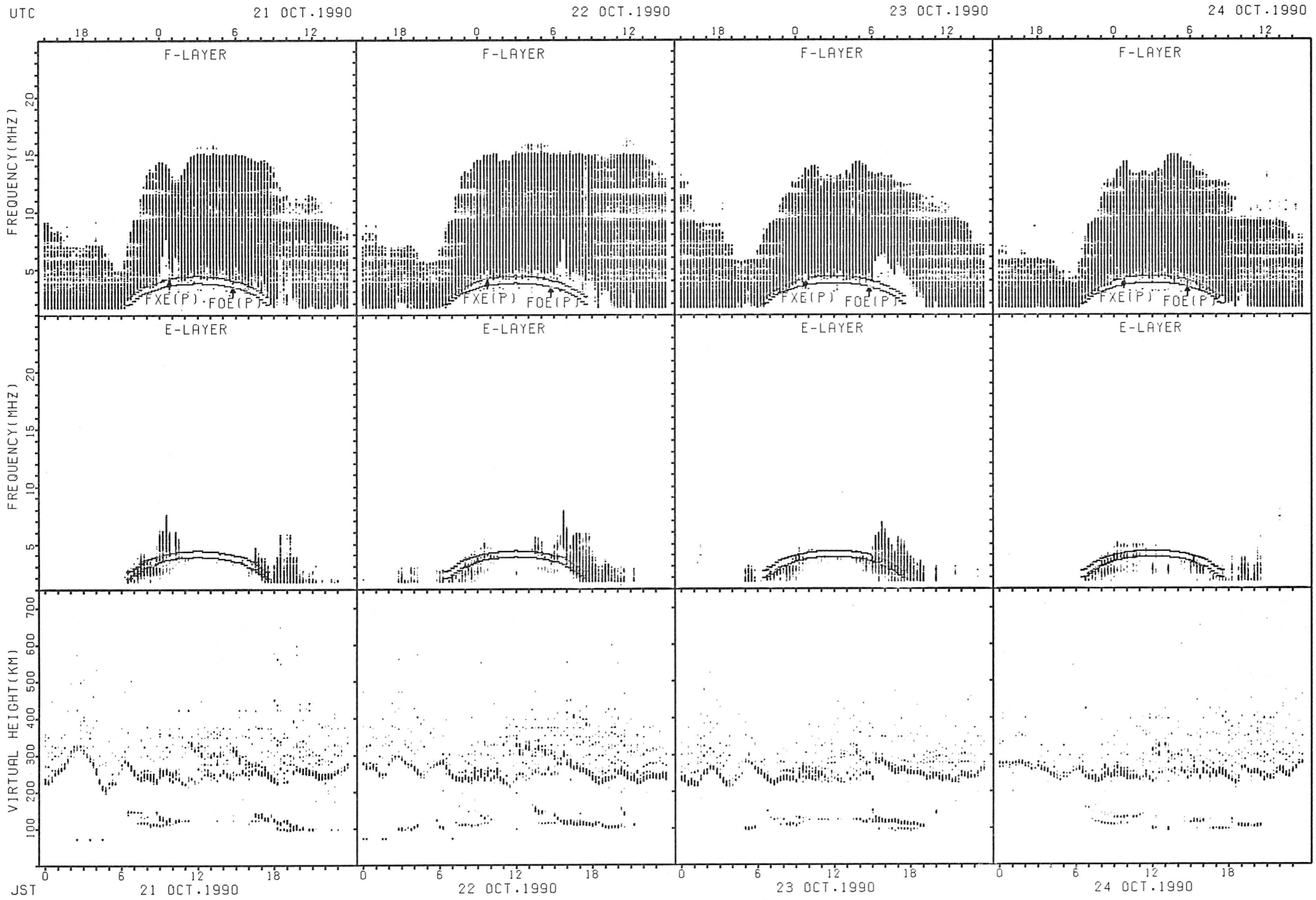
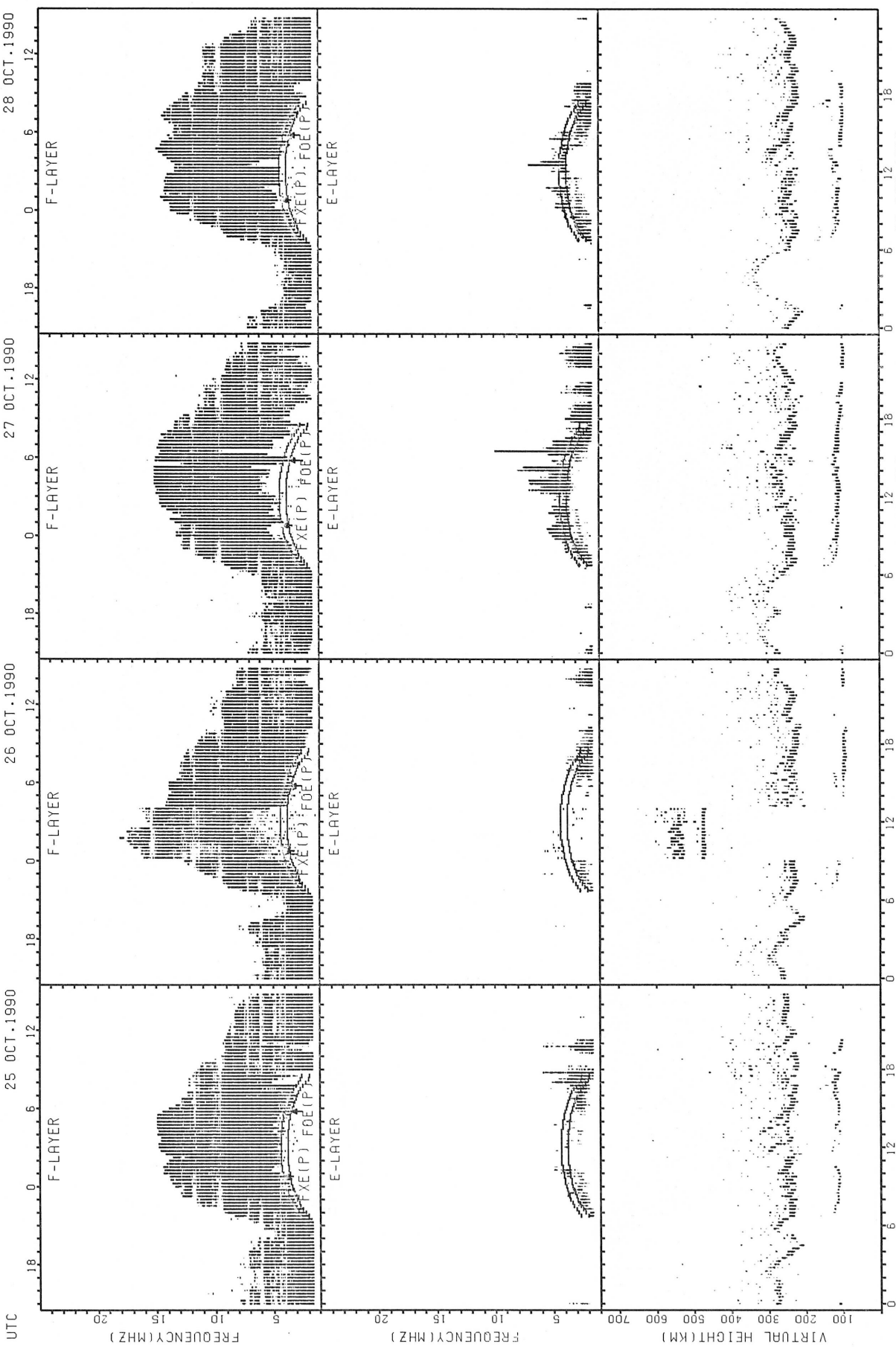
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

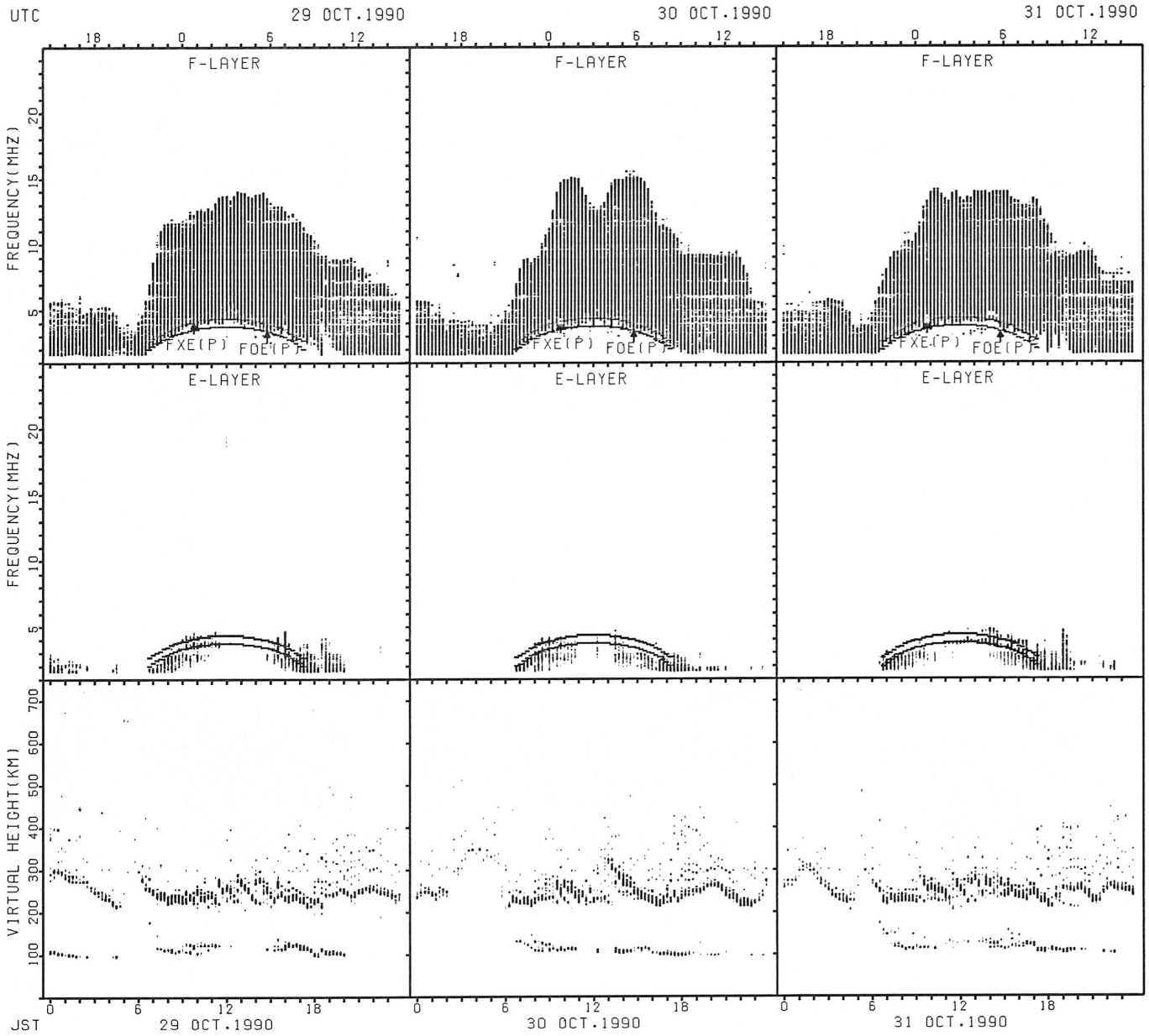
SUMMARY PLOTS AT YAMAGAWA



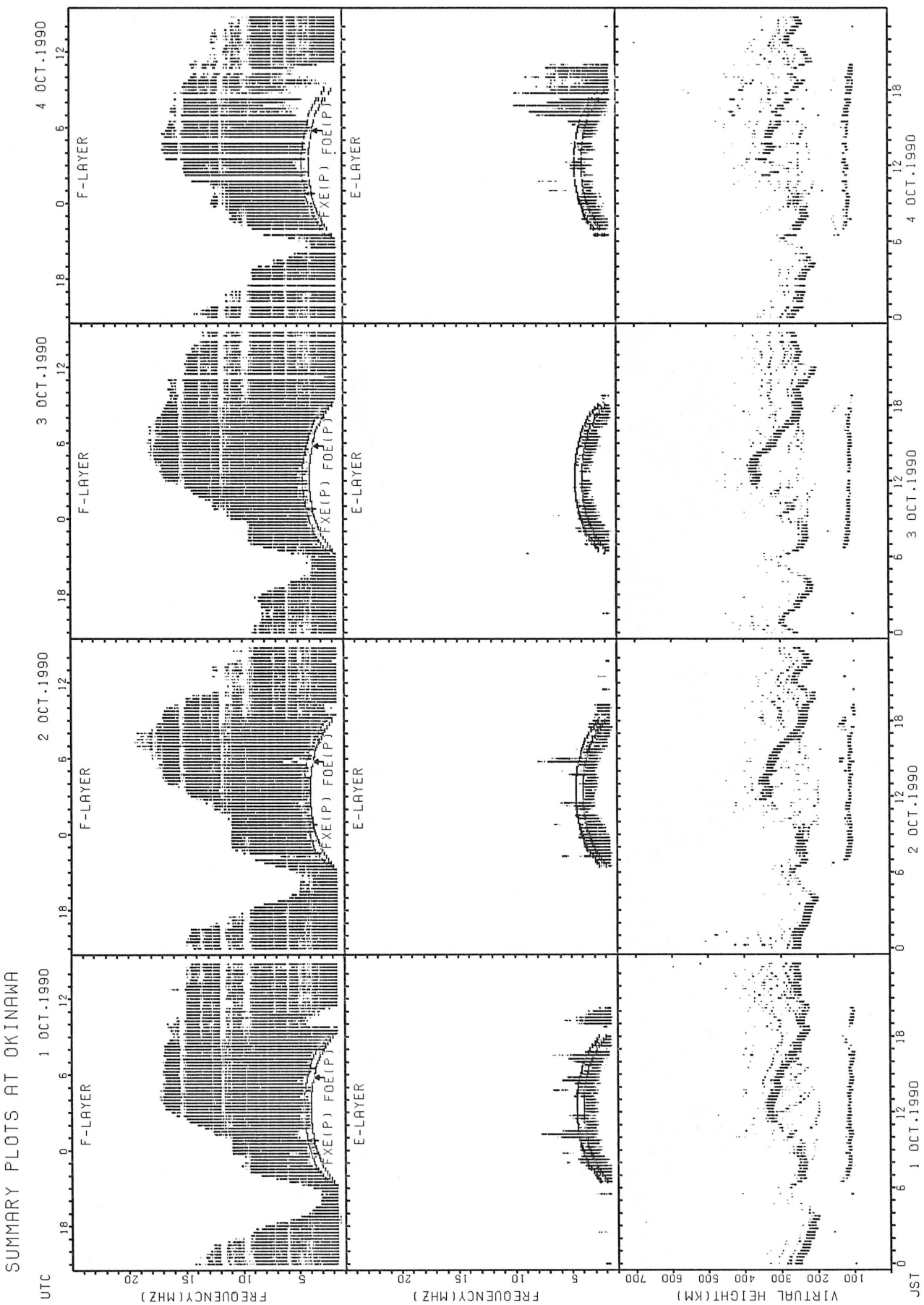
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 OCT.1990
26 OCT.1990
27 OCT.1990
28 OCT.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

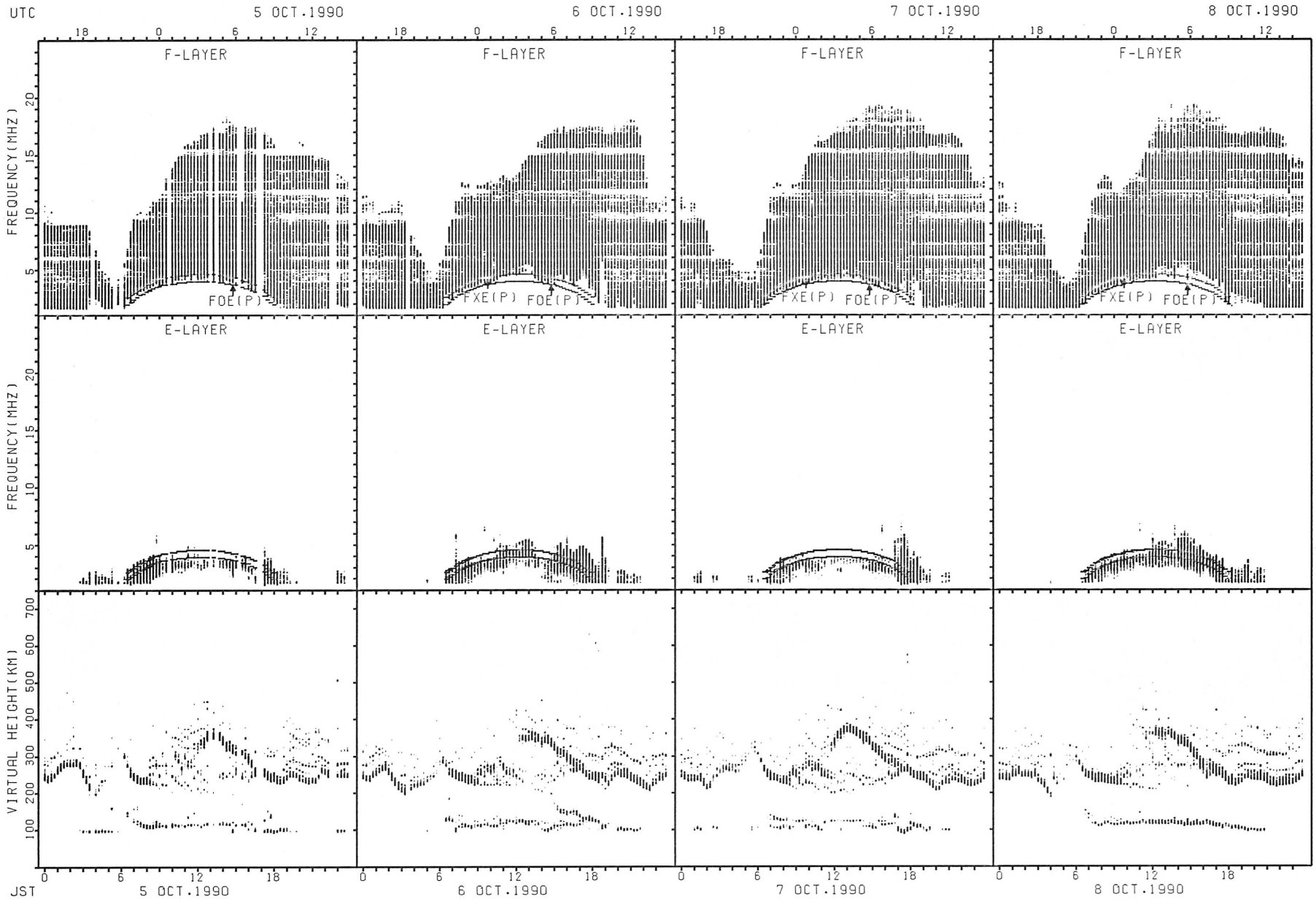
SUMMARY PLOTS AT YAMAGAWA



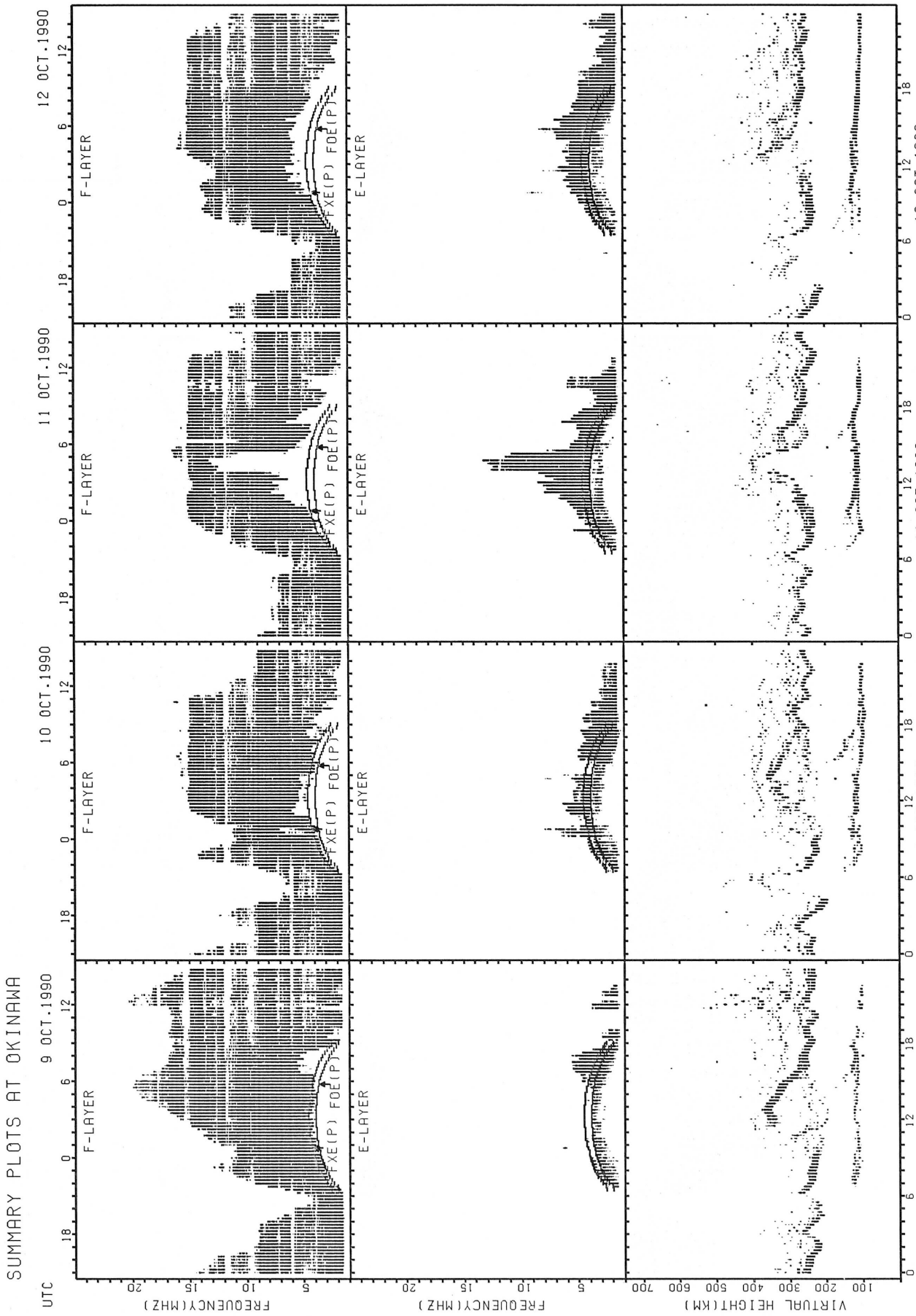
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
JST
1 OCT.1990
2 OCT.1990
3 OCT.1990
4 OCT.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

