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IONOSPHERIC DATA IN JAPAN

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CONTENTS

COMMUNICATIONS RESEARCH LABORATORY
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INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example *Es* (for *foF2*).
- B Impossible measurement because of absorption in the vicinity of *fmin*.
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of too small ionization density of the layer (for *fEs*).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of trouble in the automatic data processing system, but existence of film record.

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

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

* Measurement impossible because of interference.

B Measurement impossible because of bursts.

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C	artificial accident,
S	propagational accident,
U	inaccurate.

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

N	normal,
U	unstable,
W	disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

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

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

b. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF FOF2 AT WAKKANAI

NOV. 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	53	46	48	52	56	38	50	100	107	138	135	126	128	121	116	121	102	72	72	66	58	56	60	57
2	60	58	61	60	60	60	69	102	114	121	111	126	110	112	112	110	111	86	67	56	44	48	50	48
3	50	53	53	45	52	44	58	86	108	108	100	116	109	112	116	116	110	79	63	54	50	54	48	44
4	44	44	50	55	53	52	56	90	106	119	125	120	125	112	111	121	101	76	56	54	50	47	44	38
5	42	40	40	44	35	38	54	86	102	110	120	130	127	113	110	105	98	76	63	52	50	43	48	37
6	39	38	47	45	44	42	50	90	115	118	117	122	121	112	118	102	86	73	57	57	52	49	43	43
7	44	43	51	54	49	42	51	87	111	118	123	127	123	109	110	114	99	84	63	54	54	51	38	42
8	52	53	38	44	40	42	57	86	107	122	133	132	130	114	122	118	109	85	77	66	56	49	49	40
9	N	50	54	47	44	42	51	88	126	136	142	144	147	134	134	137	123	96	83	73	64	63	57	54
10	52	52	53	54	48	54	65	92	121	136	130	145	135	125	128	130	111	92	64	64	54	53	52	38
11	48	43	36	44	40	39	61	100	136	137	142	140	138	128	130	120		84	66	73	54	48	38	42
12	40	38	38	37	40	38	48	91	127	143	132	139	132	123	118	115	109	80	64	63	58	42	45	41
13	40	A	39	38	38	36	42	97	121	126	125	124	120	109	116	120	103	84	64	59	51	52	44	47
14	40	38	44	40	47	40	47	89	111	114	125	122	121	111	110	109	86	66	68	55	40	44	38	38
15	40	38	36	37	44	40	39	86	102	121	121	117	118	101	101	97	90	65	56	48	39	38	38	36
16	32	38								111	110	110	120	103	103	100	85	66	66	62	54	40	38	48
17	38	38	38	43	40	42	52	72	91	110	112	115	112	116	100	96	85	66	53	50	37	33	32	27
18	34	32	37	37	36	24	36	91	114	136	134	128	125	113	111	103	98	78	63	48	30	43	35	32
19	37	37	36	36	38	34	23	75	117	128	128	130	131	121	108	101	90	66	58	54	44	30	30	30
20	31	36	32	41	40	45	37	66	96	93	117	119	115	102	101	101	89	66	58	52	48	42	31	A
21	35	37	35	36	39	38	25	64	86	102	114	112	128	107	96	91	89	67	51			38		
22	68	51		40			37	62	80	102	115	111	111	102	94	103	90	52	49	38	30	31	24	33
23	32	37	38	38	41	38	35	64	84	108	101	116	105	98	100	90	73	63	43	36	34	34	31	30
24	33	36	38	36	38	37	45	66	87	103	120	122	109	106	102	96	82	51	40	40	33	26	A	30
25	34	35	32	33	32	33	34	76	91	105	117	110	110	107	99	94	73	56	39	37	38	23	35	31
26	35	38	38	38	35	38	47		89	98	110	111	104	95	103	100	80	67	58	39	38	28	38	28
27	30	36	38	38	38	34	34	64	87	114	113	118	111	100	97	112	83	64	48	50	36	34	33	33
28	31	32	32	22	30	22	26		111	108	124	131	120	128	140	127	92	77	52	51	43	40	38	39
29	33	38	38	38	53	44	32	62	91	108	111	122	130	110	110	96	78	53	44	34	41	43	38	42
30	41	43	50	38	45	51	37	65	91	96	103	124	121	100	100	82	79	66	A	A	28	31	28	31
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	28	29	28	28	29	27	29	30	30	30	30	30	30	30	29	30	29	28	29	30	28	28
MED	40	38	38	40	40	40	47	86	107	114	120	122	121	112	110	104	90	70	58	54	44	42	38	38
U Q	46	45	49	45	47	43	53	91	114	126	128	130	128	116	116	118	102	80	65	60	54	49	46	42
L Q	33	37	36	37	38	37	35	66	91	108	112	116	111	103	101	97	84	66	51	48	37	34	34	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT WAKKANAI

NOV. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	26	30	25	25	G	G	G	G	G	G	G	G	54	G	38	49	G	G	G	G	G	G
2	28	27	31	28	27	28	G	G	G	G	G	G	G	68	46	34	G	G	28	G	G	G	G	G
3	G	G	G	31	28	28	G	G	G	G	G	43	G	G	G	G	34	35	48	82	29	27	G	G
4	G	G	G	G	29	30	28	G	G	G	G	G	G	G	G	G	G	32	41	48	34	G	G	G
5	32	G	G	34	35	28	G	G	G	G	G	41	G	G	G	G	G	G	G	G	G	G	38	G
6	40	32	33	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G
7	G	G	G	G	29	G	G	G	G	G	G	42	G	G	G	53	46	G	G	31	27	26	G	G
8	G	G	32	G	G	G	G	48	40	44	G	G	G	G	G	G	32	34	G	G	G	G	G	G
9	G	G	G	G	G	G	G	46	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	26	28	G	G	G	G	45	G	G	G	G	G	G	G	G	38	44	G	G	G	G	G	28
11	G	29	31	G	G	G	G	G	G	45	58	G	G	G	G	G		G	32	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
13	G	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	N	G	G	G	G	G	G	G	G	32	28	G	G	G	G	G
16	G	G								G	G	G	G	G	G	G	30	G	G	G	G	G	G	23
17	G	G	G	G	G	G	G	G	44	G	G	G	G	G	G	G	G	G	G	G	G	27	G	G
18	G	G	G	G	G	G	G	G	36	G	45	46	48	G	36	51	58	128	59	29	34	33	35	31
19	31	G	G	G	G	29	28	G	G	49	50	60	44	G	44	G	33	28	G	G	G	G	G	G
20	G	G	G	G	34	28	26	27	46	50	G	G	58	G	G	G	G	G	G	G	G	G	G	34
21	34	G	G	G	G	G	G	27	G	G	G	G	G	G	G	G	G	G	G			29		
22	G	28	G	G		G	27	G	G	38	G	G	G	G	G	G	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G	G	G	G	46	57	50	63	57	G	34	G	G	33	G	G	30	33
24	27	G	G	25	41	G	G	G	G	G	40	46	78	G	G	G	G	G	G	G	G	24	29	G
25	G	31	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
26	27	G	G	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	G	G	G	G	G
27	G	G	27	G	G	G	G	28	G	G	G	G	G	G	N	G	29	G	G	G	G	G	G	G
28	G	29	28	G	G	G	G	G	G	G	40	G	G	G	G	G	27	G	G	G	G	G	G	G
29	G	G	25	28	28	G	G	G	G	G	G	G	G	39	G	G	G	G	G	G	G	G	G	G
30	G	G	G	G	G	G	G	G	G	36	G	G	G	G	G	G	G	30	46	59	30	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	29	28	29	29	29	28	30	30	30	30	30	29	30	29	30	30	29	29	30	29	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	26	26	G	27	13	G	14	G	G	G	G	G	G	G	G	32	30	G	15	G	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

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

HOURLY VALUES OF FOF2 AT AKITA

NOV. 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	53	50	48	50	53	A	54	84	104	129	132	122	112	115	116	115	108	84	68	67	54	57	52	52
2	46	43	29	50	54	44	52	89	107	122	112	113	116	115	118	118	103	91	67	54	47	43	39	43
3	43	44	44	32	52	44	54	91	87	111	108	114	115	114	122	N	103	84	58	51	51	42	50	50
4	47	A	44	45	41	44	54	104	108	114	118	119	116	120	117	110	112	82	58	52	52	47	47	43
5	42	44	42	41	47	46	53	90	98	102	115	124	118	112	112	104	90	86	57	54	28	51	47	44
6	40	42	45	43	42	38	49	93	110	120	119	126	115	116	111	111	94	77	57	56	52	27	44	35
7	42	42	48	47	50	38	50	86	102	112	114	115	114	114	120	113	106	78	66	48	52	51	47	26
8	62	52	49	42	42	44	57	88	108	123	120	127	123	120	116	115	106	93	78	78	61	51	56	50
9	52	50	50	54	46	46	62	100	118	131	137	121	115	127	123	126	115	97	85	79	66	54	53	54
10	52	53	52	56	47	49	54	106	113	133	131	129	127	122	120	120	116	91	78	54	62	56	55	42
11	48	48	36	49	46	48	65	105	131	138	138	132	134	133	134	120	108	102	80	66	A	28	43	34
12	37	43	40	43	40	38	47	90	136	131	136	131	123	132	126	114	110	86	76	54	54	52	44	47
13	47	48	44	39	44	40	48	90	127	122	123	127	116	113	112	107	106	78	67	66	52	58	43	48
14	44	41	44	40	42	38	46	86	108	112	116	127	118	113	112	106	94	72	60	60	53	46	40	38
15	34	40	43	42	43	38	48	86	112	122	134	117	108	112	104	94	85	73	50	52	48	44	38	36
16	36	35	36	36	36	43	37	87	110	111	116	104	104	109	104	96	79	54	57	62	A	A	A	49
17	44	50	52	52	44	50	52	90	112	135	143	132	133	118	110	91	91	78	56	48	27	35	32	A
18	A	A	40	30	32	A	43	85	112	128	132	122	118	114	86	107	103	53	57	A	A	26	A	A
19	32	30	32	35	39	31	42	78	112	132	133	126	127	118	110	104	99	52	A	A	28	37	A	32
20	A	28	31	36	33	38	35	80	85	104	108	112	108	118	111	111	87	75	63	53	52	41	28	31
21	34	32	32	33	38	38	38	68	90	108	103	116	111	122	112	98	91	74	53	44	32	31	31	32
22	32	38	26	43	31	30	40	76	82	100	106	110	106	114	110	110	91	59	45	48	35			31
23	34	35	38	41	36	34	38	77	82	100	108	112	115	109	91	97	76	50	52	45	31	32	30	32
24	28	32	33	35	35	41	45	84	88	108	124	127		116	112	92	80	52	48	52	36	35	32	31
25	31	35	37	35	36	37	38	79	97	101	103	110	114	112	101	88	80	52	48	44	38	37	32	37
26	38	37	38	39	33	34	40	73	89	106	104	95	108	108	N	90	90	68	50	51	38	35	32	32
27	34	34	38	42	32	31	38	72	88	109	108	108	116	101	90	108	87	67	52	50	43	34	34	32
28	36	34	34	A	66	A	A		88	129	135	117	131	138	140	124	106	83	55	50	49	41	40	40
29	42	44	43	44	44	N	52	79	108	110	114	118	110	120	111	101	90	56	48	47	40	32	31	35
30	32	33	34	35	35	34	33	78	99	103	104	93	120	120	103	90	84	62	58	50	32	35	34	N
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	30	29	30	26	29	29	30	30	30	30	29	30	29	29	30	30	29	28	27	28	26	27
MED	41	42	40	42	42	38	48	86	108	113	117	118	116	116	112	107	94	76	57	52	48	41	40	37
U Q	46	46	44	46	46	44	53	90	112	129	132	127	121	120	119	114	106	84	67	58	52	51	47	47
L Q	34	34	34	35	36	37	39	78	89	108	108	112	111	113	107	96	87	59	52	49	35	34	32	32

HOURLY VALUES OF FES AT AKITA

NOV.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	32	32	26	34	24	48	G	G	46	G	50	50	G	G	33	33	36	G	30	27	28	G
2	G	G	40	34	32	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
3	G	G	G	G	25	G	G	G	G	G	58	G	53	G	44	61	31	G	G	G	G	G	G	G
4	G	59	26	25	32	28	G	G	G	G	G	G	G	43	41	G	G	28	G	G	G	G	G	G
5	G	G	G	G	G	G	G	49	G	G	G	G	G	G	G	37	42	31	G	30	30	27	30	31
6	G	32	30	31	23	24	G	G	G	G	G	G	G	G	44	35	32	G	G	G	G	32	G	G
7	G	G	G	G	G	G	G	52	G	G	G	G	49	G	G	43	37	28	G	26	32	27	G	G
8	G	G	G	G	G	32	G	G	G	39	48	G	G	G	G	42	G	29	37	45	32	34	33	G
9	G	G	G	G	29	G	G	G	G	40	58	61	74	85	62	60	45	49	33	28	28	G	G	G
10	G	G	G	G	26	G	G	G	37	46	53	G	G	G	G	42	G	G	33	G	G	32	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	37	38	32	G	G
12	G	23	32	G	25	G	G	G	36	40	G	G	G	G	G	G	G	G	G	30	27	G	G	G
13	G	G	G	G	G	G	G	30	36	39	G	G	G	42	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	59	G	44	G	38	34	G	G	G	G	G	G	G	G
15	G	G	G	G	27	G	G	G	G	40	G	G	G	G	40	36	34	30	25	26	G	G	G	G
16	G	G	G	G	G	G	G	33	38	45	G	53	G	G	44	G	G	G	G	G	34	50	30	28
17	32	27	G	G	G	G	G	G	G	54	55	93	G	40	G	G	32	38	G	37	34	32	32	33
18	33	28	36	37	26	24	G	G	G	G	G	54	74	58	50	52	33	52	58	59	103	33	31	32
19	32	36	G	G	G	30	G	30	G	44	56	59	G	62	92	115	73	70	73	59	41	32	27	G
20	25	32	32	G	33	G	G	33	G	G	48	57	G	G	G	40	59	44	30	26	G	G	G	G
21	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	40	33	30	30	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	57	60	55	59	G	G	G	G	33	29	25	G	G	G	G
23	G	G	G	G	G	G	G	48	G	G	47	44	44	53	49	51	G	G	25	G	G	G	G	G
24	G	G	G	G	G	G	26	G	G	G	43	46	G	G	G	34	33	G	G	G	G	G	G	28
25	G	G	G	G	G	G	G	29	36	G	43	G	G	G	50	37	G	G	G	28	G	G	G	32
26	30	G	G	G	G	G	G	42	34	G	G	G	G	G	41	37	G	G	G	G	G	G	G	G
27	G	G	G	G	G	G	G	29	54	G	42	55	G	G	59	G	G	G	G	G	G	G	G	G
28	G	G	G	31	28	30	27	G	38	43	49	70	G	40	40	33	33	27	G	24	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	40	G	42	G	52	G	50	G	25	G	G	G	G	G
30	G	G	28	G	G	G	G	G	G	40	40	42	G	56	49	48	40	33	32	G	G	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30
MED	G	G	G	G	G	G	G	G	G	G	41	G	G	G	39	36	32	28	G	G	G	G	G	G
U Q	G	G	26	G	26	G	G	32	34	40	49	54	44	42	49	42	34	33	30	28	30	32	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

NOV. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	15	15	15	15	16	26	21	21	22	38	28	24	23	22	18	15	15	15	16	16	16	15
2	15	15	15	15	15	16	16	15	17	21	20	29	24	22	20	18	23	15	16	16	16	21	16	15
3	16	15	16	15	16	16	15	20	16	16	20	22	20	18	16	16	15	15	15	15	17	16	15	15
4	17	15	15	15	16	16	16	18	15	16	16	21	24	22	21	16	24	15	16	18	18	15	16	16
5	16	15	16	17	15	16	16	16	18	22	22	22	23	24	22	17	16	16	15	15	16	17	16	16
6	16	15	16	15	16	17	16	18	20	22	35	24	23	20	16	17	15	16	15	15	15	15	15	16
7	18	15	16	17	16	15	16	16	17	17	20	27	26	23	21	20	15	16	15	16	16	15	16	21
8	16	15	16	15	16	16	16	24	16	18	18	21	47	26	17	18	23	15	16	16	16	16	16	15
9	16	16	16	15	16	15	16	18	20	21	21	22	23	20	17	15	15	15	16	15	16	16	16	16
10	16	15	15	16	15	15	15	15	17	17	20	21	21	20	21	18	24	15	15	15	15	15	16	16
11	15	15	16	16	16	15	16	16	17	20	21	22	21	22	23	17	22	16	17	16	15	15	16	20
12	16	15	16	16	16	15	16	15	16	20	22	20	22	18	20	20	23	16	16	16	16	15	15	15
13	16	16	16	20	15	16	16	15	15	16	17	20	21	22	20	17	16	15	16	17	15	16	16	15
14	17	15	15	15	15	16	16	18	17	20	20	24	22	21	20	17	22	15	15	15	16	15	16	16
15	16	15	16	15	15	15	15	18	15	17	20	20	20	17	17	16	16	15	16	15	16	15	15	15
16	16	15	15	15	15	15	15	17	16	18	17	18	21	16	21	16	17	16	15	15	15	15	17	15
17	15	15	15	15	15	16	15	23	16	21	20	18	22	18	16	15	15	15	15	16	15	15	16	15
18	15	16	15	15	18	23	16	24	18	16	20	23	21	21	17	17	15	15	15	15	15	15	15	16
19	16	15	16	15	15	15	15	15	17	18	21	21	23	23	18	16	16	15	16	16	15	15	15	17
20	16	17	15	15	15	15	16	17	17	21	22	20	18	18	16	15	15	15	16	16	16	16	18	17
21	16	15	16	15	15	16	15	16	16	20	18	21	22	22	17	20	17	15	15	17	17	16	15	16
22	15	16	17	15	15	18	15	22	18	21	22	22	20	18	20	29	21	16	15	16	16		N	17
23	16	15	15	17	15	15	15	16	29	21	23	18	17	21	18	15	21	15	16	15	16	15	16	16
24	15	16	15	18	16	15	15	22	17	17	17	16	23	24	21	15	15	17	17	15	16	15	18	15
25	15	15	16	15	16	15	15	16	16	20	20	29	23	22	16	17	15	15	16	16	15	15	21	16
26	16	15	15	16	15	15	15	15	16	16	21	20	20	20	17	15	21	15	16	16	16	17	16	15
27	15	15	16	15	18	15	15	15	16	18	21	20	22	21	17	17	22	16	15	15	15	16	15	15
28	16	15	16	15	15	15	15	17	16	17	18	21	21	17	15	16	16	15	16	16	15	15	15	16
29	16	16	16	15	15	15	16	21	16	16	18	20	20	20	17	17	15	15	15	16	15	16	16	16
30	18	15	15	15	15	15	16	15	16	16	17	17	17	21	17	16	15	15	15	15	15	15	16	17
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30
MED	16	15	16	15	15	15	16	17	16	18	20	21	22	21	18	17	16	15	16	16	16	15	16	16
U Q	16	16	16	16	16	16	16	20	17	21	21	22	23	22	21	18	22	16	16	16	16	16	16	16
L Q	15	15	15	15	15	15	15	15	16	17	18	20	20	18	17	16	15	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

NOV. 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	54	47	47	49	52	38	52	107	107	114	119	125	112	123	127	121	116	101	73	71	74	69	52	55
2	48	48	42	40	41	47	58	82	96	119	120	112	122	119	131	119	112	104	82	57	54	48	46	42
3	41	42	42	44	48	33	50	84	96	114	120	118	108	118	122	117	107	94	73	57	53	53	48	47
4	48	42	46	A	43	A	54	86	114	114	121	121	118	127	118	108	103	88	66	58	52	46	46	41
5	40	44	40	39	48	41	52	91	103	117	133	120	120	124	116	109	102	88	65	55	53	54	54	48
6	42	38	43	40	38	34	50	85	101	118	125	126	125	118	120	110	104	83	62	56	64	53	47	43
7	41	42	44	48	54	36	48	88	106	127	116	111	105	121	120	111	105	88	64	62	52	54	52	52
8	51	53	48	42	39	42	56	86	107	135	128	119	128	126	124	120	110	104	83	76	66	52	54	50
9	53	49	48	51	48	42	64	99	116	131	140	132	127	128	128	124	116	102	87	84	78	70	55	55
10	54	54	57	55	48	46	67	105	103	124	130	130	138	133	126	118	118	102	84	71	80	70	59	54
11	53	49	49	50	48	49	66	104	135	142	142	132	136	141	138	122	112	114	91	81	64	52	47	A
12	45	50	50	38	35	37	50	101	132	145	141		133	136	127	118	107	101	79	78	73	62	56	56
13	54	50	42	46	40	40	48	103	122	132	131	118	113	125	107	106	106	89	74	71	73	55	51	47
14	51	51	46	39	29	37	52	88	110	118	123	117	117	117	112	104	100	84	71	71	59	53	36	40
15	40	38	45	40	36	37	48	84	114	118	118	119	110	116	112	107	102	78	62	66	65	63	47	46
16	38	37	33	38	33	33	44			115	124	109	104	115	106	94	96	74	64	76	59	52	A	54
17	52	50	43	48	46	50	66	108	134	141	142	139	127	121	133	105	114		65	53	52	47	47	48
18	45	42	42	42	37	35	42	88	122	145	130	126							72	63	50	41	38	A
19	35	A	32	40	37	34	42	91	107	128	134	134		128	118	107	100	84	60	58	56	42	A	A
20	32	31	34	33	34	41	38	74	102	108	110	114	124	128	131	123	115	85	63	64	54	47	37	34
21	33	33	33	38	32	32	41	72	83	116	120	114	110	120	126	110	88	76	65	56	42	41	38	37
22	36	41	43	44	28	28	40	82	81	90	104	114	108	115	125	106	94	70	46	46	48	35	34	38
23	34	33	36	38	38	33	39	81	92	96	105	116	109	121	121	107	84		54	62	48	30	27	34
24	32	33	33	33	37	37	43	82	102	104	126	135	134	134	126	108	88	69	48	52	50	41	35	33
25	30	34	33	36	38	33	42	86	94	106	109	108	107	104	115	93	82	60	51	46	42	46	35	37
26	33	36	33	33	33	32	42	81	101	98	98	97	104	111	106	95	99	86	54	58	47	37	40	32
27	30	32	34	40	33	32	36	74	107	111	118	104	102	104	109	105	100	72	60	54	45	36	38	37
28	38	36	35	N	35	31	28	67	100	138	136	127	131	138	140	127	111	86	69	53	47	42	38	39
29	40	44	45	42	40	36	36	84	120	110	116	124	120	122	126	110	90	75	52	50	52	34	30	37
30	35	36	31	32	28	31	33	73	104	108	119	107	116	128	118	110	86	80	70	59	52	39	33	32
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	30	28	30	29	30	29	29	30	30	29	28	29	29	29	29	27	30	30	30	30	28	27
MED	40	42	42	40	38	36	48	86	106	118	122	119	118	122	122	110	103	86	65	58	53	48	46	42
U Q	51	49	46	45	46	41	52	95	115	131	131	126	127	128	127	118	111	101	73	71	64	54	51	50
L Q	35	36	34	38	34	33	41	81	100	110	118	113	108	117	115	106	95	76	60	55	50	41	36	37

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

NOV. 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	G	G	G	26	43	29	32	G	G	G	G	58	46	G	G	42	37	28	G	G	G	23	32	30
2	G	G	G	G	G	28	G	G	G	G	G	G	G	46	46	38	34	G	G	G	G	G	G	G
3	G	G	G	G	G	G	G	G	55	G	G	G	48	48	51	59	33	26	G	G	G	G	G	G
4	G	G	G	58	49	31	24	34	G	43	47	G	48	G	43	37	G	G	30	26	G	G	G	G
5	G	G	G	G	G	G	G	52	G	G	G	G	G	G	G	G	38	32	28	25	26	40	G	30
6	G	G	G	G	G	G	G	33	G	40	55	G	G	G	G	40	30	G	G	G	G	30	40	29
7	G	G	G	G	G	G	G	G	G	G	47	53	G	48	48	50	33	G	G	25	29	27	G	G
8	G	G	G	G	G	G	G	G	37	G	44	G	G	G	G	55	66	59	24	G	26	30	31	G
9	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	37	31	28	31	G	G	G	31	G
10	G	G	G	G	G	G	G	48	G	45	45	48	46	43	44	44	G	26	30	40	24	G	G	G
11	G	G	G	24	G	G	G	31	G	45	44	45	57	43	G	38	G	48	28	G	30	24	31	44
12	24	28	G	28	G	23	G	G	40	41	G		G	G	86	G	G	30	28	G	G	G	G	G
13	G	25	26	25	G	G	G	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G
15	G	G	G	G	G	G	G	G	G	40	G	G	G	48	44	54	G	G	G	33	G	G	G	G
16	G	G	G	G	G	G	G			55	48	48	G	52	46	G	G	G	G	G	G	37	36	32
17	G	23	G	G	G	G	24	31	G	47	45	57	49	61	G	G	152	G	G	G	G	G	G	G
18	G	G	58	29	33	G	G	G	G	G	G	44							36	G	G	G	29	43
19	34	37	68	G	G	G	G	G	G	G	59	44	54	G	48	62	76	70	52	54	37	30	57	32
20	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	36	35	28	G	30	G	G	G
21	G	G	G	G	G	G	G	32	G	45	48	46	G	G	G	44	49	41	40	37	G	G	G	G
22	G	G	G	G	G	G	G	G	G	44	45	45	55	62	G	G	G	29	25	27	G	G	G	G
23	G	G	G	G	G	G	G	G	G	G	47	57	G	54	45	44	58	40	G	G	G	G	G	G
24	G	G	G	G	G	G	G	30	G	G	G	47	46	44	G	56	32	29	25	G	G	G	G	G
25	G	G	G	G	G	G	G	30	36	43	45	49	42	52	G	38	G	33	29	G	G	G	G	G
26	25	27	G	G	G	G	G	G	38	44	41	G	G	G	G	G	40	27	G	28	G	G	G	G
27	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G	G	G	G
28	G	G	G	G	G	G	G	30	38	46	60	48	52	55	44	37	38	40	28	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	G	46	43	42	56	47	50	50	32	G	G	G	G	G
30	G	G	25	G	G	G	G	44	G	G	47	43	49	48	48	124	36	30	25	G	G	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	29	29	30	30	29	29	29	29	29	29	29	30	30	30	30	30	30
MED	G	G	G	G	G	G	G	G	G	G	42	44	G	42	G	38	33	28	25	G	G	G	G	G
U Q	G	G	G	G	G	G	G	31	18	44	47	48	48	48	46	48	39	37	29	26	G	23	29	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

NOV. 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	68	58	31	55	48	32	36	91	103	108	131	128	120	136	140	134	130	134	120	102	104	108	84	70
2	64	73	50	44	47	28	44	68	102	108	128	117	115	127	136	140	129	118	112	102	77	76	76	58
3	52	53	48	48	44	54	26	68	88	101	130	128	121	120	126	128	117	106	103	83	69	76	66	62
4	47	32	51	47	52	29	30	74	111	122	137	138	142	152	146	138	128	111	107	86	85	75	59	42
5	43	43	50	48	47	38	35	66	97	111	141	142	126	138	136	131	123	115	106	85	86	78	74	61
6	52	47	44	46	48	51	34	76	94	106	128	137	126	127	132	130	131	115	105	86	82	76	71	63
7	49	48	54	45	55	37	31	70	104	114	117	118	110	126	136	128	121	108	103	84	86	82	78	66
8	60	56	56	35	51		45	73	100	124	131	130	131	137	138	124	121	126	108	87	104	84	76	62
9	54	55	53	54	46	29	47	82	108	127	146	135	126	140	139	130	124	120	113	101	102	87	79	67
10	67	67	57	60	49	49	47	87	105	122	138	143	128	150	136	129	126	126	118	108	104	102	84	66
11	62	51	52	52	48	32	42	81	123	139	146	146	145	149	153	136	135		126	118	98	82	86	84
12	72	84	69	41	67		27	76	116	142	147	142	126	145	135	124	117	110	106	87	106	86	84	66
13	62	52	38	48	46	71	60	74	120	126	134	137	126	136	125	116	111	108	102	86	88	86	76	74
14	67	67	50	43	36	N	33	74	103	118	132	128	126	126	127	112	112	112	91	84	87	85	60	42
15	66	65	40	35	46	28	30	71	104	117	127	137	121	126	134	132	119	99	85	85	83	87	82	62
16	53	55	36	38	35	31	34	64	103	121	136	140	127	120	134	128	120	117	108	103	94	86	74	75
17	86	75	74	66	53	47	61	88	135	158	162	158	147	135	135	129	127	113	102	93	88	86	79	64
18	66	66	68	63	A	38	42	76	122	152	144	140	136	145	138	132	112	108	112	98	86	N	63	53
19	40	41	29	60	42	52	53	79	107	130	147	139	135	144	147	135	132	124	101	84	85	83	53	35
20	47	70	41	39	36	40	46	65	85	104	113	128	129	138	146	151	146	130	123	110	94	88	83	62
21	53	50	49	38	43		28	60	81	102	117	122	115	114	131	137	122	107	87	67	76	71	57	
22	51	50	48	42	31	36	30	60	85	98	109	115	123	130	132	127	122	103	78	54	72	64	64	86
23	71	35	60	36	41	32	31	74	80	90	104	118	122	132	140	142	136	108	83	81	86	72	79	79
24	44	71	51	36	37	43	28	61	86	117	135	122	136	135	141	131	135	123	90	74	80	78	57	46
25	30	32	66	34	38	38	31	58	87	101	101	111	110	114	120	119	110	92	76	72	75	72	60	59
26	56	36	36	39	38	36	30	66	91	96	96	101	111	110	117	118	114	111	87	84	80	74	62	62
27	70	68	41	40	43	35	26	53	96	118	120	102	99	100	116	109	105	98	99	78	75	61	53	66
28	53	47	56	56	46	35	35	52	87	125	129	130	120	129	141	127	112	91	86	63	56	62	60	50
29	69	71	50	43	40	27	32	51	108	107	120	137	142	138	136	130	126	112	94	71	78	85	64	54
30	32	41	40	36	28	31	35	58	98	105	117	122	121	132	133	141	137	109	105	98		87	90	66
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	26	30	30	30	30	30	30	30	30	30	30	30	29	30	30	29	29	30	29
MED	55	54	50	44	46	36	34	70	102	117	130	130	126	134	136	130	122	111	103	86	86	82	74	62
U Q	67	67	56	52	48	43	44	76	108	125	138	139	131	138	140	135	130	119	108	98	94	86	79	66
L Q	49	47	41	38	38	31	30	61	88	105	117	122	120	126	132	127	117	107	90	81	77	74	60	56

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

NOV.1990

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

DAY \ HOUR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	26	G	G	G	G	G	G	G	G	G	G	41	G	33	38	25	G	G	G	G
2	G	G	G	G	G	G	G	G	36	42	46	48	60	51	45	50	71	40	28	25	G	G	G	G
3	G	G	G	G	G	G	G	G	39	G	53	G	51	54	59	81	70	46	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	46	G	G	72	G	43	41	45	57	57	25	25	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	44	G	44	46	39	42	32	36	G	G	G
6	G	G	G	G	G	G	G	29	G	G	G	G	G	52	46	45	35	G	35	G	G	G	G	G
7	G	G	G	G	G	G	G	31	G	44	42	52	53	52	45	82	68	48	33	29	30	G	G	G
8	G	G	G	G	G	G	G	G	G	44	51	58	63	G	G	61	56	31	G	G	G	G	G	G
9	G	G	G	G	G	G	G	28	G	47	48	G	G	61	G	59	G	G	25	G	G	G	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	47	G	37	37	38	G	32	G	G
11	G	23	G	G	G	G	G	G	G	G	G	56	59	43	G	G	39		G	31	G	G	G	G
12	G	G	43	G	G		G	G	35	G	G	46	66	G	43	G	G	G	24	G	G	G	G	G
13	G	G	G	G	G	G	G	28	G	42	42	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	G	G	32	26	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	40	G	54	51	G	G	67	45	G	36	26	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	50	65	59	G	G	G	G	G	G	G	31	30	35	32
17	28	24	G	G	G	G	G	G	G	44	47	43	G	G	G	39	60	48	47	30	32	G	G	G
18	G	G	G	G	42	34	G	G	G	G	47	47	49	47	G	56	36	45	47	26	31	G	38	G
19	G	G	G	G	G	25	G	G	G	54	46	52	54	G	42	44	43	40	40	G	G	G	G	G
20	G	G	G	G	G	G	G	27	G	G	G	G	G	G	G	G	G	29	28	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	42	45	G	G	G	G	G	G	G	24	G	24	G	G	G
22	G	G	G	G	G	G	G	G	G	G	45	45	G	78	G	42	G	G	G	G	28	23	G	25
23	29	G	G	G	G	G	G	G	G	G	G	G	G	G	41	42	G	G	29	G	G	G	G	G
24	G	G	G	G	G	G	G	G	83	G	G	G	G	44	42	G	G	G	24	G	G	G	24	G
25	G	G	G	G	G	G	G	G	G	G	G	G	50	51	47	41	G	G	22	25	G	G	G	G
26	G	G	G	G	G	G	G	G	44	G	43	G	G	G	G	G	G	29	G	G	G	G	G	G
27	G	G	G	G	G	G	G	G	G	G	G	G	52	G	G	39	G	G	29	G	G	G	G	G
28	G	G	G	G	G	G	G	G	G	G	G	78	52	44	52	39	G	28	27	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25	G	G	G	G	G
30	29	G	G	G	G	G	G	24	G	43	48	84	66	52	43	42	40	G	28	G	G	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30
MED	G	G	G	G	G	G	G	G	G	G	22	G	25	G	G	41	G	28	28	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	42	47	52	54	51	43	47	45	39	36	25	24	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	22	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

NOV. 1990

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

NOV.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	105	90	67	66	54	29	37	90	108	104	138	143	145	156	158	160	156	157	177	170	177	154	142	108
2	87	86	61	54	52	39	32	66	105	108	140	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	140	139	137	146	140	145	136	142	110	110	100	77
4	72	73	58	49	54		26	66	105	140	144	160	163	184	194	171	171	164	164	134	145	140	110	114
5	86	88	86	82	66	43	28	66	98	131	146	146	145	150	162	163	158	145	139	150	141	129	108	100
6	86	87	83	79	80	44	32	66	96	108	140	142	120	142	158	162	158	156	146	145	146	146	111	101
7	89	85	84	80	73	30	26	66	108	123	120	120	126	138	144	144	142	136	119	108	143	145	145	90
8	88	N	84	59	57	54	43	77	103	118	135	138	141	145	156	146	141	142	142	128	139	145	120	89
9	90	84	73	65	53	37	38	85	107	130	145	147	140	152	162	154	146	145	146	145	164	177	145	90
10	84	85	84	70	54	38	42	86	100	126	142	144	144	152	154	146	142	146	146	145	175	177	158	110
11	87	84	74	67	62	42	36	73	127	156	146	156	158	168	168	169	166	170	168	166	174	179	176	146
12	139	128	110	84	42	35	28	77		142	146	148	146	144	146	145	131	121	126	128	130	147	129	109
13	86	63	32	56	51	39		66	122	130	141	144	145	135	142	120	119	121	N	108	125	158	144	110
14	108		72	46	40	31	32	63	108	131	142	142	135	140	138	134	124	128	107	108	111	110	90	79
15	109	66	61	55	42	32		66	107	126	142	142	153	150	161	162	146	141	135	142	145	144	146	121
16	86	65	56	51	46	30	N	60	108	132	147	146	145	147	149	167	162	165	145	145	160	162	143	108
17	127	87	108	86	66	64	75	108	143	157	166	160	150	149	156	160	151	146	143	145	166	161	144	109
18	87	90	88	83	54	38	54	81	121	157	161	157	156	164	167	163	145	145	145	145	157	145	110	109
19	85	88	88	86	82	82	67	88	126	142	145	144	138	156	168	170	167	163	165	164	172	146	109	90
20	66	80	77	78	64	52	N	60	94	111	126	138	157	170	177	197	188	187	189	167	148	138	128	107
21	90	86	85	77	58		26	55	90	107	111	120	117	127		145	147	136	108	103	108	90	84	81
22	63	34	53	31	28		28	63	89	103	116	120	130	141	150	160	161	146	150	108	107	90	90	63
23	45	34	31	42	43	34	34	60	88	90	104	121	133	155	167	174	184	171	145	127	146	144	127	90
24	90	90	85	66	66	56	37	59	88	128	151	150	143	166	166	170	182	172	164	147	144	144	111	84
25	62	35	54	50	56	50	32	54	79	91	108	112	108	130	120	136	140	120	118	108	97	86	78	54
26	52		43	41	48	38	37	63	88	99	103	109	110	120	127	138	141	138	139	141	146	143	108	90
27	67	N	66	52	58	31	N	54	106	120	121	110	105	125	121	125	118	107	131	122	108	90	83	85
28	84	66	N	25	28	32	29	54	120	122	131	131	135	A	137	121	118	107	108	102	87	90	90	83
29	66	54	58	60	42	29	27	53	105	130	141	146	165	170	164	168	177	162	161	145	144	146	120	102
30	85	83	82	71	48	38	38	66	100	120	132	126	128	148	162	180		174	164	164	169	170	150	110
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	25	28	29	29	26	24	29	28	29	29	28	29	28	28	29	28	29	28	29	29	29	29	29
MED	86	84	74	65	54	38	33	66	105	126	141	142	141	148	157	160	146	145	145	142	145	145	120	100
U Q	90	87	84	78	63	44	38	77	108	131	145	146	148	156	165	168	164	163	162	146	162	156	144	109
L Q	69	65	58	50	44	32	28	60	95	108	123	123	129	139	143	144	140	136	133	115	118	119	104	84

HOURLY VALUES OF FES AT OKINAWA

NOV. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	11	G	G	G	G	G	46	G	G	G	G	G	G	G	G	34	G	25	25	G
2	G	G	G	G	G	G	G	28	36	47	45	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	54	G	51	54	44	45	46	34	G	G	G	G
4	27	G	G	G	G	G	G	G	38	48	51	46	46	64	46	64	42	46	38	G	G	G	G	G
5	G	G	G	G	G	G	G	29	G	44	52	49	50	G	66	47	62	96	84	29	G	G	G	G
6	G	25	G	G	G	G	G	G	35	G	G	48	G	G	60	50	47	37	28	G	24	G	G	G
7	G	G	G	G	G	G	G	G	G	44	54	52	60	44	G	N	41	34	G	G	24	G	G	G
8	G	G	G	G	G	G	G	G	39	45	69	54	64	64	G	42	38	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	31	G	G	G	49	G	G	50	42	G	G	26	36	30	23	24	G
10	G	G	G	G	G	G	G	G	G	G	G	G	64	45	G	G	38	G	24	G	G	G	G	G
11	G	G	G	G	G	G	G	G	59	G	G	G	G	G	G	48	37	31	G	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	41	G	46	G	G	G	42	38	32	G	G	G	G	G	G
13	G	G	G	G	G	G		G	44	44	44	47	56	45	44	42	39	31	G	G	G	G	G	G
14	G		G	G	G	G	G	G	G	58	42	G	G	G	45	44	37	35	48	32	32	25	29	G
15	G	G	G	G	G	G		G	38	G	G	46	63	66	62	67	40	30	26	G	24	G	G	G
16	G	G	G	G	G	G	G	G	G	G	42	G	56	G	G	G	G	G	23	G	G	G	G	G
17	G	G	33	31	G	G	G	G	G	59	44	45	50	58	45	60	68	41	61	30	G	G	G	G
18	G	G	G	G	G	28	29	32	36	48	51	49	52	57	68	63	46	48	34	26	30	G	G	G
19	26	G	G	G	G	G	G	29	39	45	48	51	57	78	44	68	G	36	G	27	32	33	G	25
20	G	G	G	G	G	G	G	G	34	39	44	G	69	44	44	G	G	G	29	G	30	32	23	G
21	G	G	G	G	G		G	26	G	G	44	G	G	G	G	G	G	57	26	28	24	G	G	G
22	G	G	G	G	G		G	28	35	G	58	61	50	G	45	G	64	39	26	32	G	G	G	24
23	G	28	G	31	30	G	G	G	G	G	G	G	50	G	G	40	51	G	23	G	24	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	47	51	62	G	38	G	26	G	28	G	G
25	G	G	G	G	G	G	160	G	G	G	G	G	52	50	50	46	39	G	G	G	24	29	G	G
26	G		G	G	G	G	G	G	G	39	G	G	47	44	G	G	G	G	22	G	G	G	G	G
27	G	G	G	G	G	G	G	G	G	67	G	66	46	G	G	40	37	G	G	32	26	G	G	29
28	G	G	G	G	G	G	G	28	G	G	46	G	57	88	64	44	G	G	27	G	24	G	G	G
29	G	G	G	G	G	G	G	G	82	G	G	G	46	47	62	46	43	31	37	29	30	26	30	30
30	G	G	G	G	G	29	G	24	G	G	G	52	G	59	50	71	76	G	34	26	32	29	G	32
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	27	29	29	29	27	27	29	29	29	29	28	29	29	29	28	29	29	29	29	29	29	29	29
MED	G	G	G	G	G	G	G	G	G	G	42	46	50	44	45	44	38	31	26	G	24	G	G	G
U Q	G	G	G	G	G	G	G	27	37	45	47	49	56	57	51	57	45	38	34	29	28	25	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	20	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

