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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

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

* Measurement impossible because of interference.

B Measurement impossible because of bursts.

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C	artificial accident,
S	propagational accident,
U	inaccurate.

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

N	normal,
U	unstable,
W	disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

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

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

b. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF FOF2 AT WAKKANAI

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	62	59	54	53	56	54	56	73	91	85	88	96	93	96	96	92	87	92	93	61	60	51	50	57
2	48	56	55	A	A	A	71	59	N	56		57		57	61	52	58	58	54	52	54	51	58	55
3	42	37	35	43	48	53	A	62	56	60		62	62	74	77	83	92	104	67	60	56	56	55	48
4	52	52	45	46	42	44	85	112	101	112	126	128	120	117	118	119	129	129	109	82	58	68	63	66
5	62	70	60	56	53	A	75	90	97	105	130	121	114	120	118	114	111	101	91	82	57	71	66	66
6	58	58	56	52	54	55	79	87	120	110	114	123	124	120	118	121	113	112	91	79	69	70	63	57
7		58	51	52	47	58	106	90	115	120	122	127	126	120	121	123	116	106	90	112	66	74	79	60
8	75	67	55	67	62	68	108	112	122	138	136	130	132	126	119	118	120	102	90	76	72	58	A	65
9		57	54	64	A	56	A	79	115	120	115	121	123	118	118	117	120	106	109	82	80	73	68	61
10	56	53	54	55	55	66	105	112	122	133	138	136	129	127	127	126	125	130	85	88	72	76	65	63
11	62	58	55	66	56	52	84	124	128	143	142	137	137	137	131	127	128	122	98	82	68	68	70	71
12	58	60	60	52	54	58	81	121	124	132	141	138	141	132	128	126	118	101	80	82	82	73	73	66
13	55	60	52	57	68	72	88	108	128	136	138	141	137	124	125	126	129	98	91	86	80	73	67	67
14	70	63	68	63	63	60	82	120	125	136	140	138	133	130	125	121	119	125	87	88	78	66	64	66
15	63	63	57	64	64	63	88	131	128	131	136	131	131	128	127	128	124	108	85	82	82	80	77	68
16	66	67	66	66	65	61	92	105	130	128	140	137	136	131	133	125	130	112	92	86	79	76	65	64
17	66	68	69	63	57	57	84	109	129	133	132	134	130	125	127	125	132	110	90	88	79	72	73	58
18	58	51	54	59	51	57	64	122	130	127	130	136	135	130	121	124	107	105	91	79	78	73	68	66
19	73	66	66	66	62	62	82	118	142	141	151	151	135	135	128	142	127	105	106	93	73	74	67	61
20	64	67	74	63	62	60	86	105	137	138	141	145	142	140	141	137	129	109	106	92	70	81	72	66
21	76	64	66	67	58	62	101	128	139	155	156	154	145	150	143	127	142	131	112	76	68	54	55	52
22	49	44	34	36	32	35	53	66	107	92	128	123	117	112	117	122	113	87	70	79	70	58	53	49
23	47	46	45	49	A	58	52	83	120	120	136	128	133	122	122	130	145	109	86	77	73	58	57	58
24	54	48	50	44	43	47	85	108	110	127	136	140	138	138	131	139	122	131	92	100	80	61	66	56
25	62	58	56	57	56	52	58	81	112	113		135	141	124	131	127	117	113	86	79	64	60	53	62
26	60	53	51	64	47	53	79	87	106	103	101	91	84	86	88	96	98	98	82	66	54	51	48	49
27	43	38	35	30	34	38	55	88	84	90	103	124	119	114	118	113	96	83	74	68	66	N	62	58
28	46	48	48	45	28	34	54	86	112	134	141	140	135	141	140	138	130	122	90	84	61	55	48	37
29	31		31	29	24	A	44	58	88	90	92	115	111	116	108	108	109	107	107	92	65	86	64	67
30	66	58	46	40	32	39	57	84	116	124	135	148	136	131	132	138	130	109	96	87	70	A	63	61
31	A	45	55	A	41	36	52	86	120	138	128	141	150	136	126	112	107	91	86	73	64	58	51	54
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	31	29	28	28	29	31	30	31	28	31	30	31	31	31	31	31	31	31	31	29	30	31
MED	59	58	54	56	54	56	81	90	120	127	136	134	132	125	125	124	120	107	90	82	70	68	64	61
U Q	65	63	60	64	60	60	87	112	128	136	140	140	137	132	131	127	129	113	96	88	78	73	68	66
L Q	50	51	48	45	42	49	56	83	107	105	124	123	120	117	118	114	109	101	85	76	64	58	55	56

HOURLY VALUES OF FES AT WAKKANAI

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	30	28	G	G	G	G	G	G	G	G	G	G	G	G	34	32	G	G	G	G
2	G	26	27	33	58	59	G	129	41	42		G		G	G	G	G	G	G	G	G	G	G	27
3	G	G	24	26	29	26	58	43	42	G		G	G	G	42	G	G	40	G	32	35	35	30	38
4	G	G	G	31	29	39	27	G	G	47	G	G	G	G	42	46	G	G	47	37	40	G	G	G
5	G	G	G	G	27	43	37	G	G	60	51	G	G	56	G	G	G	G	28	G	G	G	G	G
6	29	G	G	29	35	60	G	G	G	48	G	90	42	46	G	G	59	50	44	68	32	28	G	G
7	G	G	30	40	29	G	G	G	G	G	G	G	60	60	46	G	37	31	58	G	G	36	G	G
8	31	44	G	35	26	G	34	34	G	G	46	G	G	G	G	G	32	34	45	44	G	30	31	G
9	G	G	G	24	42	25	80	45	45	46	58	G	G	G	46	46	G	30	40	41	31	G	G	G
10	G	G	G	G	G	G	G	G	G	47	46	64	G	45	G	45	55	45	33	33	47	67	G	G
11	G	G	G	G	G	G	G	G	G	46	G	G	G	41	44	G	G	G	G	27	37	G	49	28
12	G	G	31	G	G	G	36	40	G	41	55	56	60	64	47	41	G	31	28	G	32	43	G	G
13	G	G	28	38	G	G	G	G	G	G	G	G	G	G	G	G	G	43	72	27	G	27	G	G
14	G	G	G	24	G	G	41	36	G	G	G	42	50	G	G	G	33	57	45	40	42	30	38	G
15	G	38	44	45	59	50	36	G	118	46	43	49	42	46	G	39	40	G	45	37	29	28	G	G
16	G	G	28	24	G	G	44	35	G	49	50	42	G	G	G	G	G	40	66	32	44	42	30	28
17	27	G	G	G	G	35	36	85	G	46	G	G	G	G	G	45	30	57	48	49	45	38	28	G
18	27	G	G	G	G	G	G	G	G	46	50	46	45	48	G	48	74	40	G	G	G	G	G	G
19	G	G	G	G	G	G	G	34	38	46	50	G	G	48	53	G	38	29	92	46	41	41	G	27
20	G	G	G	G	G	G	G	G	G	G	60	G	42	50	G	G	46	56	G	37	42	31	32	27
21	G	G	G	24	G	25	G	G	G	G	58	G	G	G	68	37	36	28	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	43	47	50	56	50	48	52	48	67	61	47	45	46	33	43	G
23	G	29	G	G	28	59	46	37	42	48	64	57	59	48	G	64	G	G	32	38	31	30	G	G
24	G	G	G	G	G	G	G	G	48	47	46	G	G	G	G	G	33	G	32	30	G	G	G	G
25	G	G	G	G	G	G	G	G	46	G		42	G	40	G	40	35	70	58	G	28	G	G	28
26	G	G	G	G	G	G	26	G	G	60	89	G	G	54	G	G	32	39	42	36	G	G	27	G
27	35	G	G	G	G	G	28	G	36	G	G	G	G	G	38	G	32	33	34	54	G	G	G	30
28	28	G	27	G	32	G	53	39	72	46	47	65	60	G	G	35	G	G	G	G	36	30	G	G
29	G		G	G	24	59	58	37	G	G	G	G	G	G	G	G	G	G	G	59	29	40	32	G
30	24	31	30	G	G	G	46	82	57	49	G	52	60	52	69	85	65	37	28	G	58	66	45	44
31	52	59	65	59	27	G	31	G	G	41	G	G	G	G	G	G	G	33	G	G	G	59	40	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	31	31	31	31	28	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	27	G	G	46	46	G	G	G	G	G	32	33	34	32	31	30	G	G
U Q	24	G	27	29	29	35	41	37	42	47	50	49	45	48	44	45	38	43	47	41	41	38	31	27
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	15	16	16	17	17	20	18	35	27	24	44	38	36	22	20	18	21	16	15	15	16	17	17
2	16	17	15	15	15	17	20	18	22	23		27		24	22	20	34	17	16	17	16	16	17	15
3	18	14	15	18	14	17	17	18	24	23		49	41	40	28	33	23	18	16	18	18	18	17	17
4	17	18	17	21	20	17	18	20	29	26	39	32	22	23	21	18	27	21	17	17	22	24	18	17
5	17	18	16	15	15	18	17	26	33	23	29	42	29	32	23	22	17	20	17	18	17	18	26	22
6	17	21	17	14	15	15	23	28	21	22	26	30	24	24	24	20	17	17	17	21	23	17	24	18
7	23	21	17	15	18	16	20	28	21	22	38	38	28	30	24	22	17	17	17	18	17	17	18	24
8	17	16	17	17	15	17	17	18	20	22	28	27	26	22	20	20	22	18	15	15	20	22	20	16
9	20	16	26	15	15	18	17	20	20	24	26	40	37	35	26	17	29	20	16	16	16	17	14	15
10	16	15	15	15	16	15	20	18	22	24	29	32	29	28	29	23	17	17	17	17	17	15	16	16
11	17	15	15	16	15	18	22	22	21	26	28	27	24	27	23	21	21	22	18	16	15	15	17	17
12	15	16	14	15	14	16	17	17	21	24	27	24	24	23	23	23	26	17	18	17	18	14	18	17
13	16	18	18	16	17	16	20	20	20	23	22	23	37	38	22	32	18	17	15	18	17	18	17	16
14	17	15	16	16	17	14	17	18	18	20	21	34	28	27	22	20	17	15	15	16	17	17	16	18
15	16	18	16	17	17	16	16	18	18	21	24	28	27	26	23	20	20	17	16	16	17	17	16	16
16	17	17	16	16	15	16	17	18	20	21	21	40	23	22	23	20	20	16	17	17	18	18	18	18
17	18	17	15	15	18	16	15	26	20	20	21	23	38	22	35	18	16	16	17	18	18	16	20	17
18	17	17	16	17	16	15	18	22	20	22	24	27	38	21	20	17	17	16	16	17	15	15	18	16
19	17	16	16	17	15	17	21	17	18	22	33	23	34	30	21	18	18	18	17	17	16	17	16	16
20	17	17	15	16	17	16	17	20	33	22	21	38	27	33	22	21	17	15	16	17	15	17	16	18
21	15	16	15	15	15	17	17	17	18	21	24	24	35	22	18	18	16	18	17	17	17	18	18	16
22	17	15	15				18	18	18	20	24	23	27	22	21	18	18	14	16	18	16	14	16	16
23	16	15	15	15	15	15	17	17	21	22	29	24	24	27	22	21	21	16	16	16	17	18	17	20
24	16	18	16	16	16	17	16	26	20	24	36	32	42	24	20	21	16	17	16	18	21	17	18	17
25	15	15	16	16	16	16	18	20	24	41		35	37	27	35	24	17	18	17	14	18	18	18	17
26	16	16	16	17	17	16	18	21	20	22	32	40	42	26	22	20	17	15	15	17	15	17	18	17
27	16	15	15				22	20	21	38	40	26	42	35	30	88	17	14	16	20	17	18	17	17
28	20	17	18	17	14	18	16	17	18	22	23	22	23	26	20	21	23	17	16	17	16	16	15	
29					17	16	14	20	20	22	23	37	35	36	23	27	21	17	16	17	17	16	17	17
30	16	15	16			15	17	22	21	21	22	23	22	22	21	20	20	17	16	16	18	17	17	15
31	17	17	14	15	21	16	15	20	21	23	38	35	39	23	21	18	21	17	16	16	17	16	17	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	27	28	29	31	31	31	31	28	31	30	31	31	31	31	31	31	31	31	31	31	30
MED	17	16	16	16	16	16	17	20	21	22	26	30	29	26	22	20	18	17	16	17	17	17	17	17
U Q	17	17	16	17	17	17	20	22	22	24	30	38	38	32	24	22	21	18	17	18	18	18	18	17
L Q	16	15	15	15	15	16	17	18	20	22	23	24	24	23	21	18	17	16	16	16	16	16	16	16

HOURLY VALUES OF FOF2 AT AKITA

OCT. 1991

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	52	58	52	41	50	58	70	88	100	112	N	117	106	111	102	107	97	97	88	63	54	53	53	58
2	42	58	45	A	31	A	40	A	42	52	48				56	57	54	56	52	52	47	A	57	52
3	44	43	44	46	45	36	67	77	74	78	86	84	84	84	86	90	91	88	55	50	A	51	45	46
4	35	52	46	48	46	46	54	86	97	118	131	128	120	119	122	126	131	111	90	54	53	53	53	53
5	57	54		54	52	48	72	88	127	141	130	130	121	130	122	120	112	103	84	43	46	55	52	56
6	58	53	58	58	54	54	80	102	110	110	120	124	130	122	117	117	118	91	90	54	53	A	53	62
7	52	48	52	50	52	52	83	103	105	112	122	137	133	126	117	122	118	111	84	85	52	62	74	54
8	54	60	53	63	58	64	90	117	112	125	131	136	136	132	127	122	121	103	97	67	53	52	50	50
9	50	51	54	51	54	60	82	90	111	113	132	131	132	126	126	127	121	118	88	84	43	A	51	A
10	52	52	58	52	58	59	86	110	126	127	138	134	136	135	136	136	131	110	100	86	52	73	67	52
11	54	53	54	66	53	51	82	120	127	138	138	137	140	138	133	130	130	110	87	82	84	54	67	63
12	58	A	68	57	53	50	86	125	127	134	136	138	138	131	130	127	120	107	84	70	77	67	63	67
13	54	63	55	54	52	53	84	110	127	136	136	132	131	131	126	122	115	103	90	87	80	66	67	66
14	66	67	62	63	63	54	83	106	121	131		138	136	133	127	115	116	111	91	84	80	66	66	54
15	60	58	63	52	60	53	84	114	120	117	124	140	134	127	127	130	120	110	90	84	84	75	79	64
16	67	62	67	66	64	60	81	106	130	127	135	138	138	131	135	131	127	111	90	86	83	80	67	66
17	64	54	63	58	48	48	73	106	120	121	131	132	128	120	118	123	116	112	89	86	86	74	74	66
18	63	58	47	51	37	46	72	106	120	130	118	133	128	130	128	128	111	112	87	70	66	66	66	53
19	67	67	51	64	59	50	82	111	131	140	133	140	136	130	130	132	129	112	90	86	79	67	66	54
20	66	64	67	66	58	54	81	112	123	134	136	140	138	138	137	140	130	118	90	89	87	83	72	52
21	54	67	73	63	54	49	86	108	129	135	164	157	160	140	137	135	140	128	91	83	54	55	54	61
22	49	54	44	44	43	38	58	86	124	141			136	127	126	127	N	91	76	A	67	24	A	A
23	50	37	47	44	44	38	66	88	128	131	137	139	131	136	134	130	121	110	77	60	66	59	65	60
24	54	51	46	53	43	45	56	106	126	118	134	146	137	138	138	136	130	109	90	90	86	53		54
25	54	53	53	54	57	52	76		126	131	140	146	144	137	131	130	124	111	A	80	51	A	A	53
26	50	53	47	51	47	47	62	87	90	108	97	114	124	114	112	111		100	61	70	52	A	A	A
27	47	45	40	35	A	19	A	86	108	128	130	134	138	130	122	116	112	90	54	53	52	53	52	51
28	A		46	48	30	32	54	88	130	151	160	148	138	136	140	136	120	104	90	87	58	53		N
29	34	19	A	N	26	A	A	80	110	130	127	137	135	130	122	95	109	110	110	103	80	91	90	84
30	80	74	58	52	44	44	77	84	88	133	137	140	140	132	136	131	127	113	90	90	A	A	58	53
31	53	53	43	45	42	46	72	113	138	146	156	156	160	143	137	124	110	96	86	81	66	58	64	57
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	29	30	29	29	29	31	31	28	29	30	30	31	31	29	31	30	30	29	25	26	27
MED	54	54	53	52	52	50	77	106	121	130	132	137	136	130	127	127	120	110	90	82	66	59	64	54
U Q	60	61	60	60	57	54	83	110	127	135	137	140	138	136	135	131	128	111	90	86	80	70	67	63
L Q	50	51	46	48	44	45	66	87	108	117	125	131	130	126	122	117	112	100	84	63	52	53	53	53

HOURLY VALUES OF FES AT AKITA

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	G	43	41	36	30	26	28	G	G
2	G	G	G	32	49	59	34	34	G	G	51	G	G	G	G	G	G	G	G	25	31	40	25	G
3	G	24	24	G	G	G	31	G	46	G	G	G	G	G	G	43	38	36	30	26	81	G	G	31
4	29	29	G	27	26	G	G	G	39	47	G	46	G	G	G	G	G	G	G	G	27	29	27	G
5	G	G		G	28	G	G	G	G	48	44	46	G	49	G	G	G	44	47	41	31	37	54	29
6	30	32	28	25	G	G	G	44	G	49	G	G	G	G	50	51	50	G	28	G	34	47	37	G
7	G	G	30	42	35	40	G	G	G	G	G	G	G	G	G	41	34	38	31	30	G	G	G	G
8	G	G	G	G	G	G	G	41	51	50	50	65	59	56	42	G	45	50	46	41	G	G	G	G
9	G	G	G	G	33	G	33	54	61	83	51	51	G	G	42	G	G	34	40	40	46	56	43	47
10	26	27	G	G	G	G	G	G	40	G	G	G	54	G	G	42	40	G	25	33	40	33	39	G
11	G	37	G	G	G	G	G	40	56	G	G	52	G	49	G	G	41	37	54	36	G	40	29	40
12	41	34	51	G	G	G	38	48	73	60	86	56	52	51	G	G	44	40	37	30	40	G	38	33
13	G	G	G	G	30	28	G	G	G	57	G	G	G	48	G	G	G	G	G	54	59	34	G	G
14	G	G	G	G	40	29	28	G	39	41	G	G	52	G	G	G	G	41	42	35	40	42	38	51
15	G	G	26	G	G	28	91	57	58	41	G	G	G	G	G	G	48	44	48	37	42	55	38	36
16	28	27	30	25	29	G	G	33	39	G	80	69	G	45	52	50	37	28	28	28	26	G	G	G
17	G	G	G	G	24	G	34	38	58	50	59	59	66	54	51	54	43	40	30	28	35	29	32	29
18	G	G	G	G	G	43	31	39	46	51	54	50	54	55	49	G	42	35	33	30	G	G	G	25
19	G	G	G	G	G	G	G	34	G	69	49	50	57	58	73	57	42	33	G	26	38	29	29	G
20	29	G	G	G	G	G	28	G	40	G	47	52	53	G	G	61	82	46	29	G	29	24	G	25
21	28	26	G	G	G	G	G	G	G	G	44	58	54	45	47	39	38	35	31	29	G	G	G	G
22	G	G	G	G	G	G	G	G	48	54			74	63	50	G	G	55	50	94	33	34	34	25
23	G	G	G	G	G	G	31	48	52	49	G	46	48	55	G	94	52	36	30	G	G	27	G	28
24	G	G	G	G	G	G	G	33	38	G	G	G	46	48	G	G	37	36	G	G	38	33		G
25	G	G	G	G	G	G	G		38	G	G	G	G	G	42	38	G	40	83	40	38	38	54	32
26	G	G	G	G	G	G	G	G	42	50	44	G	G	54	G	37		31	50	41	32	45	49	40
27	29	G	G	G	38	G	31	32	37	G	G	55	G	G	G	G	32	24	43	35	31	51	30	26
28	30	G	G	25	G	G	G	G	36	53	43	G	74	G	42	G	G	33	G	G	G	G	G	G
29	G	G	29	G	G	39	44	41	59	112	116	G	54	52	44	G	G	G	G	G	G	31	55	29
30	29	30	30	29	28	G	11	50	51	58	G	58	51	61	53	38	33	48	51	40	38	58	58	G
31	G	G	29	26	G	G	G	G	40	G	G	G	G	G	44	44	34	G	46	G	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	31	31	30	31	31	30	30	31	31	31	31	30	31	31	31	31	31	30	31
MED	G	G	G	G	G	G	G	32	40	47	22	24	G	45	G	G	37	36	31	30	31	31	29	25
U Q	28	26	26	25	28	G	31	41	51	53	50	52	54	54	47	43	43	41	46	40	38	40	38	31
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	25	G	G	G	G	G

HOURLY VALUES OF FMIN AT AKITA

OCT. 1991

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	18	16	15	16	16	16	23	20	23	26	26	38	24	22	23	22	18	18	16	17	17	16	17	17
2	18	17	17	17	16	16	16	18	21	21	24	29	24	24	21	21	18	22	16	18	16	16	16	16
3	17	17	20	17	18	18	18	16	20	20	26	45	43	47	36	22	23	16	15	17	16	17	17	17
4	18	16	17	17	18	17	22	18	18	20	35	23	40	22	16	16	18	21	16	16	16	18	20	16
5	18	17		18	18	20	23	16	21	21	23	33	40	23	21	18	18	17	16	18	18	16	16	17
6	17	16	17	17	18	18	18	17	21	20	20	35	44	34	24	22	18	17	17	18	18	18	20	17
7	17	18	20	17	16	16	22	18	20	20	20	28	23	40	21	21	17	18	16	20	16	20	16	16
8	17	15	17	15	15	18	23	18	20	21	23	26	26	24	22	20	24	16	16	16	18	17	18	18
9	18	20	17	17	18	17	16	17	21	21	24	23	23	23	20	18	29	16	16	16	15	17	16	16
10	16	17	18	22	17	18	21	17	20	22	29	24	30	24	23	21	17	20	16	16	16	17	16	17
11	18	16	20	15	16	17	23	18	18	21	23	26	24	23	21	22	20	17	16	18	17	17	17	17
12	17	16	16	16	18	16	16	18	18	23	23	22	22	22	18	15	16	16	16	17	17	20	17	17
13	17	17	17	16	17	17	21	20	17	23	21	22	39	24	21	18	28	20	17	16	16	18	18	20
14	20	18	18	15	15	17	18	17	20	21		27	24	23	20	18	16	16	16	17	18	16	17	17
15	17	15	15	17	16	18	16	17	20	21	22	26	39	23	18	20	20	16	17	17	17	17	16	16
16	16	18	15	17	17	16	21	16	16	18	22	23	26	22	21	16	16	15	17	18	16	16	16	18
17	16	16	18	18	17	17	16	16	15	17	17	21	21	22	20	17	17	15	16	20	17	18	17	17
18	20	16	17	18	16	15	16	16	17	20	20	18	21	21	20	18	16	16	15	17	17	18	16	17
19	17	18	18	16	18	17	20	16	16	20	21	22	22	22	18	20	17	16	17	16	16	17	18	17
20	17	17	18	18	18	18	21	16	16	18	18	36	35	16	16	20	16	16	16	18	17	20	17	17
21	17	18	18	16	16	16	20	17	18	20	24	22	33	22	20	18	16	16	17	16	17	17	18	15
22	20	16	16	15			20	21	22	21			23	23	21	16		16	15	16	16	16	18	18
23	17	18	17	20	20	18	15	17	20	22		23	27	22		16	16	17	18	17	16	16	17	16
24	20	16	16	20	20	17	20	17	20	20	46	35	36	22	22	17	20	16	16	17	17	16		18
25	18	18	17	17	18	18	18		27		29	39	29	38	24	20	28	16	15	16	16	16	16	16
26	20	17	17	18	18	18	20	16	17	21	39	43	28	26	22	17		16	16	17	17	16	17	16
27	16	17	17		17		17	24	21	45	22	20	43	21	20	78	16	26	18	16	16	17	16	20
28	18	22	17	17	17		20	18	21	22	22	40	38	24	23	20	27	16	18	17	16	17	21	18
29		66	18		17	17	17	17	20	22	26		22	21	18	21	26	17	15	16	16	16	17	21
30	16	16	15	15	16	17	17	22	21	22		24	23	21	18	16	22	16	16	18	18	17	17	18
31	17	16	15	16	16	18	18	21	20	24	40	39	34	23	23	20	17	17	17	17	18	20	20	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	29	30	28	31	30	31	30	27	29	31	31	30	31	29	31	31	31	31	31	30	31
MED	17	17	17	17	17	17	20	17	20	21	23	26	27	23	21	20	18	16	16	17	17	17	17	17
U Q	18	18	18	18	18	18	21	18	21	22	26	35	38	24	22	21	22	17	17	18	17	18	18	18
L Q	17	16	16	16	16	16	17	16	18	20	21	22	23	22	20	17	16	16	16	16	16	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

OCT. 1991

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	62	57	57	48	53	54	80	106	117	131	132	135	124	121	113	105	106	105	91	73	58	54	52	53
2	51	58	56		37	A	44	A	46	47		50			54	67	66	82	64	54	52	66	68	73
3	44	44	48	42	43	54	87	102	101	97	98	98	91	94	88	100	102	91	82	57	54	56	A	58
4	53	56	54	52	45	48	68	88	118	116	131	128	127	130	128	130	133	117	96	74	76	68	70	73
5	62	58	62	61	55	51	68	86	138	150	124	125	138	138	140	127	122	114	90	81	81	N	66	62
6	56	51	57	56	56	53	83	101	112	113	122	128	131	125	121	121	130	114	90	77	73	68	58	67
7	62	56	51	51	54	58	82	102	110	114	123	141	137	129	124	126	124	113	90	92	87	73	81	82
8	66	54	58	55	62	61	93	117	126	123	135	137	138	138	137	128	121	110	102	94	71	70	60	54
9	56	58	54	54	49	58	83	106	112	126	131	135	143	130	129	136	133	131	108	83	74	70	70	54
10	60	61	62	56	57	66	87	122	131	126	129	137	144	146	147	142	138	130	101	90	92	68	83	69
11	62	56	56	60	57	50	83	110	135	127	140	141	141	141	137	137	130	123	99	84	83	73	67	70
12	62	56	62	51	51	54	82	114	127	130	134	138	141	137	133	131	123	110	94	82	87	80	73	70
13	63	62	57	56	49	53	88	115	119	130	134	138	134	131	133	125	115	114	97	94	88	76	78	68
14	73	72	68	64	58	58	87	110	127	126	138	138	131	131	134	120	115	113	97	84	90	71	73	70
15	64	64	57	66	57	56	85	121	126	111	120	137	140	127	129	125	123	117	101	87	86	90	84	83
16	80	71	63	75	75	52	81	114	124	130	133	147	138	134	135	135	138	124	105	85	91	88	81	78
17	70	67	57	60	46	44	75	100	125	126	131	130	125	126	118	124	89	133	101	92	97	93	92	83
18	83	71	53	56	49	50	80	104	122	128	128	130	131	138	137	125	118	116	89	76	74	80	77	65
19	54	68	66	62	54	56	80	104	132	138	136	133	140	130	129	129	131	127	103	90	89	82	66	73
20	74	70	72	66	52	57	73	106	120	128	133	135	141	141	138	138	130	123	106	98	90	82	77	68
21	78	77	62	57	51	54	85	118	130	140	151	149	150	148	144	146	140	136	102	87	76	54	70	67
22	64	N	49	53	56	49	63	102	129	146	151	150	141	135	134	132	123	102	87	90	78	55	56	48
23	57	48	46	45	44	48	73	112	128	132	141	142	140	140	141	138	132	116	90	90	90	64	58	56
24	58	54	53	51	50	48	74	103	120	118	142	144	138	138	141	140	131	114	104	103	90	70	59	60
25	64	60	66	61	58	51	76	104	134	137	139	145	141	141	136	136	127	123	103	90	93	66	58	74
26	63	55	48	52	52	52	71	100	112	130	137	142	146	142	131	122	118	114	88	68	A	61	54	57
27	56	47	50	31	39	44	57	105	127	144	140	142	146	137	131		121	113	88	82	71	67	55	50
28	42	47	47	48	32	34	64	87	134	145	148	145	138	140	145	137	120	110	97	87	86	66	54	56
29	37	22	29		40	35	61	99	128	140	135	140	136	140	132	126	125	136	136	127	90	94	99	86
30	71	70	72	57	63	52	90	77	124	140	141	141	141	141	141	136	136	122	97	98	90	87	80	64
31	77	55	54	49	47	57	84	131	135	147	152	147	147	139	138	140	123	116	98	92	78	63	54	57
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	29	31	30	31	30	31	31	30	31	30	30	31	30	31	31	31	31	30	30	30	31
MED	62	58	57	56	52	52	80	104	126	130	134	138	139	138	134	130	123	116	97	87	86	70	69	67
U Q	70	67	62	60	57	56	85	114	130	140	140	142	141	140	138	137	131	123	102	92	90	80	78	73
L Q	56	54	51	51	46	49	71	101	118	123	131	133	134	130	129	125	118	113	90	81	74	66	58	57

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	36	44	G	49	51	47	G	G	G	43	40	35	34	33	29	41	28
2	G	G	G		26	29	G	47	G	G	G	G	G	G	G	G	G	30	G	G	G	32	34	G
3	G	26	23	G	G	23	30	39	G	G	48	G	G	G	43	45	G	40	28	28	24	33	73	57
4	37	38	32	31	30	30	G	G	G	G	G	G	G	G	G	G	G	32	27	G	G	G	G	G
5	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	29	32	59	104	73	37	58
6	57	44	35	G	G	26	G	G	G	G	G	G	52	G	G	40	85	58	27	24	33	34	37	61
7	68	60	G	31	31	41	36	G	41	G	G	G	G	55	G	G	G	G	31	30	33	G	G	G
8	G	G	G	G	G	G	31	35	50	62	53	50	54	55	G	52	48	43	39	35	31	54	G	G
9	G	G	G	G	G	G	G	41	61	60	54	49	55	46	G	G	43	34	43	36	40	28	28	32
10	30	G	26	32	27	G	G	G	G	G	G	G	G	G	52	G	44	36	59	30	35	31	35	34
11	29	G	G	59	34	G	30	38	44	44	G	G	G	46	49	48	G	38	33	34	58	38	G	G
12	34	38	32	28	G	G	G	63	43	G	47	G	G	G	G	G	34	37	32	28	29	27	28	28
13	G	G	G	G	G	32	35	G	G	G	48	G	G	50	G	44	G	G	G	G	G	G	25	G
14	G	G	G	G	G	G	G	G	72	46	61	50	50	56	G	48	53	G	43	G	25	31	45	32
15	30	26	G	G	G	G	28	44	91	65	G	46	50	52	G	G	38	32	32	33	35	37	51	60
16	58	52	30	G	G	27	G	34	G	42	48	107	59	58	47	39	G	32	41	33	31	G	G	32
17	G	G	G	G	G	G	G	34	38	57	60	60	95	44	G	49	96	59	29	33	53	49	40	36
18	31	27	G	G	G	G	G	35	60	68	58	G	G	G	G	G	40	44	27	58	34	29	G	G
19	G	G	G	G	G	G	G	48	41	G	G	56	G	61	57	50	38	44	G	G	30	28	72	36
20	G	G	G	G	G	G	29	38	42	44	52	66	57	50	58	72	54	39	44	59	41	35	G	26
21	G	G	G	G	G	29	G	35	43	42	G	49	52	47	44	41	38	53	48	34	27	G	G	G
22	G	50	G	G	G	G	G	G	G	46	51	64	61	53	G	G	G	43	58	43	66	40	32	33
23	33	25	G	G	G	G	G	G	44	50	G	49	G	44	43	47	59	58	48	37	49	48	30	28
24	25	24	G	G	G	G	G	33	38	G	G	45	46	G	G	G	37	41	37	39	28	32	31	G
25	G	G	G	G	G	G	G	33	G	43	43	G	44	48	G	38	G	29	50	35	72	28	33	34
26	29	28	25	G	26	G	G	G	40	G	G	G	G	G	45	G	G	27	58	65	60	50	38	34
27	29	28	27	G	G	G	28	41	48	G	G	G	G	G	G	G	50	31	G	G	G	G	27	G
28	30	31	28	28	26	25	25	G	41	43	44	G	G	66	G	G	G	G	G	G	60	34	25	28
29	G	G	G		G	G	36	58	G	44	45	43	G	47	G	G	G	27	32	38	42	34	47	40
30	35	31	33	36	29	G	G	44	44	58	55	G	G	G	46	49	62	62	57	30	31	25	34	37
31	30	G	G	G	G	G	G	37	49	50	50	G	G	49	45	44	42	29	58	26	G	G	30	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	29	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	26	G	G	G	G	G	G	35	41	42	44	G	G	46	G	G	38	36	33	33	33	31	31	28
U Q	31	31	26	14	26	25	28	41	44	50	51	50	52	52	45	47	48	43	48	37	49	37	38	36
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	27	24	27	25	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	16	16	14	15	15	22	16	21	21	22	26	27	32	22	23	16	16	15	15	15	15	14	16
2	15	15	15		16	16	22	15	21	21	29	40	29		20	23	15	22	16	16	16	15	14	15
3	16	14	15	21	16	15	17	16	21	22	28	40	42	40	36	18	17	16	15	14	18	16	16	16
4	15	15	14	15	14	15	22	18	15	21	42	40	39	18	21	20	18	16	15	15	17	16	15	16
5	15	18	16	15	15	15	23	16	20	21	27	44	40	42	36	16	15	15	15	15	16	17	15	15
6	15	14	15	16	16	15	24	15	18	36	20	21	33	20	18	22	15	15	16	16	15	15	15	15
7	20	16	17	15	14	15	15	15	17	23	22	26	22	20	17	17	15	21	15	15	15	15	16	14
8	16	16	15	16	15	15	17	16	20	20	27	34	26	30	20	18	17	15	15	15	16	14	15	15
9	15	15	15	15	15	15	24	16	18	21	33	32	27	24	23	20	17	15	15	14	15	15	15	15
10	15	15	14	15	15	15	22	16	18	20	39	30	24	23	22	18	16	14	15	15	15	15	15	14
11	16	15	18	14	14	15	17	16	18	21	24	41	26	21	20	17	16	14	15	15	15	15	15	15
12	15	14	14	16	20	15	16	16	18	21	27	28	24	24	17	16	15	15	14	15	15	15	16	16
13	16	15	15	15	15	15	16	18	20	39	22	26	40	36	21	17	16	21	15	15	15	15	15	15
14	17	16	15	15	15	15	16	17	18	21	20	20	33	26	21	17	15	16	15	15	15	14	15	15
15	15	16	15	16	15	15	16	15	18	17	18	22	23	18	20	15	16	15	15	15	14	14	15	15
16	15	14	15	16	15	15	21	14	17	21	21	23	32	26	23	18	15	15	16	15	15	17	17	15
17	15	15	15	14	15	15	22	15	16	18	28	30	29	23	20	18	15	14	16	15	15	15	16	15
18	15	15	16	16	15	15	21	15	16	20	21	18	23	38	20	17	16	15	14	15	15	15	15	16
19	16	15	15	15	16	15	21	15	16	18	21	28	23	35	18	21	16	17	15	15	15	15	15	15
20	16	15	15	17	15	15	14	16	17	17	22	23	29	26	20	17	15	14	15	16	15	14	15	16
21	15	15	15	15	15	16	20	15	16	17	27	23	27	20	18	16	15	15	15	15	15	15	16	15
22	15	15	15	16	15		20	16	16	18	21	27	24	23	20	17	16	16	14	15	15	15	15	15
23	14	14	16	16	15	15	21	16	20	18	29	27	28	20	18	16	15	15	14	15	15	15	15	15
24	15	15	15	15	15	15	20	16	18	20	45	35	34	26	21	20	17	15	15	15	15	15	15	16
25	15	15	15	15	15	15	20	17	36	23	28	27	30	26	30	20	15	15	15	14	15	15	15	14
26	14	14	16	15	15	14	20	16	16	22	40	43	30	40	22	16	16	17	15	15	15	15	15	15
27	15	15	15				15	20	21	24	28	23	41	30	23	86	17	15	15	16	16	16	16	16
28	16	15	14	14	17	16	17	15	18	21	24	40	27	30	24	18	17	15	15	16	15	15	16	14
29					15		15	14	18	23	30	30	39	27	24	20	16	15	14	15	15	15	15	15
30	15	14	14	14	14	16	20	16	18	23	27	23	26	22	20	21	30	15	16	17	15	18	16	16
31	15	20	15	16	18	15	18	17	18	22	34	32	39	32	17	15	15	14	16	16	15	15	16	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	28	30	28	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	20	16	18	21	27	28	29	26	20	18	16	15	15	15	15	15	15	15
U Q	16	15	15	16	15	15	22	16	20	22	29	35	34	32	23	20	17	16	15	15	15	15	16	16
L Q	15	15	15	15	15	15	16	15	17	20	22	23	26	22	20	17	15	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

OCT. 1991

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	73	63	64	59	58	53	61	88	125	127	137	145	146	135	127	126	128	122	122	103	81	76	74	63
2	78	66	67	41	40		48	63	62	67	66	77	73	77	85	96	96	102	102	87	71	84	82	101
3	76	66	61	57	49	54	72	88	111	130	134	128	117	105	104	118	107	104	102	84	71	78	80	75
4	66	66	62	58	47	48	52	86	118	131	132	137	145	149	156	148	142	136	120	90	86	82	76	83
5	78	72	67	62	52	44	51	82	131	145	117	130	151	157	161	151	143	133	121	107	86	76	73	66
6	66	63	68	66	64	52	57	88	105	124	122	138	135	134	131	134	136	126	108	90	75	76	74	80
7	67	63	53	55	55	55	76	90	110	121	122	148	152	140	141	140	133	125	111	117	103	88	82	87
8	80	76	64	59	64	60	66	105	122	130	134	142	147	146	147	140	128	126	126	108	87	80	59	74
9	63	66	53	58	53	55	78	86	112	124	132	137	144	139	143	146	146	145	141	110	90	87	86	86
10	84	74	74	69	66	60	77	111	131	137	128	140	160	181	194	194	181	170	152	158	128	112	110	108
11	85	79	85	80	81	53	63	112	128	131	133	146	150	151	156	154	142	135	131	111	103	107	86	85
12	73	66	62	52	44	38	66	110	118	131	146	147	154	170	165	163	148	144	137	108	109	103	87	84
13	80	62	72	60	52	48	61	108	122	127	136	137	139	143	143	142	135	140	130	108	103	110	94	90
14	84	79	72	72	66	61	66	110	111	126	131	137	135	142	145	143	138	133	127	109	107	85	84	80
15	76	67	68	62	67	53	60	106	111	108	122	143	148	132	138	138	134	126	126	110	109	107	90	90
16	86	88	65	71	73	46	53	102	111	126	140	135	138	145	146	145	147	140	140	138	131	110	108	108
17	85	80	67	53	46	40	42	103	111	134	132	131	125	130	137	140	137	146	145	139	129	142	145	137
18	110	86	67	73	54	20	62	102	121	127	130	127	130	138	148	145	139	131	126	107	108	110	88	85
19	81	75	72	74	54	55	56	90	122	142	148	138	144	152	143	145	140	136	133	127	111	122	90	102
20	88	86	76	80	60	56	53	86	111	125	130	131	136	142	150	139	131	131	137	110	108	88	88	86
21	82	82	75	53	40	43	59	90	121	145	161	170	157	161	160	157	152	144	128	106	108	90	85	84
22	76	80	66	N	62	60	54	79	136	158	165	172	163	155	156	150	135	124	120	90	108	77	A	58
23	62	53	48	54	52	50	54	103	126	134	148	152	157	160	161	160	154	146	132	118	124	98	66	63
24	64	66	61	57	47	44	57	88	102	127	146	153	152	157	161	155	146	140	126	125	130	107	82	79
25	76	78	73	77	62		54	89	128	141	142	157	147	147	145	151	143	144	137	128	111	86	82	80
26	80	67	56	56	60	54	65	88	111	142	171	170	170	166	164	148	142	138	130	90	90	90	82	78
27	67	58	55	54	54	57	53	90	144	165	170	159	167	167	151	147	142	138	111	104	97	86	66	54
28	53	52	54	56	30	27	49	90	111	146	168	161	154	159	169	159	146	140	136	128	111	84	67	62
29	77		33	28	58	51	67	89	127	157	157	161	146	148	151	146	141	146	162	N	110	102	108	86
30	66	59	66	80	47	A	54	76	122	158	162	154	151	161	156	146	136	134	121	108	106	106	101	83
31	77	66	56	53	54	66	106	142	145	161	181	170	160	161	154	155	156	141	140	134	135	108	90	85
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	30	31	28	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	30	31
MED	77	66	66	58	54	53	59	90	121	131	136	143	147	148	150	146	141	136	128	108	108	90	84	84
U Q	82	79	72	71	62	55	66	105	127	145	157	157	154	160	160	154	146	144	137	125	111	107	90	87
L Q	67	63	56	54	47	45	53	88	111	126	130	137	138	139	143	140	135	126	121	104	90	84	76	75