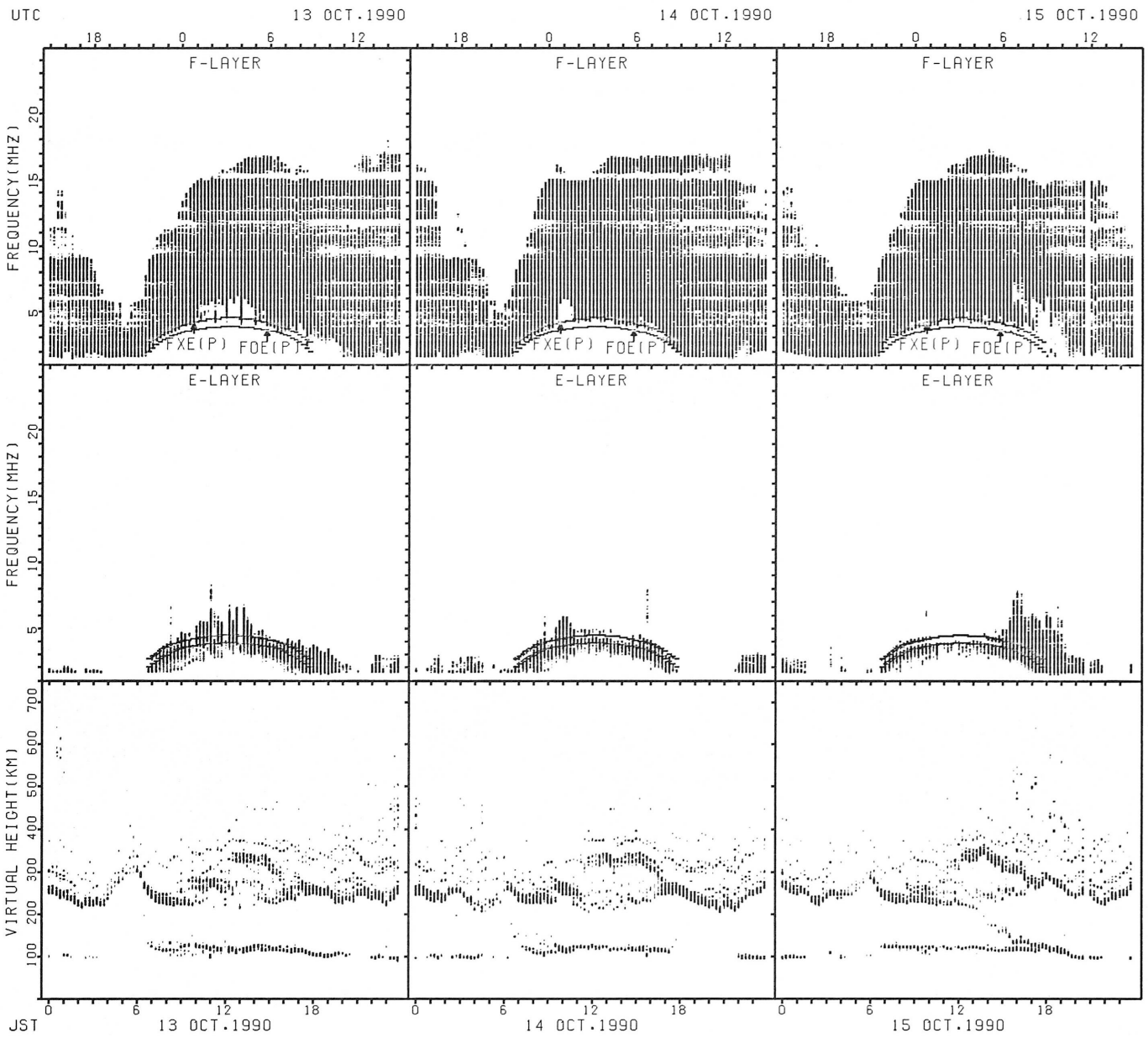
SUMMARY PLOTS AT OKINAWA



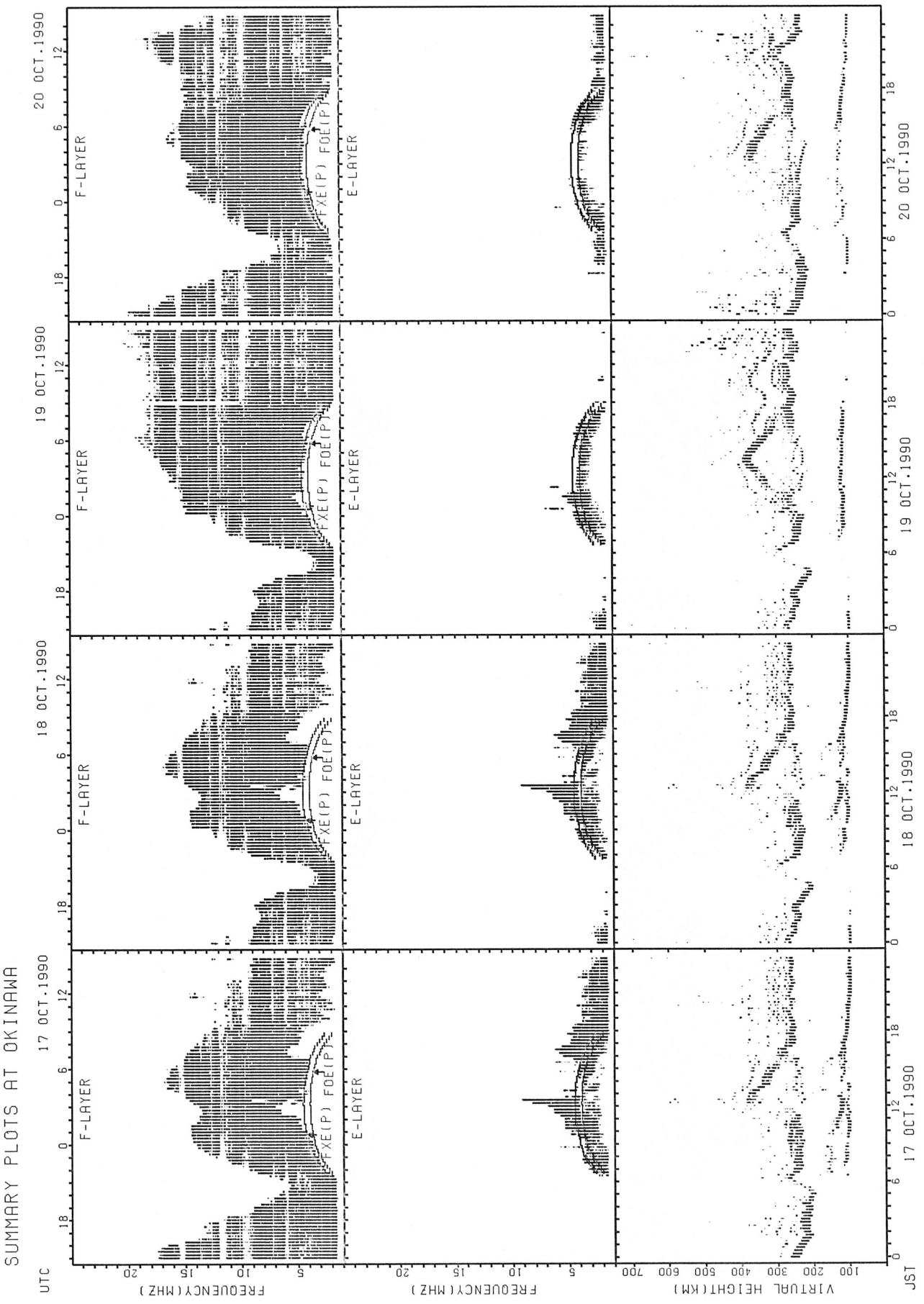
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
9 OCT.1990
10 OCT.1990
11 OCT.1990
12 OCT.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

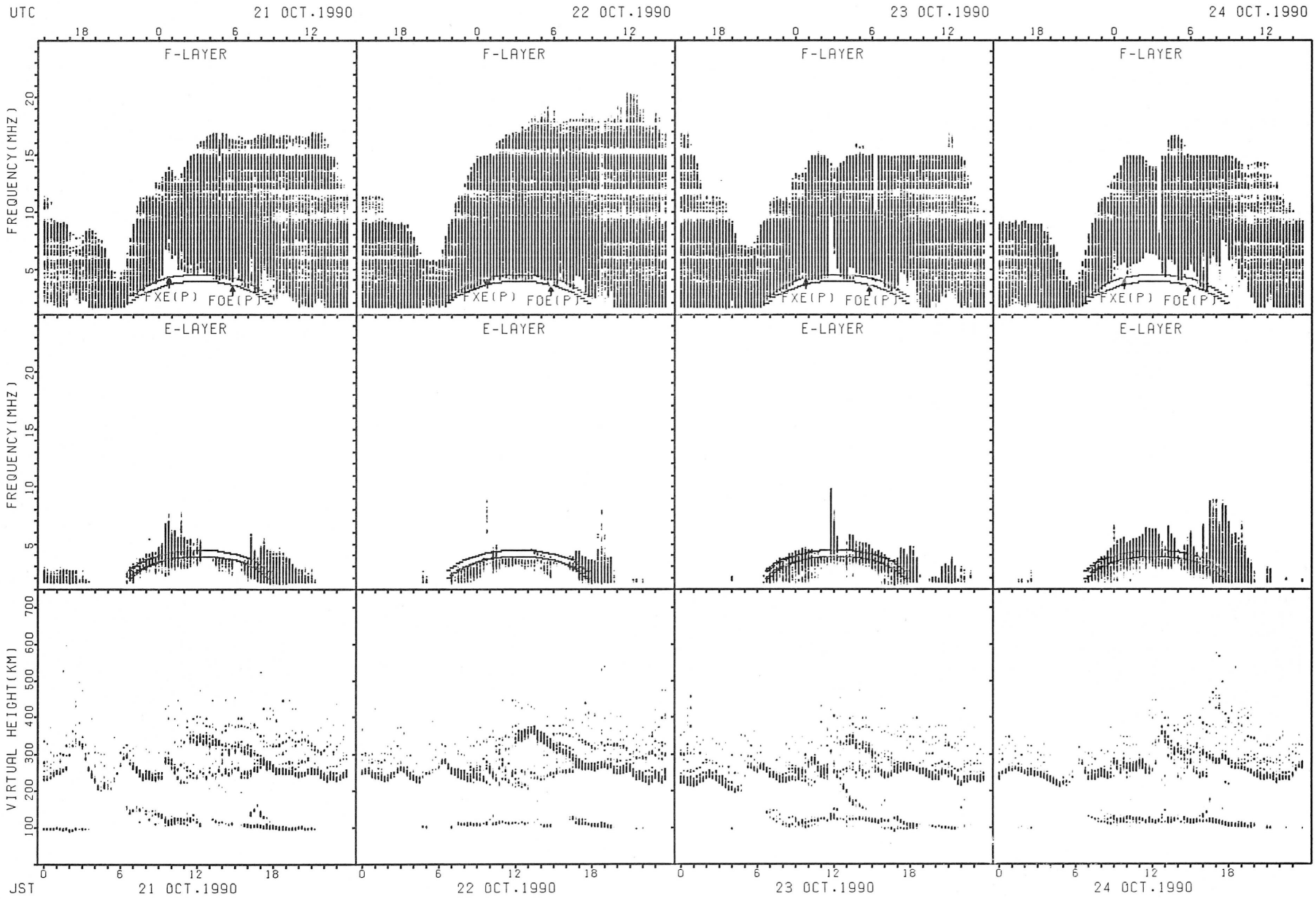
SUMMARY PLOTS AT OKINAWA



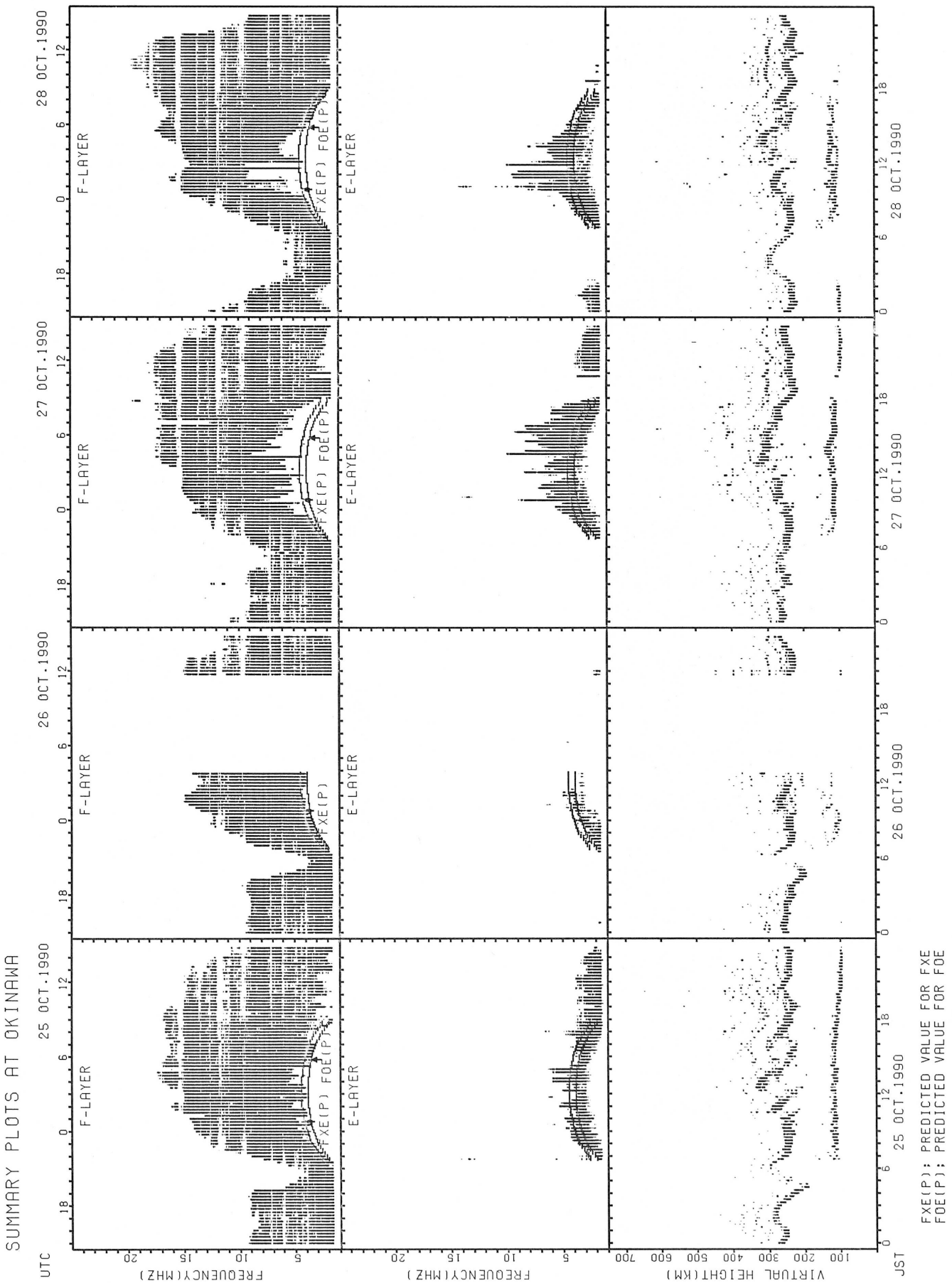
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

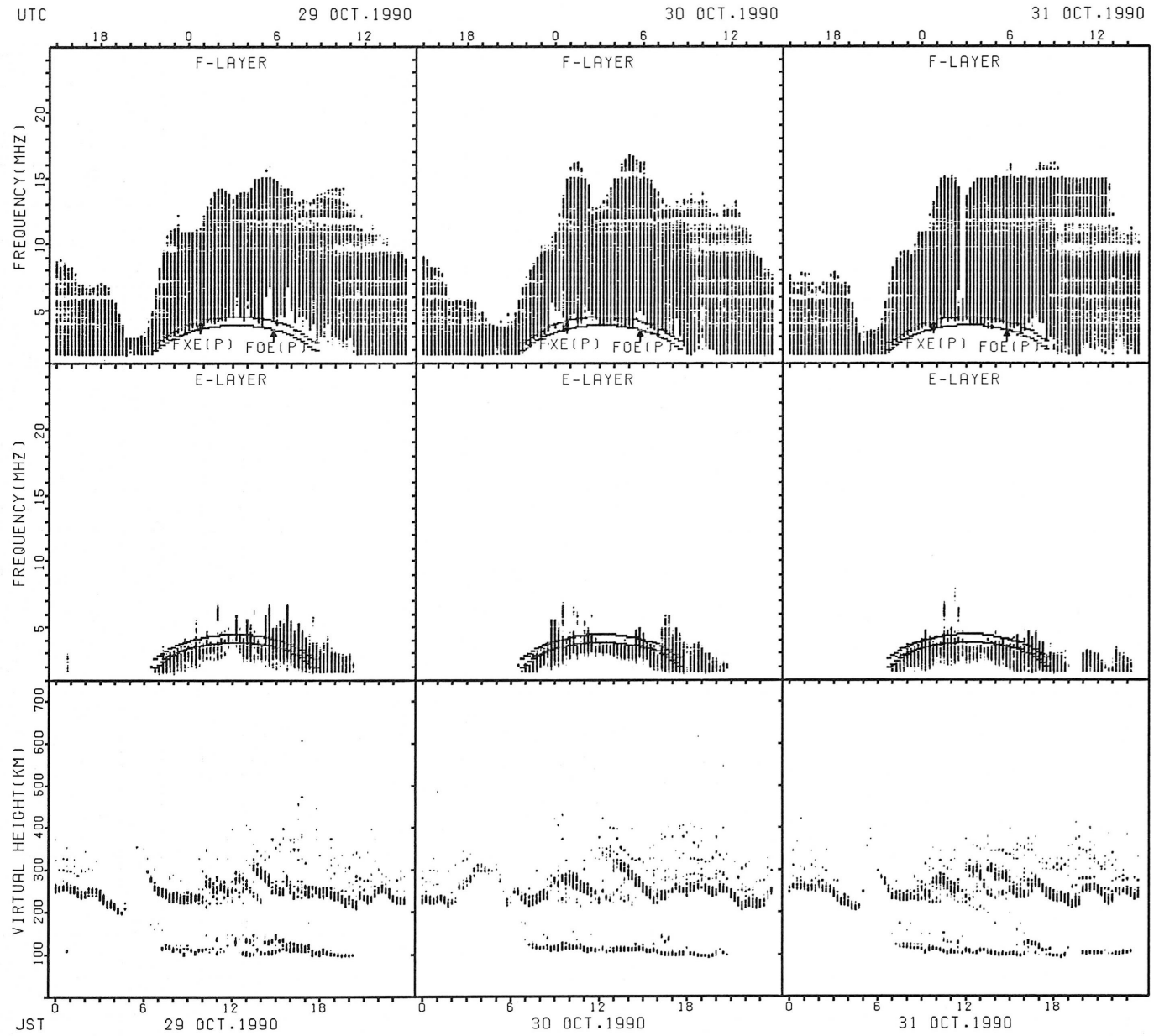
SUMMARY PLOTS AT OKINAWA



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


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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF H'F AND H'ES
OCT.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							16	31	31	31	21	14	15	26	31	31	31	31	24	16				
MED							265	244	238	240	234	238	246	254	258	258	250	256	276	291				
U Q							284	250	248	248	239	266	264	286	284	270	258	262	288	302				
L Q							256	236	232	236	231	236	234	244	250	250	244	250	263	282				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	13	15	15	17					14	10	12					13	12	17	19	13	16	16	16
MED	115	113	113	113	113					122	119	118					117	116	119	115	115	115	115	114
U Q	119	119	115	119	117					123	123	119					129	121	124	119	119	117	119	115
L Q	113	109	109	111	110					119	115	115					114	110	112	111	111	112	113	111

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							13	30	30	31	17			20	31	31	31	31	22	11				
MED							280	240	235	232	236			262	280	268	256	260	275	294				
U Q							290	250	238	240	251			292	294	278	270	264	286	308				
L Q							267	236	230	230	234			251	262	254	248	254	258	284				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12		12	10				13	14	15	17	10			11	10	14	17	21	19	15	19	12	15
MED	107		106	104				121	115	117	113	113			113	119	114	115	113	111	111	107	107	105
U Q	110		112	105				145	119	123	117	117			117	121	131	126	119	117	113	109	107	109
L Q	102		101	103				116	113	115	106	109			99	111	111	107	107	107	103	103	103	103

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							22	31	31	30	14			16	31	31	31	30	27	17	10			
MED							273	236	234	236	242			265	274	270	256	251	256	304	312			
U Q							280	244	240	244	250			283	288	280	262	264	276	318	332			
L Q							258	228	232	232	234			247	262	258	244	242	246	275	298			

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12							15	18	23	21	16		13		13	19	20	21	15	16	17	18	16
MED	104							119	117	119	117	121		115		115	125	120	113	107	107	105	105	102
U Q	105							143	131	125	119	122		118		132	137	124	119	109	110	107	107	107
L Q	101							107	113	113	113	113		109		112	117	108	108	103	105	101	99	99

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

MONTHLY MEDIANS OF H'F AND H'ES
OCT.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							23	25	25	23				22	25	25	24	27	25	24	23	20	12
MED	324							248	240	240	244				276	262	266	257	254	270	305	286	295	310
U Q	356							264	248	250	252				306	292	270	264	260	290	323	296	319	322
L Q	299							242	232	234	238				260	247	261	248	242	261	290	276	275	300