NOV.1990

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

D/H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	15	15	15	15	21	16	16	17	23	24	28	22	23	16	15	15	14	15	16	15	15
2	15	15	15	15	15	15	15	15	15	18	21	C	C	C	C	C	C	C	C	C	C	C	C	C
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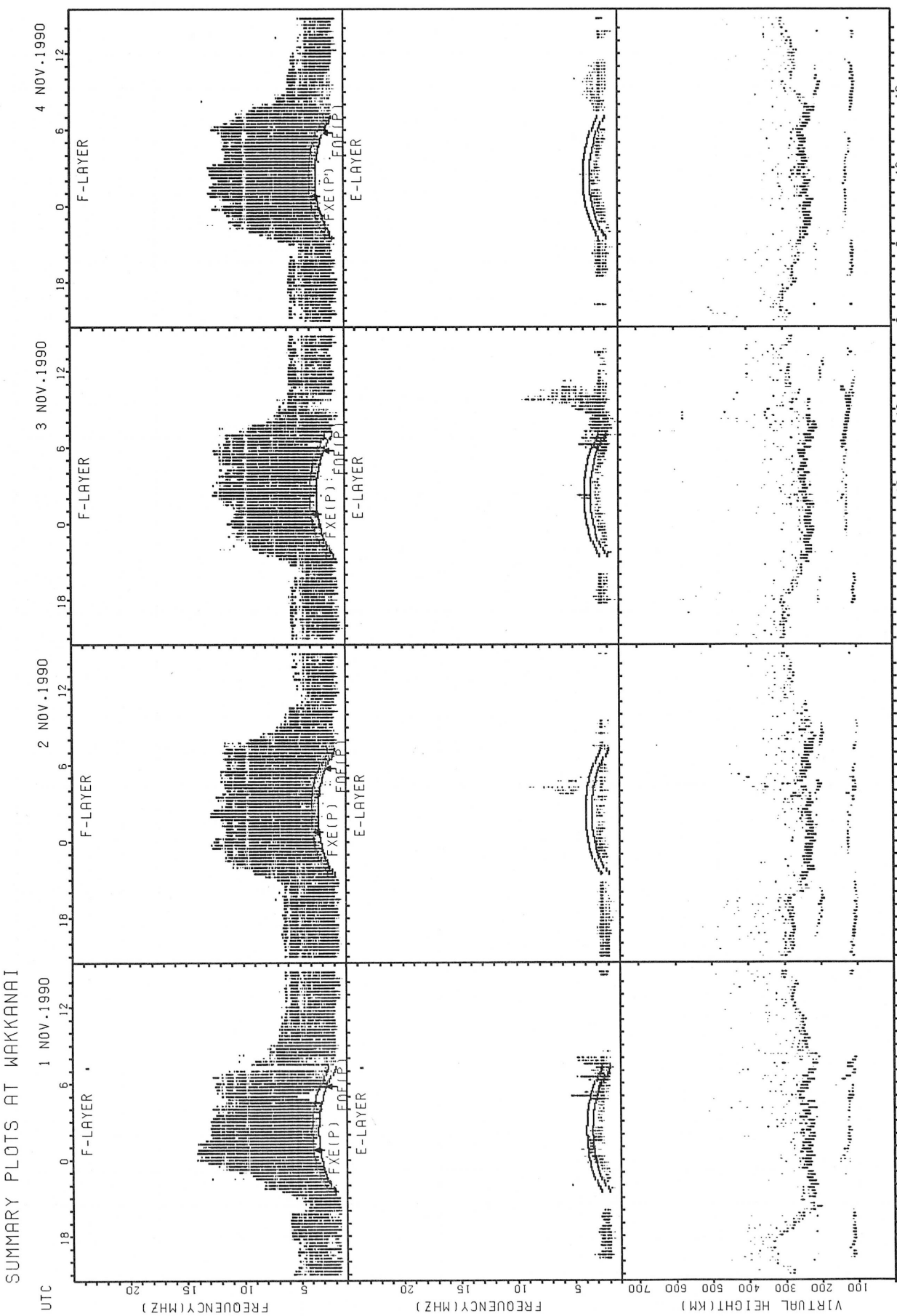
MED	15	15	15	15	15	15	15	16	15	17	22	24	26	26	24	22	18	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	20	16	20	23	26	27	27	26	24	20	16	15	15	15	15	15	15
L Q	15	15	15	15	14	15	15	15	15	16	20	22	24	24	23	21	16	15	14	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN


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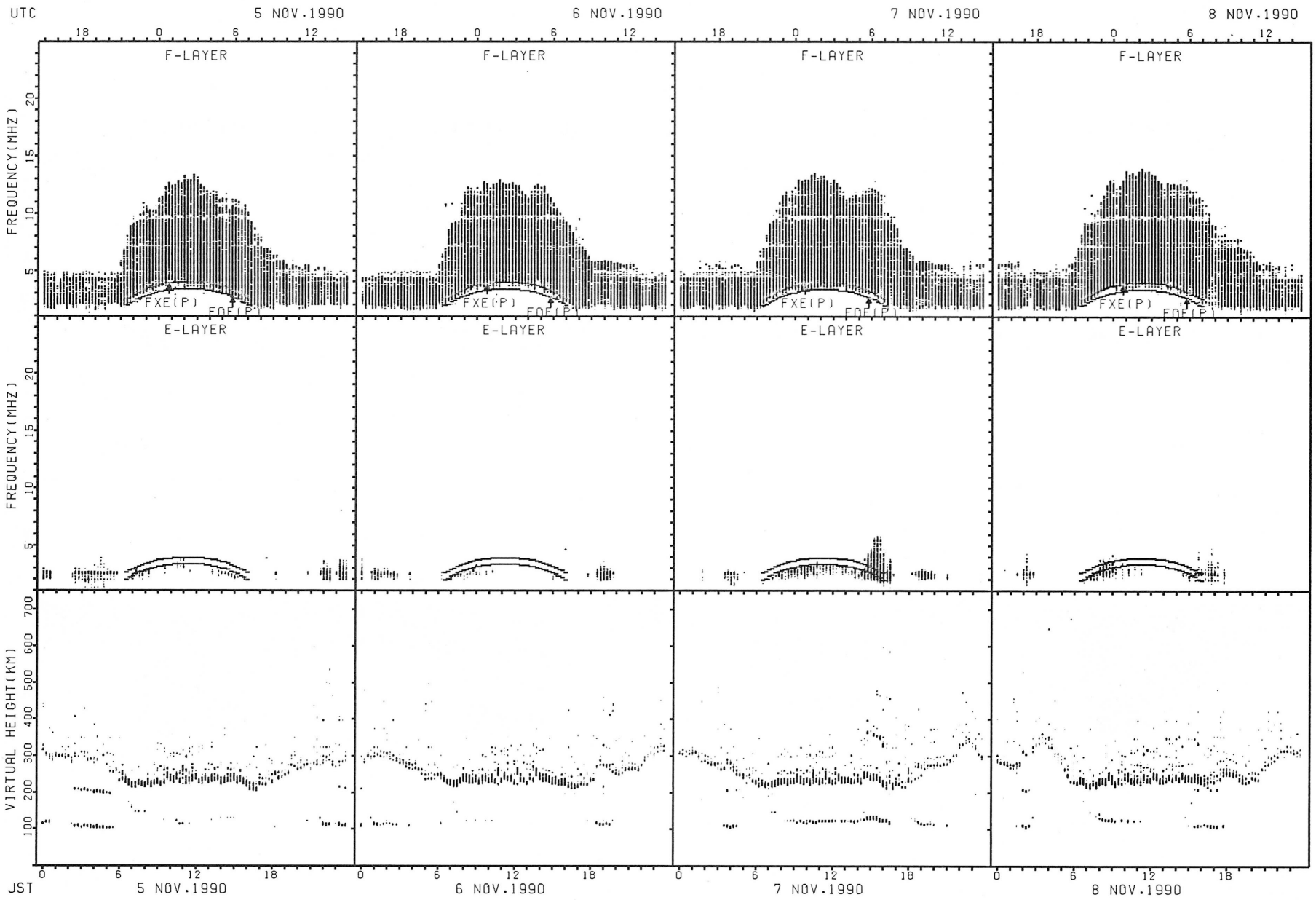
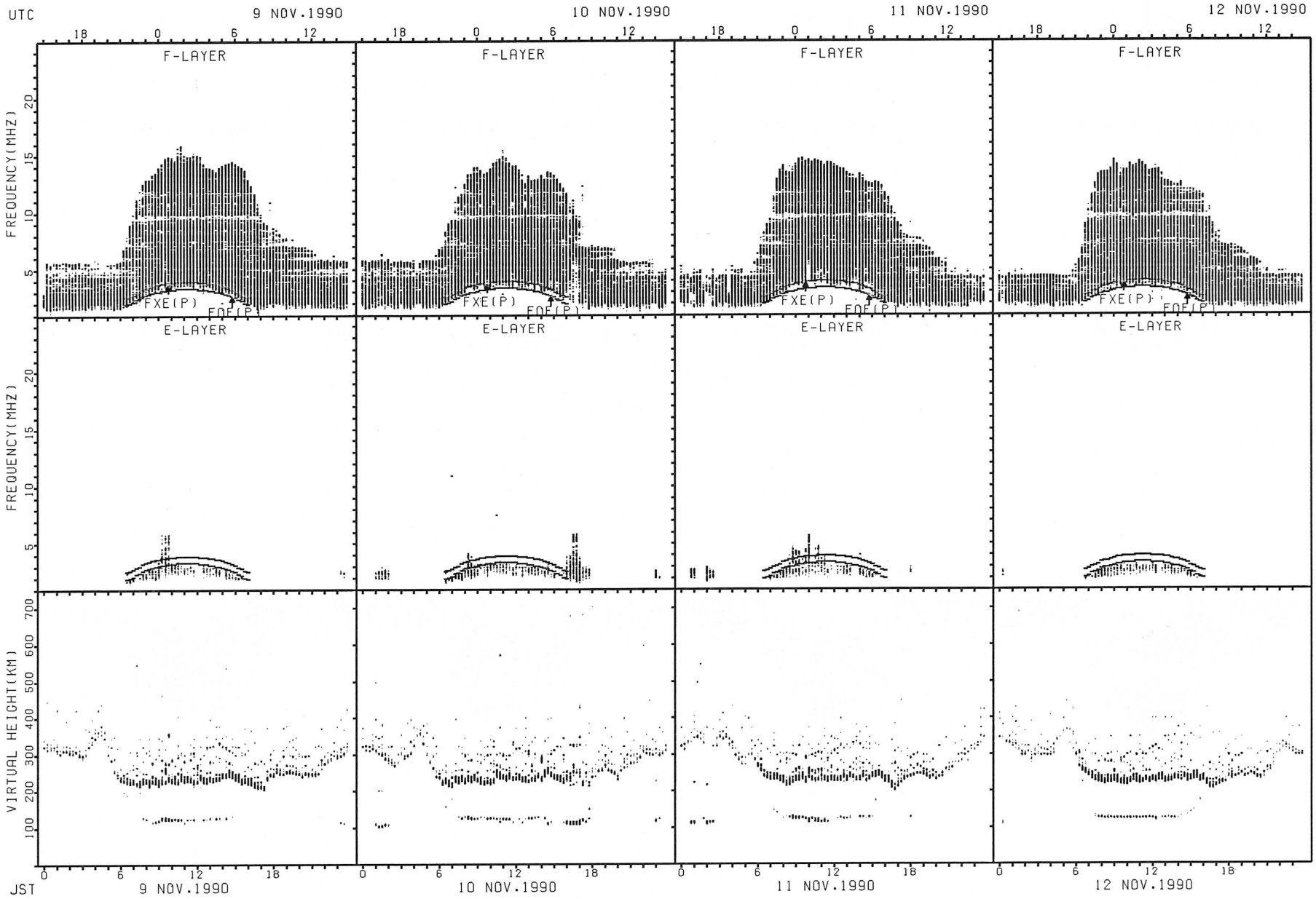
3 NOV.1990
4 NOV.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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

SUMMARY PLOTS AT WAKKANAI



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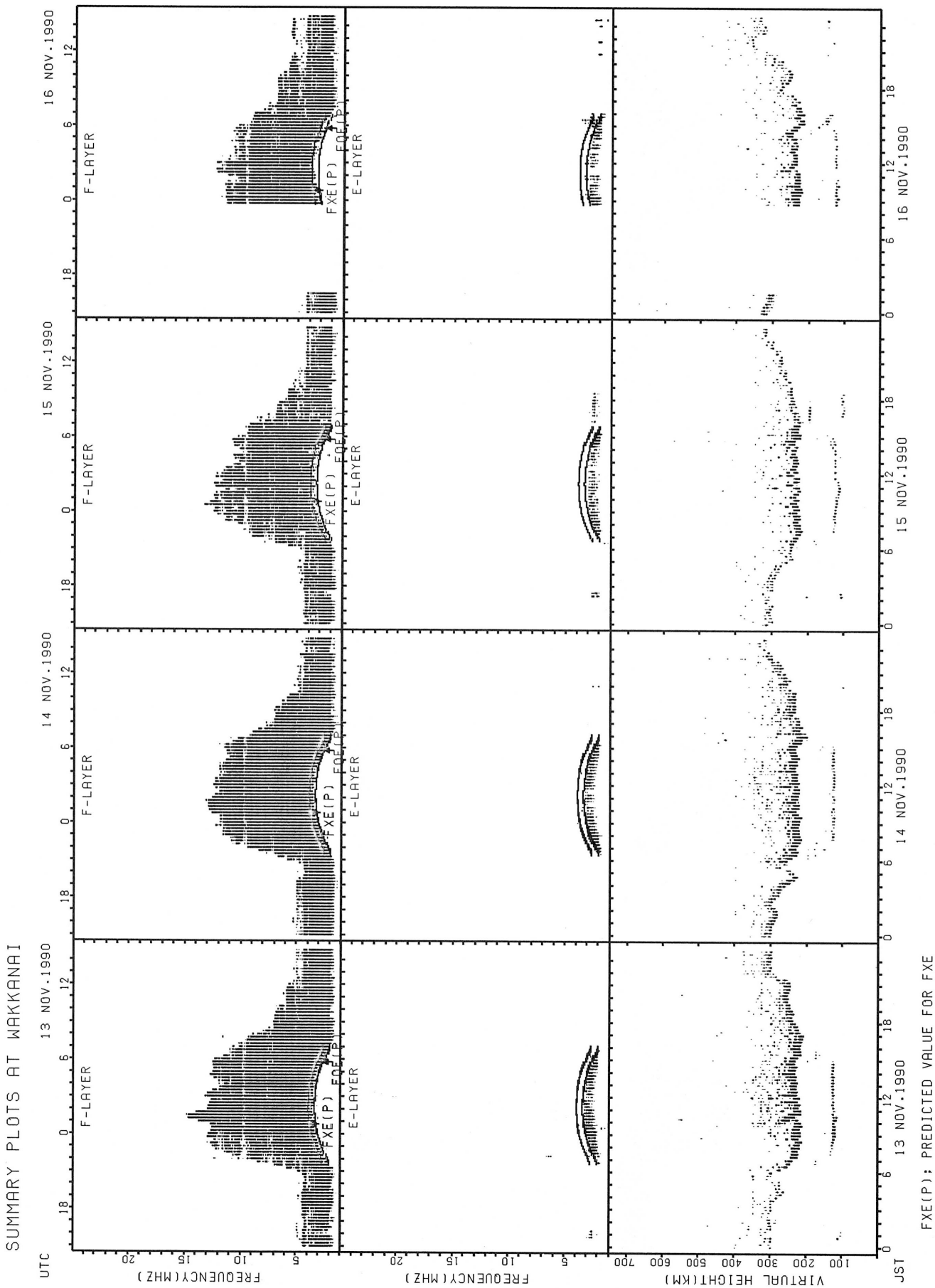
SUMMARY PLOTS AT WAKKANAI
UTC
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F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
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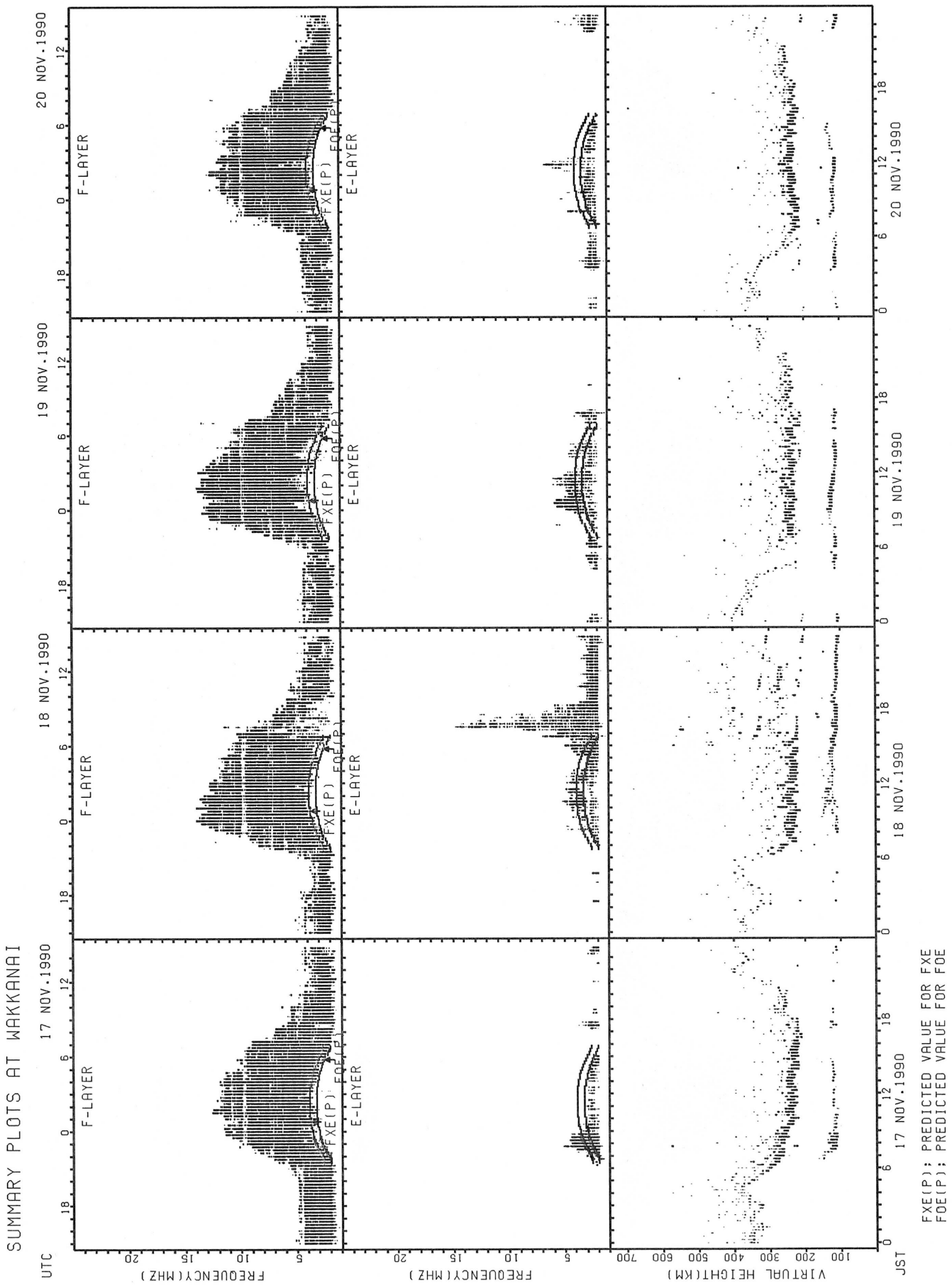
FOE(P): PREDICTED VALUE FOR FOE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UTC
JST
F-LAYER
E-LAYER
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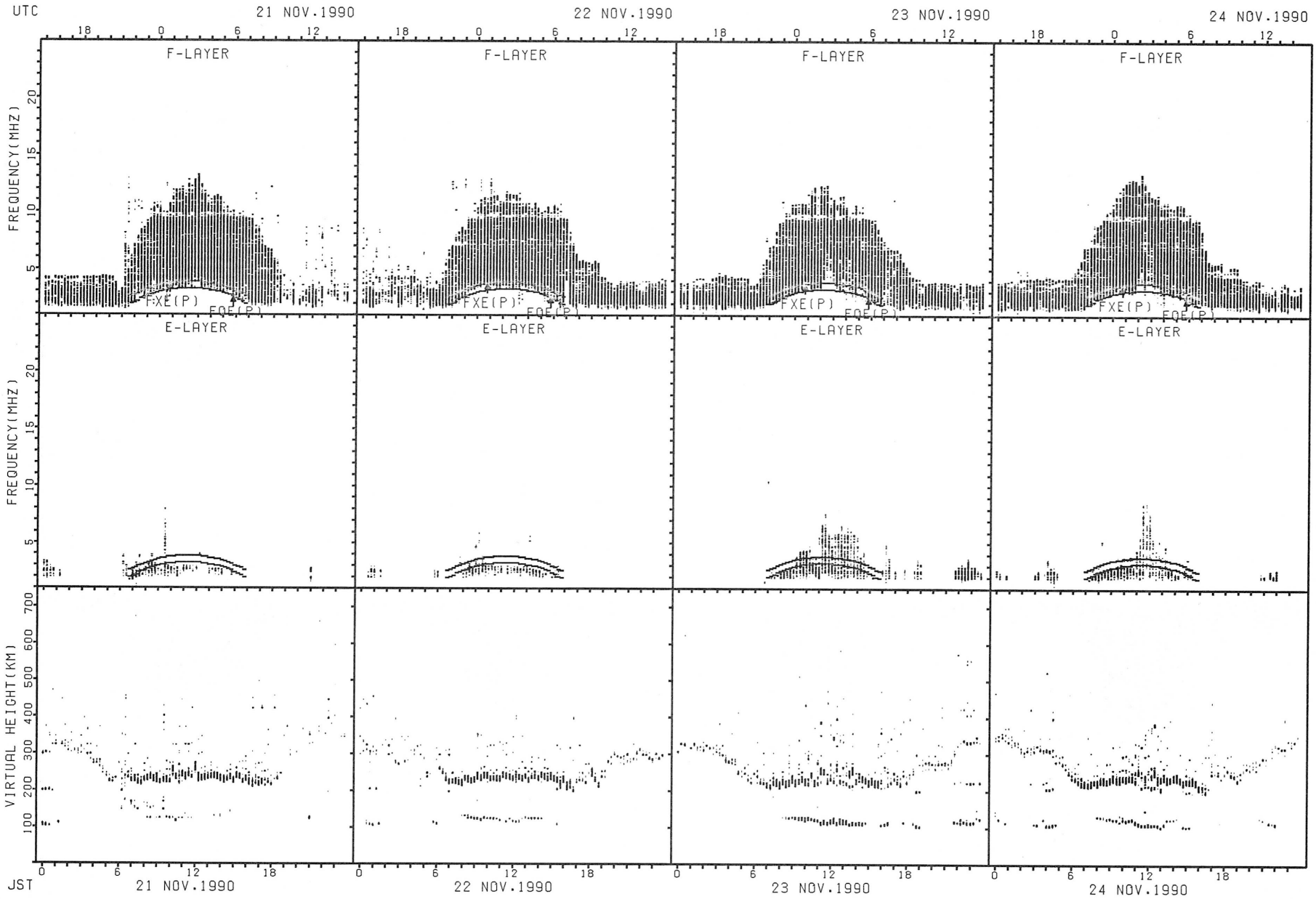
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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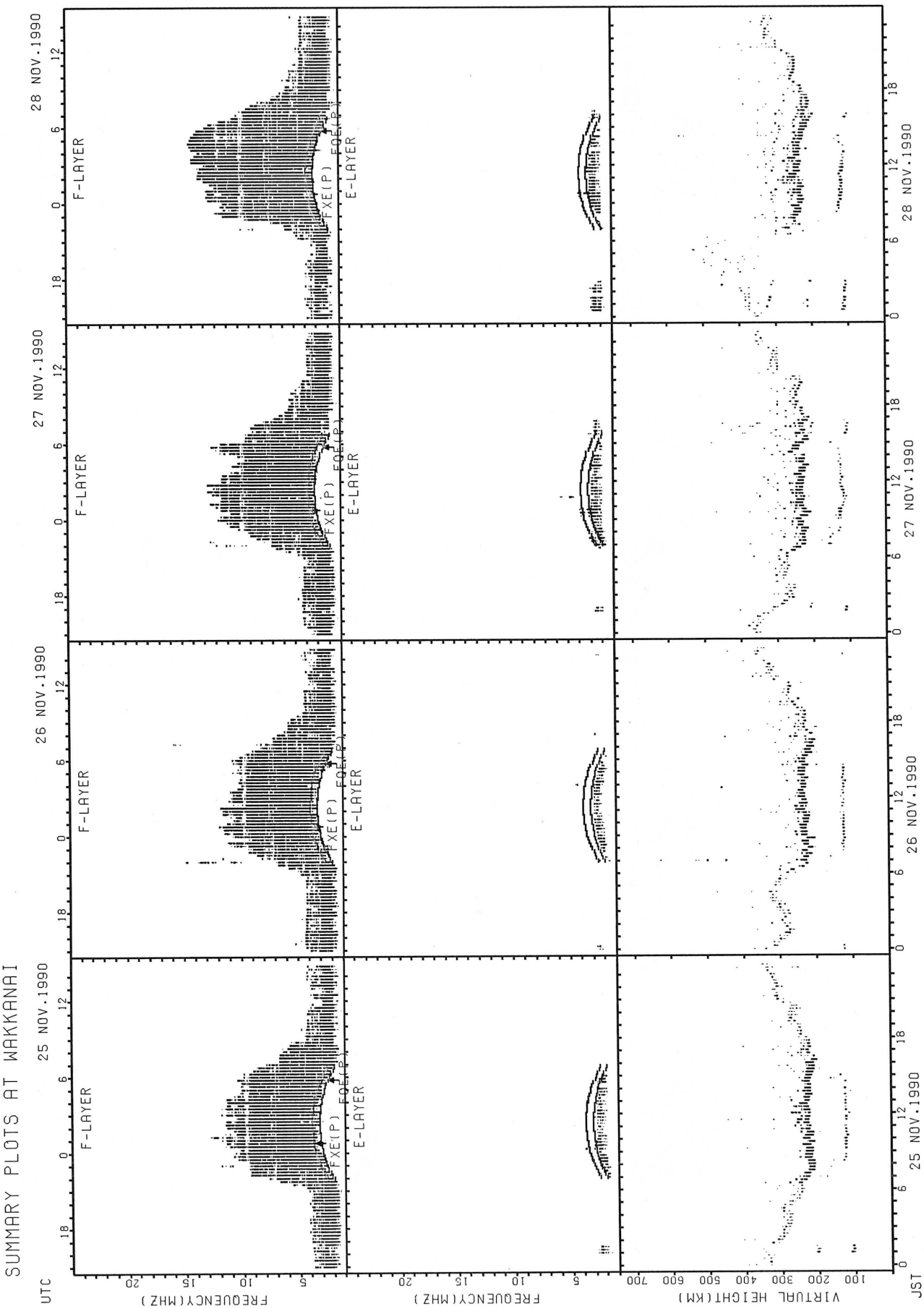
SUMMARY PLOTS AT WAKKANAI
UTC
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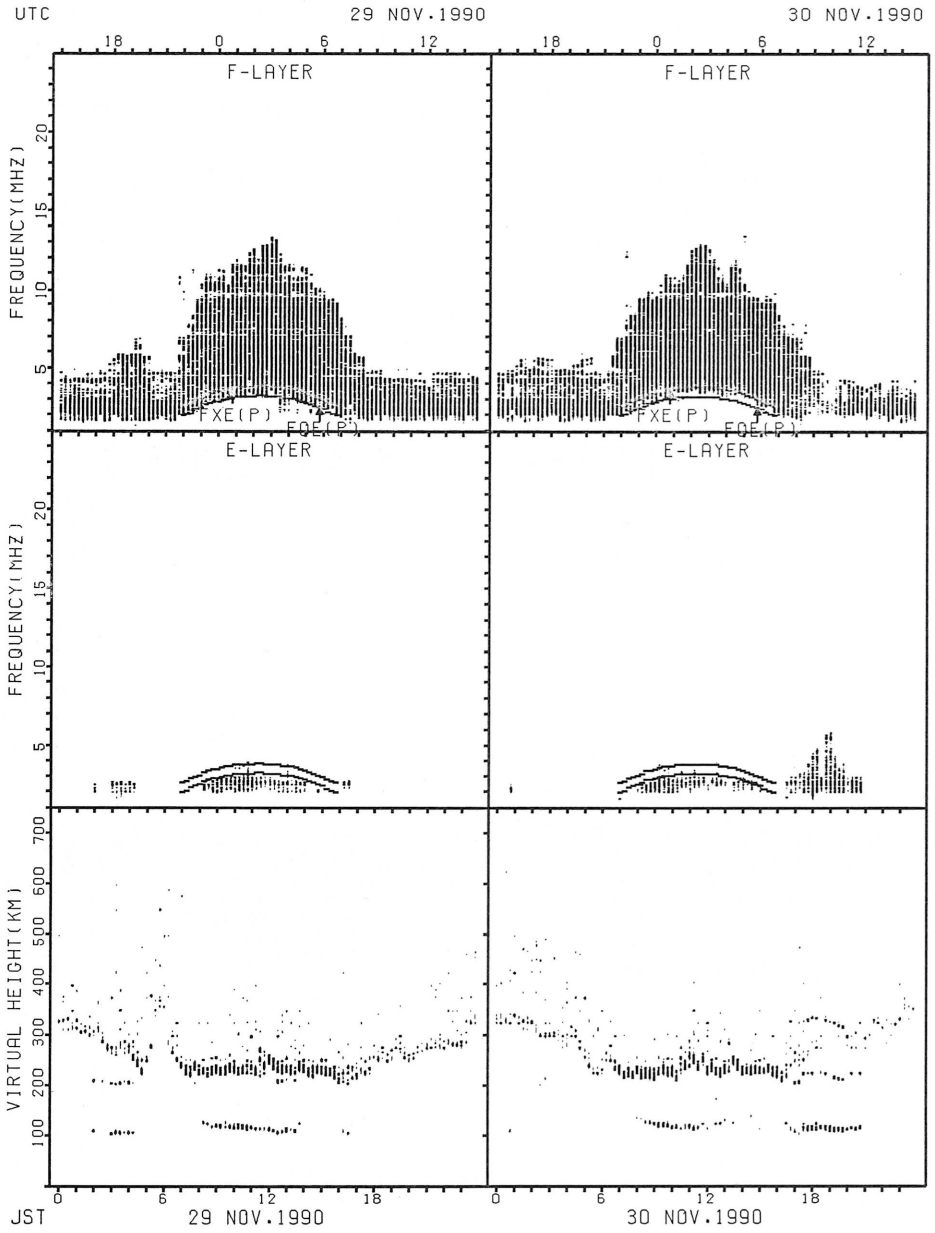
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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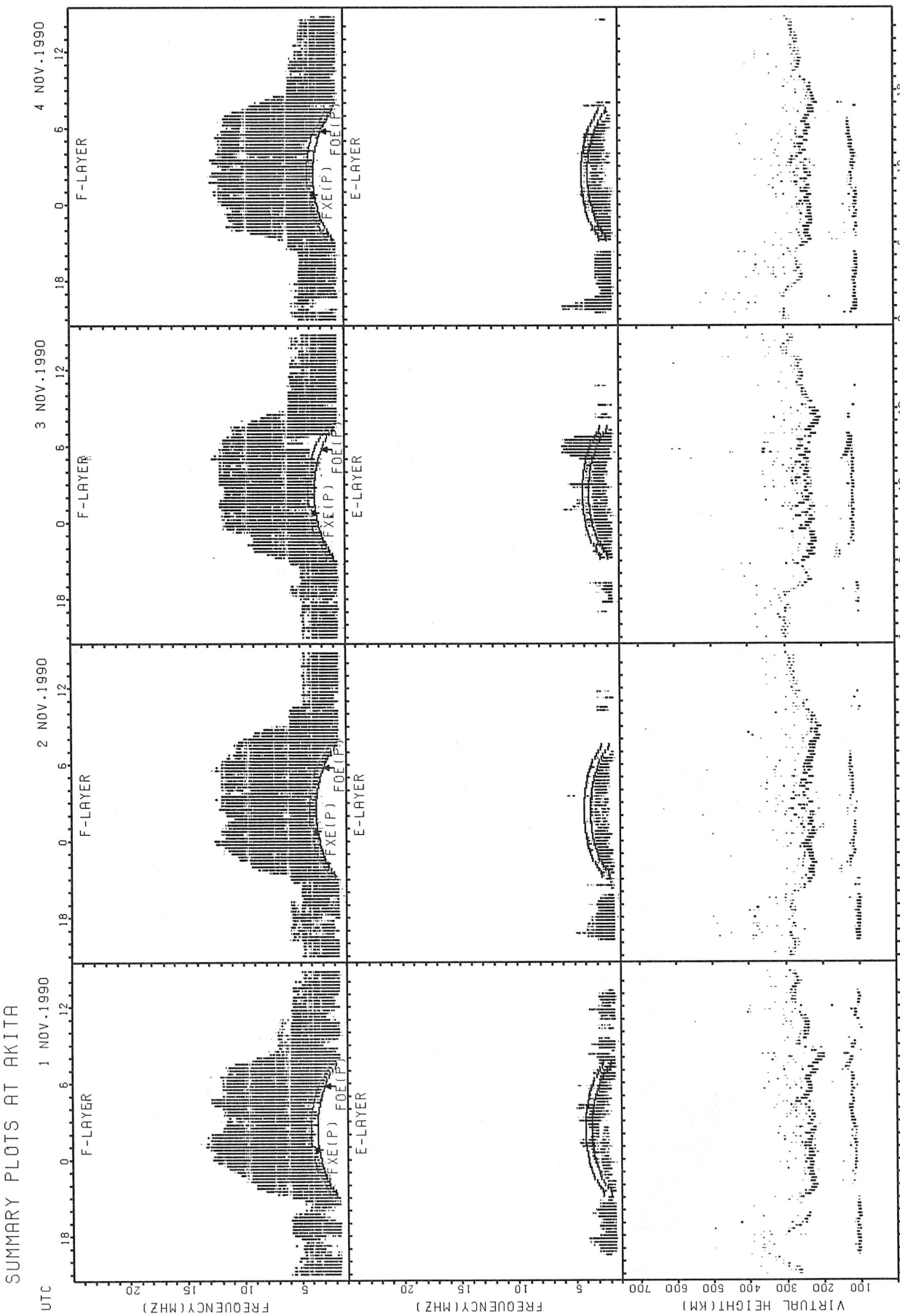
SUMMARY PLOTS AT AKITA
UTC
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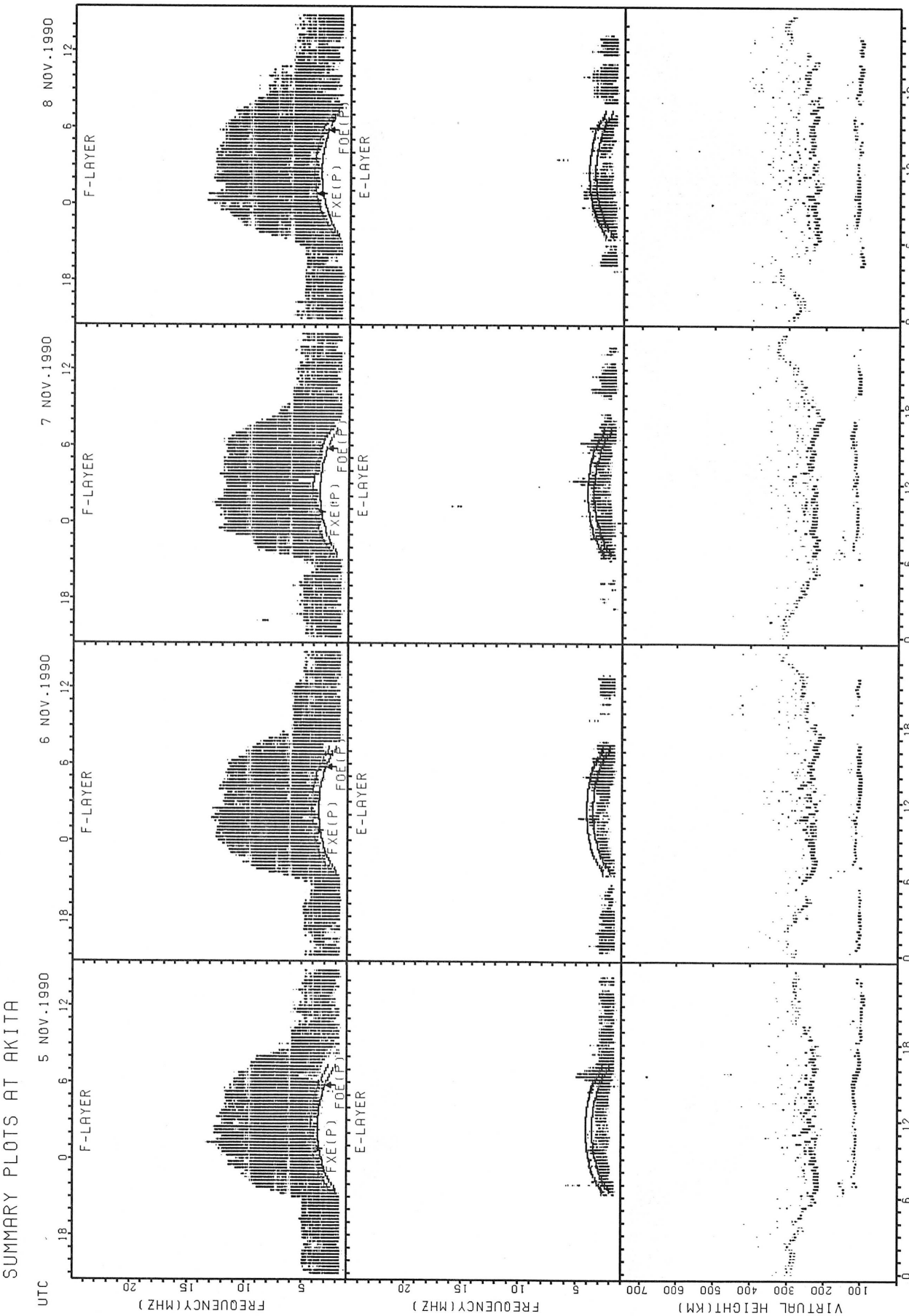
4 NOV.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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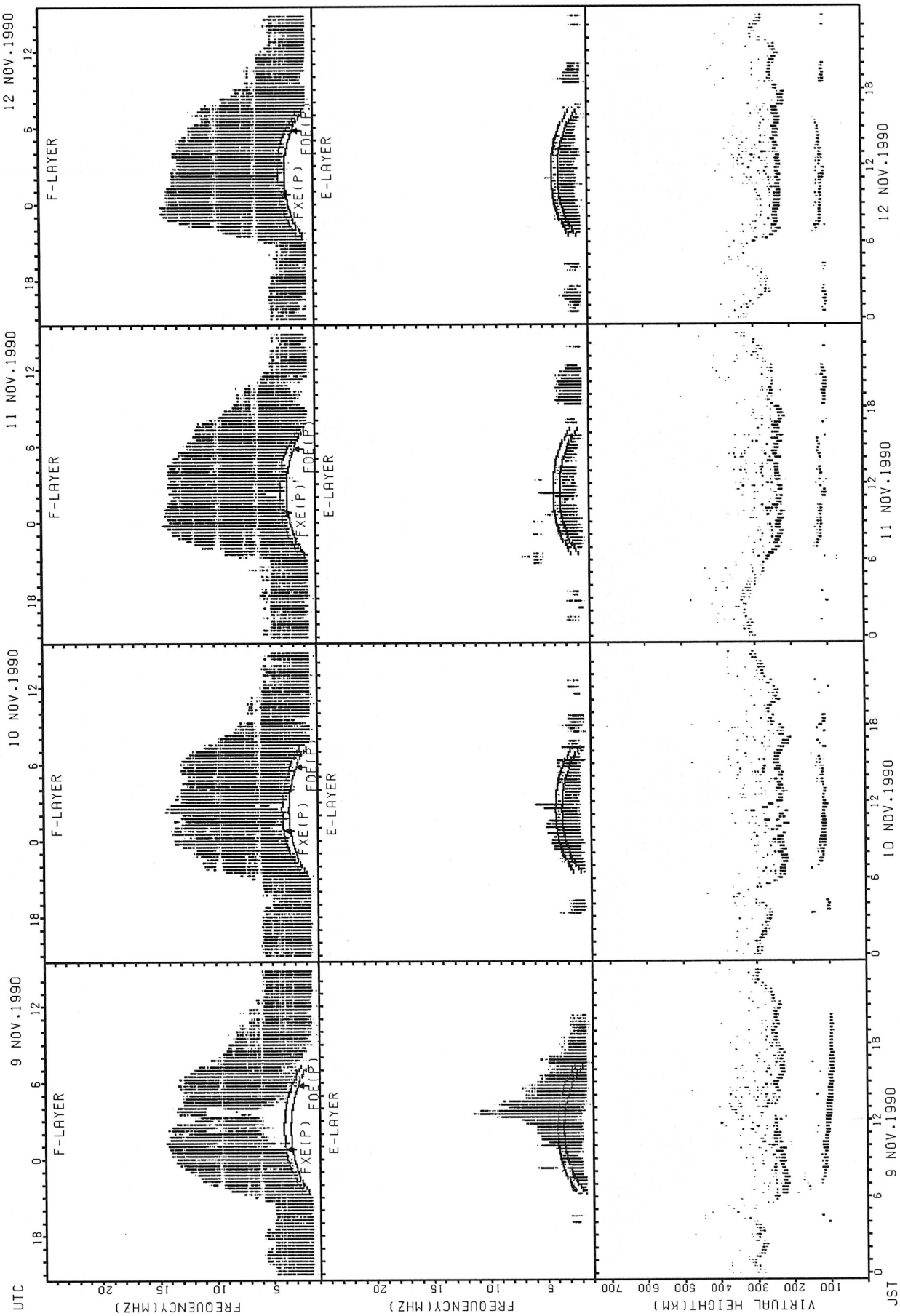
FOE(P): PREDICTED VALUE FOR FOE