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

OCT. 1991

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	G	G	56	G	93	64	G	G	G	28	32	34	34	26	G
2	G	G	G	G	G	G	G	31	42	51	45	50	G	G	G	G	G	G	31	26	G	22	G	G
3	25	26	24	G	G	G	26	31	G	G	G	G	G	G	G	G	50	69	32	30	59	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	44	34	42	39	34	30	G	G
5	G	G	G	G	G	G	G	G	39	44	G	G	G	G	G	G	42	50	22	30	59	45	33	50
6	27	G	G	G	G	26	G	G	G	G	G	G	G	G	G	G	45	94	32	41	33	36	32	30
7	27	G	G	31	62	40	39	77	59	91	45	G	G	G	G	G	43	39	24	G	G	42	40	40
8	G	G	G	G	G	G	G	G	38	46	G	52	G	G	G	G	41	54	51	48	68	32	G	G
9	G	G	G	G	G	G	G	32	45	52	G	G	G	G	G	G	G	42	28	36	G	29	25	G
10	G	G	G	G	G	G	G	32	50	41	G	G	G	G	G	G	G	69	G	32	45	58	40	40
11	39	28	G	G	G	G	G	G	51	45	G	G	60	G	G	G	G	37	31	32	31	32	G	G
12	G	G	G	25	29	28	G	G	42	48	G	55	68	G	G	45	G	42	33	32	40	34	30	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	61	53	G	G	24	40	G	G	G	G
14	G	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G	49
15	34	26	G	G	G	G	G	G	G	G	59	75	72	48	G	G	47	45	G	29	G	G	29	G
16	G	G	G	G	G	G	G	G	G	G	G	G	94	62	55	52	G	41	G	44	48	43	31	G
17	G	G	G	G	G	G	G	58	G	46	54	121	73	96	64	50	52	40	58	79	40	40	32	G
18	38	G	G	G	G	G	G	G	G	45	G	G	G	G	G	G	40	37	39	G	43	33	82	32
19	32	25	G	G	G	G	G	31	G	G	49	G	53	68	75	G	40	92	50	78	48	28	G	G
20	30	G	G	G	G	G	G	G	36	46	G	G	55	G	55	50	99	64	39	G	G	G	G	41
21	34	G	G	G	G	G	G	31	40	G	G	G	G	63	73	91	55	68	47	60	54	40	41	G
22	G	G	G	G	G	G	G	30	43	G	54	50	64	53	70	G	58	68	81	92	66	66	57	32
23	28	G	G	23	G	G	G	30	G	40	G	G	G	G	G	G	G	G	23	G	G	24	27	24
24	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	G	25	30	G
25	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	24
26	24	G	23	24	G	G	G	G	G	41	G	70	82	G	G	G	G	G	G	32	33	40	G	26
27	27	32	24	G	G	G	G	G	G	G	G	G	45	44	56	G	G	G	31	46	40	32	30	G
28	G	G	G	G	G	G	G	G	40	43	46	50	G	G	G	G	G	47	51	39	40	G	G	G
29	G	24		G	G	26	30	45	45	42	G	G	G	G	G	G	G	31	G	G	G	G	28	30
30	32	27	40	25	31	24	G	38	46	54	80	68	71	44	77	54	G	58	41	48	G	G	G	G
31	G	G	G	G	G	G	G	30	43	51	49	66	54	54	50	46	45	50	G	G	56	40	G	29
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	G	41	G	G	G	G	G	G	G	41	31	32	34	32	27	G
U 0	28	G	G	G	G	G	G	31	43	46	45	52	60	48	56	45	45	58	41	44	48	40	32	30
L 0	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

OCT. 1991

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	16	15	33	24	36	36	43	34	36	41	18	16	16	15	15	15	15	15
2	15	15	15	15	15		15	15	23	33	38	36	48	43	39	37	22	16	16	15	15	15	15	15
3	16	15	15	15	15	15	17	16	22	36	42	46	44	45	42	38	34	16	15	15	15	15	15	15
4	15	15	15	15	15	15	16	16	34	35	44	46	47	45	43	26	21	16	15	15	15	15	15	16
5	15	15	15	15	15	15	15	16	20	24	38	48	46	42	45	24	20	15	15	15	15	16	16	17
6	15	16	18	15	15	15	15	16	18	36	40	46	44	44	42	39	36	15	16	15	15	15	16	16
7	16	17	16	17	15	15	15	16	16	22	23	43	27	43	40	38	17	17	16	15	15	15	15	15
8	15	15	15	15	15	15	15	21	20	24	41	36	44	45	39	40	22	16	15	15	15	15	15	15
9	15	15	15	15	15	15	16	15	23	35	38	43	44	43	42	38	35	16	15	15	15	15	15	15
10	15	16	15	15	15	15	15	16	17	23	39	34	46	44	41	38	18	15	16	15	15	15	15	15
11	15	15	15	15	15	15	15	17	17	26	42	43	42	45	42	37	17	15	15	16	16	15	17	15
12	16	15	15	15	15	15	15	16	17	24	43	35	33	45	39	26	21	16	15	15	15	15	16	17
13	15	15	15	15	15	15	16	17	20	38	39	41	44	44	39	23	22	27	16	15	15	15	15	15
14	15	15	15	15	15	15	15	16	16	24	39	39	44	46	26	23	18	16	16	15	15	15	15	15
15	15	15	15	15	15	15	15	16	16	36	33	27	32	24	39	20	16	15	17	15	15	15	15	16
16	15	15	15	15	15	15	15	16	18	36	30	40	38	36	34	28	33	16	15	15	15	15	15	15
17	15	15	15	15	15	15	15	16	17	22	36	39	39	40	38	35	18	16	15	15	15	15	15	15
18	16	15	17	15	15	15	15	15	16	18	28	42	43	42	18	39	17	15	15	15	15	15	15	16
19	15	15	15	15	15	15	15	16	16	26	32	42	39	36	36	35	20	16	15	15	15	15	15	15
20	15	15	15	15	15	15	15	15	18	34	38	40	39	40	35	26	22	16	15	15	15	15	15	15
21	15	15	15	15	15	15	15	15	16	20	42	39	40	38	36	32	16	15	15	15	15	15	15	15
22	15	15	15	15	15	15	16	15	17	23	36	42	36	38	38	38	21	15	15	15	15	15	15	15
23	15	15	15	15	15	15	15	15	16	21	26	40	42	40	39	18	18	16	15	15	15	15	15	15
24	15	15	15	15	15	15	15	26	18	23	46	44	45	45	38	38	33	20	15	15	15	15	15	17
25	15	15	15	15	15		15	24	35	24	40	41	42	42	42	36	20	17	15	15	15	15	15	15
26	15	16	16	15	15	15	15	15	17	23	42	42	42	42	38	20	32	27	16	15	15	15	16	15
27	15	15	15	15	15	15	17	16	24	38	44	44	36	44	23	94	35	16	15	15	15	15	15	15
28	15	15	15	15	15	15	15	18	17	22	32	35	36	44	27	24	17	16	15	15	15	16	15	16
29	15		17		15	15	15	17	20	24	39	40	38	35	38	35	18	15	15	15	16	16	15	18
30	16	15	15	15	15	16	15	16	18	34	38	33	39	33	34	23	49	21	16	15	15	15	16	16
31	18	15	15	15	15	15	15	16	18	32	34	23	40	26	35	28	16	18	18	16	16	17	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	30	31	29	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	16	18	24	38	40	42	42	38	35	20	16	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	16	20	35	42	43	44	44	41	38	32	16	16	15	15	15	15	16
L Q	15	15	15	15	15	15	15	15	17	23	34	36	38	38	35	24	18	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

OCT. 1991

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	87	80	67	54	37	37	38	84	132	139	137	147	147	131	148	146	144	141	130	130	110	110	108	88
2	110	87	84	57	36	28		87	104	87	131	124	111	110	112	117	118	130	126	110	102	105	108	110
3	104	87	66	55	55	58	66	87	108	146	148	144	130	140	146	131	111	112	A	110	A	87	108	83
4	86	85	78	66	44	36	37	86	108	138	140	137	154	171	184	160	168	160	144	110	108	110	108	109
5	88	87	84	80	47	34	37	83	122	146	108	129	148	170	170	170	159	146	142	122	110	87	90	88
6	77	79	79	83	46	34	37	85	107	122	131	140	146	145	147	147	146	121	86	110	87	80	86	87
7	85	55	67		32	31	35	87	111	127	143	158	164	146	140	160	146	120	111	143	129	87	88	87
8	86	87	78	54	53	52	54	105	110	126	135	146	135	158	171	161	146	146	146	145	108	88	86	78
9	73	84	66	A	46	37	54	90	126	123	136	146	147	152	159	160	146	146	146	141	111	108	104	108
10	108	86	80	62	54	34	53	108	121	131	120	147	147	158	178	160	160	159	146	146	146	147	145	137
11	130	128	130	111	88	72	67	111	142	130	147	153	160	161	171	160	158	112	162	168	161	170	170	146
12	128	111	86	80	34	32	47	88	124	128	144	146	157	185	186	183	187	171	N	158	146	146	146	127
13	110	110	84	81	54	43	54	108	122	118	135	134	146	151	145	162	171	170	168	146	146	170	135	110
14	110	111	88	84	63	64	61	100	111	120	127	133	143	145	146	159	162	161	161	146	145	170	145	111
15	109	86	86	84	76	44	32	89	108	112	131	146	147	146	156	161	160	146	136	165	168	170	130	145
16	163	145	88	86	81	37	43	88	108	111	144	136	143	150	167	171	161	187	187	188	187	196	184	160
17	158	129	100	85	51	38	37	90	111	124	136	131	123	135	147	146	159	169	176	189	188	188	187	170
18	162	145	109	86	86	76	66	110	124	124	146	136	146	146	157	145	165	146	146	145	187	190	146	130
19	111	110	86	86	55	34	44	88	108	144	146	146	156	172	160	162	167	170	176	188	171	188	162	146
20	145	128	111	107	86	44	30	78	111	124	140	132	133	146	146	146	144	137	146	130	146	145	111	111
21	107	108	65	51	34	34	35	86	124	146	157	160	156	169	172	170	168	158	146	130	126	146	161	110
22	110	108	86	84	79	67	66	78	111	160	160	171	161	170	159	146	146	146	146	136	137	110	84	87
23	86	86	78	66	60	54	61	101	124	131	146	168	154	172	176	172	161	161	169	162	177	170	110	87
24	90	90	86	77	52	32	44	85	90	131	157		147	159	170	170	160	158	159	162	188	145	146	108
25	110	108	110	87	66	37	34	87	111	146	148	154	159	158	168	162	159	160	170	153	159	146	146	110
26	121	88	86	63	60	54	62	89	110	146	148	167	153	182	188	169	161	146	146	122	122	130	107	108
27	85	78	67	59	63	48	45	84	146	171	155	147	160	190	177		170	170	159	146	145	110	86	80
28	77	66	80	54	46	26	32	88	107	146	158	157	152	176	185	188	175	185	186	169	146	131	90	85
29	84	46	45	35	71	46	63	78	110	156	159	146	144	145	160	146	146	157	188	170	146	110	139	130
30	90	79	86	104	A	A	38	88	117	146	154	161	152	158	158	160	147	146	144	111	121	144	144	110
31	86	77	52	62	55	86	110	146	146	160	196	187	162	145	165	160	176	187	188	188	189	170	160	163
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	29	30	30	30	31	31	31	31	30	31	31	31	30	31	31	29	31	30	31	31	31
MED	107	87	84	80	54	38	44	88	111	131	144	146	147	158	160	160	160	157	146	146	146	145	130	110
U Q	111	110	86	85	66	54	61	100	124	146	154	157	156	170	172	169	167	169	169	165	168	170	146	130
L Q	86	80	67	58	46	34	37	85	108	124	135	136	144	145	147	146	146	146	144	130	121	110	104	87

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

OCT. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	42	G	G	50	G	53	65	G	G	G	51	33	32	G	45	40
2	25	24	24	G	G	G		G	42	45	50	G	G	55	53	44	G	G	G	25	G	G	G	28
3	G	G	25	23	G	G	G	32	42	41	G	G	58	G	G	G	49	48	149	165	92	90	54	30
4	27	G	G	G	G	G	G	G	G	G	G	G	G	G	48	46	43	115	56	57	32	33	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33	32	G	39	33	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	117	114	G	G	G	24	G
7	G	G	G	G	G	G	G	34	93	82	82	86	52	G	51	43	44	38	50	40	G	24	G	41
8	28	30	G	G	G	G	G	34	G	45	G	66	G	G	G	G	46	41	36	26	39	33	35	30
9	33	34	37	32	25	G	G	G	39	51	G	G	G	G	G	G	G	39	38	G	38	G	G	G
10	G	G	G	G	G	G	G	40	40	42	49	62	G	G	49	G	44	39	39	31	32	25	G	33
11	30	49	38	26	G	G	G	G	37	44	45	G	G	57	52	50	55	53	29	36	30	32	29	25
12	26	24	G	G	30	G	G	G	40	46	G	53	G	G	58	G	G	38	G	G	G	G	G	G
13	G	G	G	G	G	G	G	33	38	G	G	52	54	53	G	G	G	G	32	30	G	24	G	G
14	G	G	G	G	G	G	28	36	38	44	G	G	G	G	G	G	G	G	G	G	G	G	27	G
15	G	35	28	G	G	G	G	31	G	G	G	G	G	G	G	G	47	49	89	40	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	43	26	38	32
17	32	G	G	G	G	G	G	35	41	G	G	54	64	61	58	51	56	40	39	33	26	G	G	G
18	G	G	G	G	G	G	G	32	G	G	49	G	G	G	G	52	45	54	53	38	39	26	G	G
19	G	24	26	G	25	G	G	30	38	44	51	G	50	G	50	49	42	41	G	G	G	G	G	G
20	G	G	27	24	G	G	G	G	G	G	G	G	52	56	55	50	56	45	50	30	30	26	G	G
21	G	G	28	26	G	G	G	G	38	43	G	G	G	G	G	G	57	38	33	26	33	24	G	24
22	30	G	G	G	G	G	G	G	36	44	G	G	50	G	52	50	44	40	62	144	59	57	45	40
23	34	27	25	G	G	G	G	G	G	41	72	G	G	G	G	G	G	G	38	26	35	40	31	G
24	G	G	G	G	G	G	24	40	G	G	G		G	50	85	48	41	G	39	58	32	28	G	G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
26	G	G	G	G	G	G	G	G	40	40	G	G	G	G	G	G	G	G	26	G	25	G	G	G
27	G	G	24	25	G	G	G	32	G	G	G	G	G	G	51	G	44	G	G	29	G	34	G	G
28	G	G	27	G	G	G	G	G	G	G	G	G	G	G	51	G	43	G	G	38	G	G	G	G
29	28	G	G	24	G	G	G	G	45	72	G	53	52	51	51	45	46	35	32	32	G	36	G	G
30	G	28	G	34	31	30	25	33	45	50	G	G	G	51	51	92	G	71	G	G	G	G	G	G
31	G	G	G	G	G	G	G	G	40	51	G	52	G	52	52	49	47	40	35	32	55	59	38	35
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	30	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	38	41	G	G	G	G	49	G	43	38	35	30	26	24	G	G
U Q	27	24	25	23	G	G	G	33	40	45	G	52	50	51	52	49	46	45	50	38	35	33	31	30
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

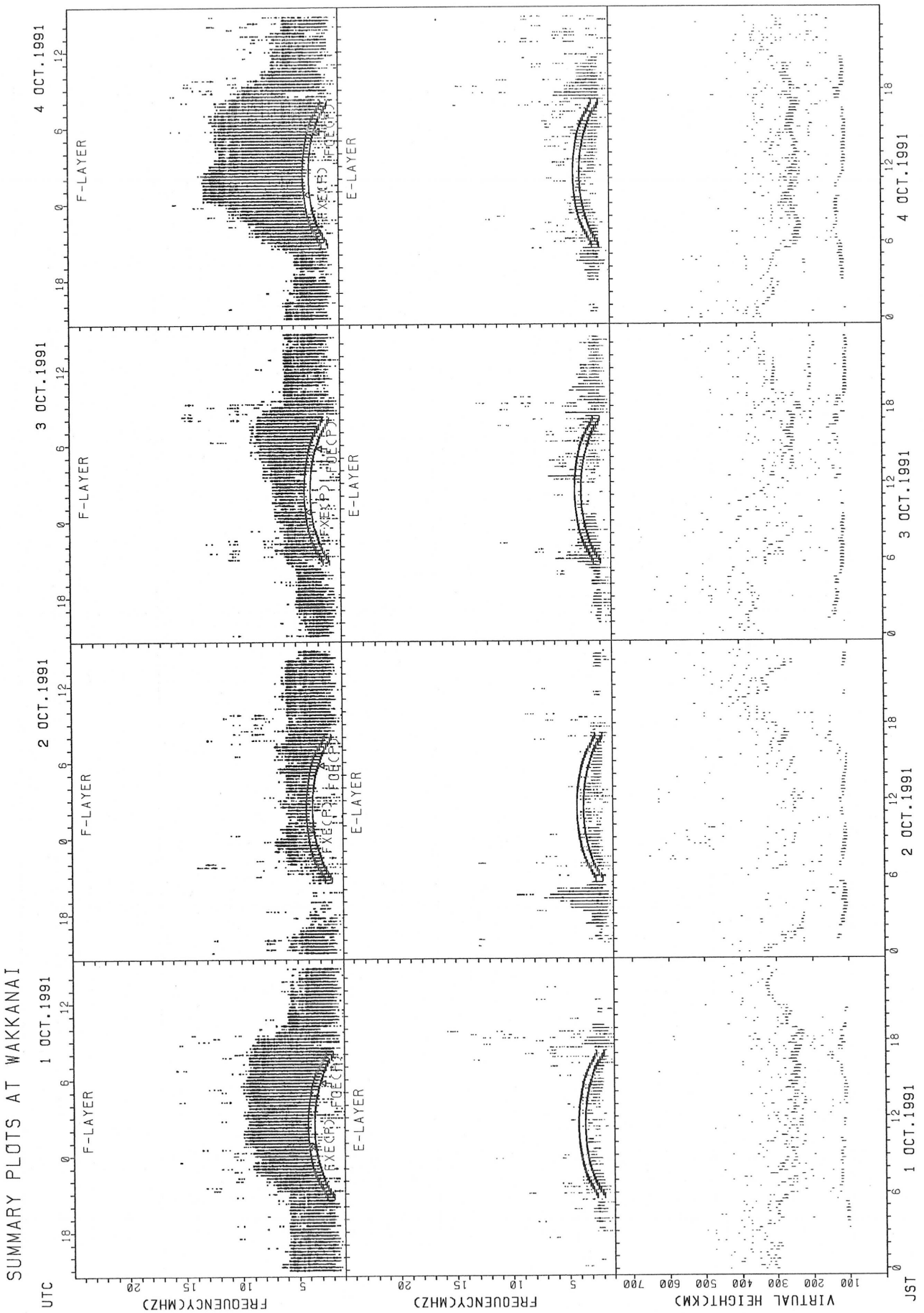
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

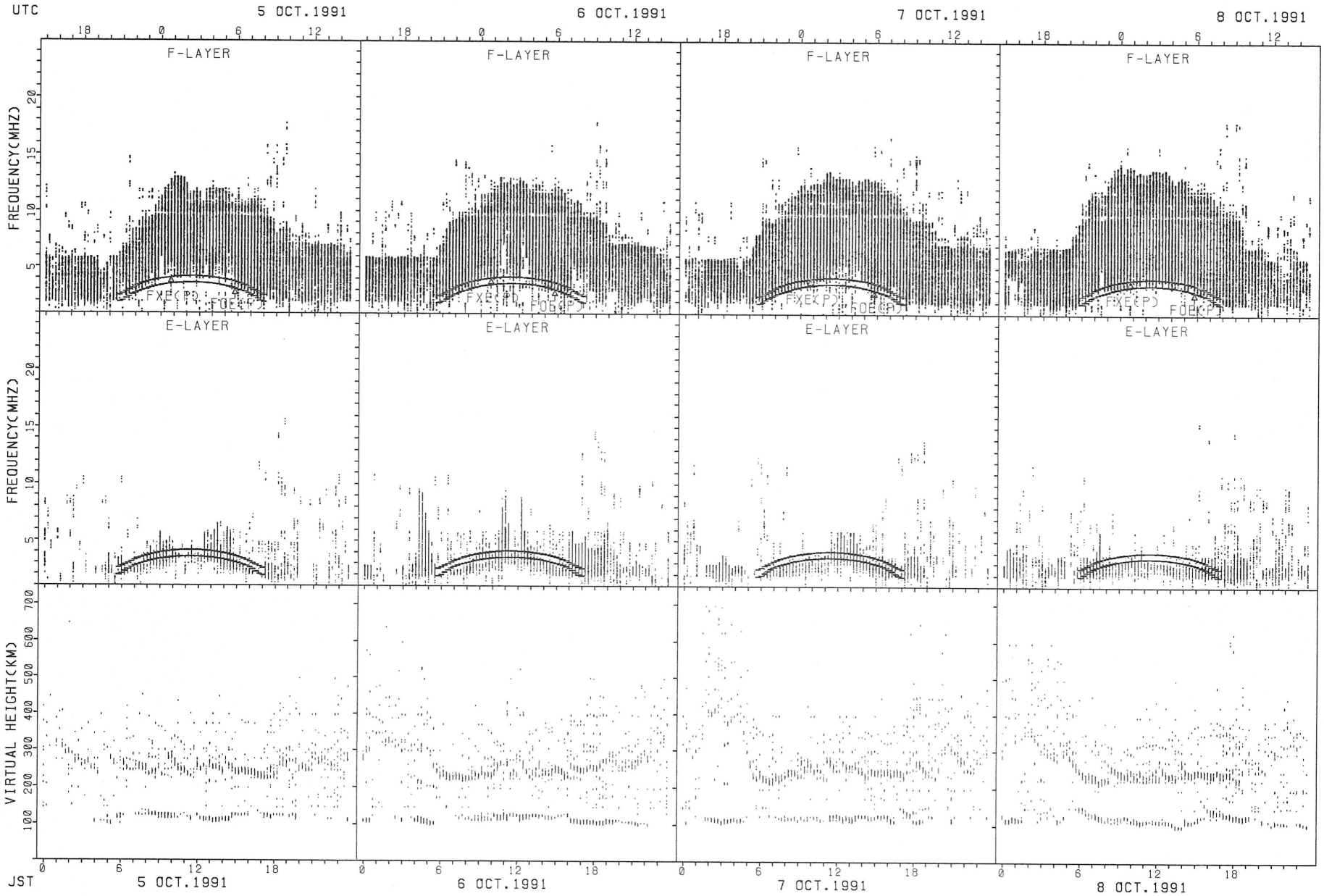
OCT. 1991

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

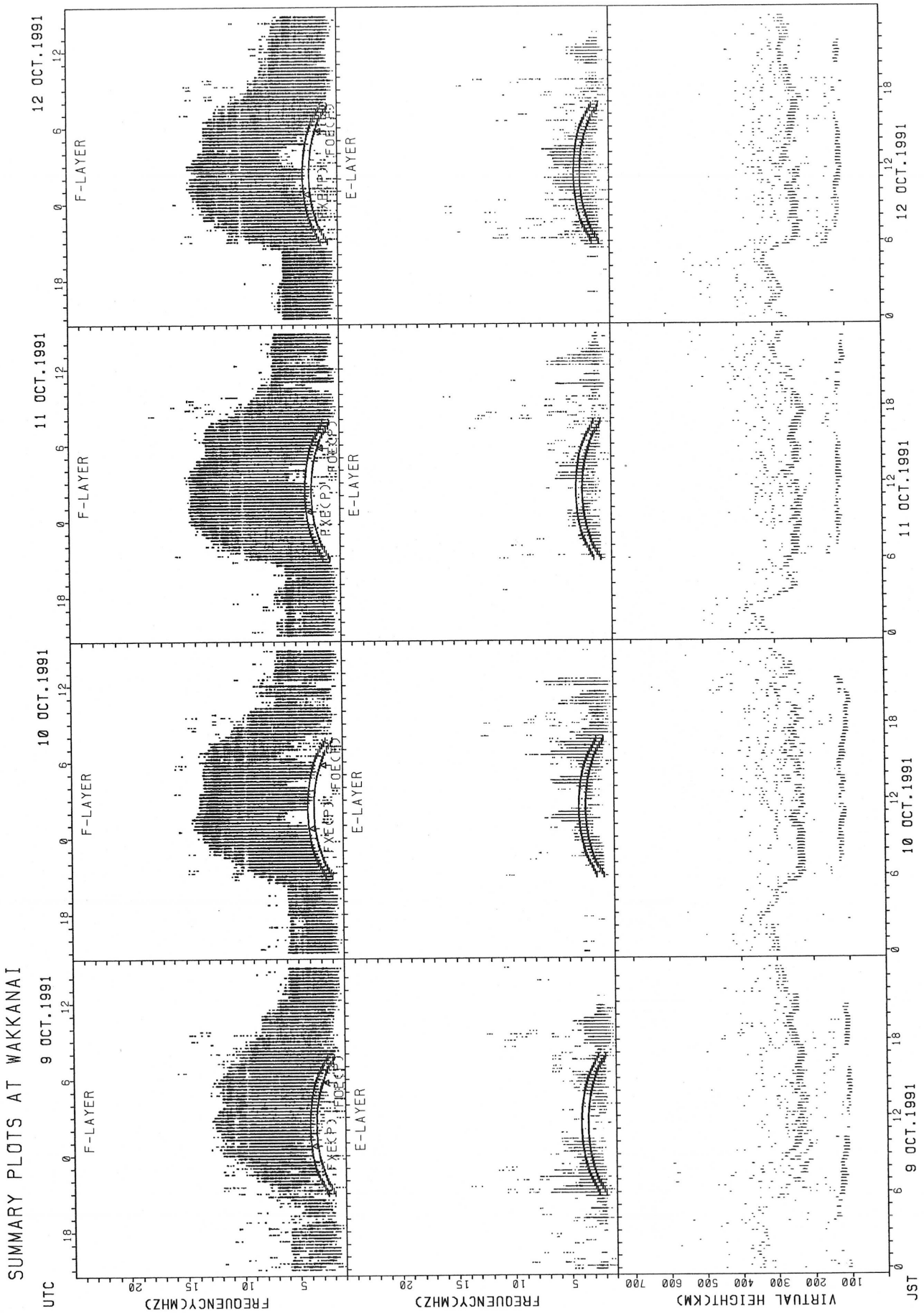
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	16	16	16	16	16	17	26	29	45	45	47	40	38	46	23	17	15	15	15	15	15	15
2	15	16	16	15	15	18		16	22	30	33	34	47	36	32	29	23	20	16	18	16	16	16	16
3	18	16	17	16	17	16	20	17	23	29	45	48	48	46	46	44	26	18	16	15	16	16	15	16
4	15	21	18	18	16	16	16	27	22	36	48	46	33	46	32	28	28	18	16	16	15	15	22	17
5	17	16	15	16	15	16	20	17	32	36	45	48	48	46	46	43	24	17	15	15	15	18	18	18
6	16	17	15	17	15	18	16	16	18	27	46	30	48	48	46	45	20	24	18	16	26	16	17	18
7	17	21	21	22	16	20	20	20	21	29	29	28	46	29	28	24	21	20	16	16	16	18	16	18
8	15	15	17	16	16	18	17	20	41	33	45	45	48	47	46	42	23	23	15	17	16	16	15	15
9	15	15	15	15	17	15	17	17	20	32	30	32	46	46	44	43	39	26	15	18	16	16	16	16
10	15	16	16	18	16	17	16	16	20	28	29	39	32	48	35	30	24	21	16	15	16	16	23	16
11	16	16	17	15	16	16	16	17	20	29	29	45	45	33	32	29	22	17	16	15	15	15	16	17
12	15	15	16	16	16	16	16	17	22	30	44	38	47	32	32	30	38	20	20	16	18	16	16	15
13	16	16	15	15	15	17	16	21	23	30	30	42	45	44	32	44	33	18	16	16	16	16	16	16
14	16	17	16	16	17	16	15	23	21	28	29	45	49	56	46	42	23	21	20	20	18	16	15	16
15	15	15	16	16	15	15	16	24	22	24	29	48	46	45	33	28	29	15	17	18	18	20	16	17
16	16	16	15	15	15	15	16	24	20	30	33	45	46	46	48	29	34	28	20	18	16	18	15	16
17	16	17	15	15	16	15	16	18	18	22	29	30	33	44	39	35	21	16	15	15	17	17	16	17
18	16	16	15	18	16	20	16	17	20	23	23	28	45	26	23	20	17	17	16	15	15	15	16	17
19	18	15	15	17	15	16	18	15	16	24	28	42	30	30	38	24	20	18	18	15	16	16	16	15
20	15	15	15	16	16	16	17	16	24	28	29	45	46	32	30	23	18	16	15	15	15	16	15	15
21	16	15	15	18	20	16	15	24	17	26	45	30	46	44	29	28	21	16	15	15	15	18	16	15
22	15	15	15	18	15	16		26	22	27	30	34	44	47	36	27	26	16	15	15	16	16	16	15
23	16	17	17	20	18	17	16	23	32	23	31	30	33	32	28	28	22	28	16	16	15	15	15	15
24	16	16	16	18	17	17	17	26	23	27	48		49	32	44	29	29	28	22	16	16	16	23	23
25	20	18	16	15	16	16	16	27	38	36	45	45	46	45	46	46	39	29	17	16	16	16	17	17
26	18	16	18	16	16	16	16	16	17	22	45	48	45	46	44	44	27	18	16	21	16	17	17	15
27	16	15	16	18	18	16		16	33	32	44	45	49	46	34	161	32	20	18	16	16	16	18	21
28	20	18	21	21	18		17	29	36	45	46	48	46	48	32	46	32	32	21	18	21	21	20	22
29	15	15		17	16	18		26	21	27	43	41	39	42	46	28	23	18	17	18	18	17	21	16
30	16	16	18	16	15	15	16	18	30	23	48	44	48	30	32	24		32	18	18	17	16	17	16
31	15	17	16	15	18	17	16	24	21	29	43	45	46	46	40	34	27	17	16	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	30	27	31	31	31	31	30	31	31	31	31	30	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	18	22	29	43	44	46	45	36	30	24	18	16	16	16	16	16	16
U Q	16	17	17	18	17	17	17	24	26	30	45	45	48	46	46	44	29	24	18	18	17	17	17	17
L Q	15	15	15	15	15	16	16	17	20	26	29	34	45	32	32	28	22	17	15	15	15	16	16	15

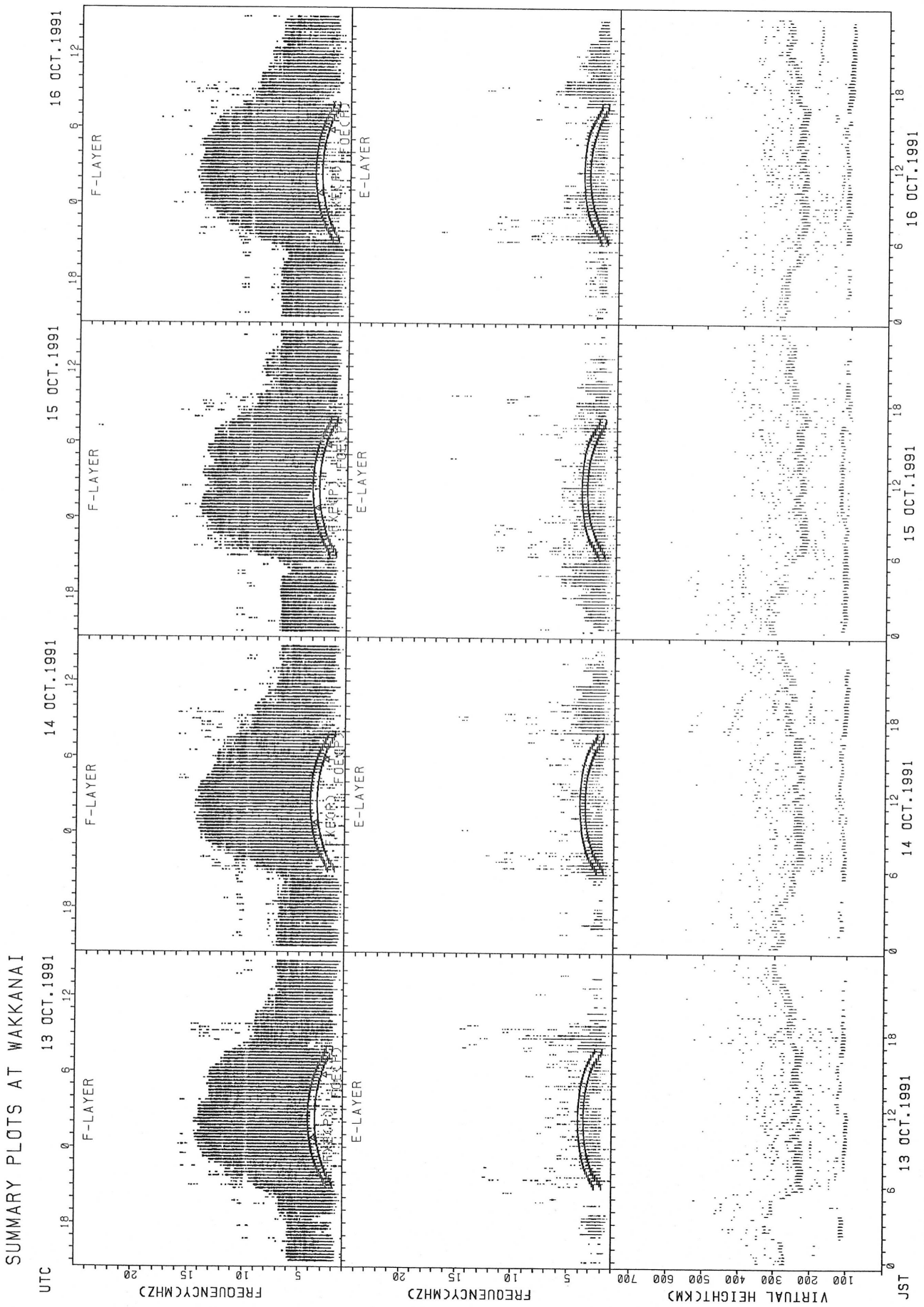

SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 OCT.1991
2 OCT.1991
3 OCT.1991
4 OCT.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

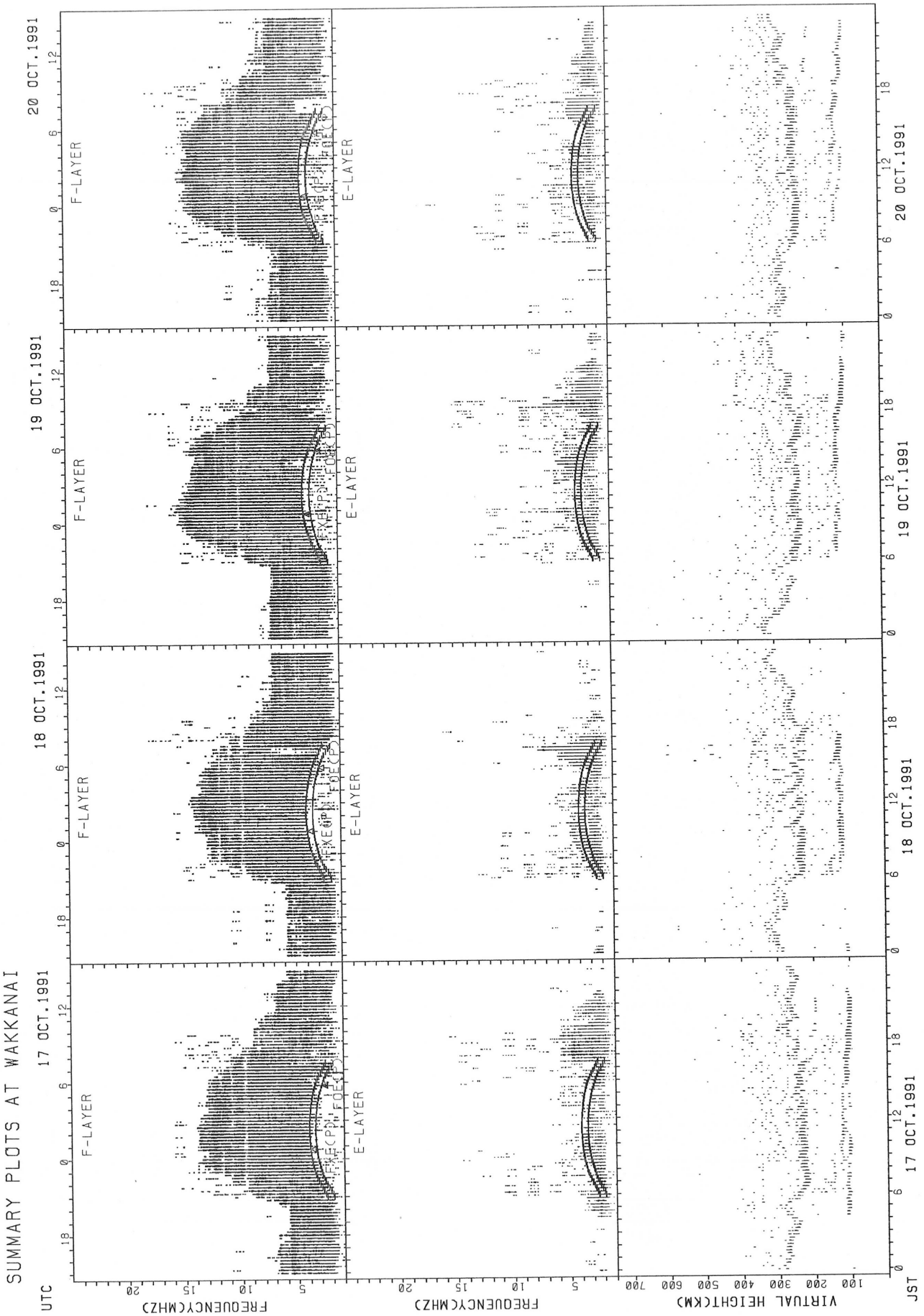
SUMMARY PLOTS AT WAKKANAI

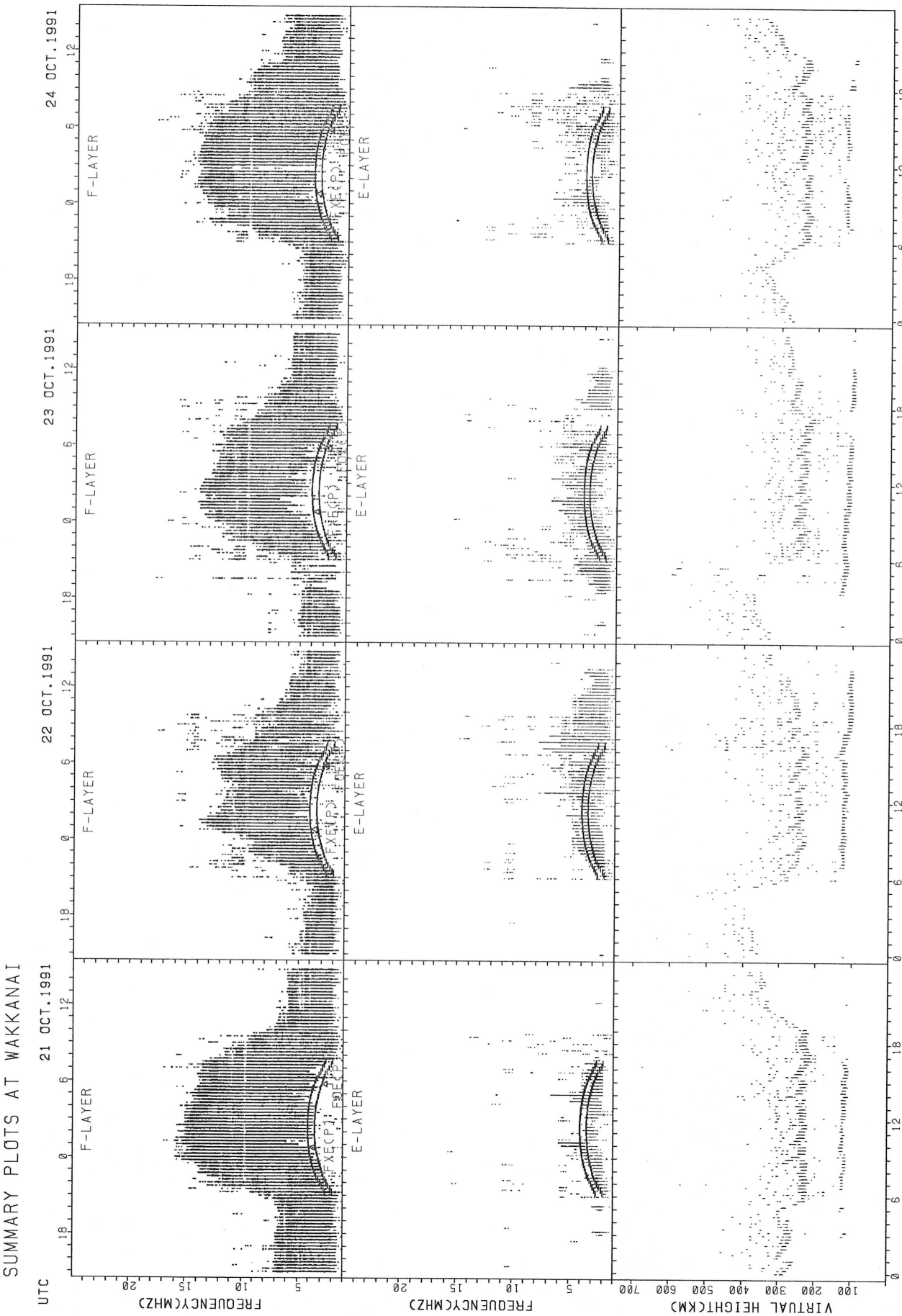


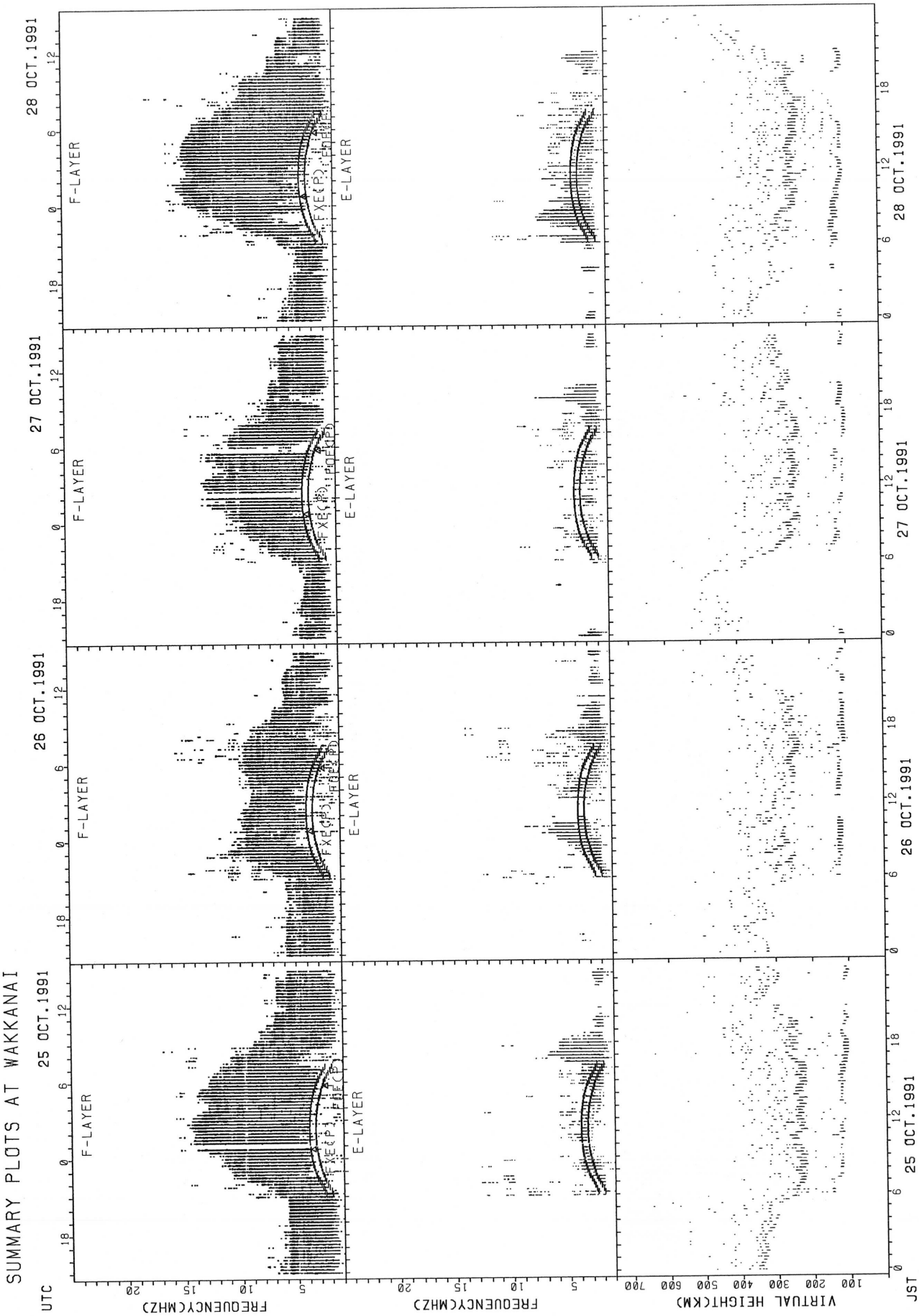
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
9 OCT.1991
10 OCT.1991
11 OCT.1991
12 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