H'ES

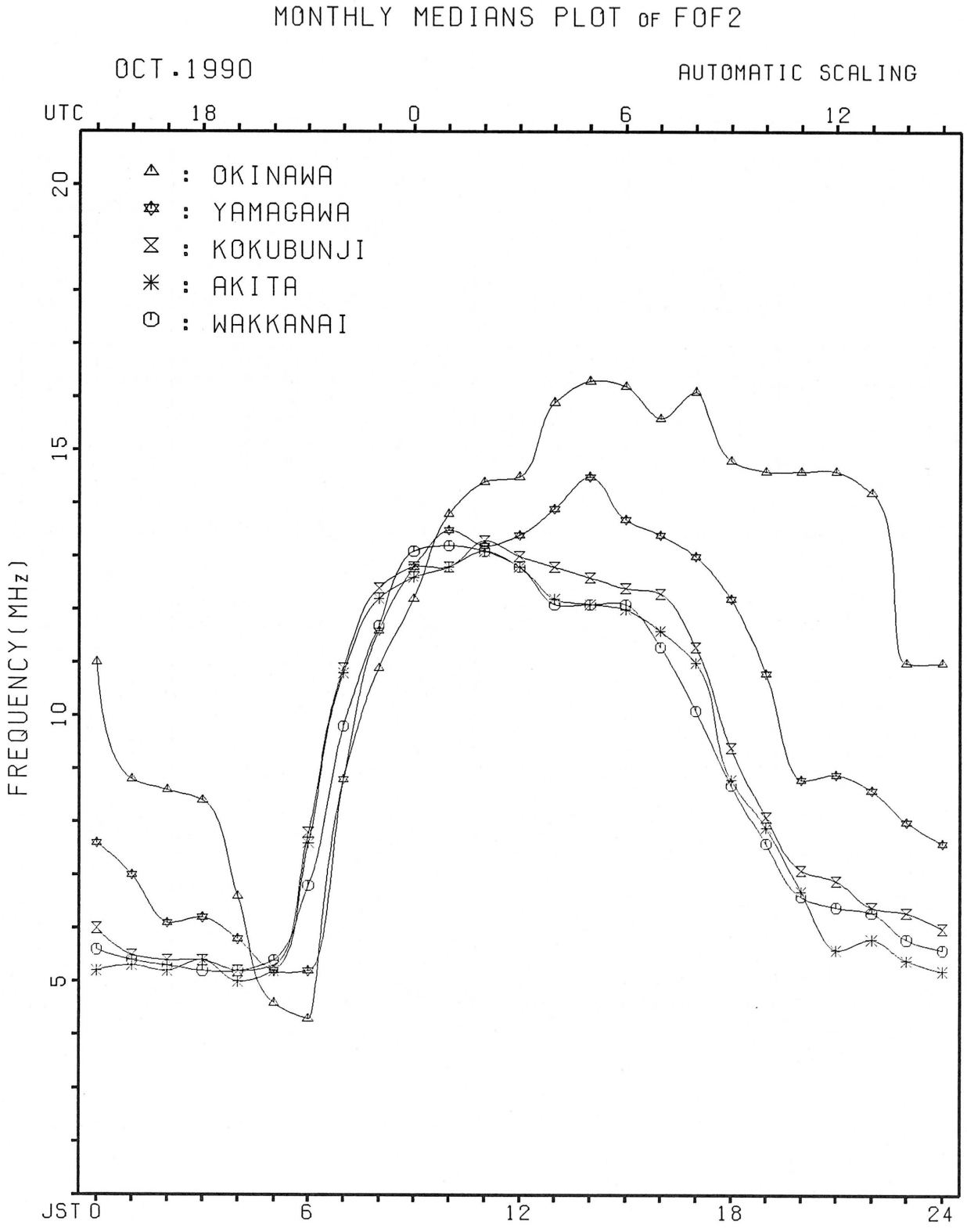
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									13	13						10	16	19	20	17	14			
MED									121	121						125	121	119	111	107	104			
U Q									153	138						139	128	125	117	107	107			
L Q									117	116						113	115	113	104	104	101			

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	29	26	22	24	14			30	31	30	31				15	31	31	30	31	31	31	31	31	30
MED	282	274	282	274	258			256	238	248	274				312	308	286	266	256	262	272	272	262	276
U Q	300	294	306	285	274			264	246	254	302				342	316	308	276	266	274	288	298	278	284
L Q	268	260	256	251	246			250	234	240	256				284	290	272	258	242	248	258	262	248	260

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								21	24	22	22	21	15	12	15	23	22	25	27	24	21	16	11	10
MED								143	131	119	125	119	121	121	119	121	120	117	109	107	105	101	101	99
U Q								152	146	125	133	129	123	121	129	143	133	130	121	114	107	105	105	99
L Q								131	125	117	117	115	117	119	115	115	117	112	107	103	101	101	97	97


MONTHLY MEDIANS PLOT OF FOF2
OCT.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

OCT. 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 72	X 70	X 66	X 60	X 53	X 49													X 106	X 75	X 70	X 68	X 68	X 70
2	X 70	X 67	X 64	X 62	X 59	X 55													X 109	X 86	X 75	X 71	X 71	X 71
3	X 65	X 66	X 66	X 65	X 60	X 61													X 118	X 97	X 74	X 71	X 70	X 70
4	X 71	X 66	X 63	X 62	X 62	X 61													X 117	X 96	X 77	X 70	X 75	X 75
5	X 73	X 67	X 67	X 69	X 63	X 59													X 120	X 95	X 84	X 76	X 77	X 76
6	X 72	X 65	X 67	X 65	X 62	X 62													X 125	X 95	X 91	X 87	X 84	X 75
7	X 71	X 67	X 54	X 55	X 55	X 57													X 102	X 81	X 74	X 76	X 72	X 68
8	X 64	X 59	X 59	X 58	X 54	X 54													X 104	X 78	X 77	X 71	X 66	X 63
9	X 62	X 60	X 60	X 58	X 59	X 62													X 104	X 81	X 78	X 78	X 76	X 72
10	X 67	65	65	X 63	X 56	57													X 112	X 103	X 90	X 85	X 89	X 94
11	X 75	X 71	X 71	X 74	X 71	X 66													X 100	X 86	X 90	X 78	X 68	X 71
12	X 69	X 67	X 63	X 61	X 59	X 62													X 111	X 87	X 80	X 85	X 78	X 78
13	X 80	X 75	X 70	X 66	X 62	X 62													X 108	X 92	X 82	X 78	X 73	X 77
14	X 78	X 69	X 65	X 64	X 63	X 63													X 110	X 102	X 96	X 84	X 68	X 69
15	X 69	X 64	66	63	63	63													X 113	X 96	X 87	X 76	X 74	X 73
16	X 68	X 67	X 66	X 67	X 61	X 68													X 107	X 96	X 78	X 77	X 76	X 74
17	X 75	X 72	X 70	X 67	X 64	X 62													X 96	X 90	X 81	X 77	X 71	X 66
18	X 67	X 67	X 66	X 68	X 68	X 68													X 101	X 88	X 81	X 75	X 74	X 71
19	X 70	X 64	X 61	X 65	X 63	X 65													X 117	X 100	X 98	X 90	X 85	X 81
20	X 77	X 75	X 77	X 67	X 64	X 65													X 102	X 89	X 89	X 92	X 90	X 93
21	99	X 80	77	77	89	69													X 104	X 90	X 86	X 80	X 71	X 65
22	X 65	X 65	X 61	X 62	X 59	X 58													X 108	X 95	X 93	X 90	X 86	X 88
23	X 83	X 64	X 60	X 59	X 57	X 58													X 96	X 92	X 88	X 85	X 74	X 65
24	X 61	X 60	X 59	X 58	X 56	X 52											C		X 96	X 85	X 85	X 77	X 74	X 70
25	X 68	X 65	X 65	X 70	X 59	X 55													X 83	X 79	X 70	X 68	X 69	X 66
26	X 56	X 56	X 58	X 59	X 59	X 49													X 89	X 74	X 71	X 70	X 69	X 68
27	X 62	X 58	X 61	X 60	X 57	X 62													X 87	X 79	X 74	X 68	X 68	X 63
28	X 64	X 61	X 44	X 46	X 46	X 48													X 89	X 71	X 71	X 71	X 69	X 55
29	X 53	X 55	X 55	X 54	X 54	X 43													X 70	X 63	X 60	X 63	X 62	X 56
30	X 57	X 52	X 50	X 47	X 48	X 50													X 80	X 79	X 78	X 83	X 80	X 61
31	X 54	X 54	X 56	X 56	55	X 50													X 81	X 77	X 77	X 66	X 64	62
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31													31	31	31	31	31	31
MED	X 69	X 65	X 64	X 62	X 59	X 61													X 104	X 88	X 80	X 77	X 73	X 70
UQ	X 72	X 67	X 66	X 66	X 63	X 62													X 110	X 95	X 88	X 84	X 76	X 75
LQ	X 64	X 60	X 60	X 58	X 56	X 54													X 96	X 79	X 74	X 71	X 59	X 66

OCT. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

OCT. 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	66	64	60	54	47	43	68	95	116	90	97	109	121	118	114	117	116	118	100	69	64	62	62	64
2	64	61	58	56	53	49	76	94	108	110	101	110	118	119	111	123	121	117	103	80	69	65	65	65
3	59	60	60	59	54	55	91	103	109	111	113	116	125	125	120	115	116	120	112	91	68	65	64	64
4	65	60	58	56	56	56	83	115	122	109	110	120	118	118	115	114	112	117	111	90	71	64	69	69
5	67	61	61	63	57	53	83	101	117	111	126	139	136	138	129	130	125	128	114	89	78	70	71	70
6	66	59	61	59	56	56	86	116	129	118	110	116	125	126	124	125	123	123	119	89	85	81	78	69
7	65	61	48	49	49	51	84	119	119	119	115	139	144	131	129	124	119	118	96	75	68	70	66	S 62
8	58	53	53	52	48	48	70	99	132	120	126	138	140	141	140	131	123	119	98	72	71	65	60	57
9	56	54	54	52	53	56	86	115	128	115	108	122	126	123	123	120	119	111	98	75	72	72	70	66
10	S 61	F 58	F 57	57	50	F 46	64	120	131	118	112	130	127	129	126	122	110	115	106	97	84	79	83	88
11	69	65	65	68	65	60	90	115	141	133	133	139	126	129	120	R 111	115	111	94	80	84	72	62	65
12	62	61	57	55	53	56	69	118	134	140	140	133	130	131	136	134	130	121	105	81	74	79	72	72
13	74	69	64	60	56	56	85	112	132	130	136	145	146	142	139	135	124	115	102	86	76	72	67	71
14	72	63	59	58	57	57	79	110	136	145	142	145	140	144	140	136	128	116	104	96	90	78	62	64
15	63	58	F 57	F 55	F 55	F 54	V 88	116	130	136	136	142	139	134	134	128	117	115	107	90	81	70	68	67
16	62	60	60	61	V 56	62	86	126	149	151	145	147	151	149	146	138	129	119	101	90	72	71	70	68
17	69	66	64	61	58	56	78	110	128	134	132	136	125	123	127	128	129	112	90	84	75	71	65	60
18	61	61	60	62	62	62	91	114	131	130	130	129	139	145	147	140	130	117	95	82	75	69	68	65
19	64	58	55	59	57	59	84	104	126	135	135	146	147	149	151	147	141	135	111	94	92	83	78	75
20	71	69	70	61	58	59	84	105	137	138	135	133	127	129	129	131	130	119	96	83	83	86	84	87
21	79	S 74	60	F 65	F 81	F 61	71	110	143	142	135	136	146	140	140	136	126	114	98	84	80	74	65	59
22	59	59	55	56	53	52	78	127	135	139	136	130	136	141	138	136	133	125	R 101	89	87	84	80	82
23	77	58	54	53	51	52	70	95	116	132	129	125	124	130	126	119	116	109	90	86	81	79	68	59
24	55	54	53	52	50	46	66	99	121	126	128	123	124	129	132	126	I C 114	109	90	79	79	71	68	64
25	62	59	59	64	54	49	73	104	123	130	127	I C 134	136	126	134	126	110	95	S 77	73	64	62	63	60
26	50	50	52	53	53	43	64	S 99	116	130	138	136	135	132	124	122	117	105	83	68	65	64	63	62
27	56	52	55	54	51	56	77	113	125	127	126	135	134	133	128	131	126	105	81	73	68	62	62	57
28	58	55	38	40	41	42	69	109	118	122	126	141	128	129	130	121	126	110	83	65	65	65	63	49
29	47	49	49	48	48	37	57	94	122	131	126	125	129	128	119	112	112	91	64	57	55	57	56	50
30	51	46	44	41	42	44	68	84	101	125	137	140	133	134	146	145	118	87	74	73	72	77	S 74	55
31	48	48	50	50	F 45	44	69	97	108	118	129	126	129	R 132	124	123	122	97	75	71	71	60	58	53
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	62	59	57	56	53	54	78	110	126	130	129	134	130	131	129	126	122	115	98	82	74	71	67	64
UQ	66	61	60	60	56	56	84	115	132	134	136	139	139	139	138	134	127	119	104	89	81	78	70	69
LQ	58	54	54	52	50	47	69	99	118	118	120	125	126	127	124	122	116	110	90	73	68	65	63	60

OCT. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

OCT. 1990 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L		U L 510	U L 540	U L 570		L	L								
2									L	L	L	L	L	L		L								
3										L	L	L	U L 640	L	L	L								
4										U L 490	L	U L 600	L	L	L	L								
5										L	L	L	L	U L 600	L	L								
6									L	L	L	L	L	L	L	L								
7										L	L	L	L	L	L									
8									L	L	L	U L 540	L	L	L	L								
9									L	L	L	L	L	L	L	L								
10										L	L	L	L	L	L		L							
11											L	L	L	L	L									
12														L	L	L								
13											L	L	L	L	L									
14										L		L	L		L									
15									L	L	L			U L 720	L	L								
16									L		L	L	L	L	L	L								
17									L	L		U L 480	L	U L 690	L	L								
18									L	L	L	L	L	L	L									
19									L	L	L	L	L	L	L									
20									L	L	L	L	L	L	L									
21										L	L	L	L	U L 780	L	L								
22								L	L	L	L	L	L	L	L									
23										L	L	L	L	L										
24										L	L	L	L			L	C							
25											L	C	L	L	L									
26									L		L	L	L											
27										L				L	L									
28											L	L	L	L										
29										L	L			L										
30										L	L	L	L	L	L									
31										L	L		L	L	L									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	1	4	2	4										
MED										U L 490	U L 510	U L 540	U L 605	U L 705										
UQ												U L 570		U L 750										
LQ												U L 510		U L 645										

OCT. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

OCT. 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 24sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							195	A	A	A	355	370	380	355	U A 330	A	270	170						
2							200	270	320	345	A	A	375	360	350	340	U A 260	A						
3							200	280	330	A	A	R	U R 380	A	A	A	275	A						
4							A	280	325	365	A	A	A	375	355	325	280	180						
5							A	A	A	U A 355	370	375	370	360	340	315	270	U A 195						
6							180	270	325	345	370	R 375	370	370	345	315	260	165						
7							160	275	A	A	370	R	385	370	355	325	260	195						
8							185	U A 260	310	350	A 375	380	390	380	365	335	275	A						
9							165	265	330	A	365	380	380	370	355	310	265	175						
10							A	265	315	340	R 355	R 370	375	370	345	310	265	160						
11							160	255	305	340	370	370	365	345	U A 325	A	270	170						
12							190	270	320	355	370	375	370	355	350	325	255	B						
13							175	270	320	345	355	360	360	350	345	325	U A 245	A						
14							170	270	325	350	370	R	355	340	U A 325	A	A	A						
15							155	270	330	370	375	R 380	R 375	370	355	320	255	170						
16							175	265	325	360	375	A	A	R	355	320	265	180						
17							150	270	310	350	U S 370	380	380	375	355	330	270	A						
18							170	270	315	350	375	360	A	A	A	A	255	A 155						
19							150	260	A	A	370	A	390	380	A	A	270	A						
20							155	270	325	U A 350	365	380	A	380	360	330	260	B						
21							155	260	A	340	U A 345	A	380	385	A	B	260	A						
22							175	255	310	340	370	380	380	375	355	320	A	B						
23							B	270	310	340	360	A	365	U A 355	340	305	230	B						
24							H 185	240	310	335	A 350	340	355	355	330	295	I C 230	B						
25							B	245	305	350	355	I C 350	355	A	330	295	H 245	B						
26							145	240	295	330	345	355	365	340	335	295	235	B						
27							B	245	295	330	345	A	A	340	335	300	250	B						
28							150	250	305	335	A	A	A	A	R 325	295	235	B						
29							B	210	285	320	340	A	R	345	335	295	230	B						
30							B	245	U A 305	A 325	A	345	350	345	325	A	215	B						
31							B	230	295	325	A	340	340	A	A	285	225	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							22	29	26	26	25	19	24	25	26	23	29	11						
MED							170	265	312	345	370	370	372	360	345	315	260	170						
UQ							185	270	325	350	370	380	380	375	355	325	270	180						
LQ							155	250	305	335	355	358	362	350	330	298	245	168						

OCT. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 15	27	J A 27	J A 24	J A 42	J A 24	G 20	52	47	J A 44	J A 48	43	G 25	41	J A 51	J A 37	35	J A 33	J A 23	J A 37	J A 53	J A 47	J A 30	J A 25
2	J A 23	E B 13	18	E B 13	E B 13	E B 13	G	J A 33	J A 66	41	J A 40	47	46	44	G	G	J A 39	J A 51	31	J A 22	J A 51	J A 24	J A 19	J A 19
3	E B 13	J A 22	E B 13	E B 13	E B 13	E B 13	24	G	41	J A 45	41	G	41	38	J A 43	34	33	25	J A 18	E B 14	E B 14	J A 17	E B 14	E B 14
4	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	23	31	35	G	39	39	J A 47	G	39	45	G	G	J A 17	J A 16	J A 22	J A 18	J A 30	J A 24
5	J A 17	E B 14	E B 13	J A 28	J A 20	E B 13	22	J A 38	J A 53	J A 40	G 31	G 28	G	G	G	G	G	22	J A 21	E B 14	E B 13	E B 14	E B 13	J A 33
6	J A 25	J A 16	J A 15	20	18	E B 13	G	G	G	G	G	G	G 30	G 35	37	34	G	G	E B 13	E B 14	E B 13	J A 17	J A 24	J A 32
7	J A 23	J A 24	E B 12	19	J A 18	E B 14	21	G	J A 36	J A 39	G	G	G 32	G	G	G	G	J A 21	J A 18	J A 17	E B 13	J A 15	J A 20	J A 28
8	J A 26	J A 19	E B 13	J A 18	E B 13	E B 13	G	J A 31	J A 43	G	J A 41	G	G	41	39	G 22	G 26	J A 30	17	J A 35	J A 33	J A 18	J A 22	E B 14
9	E B 13	E B 14	E B 13	E B 13	E B 14	E B 15	G	27	G	36	G	G	G	G	G	G	29	G	E B 14	E B 13	E B 14	E B 13	E B 14	E B 13
10	E B 14	E B 13	E B 13	E B 12	E B 13	E B 13	24	36	36	39	G	G	G 21	G	G	34	30	25	J A 16	E B 13	E B 15	E B 14	E B 14	E B 14
11	E B 12	E B 13	E B 13	E B 13	E B 14	E B 13	G	28	41	46	J A 57	48	42	38	41	J A 41	G	J A 40	J A 37	32	29	J A 26	J A 29	J A 24
12	J A 21	20	J A 18	23	E B 12	E B 13	21	J A 53	34	41	47	44	44	40	40	J A 72	J A 47	E B 18	J A 29	J A 24	J A 16	J A 34	J A 36	J A 23
13	J A 25	J A 16	19	E B 13	E B 12	E B 14	G	G	35	42	47	42	42	45	39	G	35	J A 29	J A 54	J A 37	J A 20	J A 18	J A 22	J A 20
14	E B 13	E B 13	21	E B 14	E B 12	E B 13	G	30	35	39	40	43	40	J A 52	41	J A 45	J A 39	J A 24	J A 24	J A 30	J A 24	J A 19	J A 17	23
15	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	G	G	G	G	G	G	J A 50	G	G	G	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13
16	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	G	G	35	41	42	40	39	G	G	G	G	G	J A 18	J A 33	J A 19	J A 22	J A 34	J A 28
17	E B 15	E B 13	E B 13	E B 13	E B 13	E B 15	G	30	G	G	G	G	G	G	38	38	G 20	25	J A 23	J A 48	E B 14	E B 13	E B 14	J A 21
18	J A 22	J A 19	E B 13	E B 13	E B 16	E B 14	20	G	36	41	41	39	39	39	J A 40	34	G	22	J A 22	J A 22	J A 22	J A 20	J A 16	J A 15
19	E B 13	J A 16	J A 22	19	E B 13	E B 14	G	G 26	34	37	G	40	G	G	38	33	28	J A 22	J A 50	21	J A 16	E B 13	E B 14	E B 14
20	J A 24	E B 14	21	J A 25	J A 17	E B 13	G	G	34	G 34	G	G 34	47	G	G	G	29	25	J A 22	E B 13	J A 20	J A 29	J A 23	E B 13
21	J A 17	E B 13	E B 13	E B 14	E B 13	E B 13	G	G	J A 41	39	J A 57	40	G	43	35	E B 35	G	J A 31	J A 33	E B 13	E B 15	19	E B 14	E B 13
22	J A 36	J A 30	J A 27	J A 24	J A 24	J A 14	G	G	34	G	45	43	G	43	J A 50	J A 67	J A 174	J A 26	J A 37	J A 51	J A 22	J A 22	J A 22	E B 15
23	E B 14	E B 13	E B 13	J A 22	J A 17	J A 16	E B 14	J G 23	38	40	40	38	G	39	39	G 18	J A 58	J A 41	39	E B 14	E B 13	E B 13	E B 13	E B 14
24	E B 13	J A 17	J A 17	E B 14	E B 14	E B 14	G	28	35	42	J A 48	40	G 33	G 23	G 25	G 24	C	E B 15	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14
25	E B 14	E B 14	E B 14	E B 15	J A 24	J A 19	22	J A 42	35	40	43	C	39	J A 45	37	38	J A 40	J A 54	J A 86	J A 41	J A 20	J A 41	E B 14	E B 13
26	J A 35	E B 15	J A 19	E B 15	J A 19	E B 13	G	27	G	38	J A 54	J A 49	40	G	G 25	42	J A 51	E B 17	E B 15	J A 19	J A 29	J A 28	J A 26	J A 22
27	20	E B 14	J A 16	J A 23	J A 21	E B 14	E B 12	27	33	38	J A 50	J A 73	J A 74	G	G	32	26	J A 40	J A 54	E B 16	J A 26	J A 49	J A 53	J A 27
28	E B 12	E B 13	J A 21	E B 13	E B 15	E B 13	20	G	34	40	J A 50	J A 45	J A 47	J A 52	G 22	G 18	27	E B 15	E B 13	J A 23	E B 14	E B 13	J A 23	J A 30
29	J A 26	J A 22	J A 23	J A 24	E B 13	E B 13	E B 15	G	33	39	38	40	38	37	36	34	28	E B 16	J A 16	E B 14	J A 17	J A 29	J A 43	J A 26
30	J A 20	E B 13	E B 14	E B 16	E B 15	E B 13	E B 15	27	J A 42	G 33	J A 48	G	G 31	G	G 27	J A 35	J A 23	J A 26	J A 18	25	E B 15	E B 14	E B 15	E B 15
31	E B 15	E B 13	E B 14	E B 13	J A 30	E S 15	E 9 15	G	32	48	J A 51	J A 55	37	36	33	G 27	26	J A 21	J A 20	J A 23	J A 24	J A 20	J A 21	E B 17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	30	31	31	31	31	31	31	31
MED	E B 15	E B 14	E B 14	E B 14	E B 14	E B 13	G	27	35	39	41	40	37	36	37	34	28	24	J A 21	J A 21	J A 17	J A 18	J A 20	J A 19
UQ	J A 23	J A 18	J A 19	21	J A 18	E B 14	20	30	40	41	J A 48	43	42	41	40	38	35	J A 30	J A 32	J A 31	J A 23	J A 25	J A 25	J A 24
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G	G	34	35	E G 31	G	G	G	E G 22	E G 18	G	E G 16	J A 16	E B 14	E B 14	E B 14	E B 14	E B 14

OCT. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

OCT. 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 24sec in automatic operation