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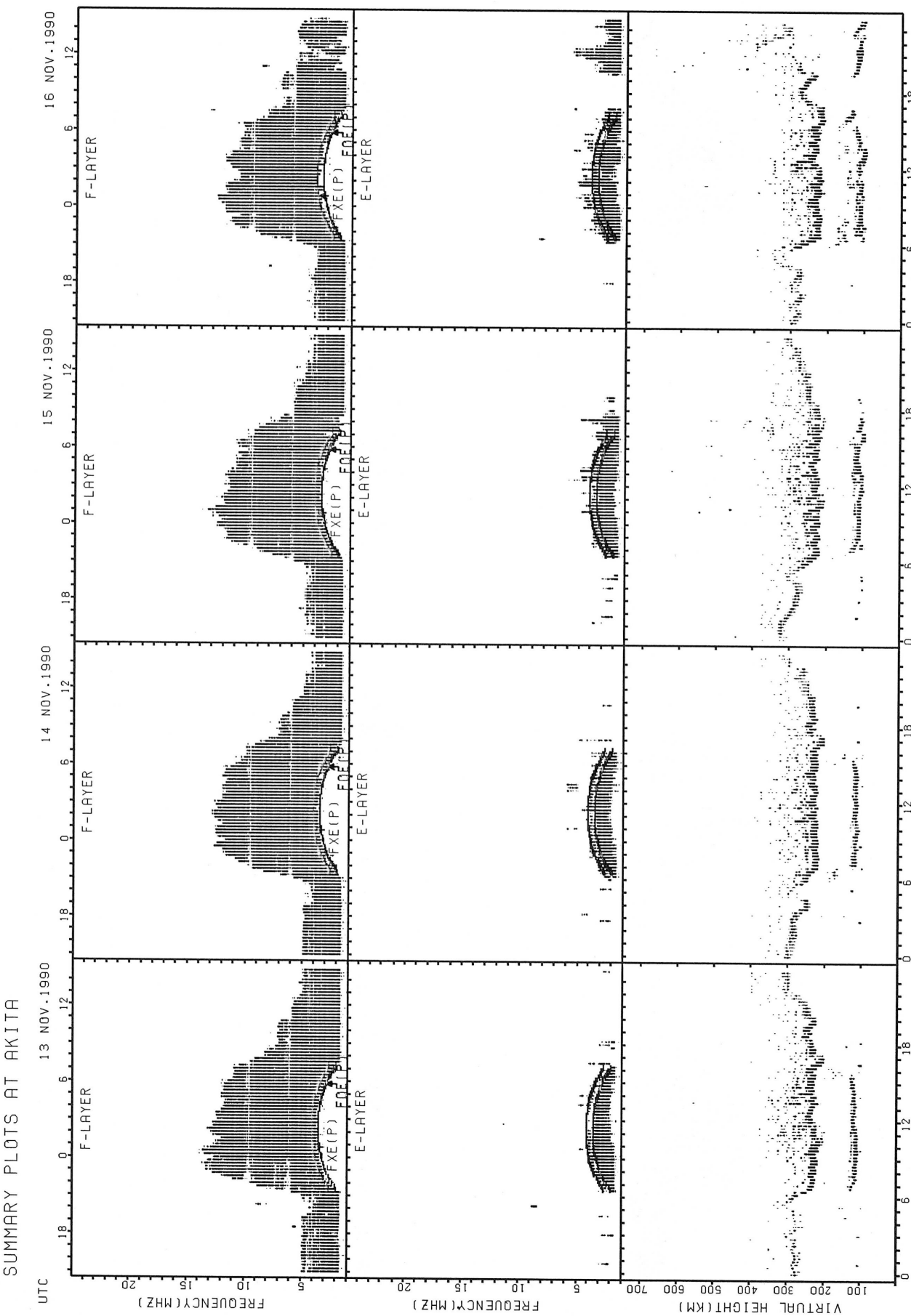
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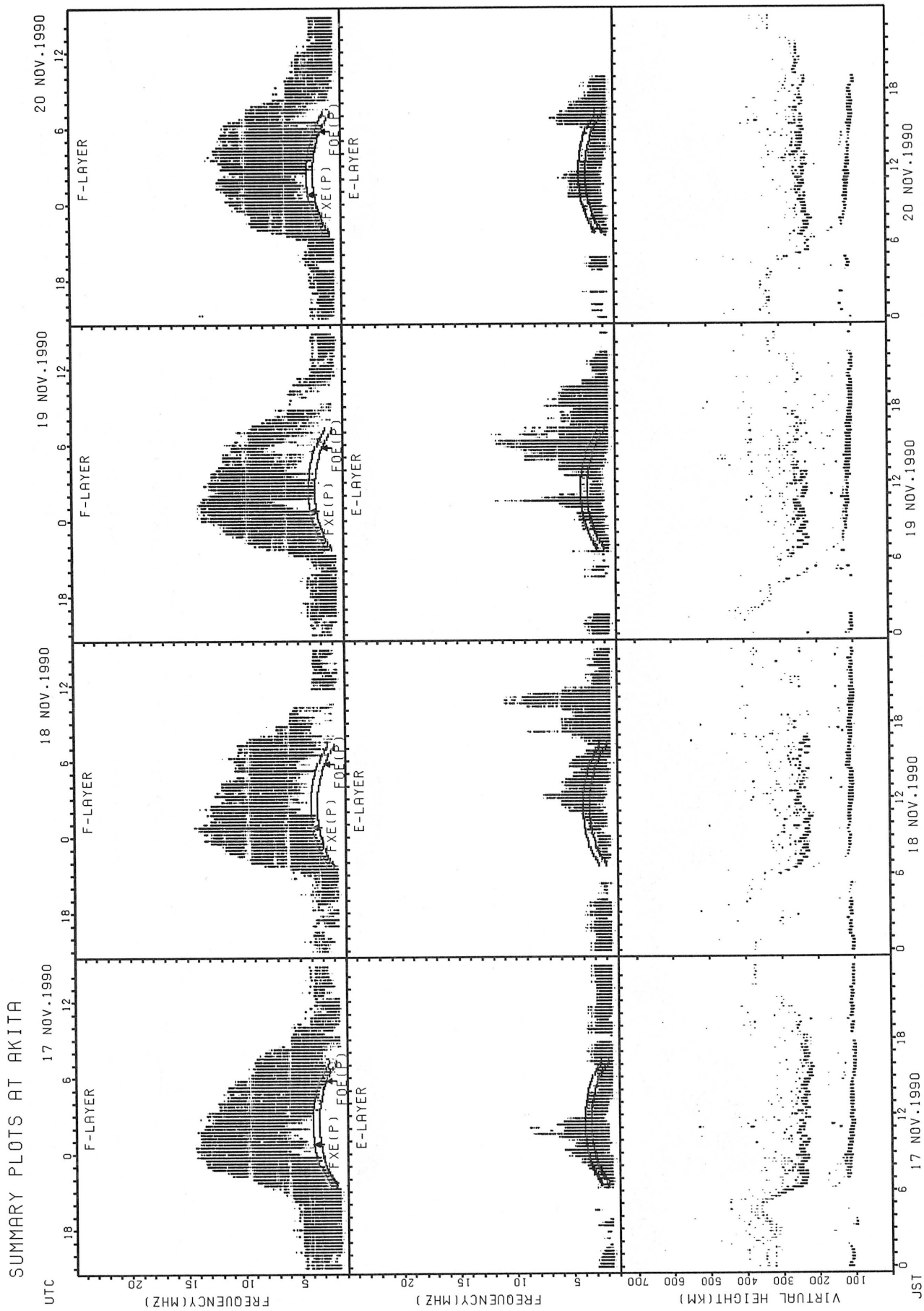
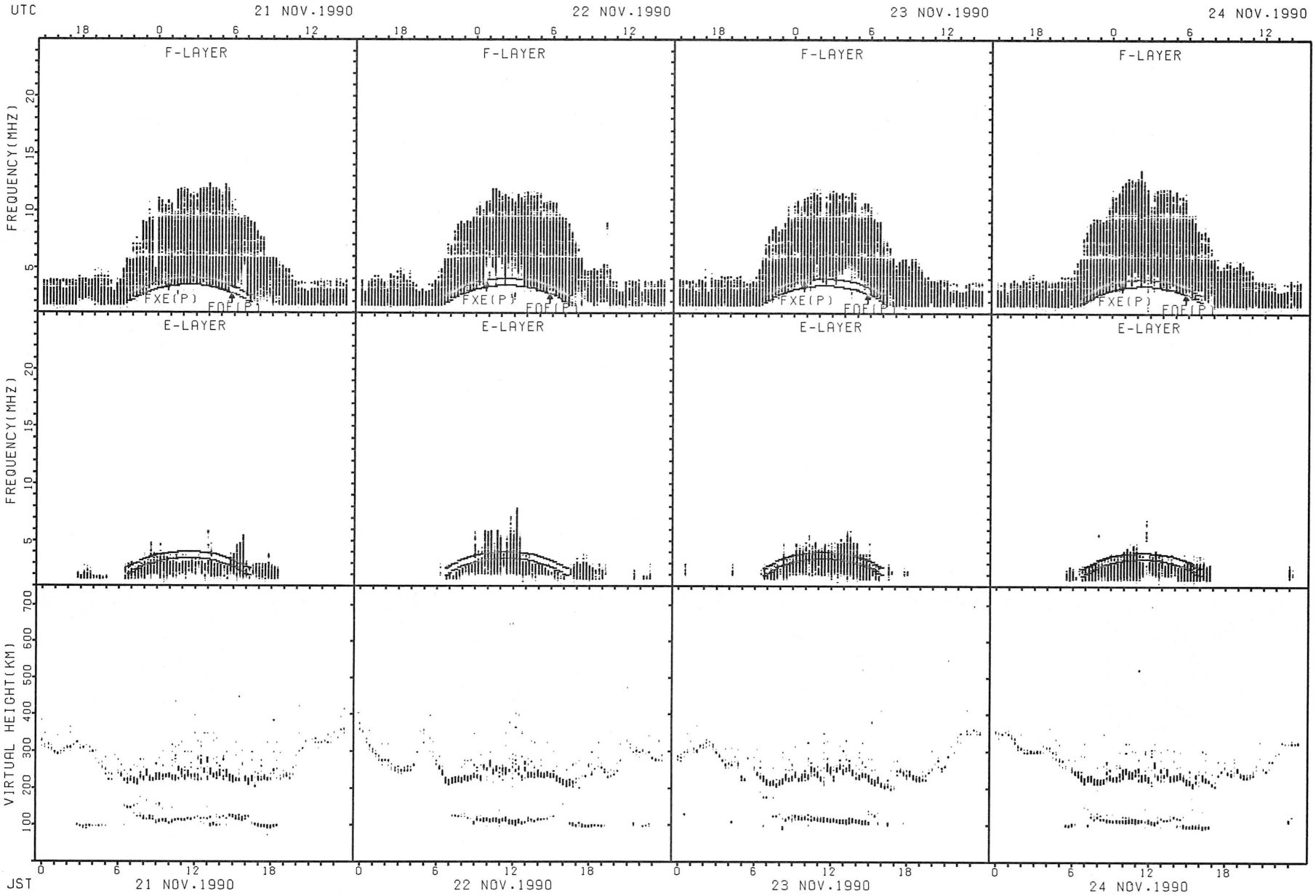
15 NOV.1990
16 NOV.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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



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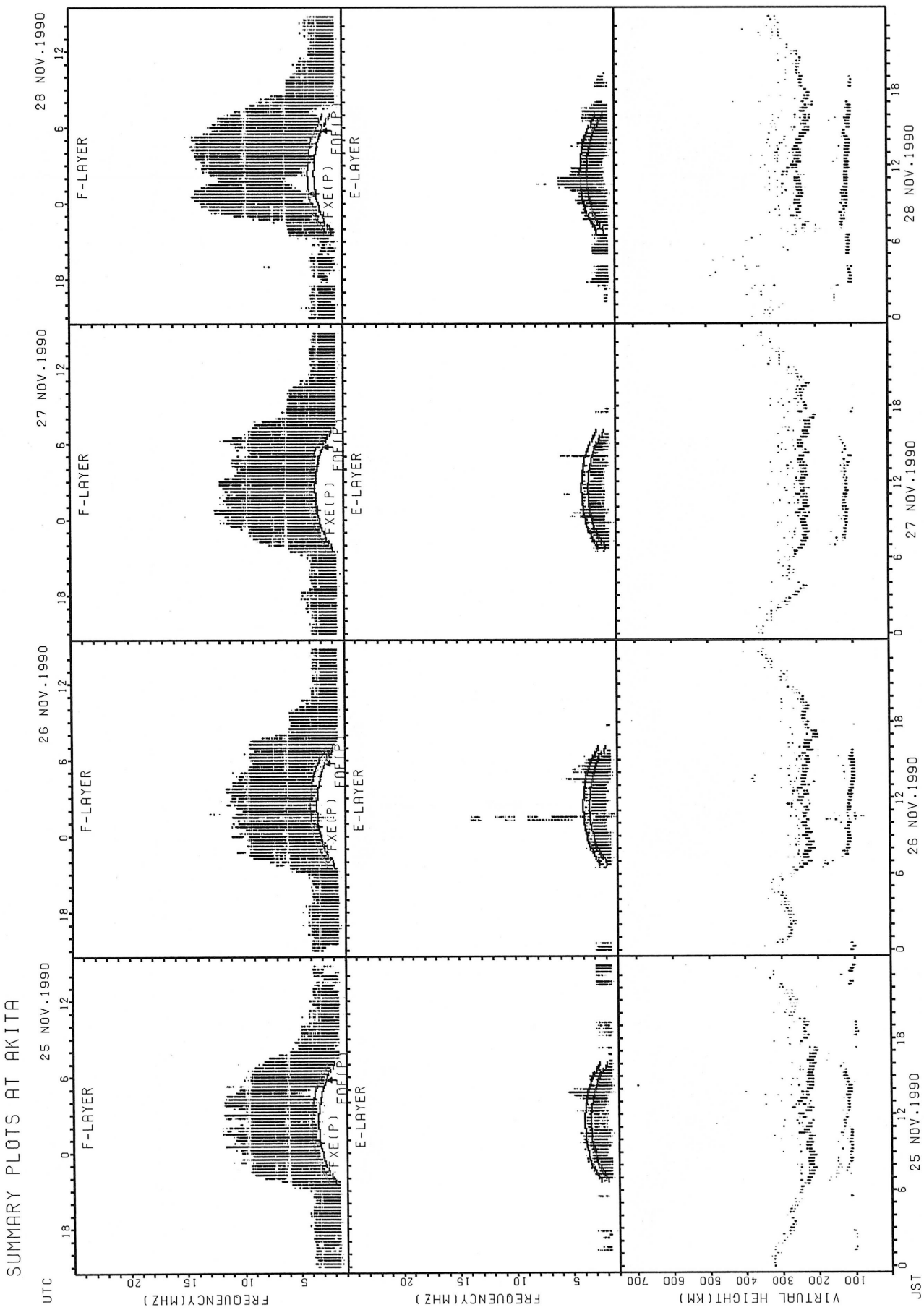
FOE(P): PREDICTED VALUE FOR FOE


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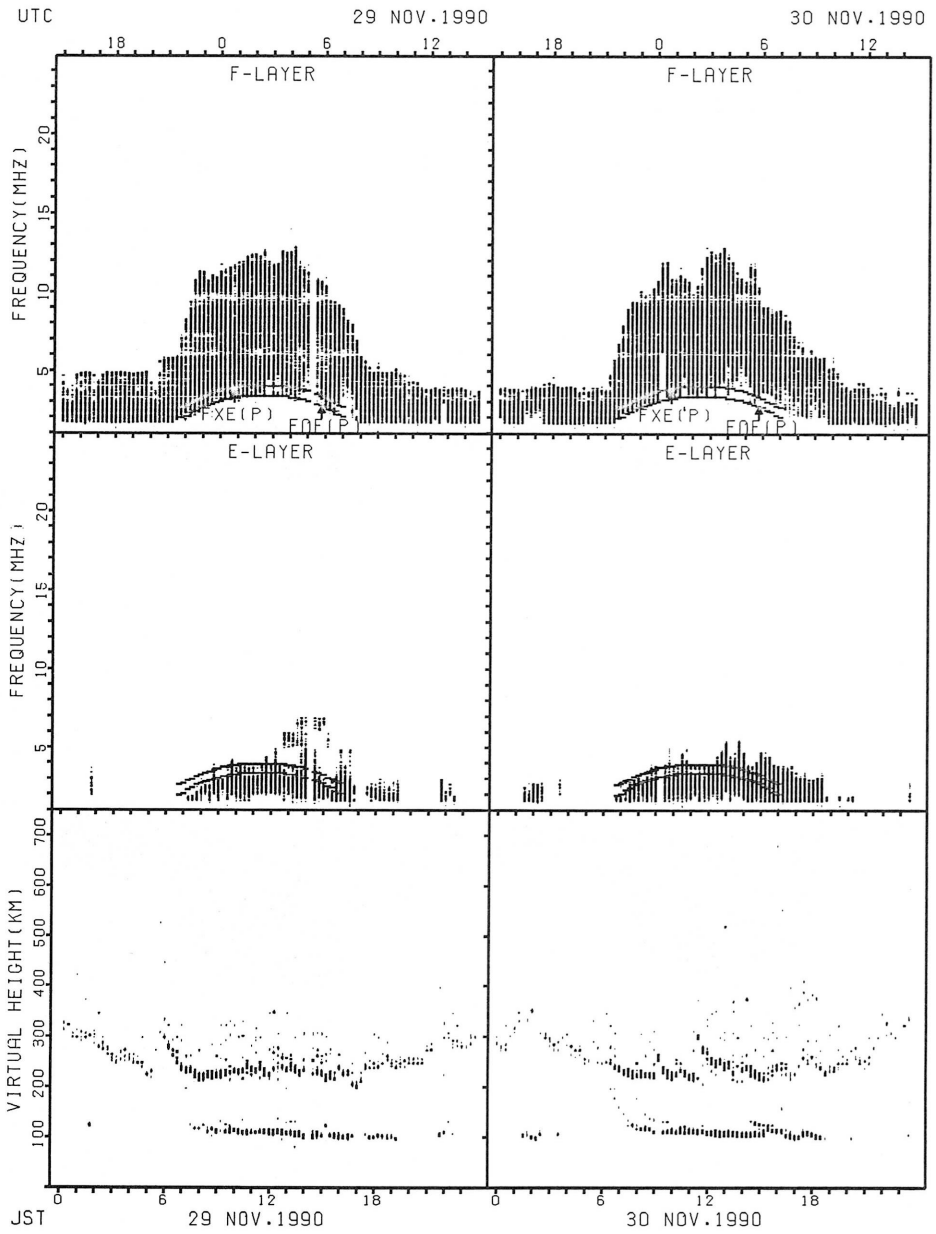
28 NOV.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



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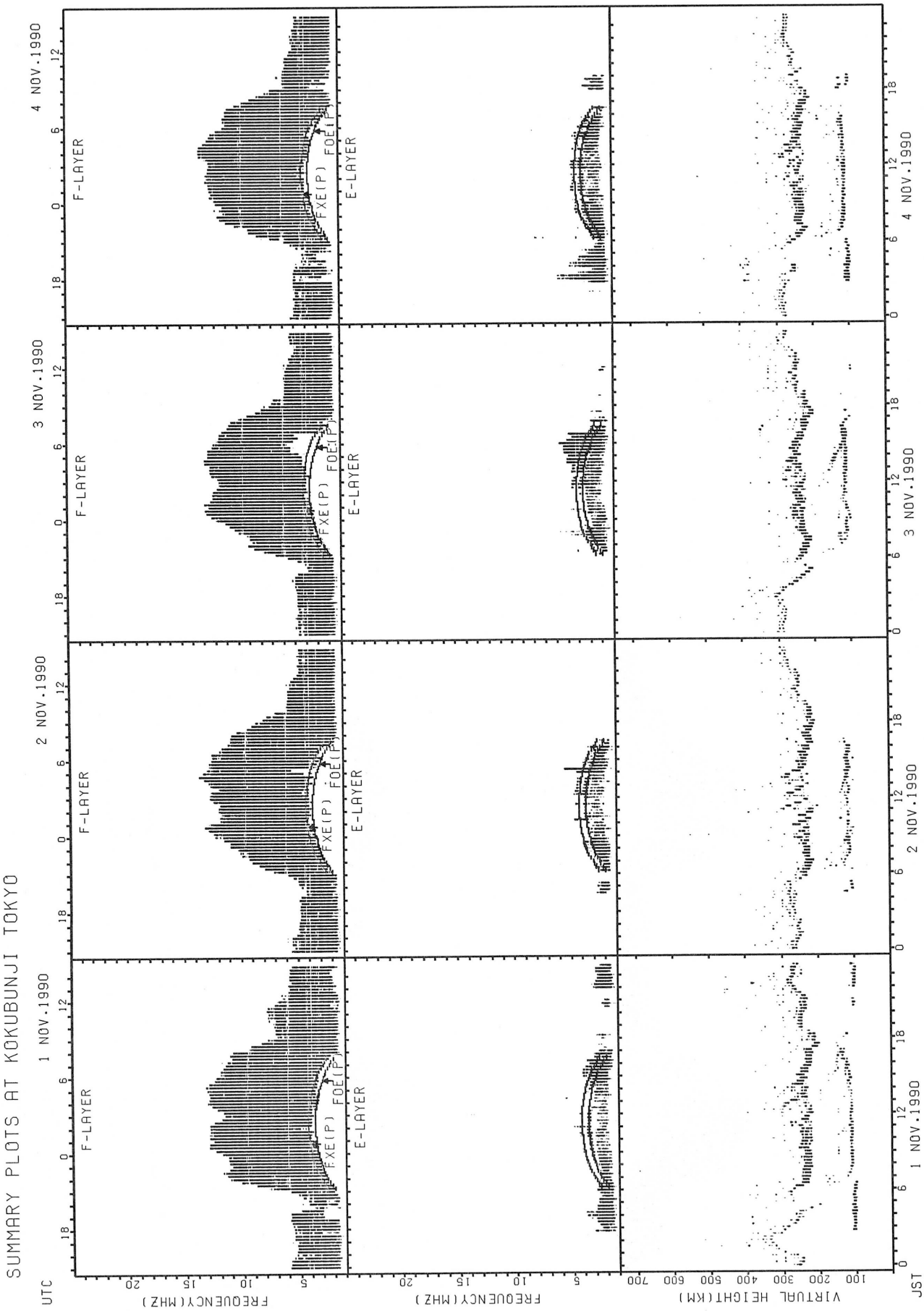
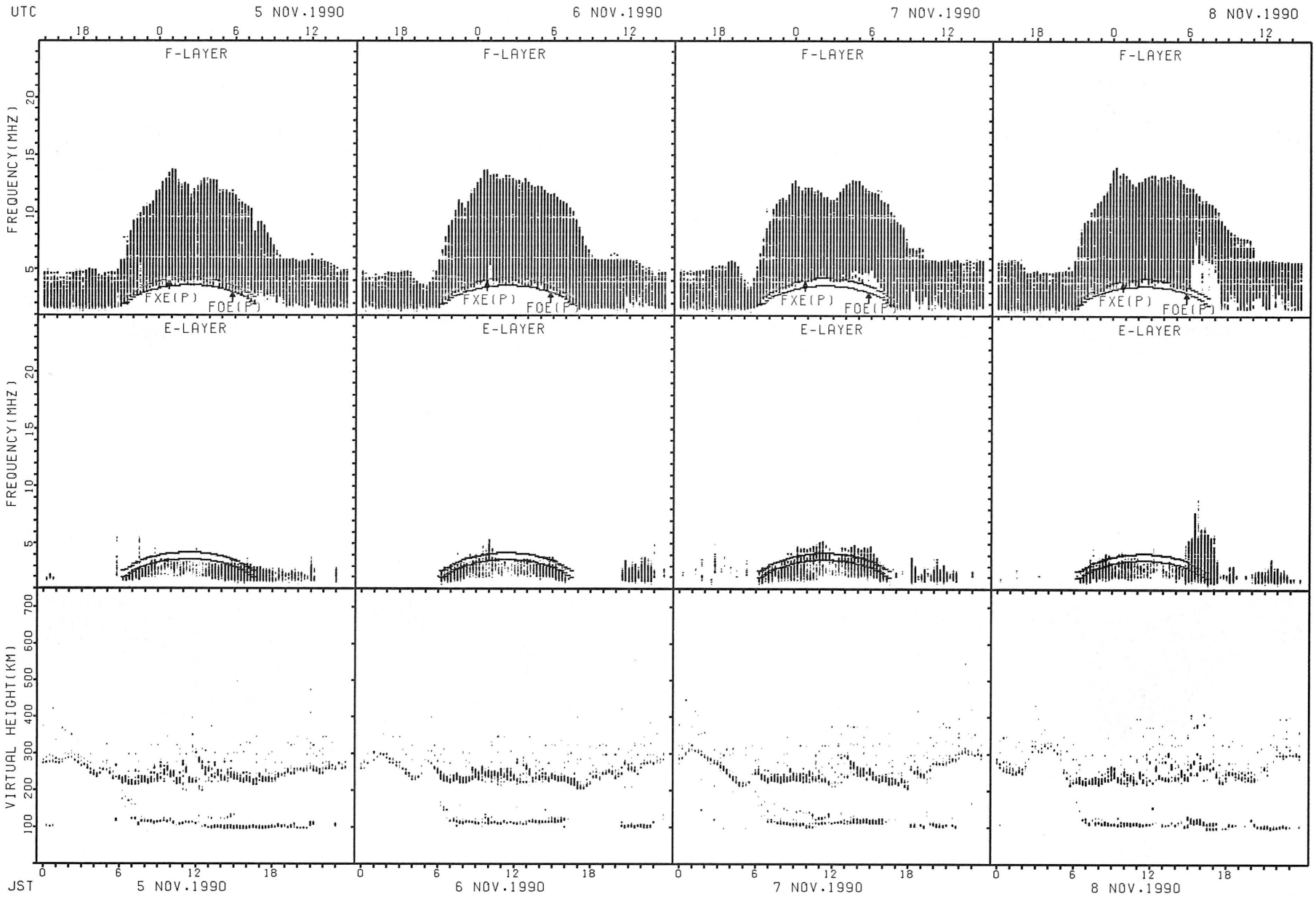
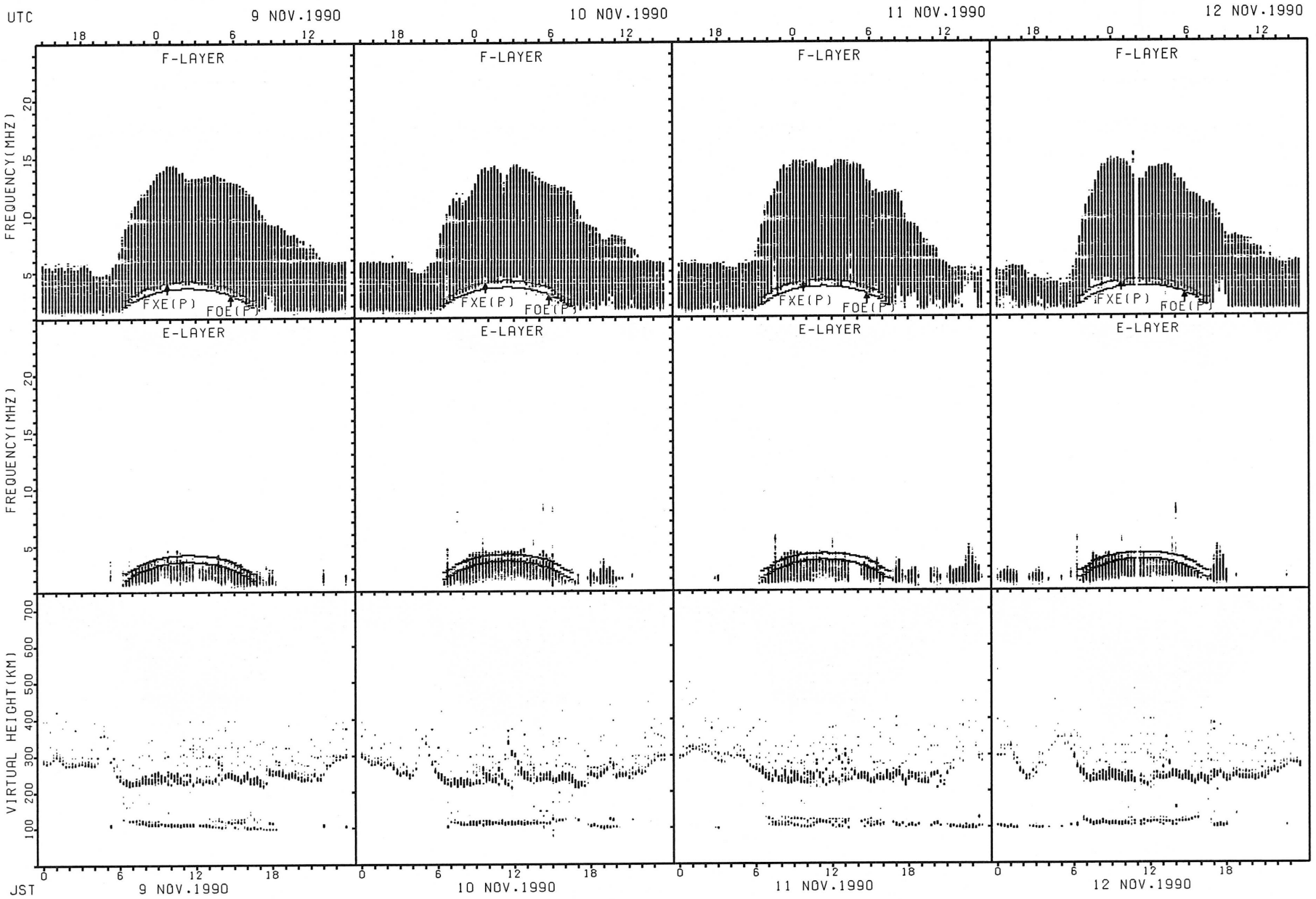

SUMMARY PLOTS AT KOKUBUNJI TOKYO
1 NOV.1990
2 NOV.1990
3 NOV.1990
4 NOV.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

SUMMARY PLOTS AT KOKUBUNJI TOKYO



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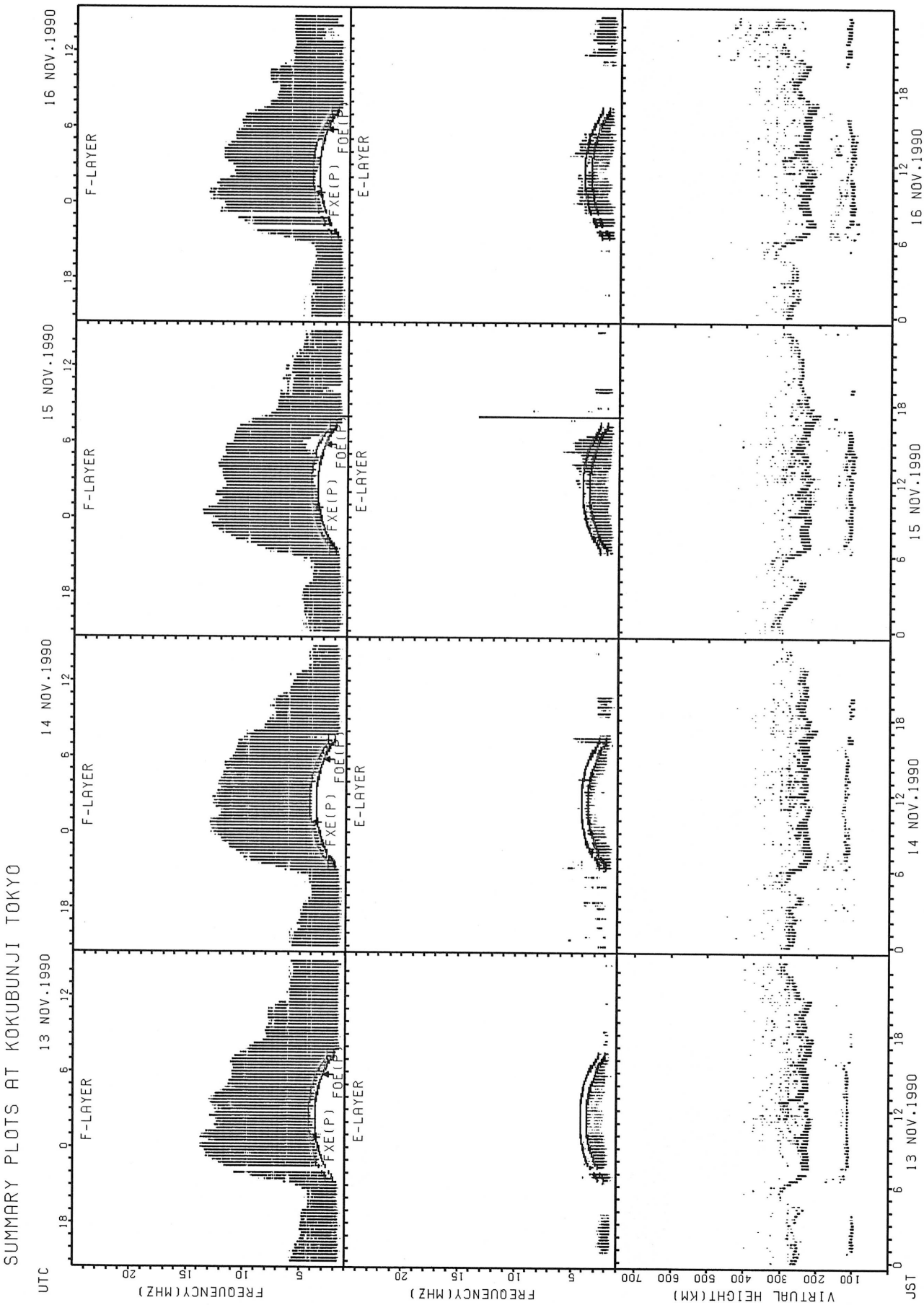
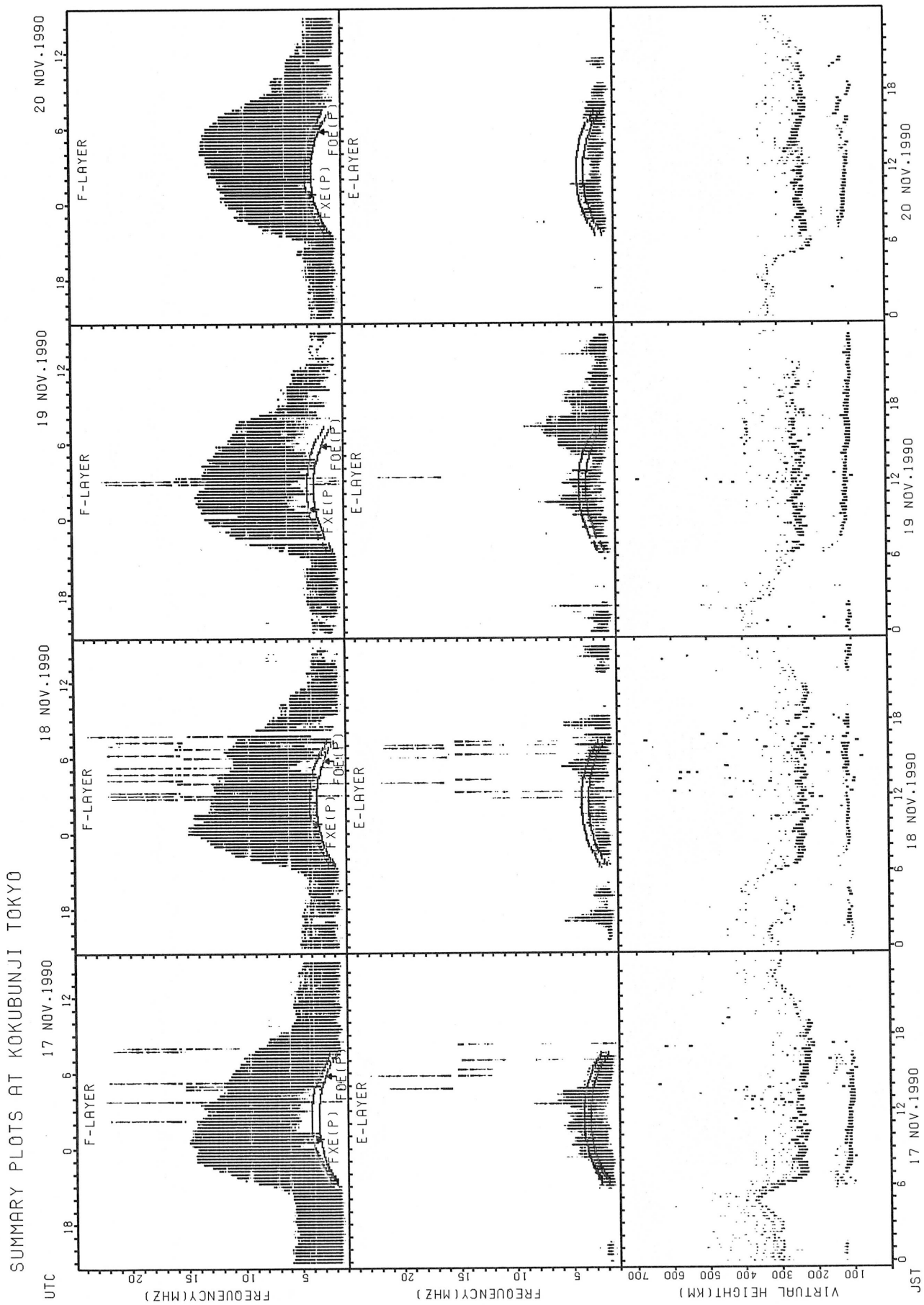
FOE(P): PREDICTED VALUE FOR FOE