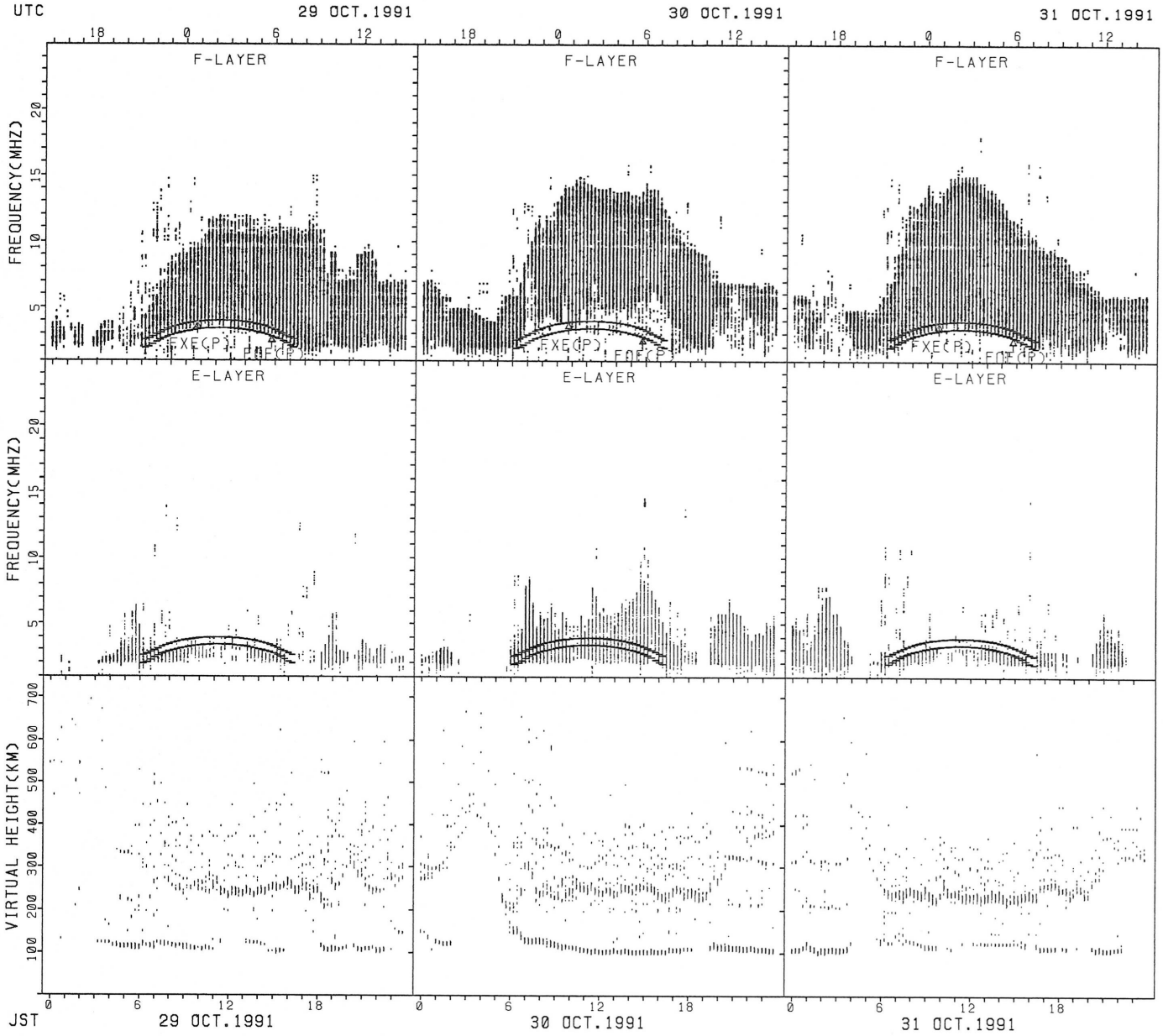

SUMMARY PLOTS AT WAKKANAI
UTC
13 OCT.1991
14 OCT.1991
15 OCT.1991
16 OCT.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
17 OCT.1991
18 OCT.1991
19 OCT.1991
20 OCT.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(CP); PREDICTED VALUE FOR FXE
FOE(CP); PREDICTED VALUE FOR FOE

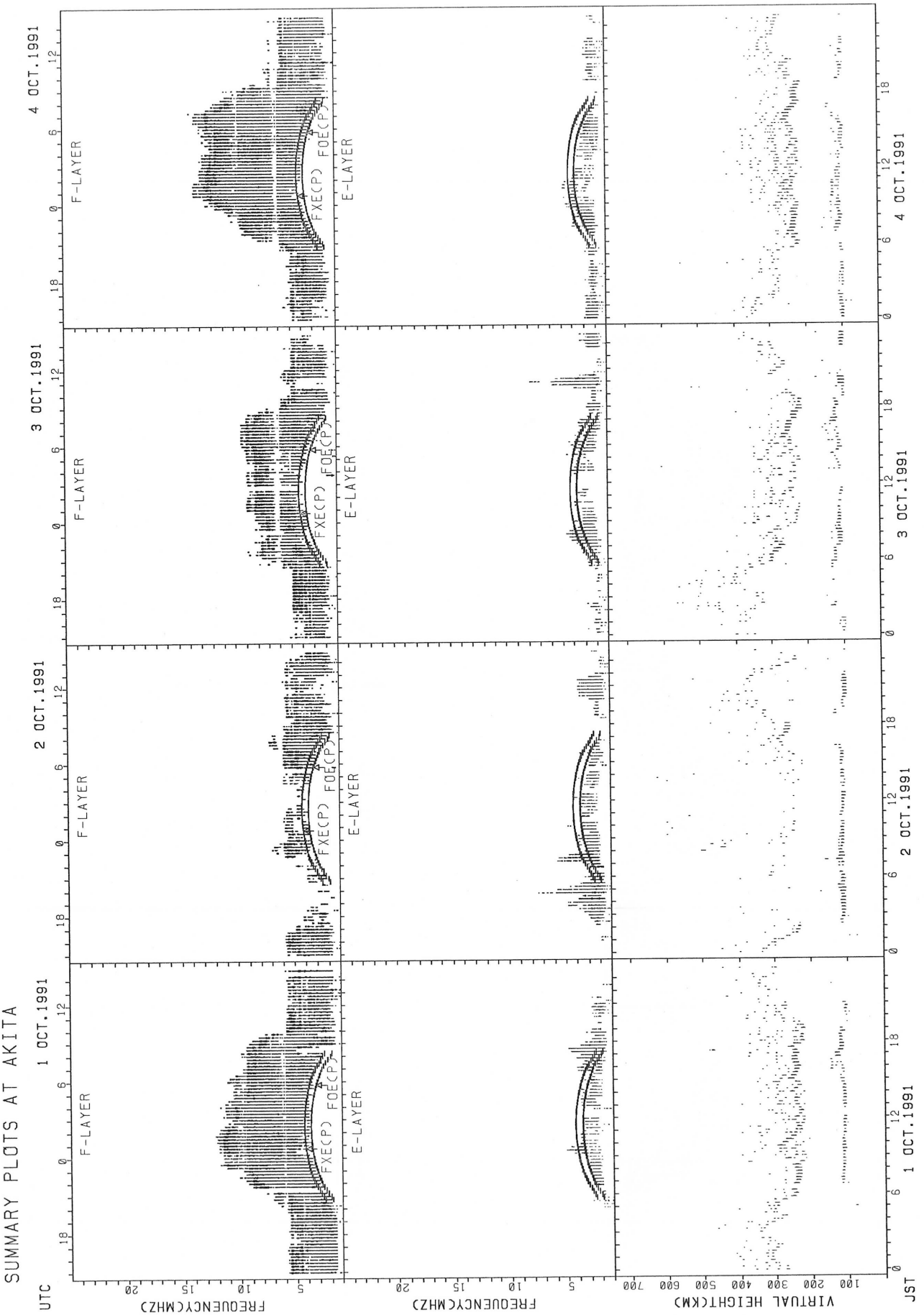

SUMMARY PLOTS AT WAKKANAI
21 OCT.1991
22 OCT.1991
23 OCT.1991
24 OCT.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

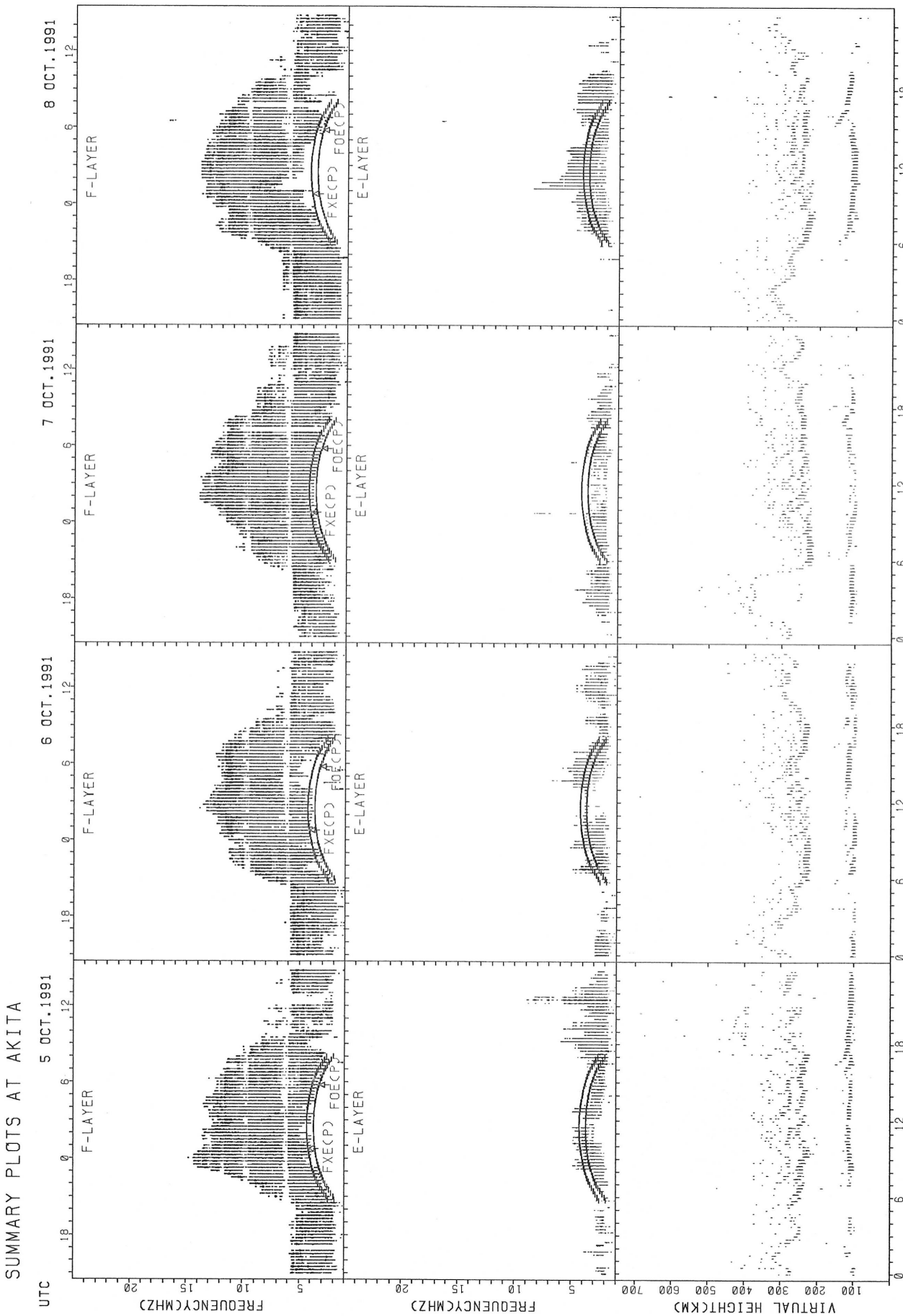

SUMMARY PLOTS AT WAKKANAI
UTC
25 OCT.1991
26 OCT.1991
27 OCT.1991
28 OCT.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

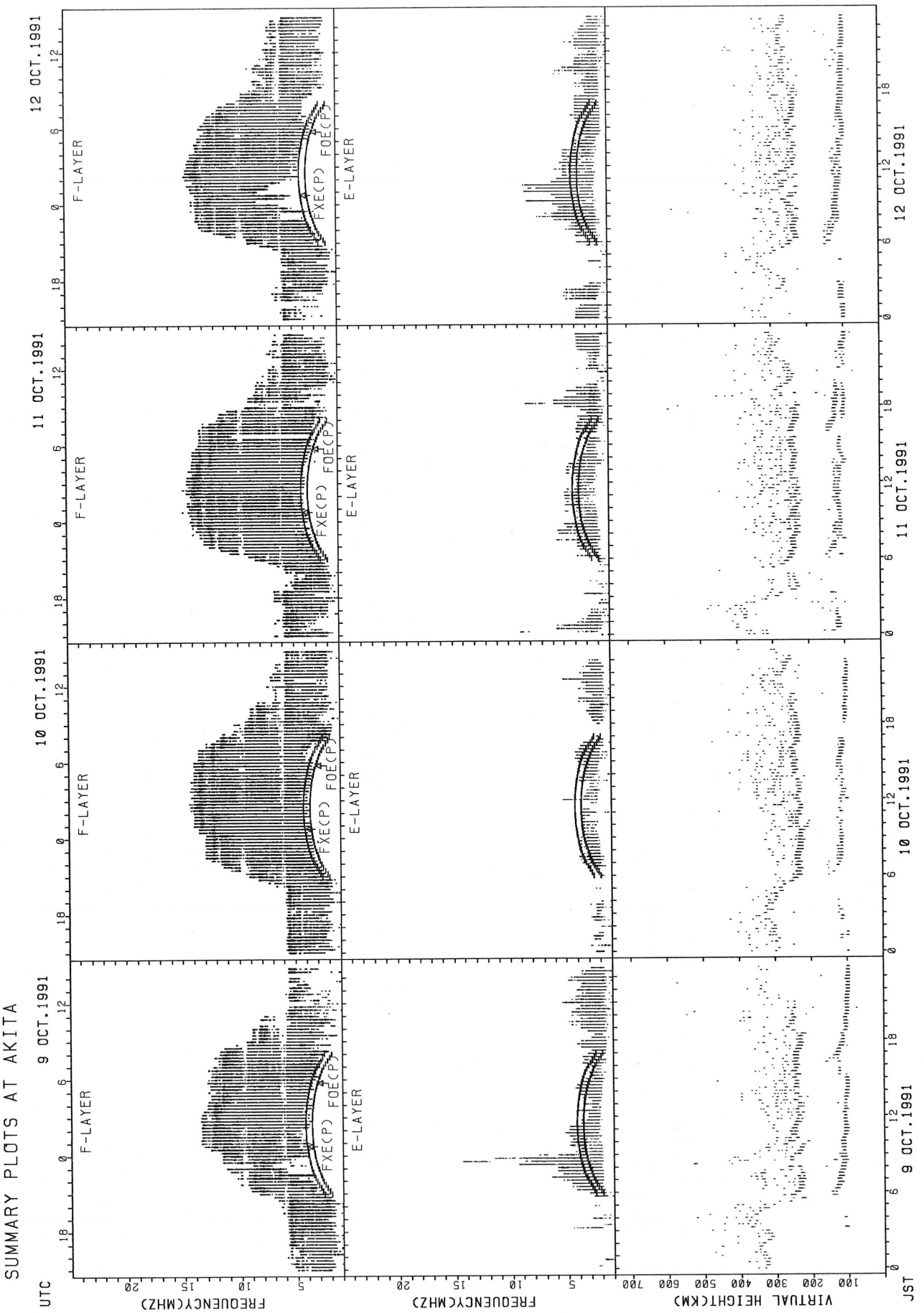
SUMMARY PLOTS AT WAKKANAI



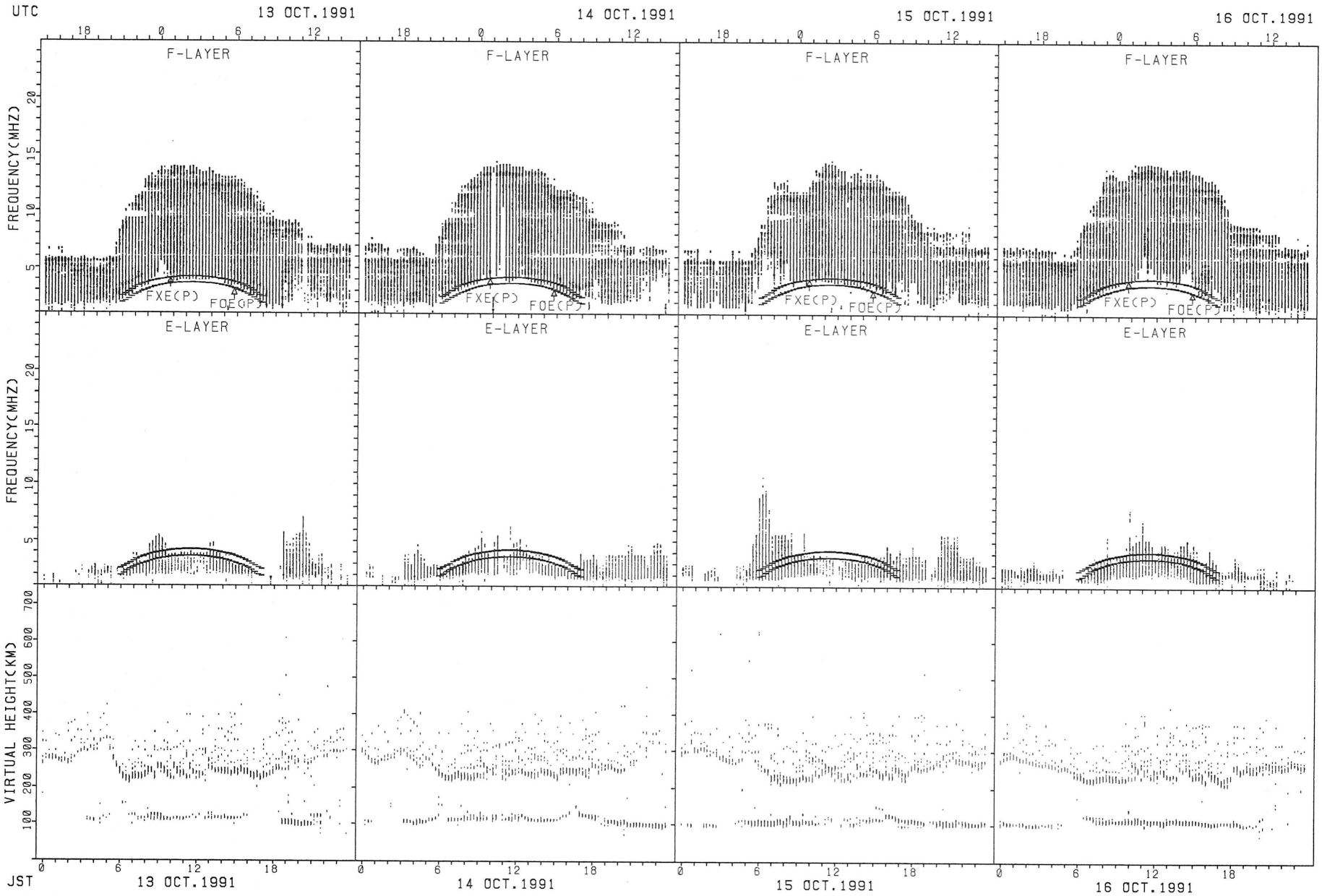
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
1 OCT.1991
2 OCT.1991
3 OCT.1991
4 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

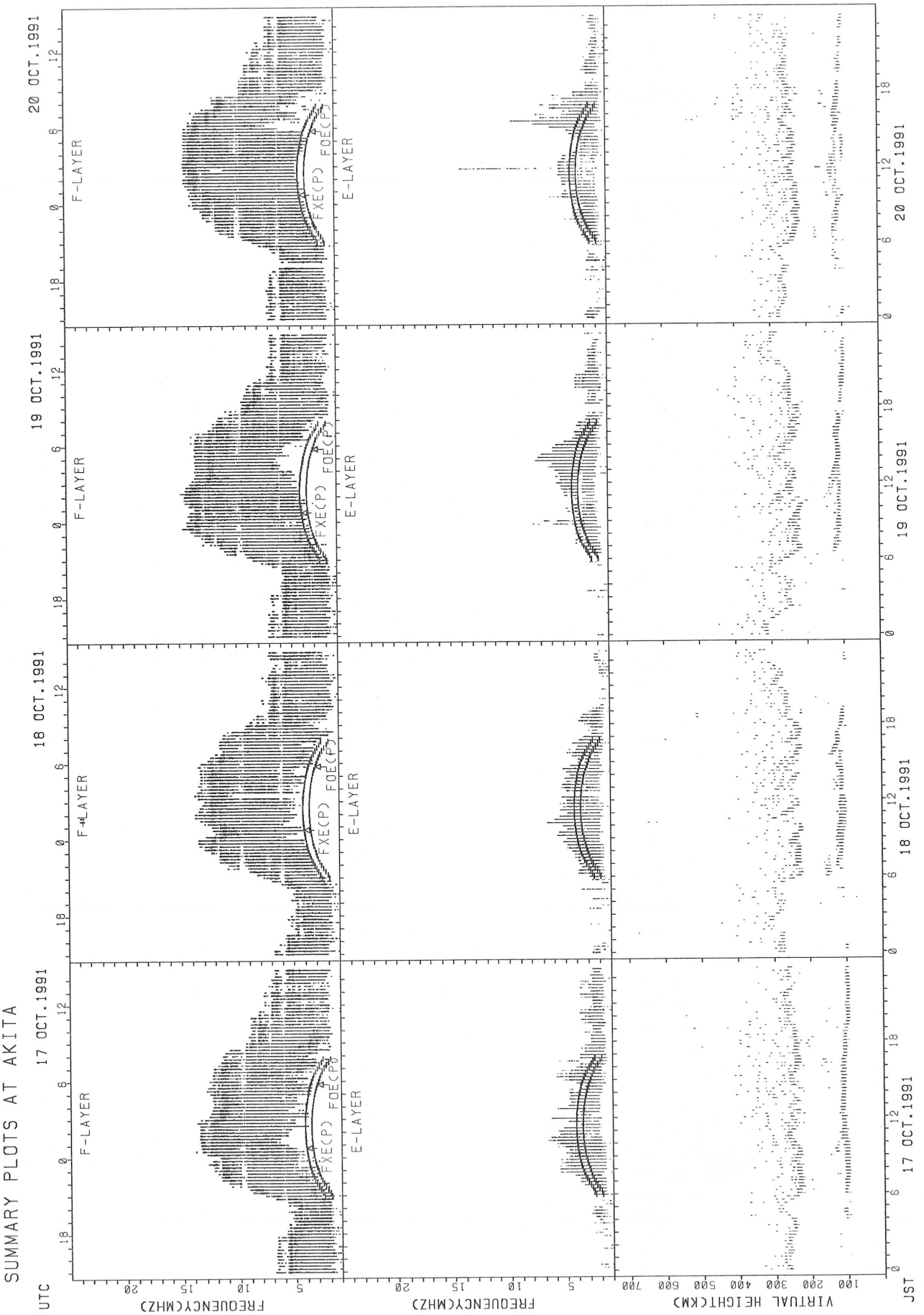

SUMMARY PLOTS AT AKITA
UTC
5 OCT.1991
6 OCT.1991
7 OCT.1991
8 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
9 OCT.1991
10 OCT.1991
11 OCT.1991
12 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

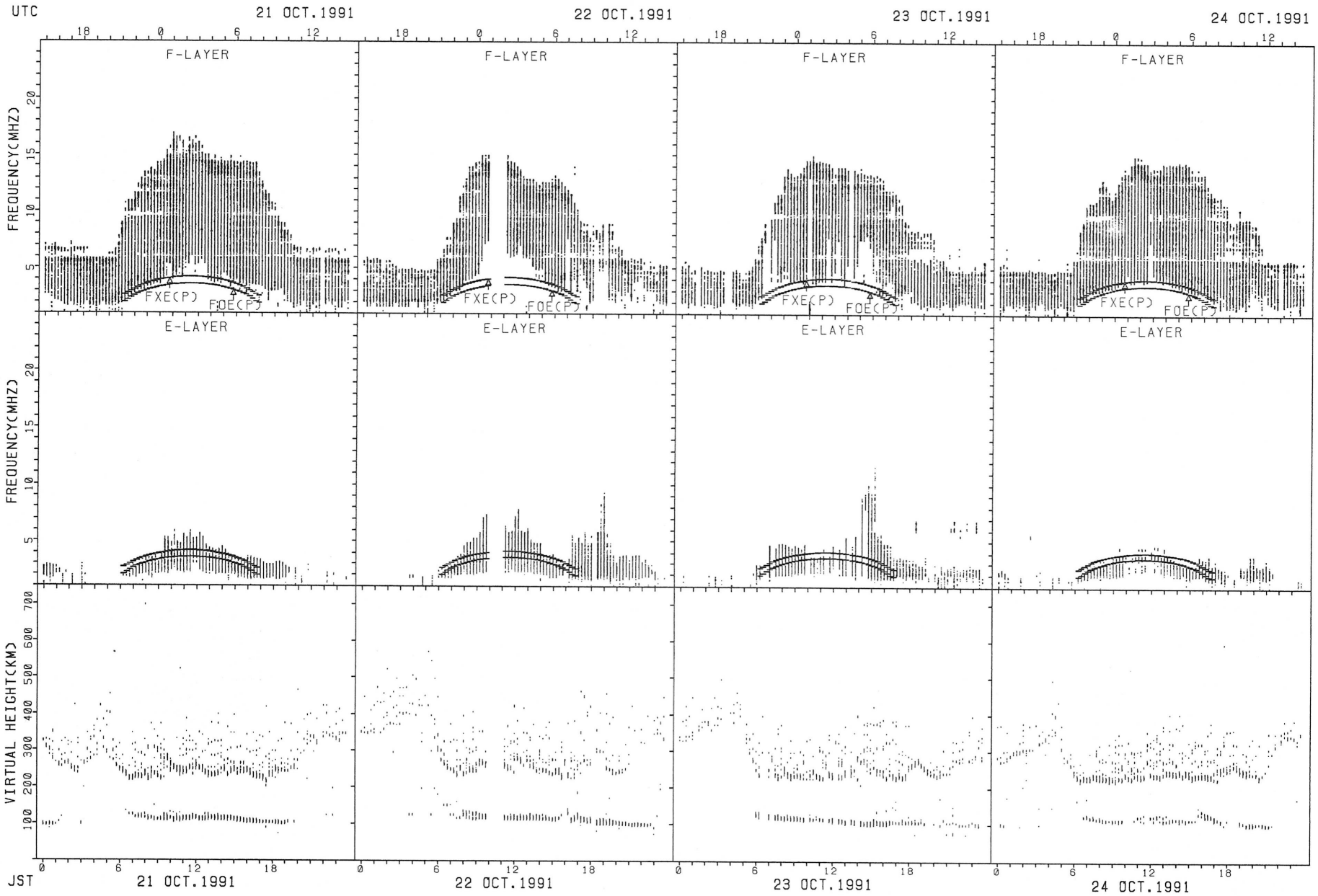
SUMMARY PLOTS AT AKITA



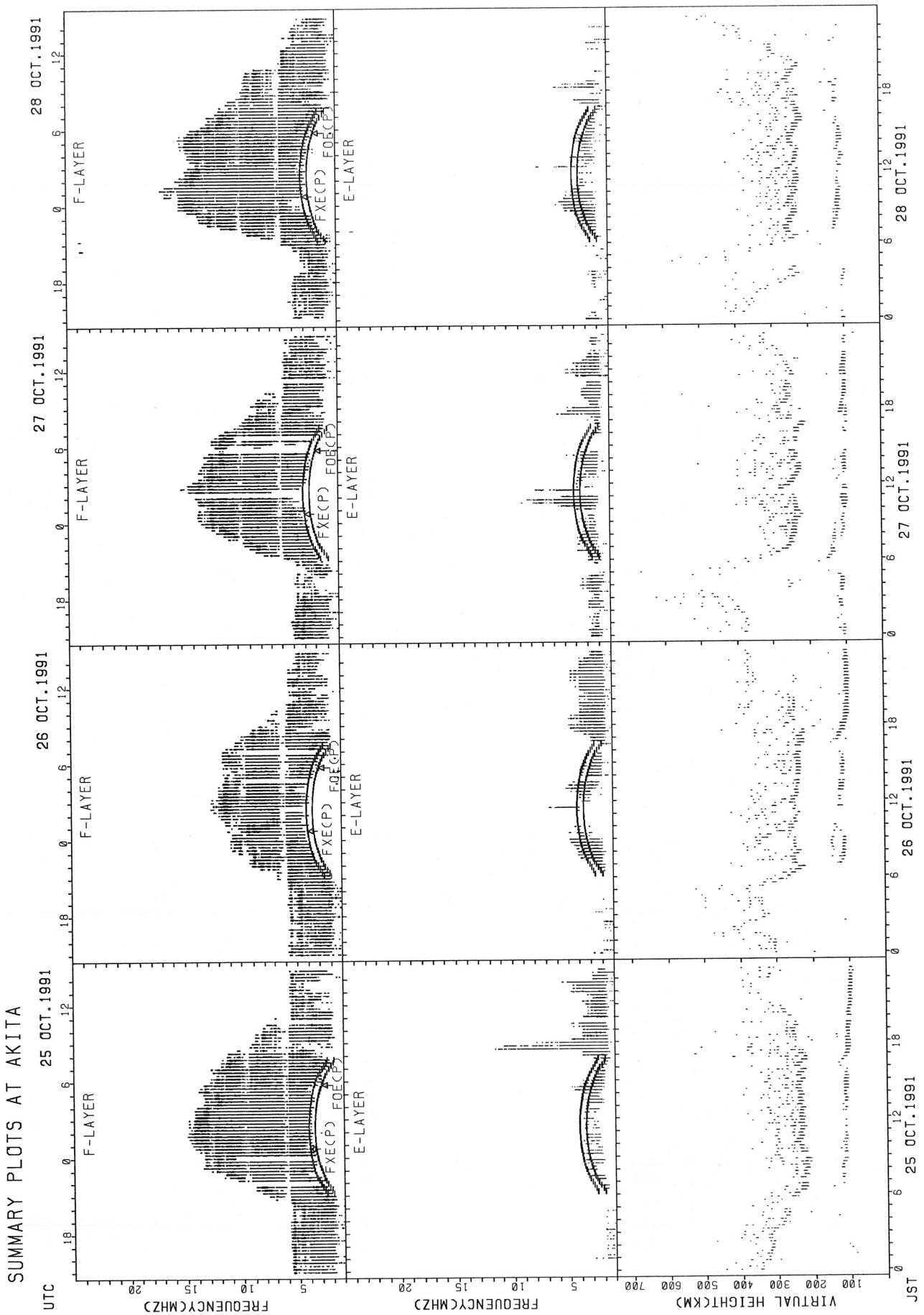
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
17 OCT.1991
18 OCT.1991
19 OCT.1991
20 OCT.1991
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

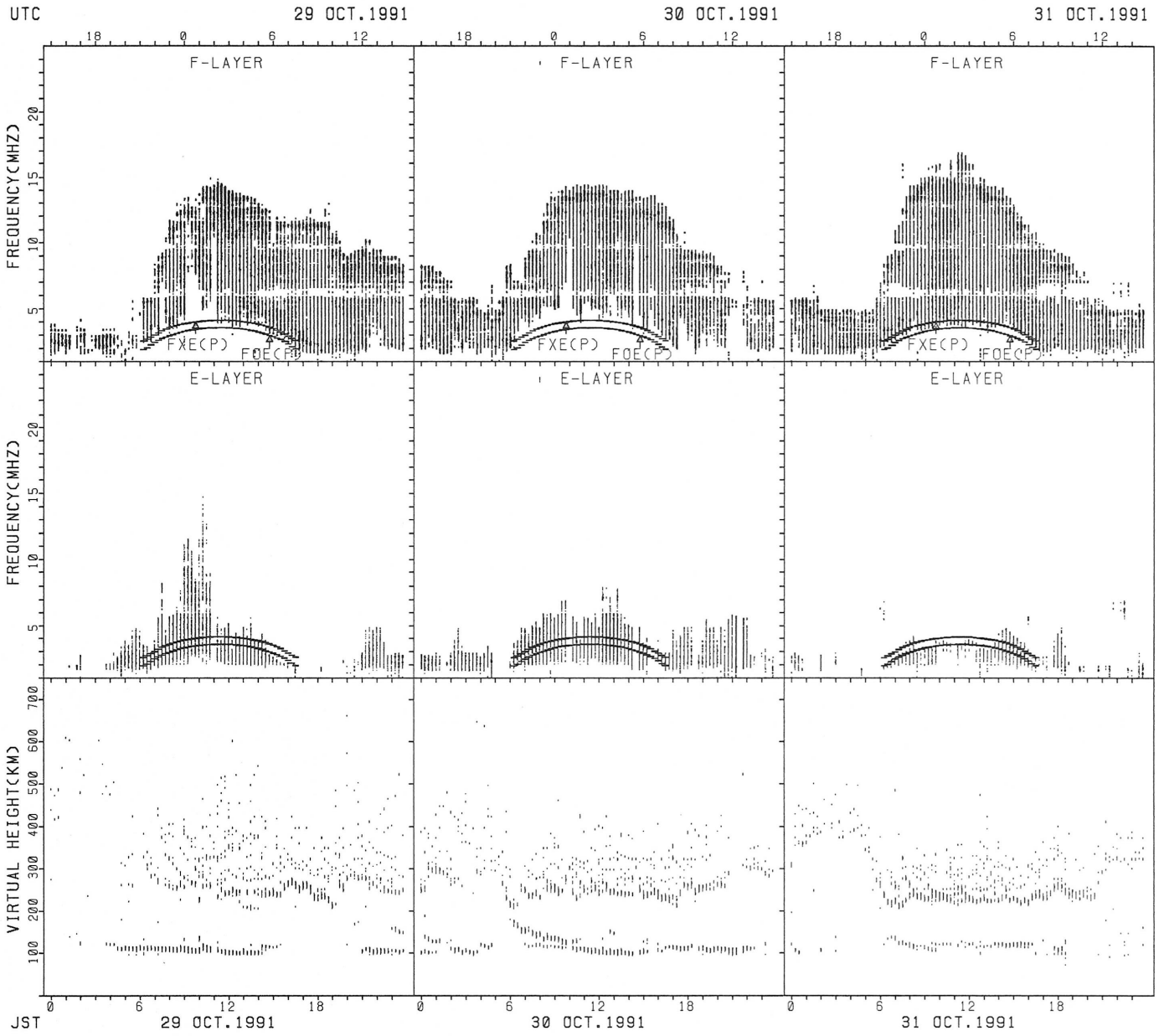
SUMMARY PLOTS AT AKITA



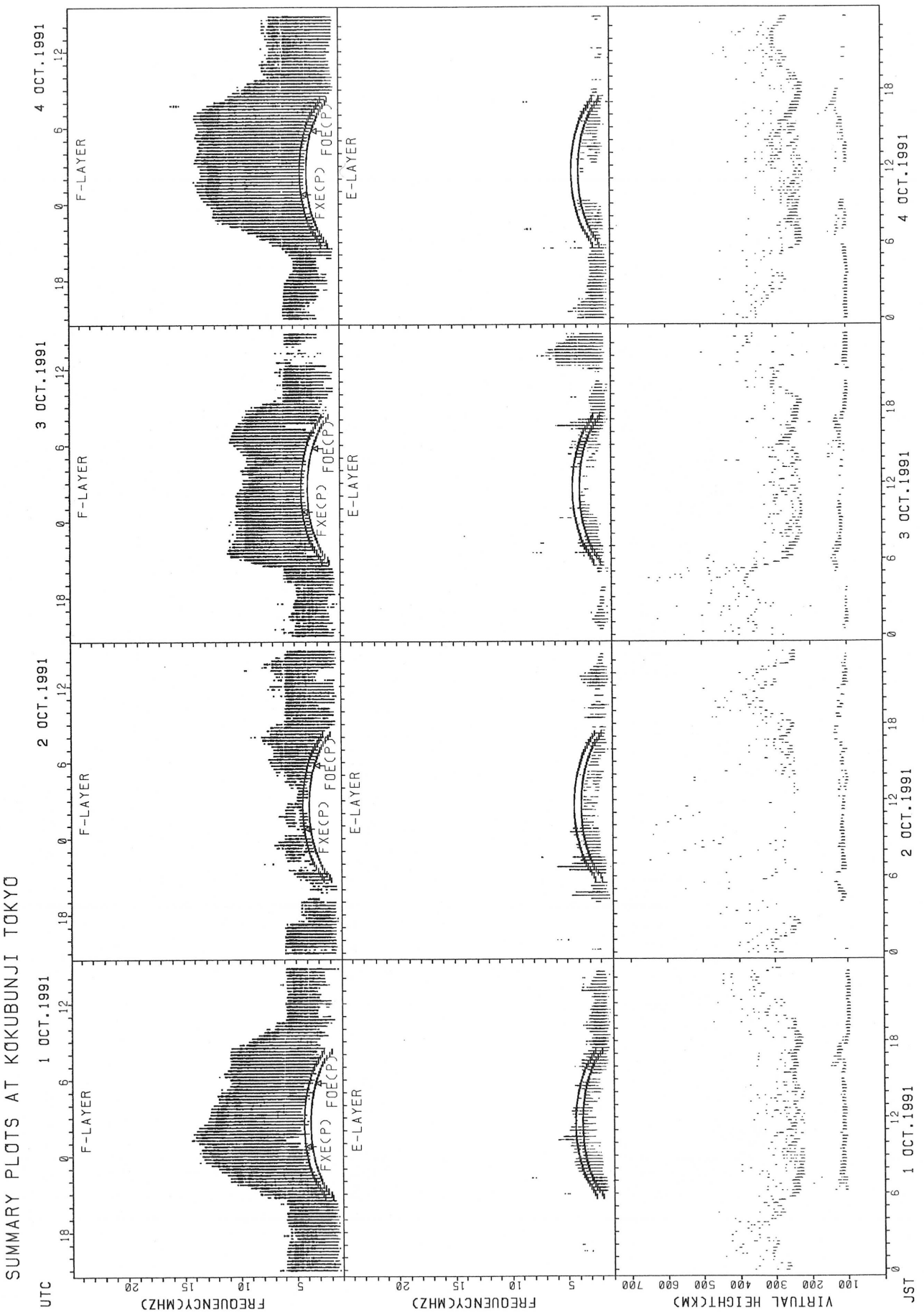
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