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

OCT. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

OCT. 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	15	13	13	12	13	13	14	15	17	18	20	20	20	17	18	20	17	13	13	13	14	12	14	13
2	13	13	13	13	13	13	13	14	15	17	20	24	20	21	18	17	16	13	13	13	14	13	13	14
3	13	12	13	13	13	13	14	14	20	25	21	24	24	25	21	17	17	13	13	14	14	14	14	14
4	13	13	13	13	13	13	13	14	17	18	25	25	26	26	20	16	15	13	13	14	13	14	13	14
5	14	14	13	13	13	13	14	16	18	23	20	20	24	22	20	17	15	13	13	14	13	14	13	14
6	12	13	13	12	13	13	14	15	16	20	21	26	23	18	21	16	14	13	13	14	13	14	14	14
7	13	13	12	13	13	14	13	14	16	17	21	21	20	22	21	18	16	13	12	13	13	15	14	12
8	13	13	13	13	13	13	14	14	16	18	20	25	23	20	17	14	14	15	14	12	14	14	14	14
9	13	14	13	13	14	15	14	16	17	20	25	32	22	27	21	19	18	13	14	13	14	13	14	13
10	14	13	13	12	13	13	14	13	16	17	18	22	18	21	18	17	15	13	13	13	15	14	14	14
11	12	13	13	13	14	13	13	14	17	21	20	21	21	20	20	14	16	13	13	14	14	13	15	13
12	14	12	13	13	12	13	14	14	17	17	18	21	21	20	18	14	16	18	13	13	13	14	14	13
13	13	13	12	13	12	14	14	14	17	18	21	20	21	19	18	16	14	13	14	13	13	13	13	13
14	13	13	13	14	12	13	14	15	17	20	23	22	19	18	17	17	16	14	13	14	13	13	13	16
15	14	13	13	13	13	13	13	15	17	18	17	31	32	22	18	17	14	13	13	13	13	13	13	13
16	14	14	13	13	13	14	14	14	16	18	20	24	23	29	20	19	16	14	13	13	13	14	13	13
17	15	13	13	13	13	15	13	15	17	18	20	20	22	22	18	15	14	13	13	13	14	13	14	15
18	14	13	13	13	16	14	13	16	15	17	25	19	30	26	20	16	16	14	13	14	14	14	13	12
19	13	12	14	13	13	14	13	14	18	20	21	26	24	22	19	18	13	12	13	16	14	13	14	14
20	13	14	14	13	13	13	13	15	16	18	21	26	26	26	29	21	17	14	13	13	13	13	14	13
21	13	13	13	14	13	13	13	14	17	20	20	23	23	24	21	35	14	12	13	13	15	13	14	13
22	13	13	13	13	13	13	13	13	15	16	20	22	24	18	22	17	18	13	13	13	13	14	14	15
23	14	13	13	14	15	14	14	13	15	18	18	25	21	22	16	14	13	14	14	14	13	13	13	14
24	13	13	13	14	14	14	13	15	17	16	20	18	20	16	16	16	C	15	14	14	14	14	14	14
25	14	14	14	15	13	15	17	15	17	20	21	C	21	20	20	16	13	14	13	12	13	14	14	13
26	14	15	14	15	13	13	12	14	17	17	20	20	18	20	17	17	16	17	15	15	14	13	14	13
27	13	14	14	13	14	14	12	14	17	18	18	16	21	20	18	19	14	13	13	16	14	13	13	13
28	12	13	13	13	15	13	13	15	16	17	21	20	20	18	19	15	15	15	13	14	14	13	13	13
29	13	13	12	13	13	13	15	17	14	20	19	20	E S 27	22	18	17	15	16	15	14	15	14	13	13
30	13	13	14	16	15	13	15	14	14	17	19	17	22	20	16	16	13	12	14	15	15	14	15	15
31	15	13	14	13	13	E S 15	15	14	16	17	19	20	24	20	17	16	14	13	13	13	14	13	15	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	30	31	31	31	31	31	31	31
MED	13	13	13	13	13	13	14	14	17	18	20	22	22	21	18	17	15	13	13	13	14	13	14	13
UQ	14	13	13	13	14	14	14	15	17	20	21	25	24	22	20	18	16	14	14	14	14	14	14	14
LQ	13	13	13	13	13	13	13	14	16	17	20	20	20	20	18	16	14	13	13	13	13	13	13	13

OCT. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

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

135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	290	310	315	305	310	300	340	350	355	325	300	295	300	290	295	295	295	320	320	325	295	275	280	280
2	295	295	290	300	295	280	340	330	335	330	305	295	290	295	275	290	305	315	315	305	285	280	280	295
3	270	275	280	300	280	275	335	340	320	320	300	285	285	280	290	285	300	305	320	335	280	280	275	280
4	290	280	275	270	275	275	315	330	325	320	290	300	285	285	275	285	290	300	310	315	290	260	270	275
5	280	260	265	275	295	275	320	330	320	300	285	295	280	285	280	285	290	305	320	310	295	285	290	290
6	290	275	285	290	285	280	325	325	330	320	295	290	285	280	280	285	295	305	325	295	285	285	300	290
7	300	305	265	270	270	270	325	335	325	325	290	300	295	290	290	290	305	315	315	310	280	285	305	295 S
8	295	270	275	290	275	270	325	320	325	330	290	295	285	285	290	295	305	315	330	290	295	290	285	280
9	285	290	270	270	275	290	330	335	335	325	280	290	290	285	285	290	305	310	315	290	285	295	290	295
10	S 260	F 270	F 265	290	265	F 265	295	325	330	320	280	290	280	275	280	285	275	290	275	275	250	250	265	295
11	280	260	255	270	280	265	300	320	315	315	295	295	285	285	285	R 280	290	300	300	265	290	295	260	275
12	280	280	255	255	245	250	280	305	315	300	290	285	280	275	280	285	290	300	300	270	265	275	265	265
13	275	300	285	270	265	250	300	315	305	300	290	290	285	285	290	295	300	300	310	295	285	290	280	280
14	285	275	260	260	270	285	315	310	320	315	305	290	285	280	280	285	290	295	295	295	310	305	280	275
15	275	265	F 260	F 260	F 270	F 265	V 310	330	310	310	290	285	280	275	280	285	285	290	300	285	280	285	270	265
16	255	255	260	265	V 235	260	295	305	310	300	285	275	280	275	275	280	285	300	295	300	275	280	275	275
17	270	275	275	280	270	285	320	315	320	305	290	290	280	275	275	285	295	310	285	295	280	290	285	275
18	280	280	285	290	305	305	325	325	320	315	300	280	275	280	280	285	295	295	300	285	275	275	275	275
19	285	265	260	275	275	290	325	330	320	300	285	285	275	270	280	280	285	295	295	280	285	265	265	275
20	270	280	295	290	270	280	325	315	310	315	290	285	280	275	275	285	295	300	290	270	260	275	265	270
21	275	S 280	250	F 260	F 290	F 300	295	295	320	310	300	275	280	280	285	285	290	295	300	290	280	285	270	270
22	260	275	260	280	280	265	295	315	325	310	300	280	280	280	275	285	290	300	R 305	280	285	300	290	300
23	305	285	275	270	285	305	325	320	325	315	315	300	285	280	290	290	295	310	295	290	300	300	290	290
24	290	290	290	290	300	285	315	320	320	310	320	290	285	270	280	290	I C 290	290	290	275	280	285	280	270
25	270	265	265	295	290	280	315	320	320	315	305	I C 300	295	280	300	300	310	305	S 295	290	285	295	300	300
26	285	265	280	290	320	300	325	S 335	315	325	315	310	295	295	290	295	300	320	320	305	290	295	280	295
27	270	255	265	270	260	270	320	335	330	330	315	300	295	290	290	300	315	320	295	305	295	290	280	285
28	300	330	270	265	265	285	320	335	310	315	305	310	300	295	300	300	305	320	310	300	295	305	325	290
29	270	280	290	315	335	295	305	325	335	340	320	300	305	300	305	310	315	320	310	305	300	280	285	295
30	305	295	285	260	265	285	340	345	315	310	310	300	295	285	295	305	315	295	285	285	285	305	S 320	310
31	280	260	275	300	F 320	275	310	340	320	315	315	305	300	R 305	300	295	320	315	300	295	300	300	290	295
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	280	275	275	275	275	280	320	325	320	315	300	290	285	280	285	285	295	305	300	295	285	285	280	280
UQ	290	288	285	290	292	288	325	335	325	322	305	300	295	288	290	295	305	315	315	305	295	295	290	295
LQ	270	265	262	270	270	270	308	318	315	310	290	285	280	278	280	285	290	298	295	285	280	280	272	275

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

IONOSPHERIC DATA

OCT. 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 24sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L		U L 395	U L 365	U L 340		L	L								
2									L	L	L	L	L	L		L								
3										L	L	L	U L 340	L	L	L								
4										U L 390	L	L	L	L	L	L								
5										L	L	L	L	U L 335	L	L								
6									L	L	L	L	L	L	L	L								
7										L	L	L	L	L	L									
8									L	L	L	U L 370	L	L	L	L								
9									L	L	L	L	L	L	L	L								
10										L	L	L	L	L	L		L							
11											L	L	L	L	L									
12														L	L	L								
13											L	L	L	L	L									
14										L		L	L		L									
15									L	L	L			U L 350	L	L								
16									L		L	L	L	L	L	L								
17									L	L		U L 400	L	U L 335	L	L								
18									L	L	L	L	L	L	L									
19									L	L	L	L	L	L	L									
20									L	L	L	L	L	L	L									
21										L	L	L	L	U L 355	L	L								
22								L	L	L	L	L	L	L	L									
23										L	L	L	L	L										
24										L	L	L	L			L	C							
25											L	C	L	L	L									
26									L		L	L	L											
27										L				L	L									
28											L	L	L	L										
29										L	L			L										
30										L	L	L	L	L	L									
31										L	L		L	L	L									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	1	3	2	4										
MED										U L 390	U L 395	U L 370	U L 340	U L 342										
UQ												U L 385		U L 352										
LQ												U L 368		U L 335										

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

IONOSPHERIC DATA

OCT. 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									235		245	270	280		280	280								
2									240	240	230	275	305	275		285								
3										255	250	260	320	300	290	290								
4										240	L 305	290	280	280	L 305	305								
5										255	260	285	L 300	290	310	285								
6									235	240	240	255	305	H 260	320	L 290								
7										245	240	280	270	255	300									
8									250	235	305	265	300	305	L 290	275								
9									240	235	H 230	260	L 305	L 300	290	280								
10										245	U L 315	L 280	H 260	310	280		L 305							
11											L 300	280	250	315	255									
12														L 260	310	L 270								
13											L 305	275	310	270	290									
14										250		295	300		305									
15									250	250	L 300			315	280	275								
16									250		H 230	305	310	L 330	315	285								
17									245	H 235		H 235	L	325	305	285								
18									230	225	240	L 305	L 315	310	305									
19									260	265	L 300	L 270	310	330	310									
20									255	235	235	L 305	305	300	L 335									
21										255	255	H 260	310	320	295	L 300								
22								255	230	260	285	L 325	L 290	305	305									
23										255	245	285	L 305	300										
24										260	245	300	305			265	C							
25											235	C	300	L 345	260									
26									255		255	270	H 255											
27										235				240	260									
28											260	255	L 300	L 305										
29										245	255			265										
30										265	255	240	290	305	270									
31										240	255		240	250	250									
	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	13	23	27	25	26	27	25	14	1							
MED								255	245	245	255	275	300	300	295	285	L 305							
UQ									250	255	292	290	305	312	305	290								
LQ									235	238	240	260	280	272	280	275								

OCT. 1990 | H'F2 (KM)

IONOSPHERIC DATA

OCT. 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	265	260	250	240	A 260	260	220	225	240	A 220	200	200	210	235	E A 260	230	245	240	220	A 235	260	305	305	290
2	275	270	270	260	250	260	225	225	230	230	220	210	H 210	240	230	H 210	A 250	245	230	225	255	290	270	260
3	305	300	265	260	275	310	235	220	230	235	210	200	215	H 205	240	235	250	250	230	220	225	260	275	285
4	275	270	265	285	270	270	240	245	225	210	210	220	240	225	230	250	245	260	230	215	240	280	A 310	290
5	280	305	315	300	210	270	245	230	235	210	215	220	H 220	215	230	235	250	245	220	225	230	260	270	280
6	275	285	270	255	260	290	245	240	235	225	210	210	H 190	225	H 220	240	240	250	225	220	270	250	265	A 260
7	255	255	255	295	320	310	240	230	225	220	205	200	205	215	230	240	240	235	220	230	265	280	260	265
8	260	285	290	275	260	285	240	235	230	215	210	205	H 215	225	235	235	250	235	215	240	250	240	265	275
9	280	280	295	290	285	270	240	235	225	220	210	200	H 210	225	240	235	245	230	220	225	255	260	260	260
10	300	310	300	250	290	375	255	235	225	220	H 210	225	220	230	235	H 240	240	250	250	270	260	275	280	260
11	255	295	315	295	260	265	255	220	235	235	240	A 240	230	225	235	235	250	240	A 250	A 260	260	255	310	305
12	270	270	315	320	315	325	250	235	235	230	225	225	230	230	240	A 250	250	240	225	A 225	260	A 305	A 310	305
13	300	255	265	285	285	335	255	215	220	225	220	H 205	230	235	235	235	235	225	235	240	230	240	265	280
14	275	285	310	310	255	245	245	230	225	220	220	215	205	A 250	235	A 255	235	230	235	265	235	225	235	280
15	285	300	285	325	310	305	250	220	220	220	H 215	H 225	H 225	225	230	H 230	235	250	235	245	250	230	270	300
16	310	325	310	315	280	315	240	235	235	225	220	215	H 210	235	235	235	245	235	225	240	230	265	300	290
17	290	280	265	270	255	235	230	225	220	215	225	210	225	225	240	240	250	225	220	265	225	240	255	285
18	280	280	275	275	255	255	235	225	230	225	215	H 205	210	240	245	235	235	230	225	235	250	265	280	280
19	280	300	335	305	275	265	220	215	220	225	215	215	225	240	240	245	245	230	225	240	250	250	285	285
20	285	275	270	255	260	265	240	220	215	235	215	H 220	225	230	240	H 245	255	235	225	235	305	A 285	280	265
21	220	270	335	330	260	215	250	235	235	225	H 215	220	225	230	H 205	250	245	230	225	240	250	235	270	270
22	A 330	A 290	310	300	270	285	265	230	230	225	220	H 215	H 205	235	260	A 255	260	225	215	270	245	250	270	250
23	230	245	285	290	260	255	230	225	235	230	220	H 205	H 225	220	240	235	A 245	235	250	255	230	250	250	265
24	275	280	270	275	260	265	250	225	230	235	225	215	225	H 255	240	240	I C 240	235	225	265	255	250	260	270
25	285	300	315	260	225	280	265	235	225	235	235	I C 220	H 205	H 225	240	235	225	225	A 245	265	255	275	265	255
26	285	305	300	275	235	235	245	230	230	235	230	220	230	H 220	230	225	235	220	220	245	A 275	265	285	275
27	295	330	305	285	330	305	235	235	230	230	230	A 250	A 245	215	230	250	240	215	240	235	250	A 290	305	275
28	245	225	285	325	340	305	255	230	220	225	A 235	235	225	235	245	235	235	215	210	230	255	245	245	255
29	315	290	290	250	230	250	250	225	235	235	215	235	H 205	215	235	235	230	215	220	250	250	290	A 310	275
30	255	265	280	320	335	295	235	215	225	H 220	220	210	220	235	235	235	210	H 205	240	275	270	250	235	235
31	270	325	290	255	250	305	250	220	225	225	A 240	230	225	220	225	240	235	205	230	265	255	235	280	265
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	280	285	290	285	260	270	245	230	230	225	220	215	220	225	235	235	245	235	225	240	250	260	270	275
UQ	288	300	310	302	285	305	250	235	235	230	225	222	225	235	240	242	250	240	235	262	260	278	285	285
LQ	268	270	270	260	255	260	235	222	225	220	212	208	H 210	222	230	235	235	225	220	230	242	248	262	262

OCT. 1990 | H'F (KM)

IONOSPHERIC DATA

OCT. 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 24sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							E A	A	A	A	A 120	A 115	115	A 115	110	115	120	B 130						
2							B 145	120	115	110	115	115	125	A	115	115	115	A						
3							135	120	120	115	110	110	115	A	A	A	115	A						
4							A	115	110	115	A	A	A	120	120	115	120	125						
5							A	A	A	A	A 120	A 120	120	115	115	115	115	120						
6							135	115	115	115	110	110	A 120	A 130	A 115	115	120	E B 160						
7							E B 140	115	A	A	110	115	A 120	115	115	110	115	E A 150						
8							E B 145	115	115	115	115	120	120	115	A 125	115	A 120	A						
9							B 135	120	115	115	115	120	115	120	120	115	115	135						
10							A	120	110	110	110	115	115	120	110	115	115	B 130						
11							130	E A 160	A	115	110	110	110	110	110	A	115	B 130						
12							E B 160	110	110	110	110	110	110	110	110	110	115	B						
13							B 150	115	110	110	110	110	110	110	110	110	115	A						
14							B 160	120	115	115	115	110	115	A 115	115	115	A	A						
15							135	120	115	110	110	B 120	125	115	115	120	115	E B 160						
16							155	115	110	110	110	115	A	120	115	115	115	B						
17							B 140	115	110	110	110	110	115	120	110	110	A 120	A						
18							E B 150	120	115	110	115	115	A	A	A	A	115	A						
19							E B 150	A 130	115	110	110	A	115	115	A	A	A 125	A						
20							B	115	115	115	110	E A 130	A	125	125	115	120	B						
21							B 155	115	A	110	110	110	115	110	A	B	110	A						
22							E B 180	115	110	110	110	120	120	115	115	115	A	B						
23							B	120	115	110	110	115	115	115	115	115	A 120	B						
24							H 155	120	110	A 120	A	E A 120	A 120	120	A 115	A 120	I C 120	B						
25							B	120	115	115	115	I C 115	115	A	A 125	110	A 120	B						
26							E B 155	120	110	115	110	A 120	E A 130	115	E A 125	115	120	B						
27							B	115	115	110	115	110	A	110	115	120	E A 150	B						
28							E B 180	125	115	110	115	110	A	A	120	120	125	B						
29							B	120	110	110	110	110	S 120	120	115	115	120	B						
30							B	115	110	A 125	A	110	A 120	115	A 120	A	A 125	B						
31							B	115	110	110	110	110	115	120	120	E A 135	125	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							20	29	26	28	28	29	25	26	27	25	29	9						
MED							B 142	118	115	110	110	112	115	115	115	115	120	B 128						
UQ							B 152	120	115	115	115	118	120	120	120	115	120	E B 150						
LQ							B 136	115	110	110	110	110	115	115	115	115	115	B 130						

OCT. 1990 | H'E (KM)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	110	125	110	105	110	110	105	110	105	115	115	105	125	110	110	145	125	120	110	110	100	100	100
2	100	B	110	B	B	B	G	145	120	120	120	120	125	125	G	G	115	115	120	110	110	105	105	105
3	B	105	B	B	B	B	160	G	115	115	115	G	E G 190	115	110	110	145	125	120	B	B	105	B	B
4	B	B	B	B	B	B	155	E G 175	E G 160	G	110	110	115	G	E G 160	135	G	G	120	115	125	110	100	100
5	110	B	B	120	130	B	110	105	105	105	105	110	G	G	G	G	G	125	115	B	B	B	B	100
6	100	105	105	105	110	B	G	G	G	G	G	G	110	110	E G 140	135	G	G	B	B	B	110	105	105
7	110	100	B	100	100	B	135	G	110	105	G	G	100	G	G	G	G	100	100	100	B	110	105	100
8	100	100	B	100	B	B	G	130	120	G	120	G	G	125	130	105	100	100	115	110	110	110	105	B
9	B	B	B	B	B	B	G	120	G	120	G	G	G	G	G	G	E G 160	G	B	B	B	B	B	B
10	B	B	B	B	B	B	135	135	140	125	G	G	105	G	G	E G 170	140	125	100	B	B	B	B	B
11	B	B	B	B	B	B	G	E G 175	140	130	120	120	125	130	115	110	G	125	110	110	95	105	105	105
12	105	110	105	100	B	B	E G 200	105	E G 160	135	125	125	125	140	130	120	120	B	105	105	110	100	105	105
13	100	100	105	B	B	B	G	G	135	130	115	120	120	115	130	G	115	110	110	105	110	110	110	110
14	B	B	105	B	B	B	G	E G 180	E G 160	130	E G 130	120	115	110	115	110	110	120	125	105	105	105	110	110
15	B	B	B	B	B	B	G	G	G	G	G	G	G	G	110	G	G	G	B	B	B	B	B	B
16	B	B	B	B	B	B	G	G	E G 165	130	120	120	120	G	G	G	G	G	110	105	110	105	100	100
17	B	B	B	B	B	B	G	E G 175	G	G	G	G	G	G	E G 185	155	105	130	95	110	B	B	B	105
18	120	105	B	B	B	B	155	G	125	120	120	120	120	115	115	120	G	125	110	110	105	105	110	105
19	B	100	100	105	B	B	G	115	120	120	G	115	G	G	120	115	E G 155	100	115	105	105	B	B	B
20	100	B	105	100	110	B	G	G	115	115	G	110	105	G	G	G	E G 175	125	115	B	110	105	110	B
21	105	B	B	B	B	B	G	G	115	125	110	120	G	E G 165	105	B	G	110	135	B	B	110	B	B
22	105	105	100	100	105	110	G	G	E G 165	G	135	125	G	E G 180	145	120	110	115	105	105	110	105	100	B
23	B	B	B	105	110	110	B	100	130	120	120	120	G	120	120	105	115	110	110	B	B	B	B	B
24	B	110	110	B	B	B	G	145	E G 140	130	100	125	100	100	95	105	C	B	B	B	B	B	B	B
25	B	B	B	B	110	110	105	100	E G 175	125	120	C	125	110	E G 185	150	135	120	115	110	110	110	B	B
26	105	B	110	B	100	B	G	E G 180	G	130	125	125	160	G	100	155	120	B	B	140	105	110	110	105
27	105	B	105	105	100	B	B	E G 165	E G 145	130	115	110	105	G	G	E G 145	105	125	110	B	130	105	105	110
28	B	B	100	B	B	B	E G 195	G	140	120	110	110	105	100	110	110	E G 140	B	B	115	B	B	120	105
29	105	105	105	105	B	B	B	G	130	120	120	120	125	130	130	E G 155	130	B	100	B	100	105	100	100
30	110	B	B	B	B	B	B	E G 165	140	110	105	G	110	G	110	105	105	105	100	100	B	B	B	B
31	B	B	B	B	125	S	B	G	E G 155	115	115	115	130	120	120	110	150	110	110	105	110	100	100	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	12	14	12	11	4	10	18	26	25	23	21	22	18	23	22	21	21	25	19	18	21	19	17
MED	105	105	105	105	110	110	U 134	U 121	U 126	120	118	120	116	118	115	114	118	120	110	110	110	105	105	105
UQ	108	108	110	105	110	110	158	E G 175	E G 155	130	120	120	125	128	125	U 132	U 138	125	115	110	110	110	110	105
LQ	100	100	105	100	102	110	110	105	120	115	112	115	105	110	110	110	110	110	105	105	105	105	100	100

OCT. 1990 | H'ES (KM)