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


SUMMARY PLOTS AT KOKUBUNJI TOKYO
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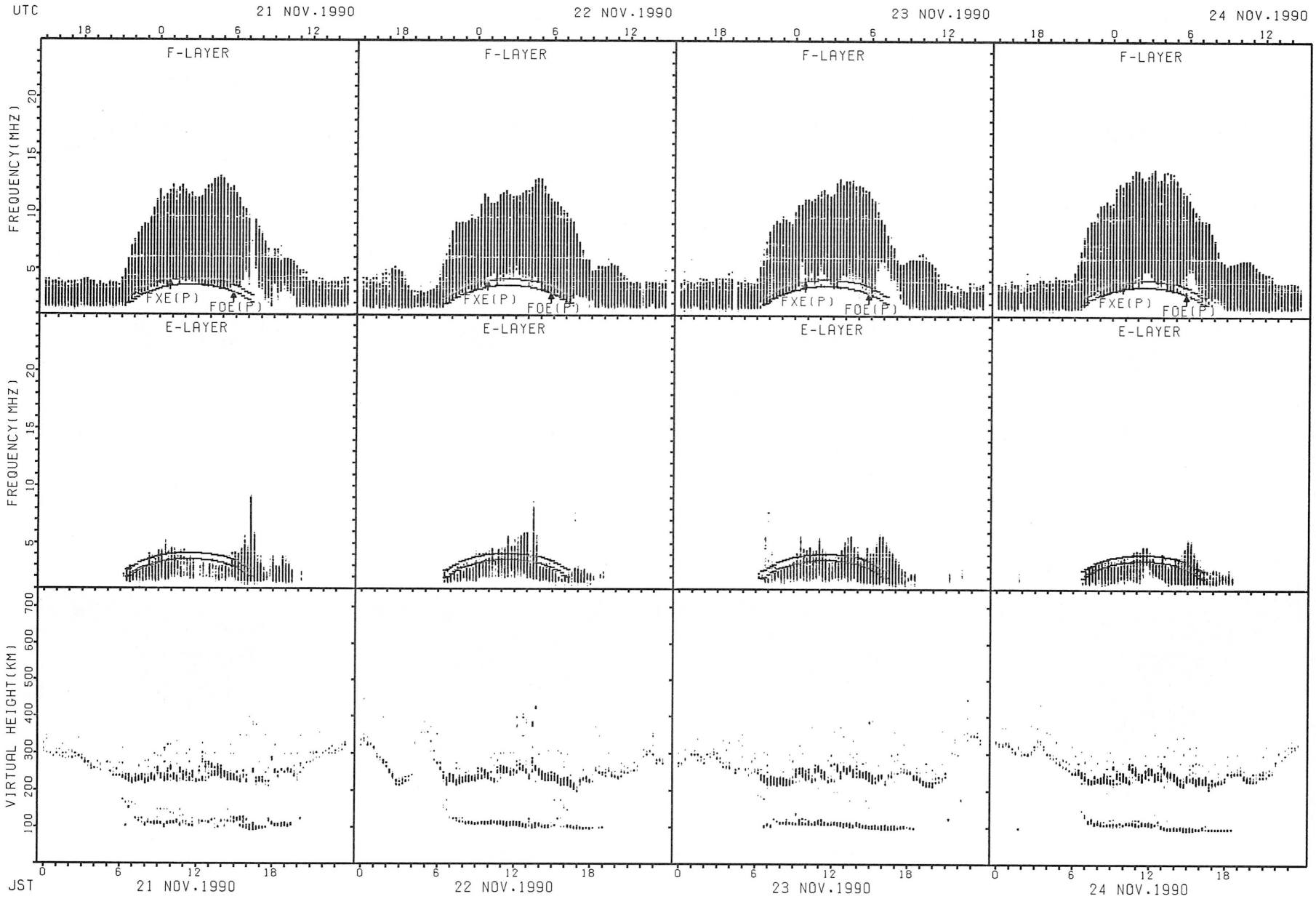
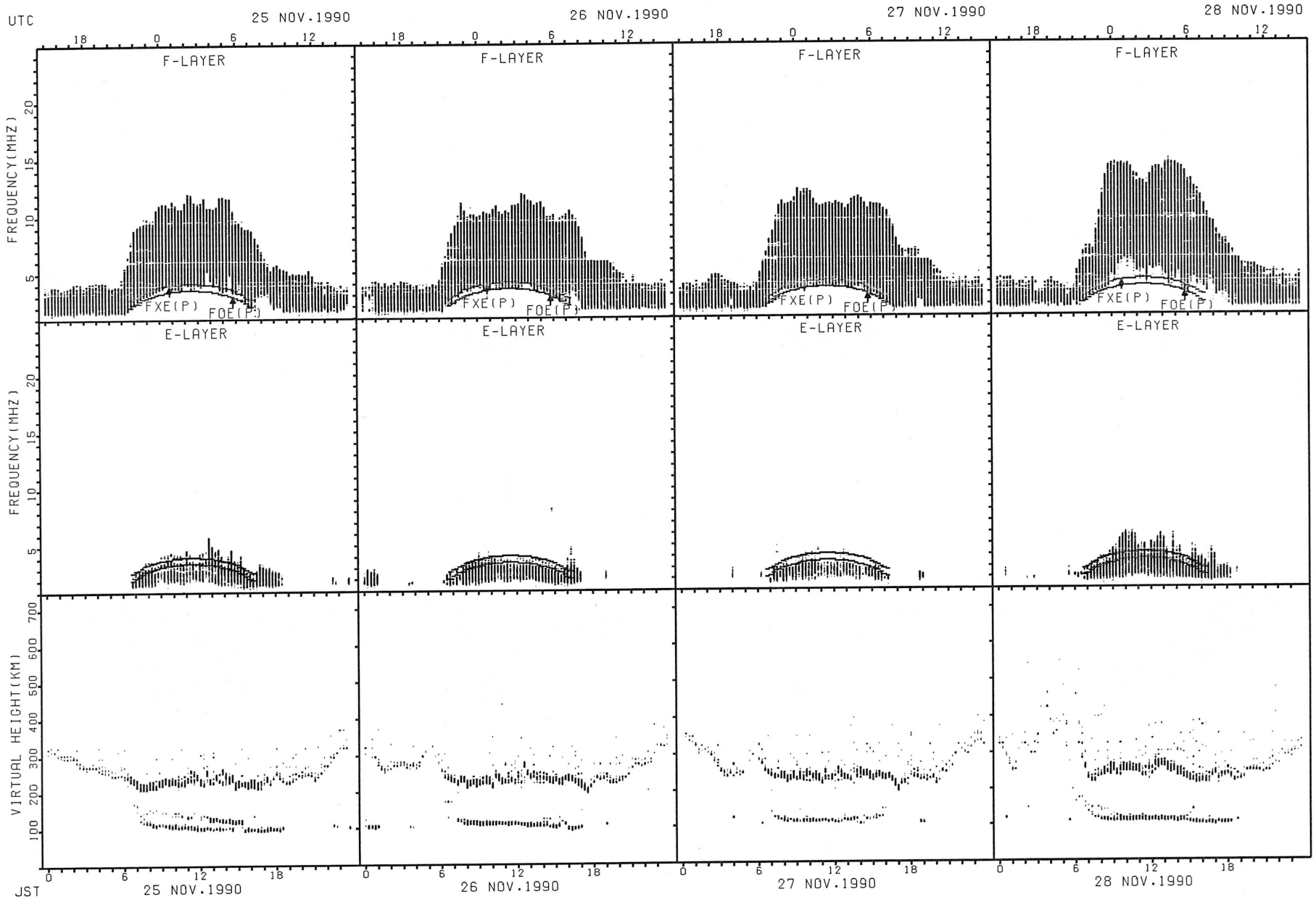
UTC
JST
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



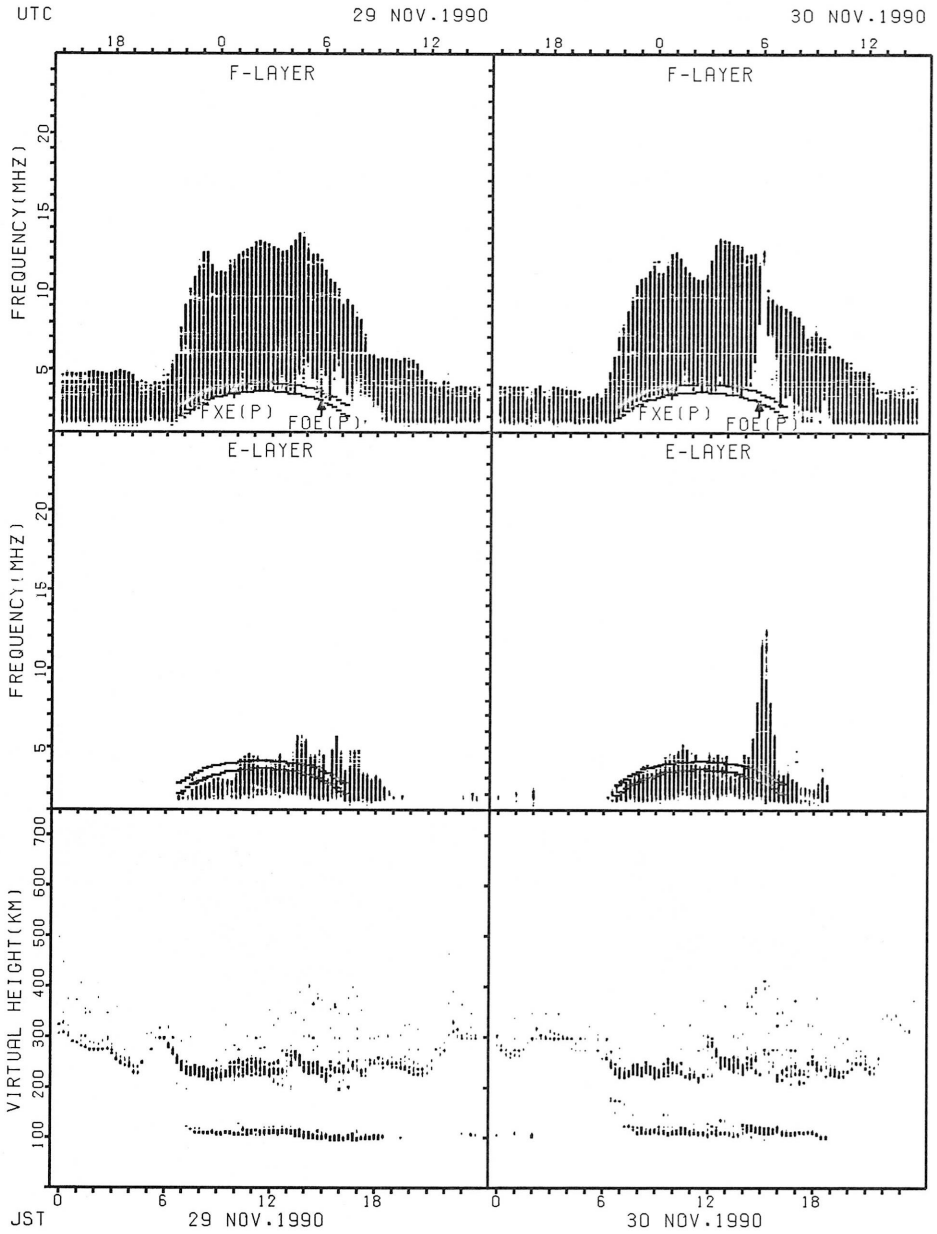
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

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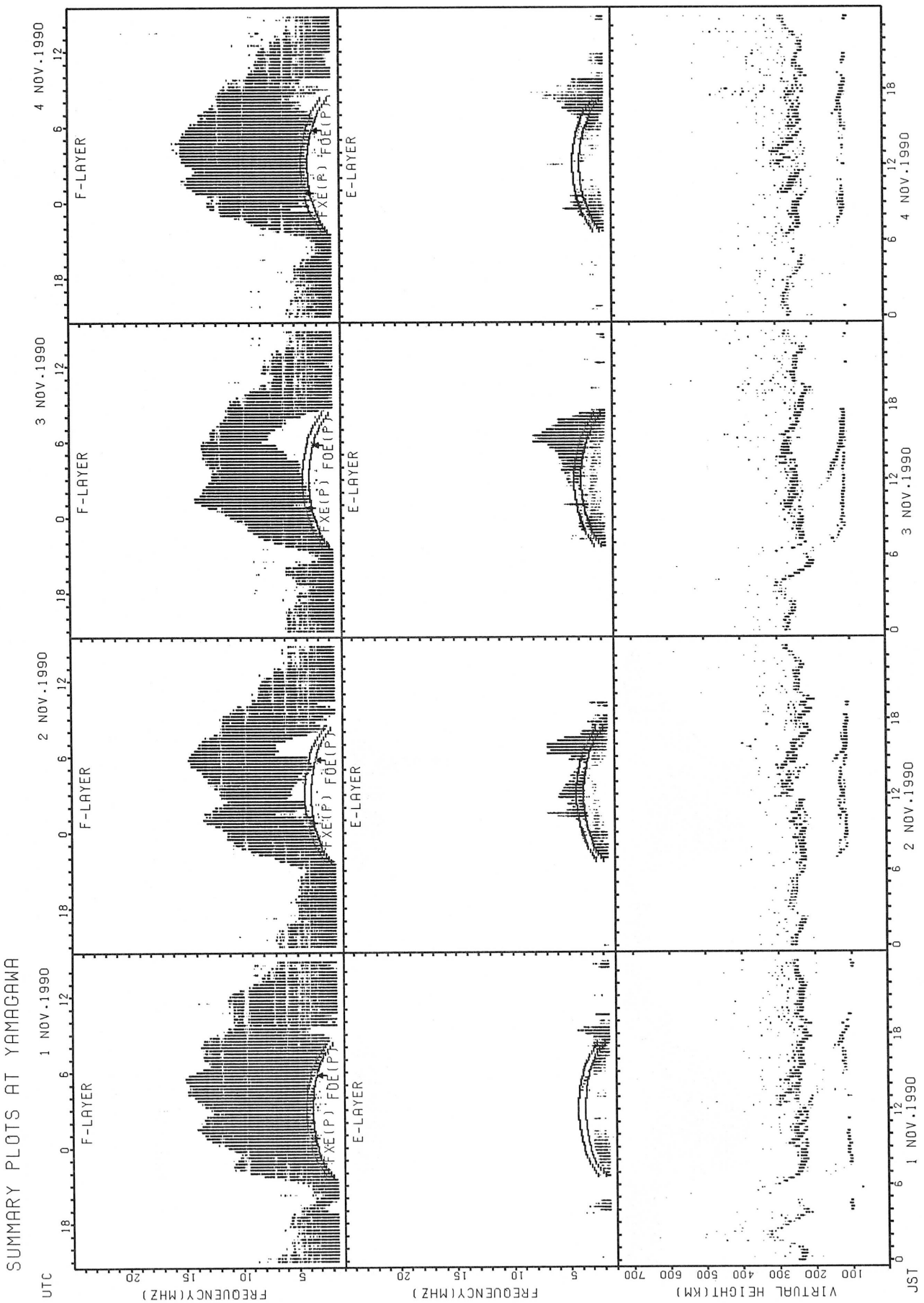
SUMMARY PLOTS AT YAMAGAWA
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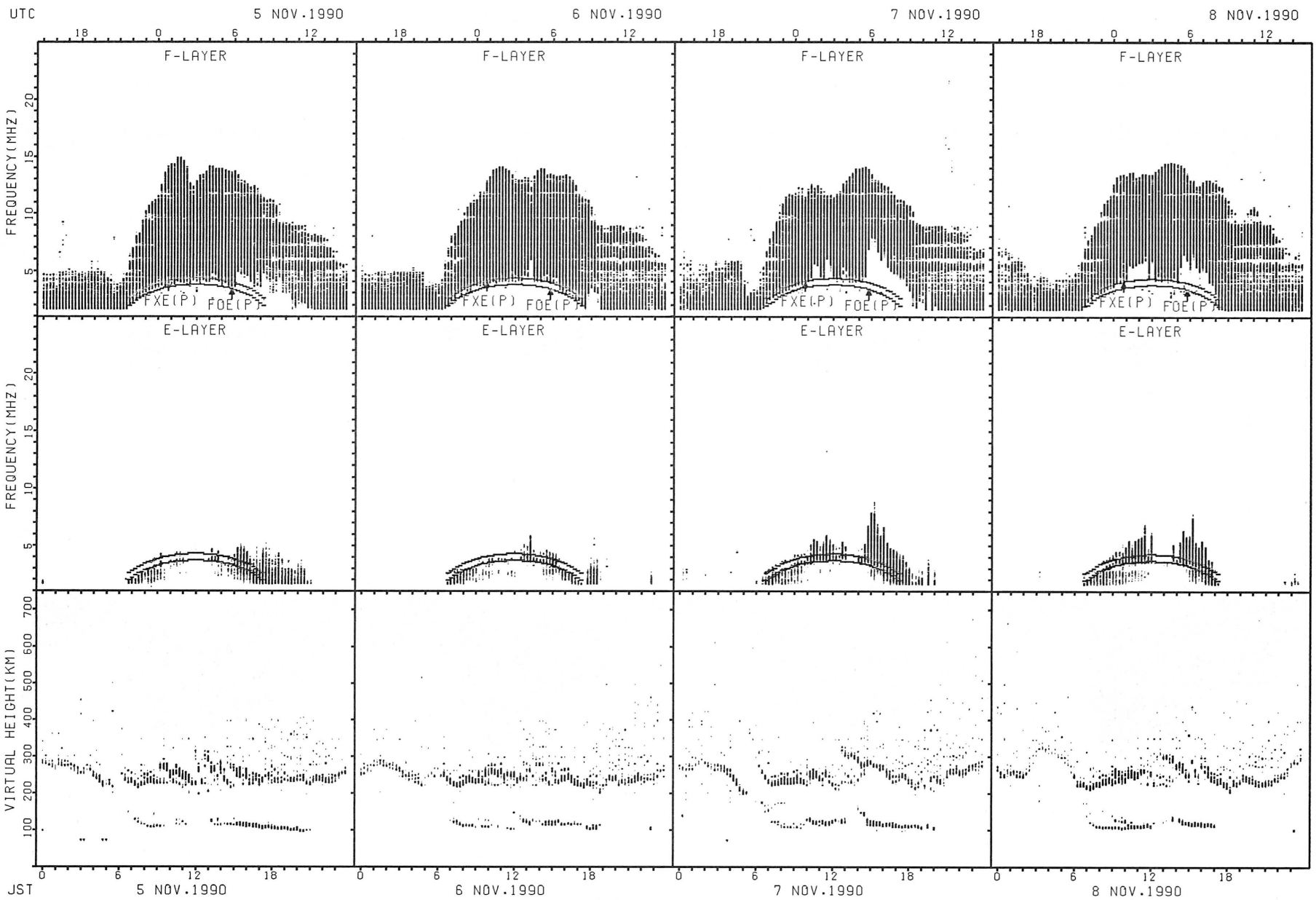
3 NOV.1990
4 NOV.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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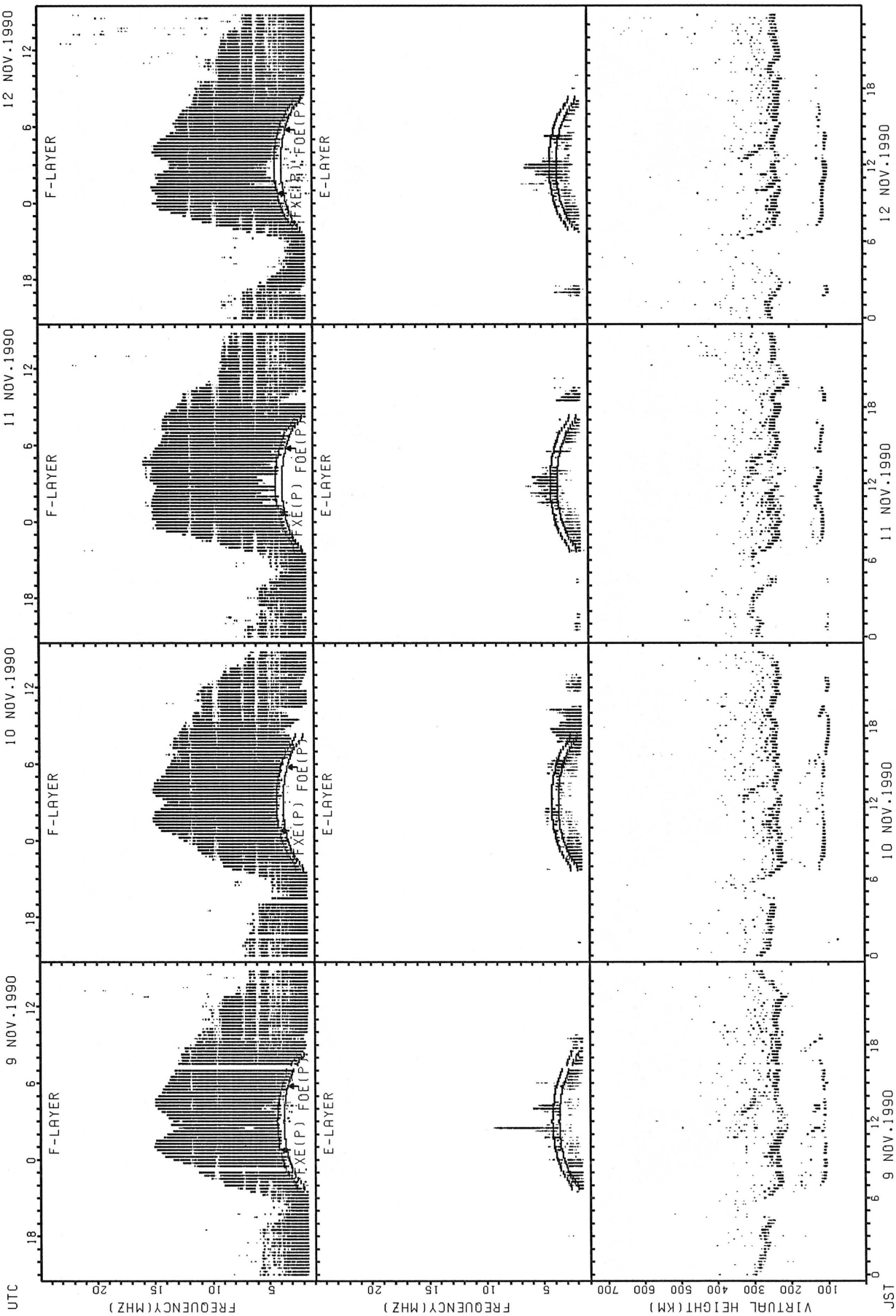
FOE(P); PREDICTED VALUE FOR FOE


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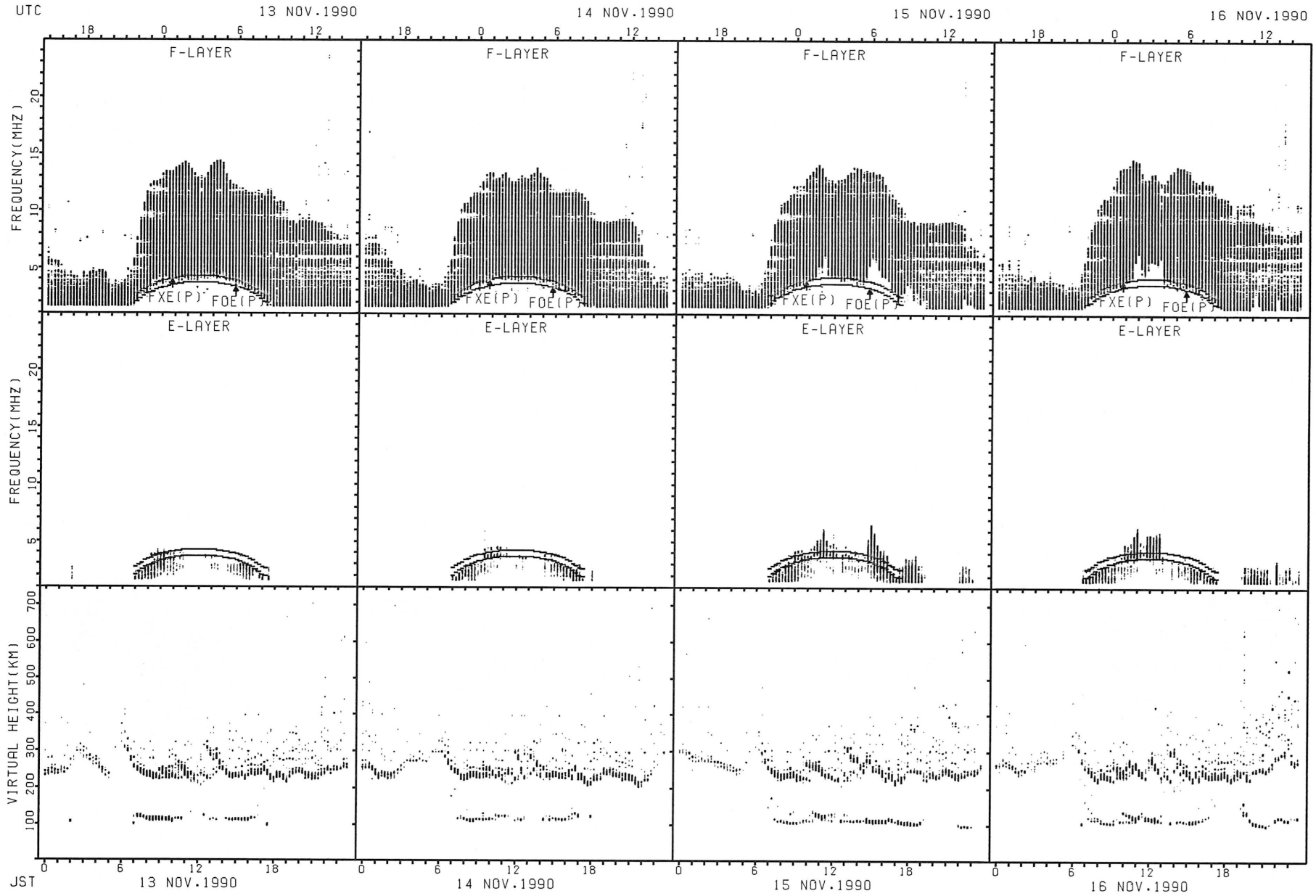
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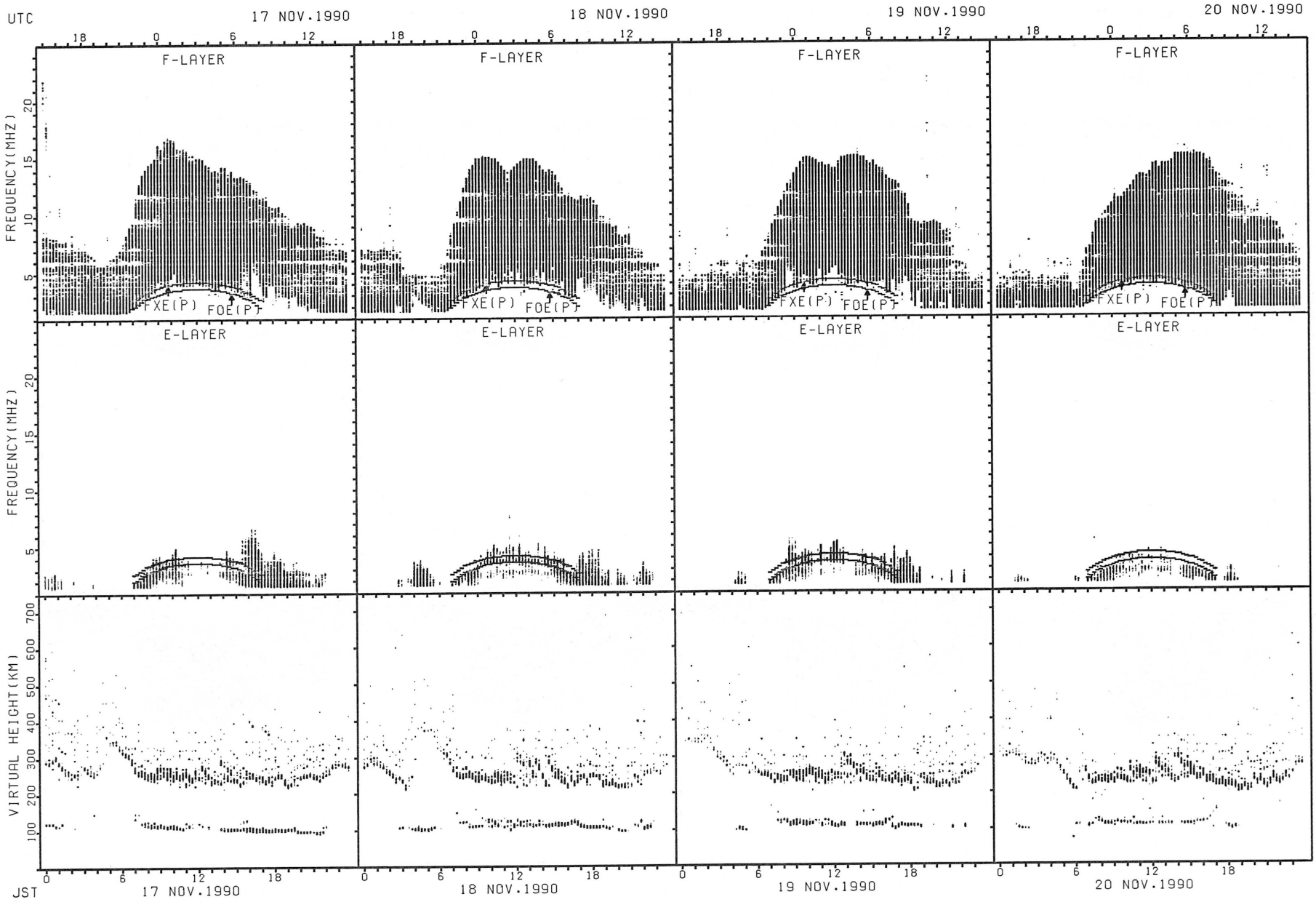
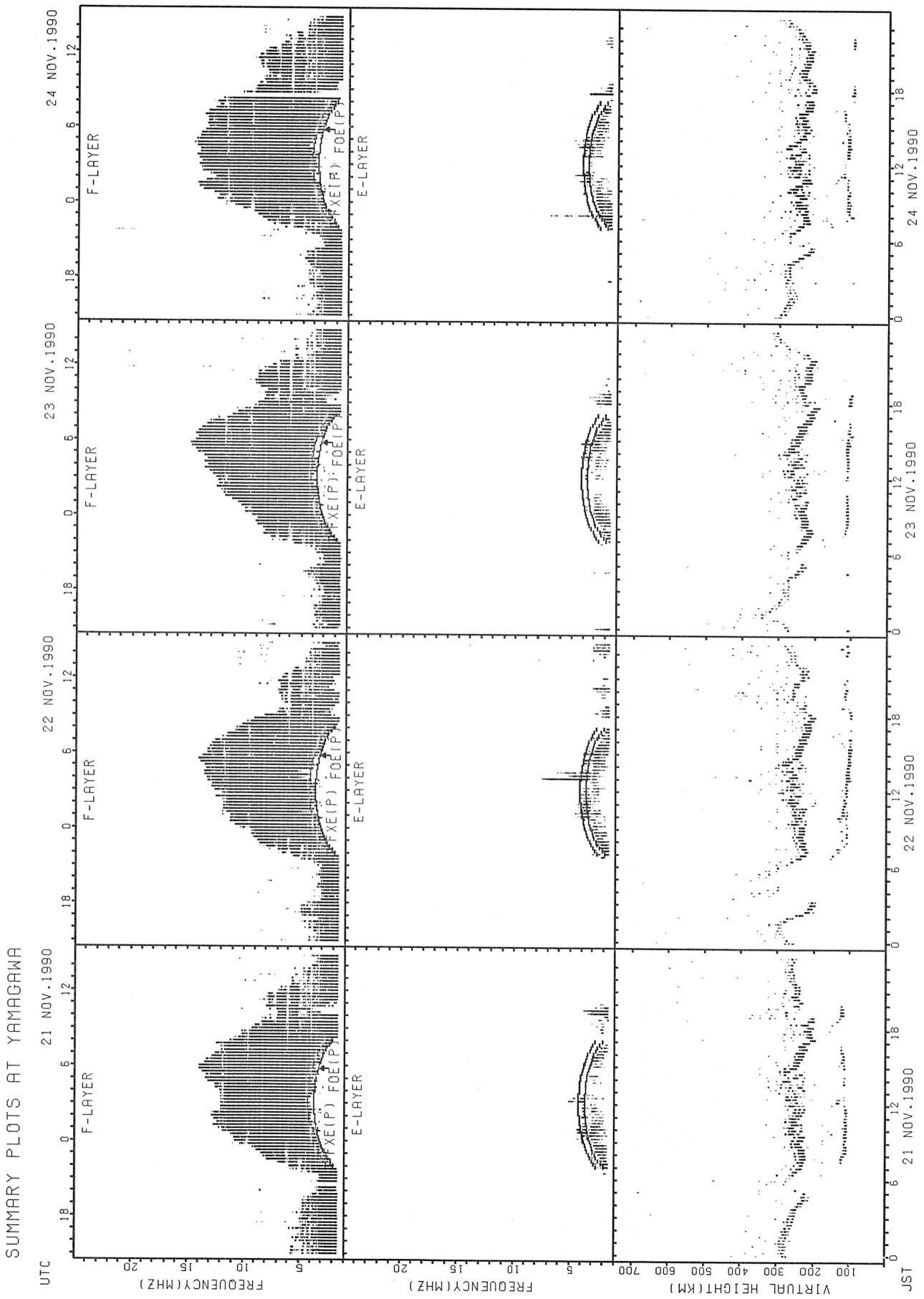
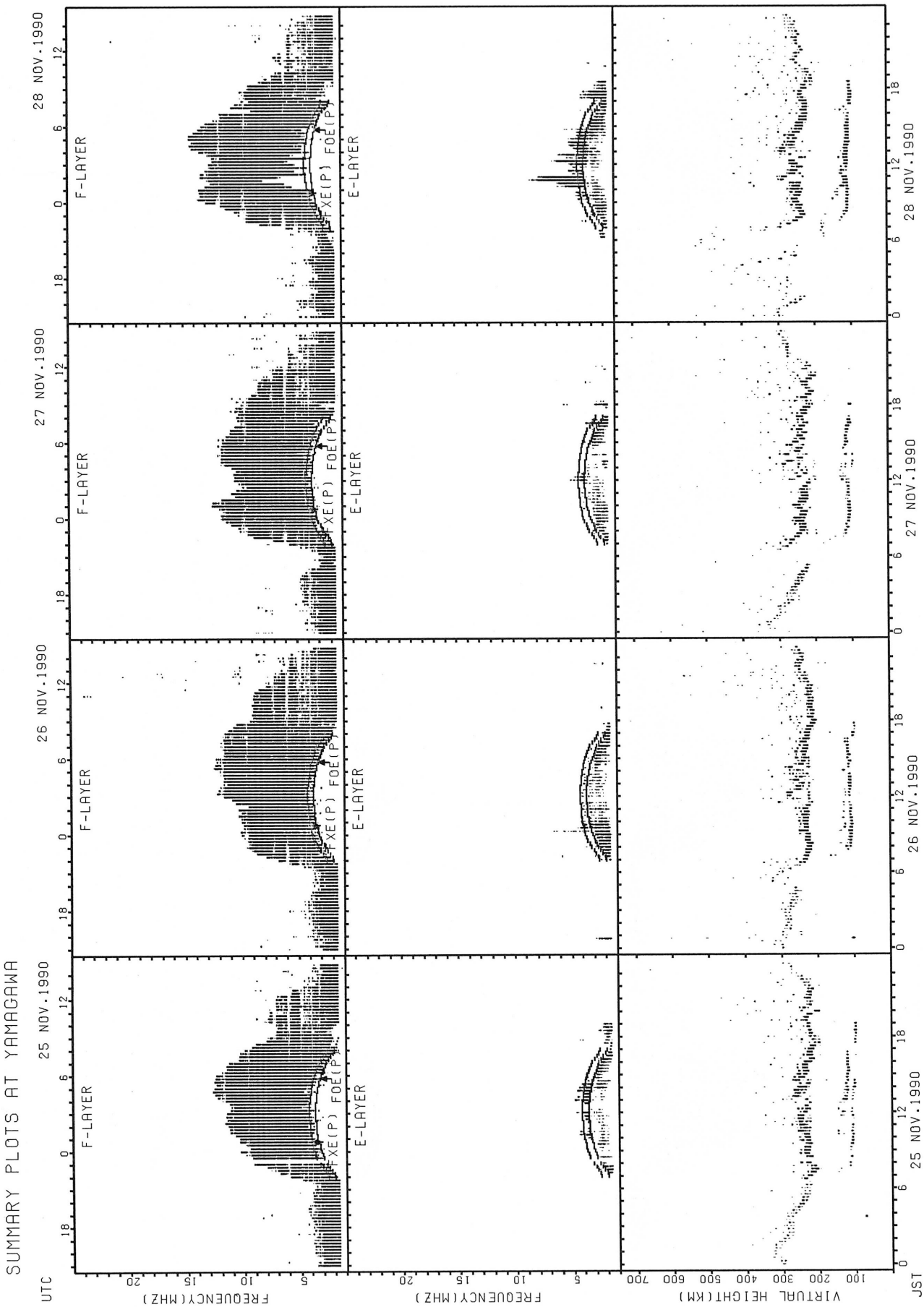
FOE(P)
FREQUENCY(MHZ)
E-LAYER
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA

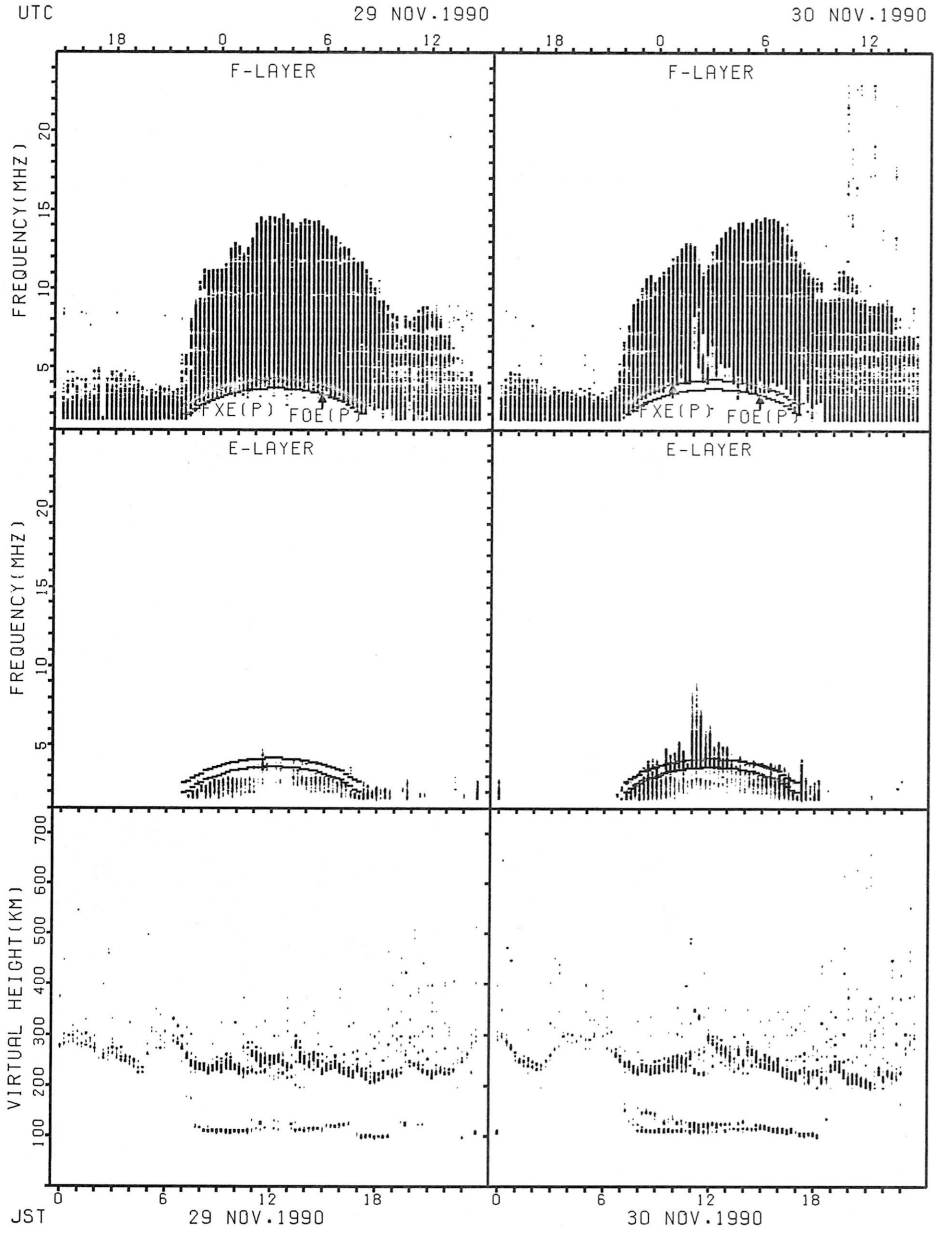


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

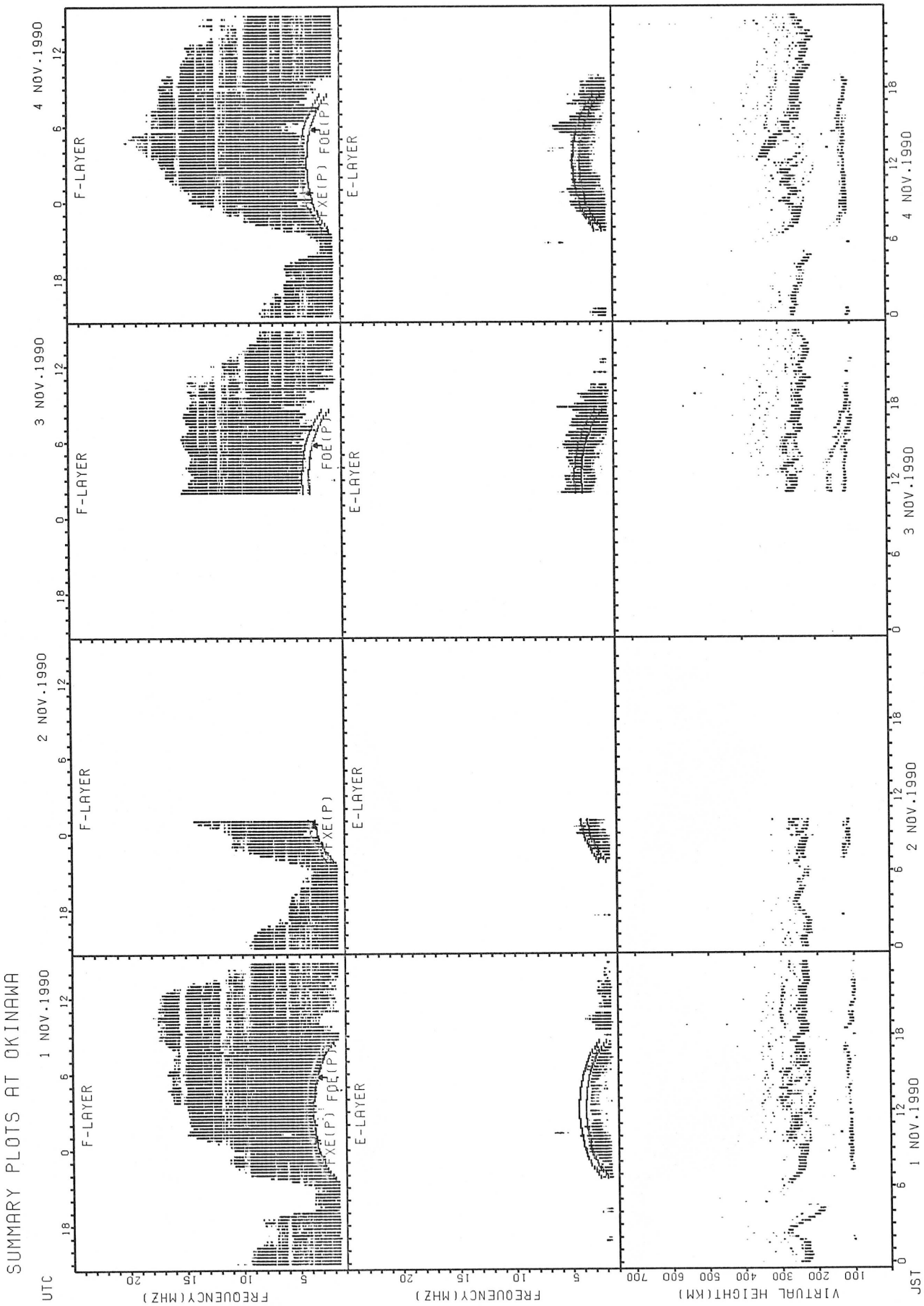

SUMMARY PLOTS AT YAMAGAWA
UTC
21 NOV.1990
22 NOV.1990
23 NOV.1990
24 NOV.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