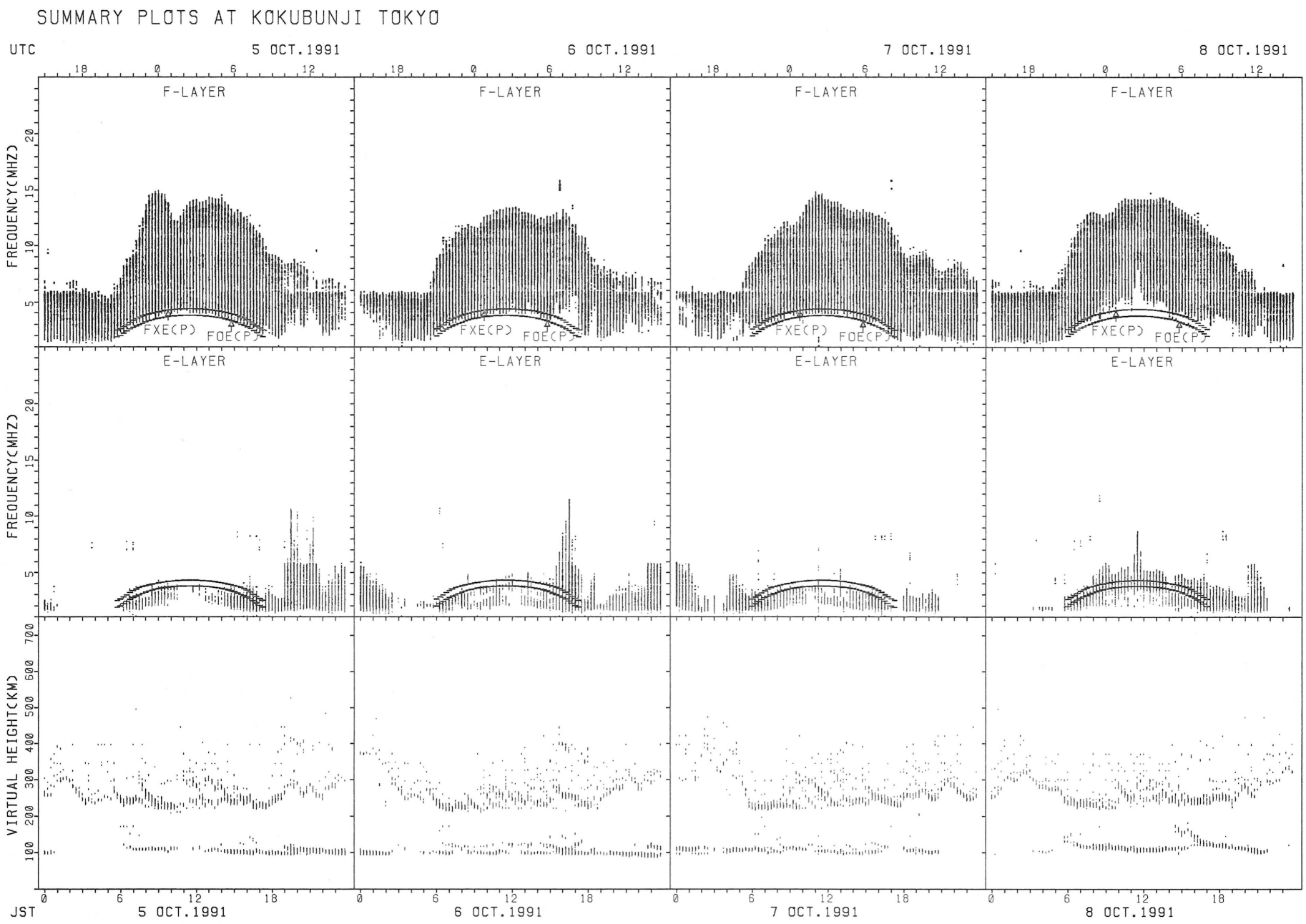

SUMMARY PLOTS AT AKITA
UTC
25 OCT.1991
26 OCT.1991
27 OCT.1991
28 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

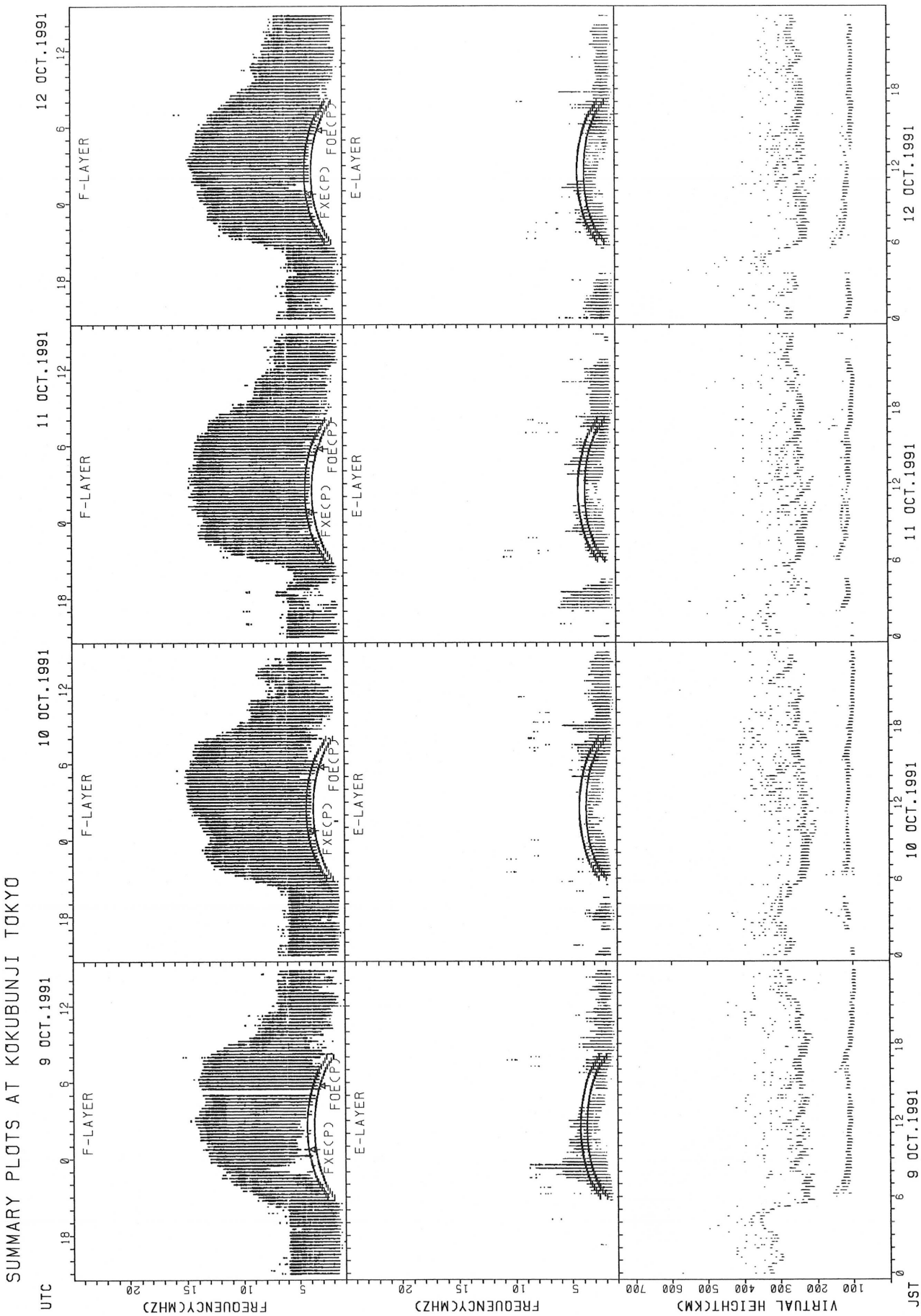
SUMMARY PLOTS AT AKITA



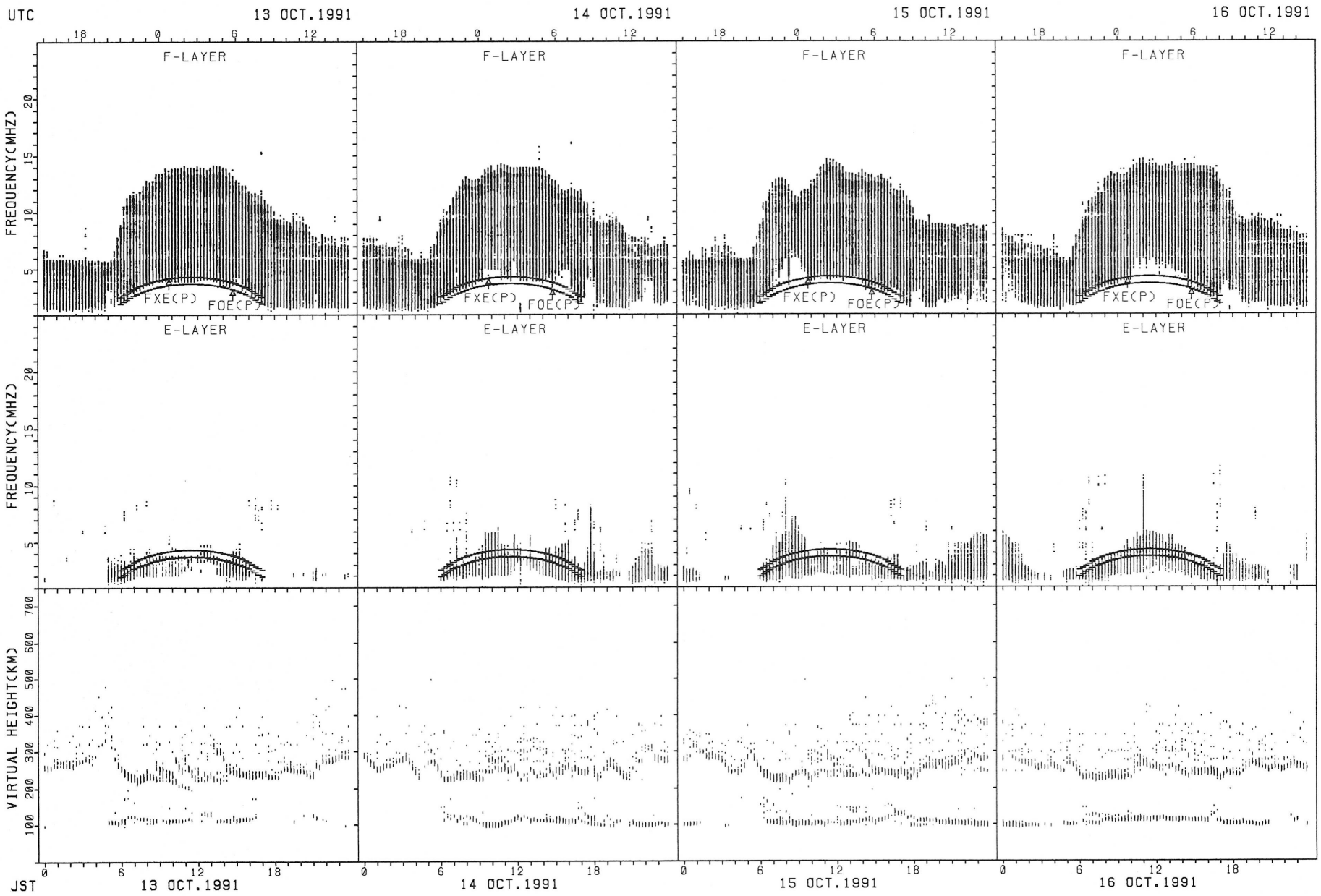
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 OCT.1991
2 OCT.1991
3 OCT.1991
4 OCT.1991
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

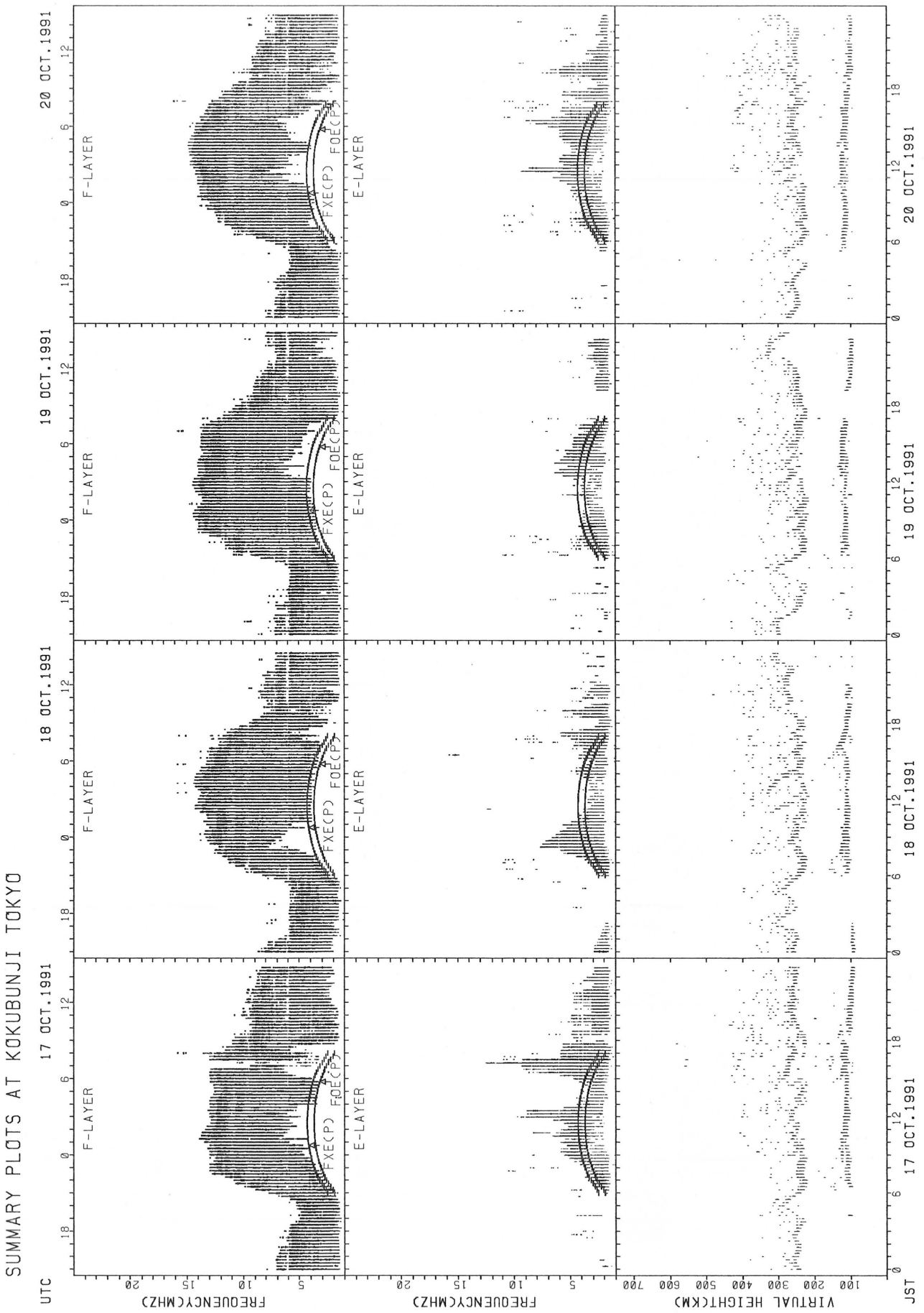

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
5 OCT.1991
6 OCT.1991
7 OCT.1991
8 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
9 OCT.1991
10 OCT.1991
11 OCT.1991
12 OCT.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

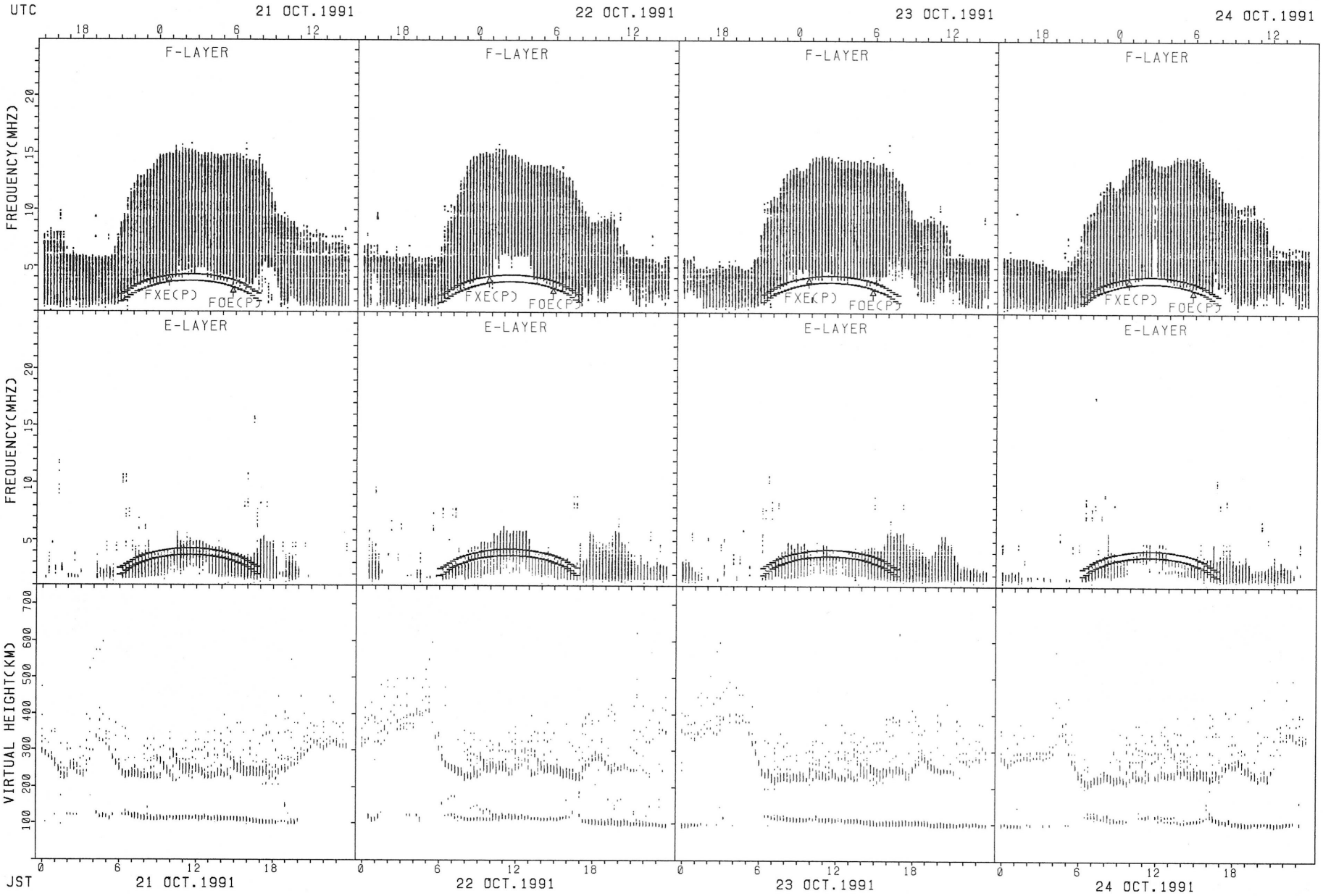
SUMMARY PLOTS AT KOKUBUNJI TOKYO



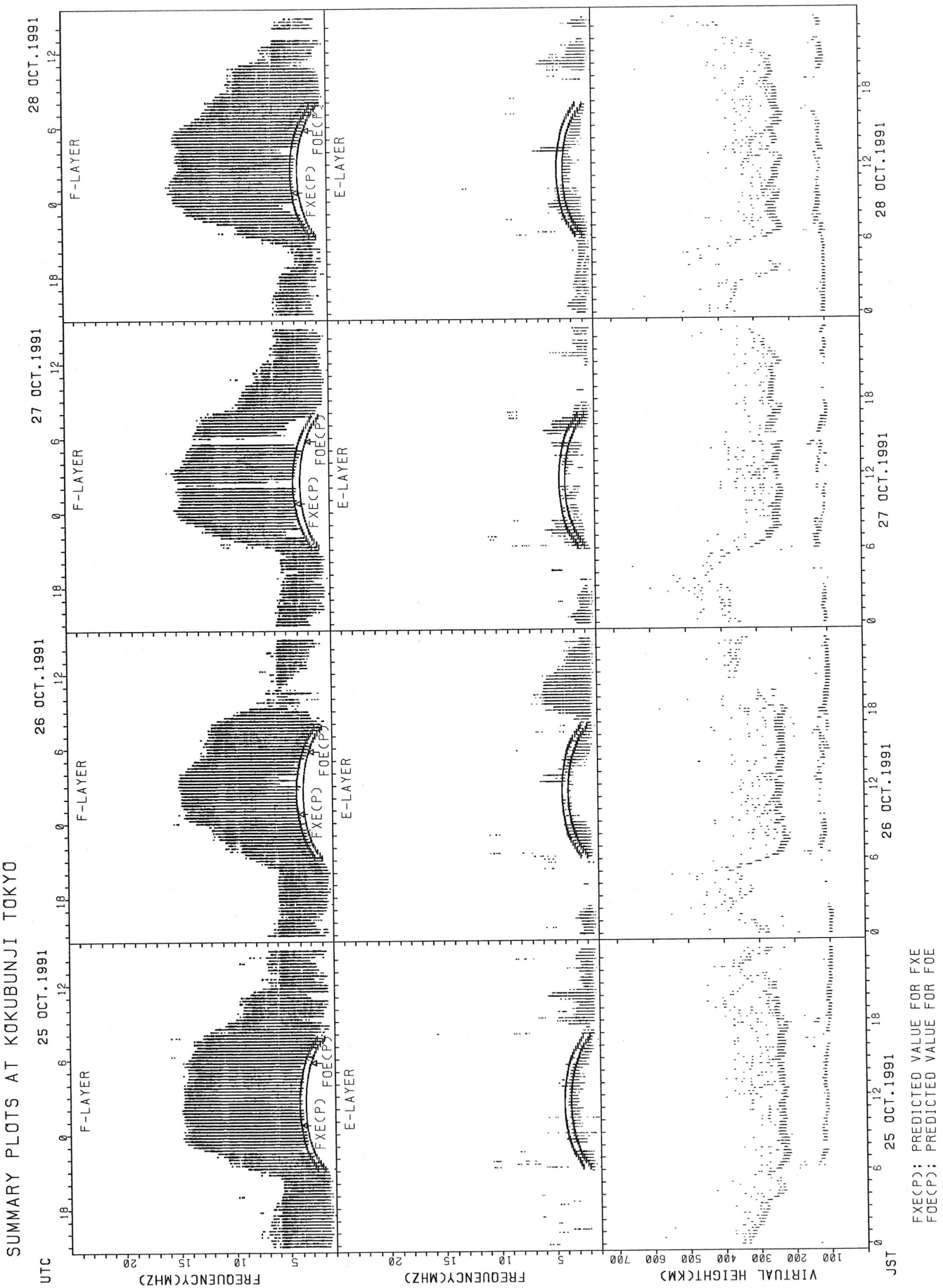
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
17 OCT.1991
18 OCT.1991
19 OCT.1991
20 OCT.1991
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

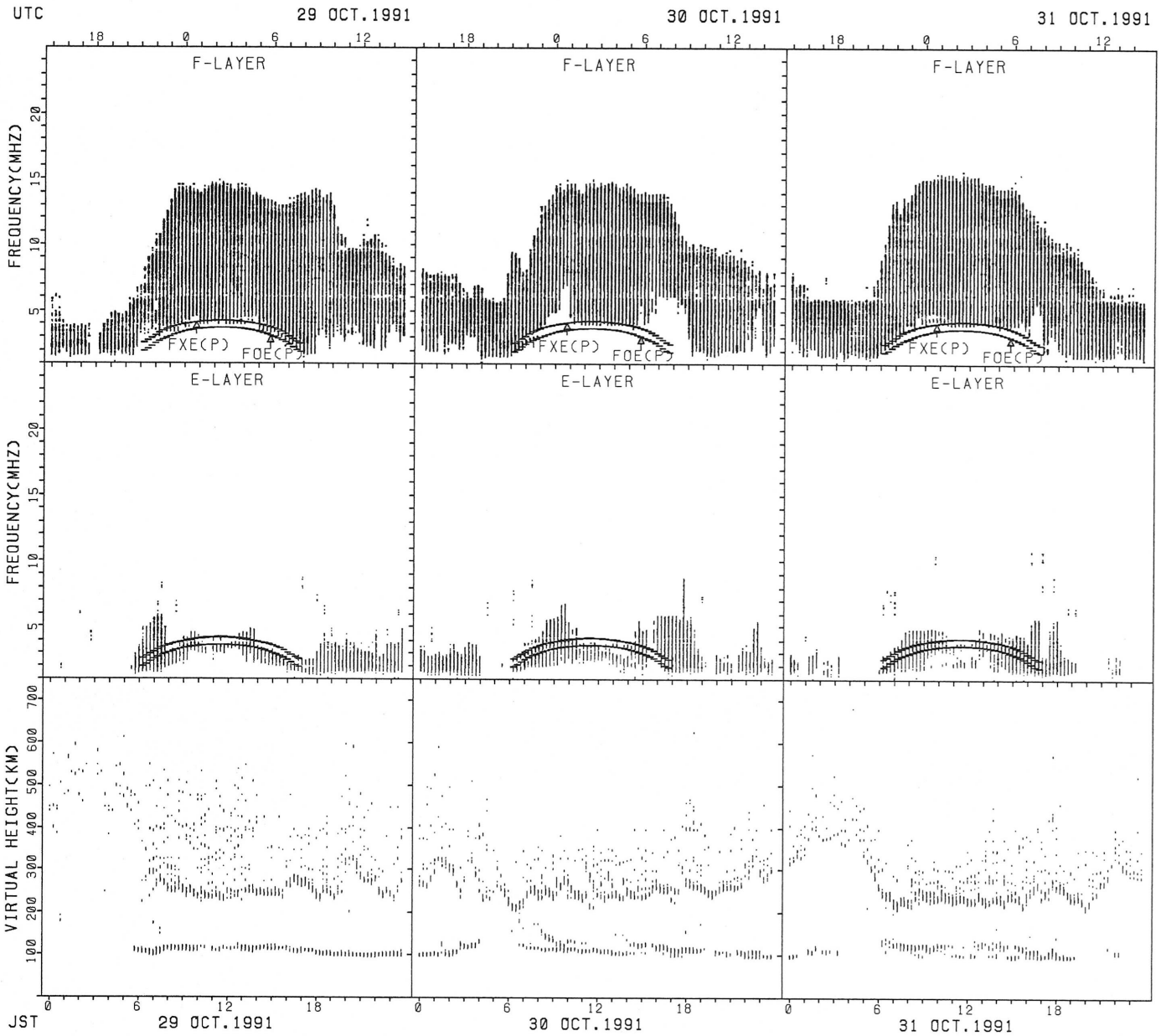
SUMMARY PLOTS AT KOKUBUNJI TOKYO



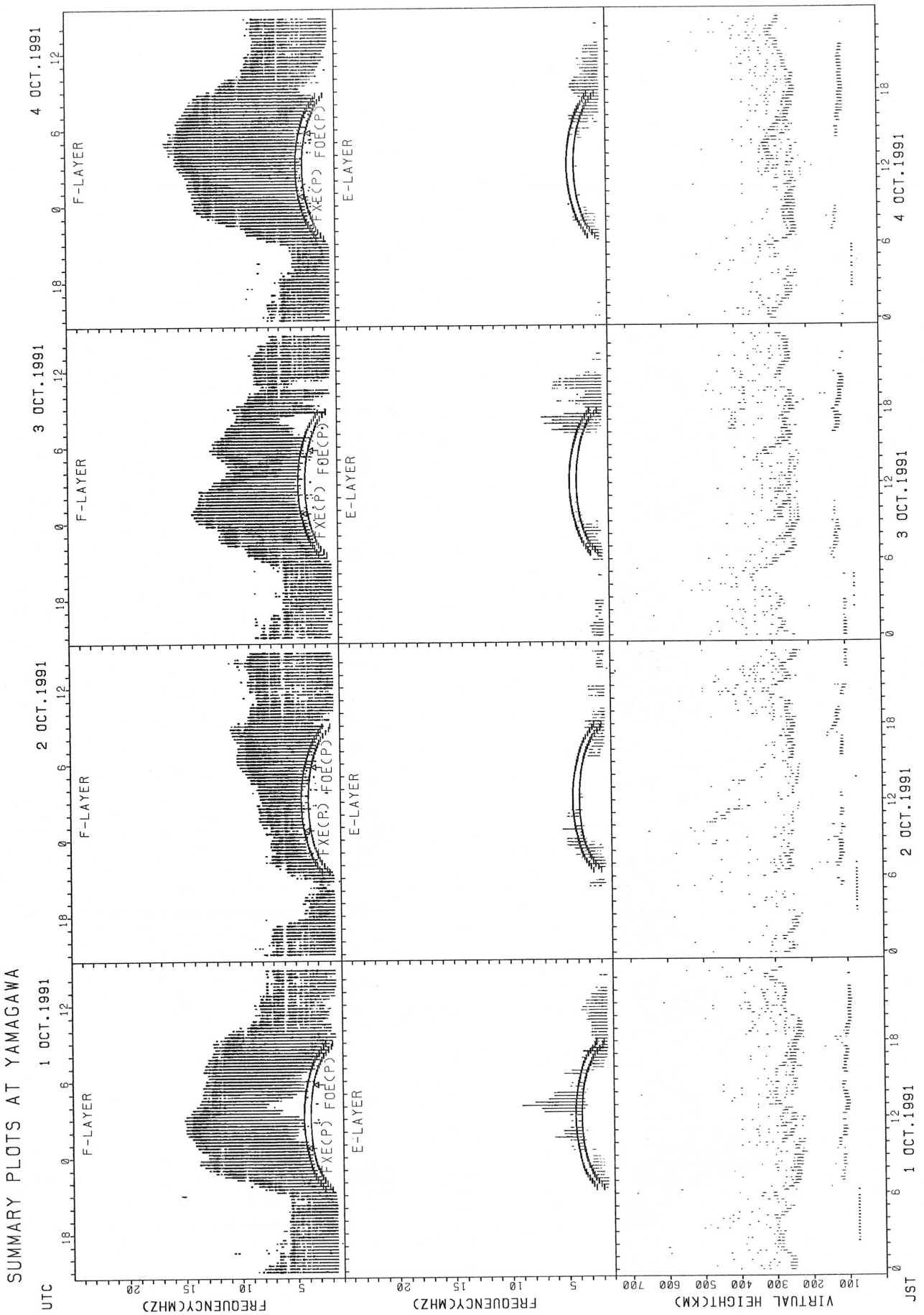
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 OCT.1991
26 OCT.1991
27 OCT.1991
28 OCT.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

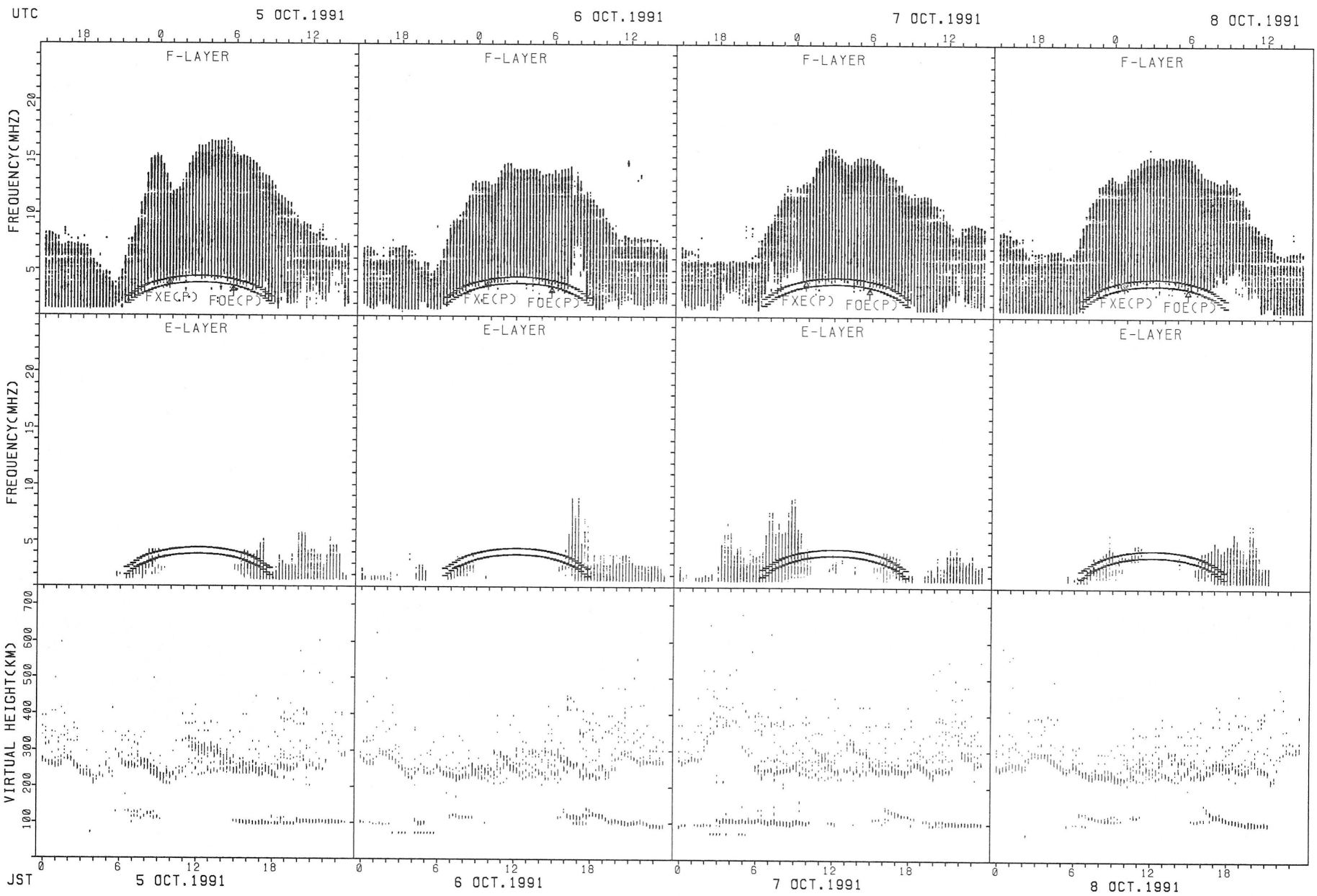
SUMMARY PLOTS AT KOKUBUNJI TOKYO



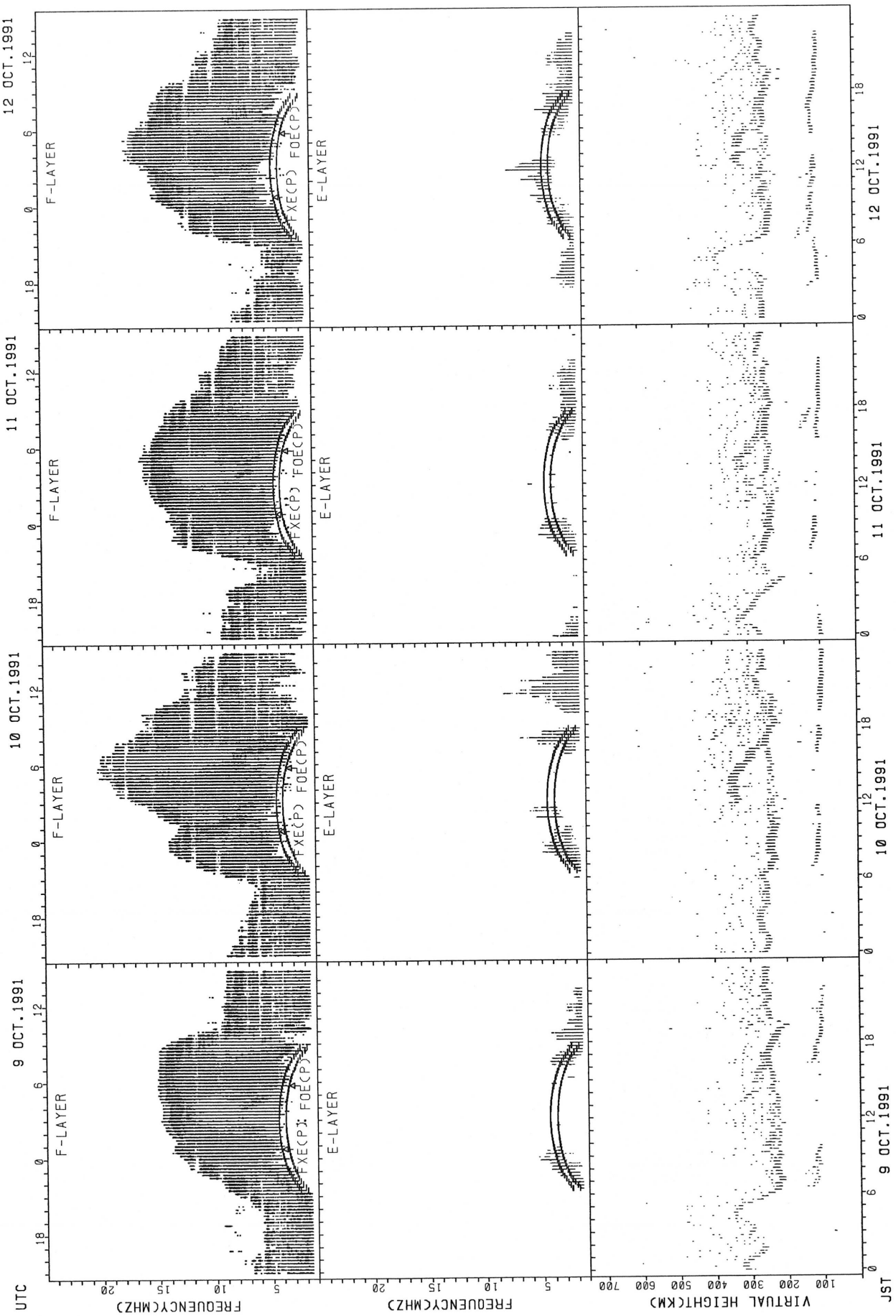
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
1 OCT.1991
2 OCT.1991
3 OCT.1991
4 OCT.1991
UTC
JST
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