IONOSPHERIC DATA

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

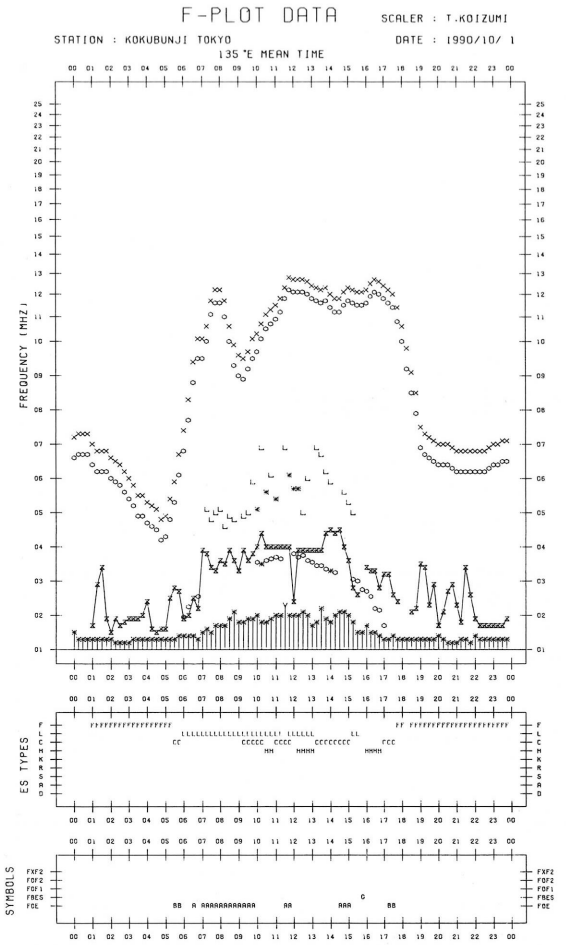
Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

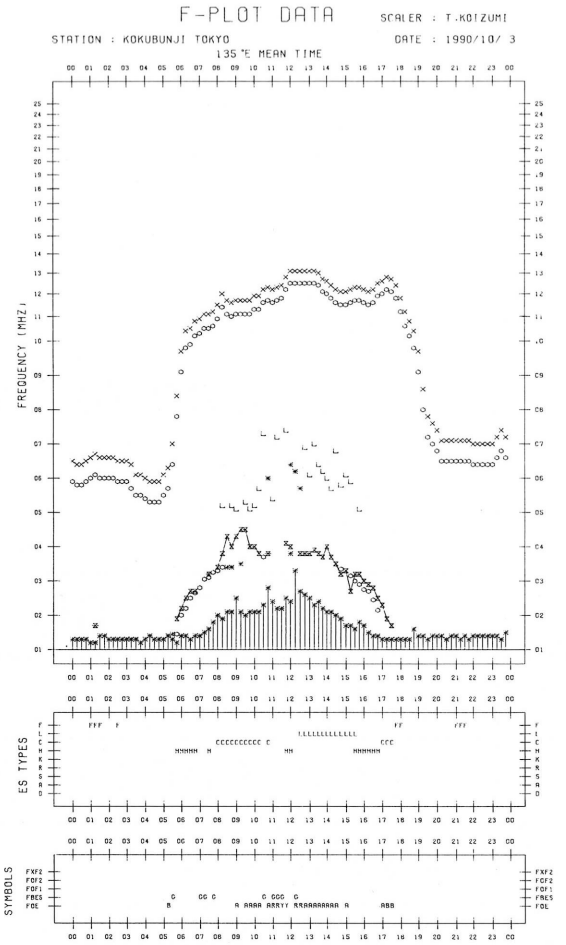
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		F 2	FF 12	F 4	F 4	F 2	L 2	L 3	L 3	L 2	CL 22	CL 11	L 1	HL 11	C 2	C 2	H 1	C 3	F 4	F 5	FF 23	F 4	F 4	F 2
2	F 2		F 1					CL 11	C 2	C 2	C 1	C 1	CL 11	CL 11			C 3	C 3	F 3	F 1	FF 32	F 2	F 2	F 1
3		F 2					H 1		C 1	C 2	C 1		H 1	L 1	L 2	L 2	H 1	C 3	F 1			F 1		
4							HL 21	H 1	H 1		L 2	L 1	L 2		H 1	H 2			F 1	F 1	F 1	F 1	F 4	F 2
5	F 1			F 1	F 1		L 3	L 3	L 3	L 2	L 2	L 1						C 1	F 1					F 2
6	F 3	F 2	F 2	F 1	F 1								L 1	L 1	HL 11	H 1						F 1	F 3	F 3
7	F 2	F 3		F 1	F 1		H 1		C 2	L 1			L 1					L 2	F 1	F 1		F 1	F 2	F 2
8	F 3	F 2		F 1				H 2	C 1		C 1			CL 11	HL 11	L 1	L 1	L 2	F 1	F 2	F 2	F 1	F 1	
9								L 1		C 1							H 1							
10							C 3	H 2	H 1	H 1			L 1			H 1	H 1	C 3	F 1					
11								HL 12	HL 22	H 2	C 3	C 2	H 1	H 1	C 2	CL 21		C 4	F 5	F 3	F 2	F 3	F 3	F 3
12	F 2	F 1	F 2	F 2			H 1	L 1	H 1	H 2	H 2	H 1	H 1	H 1	H 1	C 3	C 2		F 4	F 5	F 2	F 6	F 6	F 5
13	F 4	F 2	F 2						H 1	H 2	C 2	C 1	C 1	C 1	H 1		C 3	C 3	F 4	F 3	F 1	F 2	F 2	F 1
14			F 2					H 1	H 1	H 1	H 1	C 1	CL 11	CL 21	CL 21	C 2	C 3	C 2	FF 11	F 4	F 3	F 2	F 1	F 1
15															L 1									
16									H 1	H 2	C 1	C 1	C 1						F 1	F 2	F 1	F 1	F 2	F 2
17								H 1							H 1	HL 11	L 1	CL 31	F 2	F 3				F 2
18	F 1	F 1					H 1		HL 21	C 1	C 1	CL 11	C 1	C 1	C 1	C 2		CL 21	F 2	F 2	F 2	F 2	F 1	F 1
19		F 1	F 2	F 1				L 2	C 2	C 1		L 1			CL 11	L 1	HL 11	L 3	FF 22	F 1	F 1			
20	F 2		F 1	F 2	F 1				L 1	L 1		L 1	L 2				H 1	C 3	F 3		F 3	F 6	F 2	
21	F 1								C 2	C 1	C 2	C 1		H 1	L 1			L 2	FF 11			F 1		
22	F 4	F 4	F 2	F 3	F 2	F 1			H 1		H 1	C 1		H 1	H 2	C 2	C 2	C 2	F 1	F 2	F 2	F 2	F 1	
23				F 2	F 1	F 1		LI 1	H 2	C 2	C 1	C 1		C 1	CL 11	L 1	CL 31	C 4	F 3					
24		F 1	F 1					H 2	H 1	HL 21	LH 21	HL 12	L 1	L 1	L 1	L 1								
25					FF 11	F 1	L 1	L 1	H 1	C 1	C 1		C 1	L 2	HL 11	H 1	HL 21	C 2	F 4	F 2	F 1	F 2		
26	F 3		F 1		F 1			H 1		H 1	H 1	HL 21	HL 11		L 1	H 1	C 4			F 1	F 3	F 2	F 2	F 2
27	F 1		F 1	F 2	F 1			H 1	H 1	H 1	CL 21	CL 31	C 3			HL 11	L 2	CL 12	F 3		F 1	F 4	F 4	F 2
28			F 1				H 1		H 1	C 1	C 2	C 2	L 2	L 2	L 1	L 1	H 2			F 1			F 1	F 2
29	F 2	F 2	F 2	F 2					H 1	C 2	CL 11	C 1	C 1	C 1	H 1	H 1	H 1		F 1		F 1	F 3	F 3	F 3
30	F 1							H 1	H 1	L 2	L 1		L 1		L 2	L 2	L 2	L 3	F 1	F 2				
31					F 2				H 1	C 2	C 2	C 2	H 1	CL 11	L 1	L 2	H 1	L 1	F 2	F 2	F 1	F 2	F 1	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

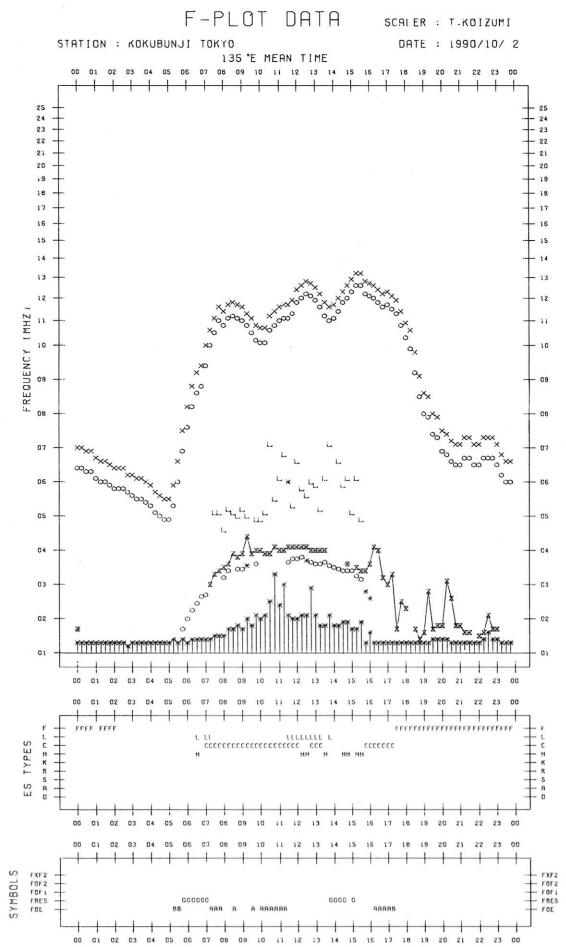
OCT. 1990 | TYPES OF ES

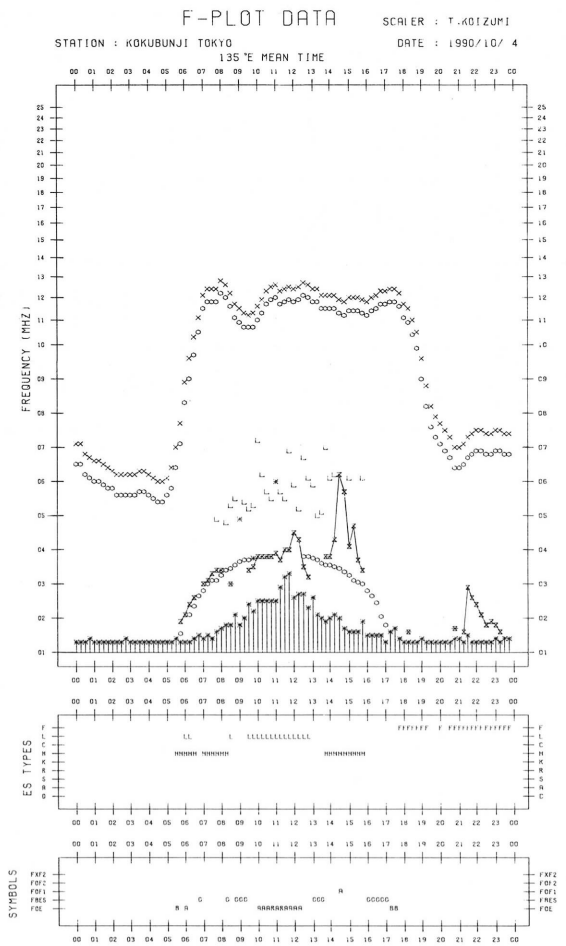
f-PLOTS OF IONOSPHERIC DATA

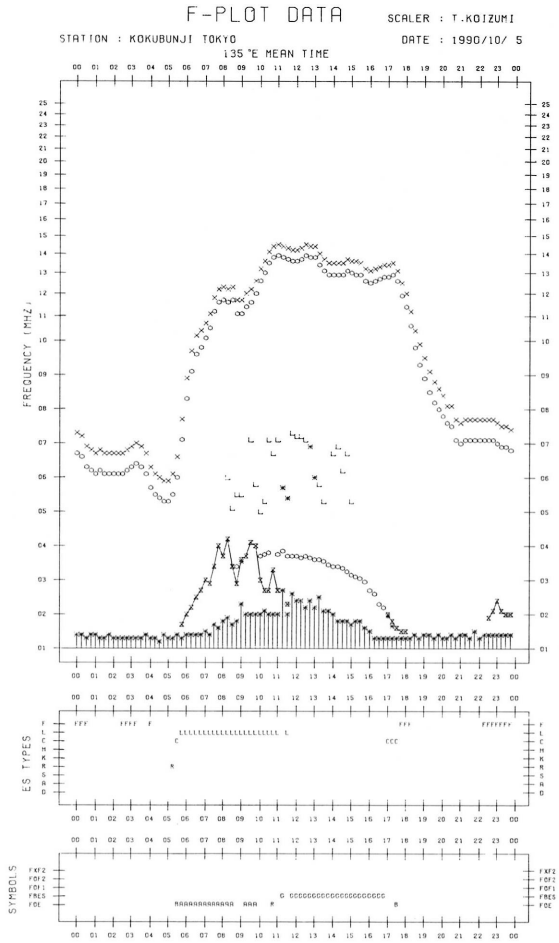
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2,FOF1,FOE
×	FXF2
✳	DOUBTFUL FOF2,FOF1,FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑,↑	FMIN
∧	GREATER THAN
∨	LESS THAN