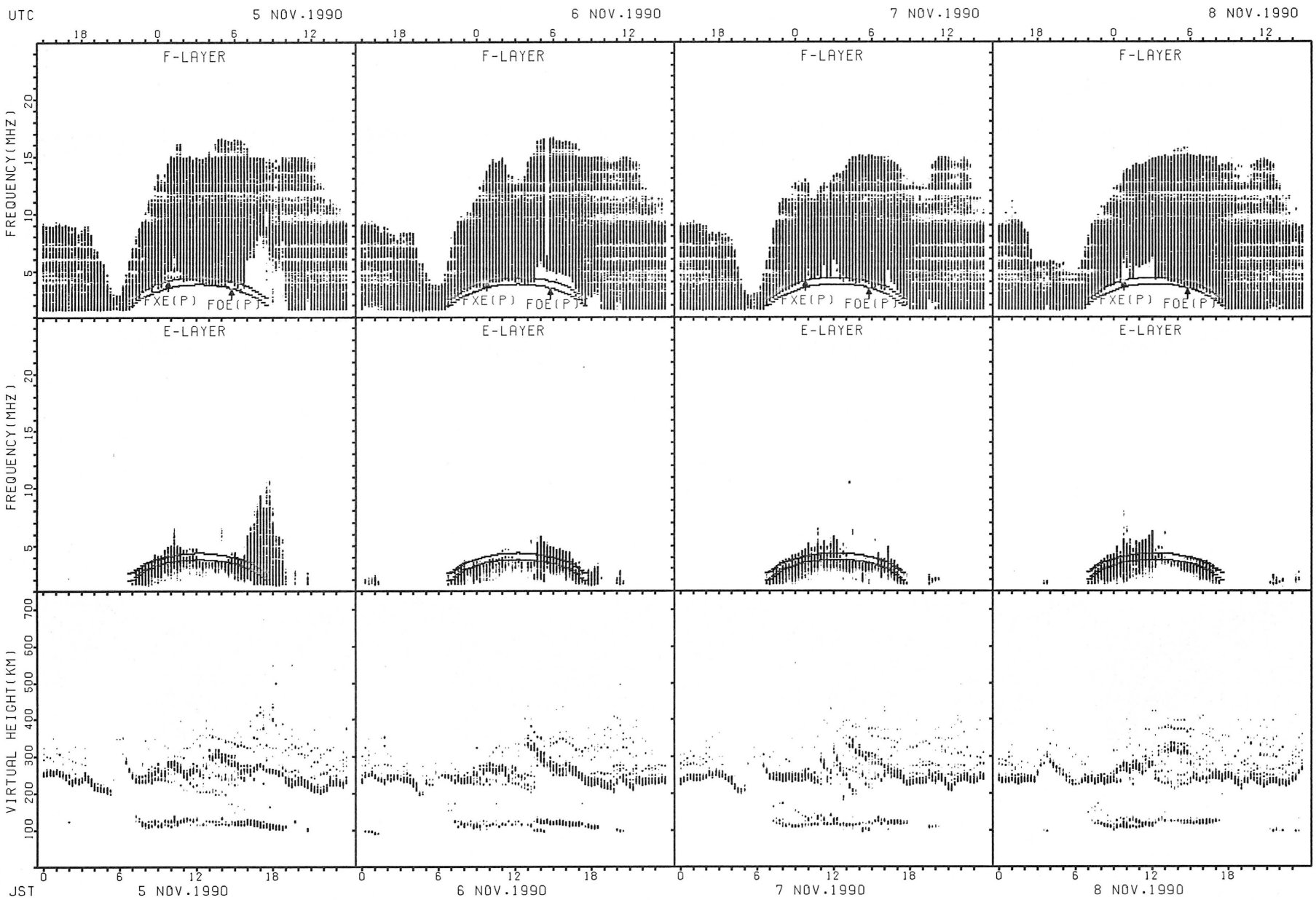
SUMMARY PLOTS AT YAMAGAWA



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

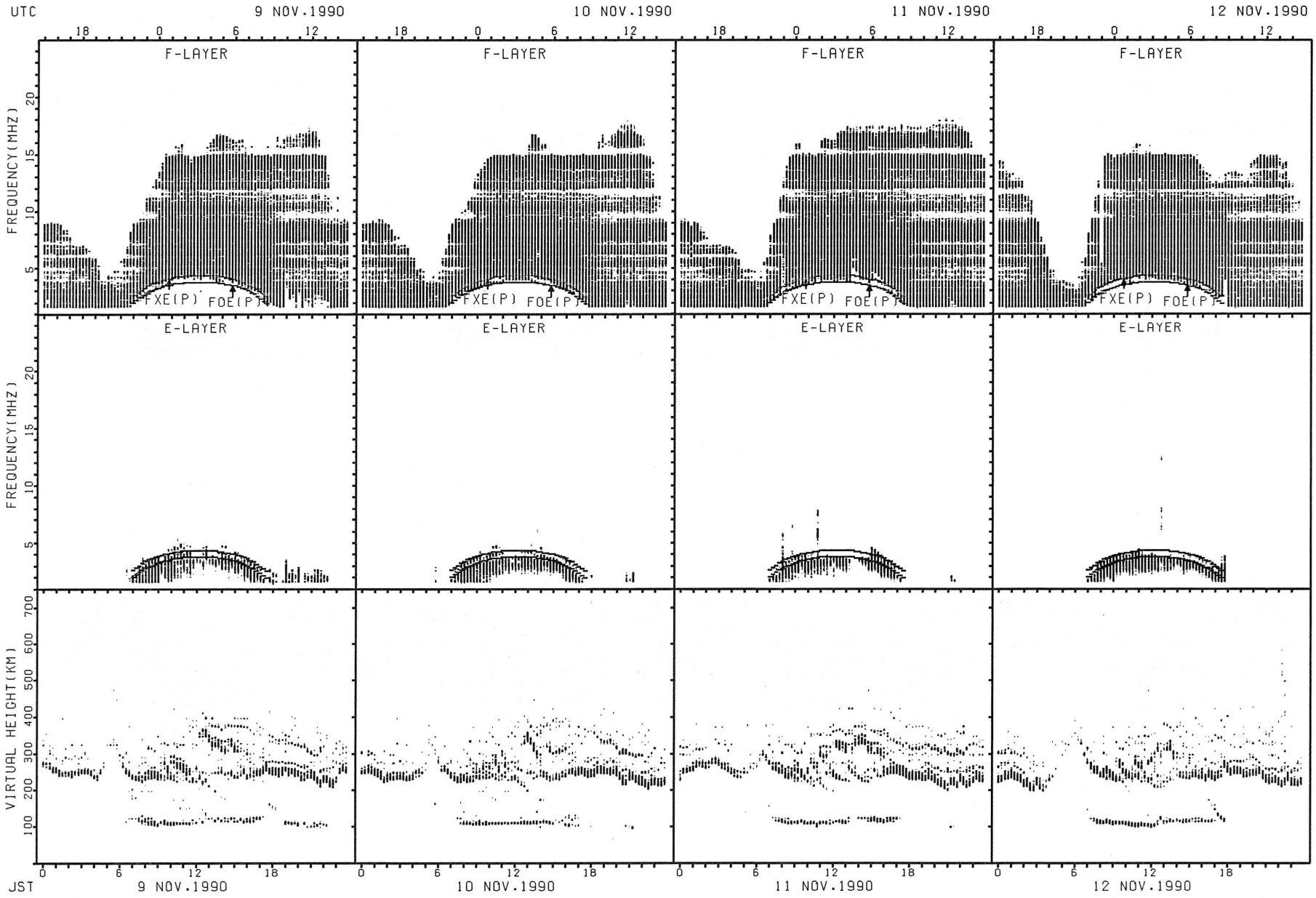

SUMMARY PLOTS AT OKINAWA
UTC
1 NOV.1990
2 NOV.1990
3 NOV.1990
4 NOV.1990
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



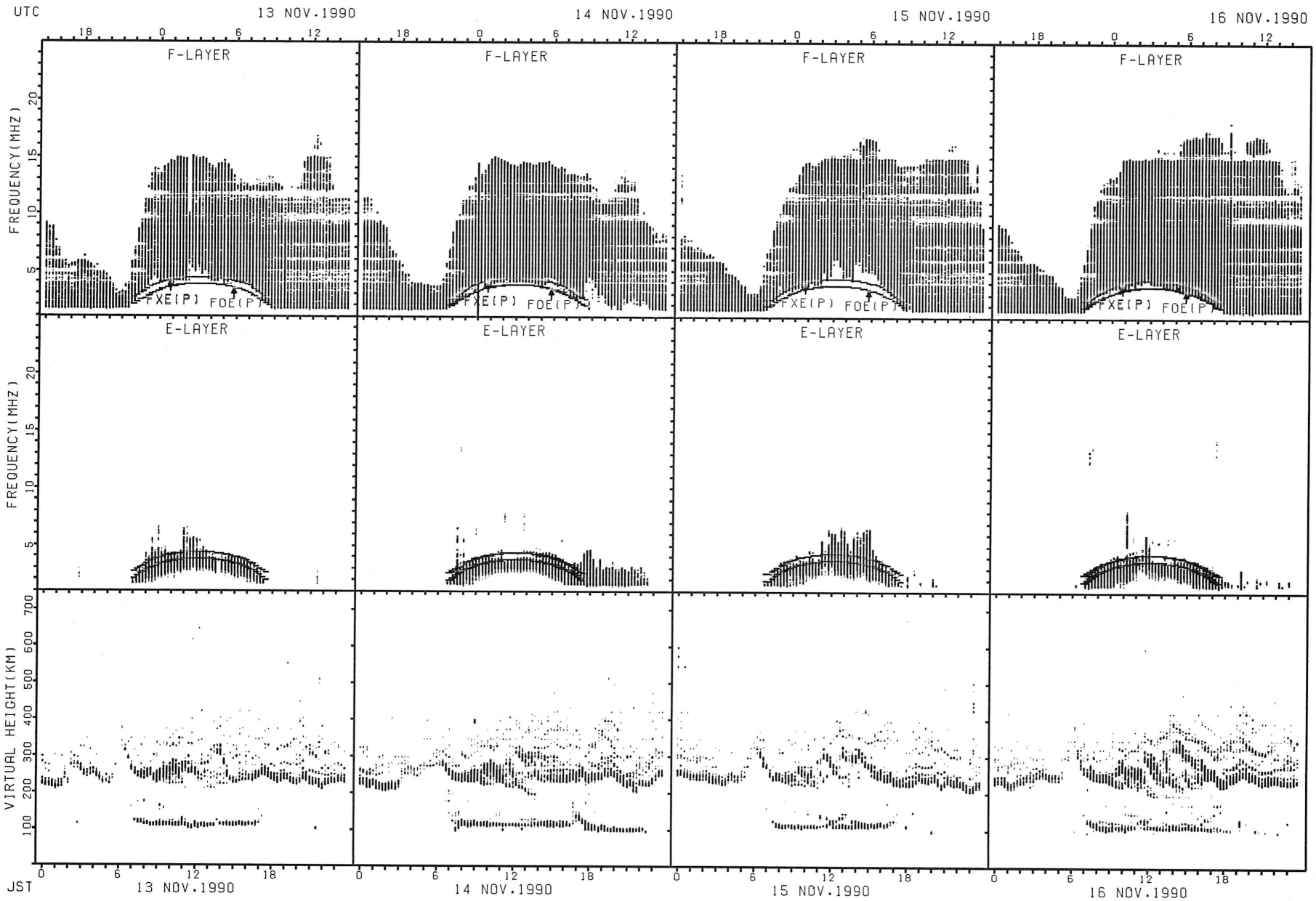
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

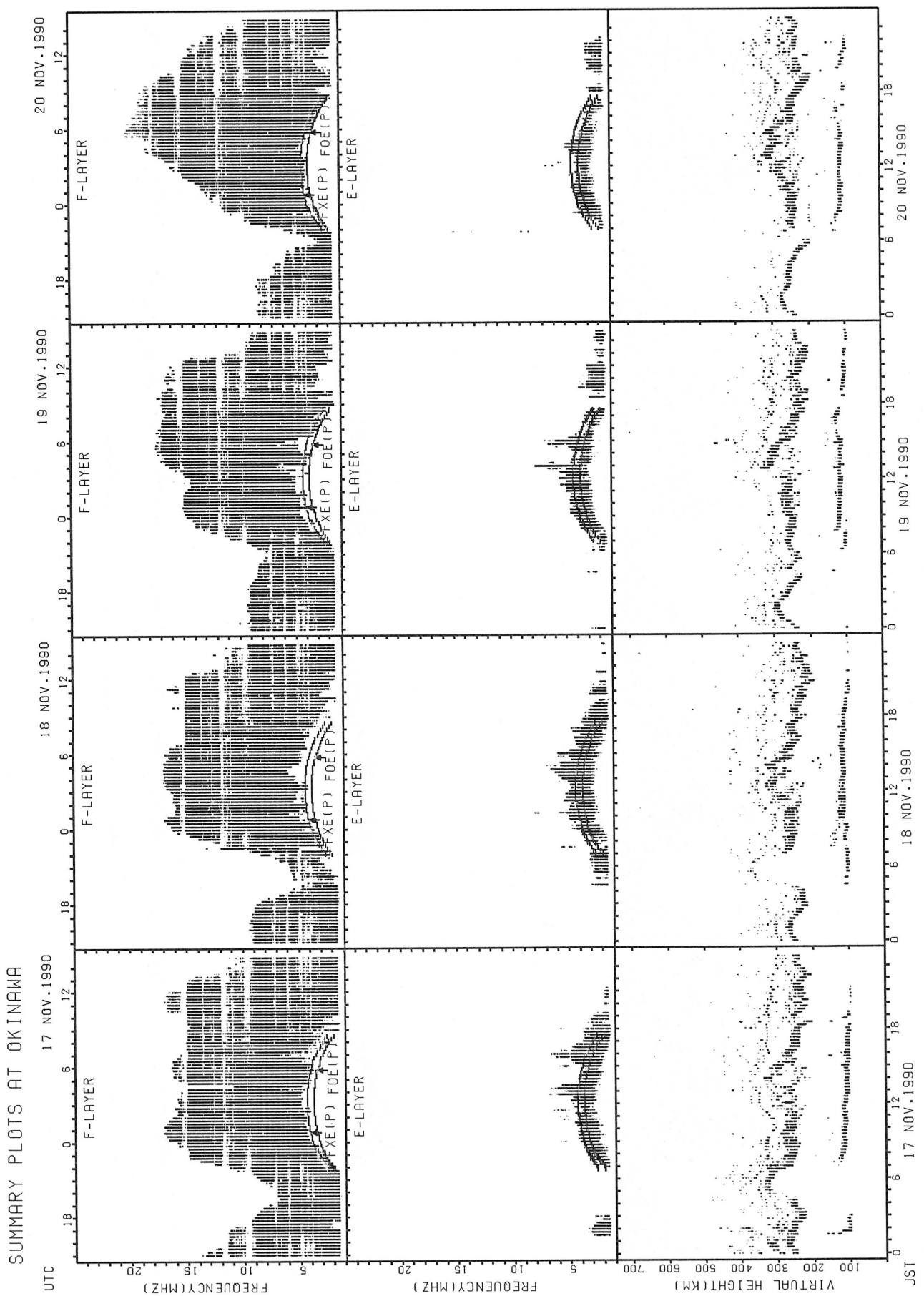


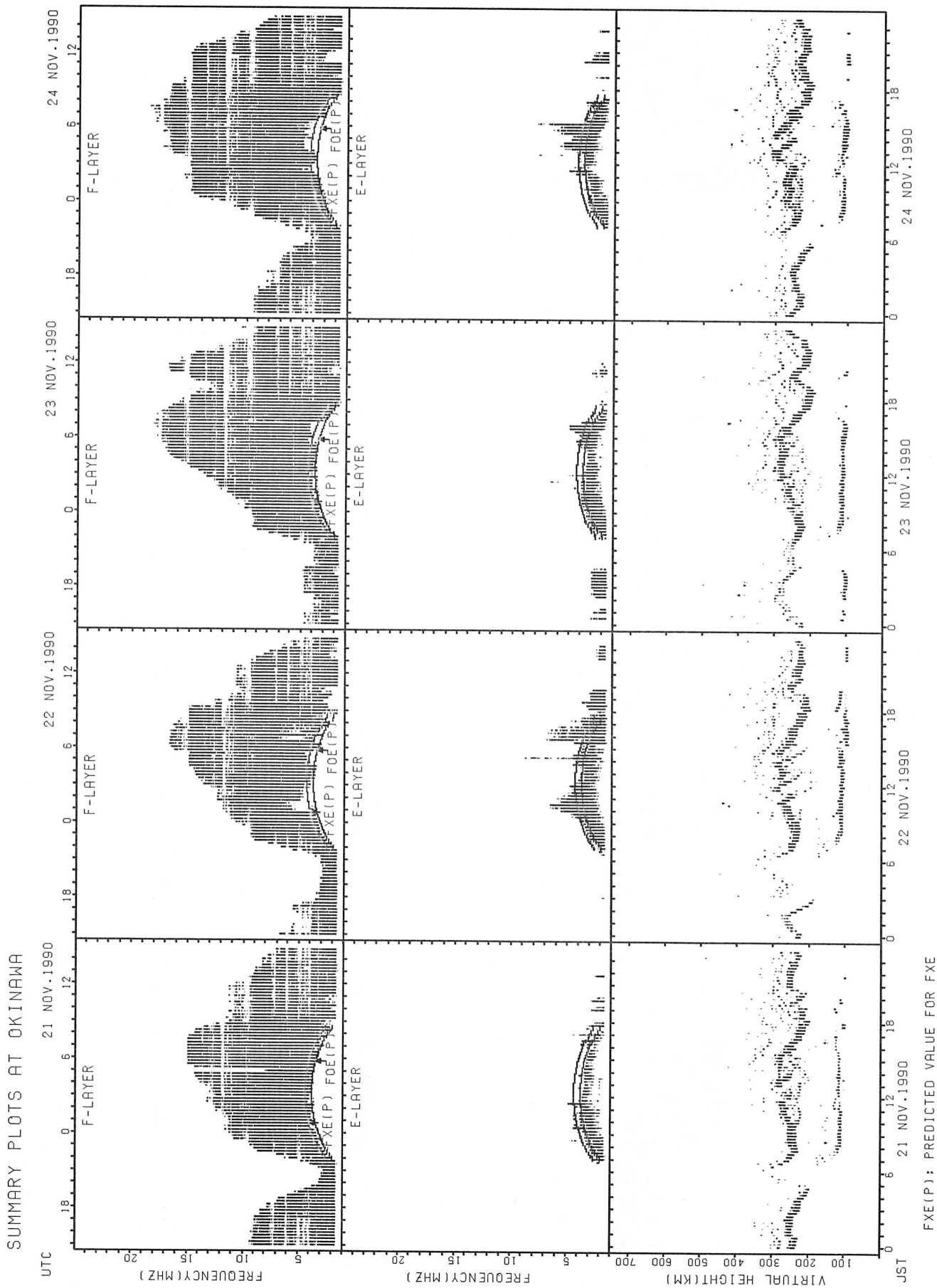
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

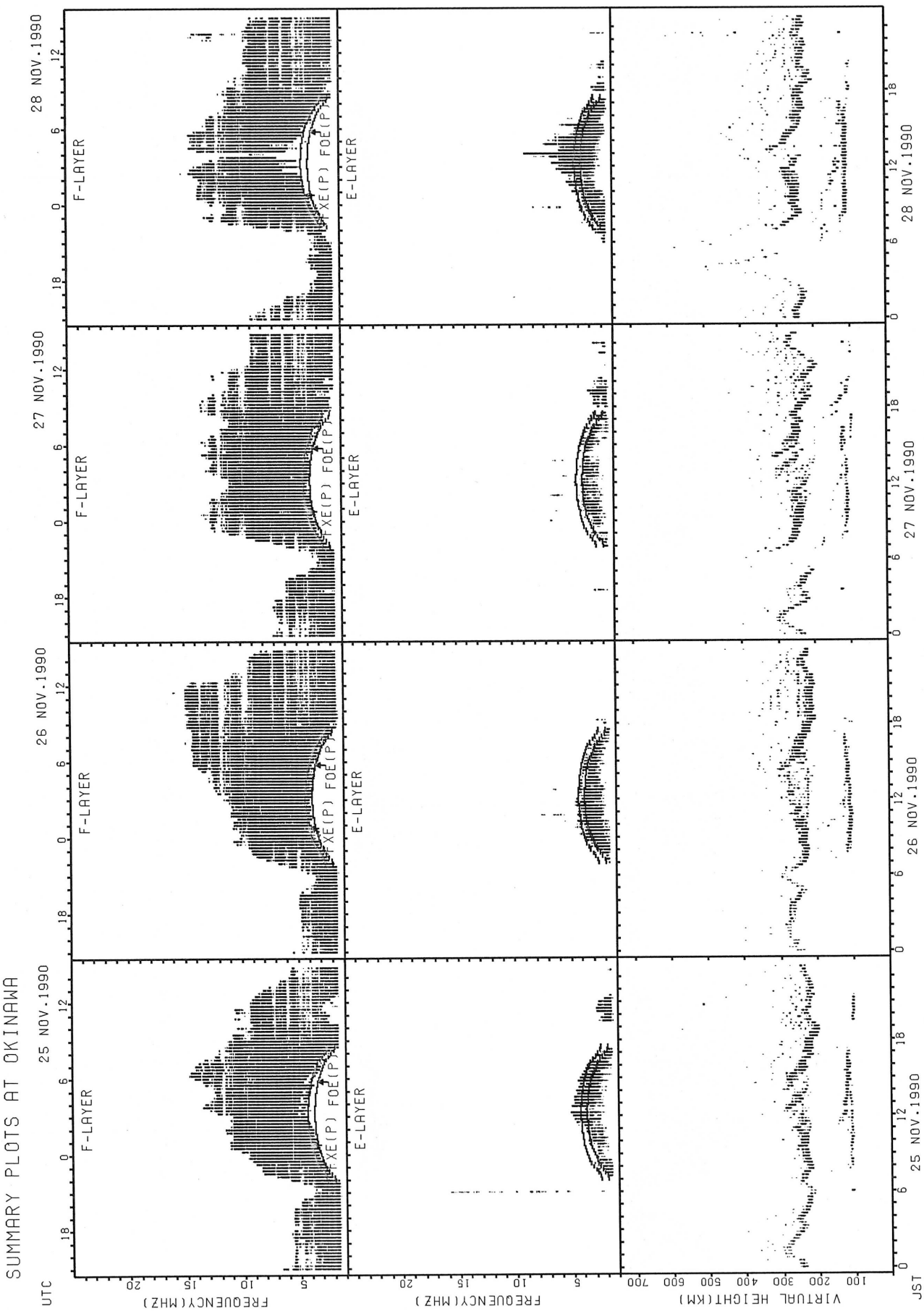
SUMMARY PLOTS AT OKINAWA



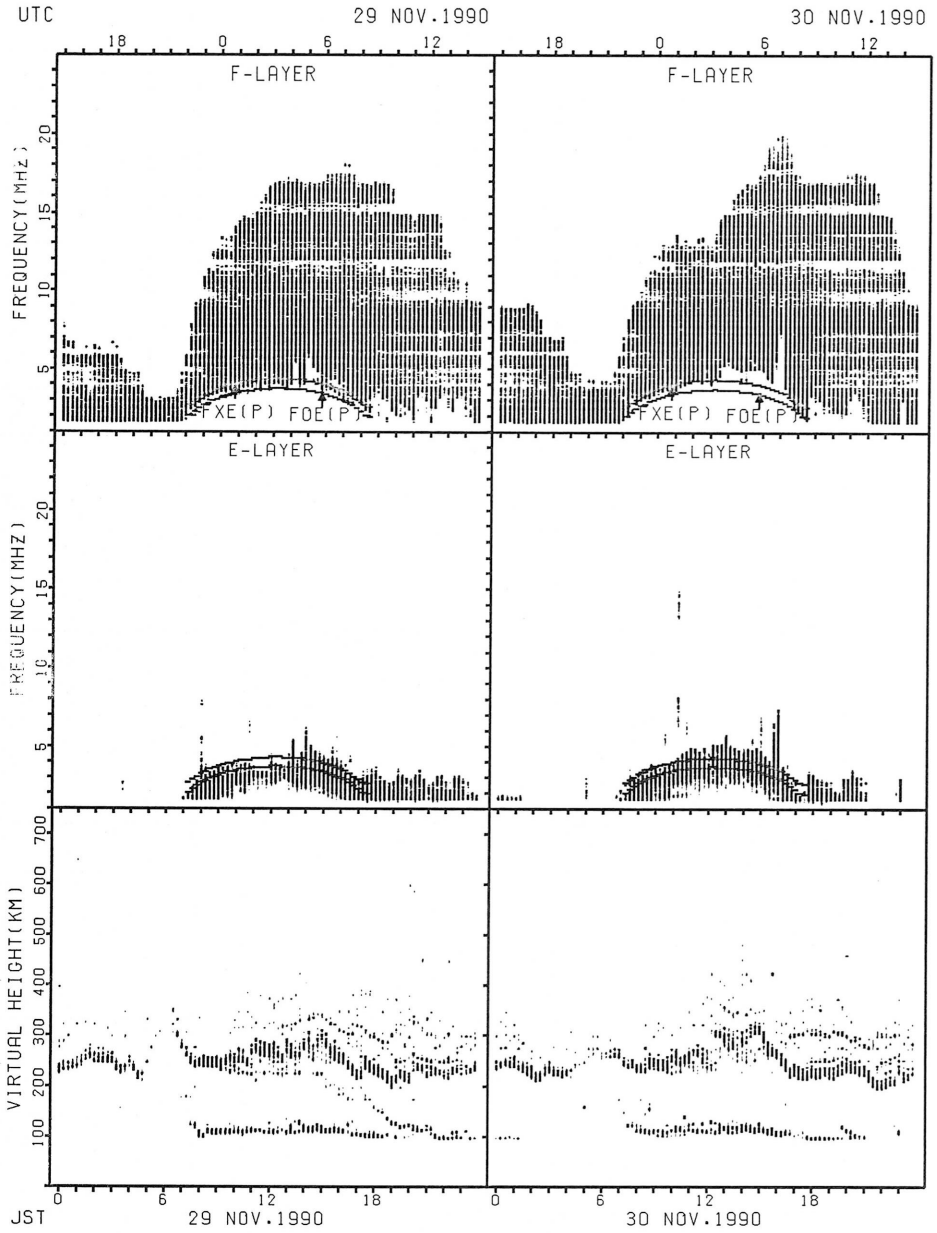
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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


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


SUMMARY PLOTS AT OKINAWA
UTC
25 NOV.1990
26 NOV.1990
27 NOV.1990
28 NOV.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
NOV.1990 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

H'F STATION WAKKANAI LAT. 45.4N LON. 141.7E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								25	31	31	31	31	31	31	31	31	30	11						
MED								252	230	232	234	240	244	240	248	242	244	276						
U Q								260	248	238	242	250	250	244	258	248	256	284						
L Q								240	224	228	228	232	236	232	236	236	236	256						

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT			10		10												13	10						
MED			112		109												117	113						
U Q			113		111												133	121						
L Q			111		107												112	109						

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								28	31	31	31	31	31	31	31	31	30	18						
MED								252	236	238	240	240	254	252	248	250	248	262						
U Q								265	246	244	246	246	260	262	264	260	260	280						
L Q								236	230	230	232	236	242	248	242	240	240	252						

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		13	18	13	10	11	17	20	17	17	14	15	12	12		
MED					105			161		119	116	117	115	109	113	116	107	107	105	105	107	110		
U Q					111			170		127	119	138	123	119	119	125	121	116	113	111	109	114		
L Q					101			149		117	113	111	109	107	107	106	102	101	103	99	104	104		

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								29	30	31	31	30	30	30	31	31	31	24						
MED								242	234	244	240	248	256	264	250	244	248	253						
U Q								261	236	250	244	260	272	270	258	250	258	259						
L Q								234	230	240	236	240	246	252	246	234	238	244						

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		14	17	18	15	17	15	21	20	21	18	12				
MED								155		120	119	118	115	125	127	119	112	107	104	107				
U Q								167		131	125	123	143	148	155	128	124	118	111	109				
L Q								143		117	117	115	111	110	113	108	103	101	101	105				

MONTHLY MEDIANS OF H'F AND H'ES

NOV.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								15	31	31	31	31	27	31	31	31	31	31	31	25	27	21	14	
MED								284	240	242	246	246	250	276	264	252	246	244	258	280	292	280	303	
U Q								290	250	252	254	252	266	292	276	262	264	256	276	296	298	304	312	
L Q								256	234	236	242	238	242	254	248	246	238	236	244	267	276	264	280	

H'ES

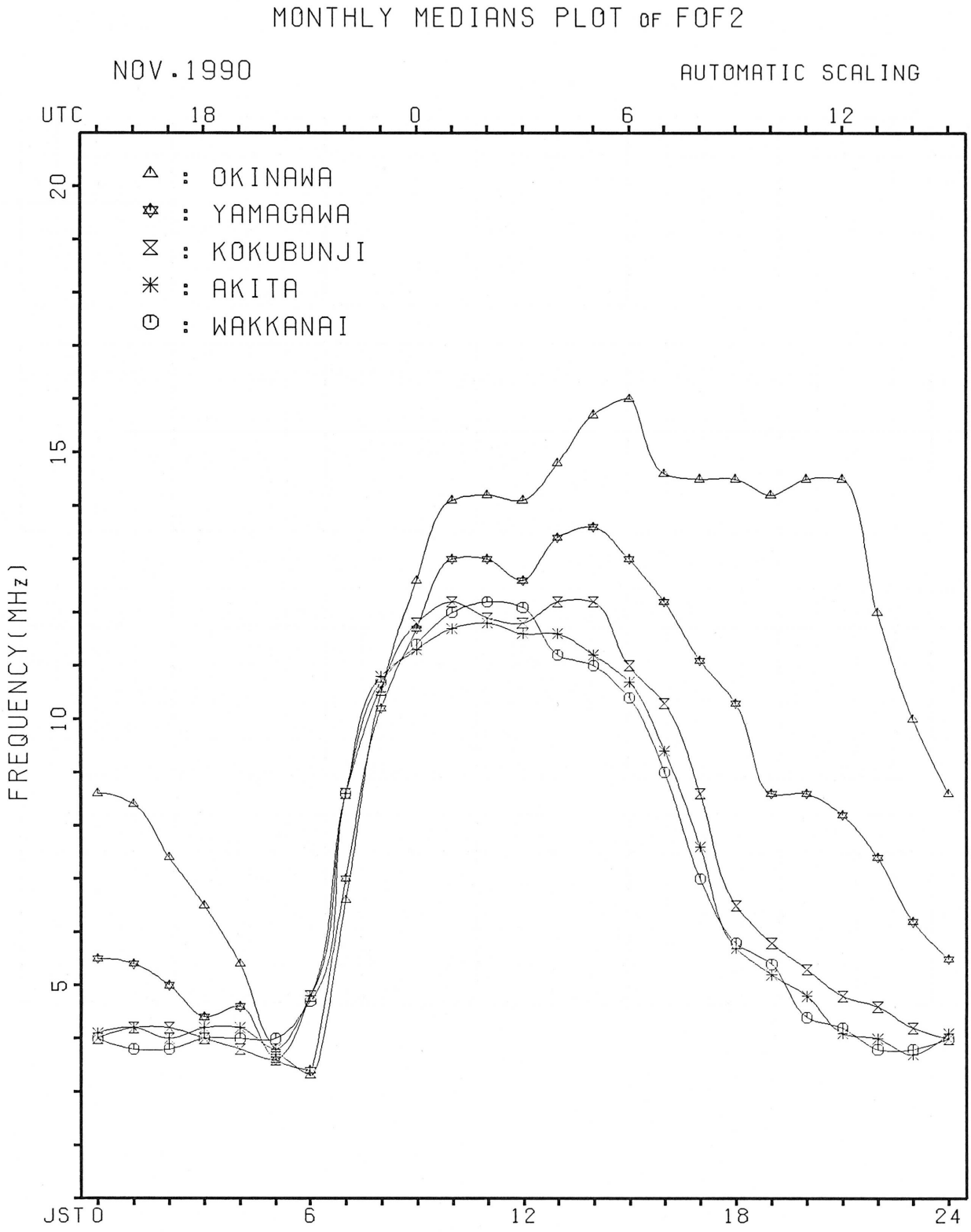
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										12	16	14	16	14	13	21	14	17	24	12				
MED										125	120	119	121	125	119	119	114	113	108	109				
U Q										142	134	125	125	129	129	128	119	129	119	112				
L Q										118	116	117	114	117	112	113	113	107	105	107				

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	17	13	10				13	29	30	30	29	20	24	30	30	30	30	30	30	30	30	29	26
MED	290	294	282	284				296	248	249	254	258	259	293	288	282	258	252	248	253	264	252	252	271
U Q	300	310	305	298				316	256	260	262	268	274	309	310	294	296	264	262	266	280	262	270	282
L Q	276	273	253	278				264	238	246	248	255	251	271	276	272	254	236	236	238	254	242	242	258

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								10	14	16	18	17	21	17	20	23	22	19	21	16	17	11		
MED								164	132	122	123	121	121	119	120	119	119	121	111	111	107	105		
U Q								179	165	155	155	156	129	126	143	127	125	137	116	119	113	117		
L Q								125	113	114	115	115	114	112	116	113	115	113	103	107	103	103		


MONTHLY MEDIANS PLOT OF FOF2
NOV.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

NOV. 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 61	X 55	X 54	X 57	X 60	X 45													X 78	X 75	X 81	X 70	X 63	X 63
2	X 56	X 56	X 51	X 48	X 49	X 48						123							X 38	X 66	X 60	X 57	X 50	X 49
3	X 48	X 48	X 48	X 50	X 51	X 40													X 78	X 64	X 60	X 58	X 54	X 54
4	X 52	X 51	X 50	X 51	X 47	X 44													X 71	X 64	X 57	X 54	X 53	X 49
5	X 49	X 48	X 48	X 48	X 51	X 47												X 94	X 72	X 63	X 62	X 64	X 59	X 53
6	X 48	X 46	X 48	X 48	X 46	X 40												X 88	X 67	X 63	X 64	X 62	X 54	X 51
7	X 49	X 50	X 52	X 55	X 59	X 43												X 94	X 72	X 69	X 60	X 60	X 50	X 58
8	X 60	X 61	X 53	X 50	X 48	X 51												X 107	X 88	X 82	X 75	X 63	X 60	X 59
9	X 57	X 56	X 56	X 57	X 51	X 52												X 107	X 94	X 90	X 83	X 75	X 65	X 63
10	X 63	X 63	X 55	X 63	X 55	X 55												X 105	X 92	X 81	X 84	X 77	X 56	X 62
11	X 59	X 57	X 57	X 59	X 56	X 57												X 122	X 99	X 86	X 72	X 59	X 54	X 54
12	X 53	X 55	X 55	X 46	X 43	X 43												X 108	X 85	X 82	X 78	X 67	X 53	X 58
13	X 60	X 55	X 50	X 50	X 48	X 45												X 96	X 79	X 77	X 78	X 64	X 61	X 56
14	X 59	X 55	X 53	X 48	X 43	X 42												X 92	X 76	X 77	X 68	X 57	X 47	X 47
15	X 44	X 47	X 49	X 49	X 43	X 43												X 86	X 71	X 70	X 69	X 65	X 56	X 51
16	X 46	X 45	X 41	X 44	X 41	X 40												X 79	X 74	X 81	X 68	X 61	X 58	X 62
17	X 60	X 57	X 56	X 57	X 56	X 59												X 89	X 75	X 58	X 56	X 56	X 54	X 54
18	X 52	X 50	X 50	X 47	X 44	X 45												X 100	X 77	X 70	X 59	X 45	X 43	X 41
19	X 41	X 42	X 42	X 43	X 42	X 44												X 92	X 68	X 65	X 56	X 47	X 42	X 38
20	X 40	X 40	X 42	X 41	X 42	X 49	X 45											X 96	X 74	X 69	X 60	X 52	X 47	X 43
21	X 42	X 41	X 40	X 42	X 40	X 40	X 44											X 84	X 69	X 62	X 50	X 47	X 43	X 44
22	X 44	X 45	X 49	X 47	X 34	X 34	X 44											X 76	X 52	X 54	X 53	X 41	X 40	X 41
23	X 41	X 41	X 42	X 43	X 43	X 41	X 46											X 59	X 61	X 67	X 54	X 39	X 36	X 38
24	X 39	X 41	X 42	X 41	X 43	X 44	X 49											X 77	X 56	X 60	X 58	X 49	X 41	X 40
25	X 40	X 40	X 42	X 41	X 43	X 41	X 47											X 70	X 56	X 54	X 50	X 51	X 42	X 41
26	X 41	X 44	X 42	X 43	X 41	X 39	X 47											X 91	X 62	X 64	X 53	X 46	X 44	X 42
27	X 43	X 43	X 44	X 48	X 41	X 38	X 42											X 80	X 69	X 63	X 54	X 43	X 43	X 42
28	X 45	X 45	X 42	X 37	X 42													X 94	X 77	X 60	X 55	X 50	X 46	X 46
29	X 47	X 49	X 49	X 52	X 47	X 44	X 47											X 83	X 57	X 58	X 56	X 45	X 40	X 41
30	X 41	X 41	X 39	X 39	X 38	X 36	X 42											X 85	X 74	X 65	X 56	X 49	X 38	X 40
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29	10					1						26	30	30	30	30	30	30
MED	X 48	X 48	X 49	X 48	X 44	X 44	X 43					123						X 92	X 74	X 66	X 60	X 56	X 52	X 49
UQ	X 57	X 55	X 53	X 51	X 51	X 47	X 47											X 96	X 78	X 77	X 69	X 63	X 59	X 56
LQ	X 42	X 43	X 42	X 43	X 42	X 40	X 44											X 83	X 68	X 63	X 56	X 47	X 43	X 41

NOV. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

NOV. 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 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	55	49	48	51	55	39	58	107	106	116	122	125	111	126	123	121	111	105	72	69	75	64	57	57
2	50	50	45	42	43	42	58	85	100	119	126	V 113	124	122	128	122	111	103	82	60	54	51	44	43
3	42	42	42	44	45	34	52	86	96	116	121	V 119	111	121	122	117	110	95	71	57	54	52	48	49
4	S 46	45	44	46	41	38	56	86	112	114	119	121	120	129	121	108	106	90	65	58	52	48	47	43
5	43	42	42	42	45	41	54	90	101	116	132	124	120	124	115	110	102	88	66	57	56	58	54	47
6	42	40	42	42	40	34	54	90	101	123	128	126	124	122	118	111	104	82	61	57	58	56	48	45
7	43	44	46	49	53	37	48	89	106	124	118	113	107	121	123	114	106	89	66	63	54	54	54	52
8	54	55	47	44	42	45	58	91	106	134	128	124	129	128	126	118	109	101	82	76	69	57	54	53
9	51	50	50	51	45	46	62	S 98	118	133	140	135	131	131	130	127	118	100	88	84	77	69	59	57
10	57	57	59	57	49	49	68	105	106	125	135	132	145	135	128	121	121	99	85	75	78	70	60	56
11	53	51	51	53	50	51	61	106	135	143	142	138	139	144	140	125	115	116	93	80	66	53	48	48
12	47	49	49	40	37	37	49	102	132	146	143	129	136	137	129	117	109	102	79	76	72	61	H 57	52
13	54	49	44	44	42	39	51	102	122	133	132	119	123	128	R 109	107	106	93	73	71	72	58	55	50
14	53	49	47	42	37	36	50	93	108	124	125	119	123	119	111	106	100	86	70	71	61	51	41	41
15	38	41	43	43	37	37	47	87	115	116	120	121	112	117	111	106	102	80	65	64	63	59	50	45
16	40	39	35	38	35	34	44	90	110	U R 122	127	112	106	115	106	97	95	73	68	75	62	55	52	56
17	54	51	50	51	50	53	68	107	135	143	147	140	129	V 123	117	107	95	83	69	52	50	49	48	48
18	46	44	44	41	38	39	48	93	121	145	132	126	125	120	109	106	105	94	71	64	53	39	37	35
19	35	36	F 35	37	36	38	44	89	110	129	134	135	130	128	119	109	99	86	62	59	50	40	36	33
20	34	34	36	35	36	43	H 39	75	99	108	111	119	124	130	129	126	112	90	68	63	54	46	S 41	37
21	36	35	34	36	34	34	38	71	85	115	120	116	109	122	125	112	94	78	63	56	44	40	37	38
22	38	39	S 43	41	29	28	38	81	86	94	103	114	110	117	124	105	96	70	46	48	47	35	S 34	R 35
23	35	35	36	37	37	35	40	79	93	98	108	115	113	124	120	109	85	53	55	61	48	33	30	32
24	33	35	36	35	37	38	43	84	102	104	123	133	131	132	125	107	91	71	50	54	52	43	35	34
25	34	34	35	35	37	35	41	83	94	105	111	H 114	106	104	113	91	35	64	50	48	44	45	36	35
26	35	38	36	37	35	33	41	80	100	96	R 99	99	106	110	108	96	98	85	56	58	47	40	38	36
27	37	37	38	42	35	32	36	74	106	109	117	103	106	100	110	104	100	74	63	57	S 47	37	38	36
28	39	39	36	31	36	35	34	65	98	141	142	129	131	140	140	126	110	88	71	54	49	44	39	40
29	41	43	43	46	41	38	41	86	119	109	119	127	122	124	126	108	89	77	51	52	50	39	34	35
30	S 35	35	34	33	32	30	36	73	103	107	121	105	117	127	119	105	85	79	68	59	48	43	32	34
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	42	42	43	42	38	38	48	88	106	118	124	121	122	124	122	109	103	87	68	60	54	50	46	43
UQ	51	49	47	46	45	41	56	93	115	133	132	129	129	129	128	118	110	95	72	71	63	57	54	50
LQ	36	37	36	37	36	34	41	81	100	109	119	114	111	120	113	106	95	78	62	57	49	40	37	35