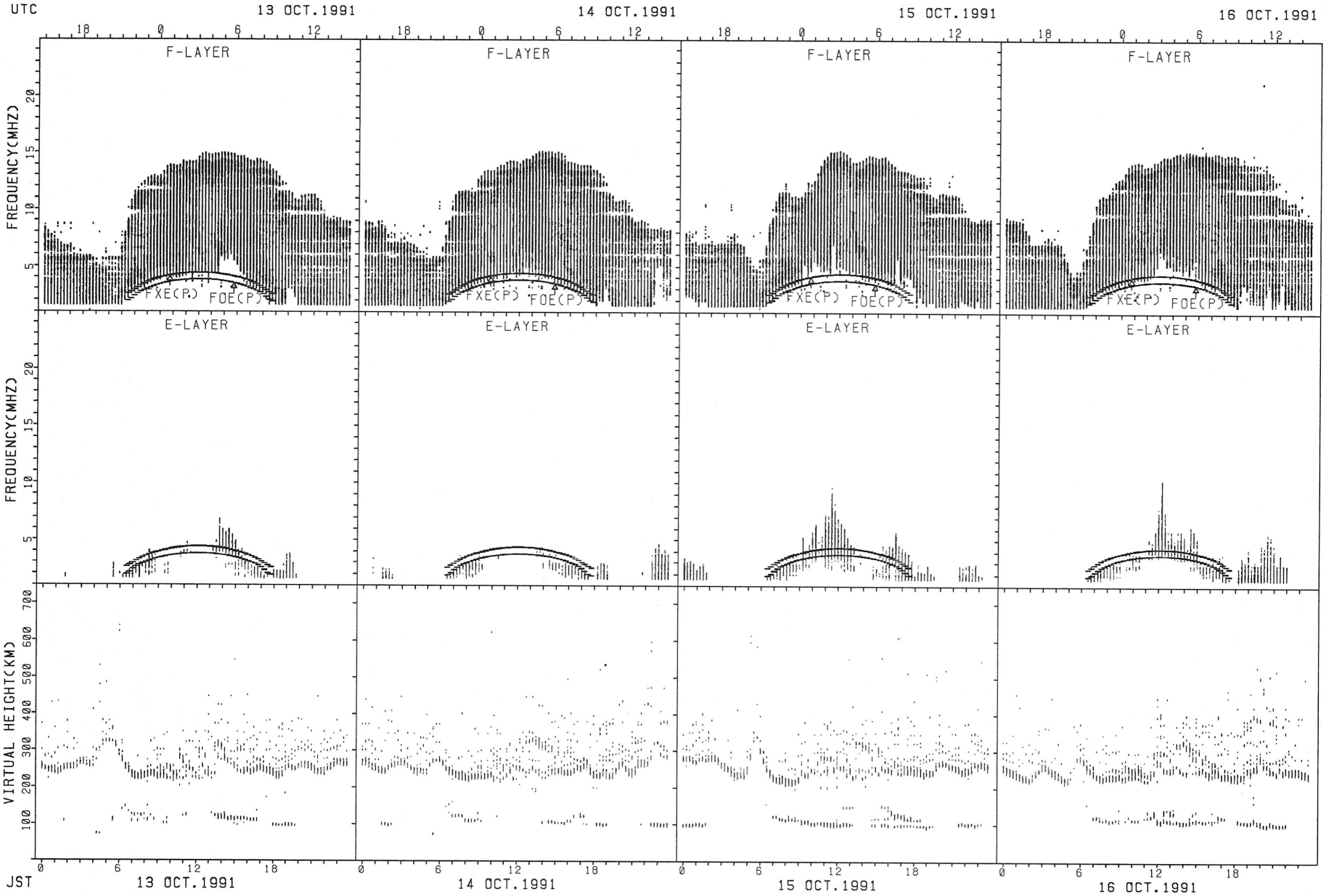
SUMMARY PLOTS AT YAMAGAWA



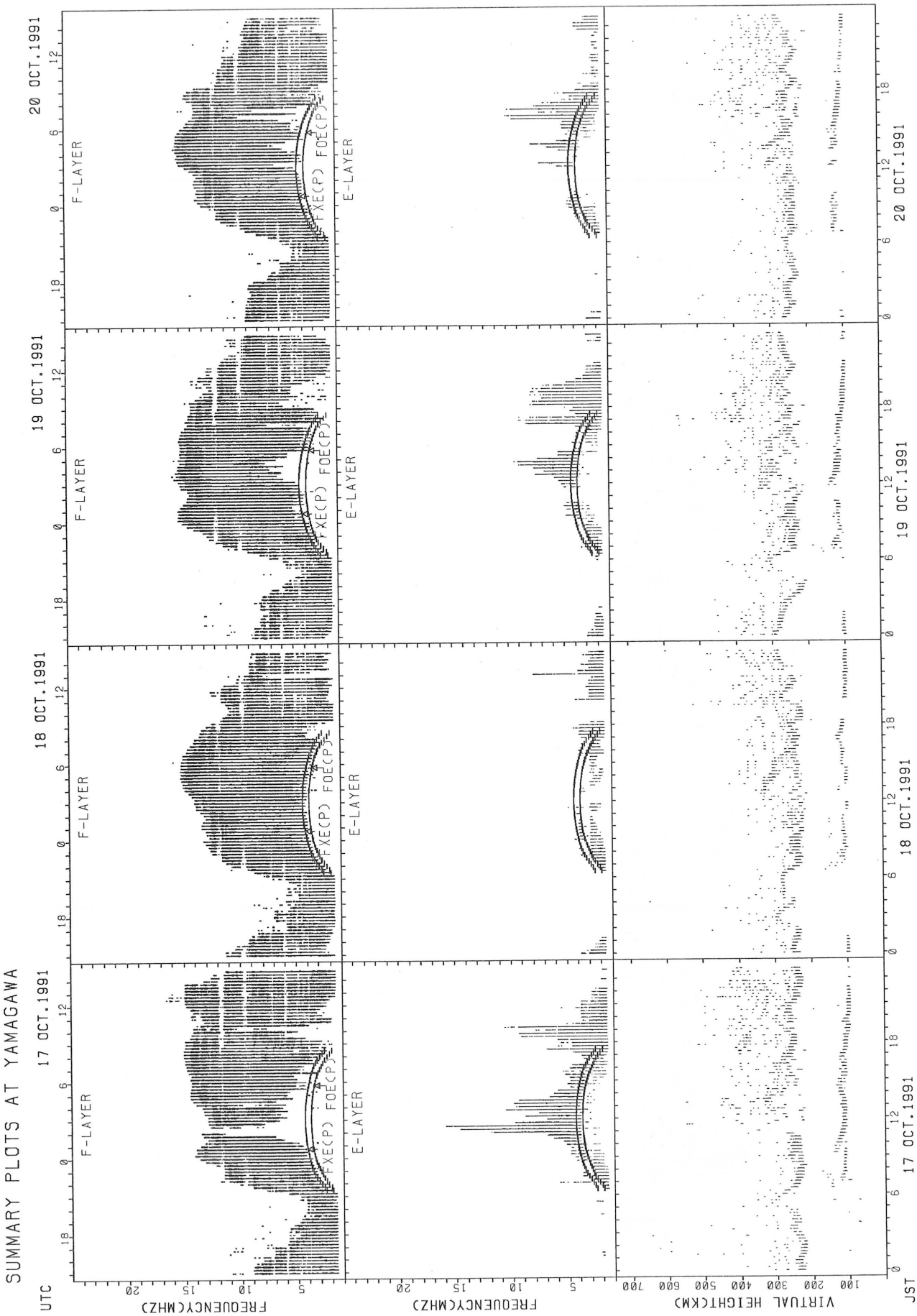
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
9 OCT.1991
10 OCT.1991
11 OCT.1991
12 OCT.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

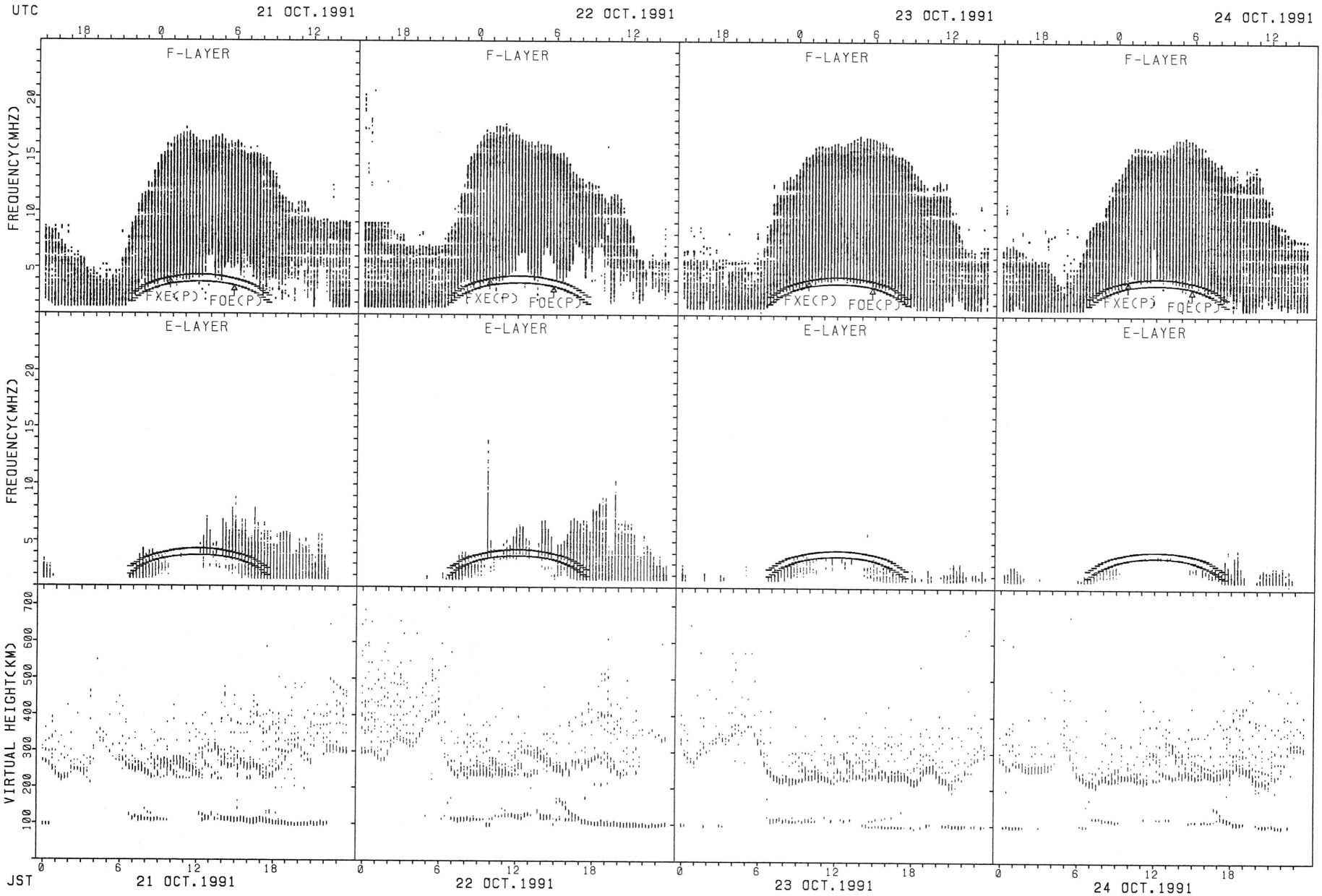
SUMMARY PLOTS AT YAMAGAWA



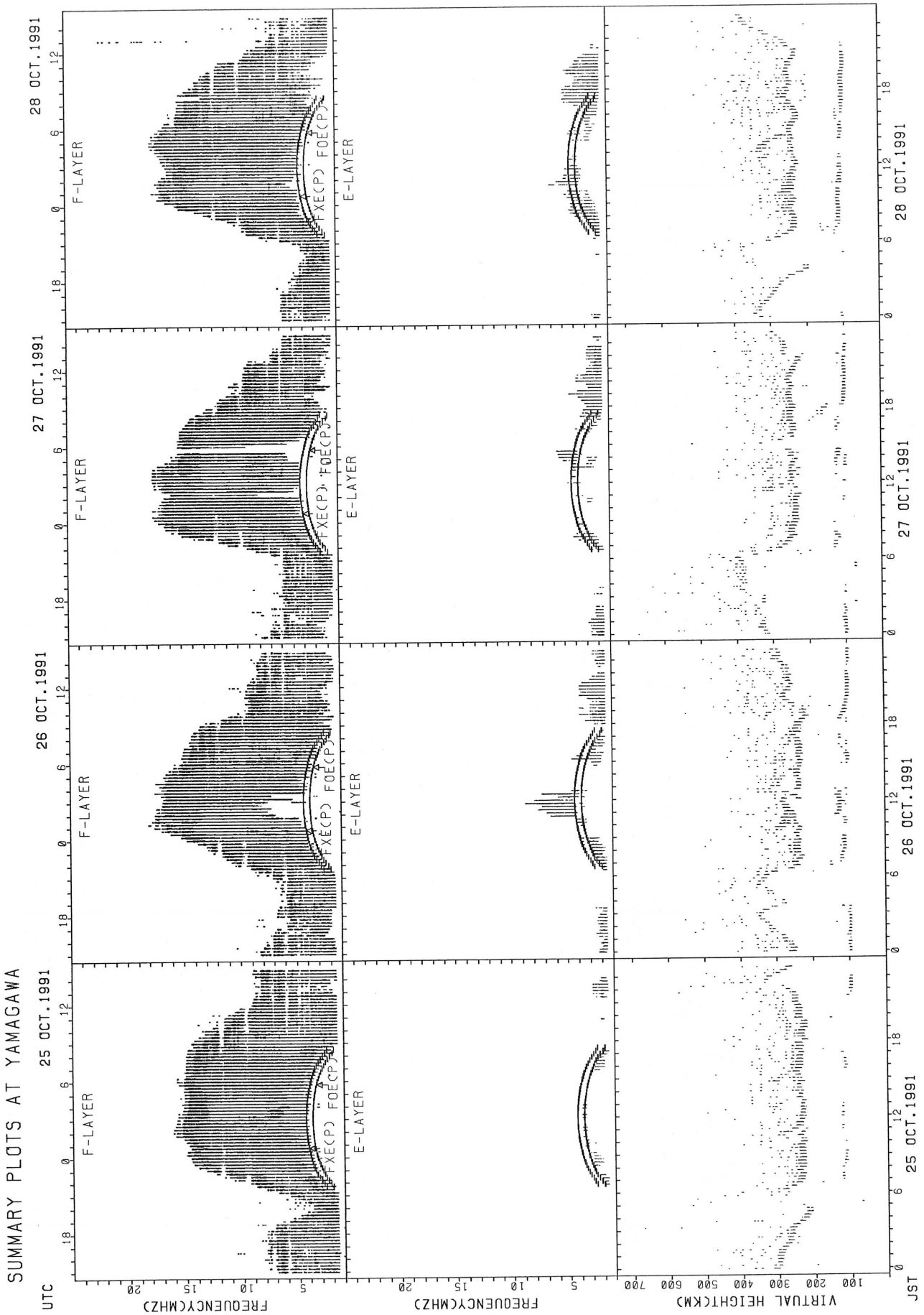
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
17 OCT.1991
18 OCT.1991
19 OCT.1991
20 OCT.1991
UTC
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

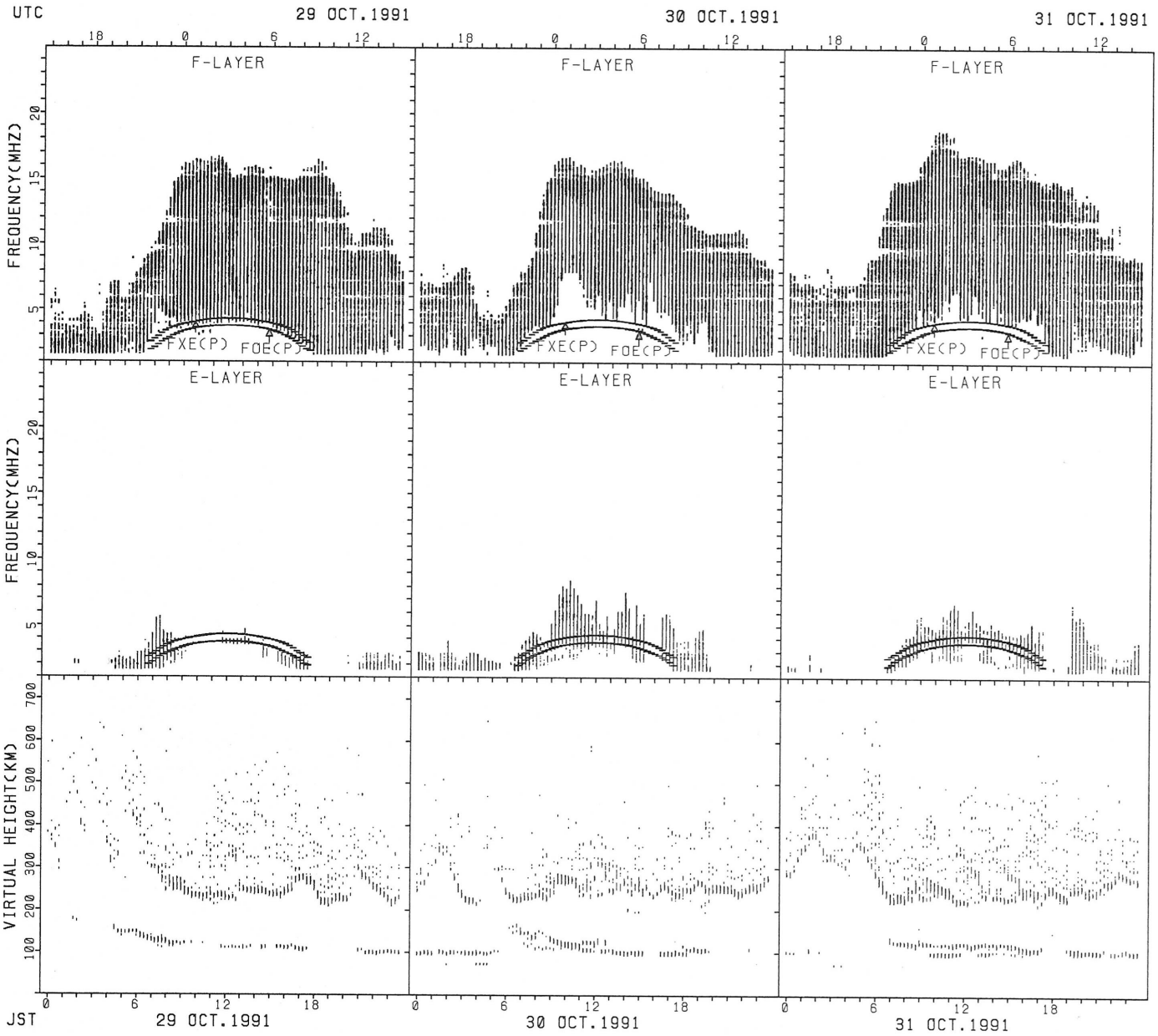
SUMMARY PLOTS AT YAMAGAWA



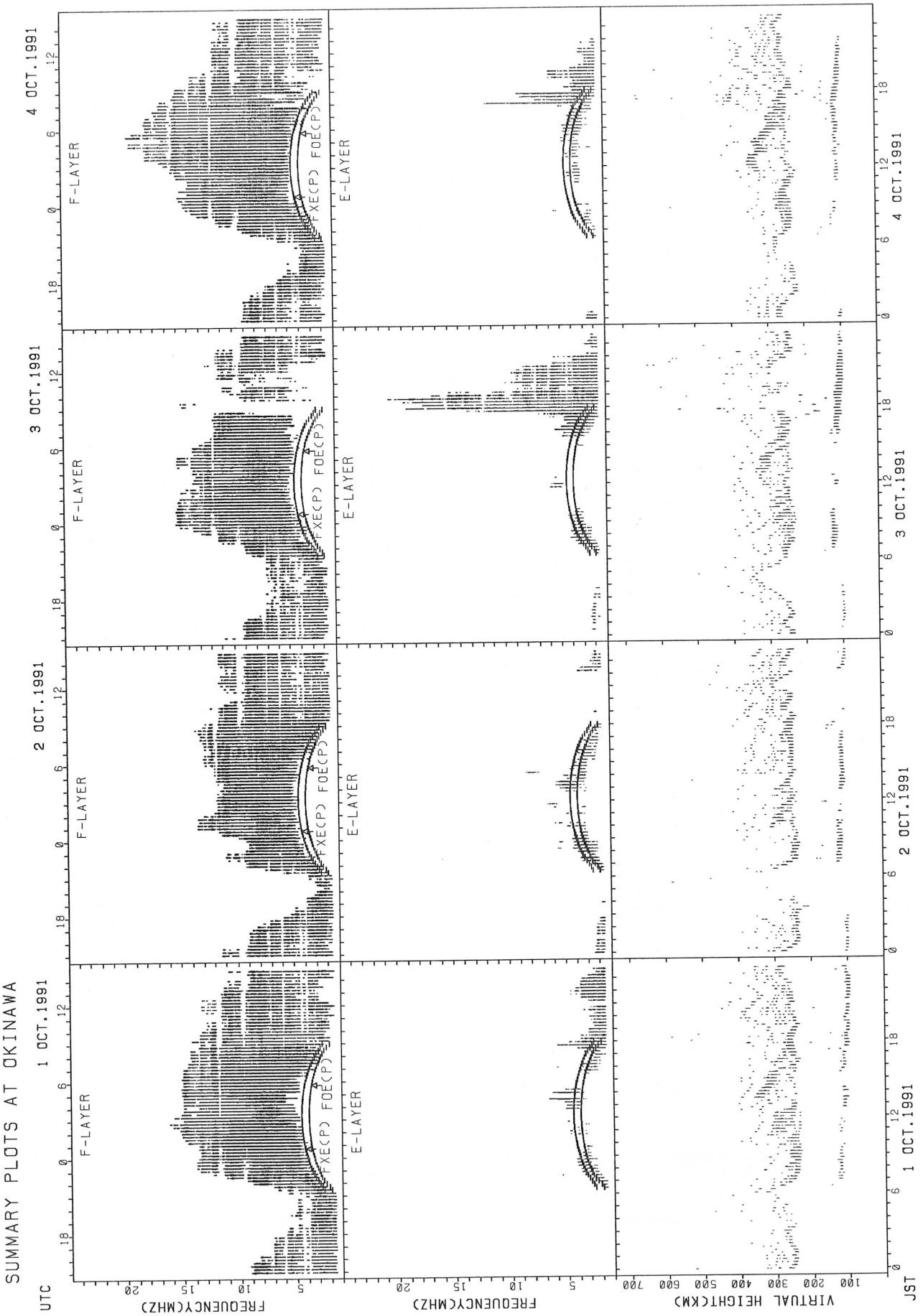
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
25 OCT.1991
26 OCT.1991
27 OCT.1991
28 OCT.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

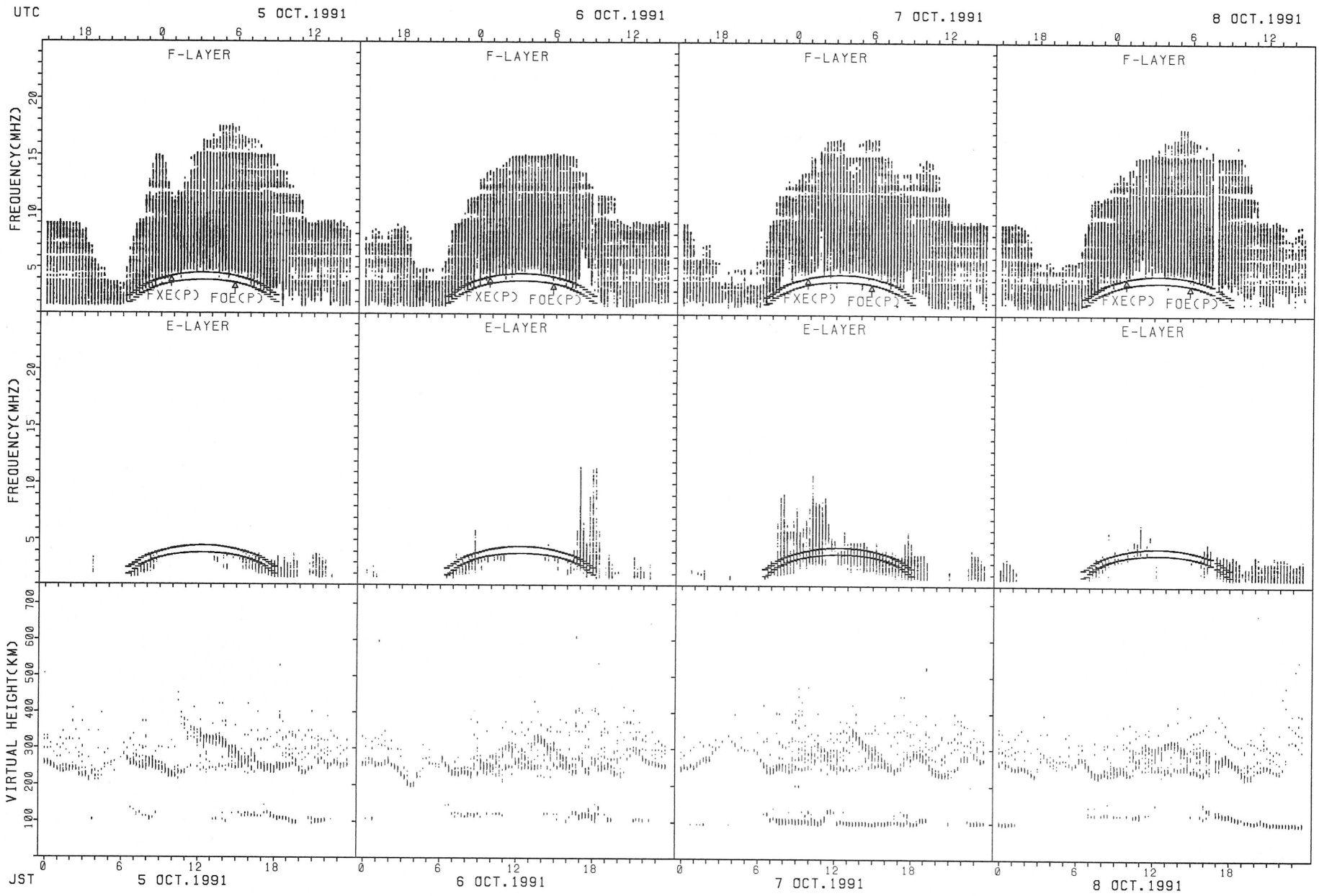
SUMMARY PLOTS AT YAMAGAWA



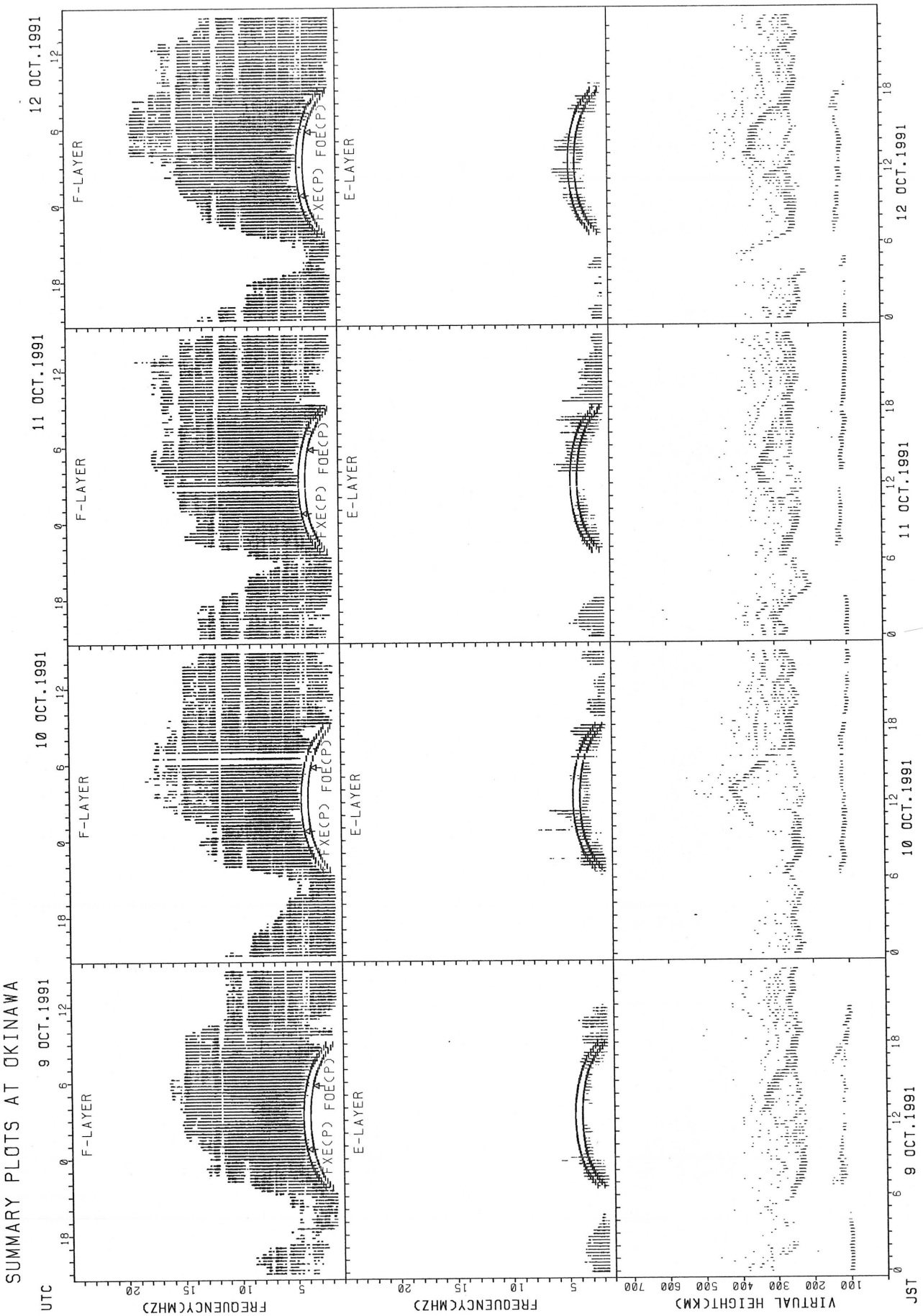
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
1 OCT.1991
2 OCT.1991
3 OCT.1991
4 OCT.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

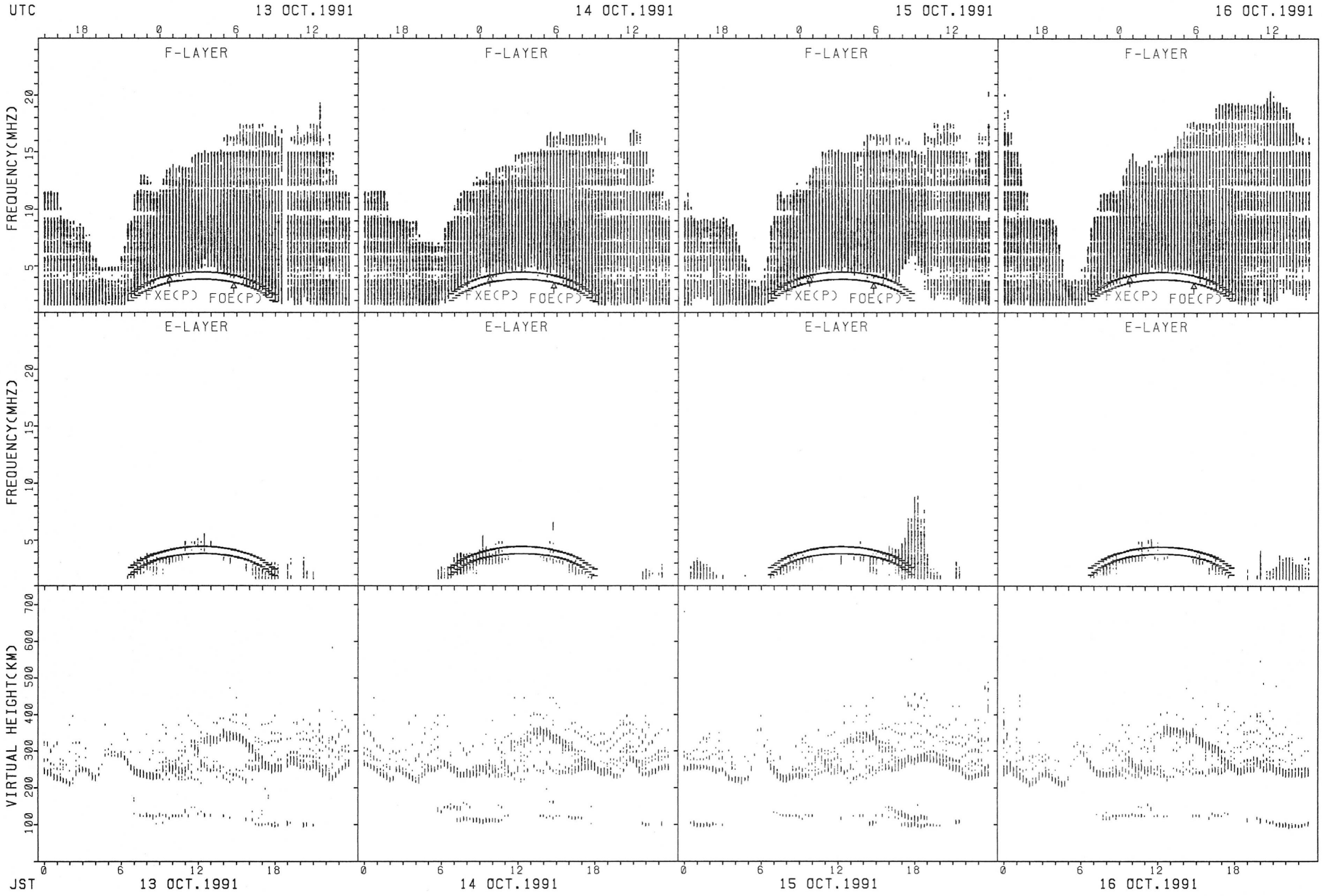
SUMMARY PLOTS AT OKINAWA



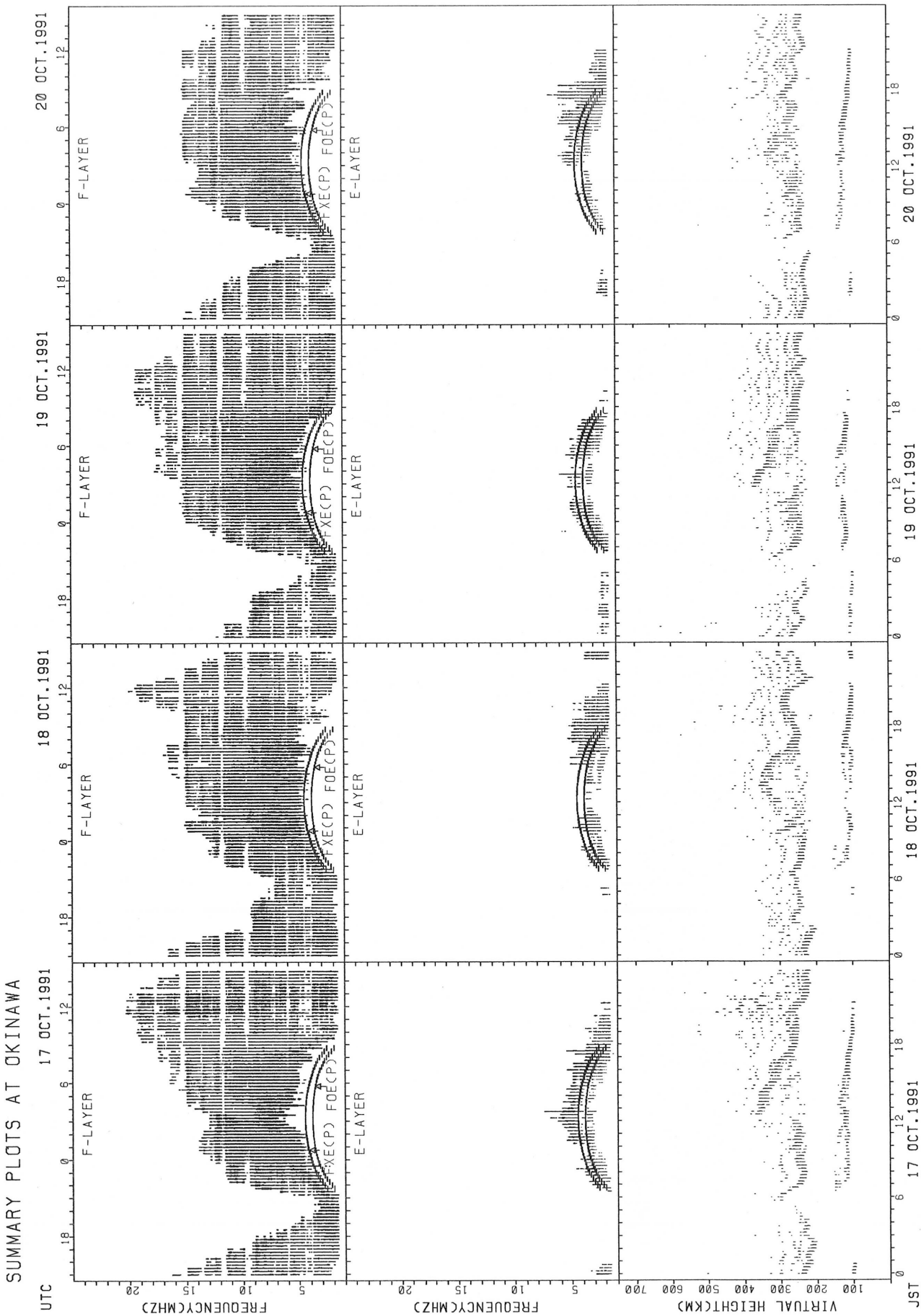
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