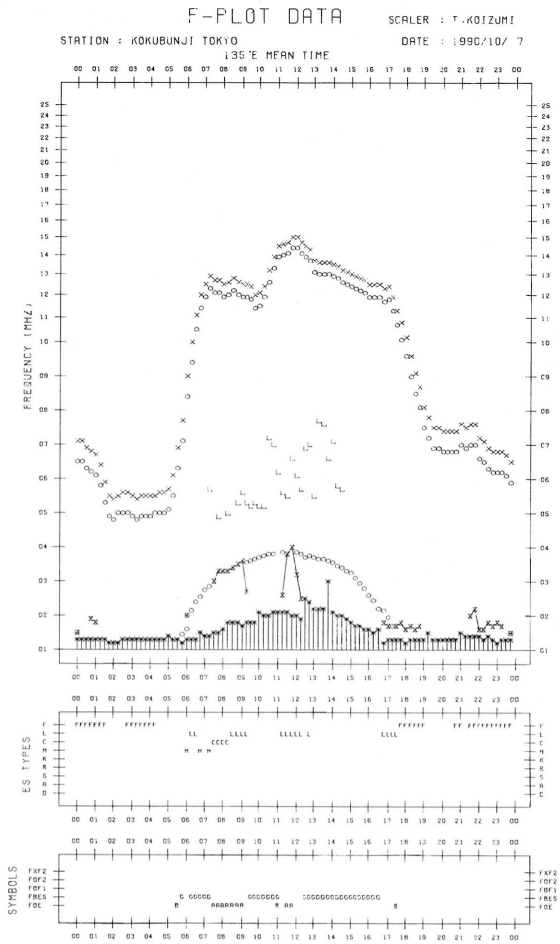

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

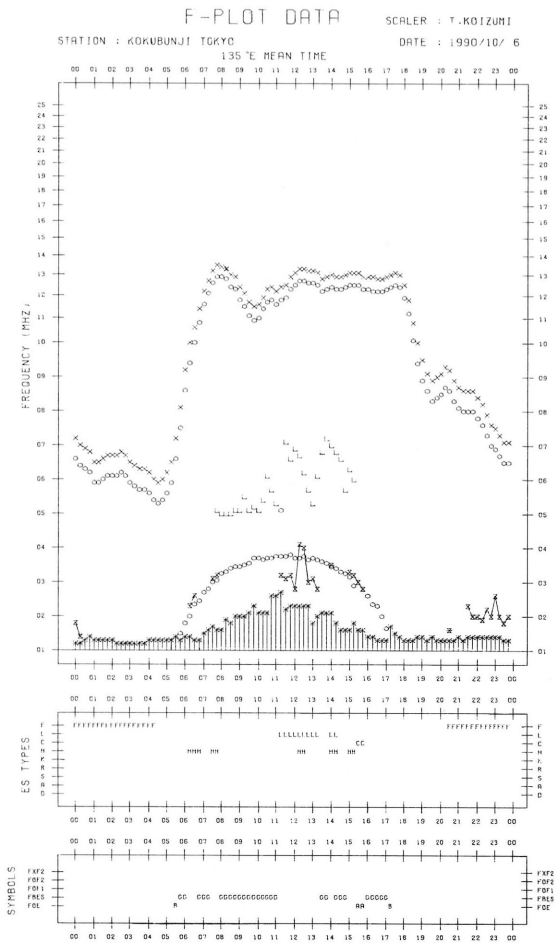

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

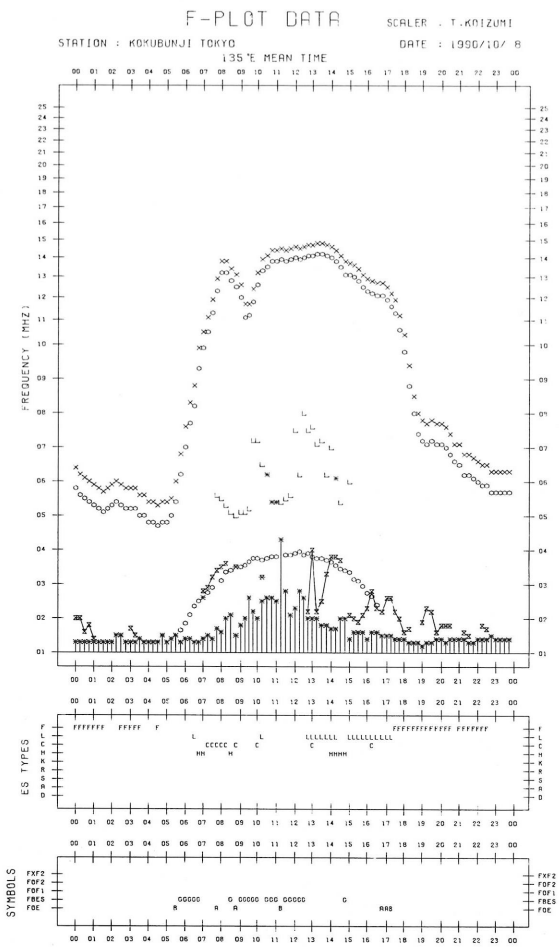

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

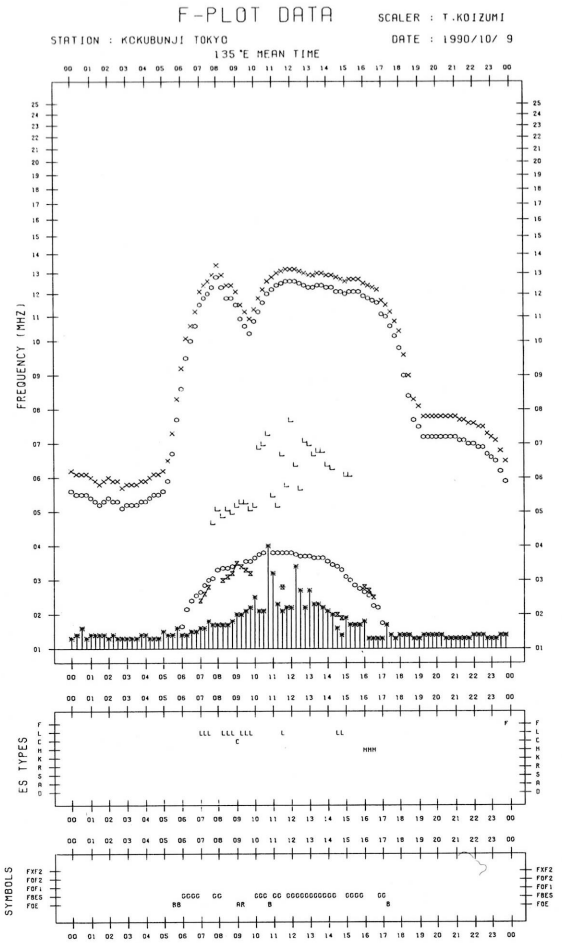

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

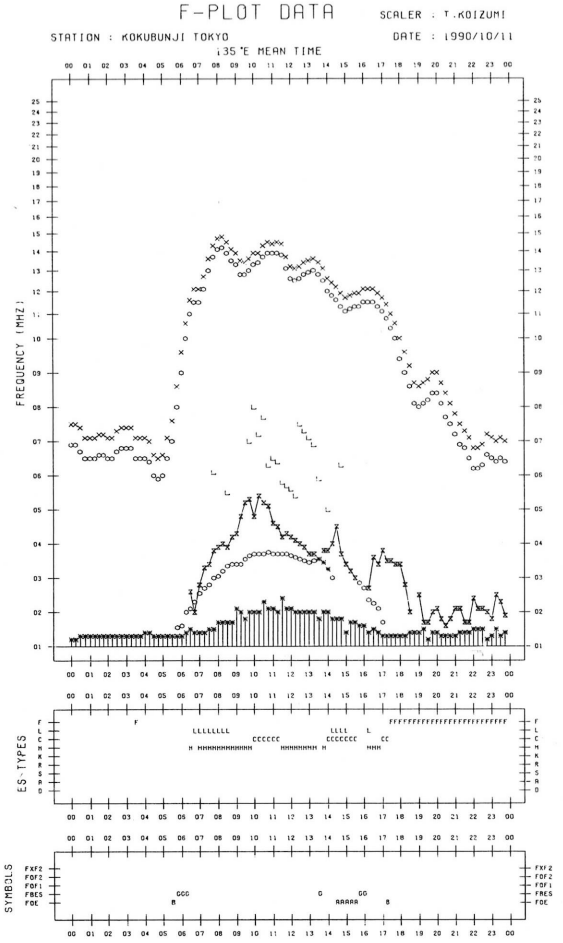

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

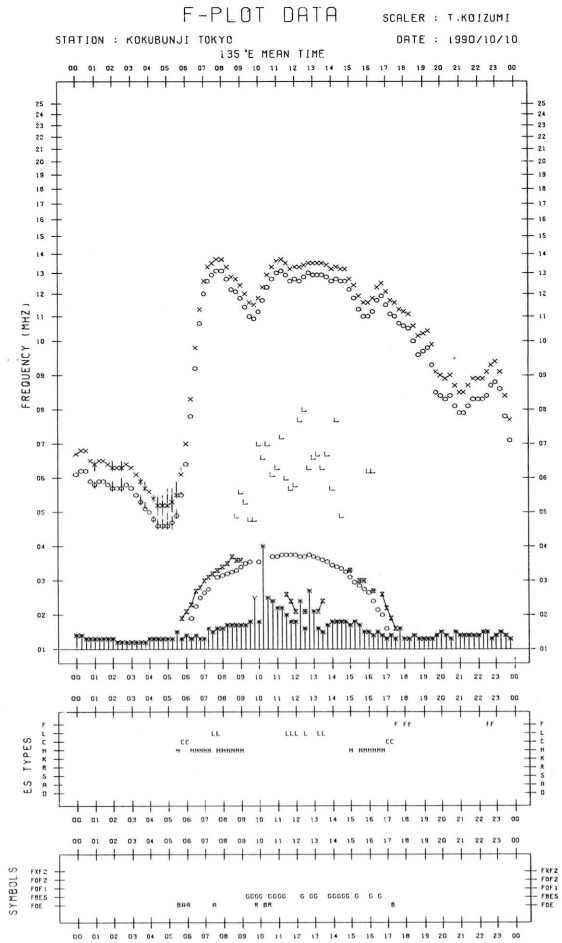

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

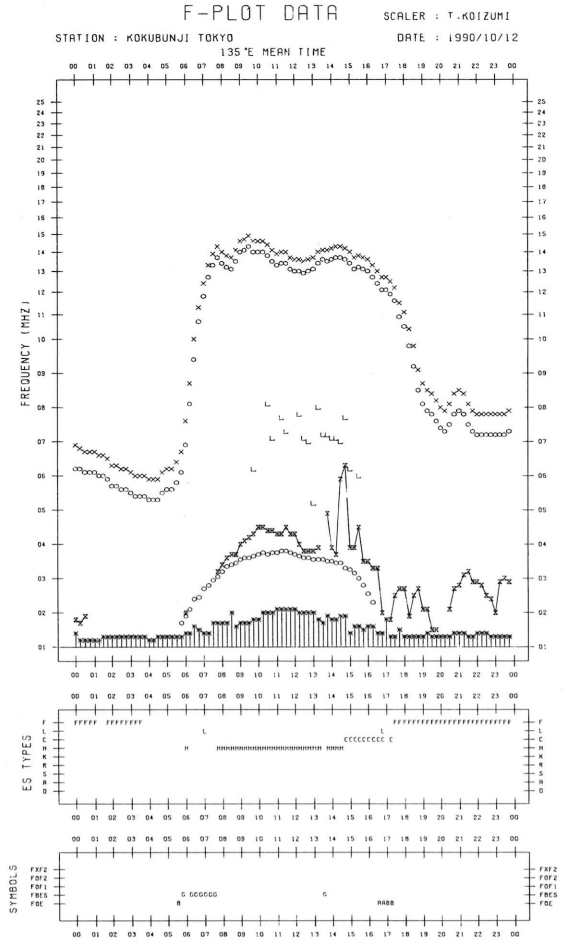

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

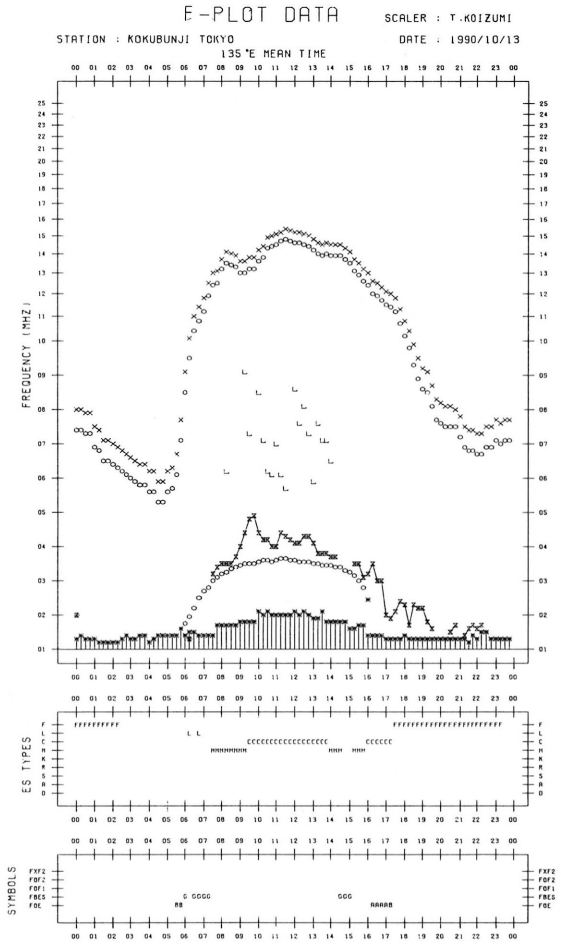

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

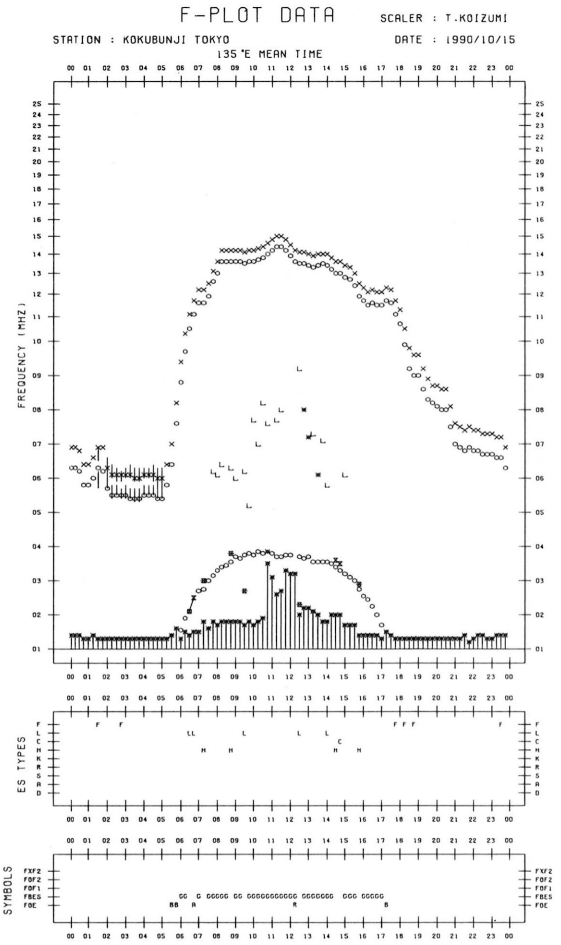

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

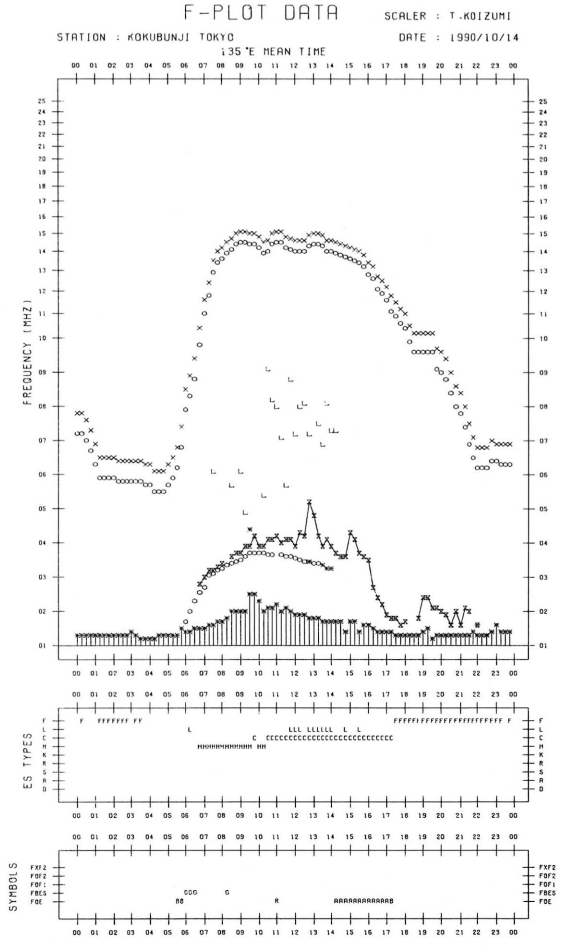

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

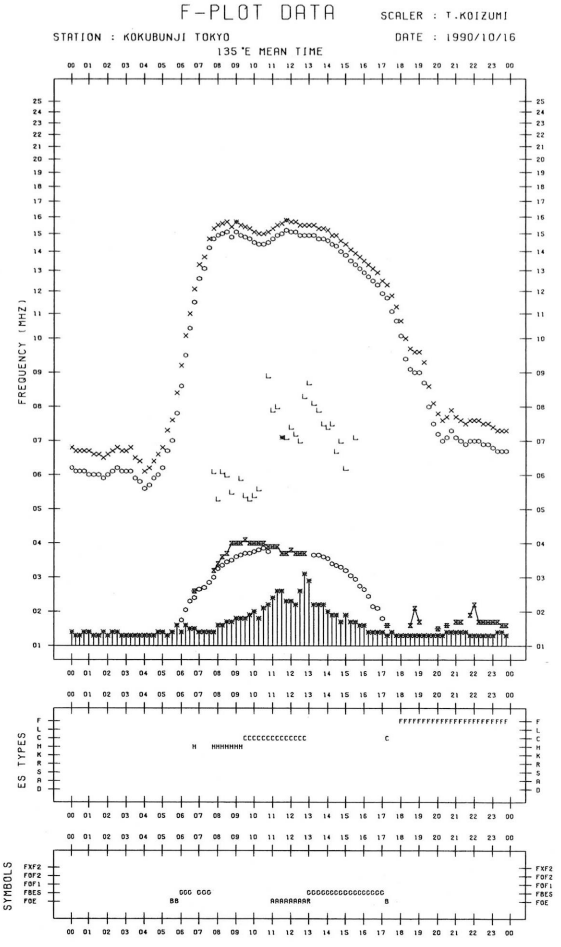

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

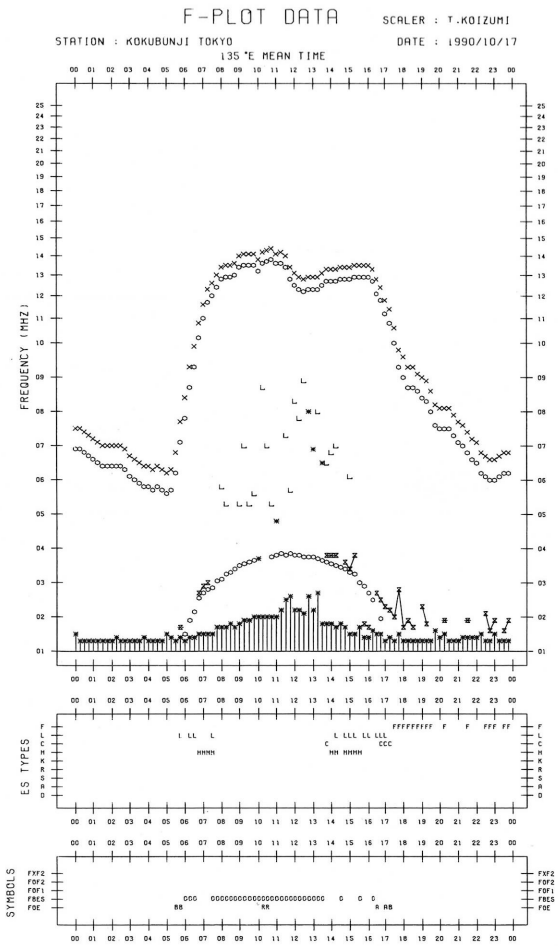

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

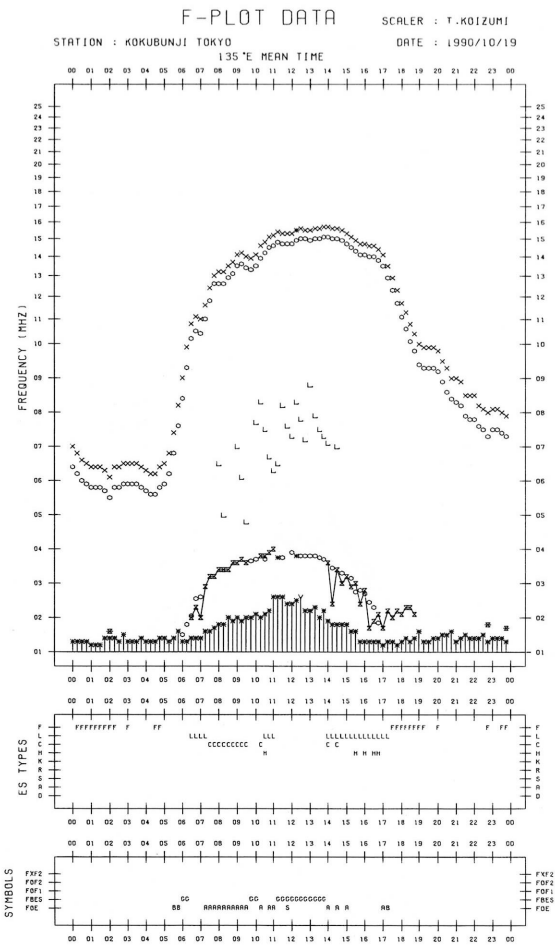

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

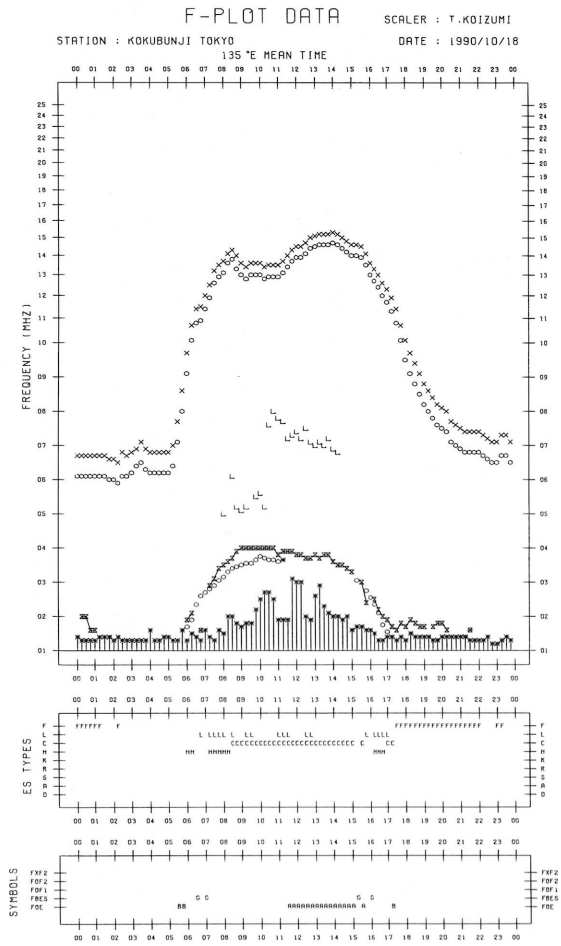

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

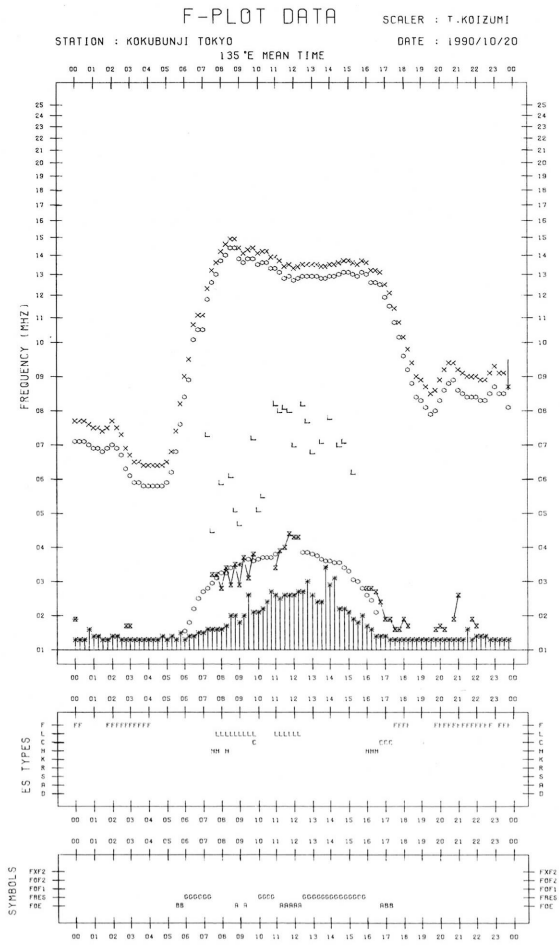

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

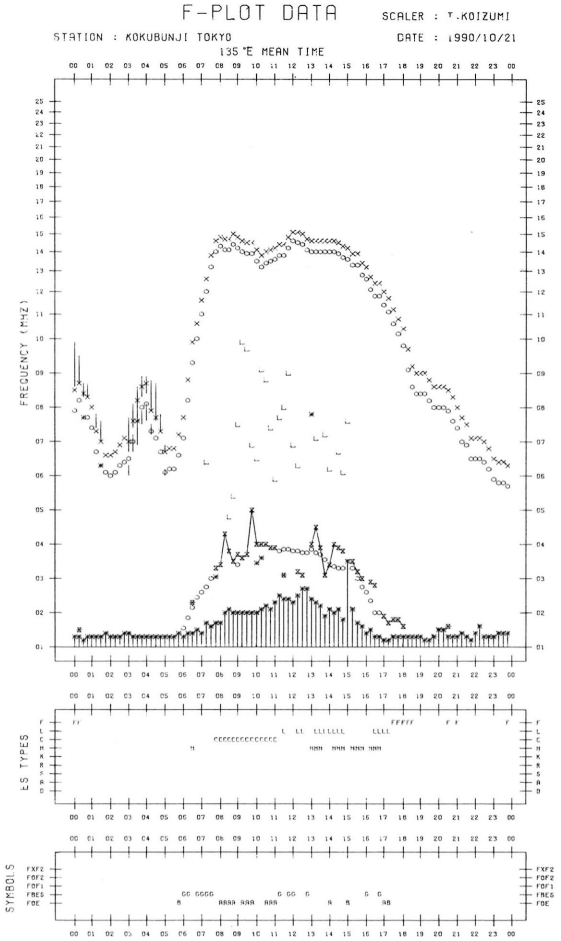

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

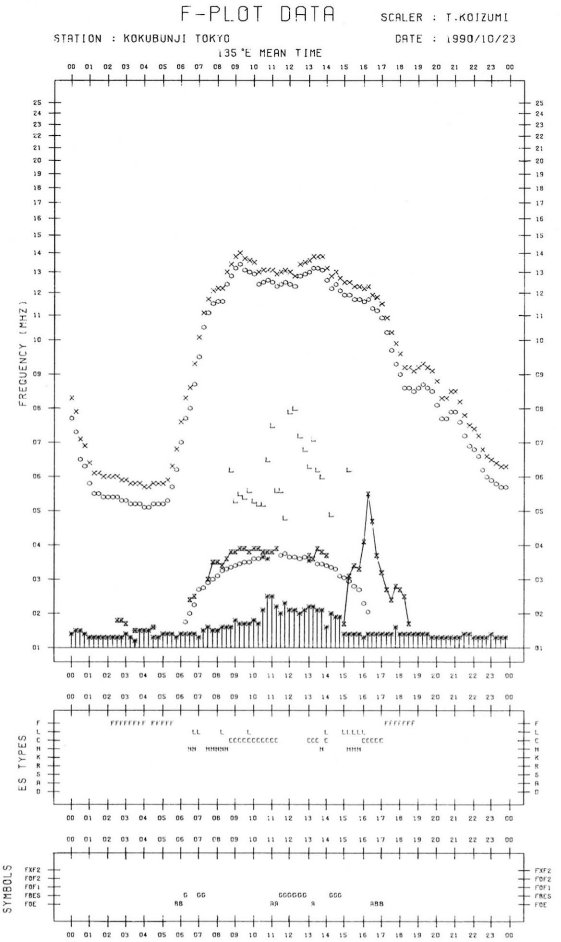

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

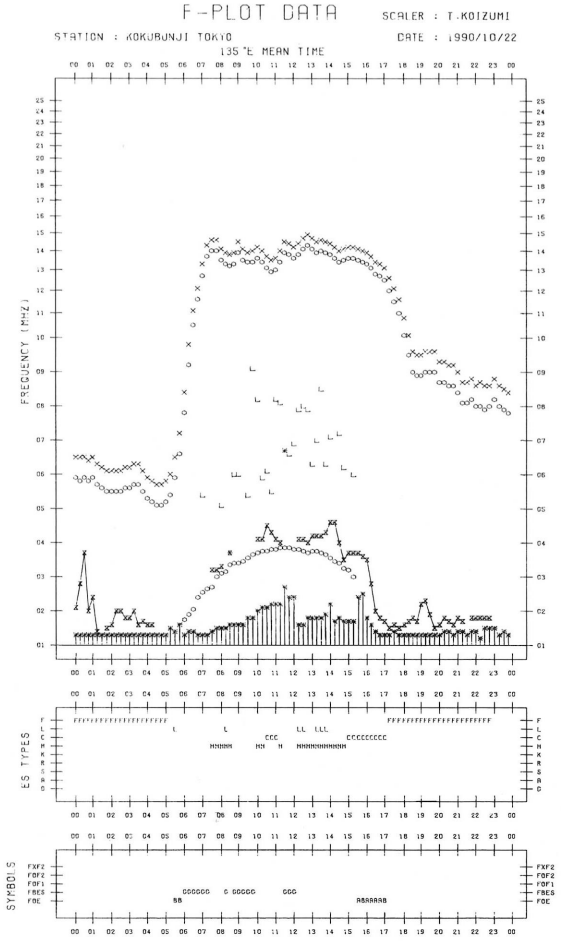

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

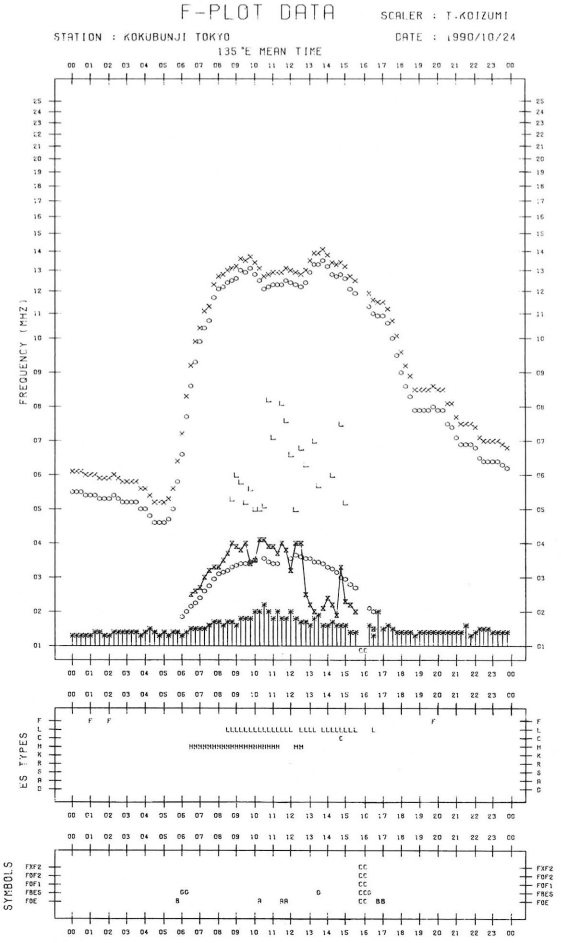

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

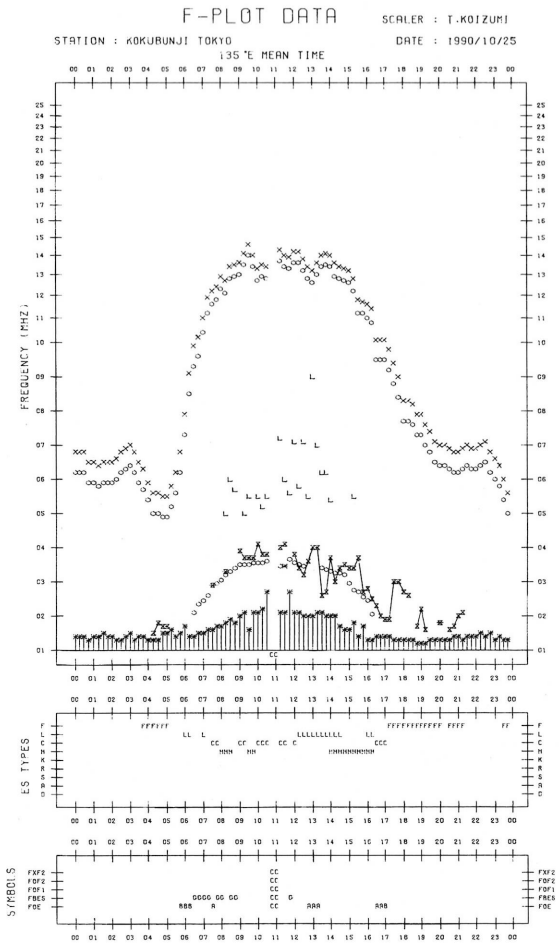

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

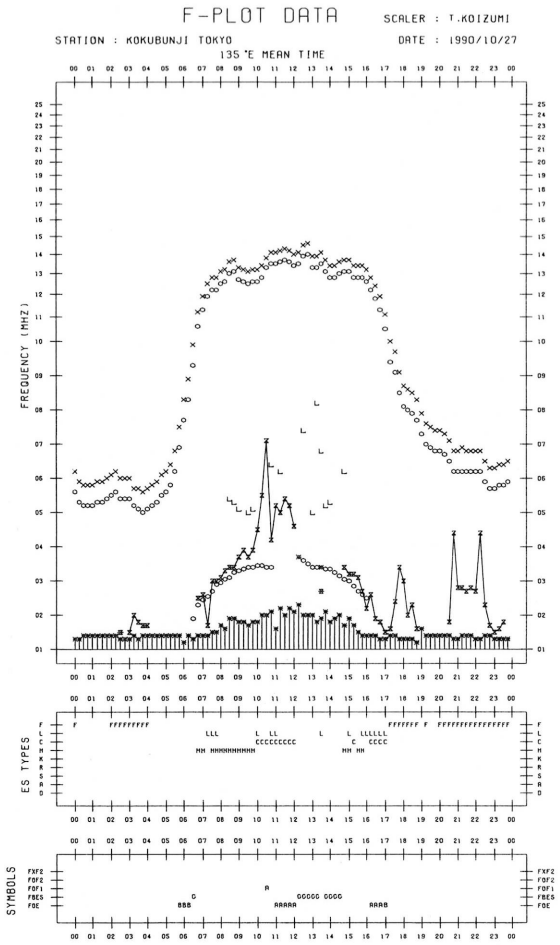

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

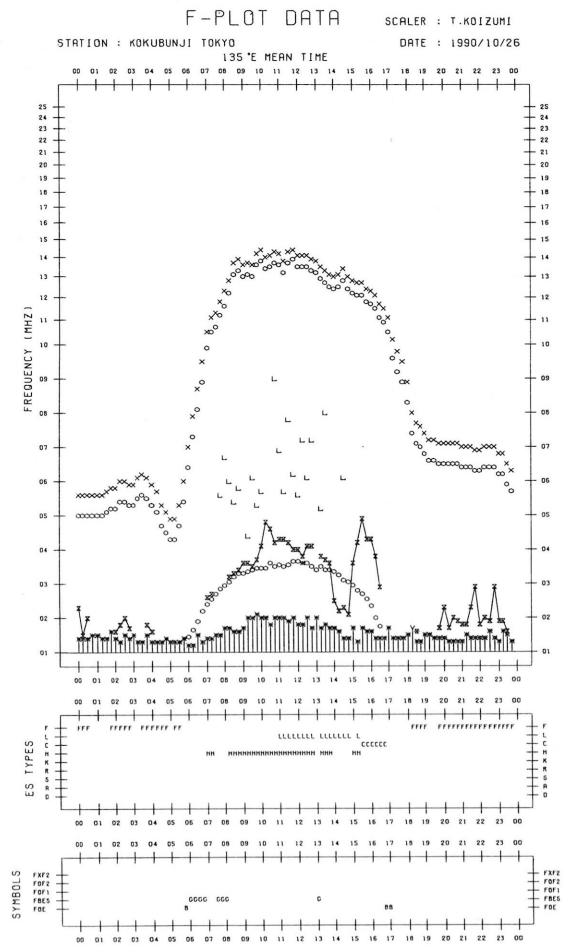

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

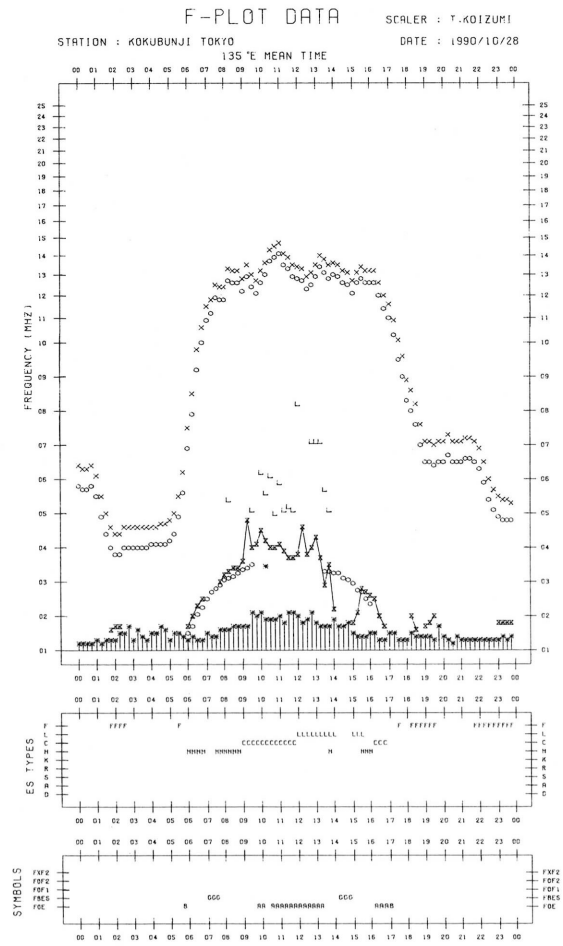

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

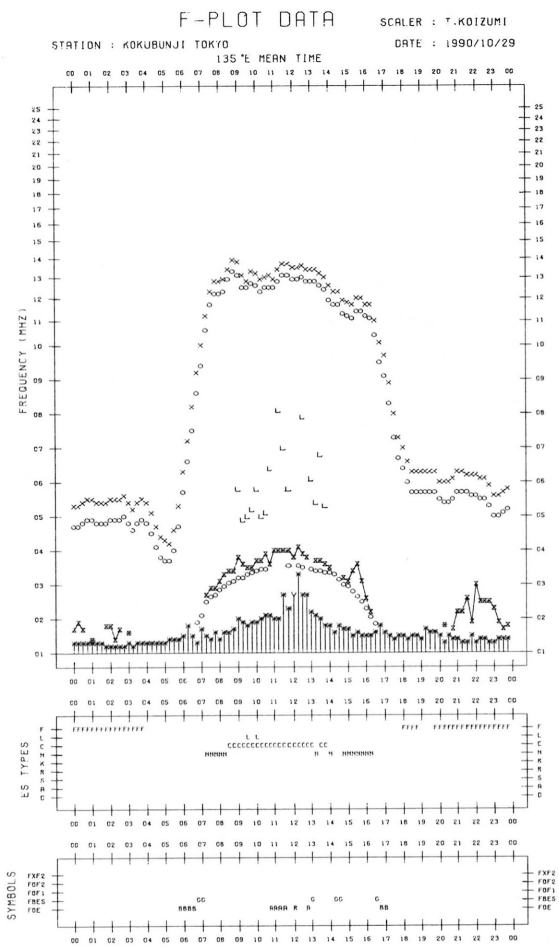

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE

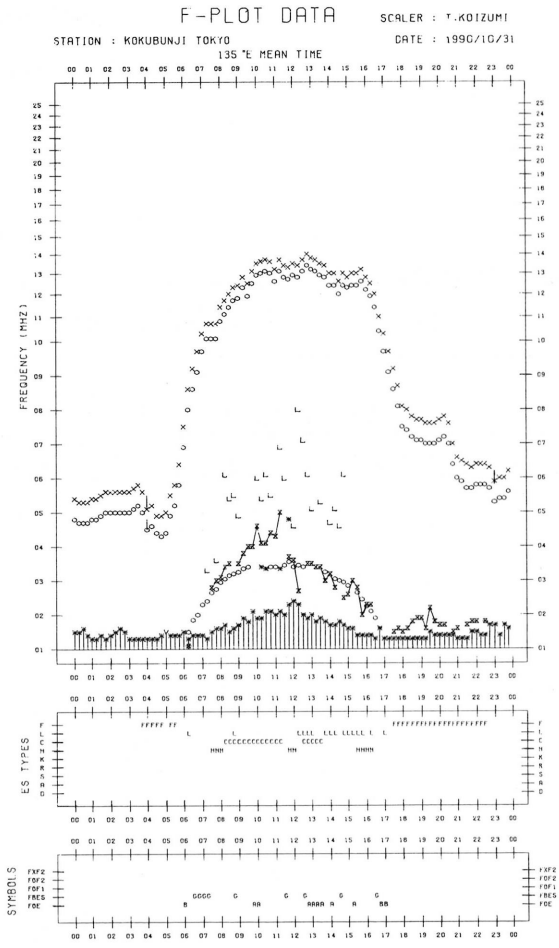

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

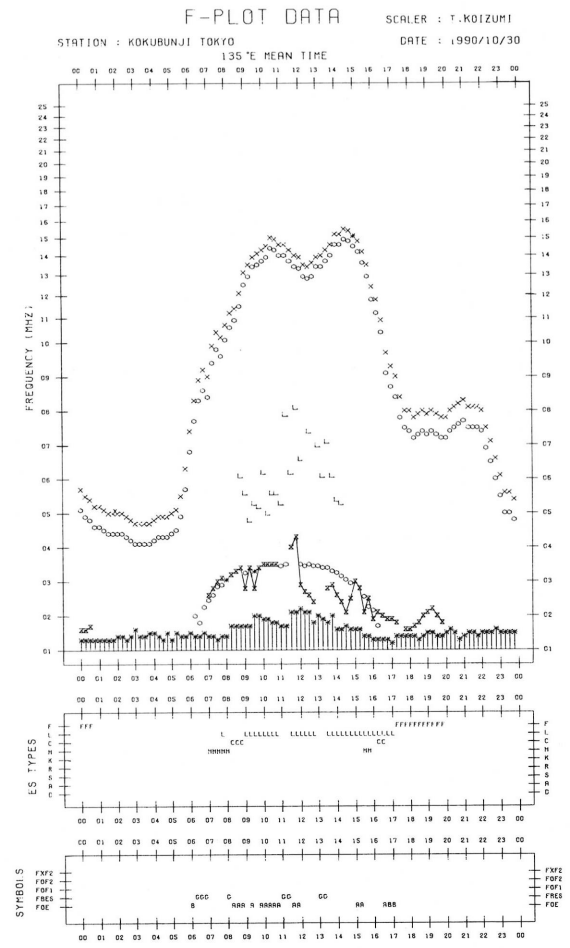

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FRES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/31
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FRES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/10/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FRES
FOE

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

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

Note: No observations during the following periods.

none.

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso October 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	48	(52)	48	49
2	49	48	46	48	48
3	49	51	51	51	50
4	51	50	52	49	51
5	51	51	51	47	50
6	50	48	49	-	48
7	49	48	48	48	48
8	51	52	48	49	50
9	50	50	48	49	49
10	49	50	49	-	49
11	50	51	49	50	50
12	49	49	48	49	49
13	49	49	48	49	49
14	49	51	49	50	49
15	53	B	52	B	52
16	53	51	50	52	52
17	51	51	50	51	51
18	51	51	52	51	51
19	B	51	(49)	-	51
20	51	52	(49)	-	51
21	-	49	(48)	49	49
22	50	49	(48)	49	49
23	49	48	(46)	48	48
24	48	48	(45)	49	47
25	48	48	(48)	-	48
26	45	44	(43)	44	44
27	47	48	(47)	46	46
28	45	44	(43)	-	45
29	42	42	(40)	41	41
30	42	41	(39)	42	41
31	43	43	(42)	42	43

Note: No observations during the following periods:

6th 2100 - 2350. 10th 2040 - 2340. 19th 2040 - 2340.
20th 2050 - 21st 0355. 25th 2050 - 2355. 28th 2050 - 2350.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso October 1990

Single frequency observations

Normal observing period; 2050 - 0800 U.T. (sunrise to sunset)

OCT 1990	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	500	41 F	0208.1	0209.7	1.9	57	-	0
	500	8 S	0310.0	0310.5	0.8	540	-	0
	200	44 NS	2033E	2341	700D	17	9	WR
2	100	48 C	0133.5	0134.9	2.8	3000	-	0
	200	46 C	0133.8	0133.8	2.0	890	-	WR
	500	8 S	0134.0	0134.0	0.7	181	-	0
	100	8 S	0142.8	0143.6	1.2	910	-	-
	200	44 NS	2032E	0017	700D	35	16	WR
3	500	4 S/F	0407.4	0408.4	1.4	19	-	0
	100	42 SER	0718.0	0724.3	7.5	480	-	-
	200	42 SER	0722.7	0723.8	19.8	95	-	WR
	200	44 NS	2032E	0050	700D	17	9	WR
	500	41 F	2303.8	2304.3	1.2	49	-	0
5	500	41 F	0002.5	0003.8	1.3	16	-	0
	200	44 NS	2036E	0636	700D	5	3	WL
6	200	8 S	0135.2	0135.2	0.3	150	-	SL
	500	27 RF	0137.0	0202.5	65	7	2	WL
	200	42 SER	0516.1	0516.6	12.5	120	-	WL
	500	46 C	0516.3	0527.0	47.5	29	9	ML
	100	41 F	0521.5	0523.1	2.6	590	-	-
	200	41 F	0540.3	0546.9	25	84	-	ML
	200	44 NS	2035E	0100	330D	16	7	WL
	200	42 SER	2112.5	2115.2	22.7	110	-	ML
	200	41 F	2155.4	2207.7	17.8	405	-	0
	100	48 C	2207.1	-	4.2	1000D	280D	-
7	100	41 F	0617	0726	110D	680	-	-
	200	41 F	0656.1	0714.8	26.4	65	-	SL
	200	44 NS	2038E	0700	690D	230	29	SL
	500	23 GRF	2248.0	2308.0	190	7	3	WL
8	500	46 C	0143.5	0144.2	1.2	53	-	0
	500	27 RF	0332.5	0403.0	80	14	7	WL
	200	43 NS	2350	0137	430	7	2	WL
10	200	43 NS	0200	0616	360D	5	2	WL
	200	46 C	0342.9	0346.2	5.9	110	-	WL
	200	41 F	0630.4	0633.3	6.0	120	-	ML
10	200	42 SER	0650.6	0654.7	5.3	390	-	0
	100	42 SER	0651.1	0651.5	1.2	1000D	-	-
	500	8 S	0651.9	0652.0	1.0	101	-	0
	200	44 NS	2040E	0047	685D	22	3	ML
	200	46 C	2218.5	2220.7	5.9	38	12	ML
11	100	41 F	0042.5	0043.2	1.3	225	-	-
	200	46 C	0042.8	0043.6	1.5	84	-	WL
	200	46 C	0600.9	0602.6	2.6	140	-	0

OCT 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
	200	44 NS	2040E	2225	300D	7	3	WL
12	500	41 F	0002.5	0003.7	2.4	111	-	O
	500	42 SER	0157.5	0200.0	6.0	53	-	O