NOV. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	L	L	L									
2										L	L	L	L	L		L								
3									L 360	L	L		L	L										
4										L	L	L		L										
5										L	L	L	L	L	L									
6										L	L	L	L	L										
7							200			L	L			L										
8										L	L	L	L	L										
9										L	L	L		L	L									
10											L	L	L	L										
11										L	L	L	L	L										
12										L			L	L										
13										L	L		L	U L 500	L									
14										L	L	L	L		L									
15											L	L	L	L										
16										L	L	L	L	L										
17										L	L	L			L									
18										L	L	L												
19										L		L												
20										L	L	L	L	L		L								
21										L	U L 530	L	L	L	L									
22											L	L			L									
23												U L 440	L	L	L									
24											L	L	L	L	L									
25														L	L									
26												L	L	L	L									
27										L	L	L	L	L	L	L								
28									L	L		L		L										
29											L	L	L	L										
30											L		L			A								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1		1		1	1		1										
MED							200		L 360		U L 530	U L 440		U L 500										
UQ																								
LQ																								

NOV. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

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

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	H 250	H 285	315	335	340	345	335	325	290	220	3						
2							B	235	280	310	340	345	345	335	305	A	A	3						
3							B	240	285	340	345	355	355	345	325	275	A	3						
4							B	240	280	320	345	330	A 340	345	330	300	205	3						
5							B	225	305	330	350	355	350	340	335	300	A							
6							B	230	305	340	345	R 355	360	345	325	290	U A 215							
7							B	H 235	300	335	350	365	365	355	340	285	A							
8							B	235	315	U A 310	355	355	365	355	335	295	U A 220							
9							B	220	305	335	360	A	R 365	350	340	295	H 210							
10							B	H 250	300	A	A	A	A	A 350	325	290	220							
11							B	230	290	330	A	A	365	360	340	A	A							
12							B	235	A	340	355	360	360	345	330	290	210							
13							B	240	305	335	350	360	365	U R 355	345	290	205							
14							B	H 240	290	345	360	A	A	A	330	285	210							
15							B	215	290	335	350	360	365	350	325	A	210							
16							B	225	305	330	355	355	355	345	335	280	210							
17							B	210	275	340	A	A	A	A	315	285	205							
18							B	215	285	320	340	A 340	355	350	330	U A 280	A							
19							B	225	285	315	U A 345	A 340	A	340	310	A	A							
20								200	275	325	345	345	340	330	315	270	195							
21								200	H 270	310	335	340	340	320	305	270	180							
22								205	265	315	A 315	A	A	335	300	260	185							
23								190	H 270	310	325	U A 335	A 335	A	310	260	A							
24								200	270	310	340	350	A	340	A	A	A							
25								195	260	320	340	345	340	340	315	U A 250	A 185							
26								190	270	A 305	A 340	350	340	340	305	265	A							
27								195	H 270	305	335	345	340	330	305	270	205							
28						J K 140	J K 155	195	265	305	U A 315	A	A	A	310	250	A							
29								180	260	305	335	U A 345	A	A	A	A	A							
30								185	270	310	340	340	340	340	325	U A 230	A							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	1	30	29	29	27	23	22	25	23	24	17							
MED						J K 140	J K 155	222	285	320	345	345	352	345	325	282	210							
UQ								235	300	335	350	355	365	350	332	290	210							
LQ								200	270	310	338	340	340	340	310	270	205							

NOV. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

NOV. 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	E B 14	E B 13	J A 20	J A 37	J A 22	J A 26	G	G	36	38	J A 51	38	37	36	35	29	J A 21	E B 15	E B 14	E B 14	J A 18	J A 26	J A 23
2	J A 15	E B 13	E B 13	E B 13	E B 14	J A 22	J A 19	G	32	34	38	39	39	39	39	32	J A 32	E B 13	E B 14	E B 15	E B 14	E B 13	E B 13	E B 13
3	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	G	37	G 22	G	41	42	42	44	J A 52	J A 27	J A 18	E B 13	E B 13	E B 13	J A 15	E B 14	E B 13
4	E B 14	E B 13	E B 13	J A 52	J A 41	J A 24	J A 18	G 23	32	36	39	39	39	37	35	G	29	E B 15	22	J A 19	E B 15	E B 14	E B 15	E B 13
5	19	J A 13	E B 13	E B 13	E B 13	E B 15	E B 14	G	32	G	G	G	G	G 27	G 28	G 27	J A 33	J A 25	J A 22	J A 20	J A 18	J A 35	E B 15	J A 23
6	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	E B 14	G	G	40	J A 49	G	G	38	G	33	24	E B 14	E B 14	E B 14	E B 14	J A 24	J A 30	J A 22
7	E B 13	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	27	33	37	40	46	39	41	41	J A 42	26	E B 13	J A 14	J A 18	J A 22	J A 22	J A 14	E B 14
8	E B 14	E B 12	E B 13	E B 13	E B 14	E B 14	E B 14	G	G	36	G	G	G	G 29	G	J A 48	64	J A 54	24	E B 13	17	J A 25	J A 25	20
9	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 15	26	G	35	G	42	G 34	G 30	G 23	G 20	J A 21	20	J A 24	19	E B 14	E B 13	J A 24	E B 13
10	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	E B 16	G	32	J A 40	40	41	40	40	37	37	G	J A 19	J A 24	J A 29	22	E B 14	E B 14	E B 15
11	E B 15	E B 13	E B 14	J A 18	E B 15	E B 14	E B 14	G 18	33	39	39	39	G	G	G	31	25	J A 26	J A 21	E B 13	J A 24	J A 18	J A 24	J A 39
12	J A 18	J A 24	E B 13	J A 21	20	J A 16	E B 14	G	J A 36	J A 36	G 30	G 26	G	G	G	G	G	J A 24	J A 21	E B 13	E B 14	E B 13	E B 15	E B 13
13	E B 13	J A 17	J A 23	J A 20	J A 16	E B 16	E B 14	28	33	G	G	G	G 31	G	G	G	24	E B 15	E B 13	E B 14	E B 14	E B 14	E B 13	E B 13
14	E B 13	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	G	39	39	J A 38	G	G	G	J A 20	E B 13	22	E B 12	E B 14	E B 13	E B 14
15	E B 13	E B 13	E B 13	E B 13	E B 14	E B 14	E B 13	G	G	G 27	39	G	39	40	37	J A 47	G 20	E B 13	E B 14	J A 27	E B 14	E B 15	E B 13	E B 15
16	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 16	G	35	J A 53	40	41	G	45	40	30	G	E B 14	E B 14	E B 13	E B 15	J A 31	J A 28	J A 25
17	J A 15	21	E B 14	E B 13	E B 14	E B 14	J A 16	26	29	40	39	J A 50	J A 42	J A 54	35	34	26	E B 14	E B 15	E B 17	E B 13	E B 14	E B 15	E B 15
18	E B 15	19	J A 51	J A 23	J A 27	20	E B 14	G 18	G	34	37	37	G	39	44	32	J A 41	J A 27	J A 30	21	E B 13	E B 13	J A 23	J A 41
19	J A 27	J A 31	J A 52	E B 16	E B 13	E B 14	E B 14	26	G	35	J A 55	39	J A 47	G	J A 43	J A 55	J A 69	J A 54	J A 48	J A 49	J A 30	J A 24	J A 52	J A 26
20	E B 14	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	G	31	36	G	G	37	G 22	34	G 18	29	J A 27	J A 21	E B 13	J A 22	E B 15	E B 16	E B 13
21	E B 14	E B 13	E B 13	E B 15	E B 15	E B 14	E B 15	25	30	38	41	38	G	G	33	J A 36	J A 42	J A 31	J A 36	J A 33	E B 15	E B 13	E B 15	E B 14
22	E B 13	E B 15	E B 14	E B 13	E B 14	E B 15	E B 13	G	G	35	38	J A 42	J A 49	J A 56	G	G 20	21	J A 23	J A 18	J A 19	E B 14	E B 14	E B 16	E B 14
23	E B 14	E B 14	E B 13	E B 13	E B 15	E B 14	E B 13	J A 31	G	35	39	J A 51	35	J A 47	J A 40	J A 39	J A 51	J A 30	J A 15	E B 14	E B 15	E B 15	E B 14	E B 14
24	E B 14	E B 14	E B 14	E B 14	E B 14	E B 13	E B 13	G	G	G	37	39	J A 40	J A 37	37	J A 49	28	J A 22	J A 19	E B 15	E B 14	E B 14	E B 16	E B 15
25	E B 14	E B 13	E B 13	E B 15	E B 13	E B 14	E B 13	G	31	36	39	41	40	45	34	J A 32	21	J A 27	J A 22	E B 14	E B 13	E B 13	22	J A 15
26	J A 18	J A 21	E B 14	E B 14	E B 13	E B 13	E B 14	J A 23	J A 32	J A 38	J A 36	G 33	G	G 32	G 25	G 25	J A 32	J A 19	E B 14	J A 21	E B 13	E B 14	E B 15	E B 14
27	E B 15	E B 14	E B 14	E B 14	J A 27	E B 14	E B 14	G	G	33	G	G	G 28	G	G 22	G	G	E B 14	E B 13	24	E B 13	E B 15	E B 15	E B 14
28	E B 14	E B 14	E B 15	16	E B 14	G 14	E B 14	24	31	40	J A 53	J A 42	J A 45	J A 48	J A 39	29	J A 32	J A 35	J A 24	E B 13	E B 13	E B 13	E B 14	E B 14
29	E B 13	E B 14	E B 13	E B 13	E B 13	E B 16	E B 14	G	G	G 27	G	J A 41	37	J A 37	J A 49	J A 39	J A 43	J A 43	J A 26	19	E B 14	E B 14	E B 14	20
30	20	J A 18	J A 18	E B 13	E B 13	E B 14	E B 14	G	31	G	41	J A 42	J A 43	42	40	122	J A 27	J A 22	J A 18	E B 13	E B 13	E B 13	E B 14	E B 13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	E B 14	G	30	36	38	39	38	38	35	32	27	J A 22	J A 18	E B 16	E B 14	E B 14	E B 15	E B 14
UQ	E B 15	E B 15	E B 14	E B 16	E B 15	E B 15	E B 15	24	32	38	40	42	40	42	40	J A 39	J A 32	J A 27	J A 24	J A 21	E B 15	J A 18	J A 23	J A 20
LQ	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 14	G	G	G 27	G	G 26	G	G 27	G 22	G 20	21	E B 15	E B 14	E B 13	E B 13	E B 13	E B 14	E B 13

NOV. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 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	E B 14	E B 13	16	17	17	19	G	G	34	36	G	37	36	35	33	28	17	E B 15	E B 14	E B 14	E B 13	17	20
2	E B 14	E B 13	E B 13	E B 13	E B 14	E B 15	E B	G	31	33	36	38	38	38	38	30	23	E B 13	E B 14	E B 15	E B 14	E B 13	E B 13	E B 13
3	E B 13	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	G	30	G 20	G	40	40	40	43	38	25	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	E B 13
4	E B 14	E B 13	E B 13	25	17	16	E B 13	G 17	30	35	37	37	39	G	34	G	26	E B 15	20	16	E B 15	E B 14	E B 15	E B 13
5	E B 13	E B 13	E B 13	E B 13	E B 13	E B 15	E B 14	G	32	G	G	G	G	G 26	G 26	G 23	22	16	18	17	17	20	E B 15	E B 13
6	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	E B 14	G	G	36	43	G	G	36	G	31	G 22	E B 14	E B 14	E B 14	E B 14	20	16	E B 14
7	E B 13	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	27	31	36	39	43	38	40	40	39	24	E B 13	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14
8	E B 14	E B 12	E B 13	E B 13	E B 14	E B 14	E B 14	G	G	35	G	G	G	G 28	G	34	58	39	E B 13	E B 13	17	16	20	E B 13
9	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 15	G 20	G	35	G	38	G 33	G 29	G 21	G 19	G 16	E B 14	21	E B 14	E B 14	E B 13	E B 13	E B 13
10	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	E B 16	G	G	35	38	40	37	38	35	34	G	18	15	23	E B 13	E B 14	E B 14	E B 15
11	E B 15	E B 13	E B 14	E B 14	E B 15	E B 14	E B 14	G 18	33	37	37	37	G	G	G	29	23	16	18	E B 13	18	E B 14	18	20
12	E B 14	17	E B 13	14	E B 13	E B 13	E B 14	G	30	G 29	G 29	G 24	G	G	G	G	G	18	18	E B 13	E B 14	E B 13	E B 15	E B 13
13	E B 13	E B 13	15	E B 13	E B 13	E B 16	E B 14	27	32	G	G	G	G 31	G	G	G	24	E B 15	E B 13	E B 14	E B 14	E B 14	E B 13	E B 13
14	E B 13	E B 14	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	G	38	39	35	G	G	G	16	E B 13	E B 13	E B 12	E B 14	E B 13	E B 14
15	E B 13	E B 13	E B 13	E B 13	E B 14	E B 14	E B 13	G	G	G 26	37	G	38	39	36	43	G 18	E B 13	E B 14	17	E B 14	E B 15	E B 13	E B 15
16	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 16	G	33	38	39	39	G	40	37	30	G	E B 14	E B 14	E B 13	E B 15	17	27	23
17	15	E B 13	E B 14	E B 13	E B 14	E B 14	E B 14	23	29	37	36	46	40	43	35	32	24	E B 14	E B 15	E B 17	E B 13	E B 14	E B 15	E B 15
18	E B 15	E B 13	19	E B 13	E B 13	E B 14	E B 14	G 17	G	34	36	36	G	37	39	32	27	16	23	E B 13	E B 13	E B 13	E B 13	17
19	18	23	E B 13	E B 16	E B 13	E B 14	E B 14	25	G	34	38	37	41	G	G 26	48	39	15	18	40	27	17	15	17
20	E B 14	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	G	30	34	G	G	37	G 21	34	G 17	27	25	17	E B 13	17	E B 15	E B 16	E B 13
21	E B 14	E B 13	E B 13	E B 15	E B 15	E B 14	E B 15	24	30	36	36	38	G	G	32	34	34	19	35	17	E B 15	E B 13	E B 15	E B 14
22	E B 13	E B 15	E B 14	E B 13	E B 14	E B 15	E B 13	G	G	32	34	36	34	G 27	G	G 18	G	15	15	E B 14	E B 14	E B 14	E B 16	E B 14
23	E B 14	E B 14	E B 13	E B 13	E B 15	E B 14	E B 13	E B 14	G	34	37	36	G 34	36	G 26	G 22	30	16	E B 13	E B 14	E B 15	E B 15	E B 14	E B 14
24	E B 14	E B 14	E B 14	E B 14	E B 14	E B 13	E B 13	G	G	G	36	36	38	G 31	32	29	22	18	E B 15	E B 15	E B 14	E B 14	E B 16	E B 15
25	E B 14	E B 13	E B 13	E B 15	E B 13	E B 14	E B 13	G	29	35	37	39	37	43	34	28	G 18	18	17	E B 14	E B 13	E B 13	18	E B 14
26	E B 14	E B 13	E B 14	E B 14	E B 13	E B 13	E B 14	G	G 22	G 31	G 27	G 25	G	G 26	G 21	G 22	19	E B 14	E B 14	E B 14	E B 13	E B 14	E B 15	E B 14
27	E B 15	E B 14	E B 14	E B 14	E B 13	E B 14	E B 14	G	G	33	G	G	G 27	G	G 21	G	G	E B 14	E B 13	E B 13	E B 13	E B 15	E B 15	E B 14
28	E B 14	E B 14	E B 15	15	E B 14	E B 14	K 16	22	29	37	49	35	37	36	G 27	G 20	26	23	17	E B 13	E B 13	E B 13	E B 14	E B 14
29	E B 13	E B 14	E B 13	E B 13	E B 13	E B 16	E B 14	G	G	G 25	G	37	35	34	41	35	41	23	18	E B 14	E B 14	E B 14	E B 14	E B 14
30	E B 14	E B 14	E B 12	E B 13	E B 13	E B 14	E B 14	G	28	G	36	36	36	38	38	98	25	19	15	E B 13	E B 13	E B 13	E B 14	E B 13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	E B 14	G	25	34	36	36	36	34	32	30	24	16	15	E B 14	E B 14	E B 14	E B 15	E B 14
UQ	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	G 18	30	35	37	38	38	38	36	34	27	18	18	E B 15	E B 15	E B 15	E B 16	E B 15
LQ	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 14	G	G	G 26	G	G	G	G 21	G 21	G 19	G 18	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	E B 13

NOV. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1990 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + ? 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	14	13	13	14	13	13	16	15	17	19	21	18	20	17	15	13	13	15	14	14	13	12	13
2	14	13	13	13	14	15	15	15	15	18	17	20	21	21	17	17	14	13	14	15	14	13	13	13
3	13	13	13	13	13	13	14	14	16	14	17	21	20	17	17	16	14	14	13	13	13	13	14	13
4	14	13	13	12	13	14	13	18	15	17	19	20	18	20	18	15	16	15	14	13	15	14	15	13
5	13	13	13	13	13	15	14	14	16	19	26	18	22	18	17	14	13	13	14	14	15	14	15	13
6	14	14	13	13	14	14	14	13	17	21	18	20	22	20	17	17	13	14	14	14	14	14	13	14
7	13	14	14	13	13	13	14	13	17	17	17	22	21	20	18	20	15	13	13	14	13	13	13	14
8	14	12	13	13	14	14	14	14	17	18	20	20	20	20	15	16	15	14	13	13	13	13	13	13
9	13	13	13	13	13	14	15	17	17	20	17	20	22	20	15	13	12	14	14	14	14	13	13	13
10	14	14	13	13	14	14	16	15	16	17	19	26	21	20	17	E S 24	15	14	12	13	13	14	14	15
11	15	13	14	14	15	14	14	14	16	17	17	22	20	18	25	14	15	13	13	13	13	14	13	14
12	14	14	13	13	13	13	14	14	17	17	19	20	18	20	18	17	18	13	13	13	14	13	15	13
13	13	13	13	13	13	16	14	13	17	20	20	22	21	22	20	17	13	15	13	14	14	14	13	13
14	13	14	13	13	13	13	14	13	16	24	21	32	30	22	21	18	16	14	13	13	12	14	13	14
15	13	13	13	13	14	14	13	14	15	18	20	20	21	18	17	15	14	13	14	13	14	15	13	15
16	13	13	13	13	13	14	16	16	16	18	18	20	22	17	15	16	16	14	14	13	15	13	13	13
17	13	13	14	13	14	14	14	14	14	20	20	21	22	20	18	14	14	14	15	17	13	14	15	15
18	15	13	14	13	13	14	14	14	16	17	18	18	24	21	18	18	14	14	13	13	13	13	13	14
19	13	13	13	16	13	14	14	15	18	17	19	18	21	20	19	14	15	14	15	14	15	14	14	14
20	14	14	14	13	13	13	14	14	14	16	20	19	20	17	16	14	13	13	13	13	14	15	16	13
21	14	13	13	15	15	14	15	16	15	16	17	18	18	19	18	16	12	14	14	14	15	13	15	14
22	13	15	14	13	14	15	13	15	16	16	19	21	20	18	17	15	15	13	13	14	14	14	16	14
23	14	14	13	13	15	14	13	14	14	16	18	22	17	20	16	16	15	12	13	14	15	15	14	14
24	14	14	14	14	14	13	13	14	16	16	17	17	23	18	17	14	16	14	15	15	14	14	16	15
25	14	13	13	15	13	14	13	14	15	22	18	18	19	19	16	17	13	14	13	14	13	13	15	14
26	14	13	14	14	13	13	14	14	14	14	17	17	18	18	17	14	13	14	14	14	13	14	15	14
27	15	14	14	14	13	14	14	14	14	17	16	18	18	20	16	17	14	14	13	13	13	15	15	14
28	14	14	15	12	14	14	14	13	14	14	17	18	18	17	16	17	13	13	14	13	13	13	14	14
29	13	14	13	13	13	16	14	13	17	16	17	17	20	20	17	14	18	14	13	14	14	14	14	14
30	14	14	12	13	13	14	14	14	15	15	17	16	17	18	18	16	14	13	13	13	13	13	14	13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	14	13	13	13	13	14	14	14	16	17	18	20	20	20	17	16	14	14	13	14	14	14	14	14
UQ	14	14	14	13	14	14	14	15	17	18	19	21	22	20	18	17	15	14	14	14	14	14	15	14
LQ	13	13	13	13	13	13	14	14	15	16	17	18	18	18	16	14	13	13	13	13	13	13	13	13

NOV. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

NOV. 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	305	270	255	285	310	275	295	335	330	310	315	310	295	300	305	315	310	325	305	290	300	315	305	305
2	300	305	310	300	310	295	325	350	320	325	340	305V	300	295	320	310	320	310	310	310	300	305	290	290
3	280	290	280	290	310	355	325	360	330	315	325	315V	310	305	305	315	315	330	320	295	305	310	300	270
4	285S	285	280	295	330	275	310	325	340	320	315	310	300	305	305	310	310	325	315	315	295	295	290	295
5	280	295	280	295	325	305	335	340	335	315	325	320	295	305	300	315	315	315	310	300	285	285	285	295
6	300	280	290	300	310	285	315	335	330	320	320	305	295	300	305	310	320	325	295	295	310	310	300	290
7	280	280	280	305	330	335	300	330	340	335	315	310	290	290	300	305	310	310	295	310	280	285	265	275
8	285	305	300	275	265	285	315	345	325	320	320	290	290	285	290	290	300	305	295	295	315	290	275	270
9	285	280	290	290	280	260	310	335S	320	310	310	295	275	280	285	280	295	295	290	295	295	290	285	275
10	275	280	275	295	280	255	305	335	330	300	305	300	290	285	290	285	300	300	295	285	295	295	285	280
11	275	265	265	275	260	280	290	315	310	305	305	290	275	280	285	285	290	305	300	310	310	295	275	280
12	275	285	320	285	260	260	275	325	310	315	310	295	285	285	295	300	300	315	300	300	305	300	270H	290
13	300	300	295	300	320	275	285	335	325	325	325	305	295	305	305R	300	315	315	295	305	315	290	290	280
14	290	305	310	290	290	285	300	340	335	315	320	295	300	295	310	305	300	320	305	315	315	315	320	290
15	285	285	290	305	310	270	290	325	330	310	320	310	290	285	295	300	310	320	305	285	295	310	300	295
16	290	295	310	305	295	270	285	330	315	U 330 R	330	325	295	295	305	305	325	295	275	300	305	265	250	270
17	265	265	250	260	255	250	265	305	315	300	310	300	300	300V	300	315	305	310	310	290	285	280	255	270
18	265	265	275	275	250	255	270	320	315	315	305	295	305	305	310	305	315	330	315	315	325	305	290	280
19	255	255	250F	270	270	280	290	330	335	320	310	310	295	295	310	300	315	320	300	305	310	325	285	275
20	280	280	280	275	280	325	280H	345	350	335	320	305	300	305	305	310	325	310	300	315	305	305	280S	270
21	280	295	290	300	295	305	315	335	330	345	335	320	305	305	315	320	335	310	320	310	305	280	285	280
22	265	280	310S	340	280	255	310	340	340	325	330	315	310	305	325	325	330	310	340	315	315	315	300S	305R
23	305	295	300	295	320	300	310	350	355	320	325	315	300	310	315	330	350	330	310	330	325	320	290	270
24	275	280	280	280	285	290	300	340	335	310	320	325	305	310	320	325	325	335	300	305	330	315	285	285
25	275	285	290	310	310	315	315	360	350	345	325	305H	315	315	325	340	330	330	320	315	300	315	290	270
26	290	300	295	295	300	275	300	345	360	345	310R	315	310	320	320	330	320	335	305	325	315	290	300	270
27	260	275	285	315	310	290	295	325	345	325	335	315	305	315	315	310	320	310	310	310	310S	295	275	275
28	270	305	275	270	255	245	260	330	295	320	315	315	295	300	305	305	315	315	320	315	300	300	295	285
29	275	280	295	290	325	285	280	330	345	330	320	315	310	305	310	320	320	325	295	310	315	305	280	285
30	300S	310	285	295	290	285	295	335	345	335	335	310	290	310	305	A	325	325	320	325	305	320	275	270
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	280	285	288	295	295	282	300	335	330	320	320	310	298	302	305	310	315	315	305	310	305	302	285	280
UQ	290	295	295	300	310	295	310	340	340	330	325	315	305	305	315	315	325	325	315	315	315	315	295	290
LQ	275	280	280	280	280	270	285	330	320	315	310	300	290	295	300	300	310	310	295	295	300	290	275	270

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

IONOSPHERIC DATA

NOV. 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	L	L	L	L									
2										L	L	L	L	L		L								
3									L 415	L	L		L	L										
4										L	L	L		L										
5										L	L	L	L	L	L									
6										L	L	L	L	L										
7							365			L	L			L										
8										L	L	L	L	L										
9										L	L	L		L	L									
10											L	L	L	L										
11										L	L	L	L	L										
12										L			L	L										
13										L	L		L	U L 360	L									
14										L	L	L	L		L									
15											L	L	L	L										
16										L	L	L	L	L										
17										L	L	L			L									
18										L	L	L												
19										L		L												
20										L	L	L	L	L		L								
21										L	U L 355	L	L	L	L									
22											L	L			L									
23												U L 385	L	L	L									
24											L	L	L	L	L									
25														L	L									
26												L	L	L	L									
27										L	L	L	L	L	L	L								
28									L	L		L		L										
29											L	L	L	L										
30											L		L			A								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1		1		1	1		1										
MED							365		L 415		U L 355	U L 385		U L 360										
UQ																								
LQ																								

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

IONOSPHERIC DATA

NOV. 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 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											235	255	255	275	275									
2										260	235	290	270	275		235								
3									225	255	240		275	265										
4										255	240	265		255										
5										235	250	275	305	260	255									
6										255	245	255	250	265										
7							255			245	250			295L										
8										260	255	295	280	300										
9										250	250	250		310	275									
10											250	250	305	310L										
11										250	250	245	255	305										
12										250			300L	280L										
13										250	255		290L	265	300L									
14										260	255	305	280		255									
15											235	275	330L	305UL										
16										250	240	230	300	270										
17										250	240	270			300L									
18										260	225	240H												
19										250		255												
20										245	250	255	275L	275		240								
21										255	260	255	300L	270	250									
22											230	260			255									
23												255	270	265	265									
24											250	255	260	270	235									
25														270	250									
26												275	255	245	240									
27										235	250	280L	245	240	260	290L								
28									315L	260		255		270										
29											250	255	240	265										
30											245		295			A								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1		2	20	24	24	21	24	13	3								
MED							255		270	250	250	255	275	270	255	240								
UQ										258	250	275	300	288	275	265								
LQ										250	240	255	255	265	250	238								

NOV. 1990 | H'F2 (KM)

IONOSPHERIC DATA

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

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	255	300	335	285	235	270	275	235	230	225	225	210H	220	215H	235	245	220	225	215	250	245	235	265	270
2	260	250	255	265	265	275	235	210	225	225	220	210	215	220	245	235	225	225	210	215	255	250	255	280
3	285	280	285	300	250	210	235	220	215	205H	205	240	225	235	240	240	225	215	220	225	250	250	245	295
4	270	275	280	290A	235	300A	250	215	230	230	215	205H	235	225	235	230	230	220	225	255	255	255	275	270
5	270	270	290	265	245	260	235	220	225	220	235	205	215H	230	230	235	225	220	220	240	255	265	255	260
6	260	285	290	265	230	285	255	225	225	235	240A	220	235	225	230	235	230	205	220	250	235	260	255	270
7	290	310	295	275	240	215	195	225	225	235	230	225	215H	240	250	245	230	225	205	235	255	270	295	305
8	280	255	255	315	320	290	225	220	220	235	225	220	210	235	235	235	255EA	250A	235	240	230	265	310	305
9	280	300	275	280	280	330	235	225	230	230	220	230	220H	230	235	240	245	220	240	250	240	235	250	290
10	295	280	275	250	250	335	245	220	220	225	230	235	210H	240	235	230	240	215	245	255	250	240	255	285
11	290	320	310	285	295	295	260	235	230	230	225	210	215	230	240	230	235	240	230	225	240	250	285	310
12	295	300	245	240	285	340	290	235	230	230	225	225	210H	215H	240	235	230	235	220	235	235	230	250	275
13	260	255	260	265	250	300	285	235	230	230	230	220	220	240	230	225	240	220	230	235	235	235	260	280
14	285	270	270	270	240	300	280	230	230	230	235	220	225H	240	235	235	225	220	220	245	230	240	230	285
15	300	310	285	260	240	310	285	225	235	230	235	220H	230	230	245	240A	230	210	230	225A	255	250	260	265
16	280	270	260	270	265	320	290	230	230	235	240	220	205H	235	245	230	230	215	260	255	230	290	365A	325
17	305	300	325	300	335	365	310	230	250	240	230	235	240	240	230	230	225	210	230	220	260	270	310	310
18	310	310	300	255	340	365	300	240	240	235	230	220	235	240	235	245	230	225	245	235	220	250	265	315
19	375	395A	390	320	305	265	275	245	240	220	225	220	240	235	235	230H	240A	215	235	285EA	260	225	290	300
20	310	330	315	330	310	250	205H	220	230	210H	225	225	210H	230	245	230	230	230	220	220	235	225	260	310
21	305	300	285	285	255	270	235	220	220	235	220	230	220	225H	230	230	225	205	280A	230	230	275	300	300
22	325	310	265	215	240	355	270	230	225H	230	235	220	230	240	245	230	220	200	220	250	240	245	290	290
23	270	290	275	290	265	270	255	220	225	230	230	210	205H	245	230	230	210	210	250	230	215	235	295	345
24	330	320	300	315	305	270	250	235	235	230	230	230	230	230	240	220	225	215	230	250	225	240	275	310
25	310	305	300	270	265	255	245	220	220	225	230	240	230	230	230	225	220	210	255	225	245	235	275	310
26	310	280	270	280	270	320	260	230	215	225	215H	230	225	235	220	230	205H	210	220	235	230	265	270	310
27	340	325	305	255	245	270	285	245	235	230	220	220H	210	230	235	230	230	205	240H	220	215	260	310	330
28	320	255	325	315	390	390	400	230	235	245	250A	240	240	235	240	220	220	230	230	225	250	250	270	290
29	310	290	275	270	245	280	300	240	225	225	220	230	220	205H	235	220	220	220	225	245	230	230	265	300
30	290	265	300	300	290	270	260	225	230	220	225	215	215	245	230	A	220	225	240	225	235	240	305	305
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	292	295	285	278	265	288	260	228	230	230	228	220	220	232	235	230	226	220	230	235	238	250	270	300
UQ	310	310	300	300	295	320	285	235	230	235	230	230	230	240	240	235	230	225	240	250	250	260	295	310
LQ	280	270	270	265	245	270	235	220	225	225	220	220	215	230	230	230	220	210	220	225	230	235	255	280

NOV. 1990 | H'F (KM)

IONOSPHERIC DATA

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

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	120	110	110	110	110	110	110	110	115	120	B						
2							B	120	110	115	110	115	120	115	115	115	A	B						
3							B	115	115	A 110	115	110	115	115	110	110	A	B						
4							B	A 130	115	115	115	110	110	115	115	115	120	B						
5							B	125	115	115	120	110	115	A 120	A 120	A 120	A							
6							B	120	115	115	110	115	115	110	115	120	A							
7							B	115	115	110	110	115	115	120	115	120	A							
8							B	120	115	110	110	110	110	A 115	110	A 125	125							
9							B	125	120	115	115	115	A	A 130	A 120	115	A 120							
10							B	120	115	A	115	120	115	A	115	S 130	130							
11							B	A 120	A 120	115	120	A	115	110	120	A	A							
12							B	120	A	A 125	A 120	A 120	115	110	115	115	125							
13							B	125	115	115	115	120	A 125	120	115	120	120							
14							B	120	115	120	115	A	A	A	120	120	140							
15							B	130	115	A 120	110	115	E A 140	115	A 120	A	E A 150							
16							B	130	110	110	110	115	115	110	A 115	115	140							
17							B	125	110	115	110	110	A	A	110	A 120	E A 135							
18							B	A 135	110	110	110	110	120	115	115	120	A							
19							B	135	120	115	120	115	A	115	120	A	A							
20								130	115	115	115	110	135	A 120	115	120	135							
21								135	115	110	115	115	110	110	115	115	A 120							
22								130	120	110	110	115	A	A 120	110	115	B 160							
23								B 135	115	115	115	115	A	A	A 130	A 130	A							
24								130	120	115	115	115	A	E A 135	A	A	A							
25								135	120	115	115	A 130	A 135	A 125	A 120	120	A							
26								D 135	E A 140	A	A	115	A 130	115	A 125	120	A 130	A						
27								130	115	115	115	115	A 125	115	120	120	140							
28							3	B	130	115	115	110	110	A	A	A 130	A 125	A						
29								135	115	A 130	110	115	110		A	A	A	A						
30								140	115	115	110	110	110	115	120	120	A							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								30	29	28	30	28	22	24	28	25	15							
MED								130	115	115	115	115	115	115	115	120	128							
UQ								135	115	115	115	115	120	A 120	120	120	139							
LQ								120	115	110	110	110	110	112	115	115	120							

NOV. 1990 | H'E (KM)

IONOSPHERIC DATA

NOV. 1990 | H'ES (KM)

135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	110	105	105	105	G	G	135	140	115	140	E G 190	E G 185	160	140	130	B	B	B	105	120	105
2	110	B	B	B	B	105	120	G	135	E G 175	135	135	130	120	115	120	110	B	B	B	B	B	B	B
3	B	B	B	B	B	B	B	G	125	100	G	E G 190	160	150	135	120	115	105	B	B	B	100	B	B
4	B	B	B	110	110	100	110	115	150	130	125	120	120	140	E G 165	G	E G 205	B	130	105	B	B	B	B
5	110	110	B	B	B	B	B	G	E G 160	G	G	G	G	100	100	100	100	100	105	105	100	110	B	110
6	B	B	B	B	B	B	B	G	G	125	120	G	G	140	G	125	120	B	B	B	B	105	105	115
7	B	B	B	B	B	B	B	160	E G 180	E G 150	135	120	140	130	120	115	115	B	115	110	110	110	110	B
8	B	B	B	B	B	B	B	G	G	125	G	G	G	110	G	130	115	110	105	B	120	105	105	110
9	B	B	B	B	B	B	B	125	G	E G 190	G	120	115	110	105	110	105	105	115	100	B	B	110	B
10	B	B	B	B	B	B	B	G	E G 150	120	125	120	115	E G 155	150	135	G	120	110	100	105	B	B	B
11	B	B	B	100	B	B	B	115	135	125	125	115	G	G	G	115	110	110	110	B	110	110	105	100
12	110	105	B	105	100	105	B	G	110	110	110	110	G	G	G	G	G	105	110	B	B	B	B	B
13	B	100	105	105	105	B	B	150	150	G	G	G	115	G	G	G	150	B	B	B	B	B	B	B
14	B	B	B	B	B	B	B	G	G	G	G	120	120	120	G	G	G	115	B	110	B	B	B	B
15	B	B	B	B	B	B	B	G	G	110	E G 150	G	150	140	125	115	115	B	B	110	B	B	B	B
16	B	B	B	B	B	B	B	G	150	115	145	150	G	150	150	E G 170	G	B	B	B	B	120	125	120
17	125	130	B	B	B	B	145	160	E G 180	130	120	110	115	105	E G 170	150	140	B	B	B	B	B	B	B
18	B	105	110	105	105	110	B	110	G	E G 160	145	125	G	130	120	120	110	110	110	115	B	B	110	105
19	110	105	105	B	B	B	B	E G 170	G	140	120	120	110	G	115	105	105	115	110	105	105	105	115	105
20	B	B	B	B	B	B	B	G	E G 170	155	G	G	E G 170	110	E G 210	110	130	120	100	B	135	B	B	B
21	B	B	B	B	B	B	B	170	155	145	135	130	G	G	E G 190	120	115	100	110	110	B	B	B	B
22	B	B	B	B	B	B	B	G	G	125	115	110	110	105	G	110	110	105	100	105	B	B	B	B
23	B	B	B	B	B	B	B	110	G	130	120	120	110	110	110	105	105	105	110	B	B	B	B	B
24	B	B	B	B	B	B	B	G	G	G	150	155	115	110	105	100	100	100	100	B	B	B	B	B
25	B	B	B	B	B	B	B	G	155	155	140	135	140	125	130	120	105	100	105	B	B	B	125	110
26	110	110	B	B	B	B	B	120	115	115	115	115	G	110	110	105	100	105	B	110	B	B	B	B
27	B	B	B	B	125	B	B	G	G	135	G	G	110	G	110	G	G	B	B	110	B	B	B	B
28	B	B	B	150	B	B	B	145	140	125	115	115	115	115	110	110	105	105	110	B	B	B	B	B
29	B	B	B	B	B	B	B	G	G	110	G	125	115	110	105	100	100	115	105	110	B	B	B	115
30	110	110	105	B	B	B	B	G	E G 170	G	130	130	125	135	125	115	115	110	110	B	B	B	B	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	7	8	4	7	6	5	4	12	17	25	21	23	21	24	23	25	25	21	19	14	7	9	10	10
MED	110	108	105	105	105	105	115	J 128	U 138	128	125	120	115	116	115	115	110	105	110	110	110	105	110	110
UQ	110	110	108	110	110	105	132	158	E G 160	U 138	138	129	135	136	U 136	120	115	115	110	110	115	110	120	115
LQ	110	105	105	105	105	105	108	115	135	120	120	115	115	110	110	110	105	105	105	105	105	105	105	105

NOV. 1990 | H'ES (KM)

IONOSPHERIC DATA

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

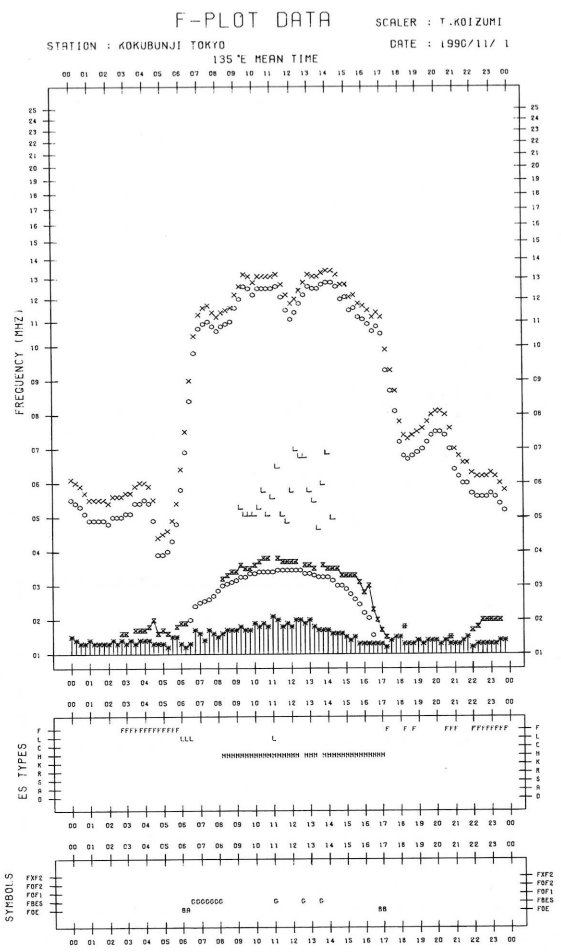
Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