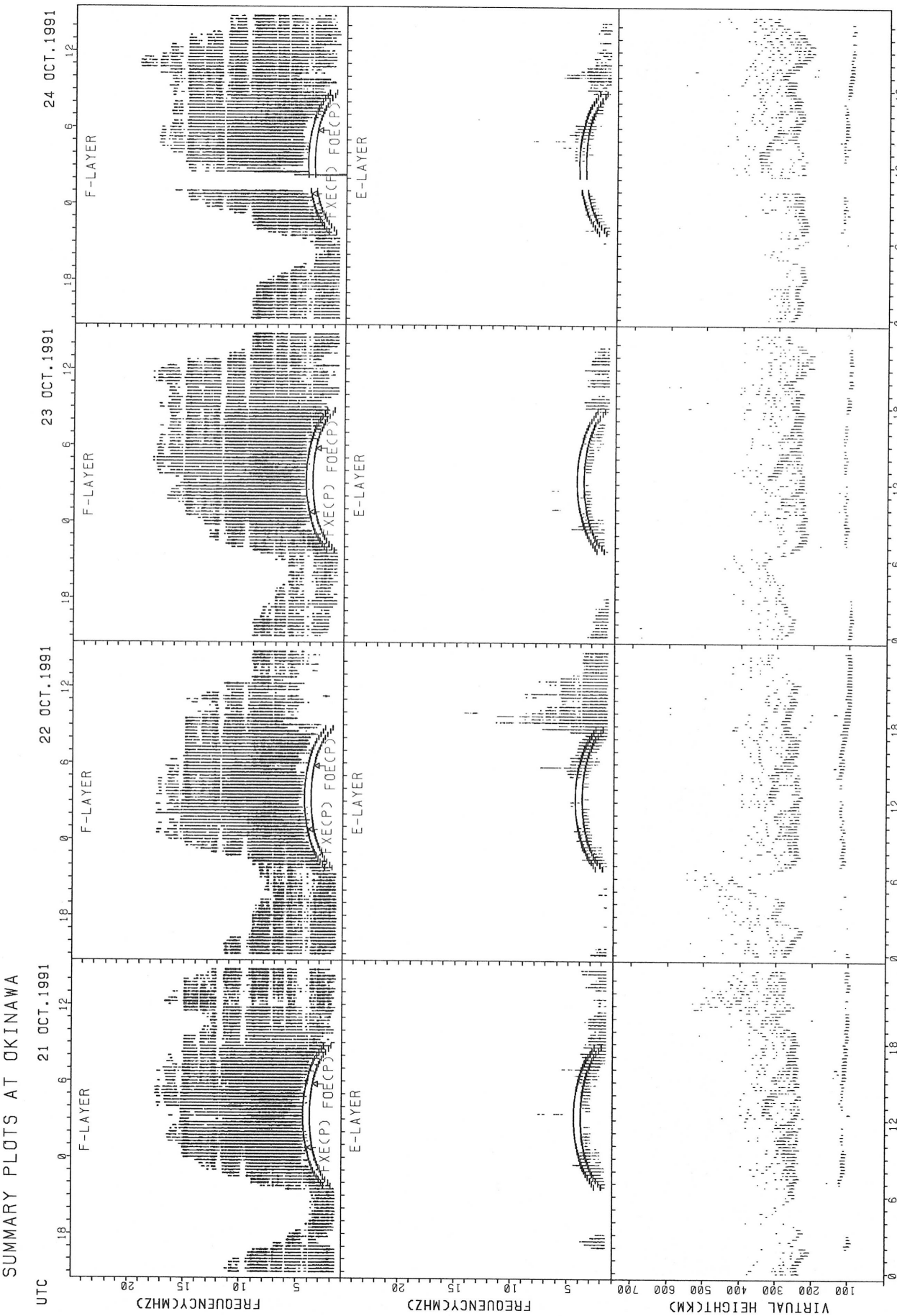

SUMMARY PLOTS AT OKINAWA
UTC
9 OCT.1991
10 OCT.1991
11 OCT.1991
12 OCT.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

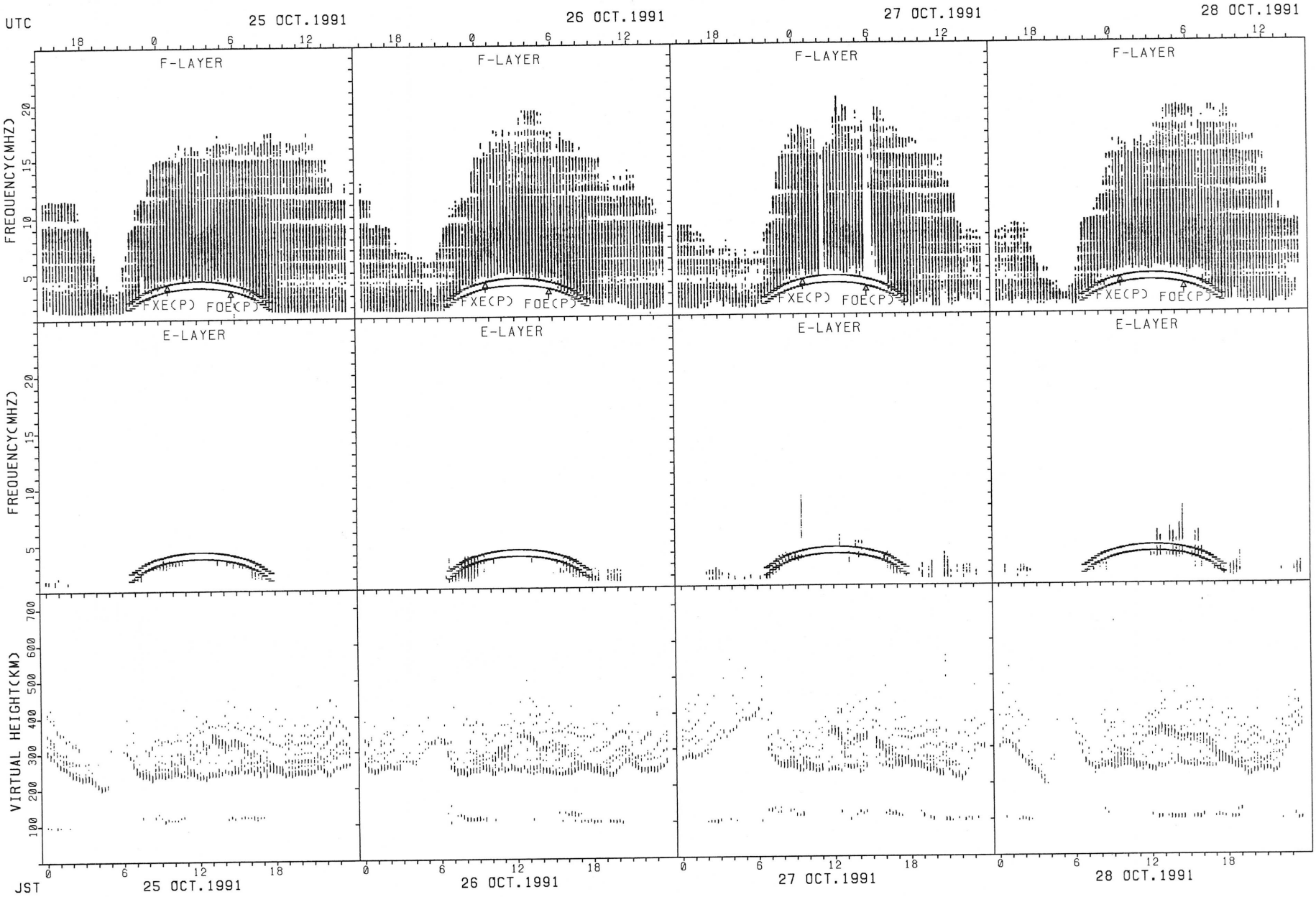


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
17 OCT.1991
18 OCT.1991
19 OCT.1991
20 OCT.1991
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

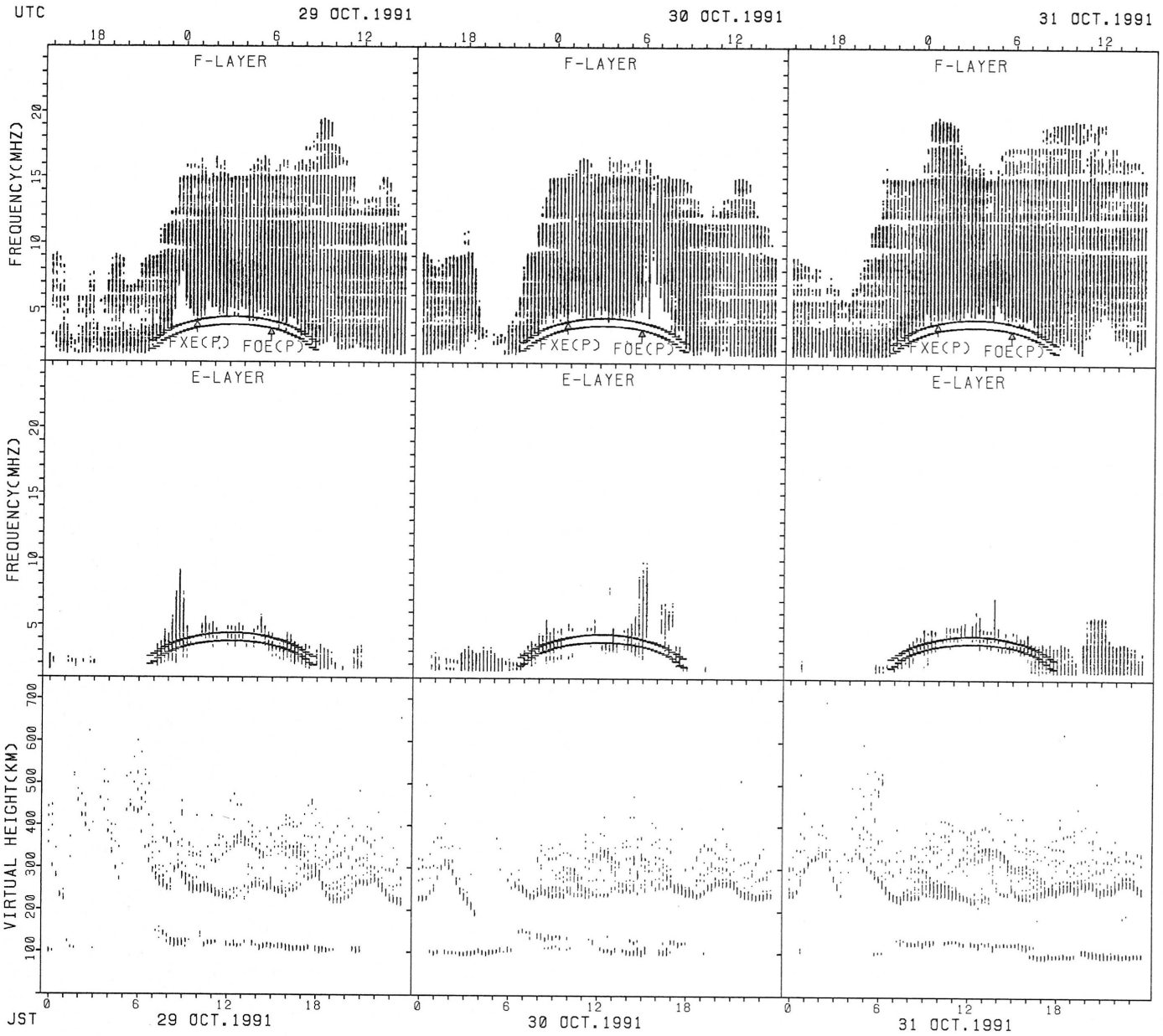

SUMMARY PLOTS AT OKINAWA
UTC
21 OCT.1991
22 OCT.1991
23 OCT.1991
24 OCT.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

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

MONTHLY MEDIANS OF H'F AND H'ES

OCT. 1991 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

STATION WAKKANAI LAT. 45.4N LON. 141.7E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							17	28	29	28	19	12	13	23	29	29	30	30	28	21				
MED							272	243	242	245	244	244	248	248	250	252	247	254	283	304				
U Q							292	282	259	277	270	263	262	260	267	260	252	266	297	317				
L Q							268	234	234	236	238	235	241	240	243	242	244	246	265	287				

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	13	14	12	17	13	11	20	17	12	11	15	11	13	17	21	22	21	19	19	12	
MED			119	113	119	116	117	125	123	119	119	121	121	121	117	119	123	113	112	107	111	109	108	
U Q			125	126	125	133	138	130	127	123	124	126	125	123	123	123	129	124	123	113	115	113	111	
L Q			111	110	111	109	112	113	117	119	115	112	113	115	107	109	114	109	109	107	105	107	106	

STATION AKITA LAT. 39.7N LON. 140.1E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							16	25	29	29	14			17	30	30	29	29	19	11				
MED							277	246	244	246	245			262	272	267	262	260	274	308				
U Q							291	260	256	258	258			276	278	276	269	275	294	318				
L Q							268	234	232	236	230			250	264	256	254	250	262	300				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10				11		12	16	23	18	16	15	15	16	14	14	20	24	24	23	22	22	18	16
MED	103				109		126	120	119	116	118	115	113	116	114	117	115	115	112	107	105	104	103	103
U Q	105				111		142	129	127	123	139	117	123	121	117	119	130	125	116	111	107	107	105	106
L Q	99				103		112	113	111	111	114	111	105	109	107	113	109	112	109	103	103	101	99	99

STATION KOKUBUNJI LAT. 35.7N LON. 139.5E

H'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							21	29	30	30	12			12	30	29	30	30	30	23	19			
MED							272	236	239	243	241			255	270	260	256	250	280	302	298			
U Q							281	251	248	254	250			272	280	274	262	260	288	326	318			
L Q							256	226	234	236	237			247	256	254	252	244	256	288	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	17	15	10				10	19	20	17	17	14	13	18	11	15	19	27	26	24	26	24	23	20
MED	101	101	101				120	123	122	119	119	115	117	115	115	115	115	113	107	103	105	103	101	101
U Q	105	105	103				135	125	126	123	123	117	121	123	121	125	131	123	115	108	109	105	105	106
L Q	98	97	99				109	113	115	113	113	111	111	109	113	111	109	107	105	101	99	100	99	99

MONTHLY MEDIANS OF H'F AND H'ES

OCT.1991 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	20							30	30	30	25				19	31	31	31	31	30	28	28	19	19
MED	322							248	244	241	244				262	276	256	254	254	268	290	290	318	322
U Q	341							268	250	252	246				280	300	268	262	266	284	308	313	342	336
L Q	297							240	234	238	237				252	260	248	246	246	258	271	274	282	286

H'ES

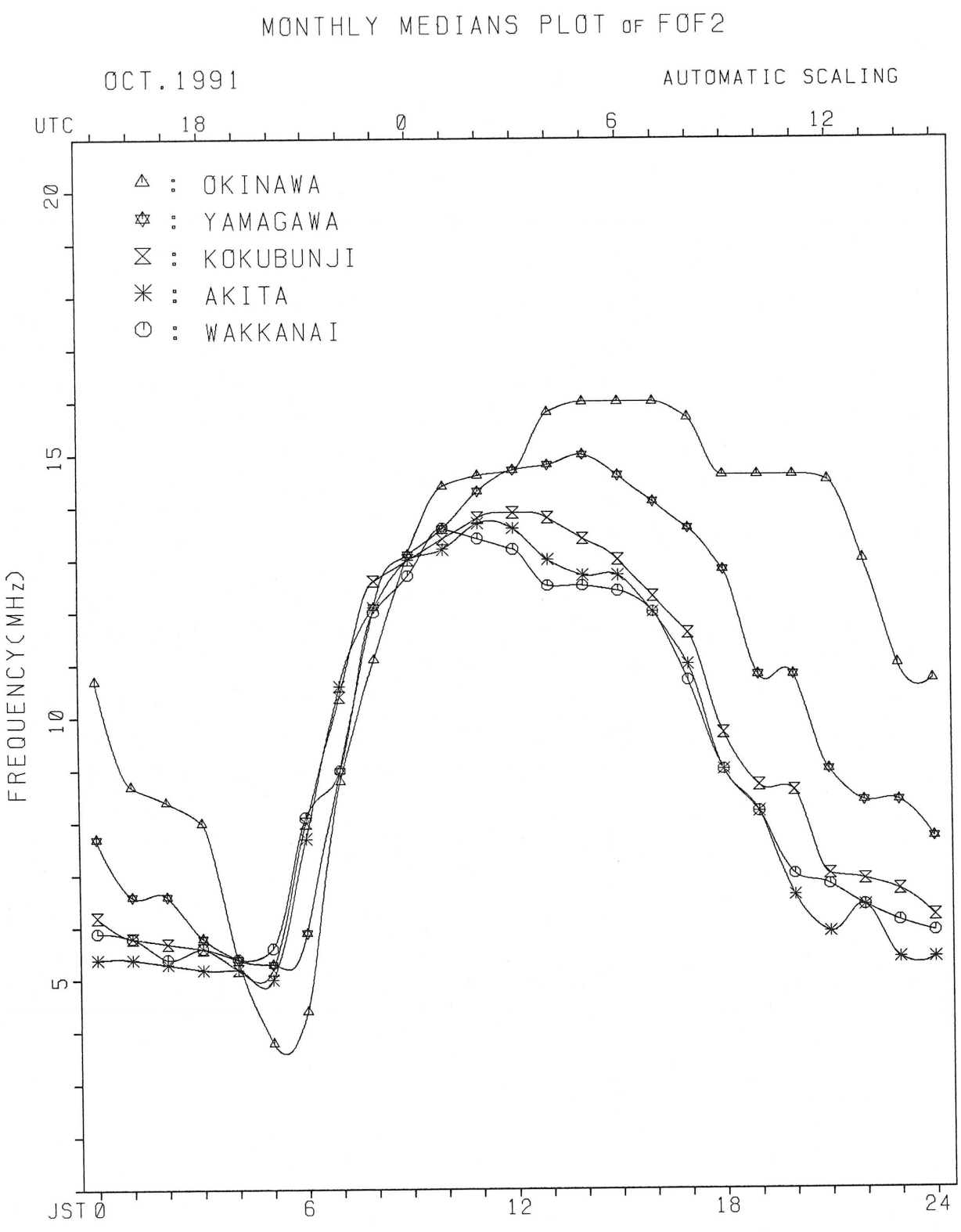
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13							13	15	17		11	12	10	11		14	22	23	23	19	22	18	13
MED	99							119	119	121		117	122	120	117		120	117	113	103	103	103	101	101
U Q	101							128	131	130		125	130	131	121		137	125	121	109	107	105	105	105
L Q	98							113	113	114		109	114	115	111		113	109	103	101	101	101	99	99

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	28	24	18	16				27	31	31	31				11	30	31	31	30	31	30	30	29	28
MED	298	291	304	277				262	244	254	254				326	308	306	266	261	266	278	275	270	282
U Q	305	298	332	305				276	252	296	266				348	326	340	274	270	276	298	312	300	315
L Q	271	257	258	266				252	236	244	248				258	286	262	260	254	256	264	256	255	271

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10		11					13	18	17				10	17	13	18	19	22	22	17	18	11	11
MED	103		103					133	120	115				120	119	117	117	115	110	109	105	103	103	101
U Q	105		103					151	125	125				127	126	122	121	119	115	113	106	105	103	103
L Q	101		99					127	115	115				111	108	107	111	109	107	105	103	101	99	99


MONTHLY MEDIANS PLOT OF FOF2
OCT. 1991
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 STATION KOKUBUNJI

OCT. 1991 FXI (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	X 67	X 63	X 62	X 57	X 62	X 62													X 97	X 79	X 65	X 64	X 63	X 64
2	X 61	X 64	X 61	X 46	X 46	X 38													X 68	X 66	X 64	X 72	X 72	X 78
3	X 55	X 53	X 52	X 50	X 53	61	97												X 87	X 63	X 64	X 68	X 65	X 64
4	X 62	X 63	X 61	X 57	X 52	X 53													X 101	X 79	X 80	X 74	X 76	X 79
5	X 72	X 68	X 70	X 67	X 59	X 56													X 96	X 87	X 87	X 83	X 68	X 68
6	X 64	X 63	X 64	X 65	X 62	X 58													X 101	X 83	X 78	X 75	X 75	X 73
7	X 68	X 66	X 61	X 61	X 62	X 64													X 97	X 94	X 93	X 80	X 85	X 79
8	X 71	X 67	X 65	X 67	X 66	X 67													X 106	X 93	X 81	X 70	X 67	X 65
9	X 68	X 68	X 66	X 64	X 62	X 67													X 114	X 88	X 84	X 76	X 74	X 71
10	X 71	X 66	X 67	X 65	X 66	X 70													X 109	X 96	X 93	X 78	X 88	X 75
11	X 67	X 68	X 64	X 68	X 62	X 56													X 110	X 89	X 87	X 77	X 76	X 75
12	X 72	X 65	X 68	X 62	X 59	X 62													X 101	X 88	X 91	X 82	X 79	X 74
13	X 68	X 67	X 64	X 61	X 58	X 60													X 103	X 95	X 94	X 82	X 81	X 78
14	X 78	X 78	X 70	X 69	X 66	X 64													X 103	X 93	X 93	X 79	X 77	X 75
15	X 69	X 68	X 68	X 70	X 67	X 62													X 106	X 93	X 90	X 89	X 88	X 88
16	X 82	X 76	X 73	X 71	X 68	X 63													X 112	X 96	X 98	X 93	X 86	X 83
17	X 75	X 72	X 65	X 66	X 54	X 53													X 112	X 99	X 102	X 98	X 94	X 88
18	X 87	X 73	X 63	X 62	X 58	X 60													X 101	X 83	X 84	X 83	X 82	X 74
19	X 75	X 75	X 72	X 68	X 60	X 58													X 108	X 96	X 90	X 81	X 75	X 79
20	X 80	X 75	X 72	X 71	X 59	X 60													X 113	X 103	X 95	X 89	X 83	X 77
21	X 78	X 81	X 67	X 63	X 59	X 61													X 108	X 94	X 83	X 79	X 77	X 77
22	X 73	X 70	X 65	X 64	X 61	X 61													X 92	X 96	X 77	X 60	X 59	X 56
23	X 58	X 56	X 54	X 53	X 53	X 53													X 97	X 97	X 93	X 69	X 64	X 63
24	X 64	X 60	X 58	X 56	X 51	X 55													X 109	X 109	X 97	X 74	X 70	X 71
25	X 69	X 71	X 70	X 67	X 62	X 58													X 108	X 96	X 90	X 72	X 70	X 75
26	X 71	X 65	X 60	X 64	X 63	X 63													X 93	X 77	X 70	X 67	X 68	X 65
27	X 62	X 57	X 56	X 54	X 54	X 55													X 94	X 86	X 77	X 72	X 64	X 58
28	X 56	X 57	X 57	X 54	X 39	X 43													X 103	X 99	X 90	X 71	X 64	X 62
29	X 51	X 42	X 45	X 37	X 51	X 54			135	147	144	150	148	147					X 146	X 133	X 98	X 105	X 107	X 89
30	X 80	79	X 76	X 67	X 67	X 58													X 103	X 104	X 94	X 93	X 86	X 80
31	X 79	X 68	X 64	X 60	X 59	X 64													X 104	X 98	X 84	X 68	X 66	X 65
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	1		1	1	1	1	1	1					31	31	31	31	31	31
MED	X 69	X 67	X 64	X 64	X 59	X 60	97		135	147	144	150	148	147					X 103	X 94	X 90	X 77	X 75	X 75
U Q	X 75	X 72	X 68	X 67	X 62	X 63													X 109	X 97	X 93	X 83	X 83	X 79
L Q	X 64	X 63	X 61	X 57	X 54	X 55													X 97	X 86	X 80	X 71	X 67	X 65

OCT. 1991 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 FOF2 (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	61	57	56	51	56	56	78	105	117	130	127	134	124	120	112	105	105	105	91	73	59	58	57	58
2	55	58	55	40	40	32	44	50	59	60	58	62	54	U R 54	62	68	66	75	61	60	58	66	66	72
3	49	47	46	44	47	51	F 86	100	98	98	98	98	91	92	88	99	100	91	81	57	58	62	59	58
4	56	57	55	51	46	47	68	92	116	122	130	129	130	130	131	129	132	115	95	73	74	68	70	73
5	66	62	64	61	53	50	69	92	133	R 154	124	128	138	140	139	126	119	108	90	81	81	77	62	62
6	58	57	58	59	56	52	82	98	111	112	121	127	130	125	123	121	129	113	95	77	72	69	69	67
7	62	60	55	55	56	58	81	97	109	114	126	147	139	133	127	127	123	112	91	88	87	74	79	73
8	65	61	59	61	60	61	87	118	125	124	134	138	140	140	137	128	120	109	100	87	75	64	61	59
9	62	62	60	58	57	61	82	105	111	126	130	134	141	133	131	135	132	128	108	82	78	70	68	65
10	65	60	61	59	60	64	94	120	129	125	133	140	153	S 154	154	150	141	129	103	90	87	72	82	69
11	61	62	58	62	56	50	84	115	134	133	141	143	145	144	140	138	128	121	104	83	81	71	70	69
12	66	59	62	56	53	56	87	111	126	129	133	142	147	141	136	131	122	109	95	82	85	76	73	68
13	62	61	58	55	52	54	87	114	124	130	134	138	137	135	135	125	115	111	97	89	88	76	75	72
14	72	72	64	63	60	58	86	108	126	126	138	138	135	135	134	123	115	114	97	87	87	73	71	69
15	64	62	62	64	61	56	84	121	124	110	120	139	141	130	132	128	122	117	100	87	84	83	82	82
16	76	70	67	65	62	57	80	108	124	129	133	144	140	138	138	137	136	125	106	90	92	87	80	77
17	69	66	59	60	48	47	74	105	125	125	130	130	126	125	121	124	122	119	106	93	96	92	88	82
18	81	67	57	56	52	54	78	109	120	130	127	133	134	138	137	128	122	115	95	77	78	77	76	68
19	69	69	65	62	54	52	79	112	131	138	135	137	141	133	132	133	131	118	102	90	84	75	69	73
20	74	69	66	65	53	54	76	105	119	126	132	136	144	147	145	139	129	122	108	97	89	83	77	71
21	72	75	61	57	53	56	84	118	129	147	R 158	U R 166	R 160	153	146	149	141	136	102	88	77	73	72	71
22	67	64	59	58	55	55	68	101	134	S 155	R 158	159	146	138	134	131	123	100	86	90	71	54	53	50
23	52	50	48	47	47	47	73	108	127	131	144	148	141	140	140	138	131	120	91	91	87	63	58	57
24	58	54	52	50	45	49	73	96	119	117	144	150	140	143	148	145	130	114	103	103	91	68	64	65
25	63	65	64	61	56	52	74	103	133	143	145	151	147	143	138	138	130	123	102	90	84	66	64	69
26	65	59	54	58	57	57	75	S 98	110	129	R 146	R 153	154	145	130	121	118	114	87	71	64	61	R 62	59
27	56	51	50	48	48	49	58	104	126	151	R 147	146	R 156	R 146	134	130	124	109	88	80	71	66	58	52
28	50	51	51	48	34	37	64	92	133	151	J R 164	U R 156	142	144	151	138	120	112	97	93	84	65	58	56
29	45	36	39	32	45	48	68	96	128	F 135	F 137	142	F 138	138	V 132	128	127	137	140	127	92	98	100	83
30	74	F 71	70	61	61	52	91	78	117	140	147	144	147	148	141	136	136	121	97	98	88	87	80	74
31	73	62	V 58	54	53	58	84	131	136	R 155	U R 159	U R 160	R 160	147	140	139	123	110	98	93	78	62	60	59
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	64	61	58	58	53	54	79	105	125	129	134	140	141	138	135	130	123	114	97	88	84	71	69	69
U Q	69	66	62	61	57	57	84	112	129	140	R 145	148	147	144	140	138	131	121	103	91	87	77	77	73
L Q	58	57	55	51	48	49	73	97	117	124	127	134	135	133	131	125	120	109	91	80	74	65	61	59

OCT. 1991 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 FOF1 (0.01MHZ) 135° E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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										L	L	L	L	L	L									
2								410	450	490	490	500	510	505	U L 520	L 530								
3									L	L	L	L	L	L	L 600	L								
4									L	L	L		L	L	L	L								
5									L	L	L	L	L	L	L									
6									L		L	L		L	L									
7										L	L	L	L	L	L	L								
8											L	L	L	L		L								
9									L	L	L	L	L	L	L	L								
10										L	L		L	U L 620	U L 700									
11									L	L	L		L	L	L									
12											L	U L 595	L	L	L									
13									L	L	L	L	L	L	L									
14											L	L	L	L	L		L							
15											L	L	L	L	L									
16													L	L	L	L								
17										L				L	L	L								
18												L		U L 680	L									
19									L	L	L	L	L											
20											L		L	L										
21										L	L		L	L		L								
22													L	L										
23											L		L		L									
24									L	L	L	L	L	L		L								
25									L		L		L		L									
26									L	L			L		L	L								
27										L	L	L	L	L										
28									L		L		L		L									
29									L	L		L	L	L	L									
30										L	L	L	L	L										
31										L	L	L	L											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	1	2	1	3	3	1								
MED								410	450	490	490	548	510	U L 620	U L 600	L 530								
U Q														U L 680	U L 700									
L Q														505	U L 520									

OCT. 1991 FOF1 (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 FOE (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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							175	A	A	A	A	A	A	A	A	330	270	A 185						
2							B	A	330	A 350	A	390	385	375	340	R 320	270	175						
3							A	275	330	R 355	A	R 390	405	R 355	355	330	275	A						
4							195	275	320	355	B	R 385	375	360	340	315	260	170						
5							180	260	R 310	340	A 345	A	375	360	345	320	275	A						
6							185	265	320	345	370	375	A 375	360	340	A 325	A	A						
7							A	270	315	355	370	385	375	A	340	325	270	H 195						
8							165	270	325	350	360	A	A	A	360	325	280	170						
9							H 200	270	335	A	A	A	A	A	345	330	280	170						
10							180	270	330	355	370	R 380	U R 380	365	A	330	A	A						
11							165	275	330	A	370	380	375	375	A	A	H 275	A						
12							A	285	340	350	370	370	375	365	345	320	265	A						
13							185	270	325	350	365	375	375	365	345	305	260	155						
14							155	270	335	355	A	385	390	380	340	280	A	165						
15							160	270	A	A	370	A	385	365	345	315	260	165						
16							B	265	320	350	385	A 390	A	A	A	A	260	A						
17							160	275	315	355	375	U A 380	A	A 365	340	305	235	B						
18							170	H 270	A 315	350	365	370	365	355	345	305	250	140						
19							H 185	H 265	A	335	350	370	360	350	340	320	A	B						
20							160	A	A	A	370	370	370	360	345	315	A 240	A						
21							B	A 255	A	345	370	A	A	A	A	A	A	B						
22							160	250	A 310	340	365	370	370	365	345	305	250	B						
23							B	255	310	A	A	A	A	A	A	A	A	B						
24							155	245	315	340	B	390	A	370	345	310	265	B						
25							175	260	345	365	375	390	400	A	A	A	250	A						
26							B	255	A	345	385	400	380	380	360	315	240	B						
27							H 205	270	330	365	380	390	385	370	R 345	B	A 210	B						
28							B	255	A	A	A	375	375	A	340	305	235	B						
29		J K 135	J K 140	J K 135			A	A	A	A	A	370	A	A	345	A	R	B						
30							170	255	325	A 340	A 360	375	R	355	350	315	B	B						
31							B	240	290	A 345	A	375	B	360	335	A	A	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		1	1	1			20	27	23	23	20	24	20	21	24	23	22	10						
MED		J K 135	J K 140	J K 135			172	270	325	350	370	380	375	365	345	315	260	170						
U Q							185	270	330	355	372	390	385	370	345	325	270	175						
L Q							160	255	315	345	365	372	375	360	340	305	250	165						

OCT. 1991 FOE (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 FOES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	E B 14	E B 16	E B 13	E B 14	E B 14	E B 15	G	J A 30	39	39	42	J A 45	40	J A 41	35	G	36	J A 34	J A 27	J A 27	J A 25	J A 22	J A 35	J A 23
2	E B 15	E B 14	E B 13	E B 15	J A 19	J A 24	E B 21	J A 41	35	37	39	G	G	G	G 25	G	31	23	E B 14	E B 15	E B 13	J A 26	J A 29	J A 16
3	E B 14	J A 19	22	21	17	21	22	33	35	G	41	G	42	G	42	38	34	J A 34	J A 22	J A 22	23	J A 25	J A 65	J A 53
4	J A 39	J A 34	J A 26	J A 25	J A 22	J A 23	G	G	35	G 34	E B 41	G	G	G 23	G 25	G 24	29	23	J A 21	J A 18	E B 17	E B 16	E B 14	E B 14
5	J A 20	E B 15	E B 13	E B 13	E B 14	E B 13	22	30	G 28	38	38	39	G 36	G 30	G 28	J A 35	J A 32	22	J A 27	J A 53	J A 67	J A 68	J A 32	J A 50
6	J A 50	J A 38	J A 27	E B 15	E B 15	B J A 19	G 17	29	G	G 23	39	41	45	40	37	42	J A 77	J A 51	J A 27	22	J A 25	J A 26	29	J A 55
7	J A 55	J A 52	J A 25	J A 24	J A 24	J A 36	J A 29	29	J A 35	39	G	G 30	G 30	J A 49	G 24	G 24	G 20	G	J A 25	24	J A 26	E B 14	E B 16	E B 14
8	E B 14	E B 14	E B 14	E B 14	20	20	24	31	J A 43	J A 58	J A 46	43	47	J A 49	40	45	41	42	J A 32	J A 29	J A 24	J A 47	E B 14	E B 14
9	E B 15	E B 13	E B 15	E B 14	J A 18	E B 14	G	J A 35	J A 53	J A 55	J A 49	42	54	40	G	G	34	27	42	J A 29	J A 34	J A 23	27	J A 25
10	J A 22	E B 14	J A 19	J A 26	J A 20	E B 14	G	29	G	G	G	G	G	G 33	J A 45	G	J A 38	J A 29	J A 54	J A 24	J A 28	J A 25	33	J A 27
11	J A 22	18	E B 16	J A 52	33	20	22	32	36	38	G 28	G	G 32	J A 42	J A 43	J A 42	31	J A 30	J A 26	J A 27	33	J A 32	E B 13	E B 14
12	J A 26	J A 30	J A 25	J A 22	J A 15	E B 15	22	31	39	G	J A 41	G 34	G	G	G 22	G 25	31	J A 30	23	J A 20	J A 21	J A 19	J A 20	J A 23
13	J A 14	E B 14	E B 13	E B 14	E B 14	B J A 25	J A 30	G	36	39	40	40	40	43	G	36	27	G	E B 13	E B 15	E B 14	J A 20	J A 18	E B 15
14	J A 16	E B 14	E B 13	E B 14	E B 14	E B 14	G	G	G 23	38	J A 54	J A 42	43	J A 49	36	J A 41	J A 46	23	J A 36	20	J A 19	J A 25	J A 42	J A 25
15	J A 24	J A 19	E B 14	20	E B 14	E B 13	G	J A 38	J A 54	J A 56	G 31	45	43	45	37	35	31	25	J A 25	J A 25	J A 28	J A 32	J A 44	J A 53
16	J A 53	J A 37	J A 24	E B 15	E B 15	B J A 20	E B 15	G 20	G 17	G	45	J A 101	J A 53	J A 51	39	33	G 21	J A 26	35	J A 24	J A 24	E B 15	E B 14	B J A 26
17	E B 14	E B 13	E B 14	E B 13	E B 15	E B 14	20	G 24	38	J A 51	J A 55	J A 54	J A 90	J A 39	G	43	J A 101	J A 53	J A 29	J A 27	J A 45	J A 42	J A 34	J A 32
18	J A 24	J A 21	18	E B 15	E B 13	E B 15	G	G 25	J A 55	J A 61	J A 51	G	G	38	J A 40	34	34	J A 37	J A 20	J A 51	J A 23	J A 22	E B 15	E B 13
19	E B 14	19	J A 21	E B 14	E B 14	E B 14	G	J A 43	J A 35	G	G	J A 50	39	J A 54	J A 50	J A 43	J A 31	18	E B 14	E B 14	J A 24	J A 23	J A 28	J A 30
20	E B 14	E B 14	E B 13	E B 15	E B 13	E B 14	22	J A 33	J A 35	J A 37	45	J A 59	50	43	J A 51	J A 66	J A 49	J A 35	J A 29	J A 51	J A 33	27	20	24
21	E B 13	E B 13	20	E B 13	E B 14	B J A 23	E B 17	27	36	G	G	J A 44	J A 45	39	38	34	J A 30	J A 46	J A 41	22	J A 20	J A 16	E B 15	E B 14
22	E B 14	J A 42	E B 13	E B 13	E B 13	B J A 17	G	G	35	40	43	J A 58	J A 55	47	G	G	28	J A 23	J A 50	J A 37	59	29	J A 27	J A 26
23	J A 26	23	20	E B 14	E B 14	E B 15	E B 19	G 24	36	43	37	J A 42	38	37	J A 37	J A 40	J A 53	J A 51	J A 42	J A 32	J A 42	J A 41	J A 22	J A 21
24	J A 18	J A 18	20	E B 14	18	18	G	G	G	36	E B 44	44	45	G	G 27	34	33	J A 30	J A 31	J A 34	J A 21	J A 25	J A 25	J A E B 16
25	E B 15	E B 14	E B 14	E B 14	E B 14	E B 15	G	G	G	G	G	G	G 36	42	38	32	G 22	21	J A 43	J A 27	J A 50	J A 21	J A 23	J A 26
26	J A 22	J A 21	23	E B 15	J A 20	E B 13	E B 17	G	J A 36	G	41	G	G	41	43	G 21	27	22	J A 51	J A 56	J A 54	J A 44	J A 30	J A 28
27	J A 21	J A 21	J A 22	20	E B 15	E B 15	G 20	34	40	40	41	43	42	40	G	E B 80	J A 43	J A 24	20	22	E B 15	18	J A 20	23
28	24	J A 24	J A 21	J A 21	J A 19	J A 18	J A 19	27	35	J A 39	39	G	G	J A 58	G	G	G	E B 14	E B 14	E B 15	J A 55	J A 27	J A 18	J A 21
29	E B 15	J K 14	J K 14	J K 14	E B 14	E B 14	B J A 29	J A 51	33	J A 37	39	G 36	38	41	36	33	G 23	19	J A 26	J A 31	J A 35	J A 27	J A 41	J A 33
30	J A 27	J A 23	J A 33	J A 30	J A 23	E B 15	G	33	39	52	49	40	G 37	40	39	41	J A 56	J A 55	J A 50	J A 23	J A 24	24	J A 28	30
31	J A 23	20	E B 13	E B 16	E B 16	E B 15	E B 16	29	J A 44	J A 44	43	G 24	41	42	J A 42	J A 38	J A 35	25	J A 50	J A 20	E B 14	E B 14	J A 23	A E B 15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A 20	19	18	E B 15	E B 15	E B 15	G	29	35	38	41	40	40	41	37	34	32	J A 26	J A 27	J A 24	J A 25	J A 25	J A 25	J A 24
U Q	J A 24	J A 23	J A 22	J A 21	J A 19	J A 20	22	J A 33	J A 39	J A 43	J A 45	J A 44	45	J A 45	J A 40	41	J A 41	J A 35	J A 42	31	J A 35	29	J A 32	J A 30
L Q	E B 14	E B 14	E B 13	E B 14	E B 14	E B 14	E B 20	G	G 33	G	G 37	G	G	G 37	G	G	G 28	22	22	20	E B 21	20	E B 18	E B 15