	200	42 SER	0341.7	0352.8	21	250	-	ML
14	500	4 S/F	0012.9	0013.9	4.0	18	-	O
15	200	46 C	0234.3	0238.3	20.5	740	45	O
				0244.9		380		O
	500	46 C	0236.0	0305.5	37.5	247	63	SL
				0242.5		97		WL
	500	29 PBI		0313.5	47.5	18	4	WL
	100	42 SER	0236.0	0246.2	15.8	240	-	-
	200	43 NS	0256	0313	80	11	3	ML
	200	46 C	2155.4	2156.1	6.6	230	24	SL
	500	27 RF	2237	2315	100	12	4	WL
	200	27 RF	2300	2333	61	43	11	ML
16	200	8 S	0510.6	0511.2	0.7	360	-	O
	500	4 S/F	2323.5	2324.8	7.0	10	-	WL
17	200	42 SER	0452.1	0454.1	31.7	810	-	O
	200	42 SER	0555.8	0556.1	27.7	420	-	O
	500	42 SER	0646.2	0649.4	4.5	98	-	WL
	200	8 S	0649.1	0649.5	0.7	2400	-	O
	200	42 SER	2109.9	2110.1	4.6	1300	-	O
	200	41 F	2314.8	2316.5	3.5	2200	-	O
	100	42 SER	2315.2	2317.1U	7.2	1000D	-	-
	500	41 F	2315.3	2315.5	3.1	32	-	WL
18	100	8 S	0037.3	0037.9	0.7	1000	-	-
	200	42 SER	0037.6	0045.5	38.3	610	-	O
	500	42 SER	0049.8	0050.0	5.4	21	-	O
	100	41 F	0052.1	0053.5	2.0	150	-	-
	200	8 S	0520.2	0520.4	0.8	420	-	O
	500	27 RF	0555	0624	43	13	5	O
	200	43 NS	0600	0628	115D	19	14	O
	500	46 C	0605.0	0606.8	4.0	130	-	O
19	500	20 GRF	0000	0054	180	4	2	O
	200	42 SER	0641.6	0710.4	29	900	-	O
20	200	8 S	0304.9	0305.0	0.7	920	-	O
	500	46 C	0433.4	0444.5	21.5	7	3	O
	200	27 RF	2150	2215	53	8	2	O
22	200	41 F	0050.4	0052.8	2.6	78	-	WR
	500	41 F	0359.9	0401.8	5.3	131	-	MR
	200	24 R	2051E	-	630D	-	10	-
23	500	41 F	0033.7	0034.0	1.5	26	-	WL
	200	24 R	2051E	-	630D	-	3	-
24	200	44 NS	2053E	0617	630D	42	13	SR
27	500	27 RF	0020	0045	64	7	3	WR
	200	43 NS	0034	0215	430D	21	6	MR
	200	8 S	0345.5	0345.5	0.3	620	-	O
	200	42 SER	0508.9	0515.8	8.0	110	-	WR
	200	43 NS	2300	2324	180	11	4	WR
28	200	42 SER	0103	0125	56	85	-	WR
29	200	43 NS	0240	0432	300D	9	3	O
31	500	8 S	2231.9	2232.4	1.1	28	-	O
	500	46 C	2308.8	2329.0	25	11	4	WR
				2315.8		9		WR

C. RADIO PROPAGATION

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

OCT 1990 FREQUENCY 15 MHZ BANDWIDTH 30 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 -2	ES -5	9	9	13	18	14	ES -2	ES -2	ES -2	ES -2	ES -23	ES -2	ES -2	ES -2	-11	4	4	ES -23	ES -23	ES 0	ES 0	ES 2	ES 0
2	ES -2	ES -2	-1	5	10	11	12	ES -23	ES -23	ES -8	ES -23	ES -23	ES -23	5	4	-3	4	0	0	-8	ES -23	-14	3	-11
3	-8	-3	2	7	12	23	13	ES -10	ES -10	ES -23	ES -23	ES -23	ES -23	ES -23	-11	-5	-8	5	-2	6	ES -23	-11	2	-11
4	-3	-3	-3	5	12	14	5	ES -23	ES -23	ES 0	ES -23	ES -23	ES -23	-11	-11	ES -23	-8	-5	0	-11	-1	-10	-3	-10
5	-8	-8	-3	5	16	8	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	11	4	10	5	-1	-8	-11	-11	2	-8
6	-8	-8	5	5	6	-5	ES -23	ES -23	ES -23	2	0	6	7	C	C	C	C	C	C	C	C	-9	2	-9
7	5	2	5	10	13	12	16	ES -23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	ES -23	ES -23	9	ES -23	ES -23	8	ES -23	ES -23	ES -23	2	ES 1	ES -23
10	2	-10	7	10	15	14	9	ES -23	ES -23	ES -23	ES -23	ES -23	-10	5	-5	ES -23	ES -23	-8	-8	-5	-10	-10	ES -23	-1
11	ES -23	-8	-8	4	-5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-1	6	-6	3	ES -23	ES -23	ES -23	-1	-4	2	-3
12	10	-8	12	5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-5	4	4	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
13	ES -23	-11	3	-1	5	-5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	0	2	ES -23	ES -23	ES -23	-11	ES -23	-1	ES 1	ES 1
14	ES 1	3	3	4	4	4	-12	ES -24	-6	ES -24	ES -24	ES -24	-12	-11	-2	5	ES -24	ES -24	ES -24	ES -24	ES -24	-12	-1	ES -9
15	ES -23	ES -23	-4	0	7	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	7	9	ES -2	ES -2	ES -23	ES -23	ES -23	0	-5	2	-1
16	-5	-2	4	8	2	ES -23	ES -23	ES -23	ES -23	ES -23	0	-8	ES -23	-5	ES -23	ES -23	ES -23	-11	ES -23	ES -23	-10	-5	0	0
17	-11	-1	0	4	7	1	-8	ES -23	ES -23	-8	ES -23	ES -23	ES -23	ES -23	0	4	6	-4	-11	ES -23	ES -23	-5	-5	ES -23
18	ES -23	-11	-5	5	11	13	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	3	-5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-10	ES -23
19	ES -23	-4	3	5	12	4	5	8	11	2	ES -22	ES -22	ES -22	-9	11	3	-9	6	ES -22	ES -22	ES -22	-4	ES -22	ES -22
20	ES -22	-2	2	8	14	14	-10	ES -22	ES -22	ES -22	-10	-1	2	-2	15	ES -22	2	ES -22	ES -22	-1	ES -22	-2	ES -22	-9
21	ES -22	-2	-2	1	15	12	ES -22	ES -22	ES -21	ES -21	ES -21	ES -21	ES -24	ES -24	-5	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-5	0	-6
22	-2	1	4	11	15	-4	-3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	4	1	ES -24	ES -24	ES -24	ES -24	-11	0	1	1
23	-1	2	3	7	9	9	-10	ES -10	ES -10	ES -10	ES -10	ES -25	ES -25	-4	1	-1	-3	12	-1	ES -25	-8	-6	ES -25	0
24	0	5	7	12	12	19	0	1	7	10	0	7	ES -25	ES -25	11	-6	0	0	0	-1	-6	0	-4	0
25	1	2	2	11	8	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -25	ES -25	9	ES -25	ES -25	-12	-13	-13	ES -25	ES -25	ES -25	-3
26	ES -25	ES -25	ES -25	-5	-6	ES -25	-13	ES -25	ES -25	ES -1	ES -1	ES -25	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	2	-2
27	ES -24	ES -24	-9	-5	0	ES -24	ES -24	ES -24	-2	ES -24	ES -24	ES -24	ES -24	ES -24	-12	1	ES -24	ES -24	ES -24	ES -25	ES -25	-3	2	-3
28	-4	2	7	12	15	ES -24	ES -24	ES -24	ES -4	ES -23	ES -23	ES -24	ES -24	ES -24	-12	ES -3	ES -3	ES -4	1	ES -4	ES -4	3	4	2
29	0	3	8	6	9	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -25	-1	-6	ES -25	ES -25	ES -25	ES -25	ES -25	-1	6	5	3
30	1	5	13	12	19	16	17	20	ES -24	ES -24	ES -24	ES -24	ES -25	ES -25	6	ES -25	ES -25	-10	5	ES -25	-6	2	5	6
31	5	4	5	8	7	SC -25	ES -25	ES -7	ES -7	-13	ES -25	ES -25	ES -1	ES -1	ES -1	12	ES -1	1	3	6	ES -1	ES -1	2	0
CNT	29	29	29	29	29	29	29	29	28	28	28	28	29	28	28	28	28	28	28	28	28	29	29	29
MED	ES -4	US -2	3	5	10	4	-13	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	0	US -6	ES -8	US -10	US -22	ES -23	ES -16	US -5	US 1	US -3
UD	5	4	9	12	15	18	14	1	-2	2	0	-1	ES -1	5	11	4	4	6	1	-1	ES -1	2	4	2
LD	ES -23	ES -23	-8	-1	-5	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -25	ES -25	ES -25	ES -12	ES -25	ES -25	ES -24	ES -24	ES -25	ES -25	ES -23	ES -23	ES -23