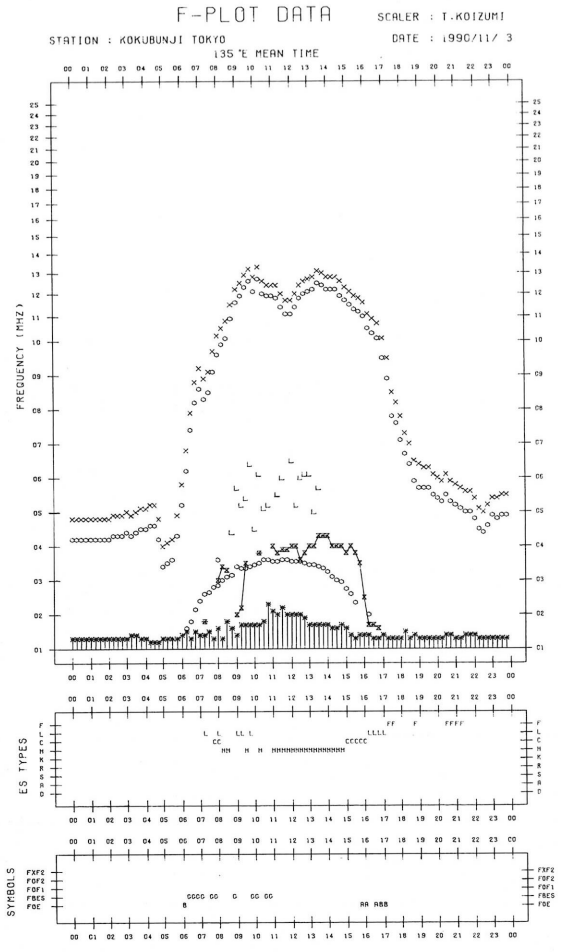
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				F 2	F 3	F 2	L 3			H 1	H 1	LH 11	H 1	H 1	H 1	H 2	H 2	H 2				F 1	FF 12	F 2
2	F 1					F 1	C 1		H 1	H 1	H 1	H 1	H 1	H 1	C 2	C 2	C 2							
3									CL 11	L 1		H 1	H 1	H 1	H 3	C 4	C 3	L 1				F 1		
4				FF 24	FF 23	F 3	L 2	L 2	H 1	H 1	H 2	C 1	C 1	H 1	H 1		H 1		F 3	F 2				
5	F 1	F 1							H 1					L 1	L 2	L 2	L 2	F 2	F 1	F 1	F 1	F 2		F 1
6										H 1	C 2			H 1		H 1	CL 21					F 3	F 2	F 1
7								H 2	H 1	H 1	HL 21	C 2	H 1	H 1	C 2	C 3	C 2		F 1	F 2	F 1	F 2	F 1	
8										C 1				L 1		HL 22	C 4	FF 42	F 1		F 1	F 2	F 4	F 2
9								L 1		H 1		C 1	L 1	L 1	L 1	L 1	L 1	F 1	FF 11	F 1			F 1	
10									H 1	C 1	C 2	C 1	C 2	HL 12	H 1	H 1		F 1	F 3	F 3	F 1			
11				F 1				L 1	HL 21	CL 21	CL 11	C 1				CL 21	L 2	F 2	F 2		F 2	F 1	F 2	F 3
12	F 1	F 2		F 1	F 1	F 1			L 2	L 2	L 2	L 1						F 2	F 3					
13		F 2	F 1	F 1	F 1			H 2	H 1				L 1				HL 11							
14												C 1	C 1	C 1				F 1		F 1				
15										L 2	H 1		HL 11	H 1	CL 11	C 2	L 2			F 2				
16									H 1	CH 11	H 1	H 1		H 1	HL 11	H 1						F 3	F 5	F 3
17	F 1	F 2					H 1	H 1	H 1	H 1	C 2	C 3	C 2	L 2	HL 11	HL 11	HL 21							
18		F 2	F 2	FF 11	F 2	F 1		L 1		H 1	H 1	C 1		H 1	C 2	C 2	C 2	F 4	F 3	F 1			F 1	F 2
19	F 3	F 4	F 2					H 1		H 1	C 1	C 2	C 1		L 1	L 3	L 4	F 1	F 2	F 4	F 4	F 2	FF 12	F 3
20									H 1	H 1			HL 11	L 1	HL 11	L 1	H 2	F 2	F 2		F 1			
21								H 2	H 1	H 1	H 1	H 1			HL 11	C 3	CL 32	F 2	F 2	F 3				
22										H 1	C 1	C 1	L 2	L 2		L 1	L 1	F 1	F 2	F 2				
23								L 1		H 2	C 2	C 1	L 1	L 3	LH 21	LH 21	L 3	F 3	F 1					
24											H 1	HC 11	C 2	L 2	LC 21	L 3	L 1	F 2	F 2					
25									H 1	H 1	H 1	HL 21	HL 12	CL 21	CL 11	C 2	L 2	F 2	F 2				F 1	F 1
26	F 1	F 2						L 1	LH 21	LH 21	L 1	L 1		L 2	L 1	L 2	L 2	F 1		F 1				
27					F 1					H 1			L 1		L 1					F 1				
28				F 1		K 1	K 1	H 2	H 2	H 2	C 3	C 1	C 2	C 2	L 2	L 2	L 3	F 3	F 1					
29										L 2		H 1	C 1	L 2	L 3	L 3	L 3	FF 13	F 2	F 1				F 1
30	F 1	F 1	F 1						H 1		H 1	H 1	H 1	H 2	HL 21	C 4	C 3	F 2	F 1					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

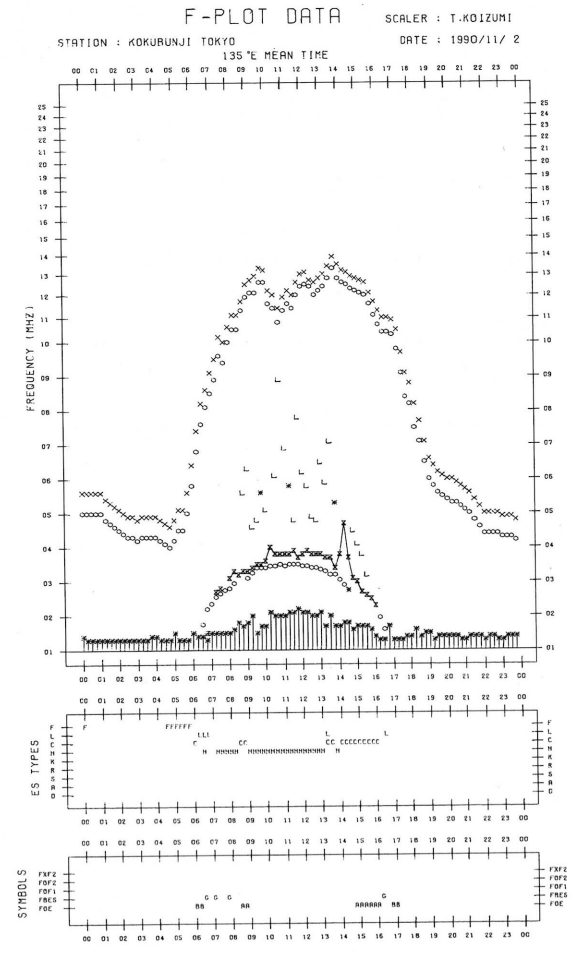
NOV. 1990 | TYPES OF ES

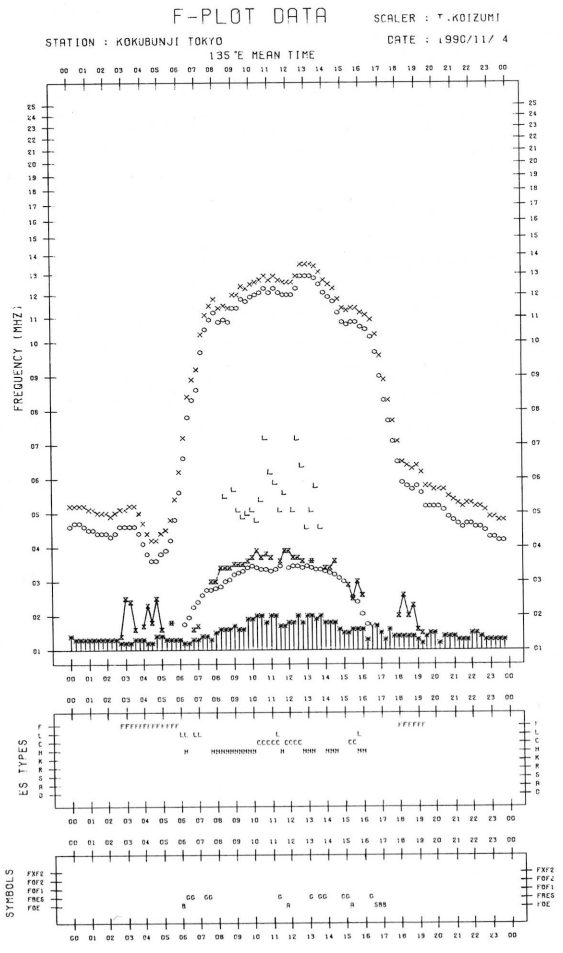
f-PLOTS OF IONOSPHERIC DATA

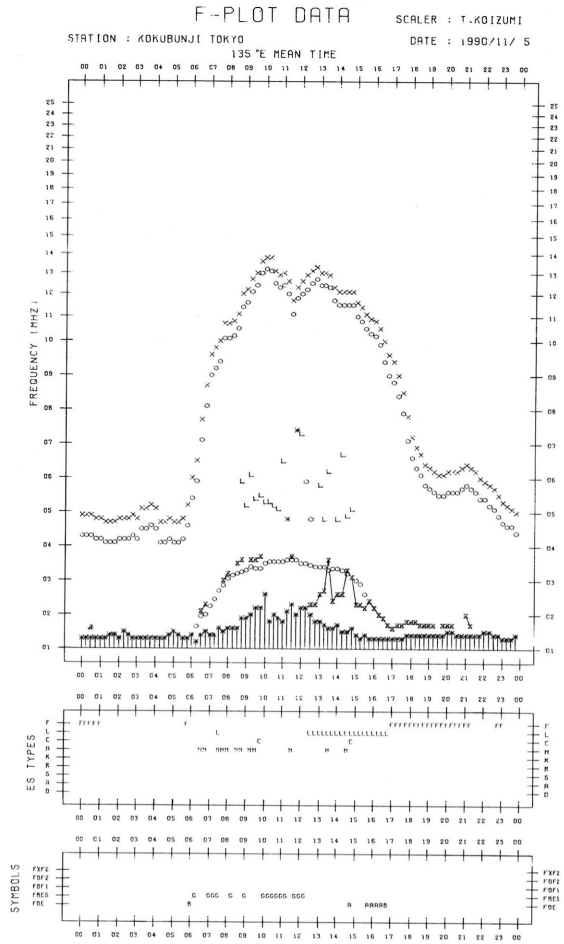
KEY OF F-PLOT	
!	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, ↑	FMIN
∧	GREATER THAN
∨	LESS THAN

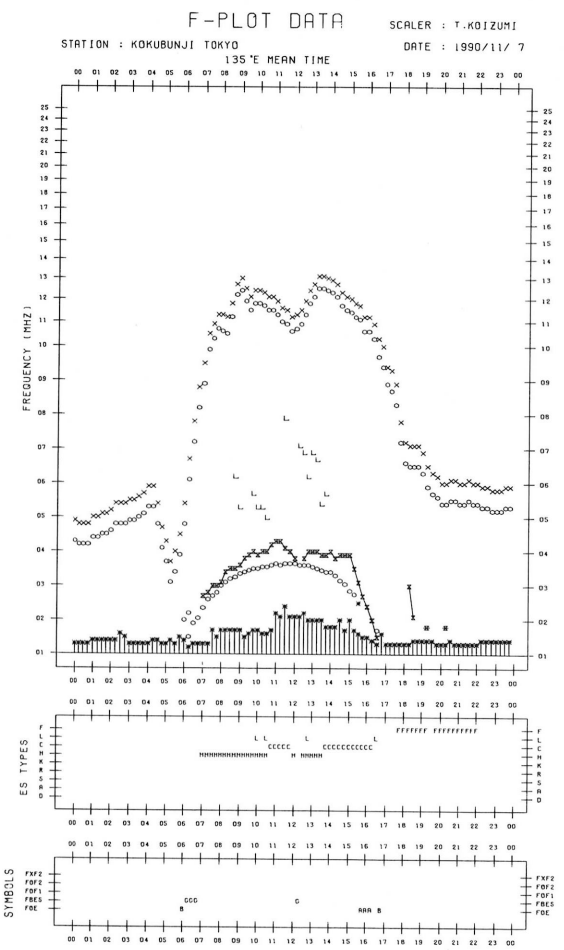

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

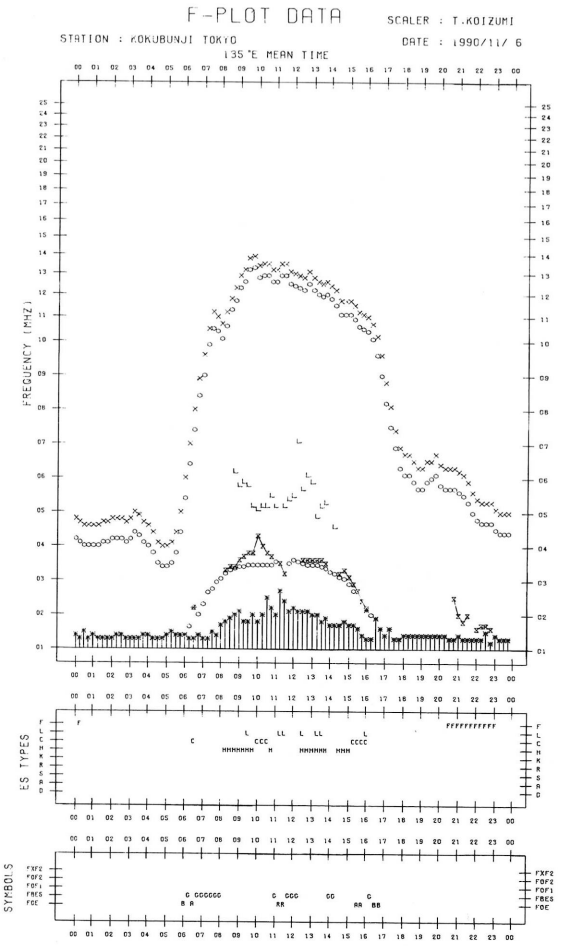

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

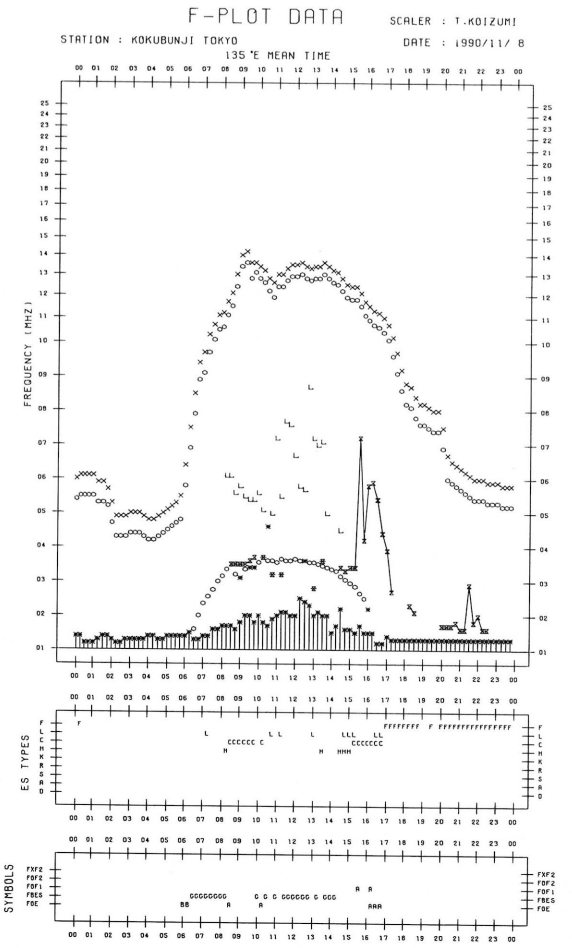

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

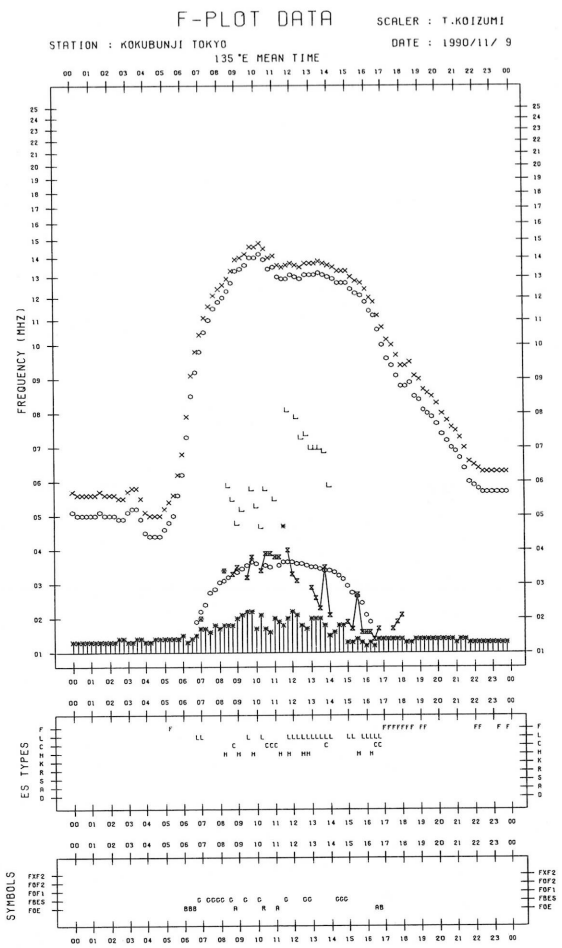

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

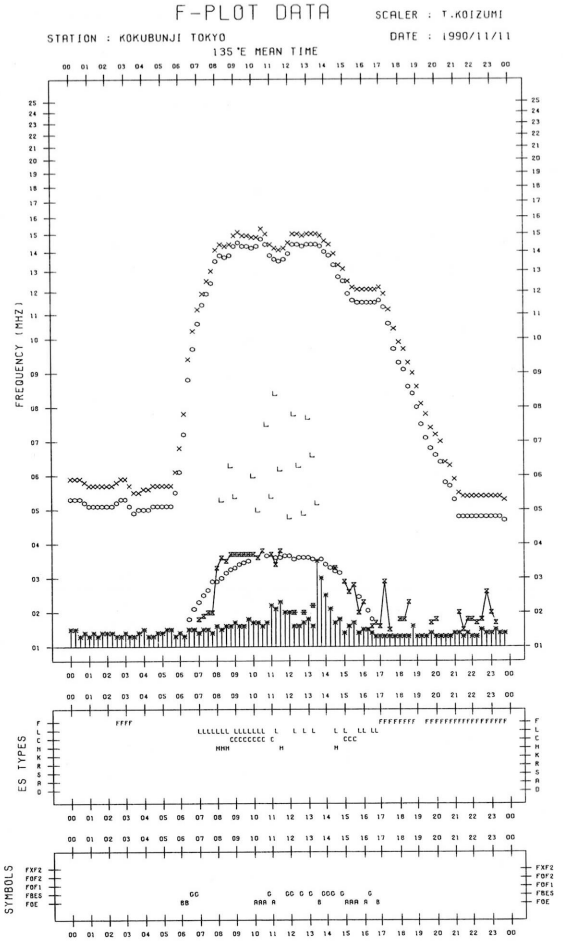

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

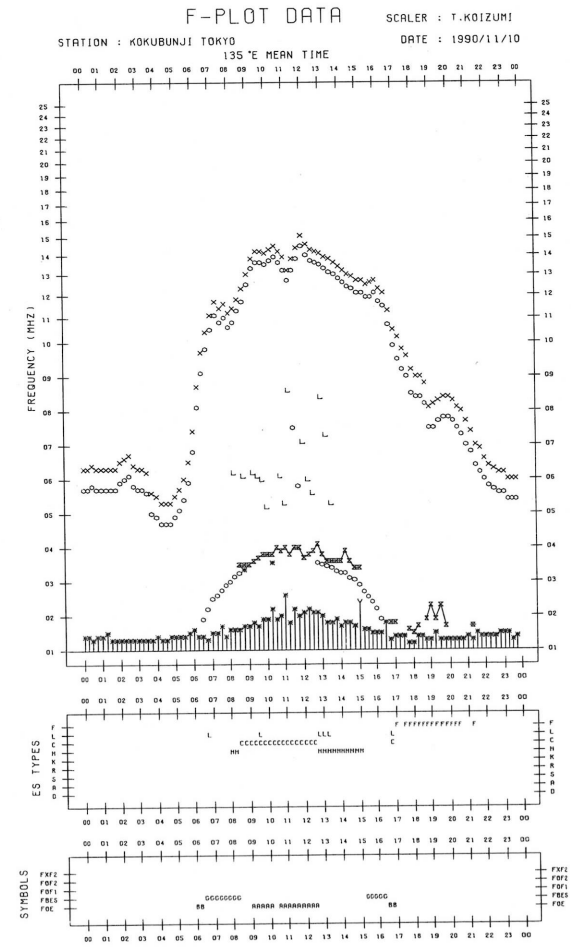

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

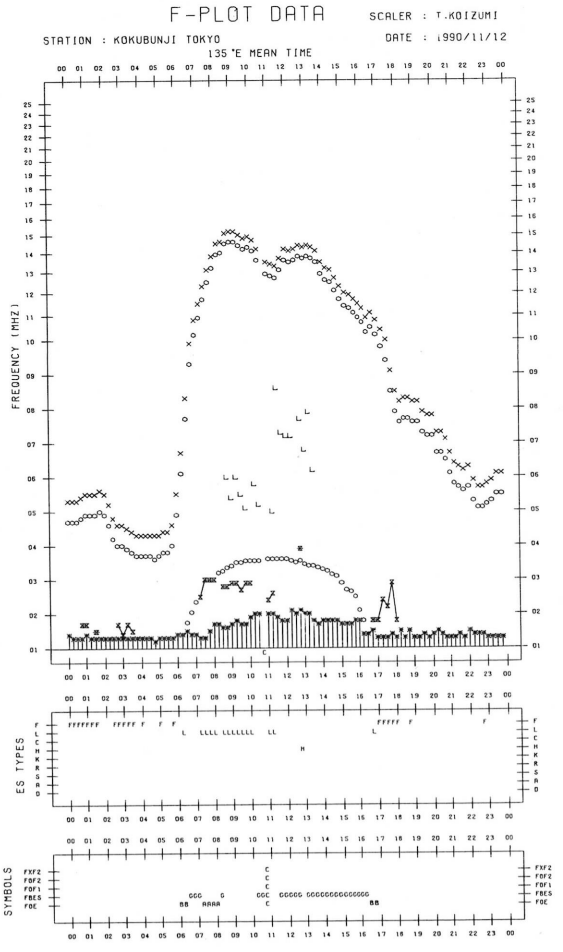

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

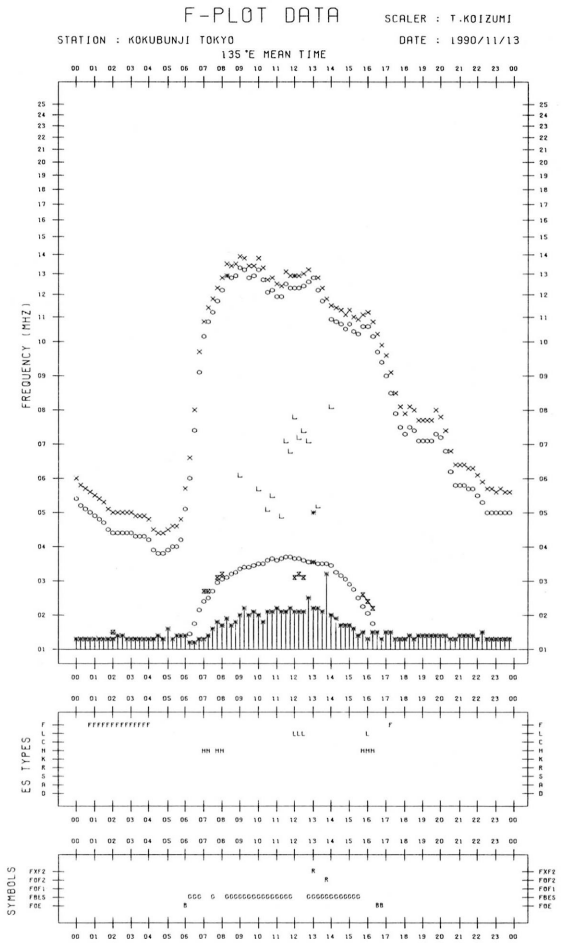

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

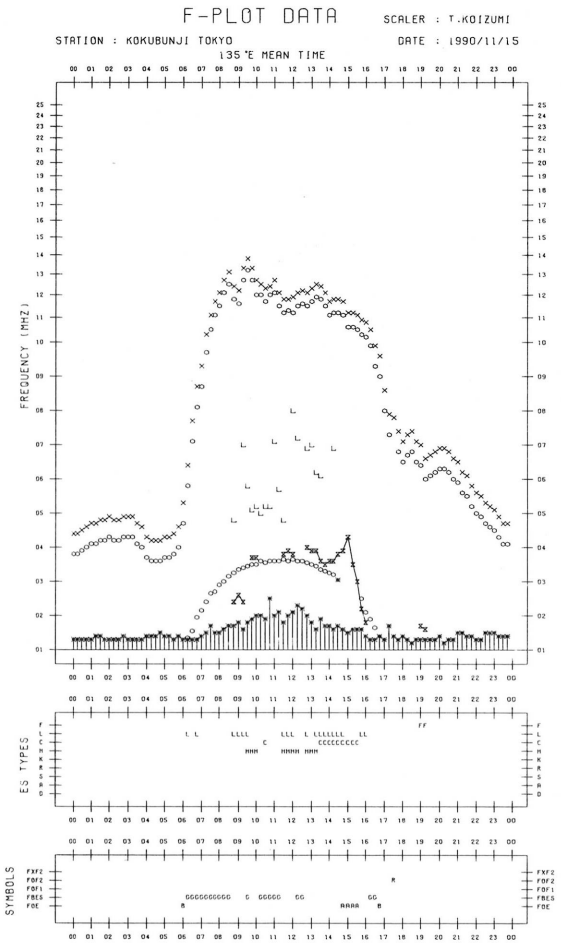

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

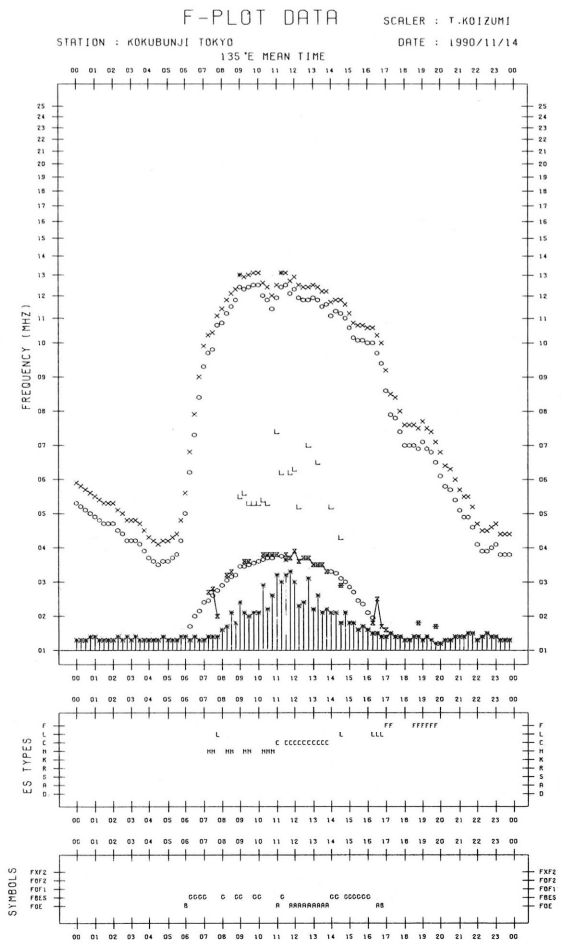

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

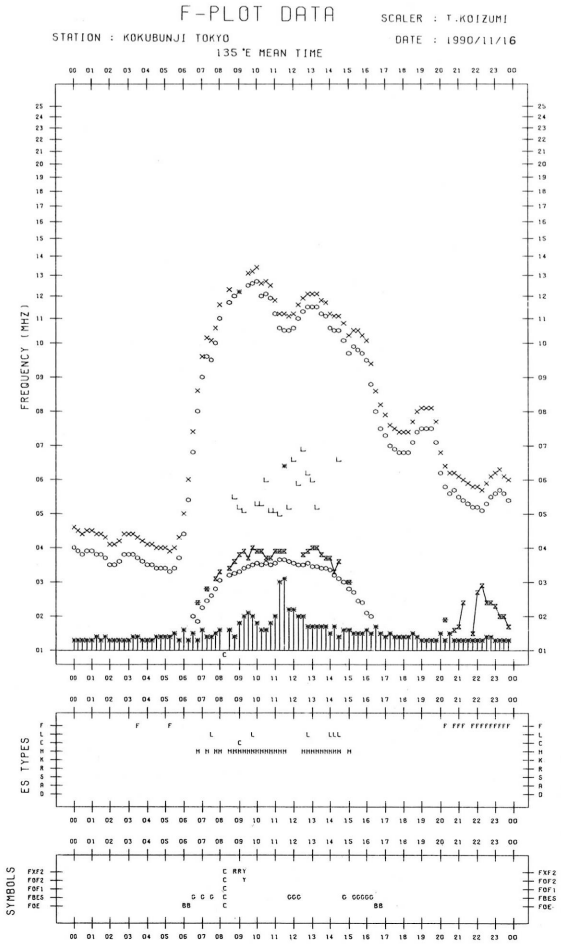

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

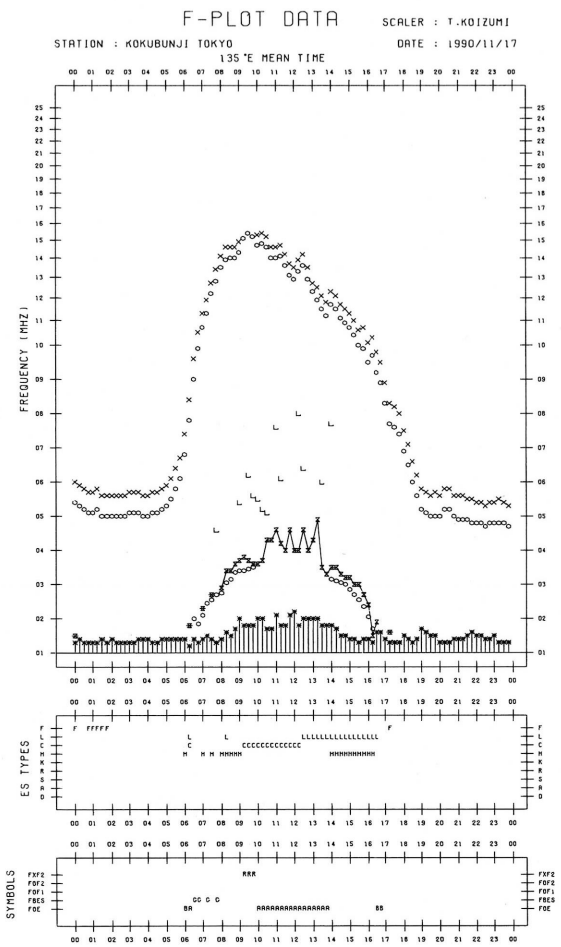

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

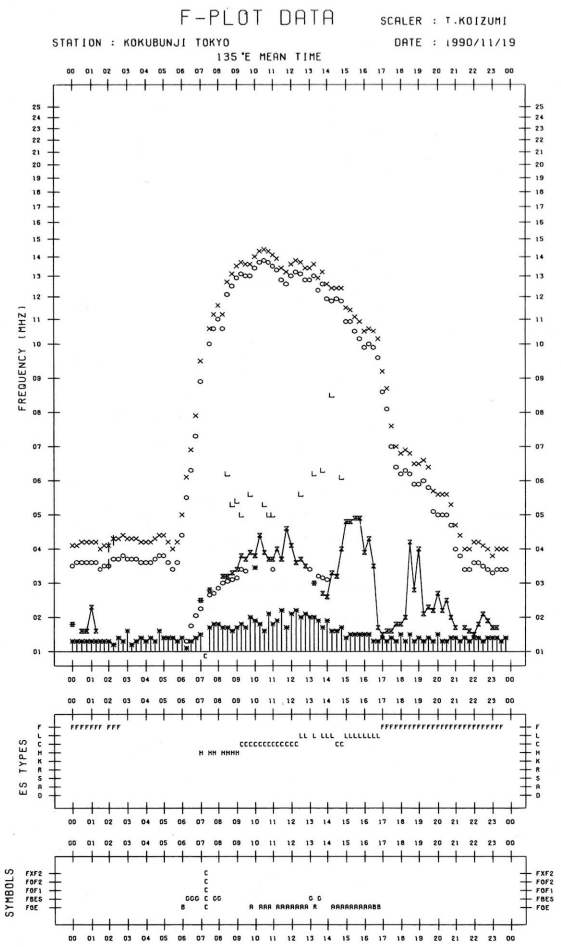

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/13
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

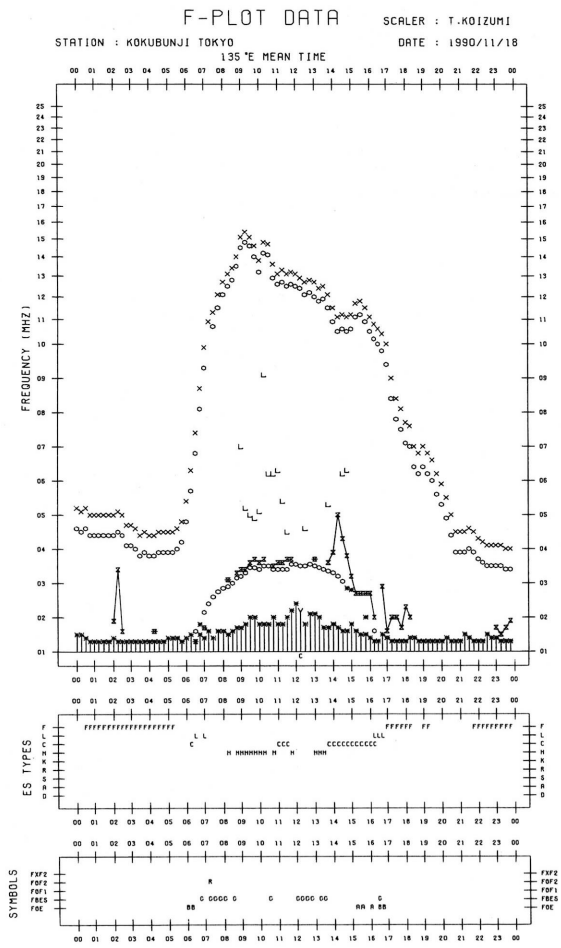

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/15
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

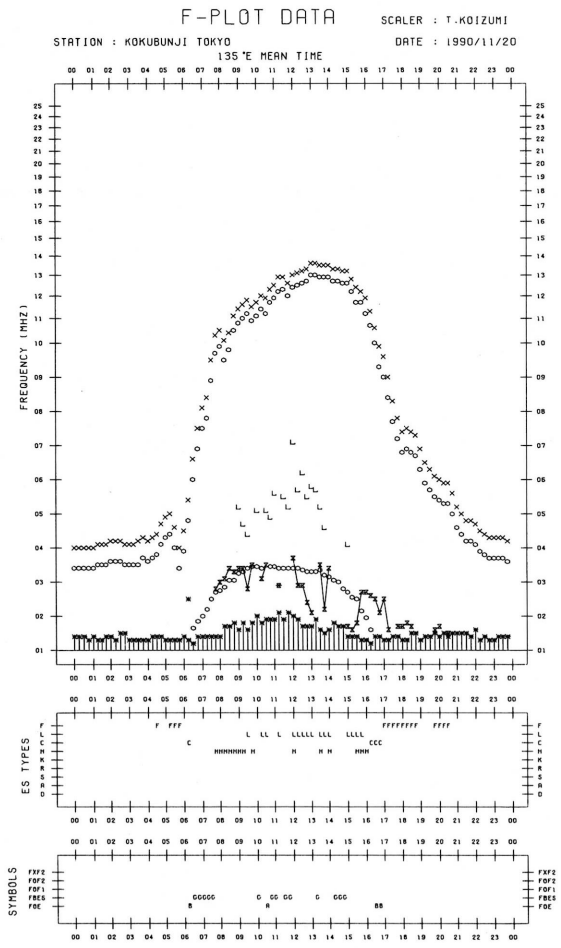

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/14
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

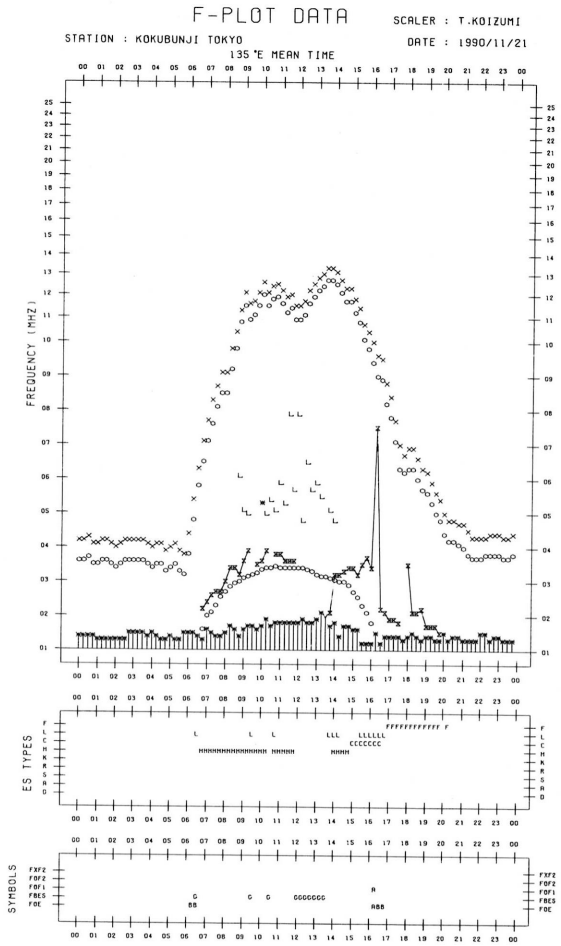

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/16
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

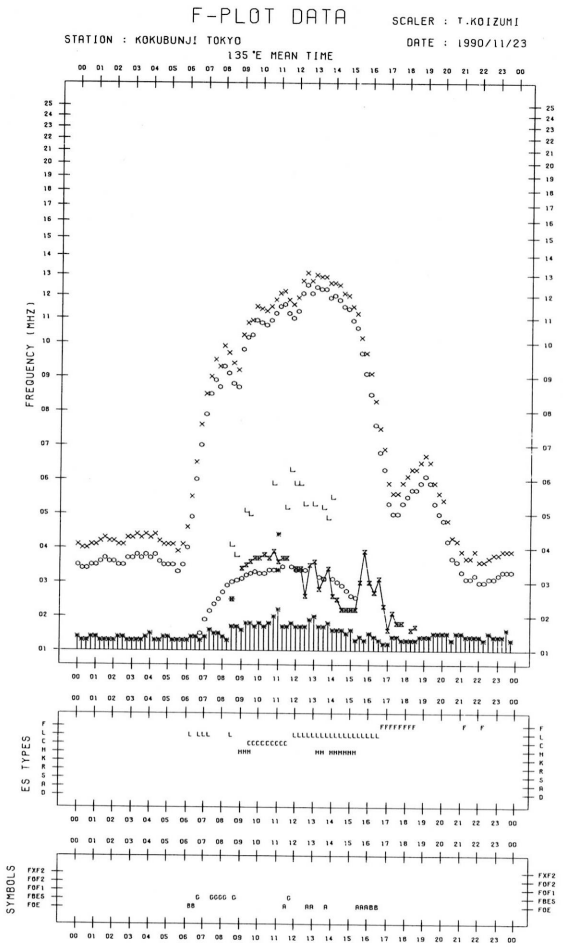

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

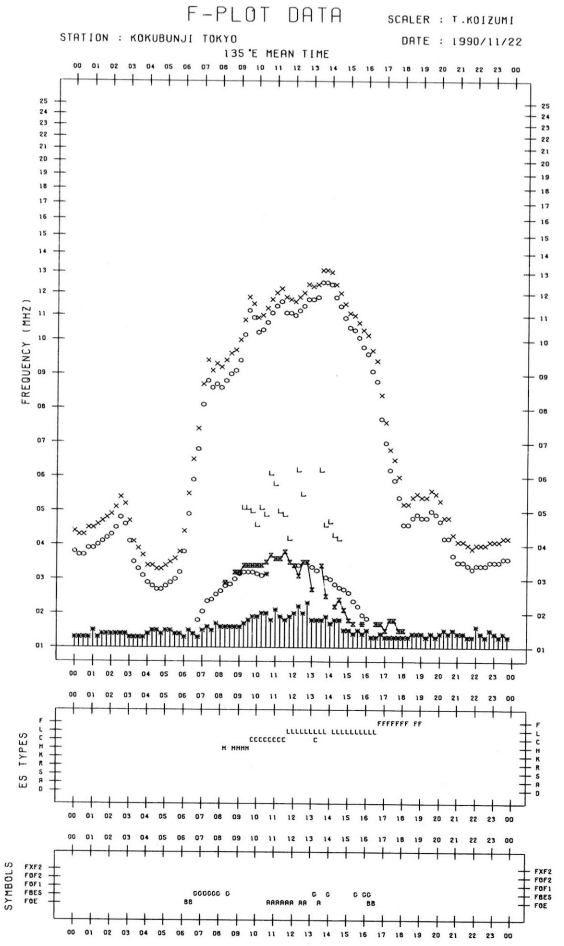

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

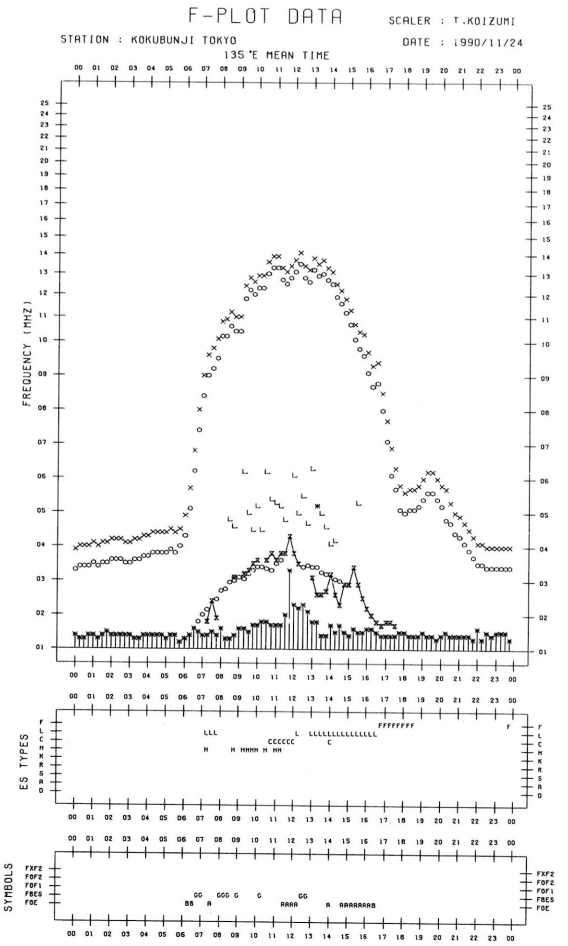

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

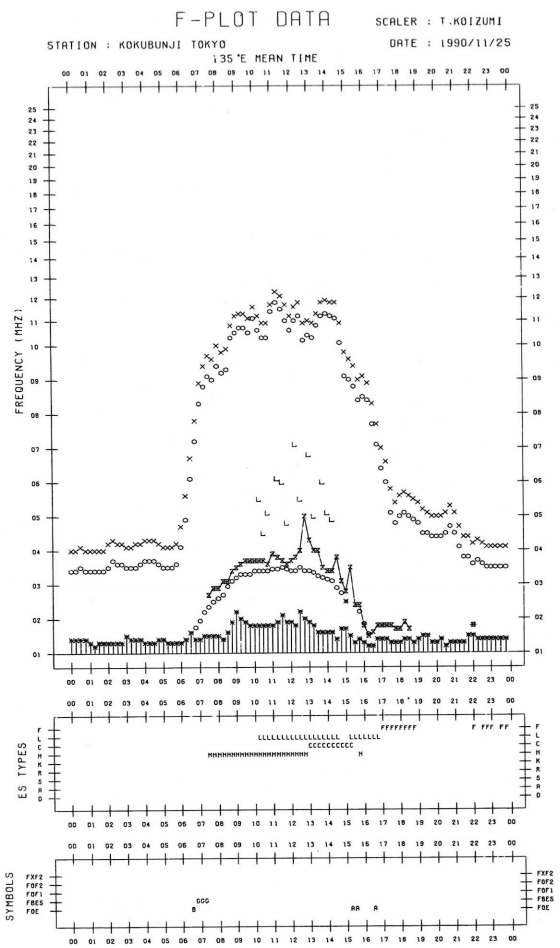

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

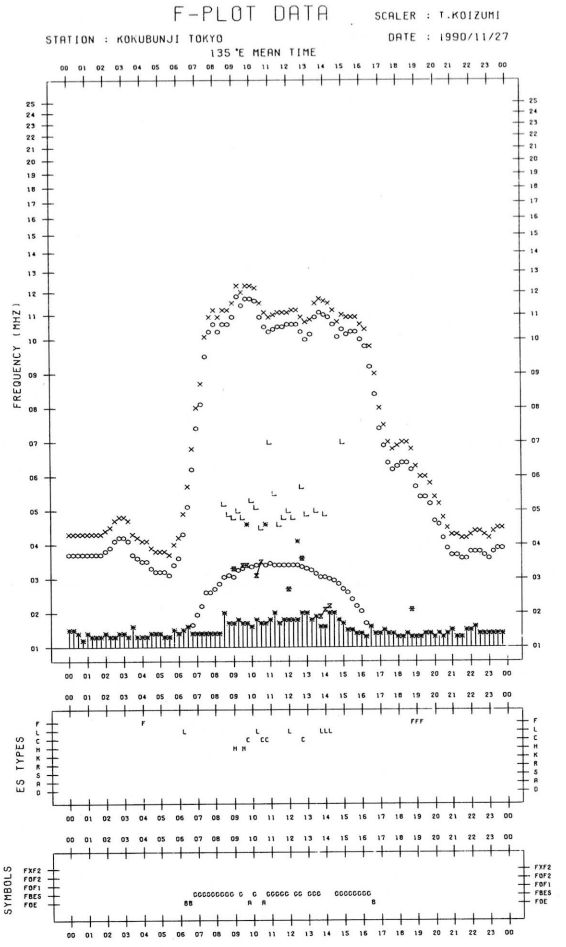

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

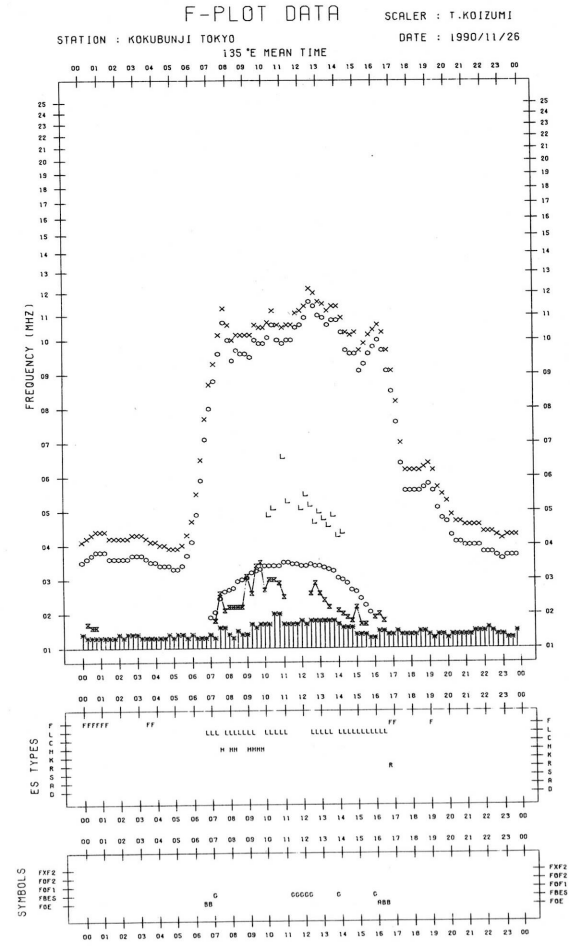

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

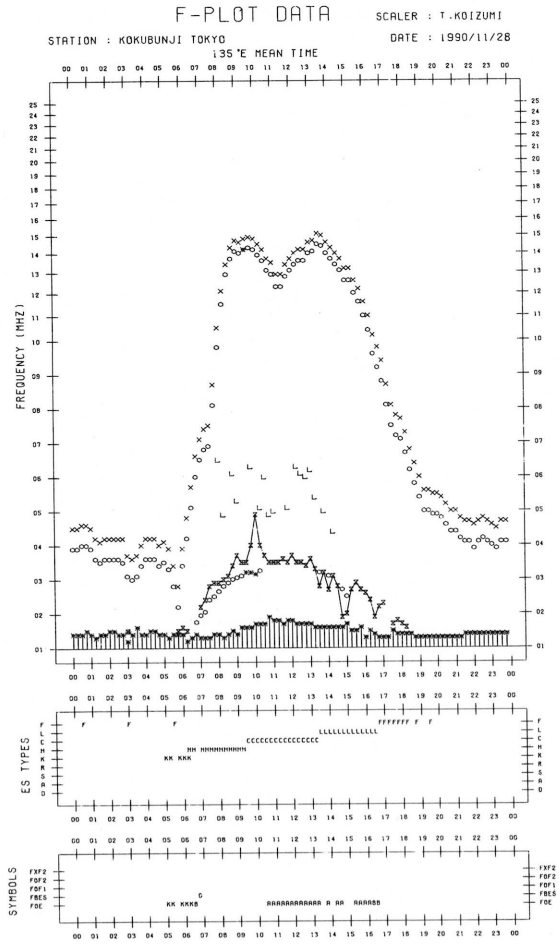

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

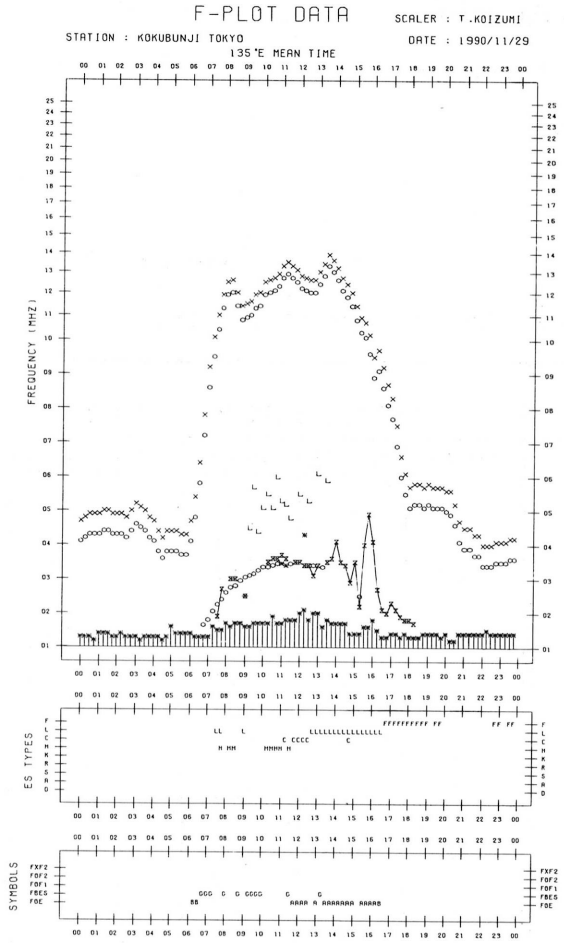

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

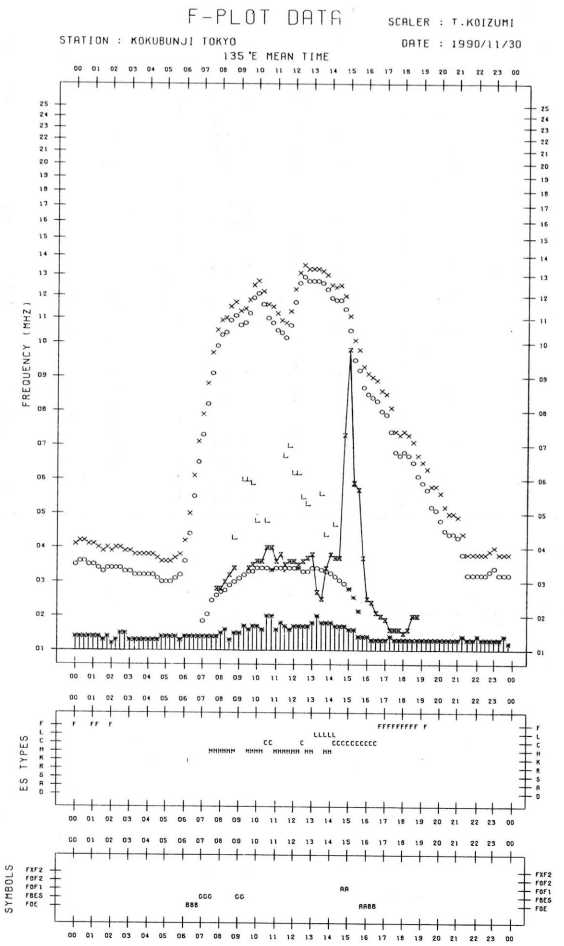

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/11/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso November 1990

Single-frequency total flux observations at 200 MHz

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

Note: No observations during the following periods.

2nd 2100 - 3rd 0055.

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso November 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	43	43	(43)	44	43
2	44	43	(43)	43	44
3	44	44	(43)	44	43
4	44	44	(45)	45	44
5	45	44	(44)	-	45
6	-	49	(47)	52	48
7	52	52	(50)	53	51
8	55	58	(57)	54	56
9	B	B	(55)	53	B
10	53	53	(53)	53	53
11	53	53	(51)	-	53
12	-	-	(-)	-	-
13	53	52	(52)	53	52
14	52	55	(54)	B	54
15	B	58	(57)	55	58
16	56	B	(58)	54	57
17	54	53	(53)	B	53
18	B	B	(B)	63	B
19	63	65	(61)	59	63
20	56	55	(53)	55	56
21	57	60	(57)	56	57
22	B	B	(B)	B	B
23	B	(B)	(B)	51	B
24	52	53	(52)	53	52
25	55	54	(54)	51	54
26	(B)	-	(48)	48	-
27	50	49	(48)	-	49
28	48	46	(45)	-	46
29	52	B	(51)	48	B
30	49	50	(50)	48	49

Note: No observations during the following periods:

5th 2100 - 6th 0225. 11th 2110 - 13th 0015. 23rd 0300 - 0510.
26th 0000 - 0520. 27th 2124 - 2350. 28th 2124 - 2350.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso November 1990

Normal observing period: 2120 - 0735 U.T. (sunrise to sunset)

NOV 1990	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	100	42 SER	0408.4	0408.8	4.0	585	-	-
	100	46 C	0555.4	0556.1U	2.6	1000D	-	-
	200	48 C	2103.8	2104.6	2.6	5000	315	O
	100	46 C	2103.8	2105.3	2.1	1000D	-	-
2	200	42 SER	0129.5	0129.7	4.0	1300	-	O
	100	42 SER	0129.7	-	4.2	1000D	-	-
	500	42 SER	0130.0	0130.5	4.3	240	-	WL
3	200	41 F	0124.0	0200.0	79.0	27	6	ML
	200	42 SER	2351.5	2357.0	5.9	74	-	O
	100	42 SER	2351.7	2356.4	6.1	930	-	-
	500	8 S	2352.8	2352.8	0.6	106	-	WL
4	200	43 NS	0251	0320	270D	7	3	WL
5	200	8 S	0345.5	0345.5	0.7	540	-	O
	200	46 C	2120.5	2121.5	1.8	280	-	O
6	200	8 S	0430.4	0430.8	0.8	1200	-	O
	100	42 SER	0430.6	0430.9	6.6	1000D	-	-
	500	41 F	0430.6	0432.3	3.0	81	-	WL
	200	42 SER	2138.9	2206.6	27.7	13	-	WR
	200	27 RF	2253	2324	79	30	8	MR
7	200	44 NS	2107E	0011	620D	13	7	WL
	500	42 SER	2223.5	2224.1	5.0	14	-	O
	100	43 NS	2300	2358	300	43	15	-
8	200	44 NS	2107E	0309	620D	220	36	ML
	200	8 S	2149.5	2149.5	0.8	295	-	SL
9	500	20 GRF	0110	0230	290	52	19	WL
	100	43 NS	0230	0453	300D	590	120	-
11	100	46 C	0422.6	0424.0	11.9	1000D	110D	-
	200	41 F	0423E	0424.4	2.6D	32	-	O
12	200	44 NS	2111E	2324	610D	8	4	WR
13	500	46 C	0443.0	0443.4	6.0	678	58	O
	200	42 SER	0623.8	0624.7	4.0	105	-	O
	200	44 NS	2112E	0219	610D	11	5	WR
14	200	42 SER	0207.3	0209.2	39	340	-	MR
	200	42 SER	0314.9	0315.2	28.4	84	-	MR
	200	44 NS	2113E	0126	610D	33	19	WR
	500	27 RF	2303.5	0020.0	97.5	49	18	WL
15	100	44 NS	2114E	0430	600D	11	3	-
	200	44 NS	2114E	0505	600D	49	25	O
15	500	42 SER	0143.5	0147.5	5.0	18	-	O
	500	27 RF	0200	0227	61	7	3	O
	200	42 SER	0222.4	0222.4	30	760	-	O
	500	42 SER	0243.7	0243.8	9.3	94	-	WR
	200	42 SER	0335.8	0354.7	53.5	1450	-	WR
	500	46 C	0353.5	0355.0	5.3	91	-	MR
	100	42 SER	0354.1	0358.0	4.1	1000D	-	-
	200	44 NS	2115E	2350	610D	55	33	MR
	200	46 C	2345.1	2345.1	1.7	1400	-	O
	500	46 C	2345.5	2346.0	5.0	53	10	O
17	500	27 RF	0417	0430	26	9	2	O
	200	44 NS	2116E	2300	610D	190	128	MR
	100	44 NS	2116E	0012	610D	180	71	-
	500	24 R	2118E	2307	605D	57	21	MR

NOV 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
18	200	44 NS	2117E	0100	610D	145	96	WR
	100	44 NS	2117E	0056	610D	220	109	-
19	100	46 C	0045.5	0046.2	2.2	1000D	-	-
	200	46 C	0215.4	0215.8	2.3	220	-	MR
	100	46 C	0215.8	0216.7	3.3	910	-	-
	500	46 C	0216.0	0216.2	3.0	28	-	0
	500	41 F	0554.5	0624.5	75D	180	-	WR
	200	46 C	0621.4	0622.0	2.9	410	-	MR
	200	44 NS	2118E	2200	610D	125	55	0
	100	44 NS	2118E	2220	610D	110	18	-
20	500	27 RF	0221	0254	39	6	3	0
	200	42 SER	0517.0	0603.3	53.0	610	-	WL
	500	41 F	0553	0557	30	87	-	0
	100	44 NS	2118E	2315	605D	35	20	-
	200	44 NS	2118E	0543	605D	140	56	SL
21	200	42 SER	0152.8	0200.0	8.6	840	-	WL
	100	44 NS	2120E	2203	600D	130	21	-
	200	44 NS	2120E	0320	600D	100	76	ML
	200	42 SER	2203.3	2220.5	22.4	540	-	SL
	100	46 C	2327.7	2328.3	1.5	860	-	-
	500	24 R	2338	0528	480D	49	28	WL
	200	42 SER	2351.5	2351.5	46.8	410	-	SL
22	100	42 SER	0215.8	0321.0	128.0	1000D	-	-
	200	42 SER	0438.3	0539.9	125.0	630	-	SL
	100	44 NS	2120E	2223	600D	570	147	-
	200	44 NS	2120E	2225	600D	280	112	ML
	500	44 NS	2120E	0010	600D	80	26	WL
	200	42 SER	2350.0	0143.6	125.0	980	-	SL
23	100	42 SER	0235.0	0257.4	79.0	610	-	-
	200	42 SER	0239.6	0258.4	23.8	2600	-	ML
	200	46 C	0337.6	0338.0	1.5	1500	-	MR
	200	42 SER	0442.9	0442.9	48.0	240	-	WR
	200	46 C	0628.4	0628.7	2.0	620	-	ML
	100	44 NS	2122E	2313	600D	270	29	-
	200	44 NS	2122E	2343	600D	190	93	WL
	500	46 C	2327.5	2328.2	1.7	19	-	0
24	500	46 C	0240.0	0240.3	2.8	76	-	MR
	500	46 C	0456.5	0457.0	1.3	37	-	ML
	200	44 NS	2122E	2323	600D	52	23	WR
25	200	8 S	0014.3	0014.3	0.8	440	-	0
	200	42 SER	0118.5	0142.9	59	70	-	ML
	500	42 SER	0149.0	0219.5	31.0	46	-	WL
	500	41 F	0610.0	0611.0	6.5	18	-	0
	200	44 NS	2122E	2213	600D	20	9	0
	500	24 R	2345	0140	165	-	-	-
26	200	42 SER	0204.6	0340.9	116	85	-	SL
	200	8 S	0546.9	0547.0	0.5	2300	-	0
	200	44 NS	2124E	0107	600D	24	13	MR
	200	42 SER	2300	0123	165	170	-	MR
27	200	42 SER	0443.8	0443.8	15.2	255	-	WR
	100	42 SER	0443.2	-	31.7	1000D	-	-
	500	46 C	0457.0	0502.0	42.0	156	9	SL
	200	46 C	0500.0	0504.0	97.0	475	22	0
				0603.3		25		MR
	100	27 RF	0515.8	0533.0	119D	105	42	- SUNSET
	200	44 NS	2125E	0100	600D	10	5	WR
28	200	8 S	0638.6	0638.7	0.7	860	-	0
	200	44 NS	2125E	-	595D	-	36	-
29	500	21 GRF	0200	0335	165	11	7	0
	200	8 S	2338.4	2338.9	1.0	190	-	WL
30	200	27 RF	0225	0317	73	10	4	WL
	500	46 C	0255.0	0257.0	7.0	22	11	0
	200	44 NS	0420	0600	106	13	7	0

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

NOV 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	9	9	21	24	20	21	20	18	29	27	28	0	-7	ES -10	ES -1	ES -1	ES -1	ES -1	8	2	13	9	4	8
2	8	13	16	17	27	23	19	19	22	10	ES -25	ES -25	ES -24	ES -24	ES -24	ES -24	ES -3	ES -4	ES -4	0	7	7	14	0
3	10	10	16	14	19	25	20	32	25	19	ES -24	-6	ES -24	ES -24	ES -16	ES 2	ES -25	ES -4	2	0	8	7	5	6
4	8	6	13	16	24	21	25	26	9	14	2	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	5	2	16	11	6	5
5	2	5	15	21	30	22	26	23	19	-4	-15	ES -24	-11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	2	22	9	7	-1
6	2	6	15	15	26	29	26	18	24	16	5	-9	-11	ES -24	ES -24	ES -24	ES -24	-13	4	2	ES -25	-4	-10	6
7	5	2	7	12	26	25	17	31	9	22	-3	ES -9	ES -24	ES -24	ES -24	-9	ES -10	ES -10	ES -10	11	15	9	0	-10
8	2	7	15	19	22	28	29	26	27	24	17	3	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	10	21	5	1	-10
9	1	5	12	23	22	25	23	27	24	24	25	12	4	-9	ES -24	-9	ES -24	20	ES -24	2	16	13	8	7
10	10	12	15	23	25	29	30	27	31	29	23	22	5	-6	-16	-16	ES -25	-12	ES -25	-1	5	8	8	5
11	10	13	14	21	13	25	23	27	25	38	18	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	0	8	7	2	-3
12	3	16	9	13	21	25	22	29	35	22	23	9	ES -4	ES -5	ES -25	ES -7	ES -5	ES -7	ES -25	-13	7	5	2	1
13	6	5	13	20	21	30	22	32	25	21	-6	2	ES -24	ES -24	ES -25	ES -25	ES -25	ES -25	ES -25	-4	12	12	7	2
14	7	8	16	21	19	28	24	23	16	5	-2	7	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	14	11	8	4
15	9	16	22	19	21	21	33	30	18	15	13	-2	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	12	0	8	4
16	3	5	3	13	18	19	25	21	6	15	24	-5	-4	-5	-12	ES -25	ES -25	-12	ES -25	-2	8	2	2	3
17	2	6	12	19	19	19	20	12	17	3	2	-2	-4	ES -25	ES -25	ES -25	ES -25	-7	ES -25	ES -25	1	5	-16	1
18	1	9	10	10	18	18	17	28	23	13	-7	ES -7	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	0	5	6	4	-1
19	7	7	13	16	23	24	23	21	10	9	-4	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	2	14	15	6	2
20	6	4	16	13	17	27	28	13	21	15	ES -4	ES -4	ES -25	ES -25	ES -25	ES -24	ES -24	ES -24	ES -24	0	0	16	9	6
21	5	5	10	16	19	23	21	26	7	13	-13	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-13	ES -25	ES -25	12	20	10	3
22	4	7	22	20	17	19	23	19	3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	16	9	12	6
23	6	10	10	18	23	20	15	20	15	-7	-13	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	13	13	13	3
24	13	7	7	5	14	19	4	8	13	-16	-16	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	8	21	6	ES -25
25	2	6	8	12	18	19	7	13	21	-6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	7	15	-1	7
26	13	6	13	17	24	21	23	22	18	-6	-10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	8	14	10	9
27	5	11	15	19	21	27	27	-4	-6	-6	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	1	19	15	8
28	5	9	14	17	22	26	21	17	7	19	15	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	9	4	2	2	5	6
29	1	7	10	13	20	15	24	15	-1	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	2	10	13	10
30	8	13	15	20	23	27	25	25	19	1	ES -9	ES -6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	14	ES -24	8	15	8	12
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	6	7	14	17	21	24	23	22	18	14	US -4	ES -7	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-2	8	9	6	4
UD	10	13	21	23	26	29	29	31	29	27	24	9	-2	ES -6	ES -10	ES -7	ES -5	ES -4	8	4	18	19	13	9
LD	1	5	7	12	17	19	15	12	3	ES -10	ES -24	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	1	2	-1	-10

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

Time in U.T

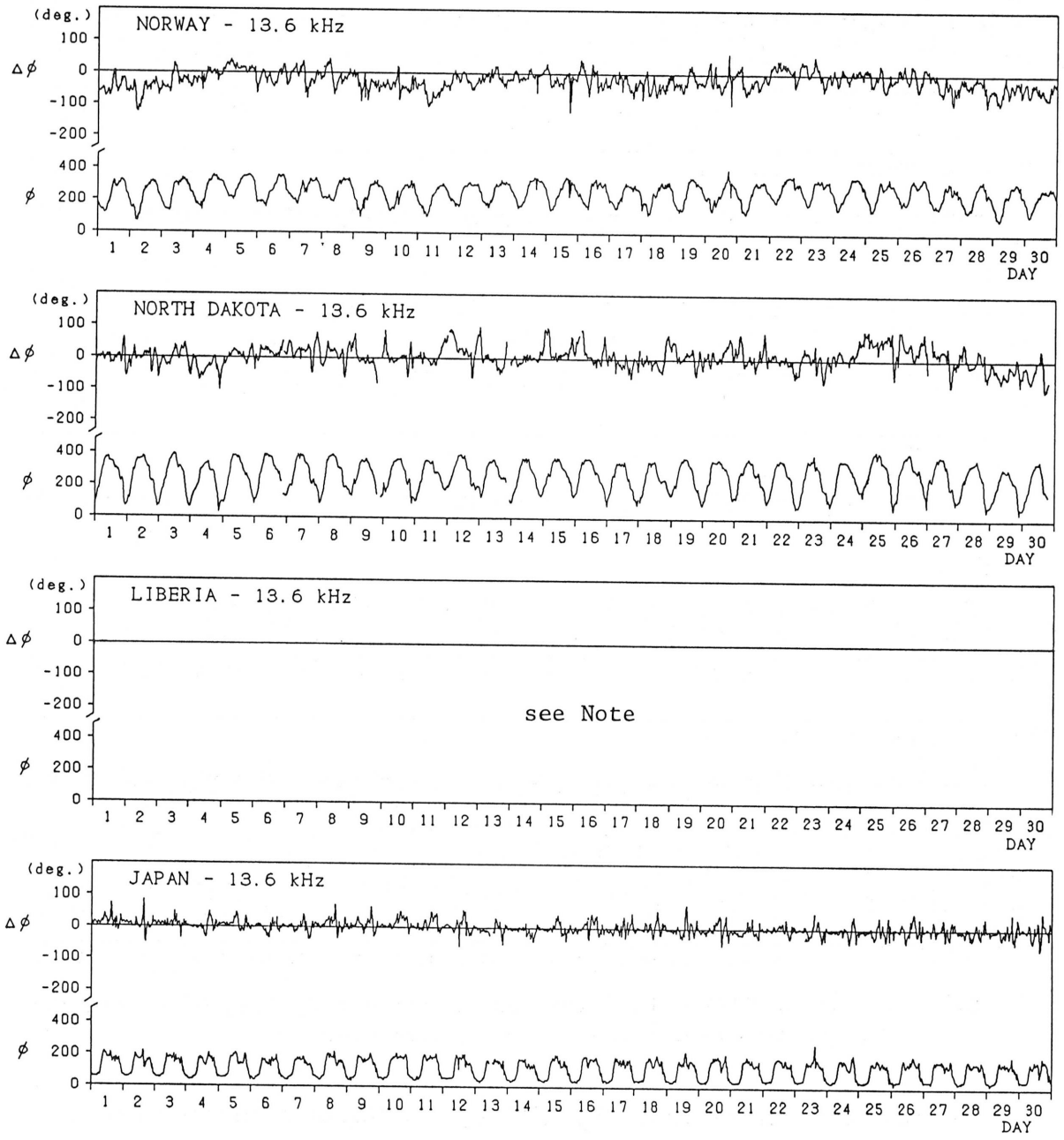
Nov. 1990	Whole Day Figure	W W V 00 06 12 18 | | | | 06 12 18 24	W W V H 00 06 12 18 | | | | 06 12 18 24	Conditions 00 06 12 18 | | | | 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4+	4 S 5U 4U	4 5 5U 4	N N N N			
2	4o	4 S S 4	4 4 S 4	N N N N			
3	4o	4 S 5U 4	4 4 S 4	N N N N			
4	4o	4 S S 4	4 4 S 4	N N N N			
5	4-	3 S S 3U	4 4 S 4	N N N N			
6	4-	3 S S 4	4 4 5U 3	N N N N			
7	4o	4 S 5U 4	3 4 S 4	N N N N			
8	4+	4 S S 4	4 5 S 4	N N N N			
9	4+	4 5U 5U 4U	4 5 5U 4	N N N N			
10	4+	4 S 5U 4	4 5 5U 4	N N N N			
11	4o	4 S S 4	4 4 S 4	N N N N			
12	4+	4 S S 4	4 5 S 4	N N N N			
13	4o	4 S S 3	4 5 S 4	N N N N			
14	4o	4 S S 4	4 4 S 4	N N N N			
15	4o	4 S S 4	4 5 S 3	N N N N			
16	4+	4 5U S 4	4 4 5U 4	N N N N	01.8	24	125
17	4o	4 S S 4	4 4 5U 3	N N N N			
18	4-	4 S S 4	3 4 S 4	N N N N			
19	4o	4 5U S 4	4 4 S 4	N N N N			
20	4o	4 S S 4	4 4 S 4	N N N N			
21	4o	4 S S 4	4 4 S 4	N N N N			
22	4-	3 S S 4	4 3U S 4	N N N N			
23	4-	3U S S 4	4 3 S 5	N N N N			
24	3+	3 S S 4	4 3 S 3	N N N N			
25	3+	3U S S 4	3 3 S 4	N N N N			
26	3+	3U 4U S 3U	4 3 S 4	N N N N	2332	---	124
27	4-	5 4U S 4	4 2 S 4	N N N N	---	---	
28	4o	4 S S 4U	4 4 S 4	N N N N	---	21	
29	3-	4 S S 3U	4 3U S 4	N N N N			
30	4-	3 S S 4U	4 4 S 4	N N N N			

C. Radio Propagation

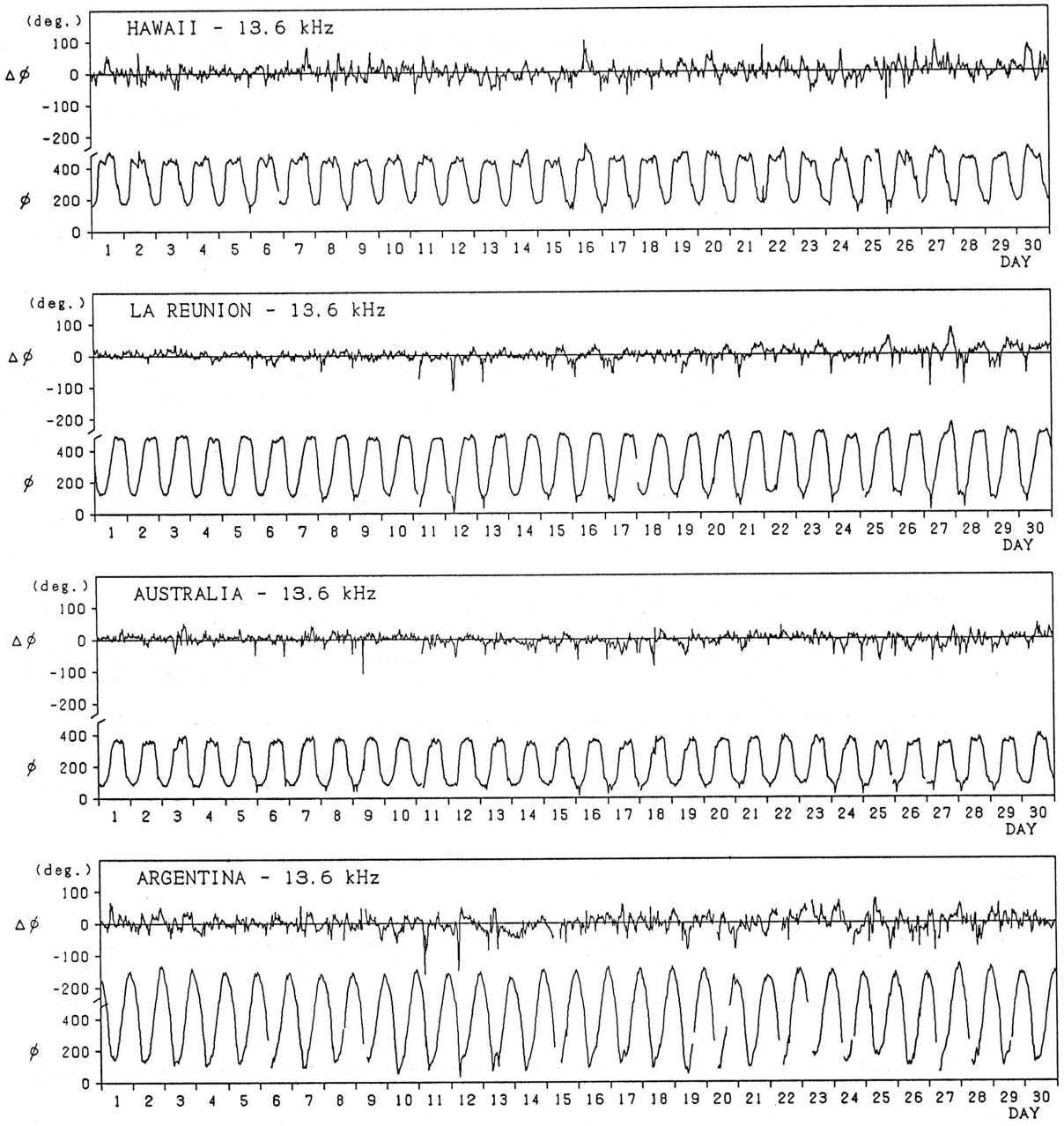
C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo

November 1990



Inubo November 1990



Note: As for LIBERIA - 13.6 kHz, no record during July 09 - November 30, 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.

Nov. 1990	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
6	27	34	9			0014	22	SL	1-	x	x
6			9			2046	77	S	1-	x	x
9			13			0005	20	SL	1		
9			11			0250	12	SL	1-	x	x
11			25			0422	48	SL	2	x	x
13			17			0444	12	S	1+	x	x
16			17			0207	84	G	1+	x	
16			11			2314	24	S	1-	x	
16			11			2330	13	SL	1-	x	
16		x	15			2347	14	SL	1	x	
17	x	x	13			0215	48	G	1	x	
17		x	13			0720	36	SL	1	x	
17			12			2241	27	SL	1	x	
18			15			0015	18	SL	1	x	
19			14			0211	16	SL	1		x
19			14		5	0920	23	G	1		
19			15		9	0948	21	SL	1		
21			11			0500	14	S	1-		
21			15			0528	30	SL	1		
22			9			0145	17	S	1-		
23			5			0500	25	SL	1-		x
24			20			0212	88	G	2-		x
25			20			0215	45	SL	2-		x
25		x	17			2219	41	SL	1+		
25			6			2345	16	SL	1-		
26			10			0120	20	SL	1-		x
26		x	20			2315	30	S	2-		
27	x	x	27			0504	18	SL	2		
28			9			0140	19	SL	1-		
28			11			0622	36	G	1-		
29			5	x		0149	10	S	1-		
30			6			0549	20	SL	1-		

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Nov. 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
3		—	15	20	9		0323	0405	0338
3		—	6				0653	0719	0657
3		—		—	21		2353	0046	0001
4		—	15	8			0507	0544	0517
4		—	23				0733	0811	0749
4		—		8	12		2334	0020	2343
5	6	—		—	19		0032	0121	0042
5		—	12				0700	0725	0703
5		—	11				0825	0851	0831
5		—	25	64	71	25	2307	0050	2318
6		—	9	11			0434	0516	0438
6		—	15				1012	1052	1019
6		—		—	125	61	2041	2221	2058
7		—	6				0352	0411	0357
7		—	10	10			0453	0523	0459
7		—	8	6			0632	0705	0637
7		—	6				0821	0847	0827
7		—			13	14	2225	2252	2232
8	16	—	52	59	32		0302	0356D	0329
8		—	28	16			0356E	0451	0409
8		—	14	12			0548	0621	0552
8		—	13				0857	0941	0908
8	10	—			8		2113	2137	2118
8		—		8	10		2303	2334	2310
8	32	—	50	68	64	35	2356	0047	0014
9	21	—	62	53	37	28	0248	0334D	0257
9		—	35	43*	24	37	0334E	0424	0341
10		—	12	8			0558	0703	0616
10		—	11				0923	0953	0927
10		—	7				1200	1230	1205

Inubo

Nov. 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
11	52	—	198	128	90	51	0421	0800	0439
11		—			15		2050	2120	2103
11		—			46	24	2200	2255D	2204
11		—		5	9		2255E	2317	2300
12	19	—		18	16		0009	0048	0015
12		—	9	14	6		0147	0226	0155
12		—	8	5			0453	0509D	0502
12		—	17	9			0509E	0534D	0513
12		—	113	43			0534E	0923	0637
12		—			34		1919	2005	1924
13		—		—	4		0158	0237	0207
13	13	—	29	—	19		0310	0357	0324
13	41	—	105	—	49	18	0441	0552	0447
13		—	5	—			0705	0744	0708
14	9	—	12				0358	0435	0404
15	21	—	13	16	6		0253	0315	0257
15	14	—	58	40			0523	0638D	0534
15		—	17				0638E	0724	0643
15		—	48				0914	1000	0926
15		—	13				1117	1143	1121
15		—			31		2121	2202	2125
15		—		8	10		2322	0000	2329
16	16	—	27	46	36	30	0025	0139	0034
16	25*	—	80	65	49		0201	0346	0227
16		—	10	9			0357	0422	0400
16		—		5	6		2317	2332D	2325
16	9	—		18	21	11	2332E	2345D	2339
16	28	—	40	75	70	42	2348E	0112	2355
17	13	—	55	55	38	24	0216	0349	0240
17	14	—	18	17			0410	0437	0417
17		—	7	6			0500	0525	0505
17		—	61	40			0539	0645D	0547
17		—	62	17			0645E	0721D	0700
17		—	56	17			0721E	0818	0729
17		—	19				0900	0951	0911
17		—	27				1105	1154	1112
17		—			37		1934	2021	1948
17	18	—	18	27	55	40	2241	2345	2247
18	46	—	71	100	86	64	0013	0131D	0024
18		—		14	8		0131E	0156	0134
18		—		7		12	0204	0220	0206
18		—	9			12	0354	0432	0359
18		—	7	8			0534	0555	0541
18		—	14	6			0600	0634	0614
18		—	8	21	31	18	2306	2352	2311
19		—	21	—	10		0214	0251	0222
19		—	22	—	6		0337	0425	0343
19		—	7	—			0451	0514	0457
19		—	38	—			0622	0647D	0628
19		—	32	—			0647E	0726	0653
19		—	111				0925	0947D	0938
19		—	139				0947E	1146	0953
19		—	13				1338	1412	1348
19	10	—			11		2221	2256	2227
19		—		15	17		2315	2345	2321
19		—		22	12		2351	0020	2358
20		—		—	8	11	0031	0051D	0038
20	9	—		—	20	11	0051E	0132	0057
20		—	10	12	7		0204	0243D	0213
20		—	6	14			0243E	0316	0246

Inubo

Nov. 1990	S				P		A		
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
20		—	42	39			0451	0617	0509
20		—	12				0701	0733	0706
20		—	73				0953	1123	1002
20		—			12		2144	2204D	2151
20		—			32	14	2204E	2252	2211
21		—			4		0008	0044	0014
21		—	46	43	22		0242	0401	0300
21	19	—	62	46	29		0458	0528D	0504
21	29	—	103	63			0528E	0629D	0538
21	14	—	81	29			0629E	0738	0638
21		—	9				0817	0849	0827
21		—	18				0938	1023	0946
22	12	—	31	38	19		0147	0247	0152
22		—	6	7			0407	0422	0410
22		—	62	19			0823	0926	0833
22		—	7				1124	1149	1130
23		—		14	8		0011	0052	0027
23		—		10	4		0151	0219	0159
23		—	8				0401	0423	0408
23	23	—	22	22			0437	0500D	0444
23	8	—	55	51			0500E	0605	0507
23		—	13				0903	0939	0909
23		—			25	32	2058	2158	2117
24	37	—	99	81	48	37	0219	0432	0245
24		—			9		2145	2203	2151
24		—			9		2208	2248	2223
24	28	—	35	77	72	59	2324	0053	2348
25	6	—	14	17	6		0158	0253	0209
25	36	—	117	—	40	35	0314	0457	0325
25		—	15	—			0615	0658	0621
25		—	48	—			0810	0852	0818
25		—	12	—			1015	1048	1025
25		—		—	49		1850	2019	1919
25		—		—	21		2120	2149	2128
25		—		—	14		2210	2220D	2217
25	12	—	17	—	104	62	2220E	2346	2230
26	20	—	66	—	48	37	0118	0217	0127
26		—	63	—			0631	0744	0650
26		—	12	—			0934	1029	0939
26		—		—	16		2156	2210D	2159
26		—		—	12		2210E	2232	2214
26	46	—	75	—	154	83	2313	0102D	2319
27		—		—		54	0017	0119	0030
27		—		—	8		0102E	0136	0108
27		—	10	—	4		0248	0311	0255
27		—	11	—			0325	0414	0341
27		—	14	—			0436	0459D	0446
27	46	—	164	—	32	23	0459E	0538D	0513
27	13	—	87	—			0538E	0734	0545
27		—		—	49	36	2223	2327	2236
28		—	52	—	35	26	0138	0328	0153
28		—	29	—		23	0417	0542	0436
28		—	111	—			0621	0802	0644
28		—	19	—			0813	0841D	0820
28		—	30	—			0841E	1004	0854
28		—		—	17		2251	0033	2316
29		—	27	—	16	15	0145	0207D	0153
29		—	55	—	34	17	0207E	0344	0234
29		—	31	—			0945	1039	0954
30		—	14	—			0400	0508	0418
30		—	60	—			0547	0649D	0557
30		—	19	—			0649E	0703D	0653
30		—	21	—			0703E	0730	0708

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