C. RADIO PROPAGATION

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

OCT 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	5	3	10	12	19	23	25	30	27	10	13	16	ES 1	ES -2	ES -23	ES -23	ES -23	14	ES -23	5	10	9	4	1
2	ES -2	ES -2	4	12	18	25	29	25	30	21	33	11	8	13	ES -23	0	ES -23	7	20	9	15	0	-2	-11
3	-8	-8	4	13	22	23	23	27	24	28	11	19	-11	ES -23	ES -23	ES -23	ES -23	18	16	3	4	4	-11	-8
4	-8	-8	5	10	19	25	25	23	26	24	25	0	-11	7	ES -23	ES -23	ES -23	24	25	11	2	-4	-3	-10
5	0	2	5	9	17	32	17	32	25	36	34	23	-6	-8	ES -23	ES -23	ES -23	13	22	15	7	5	3	-3
6	-10	-2	3	10	20	23	25	29	29	22	15	15	22	C	C	C	C	C	C	C	5	2	0	-1
7	3	5	6	13	13	25	24	20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	12	ES -23	ES -23	ES -23	ES -23	24	10	0	8	4	ES -2	4
10	2	-4	6	18	15	22	25	30	25	23	20	19	24	29	22	25	28	24	12	13	8	4	-1	-2
11	-4	5	9	14	20	24	24	25	29	24	23	20	-5	10	2	2	20	17	ES -23	8	5	4	-3	-3
12	-11	3	2	9	20	24	26	24	27	28	29	-5	-3	-10	-4	-10	ES -23	5	-3	15	8	-5	-10	-5
13	ES -23	-1	8	9	16	25	25	25	26	27	21	3	-9	-9	ES -23	ES -23	ES -23	ES -23	3	8	-5	4	ES 1	ES 1
14	ES 1	9	9	12	22	29	18	24	28	27	21	10	-12	ES -24	ES -24	ES -24	ES -24	-2	21	4	6	ES -6	-6	ES -9
15	3	ES -23	5	10	25	21	33	24	22	25	23	14	-1	ES -23	ES -2	ES -2	ES -23	ES -23	ES -23	11	4	4	2	-5
16	-11	0	16	9	14	24	24	28	29	26	30	4	11	-11	-8	ES -23	-5	5	ES -23	9	8	9	0	0
17	-1	ES -23	5	13	23	25	24	25	30	26	30	19	5	ES -23	ES -23	ES -23	ES -23	8	19	5	10	0	-3	-14
18	-11	-5	0	17	16	25	25	31	27	22	19	15	-10	-10	ES -23	ES -23	ES -23	15	-8	19	8	5	-5	-8
19	-8	-11	0	6	12	27	20	26	25	25	28	21	14	18	11	-9	-10	13	23	8	11	-4	-1	ES -22
20	-2	ES -22	7	24	21	27	28	29	26	18	19	1	4	12	-1	ES -22	ES -22	ES -22	25	17	14	-14	ES -22	-9
21	-5	-4	8	9	17	22	25	27	30	29	11	-3	ES -24	-6	-3	-12	-12	16	1	3	4	0	4	-7
22	2	-4	4	15	19	24	19	25	27	22	27	5	6	8	1	ES -24	ES -24	ES -24	ES -24	11	12	3	3	1
23	-4	5	10	7	15	24	20	26	27	24	12	-3	ES -25	ES -25	ES -25	ES -25	-13	5	-8	9	6	3	4	2
24	-3	5	8	15	17	23	21	29	19	16	18	24	14	-3	ES -25	ES -25	ES -25	21	18	8	10	6	0	0
25	-2	4	13	12	21	26	23	25	23	19	-9	-9	-5	-10	ES -25	ES -25	ES -25	-1	7	3	14	6	1	4
26	0	7	13	19	23	23	19	27	25	30	23	-6	-8	-8	ES -26	ES -26	ES -26	-7	ES -26	9	6	9	2	-2
27	3	10	9	17	20	28	26	29	20	18	-5	-9	-11	-11	-12	ES -24	ES -24	ES -24	ES -24	2	8	9	-2	3
28	2	7	11	20	22	22	29	34	22	20	-5	-3	-3	ES -24	ES -3	ES -3	ES -3	11	18	13	12	6	7	0
29	3	9	0	19	24	24	21	30	27	17	ES -24	ES -24	-13	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	11	16	11	6	5
30	9	7	9	18	22	26	20	25	16	-1	22	26	ES -5	ES -25	ES -25	ES -25	ES -25	4	14	10	5	11	3	4
31	10	7	13	18	21	25	25	27	24	19	20	1	ES -1	3	ES -1	ES -1	ES -1	9	29	11	15	8	10	7
CNT	29	29	29	29	29	29	29	29	28	28	28	28	29	28	28	28	28	28	28	28	29	29	29	29
MED	US -2	2	7	13	20	24	24	27	26	24	20	8	US -3	US -10	ES -23	ES -23	ES -23	8	8	9	8	4	US 0	US -2
UD	5	9	13	19	23	28	29	31	30	29	30	23	14	13	2	0	ES -1	24	25	15	15	9	6	4
LD	ES -11	ES -22	0	9	14	22	19	24	20	16	-5	-9	ES -13	ES -25	ES -25	ES -25	ES -25	ES -24	ES -24	3	4	-5	ES -10	ES -11

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

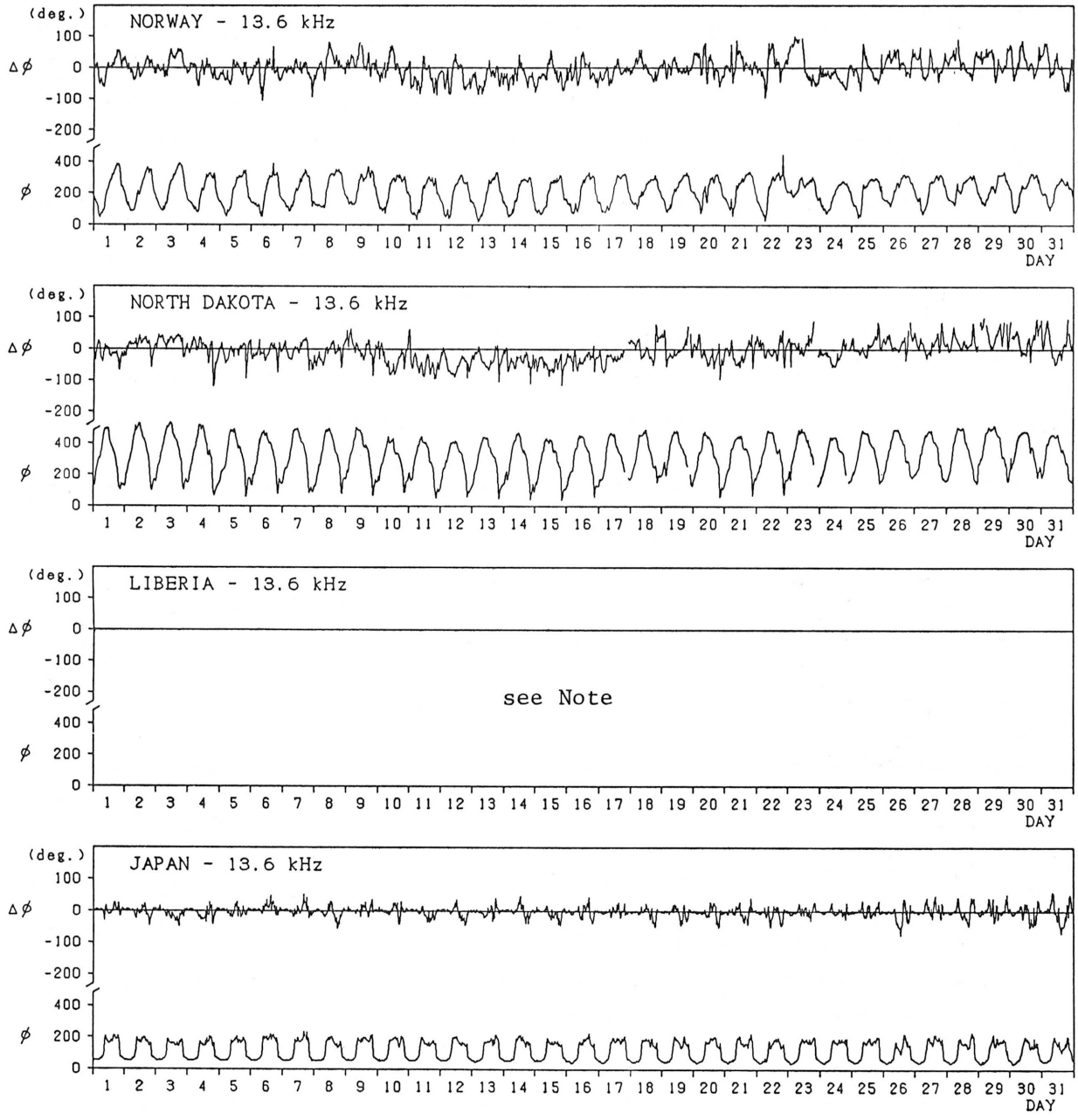
Hiraiso — Time in U.T

Oct. 1990	Whole Day Figure	W W V 00 06 / 06 12	W W V 06 12 / 12 18	W W V 12 18 / 18 24	W W V H 00 06 / 06 12	W W V H 06 12 / 12 18	W W V H 12 18 / 18 24	Conditions 00 06 / 06 12	Conditions 06 12 / 12 18	Conditions 12 18 / 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4o	5	S	4U 4U	4 4	4	3U 4	N N	N	N N			
2	4o	4	S	4 4	4 4	4	4 4	N N	N	N N			
3	4o	4	S	4 4	4 4	4	4U 4	N N	N	N N			
4	4o	4	S	4U 4	4 4	4	4 4	N N	N	N N			
5	4o	4	S	5 4	4 4	4	4 4	N N	N	N N			
6	4o	4	5U	C 4	4 4	C	4	N N	N	N N			
7	4-	4	C	C C	4 3U	C	C	N N	N	N N			
8	C	C	C	C C	C C	C	C	N N	N	N N			
9	4o	C	C	4U 4U	C C	4U	4	N N	N	N N	11.9	---	174
10	4+	4	5U	4U 4U	4 4	5	4	N N	N	N N	---	22	
11	4-	3	S	4U 4	4 4	4U	3	N N	N	N N			
12	3+	3	S	4U 2U	4 4	4	3	N N	N	N N			
13	4-	3	S	4U 4U	4 4	3U	3	N N	N	N N			
14	4o	4	5U	4U 3U	4 4	3U	4	N N	N	N N			
15	3+	3U	S	4U 4	4 4	2U	3	N N	N	N N			
16	4-	3	4U	3U 4	4 4	4U	4	N N	N	N N			
17	4o	4	4U	5 3U	4 4	4U	4	N N	N	N N			
18	4-	4	S	4U 3U	4 4	3	3	N N	N	N N			
19	4o	4	5U	5U 3U	3 4	5	4	N N	N	N N			
20	4o	4	5U	4U 4U	4 4	4U	4	N N	N	N N			
21	4-	4	S	3U 4	4 3	4U	4	N N	N	N N			
22	4o	4	S	4U 4	4 4	3U	4	N N	N	N N			
23	4-	4	S	4 4	4 3	3U	4	N N	N	N N			
24	4+	5	5U	5 4	4 4	5	4	N N	N	N N			
25	4-	4	S	4U 3U	4 3	4	4	N N	N	N N			
26	3o	2U	S	2U 3U	4 4	2U	4	N N	N	N N			
27	3+	3U	4U	4U 4	4 3	3U	3	N N	N	N N			
28	4o	4	S	4 4	4 4	4U	4	N N	N	N N			
29	3+	4	S	3U 4	4 3	2U	4	N N	N	N N			
30	4+	5	5U	4U 5	4 4	4U	5	N N	N	N N			
31	4+	4	4U	5U 4U	4 4	5U	5	N N	N	N N			

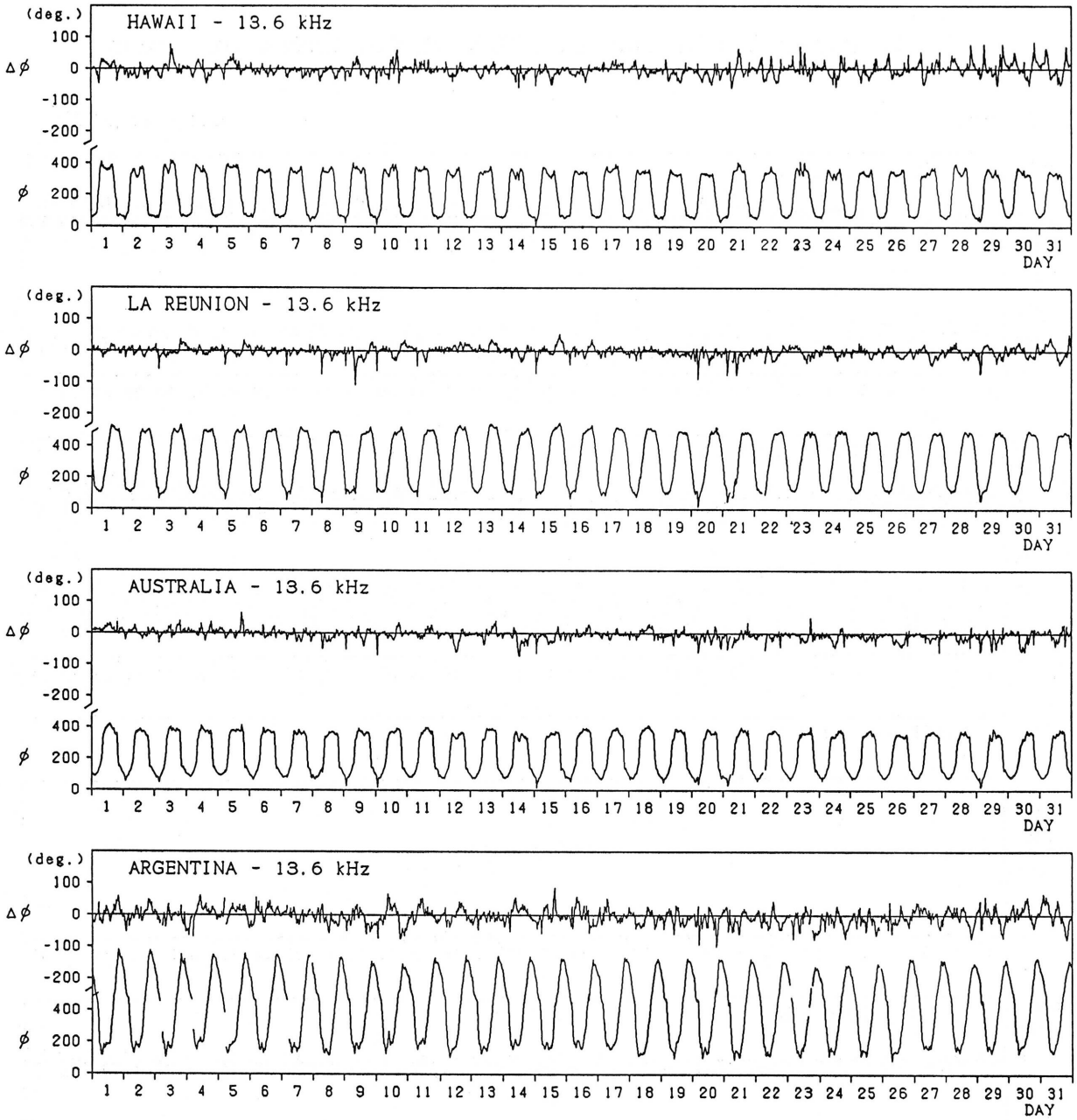
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo October 1990



Inubo October 1990



Note: As for LIBERIA - 13.6 kHz, no record during October 01 - October 31, due to the maintenance of transmitter.

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

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso Time in U.T.

Oct. 1990	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
2		x	13			0133	24	SL	1	x	x
3			12			0310	29	SL	1		
5					12	0623	14	SL	1	x	
8	C	C	15	x	11	0657	19	SL	1		
9	C	C	17	x		0127	26	SL	1+		
10			14	x	x	0104	82	SL	1	x	x
15		25	36	x		0129	15	S	3	x	x
15			16			0237	20	SL	1+	x	x
18			10	x		0608	14	SL	1-	x	
20		x	13			0441	52	S	1	x	
21		x	15			0316	13	S	1	x	
21			32	30	x	0552	38	SL	3-	x	
22			22	25	11	0615	44	G	2-		
29		x	19			0246	47	G	1+		

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Oct. 1990	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1		—	17	9			0653	0802	0709
1		—	33	13			0827	0908	0835
1		—		6	6		2308	2341	2312
2	24	—	57	59	36	21	0134	0219D	0146
2		—	13	32	14		0219E	0339	0230
3		—	13	8	5		0140	0215	0149
3	16	—	67	47	20		0307	0350D	0319
3		—	33	26			0350E	0427D	0355
3		—	20	16			0427E	0509D	0432
3	17	—	25	18			0509E	0556	0515
3		—	21	8			0631	0720	0639
3		—	17				0739	0820	0745
3		—	25				1030	1108	1034
3		—			19		2040	2128	2050
3		—			8		2311	2353	2319
4		—	11	10	4	12	0303	0336	0314
4	16	—	6	6			0449	0536	0457
4		—	9				0720	0749	0726
4	24	—			15		2136	2210	2148
5		—	58	35			0600	0800	0633
6		—		6	6		0023	0113	0035
6		—	22	33	9		0208	0423	0257
7		—	12	10			0340	0417	0349
7	19	—	53	40	11	12	0438	0554	0448
7		—	35				0709	0842	0731
7		—			12		2139	2219	2154
7	—	—	—	18	30	—	2250	2340	2311
8	13	—	15	16	8		0145	0208D	0152
8		—		11			0208E	0223	0212
8		—	15				0614	0654D	0634
8	38	—	154	83			0654E	0858	0708
9	45	—	84	—	48	31	0131	0241	0149
9		—	17	—			0312	0354	0322
9		—	22	—		23	0438	0539	0444
9		—	13	—			0605	0643	0617
9		—	113				0847	1111	0913
9	20	—			8		2235	2257	2245
10	30	—	55	78	52	52	0103	0227	0115
10		—	7				0642	0711	0655
10		—	14				0934	1005	0944

Inubo

Oct.	S			P		A			
1990	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
11		—	5	—			0513	0527	0516
11		—	89	32			0735	0849	0744
11		—		14	14	24	2317	0011	2326
12	19	—		14	8	16	0104	0134	0114
12	16	—	19	16	7		0202	0239	0212
12	16	—	21	14	4		0336	0419	0346
13		—	9	12	5		0243	0324	0256
13		—	19	15	5		0507	0554	0514
14		—	47	22			0720	0823	0737
14		—		7	8		2311	0002	2322
15	49	—	137	—	88	59	0130	0237D	0138
15	13	—	51	—	27	25*	0237E	0400	0248
15		—			8		2321	2352D	2330
15		—			9		2352E	0019	0000
16		—	21	16	9		0324	0347D	0331
16		—	45	39	21		0347E	0439	0355
17		—	12	5			0602	0634	0608
17		—	23	10			0647	0725	0654
17		—				17	1713	1730	1720
18	15	—		—	12	19	0047	0127	0058
18		—	13	—			0334	0425	0345
18		—	21	—			0524	0606D	0531
18		—	70	—			0606E	0717	0613
18		—	33				0946	1037	0952
18		—			20		2209	2301	2221
18		—		9	7	16	2319	2346	2330
19		—	29	27	14		0204	0308	0234
19		—	21	20	7		0334	0419	0346
19		—	14	10			0546	0648	0554
19		—	15				0833	0858	0840
20	14	—	28	35	15	13*	0205	0256D	0217
20	12	—	32	39	14	16	0256E	0400	0304
20		—	111	72	12		0440	0644D	0509
20		—	13				0644E	0710	0652
20		—	23				0857	0955	0907
20		—			35	20	1757	1841	1810
20		—			38		2136	0009	2220
21	31	—	88	69	32	26	0314	0330D	0322
21	38	—	78	62			0330E	0447	0342
21	61	—	199	112	24	34	0551	0713D	0605
21		—	42	7			0713E	0746D	0730
21		—	36*				0746E	0830	0803
21		—	72				0946	1143	1008
22	8	—	32	—	19	17	0140	0219	0149
22	51	—	232	—	10	25*	0609	0835	0634
23		—	7				0709	0734	0712
24		—	33	37	18	31	0201	0249	0212
24		—	14	5			0506	0521	0516
25		—	13	6			0654	0735	0703
25		—	7				0905	0929	0907
25		—	16				1108	1137	1116
27		—	13				0538	0633	0548
28		—		8	6		2335	2350	2339
29		—	16	—	6		0104	0121D	0119
29	14	—	21	—	14	13	0121E	0206	0130
29	26	—	92	—	33	33	0237	0541	0310
30		—	27	18			0532	0620	0540
31		—			6		2154	2216	2200

IONOSPHERIC DATA IN JAPAN FOR OCTOBER 1990
F-502 Vol.42 No.10 (Not for Sale)

電離層月報（1990年10月）
第42巻 第10号（非売品）
1991年1月25日 印刷
1991年1月31日 発行
編集兼 郵政省通信総合研究所
発行所 〒184 東京都小金井市貫井北町4丁目2－1
☎（0423）（21）1211（代）

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