OCT. 1991 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 FBES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	E B 14	E B 16	E B 13	E B 14	E B 14	E B 15	G	28	36	37	41	40	40	40	U Y 35	G	34	27	20	19	18	18	30	16
2	E B 15	E B 14	E B 13	E B 15	17	14	E B 21	33	35	36	38	G	G	G	G 24	G	30	22	E B 14	E B 15	E B 13	E B 14	17	E B 13
3	E B 14	15	E B 14	E B 14	E B 13	E B 14	22	31	G	G	40	G	42	G	41	37	30	24	18	19	17	21	50	42
4	24	23	19	19	18	E B 15	G	G	34	G 33	E B 41	G	G	G 22	G 25	G 24	29	23	E B 13	E B 14	E B 17	E B 16	E B 14	E B 14
5	E B 14	E B 15	E B 13	E B 13	E B 14	E B 13	21	29	G 28	37	37	U Y 39	G 35	G 30	G 28	G 26	G 20	21	18	20	42	46	20	26
6	34	25	22	E B 15	E B 15	E B 14	G 16	28	G	G 22	38	39	43	38	36	34	41	40	20	18	23	23	23	26
7	34	41	17	20	19	17	21	28	33	38	G	G 30	G 30	38	G 23	G 24	G 19	G	E B 13	17	21	E B 14	E B 16	E B 14
8	E B 14	E B 14	E B 14	E B 14	E B 13	E B 14	22	30	37	40	43	41	46	45	40	42	38	35	29	26	21	27	E B 14	E B 14
9	E B 15	E B 13	E B 15	E B 14	E B 13	E B 14	G	29	37	39	41	40	46	39	G	G	33	25	33	18	28	E B 14	18	20
10	17	E B 14	E B 14	17	E B 14	E B 14	G	28	G	G	G	G	G	G 32	42	G	32	21	41	19	21	20	28	20
11	20	E B 14	E B 16	27	23	E B 16	20	29	36	37	G 28	G	G 31	G 31	36	33	30	23	23	24	25	21	E B 13	E B 14
12	E B 14	25	17	17	E B 16	E B 15	21	30	35	G	G 34	G 34	G	G	G 22	G 23	29	25	22	17	18	E B 14	18	20
13	E B 13	E B 14	E B 13	E B 14	E B 14	19	G 17	G	36	39	39	39	40	41	G	34	27	G	E B 13	E B 15	E B 14	E B 14	16	E B 15
14	E B 15	E B 14	E B 13	E B 14	E B 14	E B 14	G	G	G 22	38	43	G 36	41	G	35	32	41	21	26	E B 14	E B 14	17	35	18
15	20	17	E B 14	E B 15	E B 14	E B 13	G	G 23	38	39	G 30	41	42	43	37	34	29	23	20	E B 13	21	23	34	40
16	34	24	18	E B 15	E B 15	17	E B 15	G 18	G 17	G	41	49	41	41	39	31	G 20	19	24	18	20	E B 15	E B 14	16
17	E B 14	E B 13	E B 14	E B 13	E B 15	E B 14	G 12	G 19	37	47	45	47	48	37	G	40	43	41	E B 14	20	E B 14	22	24	22
18	20	18	17	E B 15	E B 13	E B 15	G	G 24	44	56	49	G	G	38	38	33	30	26	E B 14	36	E B 14	16	E B 15	E B 13
19	E B 14	E B 13	E B 14	E B 14	E B 14	E B 14	G	G 25	31	G	G	G	39	50	49	40	28	18	E B 14	E B 14	E B 14	17	22	22
20	E B 14	E B 14	E B 13	E B 15	E B 13	E B 14	G 15	26	31	35	43	57	49	42	43	61	33	16	27	19	17	22	E B 13	18
21	E B 13	E B 13	E B 13	E B 13	E B 14	E B 16	E B 17	27	34	G	G	40	42	37	36	33	27	43	38	E B 15	E B 14	E B 14	E B 15	E B 14
22	E B 14	16	E B 13	E B 13	E B 13	E B 13	G	G	34	38	42	50	50	45	G	G	27	17	30	26	34	19	16	18
23	21	18	E B 14	E B 14	E B 14	E B 15	E B 19	G 22	34	41	37	40	U Y 38	36	34	35	40	26	21	21	27	31	E B 14	E B 13
24	15	E B 15	E B 13	E B 14	E B 14	E B 13	G	G	G	35	E B 44	43	44	G	G 26	33	28	22	20	20	E B 15	20	17	E B 16
25	E B 15	E B 14	E B 14	E B 14	E B 14	E B 15	G	G	G	G	G	G	G 36	41	38	32	G 21	20	16	19	30	E B 14	17	21
26	17	20	17	E B 15	E B 14	E B 13	E B 17	G	32	G	40	G	G	40	G 29	G 21	27	20	31	39	44	32	26	19
27	20	15	16	E B 14	E B 15	E B 15	G 19	31	40	39	40	40	41	39	G	E B 80	41	22	E B 15	E B 15	E B 15	E B 15	18	E B 15
28	20	23	18	19	17	E B 14	E B 17	27	34	35	38	G	G	48	G	G	G	E B 14	E B 14	E B 15	22	21	16	16
29	E B 15	K 14	K 14	K 14	E B 14	E B 14	26	41	32	37	38	G 36	37	40	G 32	30	U G 23	17	23	21	28	22	39	23
30	23	16	19	23	15	E B 15	G	31	36	49	47	39	U G 37	39	38	40	56	50	19	18	E B 14	18	26	26
31	19	E B 16	E B 13	E B 16	E B 16	E B 15	E B 16	28	40	40	41	G 24	40	41	37	36	33	17	20	E B 15	E B 14	E B 14	18	E B 15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 15	E B 15	E B 14	E B 14	E B 14	E B 14	G	27	34	37	39	39	40	39	35	32	30	22	20	18	18	18	18	18
U Q	20	18	17	16	15	E B 15	20	29	36	39	42	40	42	41	38	36	34	26	26	20	25	22	26	22
L Q	E B 14	E B 14	E B 13	E B 14	E B 14	E B 14	E B 17	G	G	G	G	G	G	G	G 32	G	G 27	18	E B 14	E B 15	E B 14	E B 14	E B 15	E B 14

OCT. 1991 FBES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 FMIN (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

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

OCT. 1991 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	280	255	270	250	265	265	310	320	290	300	285	300	285	290	300	290	305	305	310	295	265	275	255	250
2	255	275	315	240	250	225	270	215	230	245	220	245	210	U R 195	250	270	275	295	285	245	235	270	255	285
3	240	235	255	240	235	245	F 300	320	305	285	295	305	305	305	295	305	315	315	320	275	270	280	A 280	275
4	260	275	275	280	265	280	330	315	320	300	300	290	280	285	280	290	310	315	300	295	275	265	265	275
5	280	265	275	285	275	280	305	290	300	R 315	300	275	290	280	295	290	305	310	295	285	295	305	285	295
6	270	260	270	290	285	275	330	330	330	315	300	300	290	290	285	290	310	315	315	285	280	280	290	280
7	275	265	250	255	255	265	325	325	315	310	285	295	285	280	280	285	295	305	275	275	295	260	280	290
8	275	260	260	260	275	280	315	320	325	300	300	295	290	290	290	295	295	300	295	300	280	280	265	255
9	255	260	250	260	245	265	330	340	315	310	300	295	295	285	280	290	300	315	320	285	300	285	280	280
10	270	280	270	265	270	285	325	335	325	315	295	280	280	S 275	285	280	285	290	285	280	305	270	290	295
11	265	250	255	265	285	270	305	310	325	300	295	290	275	280	275	285	295	300	300	285	290	275	280	290
12	290	280	285	290	255	265	325	330	320	305	295	290	290	275	275	290	295	295	295	275	300	290	290	295
13	295	285	290	280	260	260	320	340	320	315	300	295	280	275	285	285	290	290	290	290	295	285	280	275
14	275	290	285	280	285	275	325	320	325	305	300	295	275	275	275	280	280	295	300	280	305	275	285	285
15	280	275	280	290	305	280	320	330	330	305	290	285	290	275	280	280	290	290	305	285	285	285	285	295
16	295	290	295	295	300	280	320	330	315	315	295	295	285	275	280	285	290	295	295	280	295	295	300	305
17	310	300	295	310	280	275	320	325	325	320	305	290	280	285	275	285	285	300	295	280	285	295	290	290
18	290	300	265	280	275	275	315	330	325	310	295	280	280	275	285	285	295	300	300	270	270	275	280	260
19	265	275	275	290	270	265	300	325	310	300	300	280	290	275	280	280	295	295	290	290	290	270	260	270
20	285	290	295	305	280	285	310	315	305	305	300	285	285	285	285	295	295	305	300	285	285	265	275	265
21	265	300	290	300	255	255	310	320	310	300	R 295	U R 305	R 295	290	285	295	295	305	295	290	270	255	255	260
22	245	250	240	230	235	225	250	305	275	S 295	R 300	305	285	285	285	295	305	300	285	310	325	285	260	255
23	260	260	245	240	240	240	305	340	320	310	300	305	290	290	295	300	305	315	300	295	305	305	270	275
24	285	290	285	275	255	270	325	335	325	300	300	300	280	275	290	290	300	290	285	290	295	280	260	255
25	250	260	270	265	280	245	300	325	310	310	300	295	285	280	275	285	285	295	300	280	280	265	245	270
26	275	260	225	245	235	235	290	S 315	285	265	R 290	R 295	290	290	295	290	295	305	305	290	280	270	R 275	255
27	250	240	235	225	220	225	260	310	300	300	R 300	285	R 285	R 285	280	290	285	300	290	295	290	290	275	255
28	250	255	260	290	320	240	295	300	305	295	J R 310	U R 295	275	275	285	285	285	290	285	295	300	265	235	235
29	225	220	220	200	220	200	225	265	270	F 285	F 285	280	F 275	270	V 265	260	260	275	290	290	255	260	290	290
30	290	F 275	280	250	300	270	330	290	285	295	305	285	285	290	285	290	295	305	285	295	300	295	280	280
31	270	245	V 230	235	230	245	280	330	295	R 310	U R 320	U R 305	R 300	280	285	300	300	295	290	305	290	280	260	265
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	270	265	270	265	265	265	310	320	315	305	300	295	285	280	285	290	295	300	295	285	290	280	280	275
U Q	285	285	285	290	280	275	325	330	325	310	300	300	290	290	285	290	300	305	300	295	300	285	285	290
L Q	255	255	250	245	245	245	300	310	300	300	295	285	280	275	280	285	285	295	290	280	280	270	260	260

OCT. 1991 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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										L	L	L	L	L	L									
2								335	305	325	345	365	355	350	U L 320	L 315								
3									L	L	L	L	L	L	L 340	L								
4									L	L	L		L	L	L	L								
5									L	L	L	L	L	L	L									
6									L		L	L		L	L									
7										L	L	L	L	L	L	L								
8											L	L	L	L		L								
9									L	L	L	L	L	L	L	L								
10										L	L		L	U L 345	U L 325									
11									L	L	L		L	L	L									
12											L	U L 340	L	L	L									
13									L	L	L	L	L	L	L									
14											L	L	L	L	L		L							
15											L	L	L	L	L									
16													L	L	L	L								
17										L				L	L	L								
18												L		U L 330	L									
19									L	L	L	L	L											
20											L		L	L										
21										L	L		L	L		L								
22													L	L										
23											L		L		L									
24									L	L	L	L	L	L		L								
25									L		L		L		L									
26									L	L			L		L	L								
27										L	L	L	L	L		B								
28									L		L		L		L									
29									L	L		L	L	L	L									
30										L	L	L	L	L										
31										L	L	L	L											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	1	2	1	3	3	1								
MED								335	305	325	345	352	355	U L 345	U L 325	L 315								
U Q														L 350	L 340									
L Q														U L 330	U L 320									

OCT. 1991 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 H'F2 (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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										260	250	265	260	305	265									
2								655	555	450	635	515	740	780	L 465	380								
3									275	260	310	290	315	300	300	280								
4									255	255	255		L 315	275	310	275								
5									270	250	225	320	285	310	280									
6									235		260	270		300	L 310									
7										270	290	285	260	300	280	280								
8											285	250	300	290		260								
9									260	250	260	235	270	250	305	275								
10										225	245		310	300	320									
11									250	250	300		335	305	305									
12											250	275	290	310	310									
13									250	255	240	280	260	L 320	285									
14											285	265	300	305	L 290		300							
15											280	L 300	270	L 310	305									
16													260	L 305	L 320	285								
17										270				305	L 325	300								
18												L 320		320	290									
19									255	300	235	310	300											
20											270		L 300	300										
21										275	300		250	300		265								
22													300	305										
23											250		L 310		265									
24									235	L 300	270	275	L 310	L 330		250								
25									240		L 295		305		L 310									
26									L 300	L 340			300		L 275	280								
27										L 280	240	300	300	L 320		E B 280								
28									260		255		L 320		300									
29									305	260		300	310	310	L 355									
30										305	275	L 325	310	265										
31										250	255	240	285											
	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	14	19	25	19	28	25	22	12	1							
MED								655	258	260	260	285	300	305	305	280	300							
U Q									275	300	288	310	310	L 310	L 310	282								
L Q									250	250	250	265	278	300	285	270								

OCT. 1991 H'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 H'F (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35° 42.4'N LON.139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	270	310	300	340	305	290	250	240	230	225	230	230	230	H 235	225	250	245	250	A 235	235	280	280	A 355	330
2	280	290	250	H 300	305	430	310	260	295	260	245	250	250	245	245	250	255	270	250	320	350	305	325	250
3	270	355	320	330	385	360	265	240	225	235	225	225	225	235	230	230	245	235	230	250	290	285	A	E A 355
4	335	305	285	270	280	275	225	225	230	230	230	230	220	225	230	240	250	230	225	240	275	280	295	285
5	260	300	300	250	240	255	245	240	230	H 220	210	H 210	H 220	240	245	240	240	230	235	255	285	A 280	250	280
6	A 315	A 340	310	275	255	240	235	220	220	225	215	230	235	235	235	H 230	250	235	225	250	270	290	275	290
7	A 325	E A 350	340	355	335	305	220	225	230	230	220	230	235	225	240	235	250	235	240	260	255	270	280	250
8	255	300	300	310	280	275	240	235	230	230	230	230	230	245	245	245	240	240	250	230	280	270	290	320
9	325	300	330	315	355	325	230	230	220	230	230	220	250	230	H 215	245	245	240	225	230	250	250	285	275
10	285	265	290	310	300	275	235	225	225	220	210	H 210	H 205	215	240	250	245	230	A 270	245	250	275	290	255
11	310	340	320	340	240	270	245	230	240	220	210	H 210	H 215	H 210	240	240	245	240	230	240	265	255	280	270
12	265	A 300	270	260	330	320	240	225	230	225	220	210	H 205	240	230	245	240	230	235	250	250	245	265	265
13	260	265	265	280	290	345	255	225	230	225	220	210	225	230	220	245	235	235	235	255	250	235	275	285
14	290	255	265	280	245	270	240	225	235	230	235	220	240	H 220	235	240	A 250	245	A 240	255	240	245	310	280
15	280	300	285	275	250	285	250	225	215	220	H 210	H 220	230	H 235	235	245	240	245	240	255	270	265	290	285
16	280	280	265	260	260	265	240	230	225	225	230	255	220	235	240	235	240	225	235	255	260	250	250	260
17	240	255	240	250	230	290	245	225	230	230	235	240	A 250	H 215	230	240	A 250	A 245	230	240	260	265	265	260
18	260	250	290	275	260	285	245	230	245	A 250	A 250	225	225	225	240	235	240	240	220	A 300	270	275	265	300
19	300	300	250	235	225	305	255	230	230	H 225	220	H 210	235	A 250	A 250	245	240	220	230	240	250	255	310	305
20	270	250	250	260	220	280	235	230	220	230	230	A 255	245	235	245	A 255	245	240	245	270	250	255	250	265
21	290	260	230	235	300	315	250	230	225	220	230	245	230	225	235	245	235	230	225	240	265	310	305	315
22	310	325	340	360	365	405	305	255	H 225	230	250	A 245	235	A 250	250	240	230	225	270	265	250	240	295	330
23	340	320	360	360	385	385	265	220	230	220	210	230	230	230	225	240	230	230	230	275	240	250	275	280
24	280	270	280	285	300	325	235	210	225	220	225	225	230	235	240	230	230	225	260	250	215	235	310	330
25	335	320	295	280	245	H 250	250	220	220	H 205	230	235	230	240	240	240	235	230	225	245	270	255	310	305
26	275	300	380	335	340	380	270	225	H 215	235	240	240	230	240	230	230	230	235	220	A 290	E A 325	330	335	330
27	A 335	365	375	400	435	400	310	255	235	H 230	225	230	235	240	230	B	245	230	250	250	245	225	255	290
28	350	355	330	260	235	400	265	220	240	230	225	230	225	A 250	230	230	220	235	235	250	240	300	340	390
29	445	465	475	570	385	475	A 360	295	255	245	230	230	230	230	245	240	265	265	235	230	300	285	275	230
30	270	295	300	A 255	250	245	220	220	235	230	235	230	H 230	240	240	235	250	A 245	H 230	255	245	260	285	295
31	300	340	385	390	370	340	260	215	220	235	230	225	225	230	230	235	220	220	255	230	210	260	320	290
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	30	31
MED	285	300	300	280	290	305	245	225	230	230	230	230	230	235	235	240	240	235	235	250	258	265	288	285
U Q	325	340	330	340	340	360	265	235	235	230	230	235	235	240	240	245	250	240	245	255	275	280	310	315
L Q	270	270	265	260	245	275	235	225	225	220	220	220	225	225	230	235	235	230	230	240	250	250	275	265

OCT. 1991 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 H'E (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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							135	115	115	115	115	A	A	A	A	120	115	B 145						
2							B	A	115	115	A	115	115	110	110	115	A 120	135						
3							A	120	120	115	120	120	B 130	115	110	115	120	A						
4							E B 160	120	A 120	E A 130	B	110	B 125	A 115	A 115	120	115	B 140						
5							B 150	120	A 130	110	110	A	A	A 120	A 120	A 125	A 130	A						
6							E A 145	A 120	115	A 115	A 115	E A 125	120	E A 130	A 115	A 120	A	A						
7							A	A 120	120	115	115	A 120	E A 130	A	115	A 115	115	140						
8							B 140	120	115	110	115	115	115	A	115	115	115	B 140						
9							140	120	120	110	115	A	A	A	115	115	115	B 130						
10							B 145	115	110	115	115	115	115	E A 125	115	110	115	A						
11							125	120	115	A	A 120	120	A 125	A 125	A	A	120	A						
12							A	120	115	115	E A 145	A 120	110	120	115	A 120	A	A						
13							E A 175	120	A 120	120	115	115	120	B 130	115	120	E A 145	E B 145						
14							B 140	125	120	A 120	A	E A 130	120	120	115	110	A	A 150						
15							E B 150	A 140	A	A	A 120	A	120	A 120	110	110	115	B 135						
16							B	A 120	115	110	115	115	120	A	120	A	A 130	A						
17							E B 180	A 125	110	110	120	115	115	115	115	115	115	B						
18							E B 140	A	A 120	110	110	110	110	120	A 125	110	120	B 130						
19							B 165	A	A	115	110	120	115	115	115	120	A	B						
20							A	A	A	A	115	115	125	120	115	115	115	A						
21							B	A	110	110	115	115	A	115	110	A	A	B						
22							E B 170	120	A	115	115	115	115	120	115	115	115	B						
23							B	A 140	120	110	A	A	A	A	A	A	A	B						
24							E B 175	120	120	115	B	120	120	120	A 120	A 125	120	B						
25							E B 190	125	130	120	120	115	E A 135	120	120	A	A 125	A						
26							B	120	A	110	120	B 130	115	B 125	A 125	115	120	B						
27							A	120	115	A 125	A	A 120	120	120	120	B	A	B						
28							B	A 120	120	A	A	115	120	A	115	115	125	B						
29			B	B	B			A	A	A	A	A	A	A	A 130	A	A	B						
30							B 175	120	115	A	A	A 130	A	A	E A 135	120	B	B						
31							B	125	120	120	B 130	A 120	B	120	120	A	A	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							18	25	25	25	22	25	23	22	28	23	21	10						
MED							B 145	120	120	115	115	115	120	120	115	115	118	B 139						
U Q							E B 175	A 122	A 120	A 118	120	A 120	125	A 120	A 120	A 120	A 122	B 145						
L Q							140	120	115	110	115	115	115	115	115	115	115	B 135						

OCT. 1991 H'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 H'ES (KM) 135° E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	B	B	B	B	B	B	G	125	115	115	115	110	110	115	115	G	140	125	115	100	100	100	100	105
2	B	B	B	B	115	120	B	110	E G 165	120	120	G	G	G	105	G	160	140	B	B	B	110	105	105
3	B	100	100	105	105	130	135	130	140	G	120	G	155	G	140	130	130	125	105	100	100	95	100	100
4	115	95	100	100	95	100	G	G	140	110	B	G	G	100	110	110	170	125	120	110	B	B	B	B
5	105	B	B	B	B	B	170	170	110	130	120	120	115	110	110	105	100	105	100	115	105	110	105	110
6	105	105	100	B	B	105	105	160	G	105	135	135	120	130	135	150	110	115	120	100	100	100	95	120
7	110	110	125	110	110	110	110	165	140	130	G	110	110	105	105	105	110	G	115	100	105	B	B	B
8	B	B	B	B	105	110	135	150	120	115	115	110	105	110	E G 190	150	140	125	125	120	110	105	B	B
9	B	B	B	B	135	B	G	130	115	120	115	115	110	110	G	G	135	120	110	110	105	105	100	100
10	100	B	120	110	120	B	G	E G 170	G	G	G	G	G	110	110	G	115	105	105	105	100	100	100	100
11	100	100	B	110	110	115	135	130	125	120	110	G	110	110	120	105	155	100	100	100	100	105	B	B
12	115	105	105	110	115	B	150	140	140	G	115	110	G	G	105	100	150	100	110	105	100	105	110	105
13	105	B	B	B	B	110	110	G	150	140	140	150	150	130	G	120	E G 185	G	B	B	B	130	120	B
14	110	B	B	B	B	B	G	G	110	140	100	110	125	115	140	120	110	150	120	105	115	110	100	105
15	105	110	B	105	B	B	G	110	105	105	105	100	150	145	155	180	155	125	115	110	105	105	105	100
16	100	95	95	B	B	105	B	100	110	G	125	115	115	115	115	110	110	110	105	105	100	B	B	110
17	B	B	B	B	B	B	105	110	155	125	120	115	110	125	G	130	115	115	120	105	105	110	100	100
18	95	95	100	B	B	B	G	110	125	115	115	G	G	E G 165	135	160	135	120	110	110	110	110	B	B
19	B	110	110	B	B	B	G	115	115	G	G	100	150	120	120	120	115	115	B	B	110	105	100	100
20	B	B	B	B	B	B	115	115	115	115	135	120	125	125	120	115	115	110	110	110	105	105	105	105
21	B	B	125	B	B	120	B	E G 180	115	G	G	115	120	115	115	110	110	105	105	110	110	110	B	B
22	B	110	B	B	B	120	G	G	160	135	130	120	120	120	G	G	160	125	105	100	100	100	100	100
23	95	100	105	B	B	B	B	115	120	110	115	110	115	110	110	105	100	105	105	105	100	100	100	105
24	100	100	105	B	105	105	G	G	G	135	B	125	125	G	110	E G 180	145	110	105	100	105	105	105	B
25	B	B	B	B	B	B	G	G	G	G	G	G	115	120	120	115	110	110	135	105	105	100	100	100
26	100	100	100	B	115	B	B	G	115	G	140	G	G	150	115	105	140	135	115	105	100	100	100	105
27	110	110	105	110	B	B	125	130	125	140	150	140	140	140	G	B	110	100	110	100	B	105	105	110
28	105	105	100	100	105	105	105	175	125	115	115	G	G	105	G	G	G	B	B	B	120	105	120	115
29	B	B	B	B	B	B	110	100	115	115	110	115	115	110	120	120	120	110	110	105	105	105	105	105
30	105	105	115	125	135	B	G	170	160	135	125	125	110	145	140	120	115	115	115	115	110	110	105	110
31	100	120	B	B	B	B	B	135	120	120	120	105	135	130	125	100	115	100	105	100	B	B	110	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	18	16	10	13	13	13	24	27	23	24	22	24	27	25	24	30	28	27	27	26	27	24	22
MED	105	105	105	110	110	110	115	129	120	120	120	115	118	115	118	116	116	115	110	105	105	105	102	105
U Q	110	110	112	110	118	120	135	162	140	135	128	120	130	130	135	130	145	125	115	110	110	110	105	110
L Q	100	100	100	105	105	105	108	112	115	115	115	110	110	110	110	105	110	105	105	100	100	100	100	100

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1991 TYPES OF ES 135°E MEAN TIME (G.M.T. + 9H)

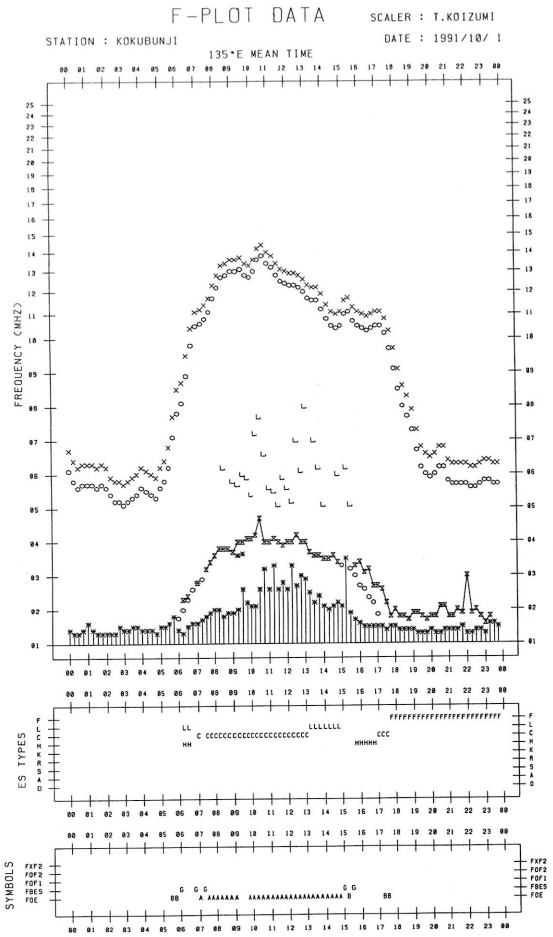
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

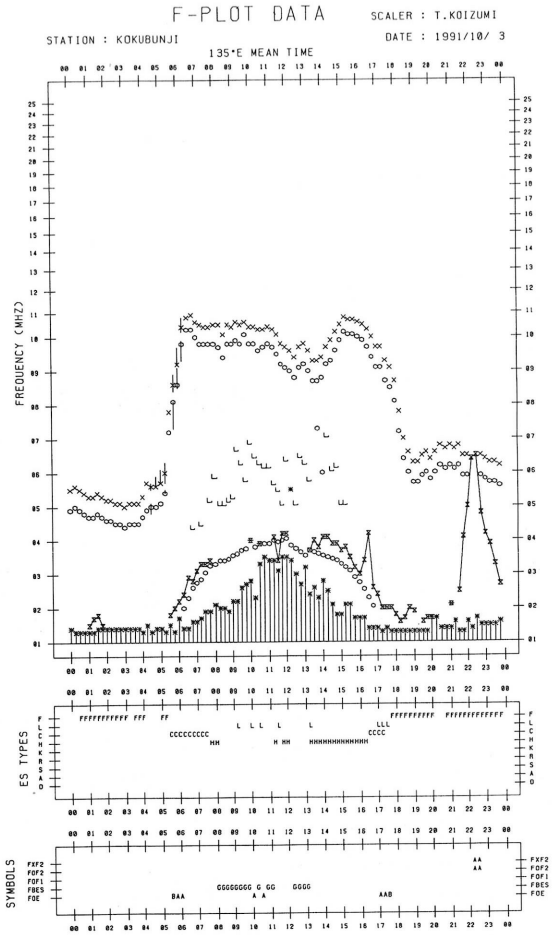
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								C 1	C 1	C 1	C 1	C 1	C 2	C 1	L 1		H 2	C 3	FF 31	FF 22	F 2	F 2	F 3	F 2
2					F 2	F 1		C 3	HC 11	C 1	C 1				L 1		HL 12	H 2				F 1	F 2	F 1
3		F 3	F 2	F 2	F 1	F 2	C 2	C 2	H 1		L 1		H 1		H 1	H 1	H 1	CL 31	F 2	F 3	F 1	F 2	F 4	F 5
4	FF 23	F 3	F 2	F 2	F 3	F 2			HL 11	L 1				L 1	L 1	L 1	H 1	C 2	F 1	F 1				
5	F 1						H 1	H 1	L 1	H 1	C 1	C 1	L 1	L 1	L 1	L 1	L 2	L 2	F 1	FF 21	FF 31	F 3	F 3	FF 22
6	F 3	FF 23	F 3			F 1	L 1	HL 11		L 1	HL 11	HL 11	C 1	HL 11	HL 11	HCL 11	CL 31	CL 22	FF 11	F 1	F 2	F 1	F 2	FF 12
7	F 3	F 3	FF 21	F 1	F 2	F 2	C 2	HL 11	HL 11	H 1		L 1	L 1	L 1	L 1	L 1	L 2		F 1	F 2	F 3			
8					F 1	F 1	C 3	HC 12	C 2	C 3	C 2	C 1	C 2	C 2	H 1	H 2	H 2	C 4	F 3	F 5	F 2	F 3		
9					F 1			H 2	C 2	C 2	C 2	C 1	C 2	L 1			H 2	C 3	F 5	F 3	F 3	F 2	F 2	F 2
10	F 2		F 2	F 2	F 1			H 1						L 1	C 2		C 3	C 3	F 5	F 2	F 3	F 2	F 2	F 2
11	F 1	F 1		F 4	F 4	F 1	H 1	C 1	C 2	CL 11	L 1		L 1	L 1	CL 11	L 1	H 1	L 2	F 2	F 3	F 4	F 3		
12	F 1	F 3	F 2	F 2	F 1		C 1	H 1	H 1		L 1	L 1			L 1	L 2	HL 12	L 2	FF 22	F 1	F 2	F 1	F 1	F 2
13	F 1					F 2	L 2		HL 11	H 1	H 1	H 1	H 1	C 1		C 2	HL 12					F 1	F 1	
14	F 1								L 1	HL 11	L 2	L 1	C 1	L 1	H 1	C 2	CL 41	HL 21	FF 32	F 1	F 1	F 2	F 3	F 2
15	F 2	F 2		F 1				L 2	L 3	L 2	L 1	L 1	HL 11	HL 11	H 1	HL 11	H 2	C 3	FF 21	FF 21	F 4	F 3	F 4	F 4
16	F 4	F 3	F 2			F 1		L 1	L 1		HC 11	C 2	C 1	C 2	C 1	L 2	L 1	L 2	F 4	F 2	F 2			F 1
17							L 1	L 1	H 1	H 2	C 2	C 2	C 2	C 1		H 2	C 4	C 5	F 1	F 2	F 2	FF 12	F 3	F 3
18	F 2	F 1	F 1					L 2	HL 32	C 3	C 2			H 1	HL 11	H 1	H 2	C 3	F 1	F 3	F 2	F 1		
19		F 1	F 1					L 2	L 2			LH 11	H 1	H 3	H 2	C 2	C 2	C 2			F 2	F 2	F 2	F 3
20							L 1	L 2	C 2	L 1	H 2	C 2	C 2	C 1	C 2	C 4	C 3	C 2	F 2	F 2	F 2	F 4	F 2	F 2
21			F 1			F 1		HL 12	C 2			C 1	C 1	C 1	C 1	L 2	L 3	L 4	F 5	F 2	F 1	F 1		
22		F 2				F 1			HL 12	H 1	H 2	C 2	C 2	C 2			H 1	C 1	F 4	F 2	F 2	F 3	F 2	F 2
23	F 4	F 2	F 1					L 1	C 1	C 3	C 2	L 1	L 1	L 2	L 2	L 3	L 4	L 3	F 2	F 2	F 4	F 4	F 2	F 2
24	F 2	F 2	F 1		F 1	F 1				H 1		C 1	C 1		L 1	HL 11	H 1	C 3	F 3	F 3	F 1	F 2	F 1	
25													L 1	C 1	C 1	C 1	L 1	L 2	FF 11	F 3	F 5	F 2	F 2	F 3
26	F 3	F 2	F 1		F 1				L 1		H 1			H 1	LH 11	L 1	H 1	CL 12	F 5	F 4	F 3	F 4	F 2	F 1
27	F 3	F 2	F 2	F 1			L 2	H 1	H 2	HL 11	HL 11	HL 11	H 1	H 1			CL 21	L 3	F 1	F 1		F 1	F 2	F 1
28	F 1	F 2	F 3	F 2	F 1	F 2	L 2	HL 11	C 1	R 1	C 1			L 2							FF 12	F 4	F 1	F 3
29		K 1	K 1	K 1			C 3	L 4	L 2	L 2	L 1	L 1	L 1	C 1	L 1	L 1	L 2	L 2	F 3	F 3	F 4	F 3	F 3	F 3
30	F 3	F 2	FF 32	F 3	F 1			H 1	H 1	HL 31	CL 31	HL 11	L 1	HL 11	HL 11	C 2	C 2	CL 42	F 2	F 2	F 1	F 1	FF 21	FF 22
31	F 2	F 1						C 2	C 2	CL 21	C 1	L 1	H 1	C 1	HL 11	L 2	CL 32	L 2	FF 21	F 1			F 1	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

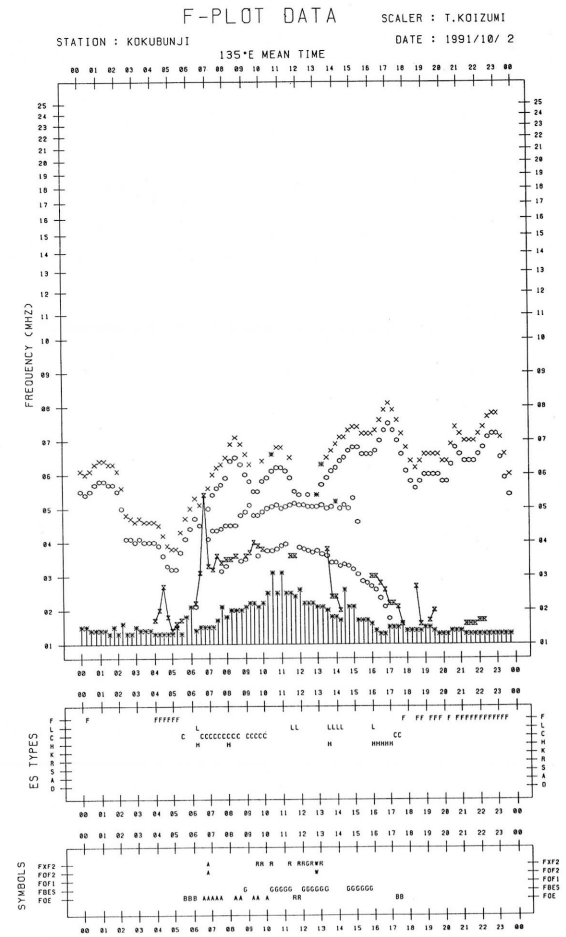
OCT. 1991 TYPES OF ES COMMUNICATIONS RESEARCH LABORATORY, JAPAN

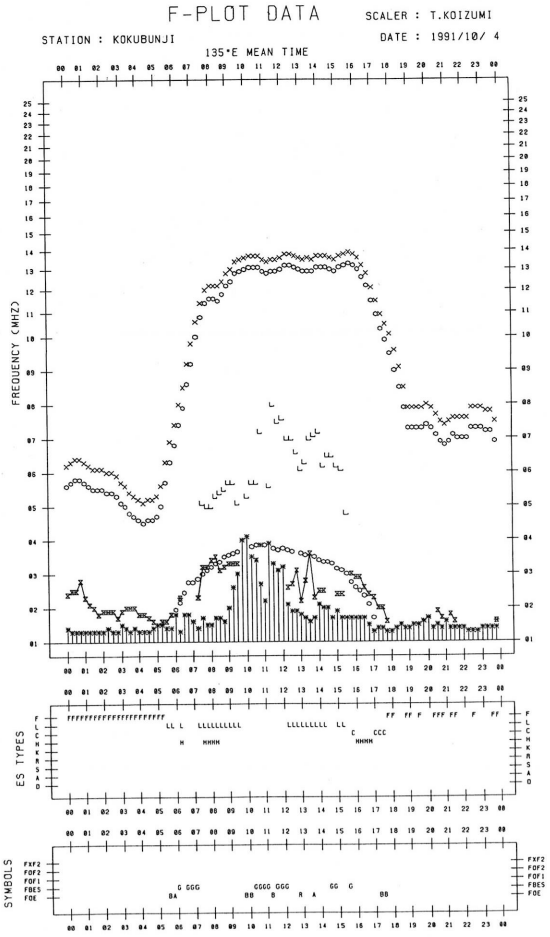
f-PLOTS OF IONOSPHERIC DATA

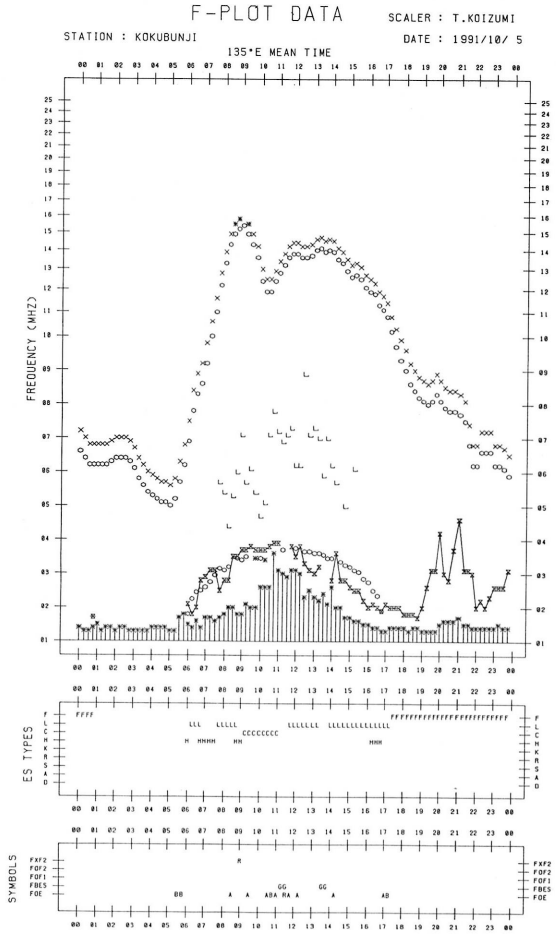
KEY OF F-PLOT	
I	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN

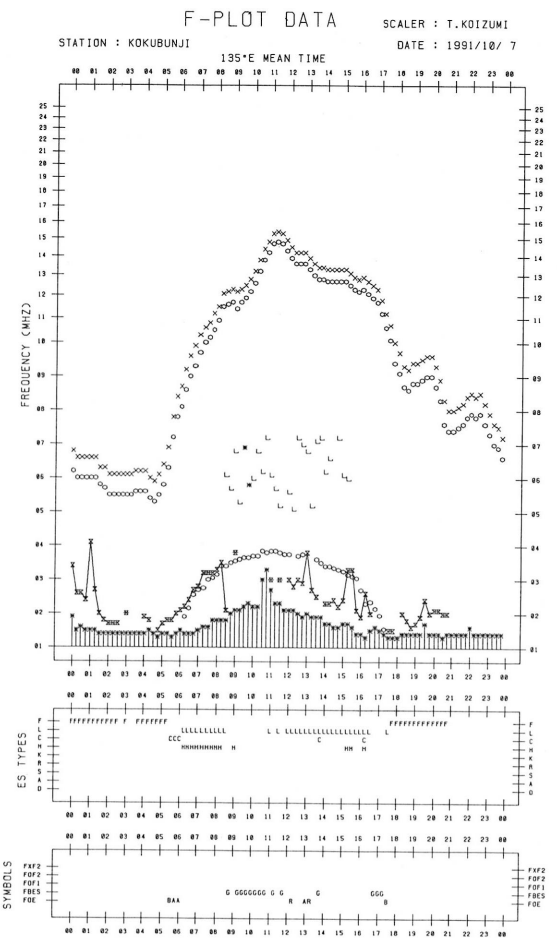

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

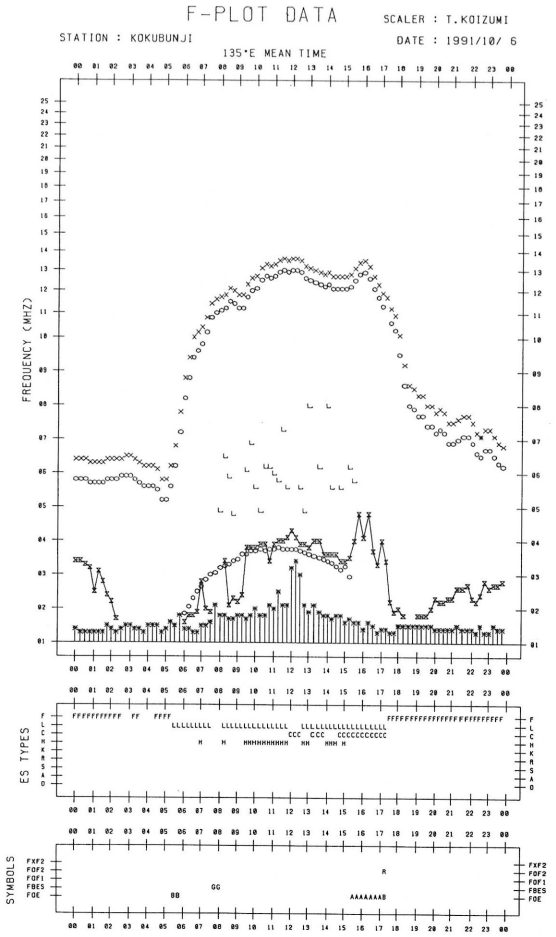

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

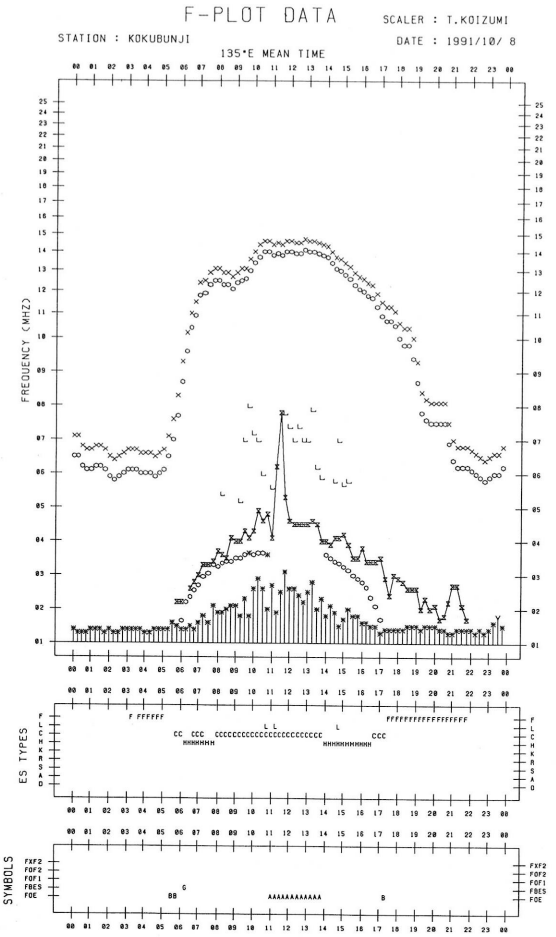

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

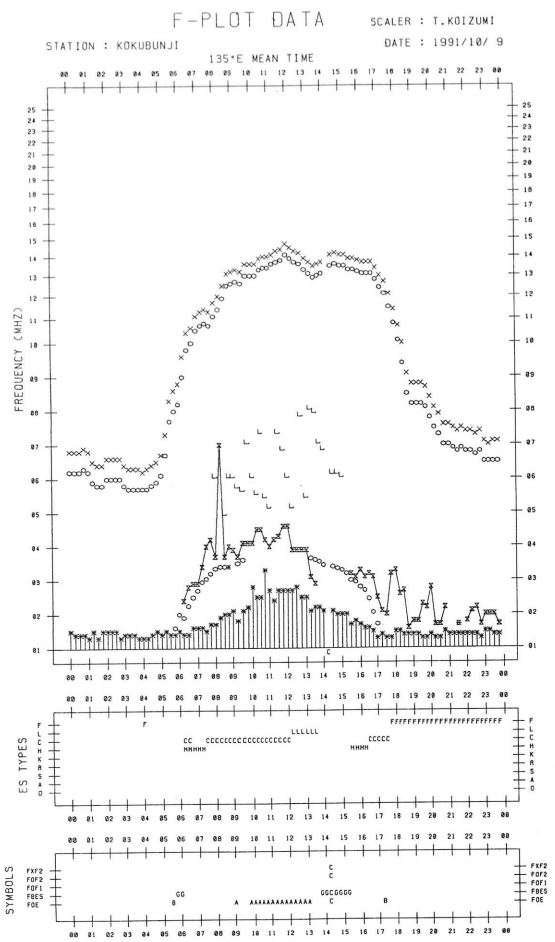

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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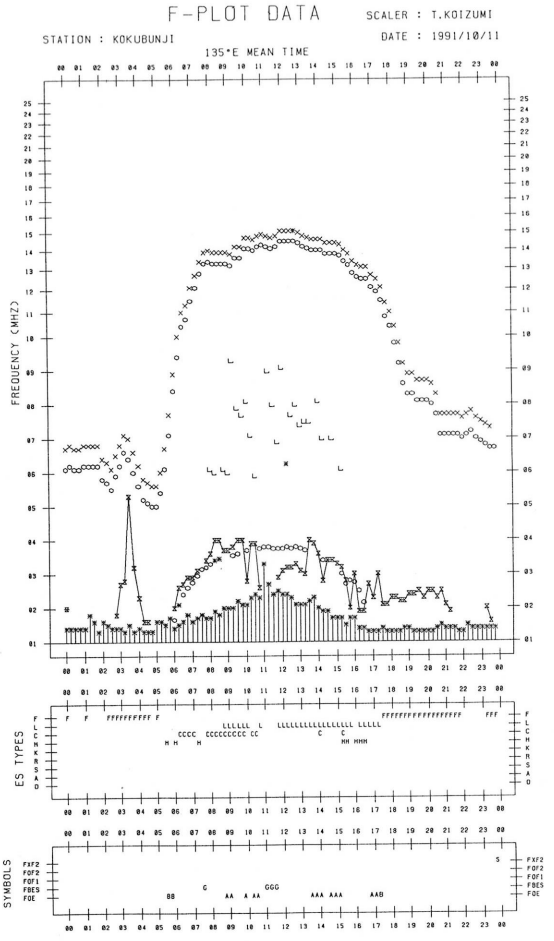
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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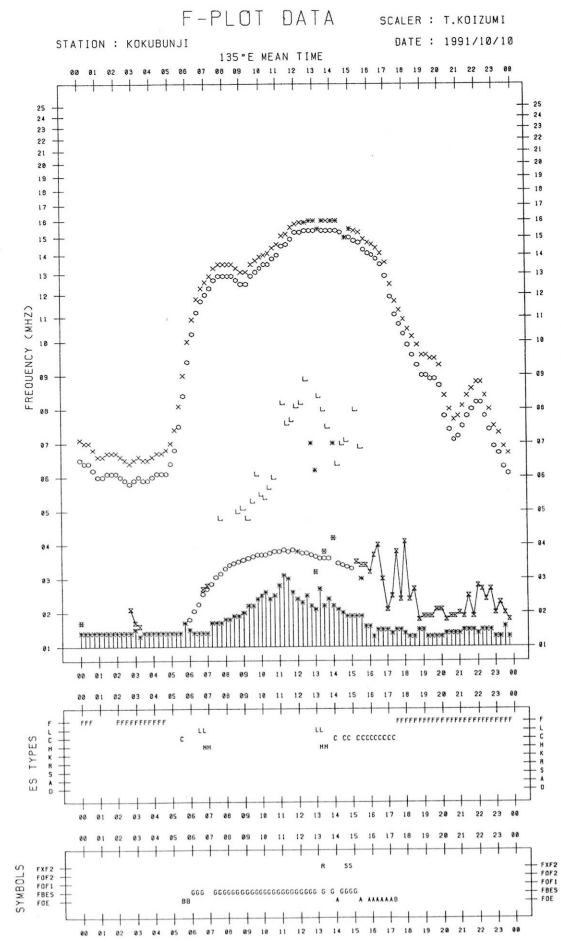
STATION : KOKUBUNJI
DATE : 1991/10/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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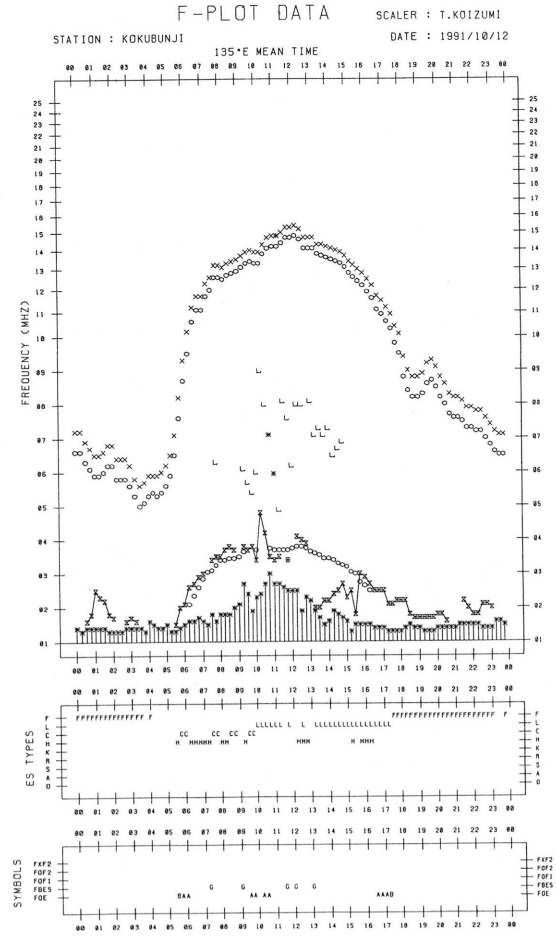
STATION : KOKUBUNJI
DATE : 1991/10/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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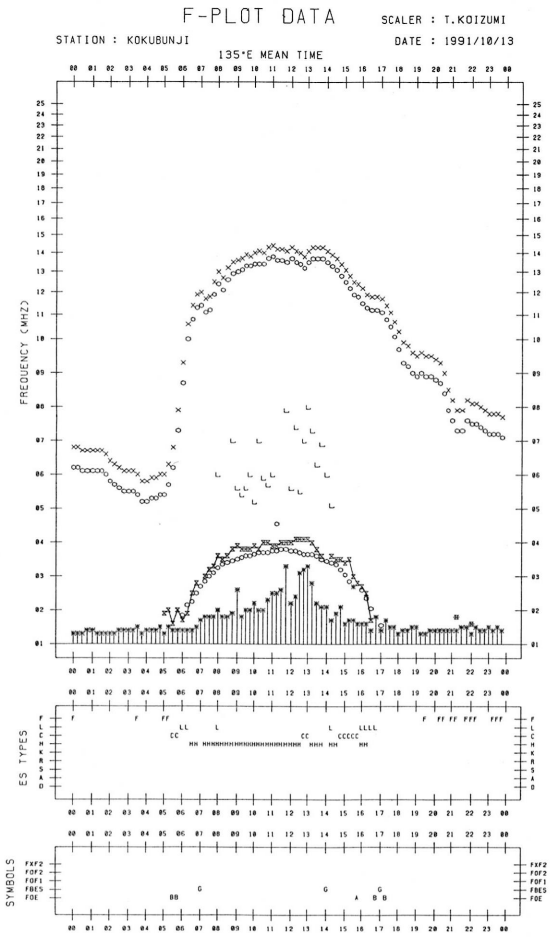
STATION : KOKUBUNJI
DATE : 1991/10/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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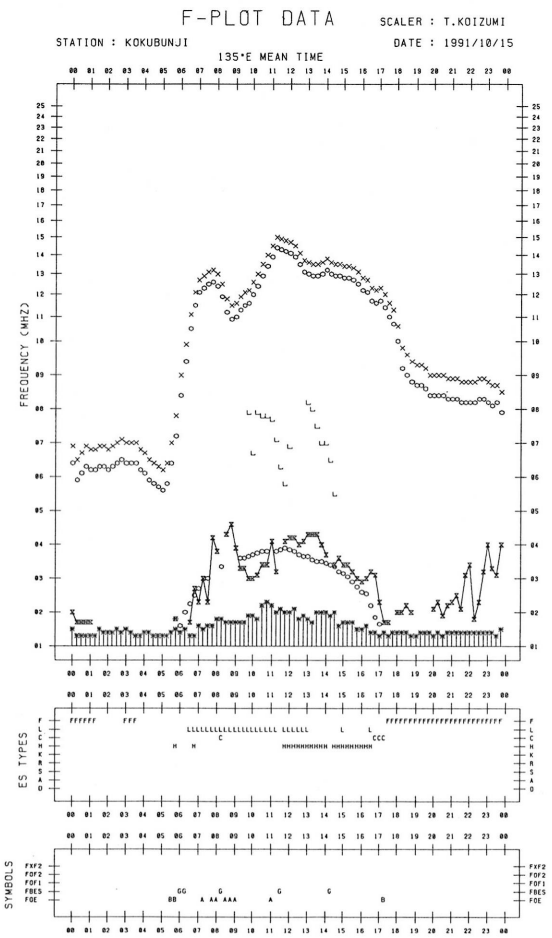
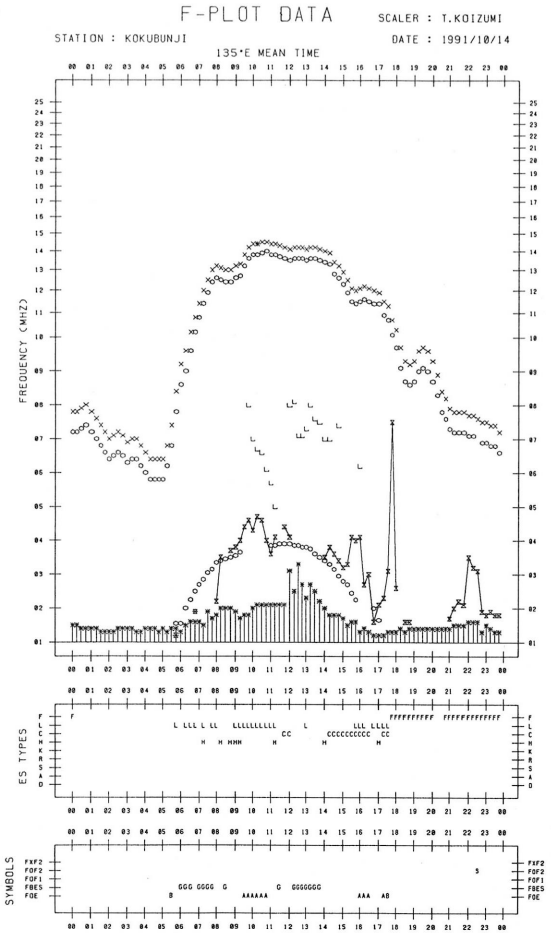
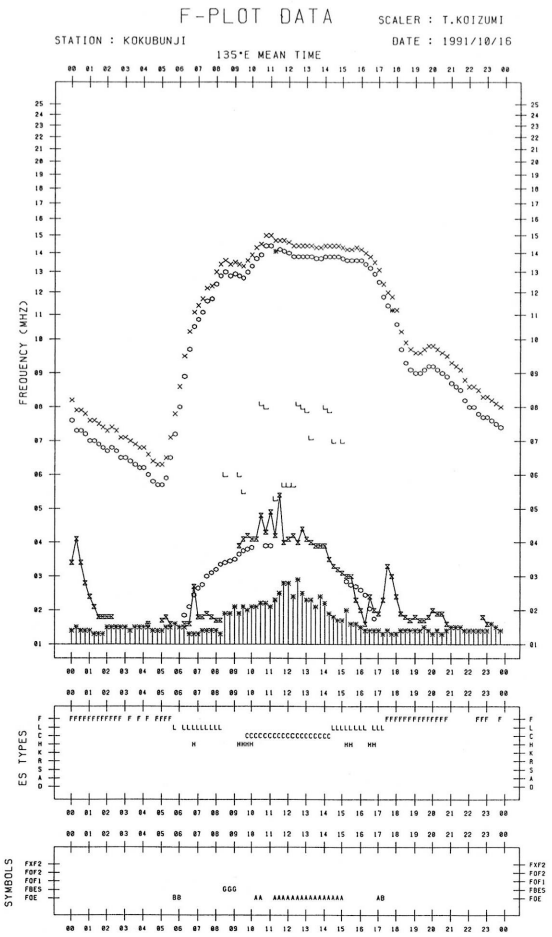
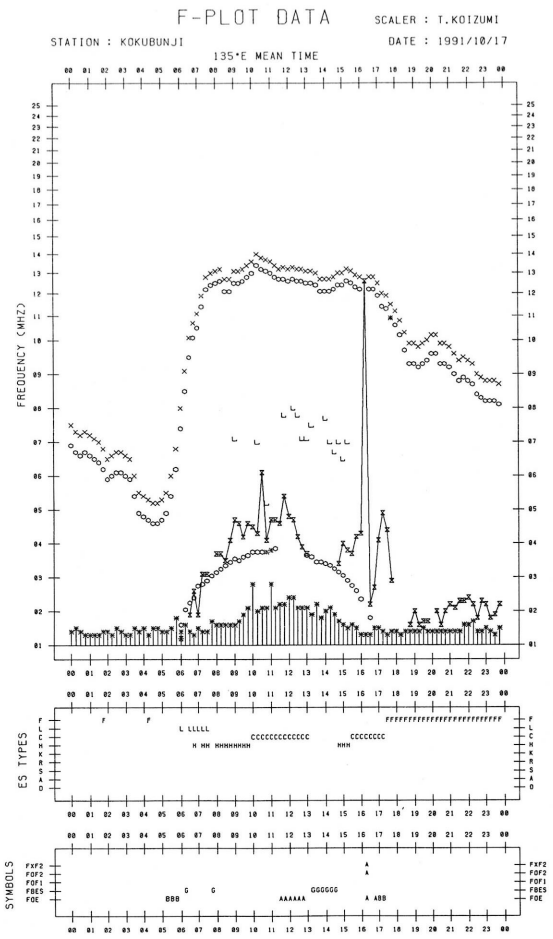
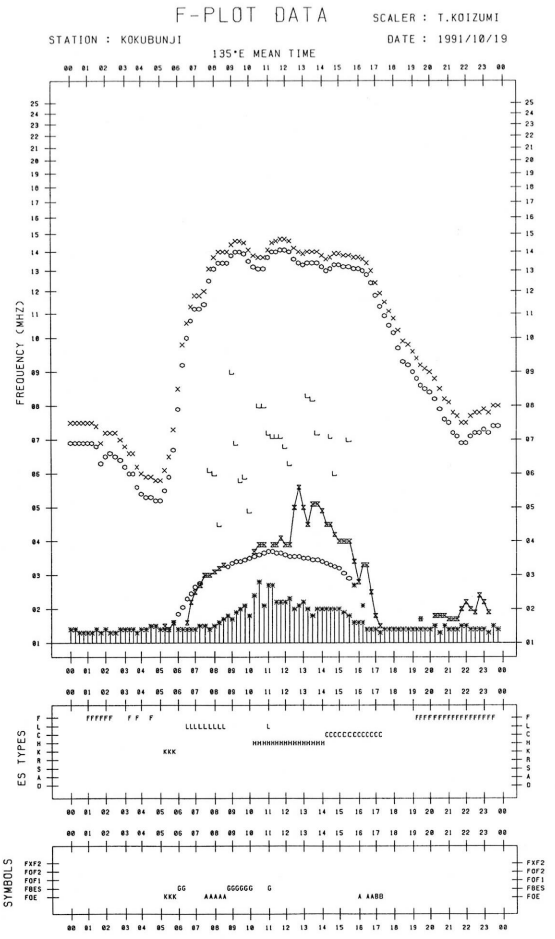
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

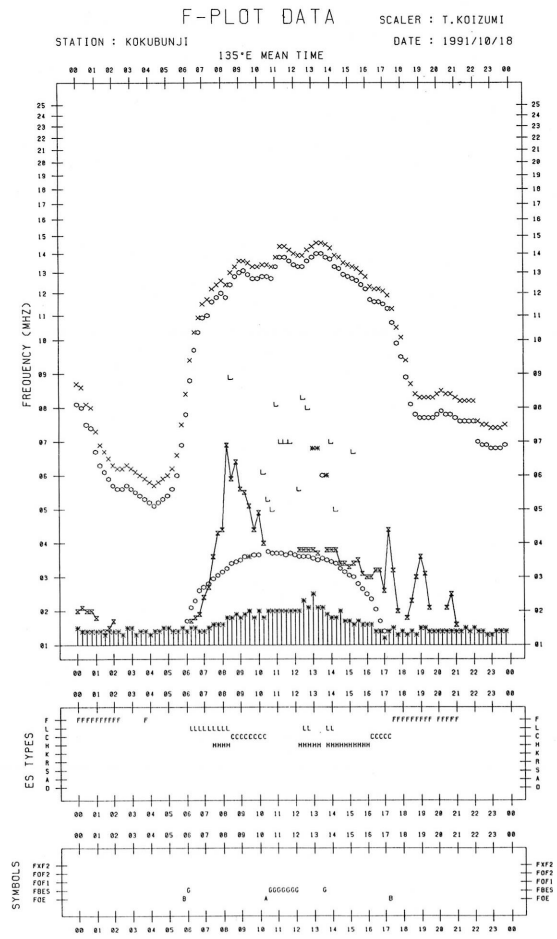

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

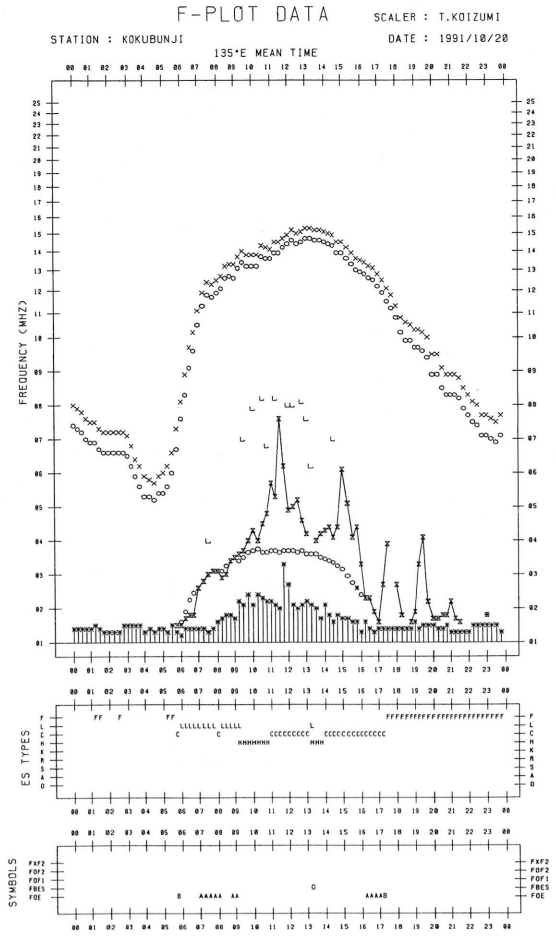

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

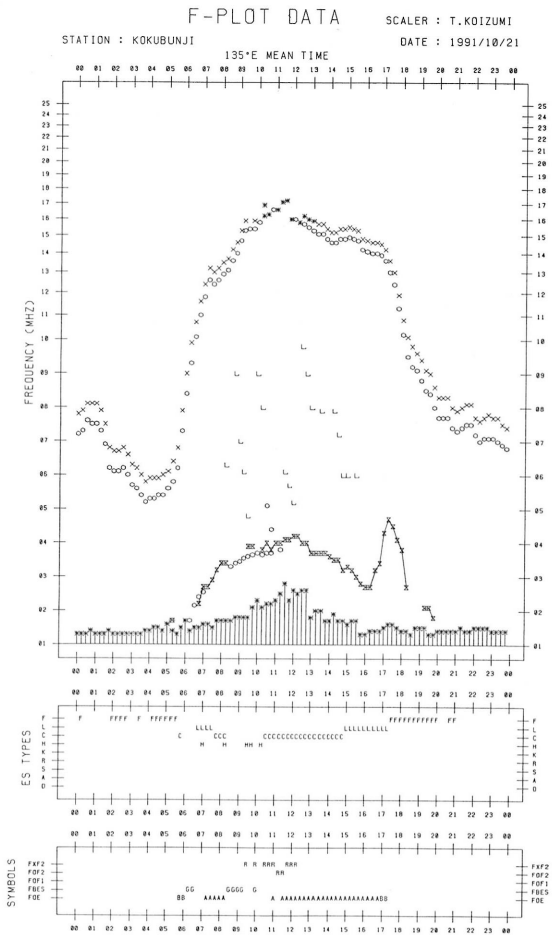

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

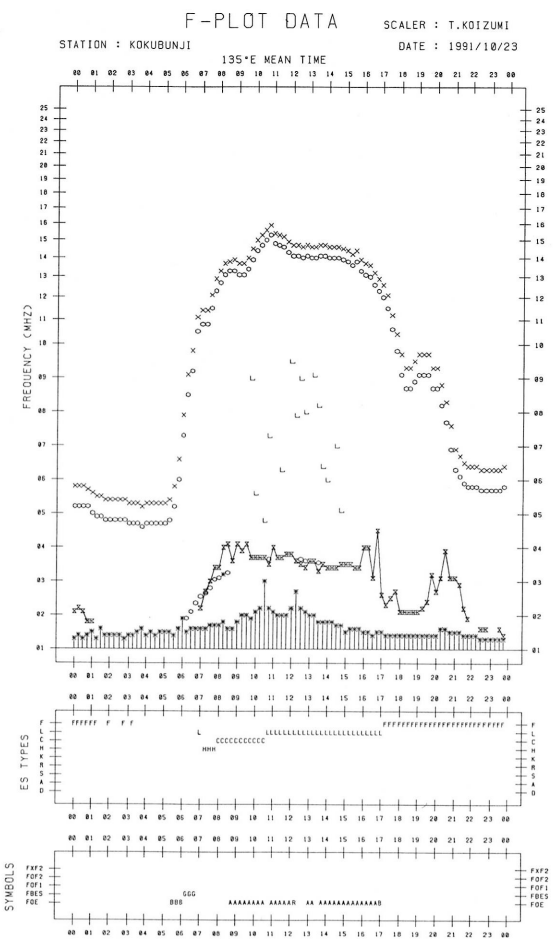

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

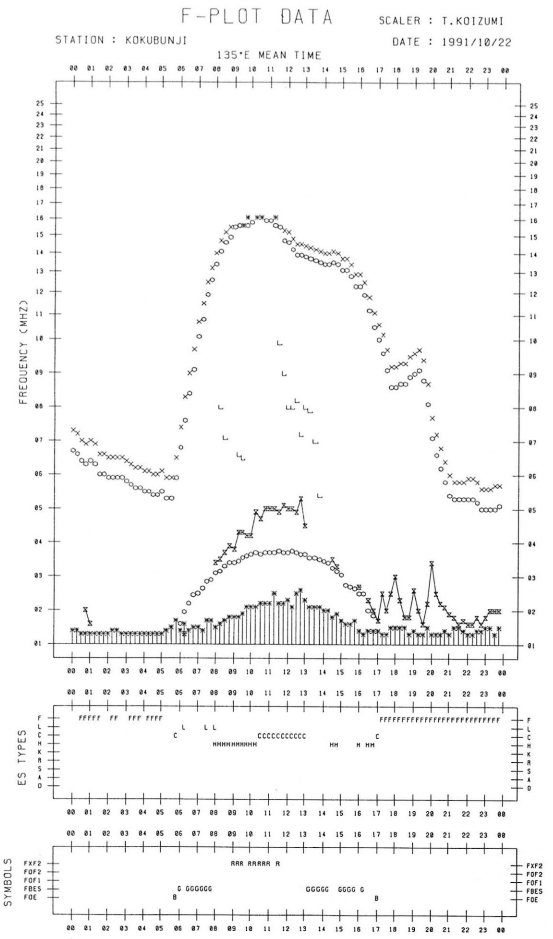

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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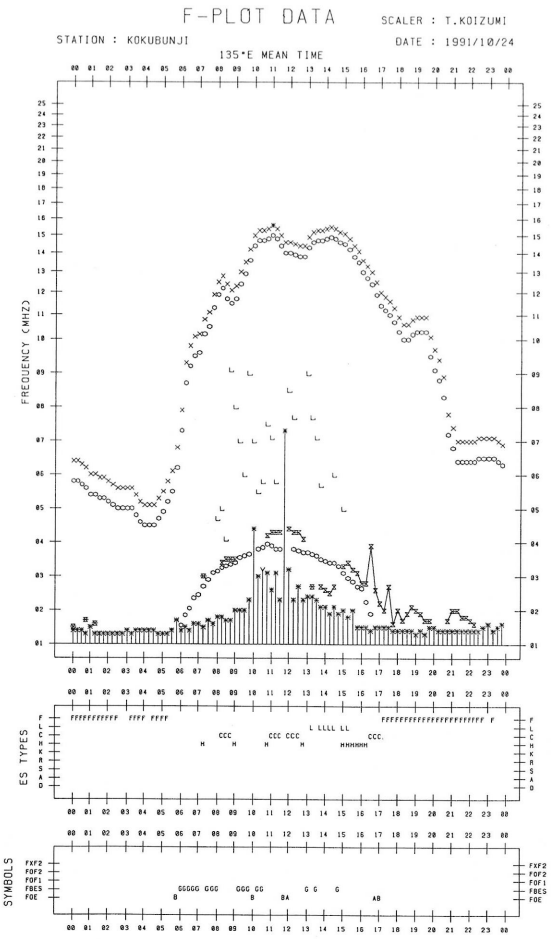
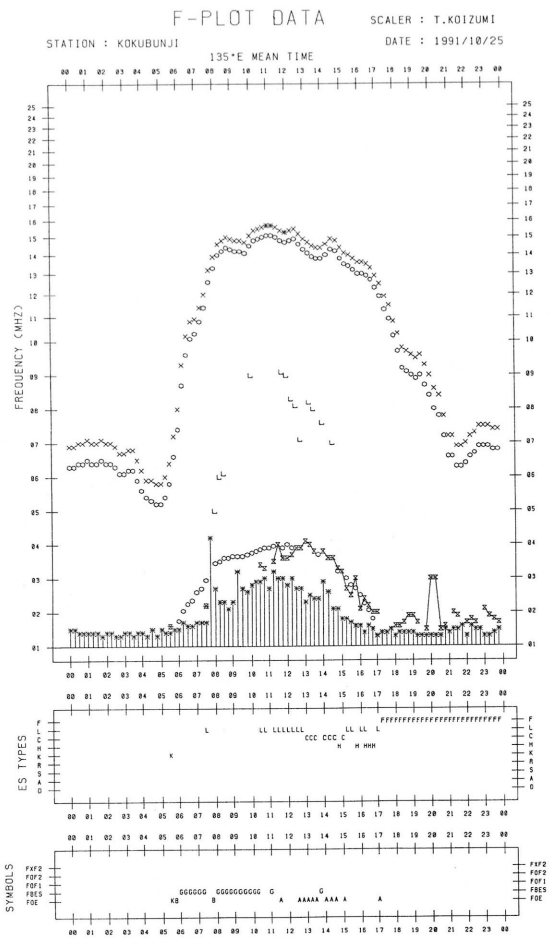
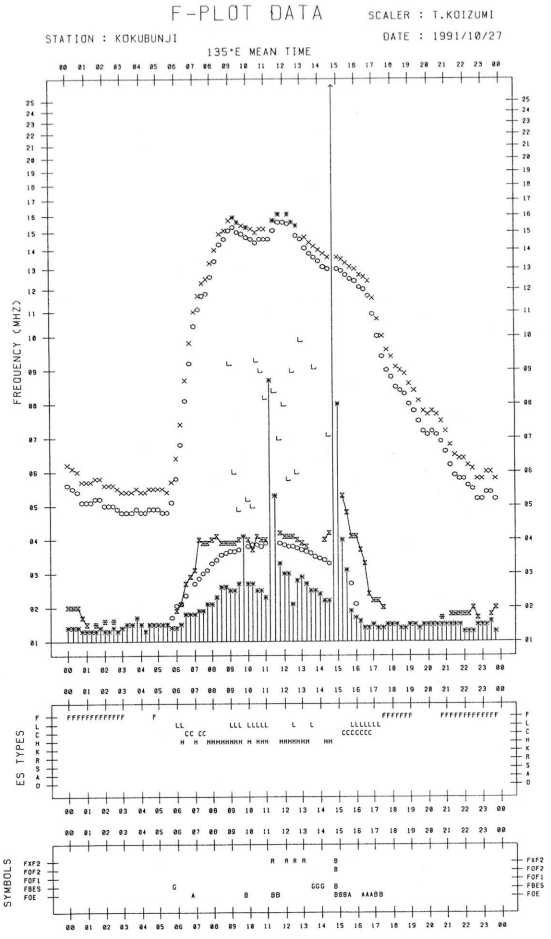
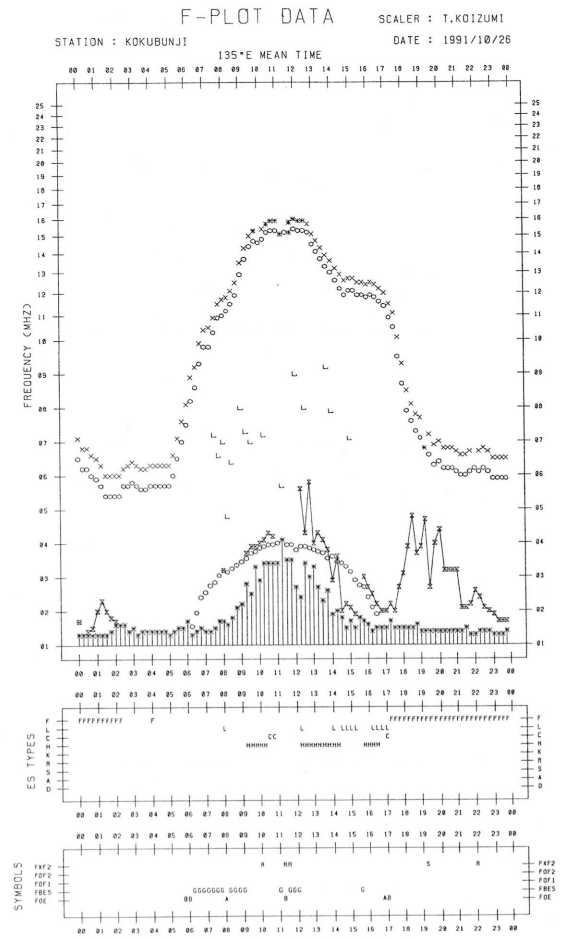
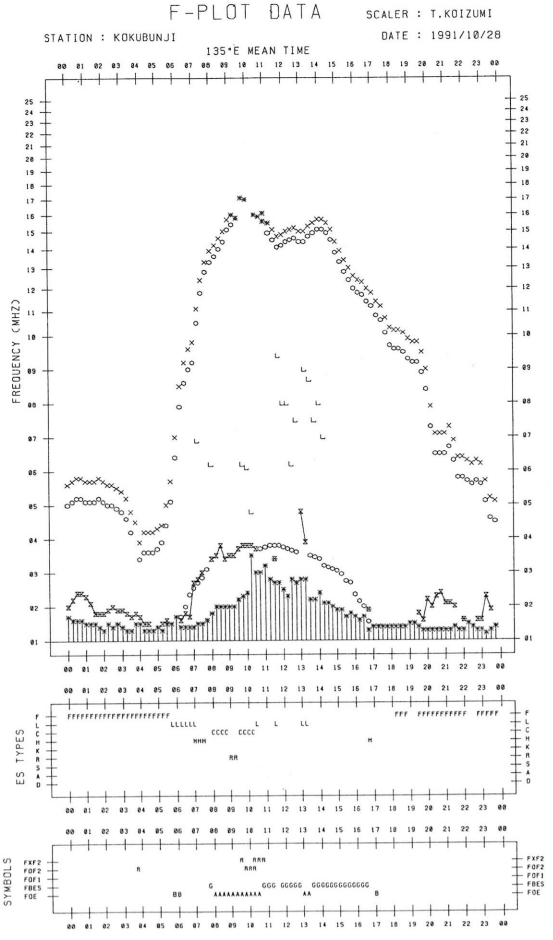
STATION : KOKUBUNJI
DATE : 1991/10/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

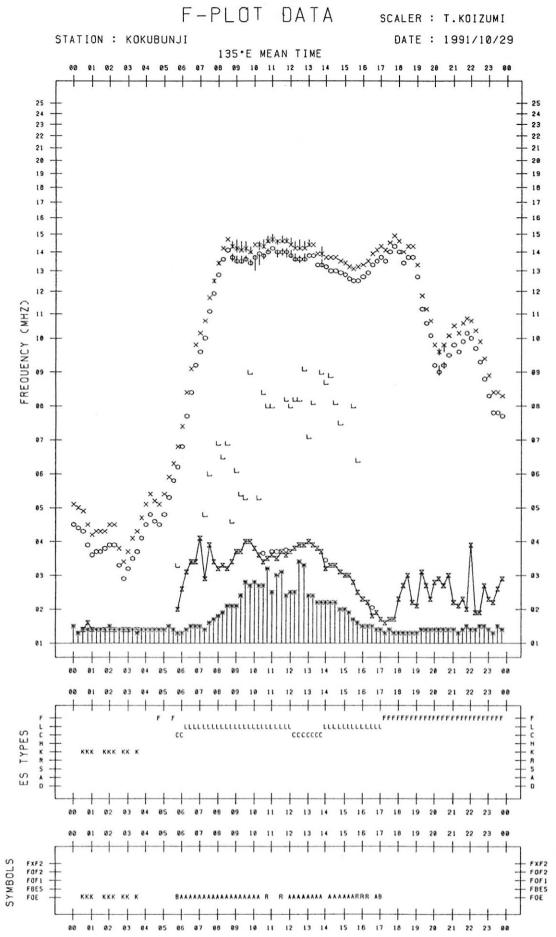

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

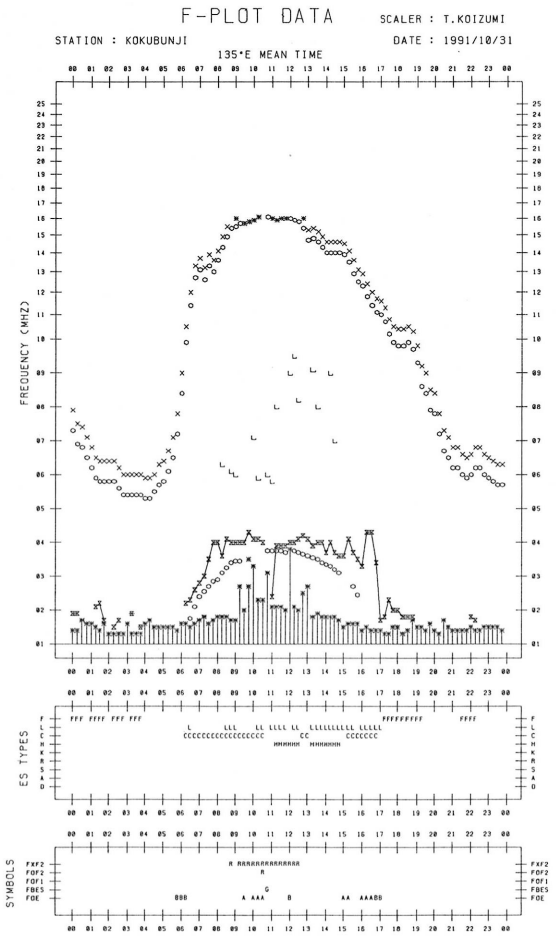

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

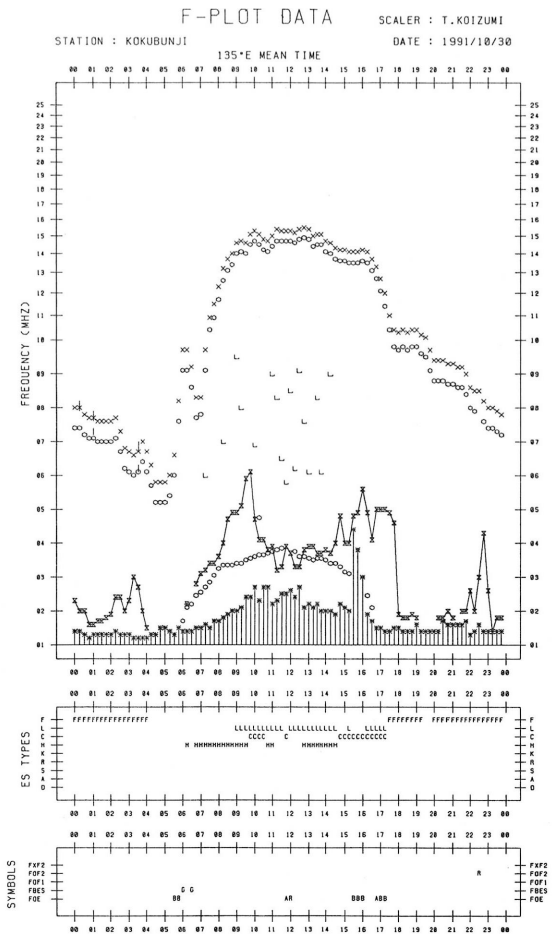

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/10/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Hiraiso October 1991

Single-frequency total flux observations at 200 MHz

Flux density: 10^{-22} Wm^{-2}Hz^{-1} Variability: 0 to 3

UT Date	Flux density 00-03	03-06	06-09	21-24	Day	Variability 00-03	03-06	06-09	21-24	Day
1	B	B	B	-	B	1	1	1	-	1
2	B	B	B	14	B	1	1	1	0	1
3	13	B	B	B	B	0	2	1	1	1
4	B	*	B	B	B	1	*	2	3	1
5	B	B	B	B	B	3	3	3	2	3
6	B	B	*	B	B	1	2	*	1	2
7	B	B	B	-	B	1	0	1	-	1
8	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-
23	-	-	9	9	9	-	-	0	0	0
24	9	9	9	B	9	0	0	0	0	0
25	B	10	*	B	12	1	0	*	1	0
26	B	B	B	B	B	1	1	1	2	1
27	B	B	B	B	B	2	2	2	1	2
28	B	B	B	B	B	1	1	1	1	1
29	B	B	-	B	B	1	1	-	2	1
30	B	B	B	10	B	2	3	0	0	2
31	10	12	12	13	11	0	0	0	0	0

Notes: No observations during the following periods.

1st 2050 - 2400 7th 2050 - 23rd 0605 29th 0526 - 0735
29th 2100 - 2216

No observations for 500 MHz due to equipment failure by lightning.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso October 1991

Single-frequency observations

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

OCT. 1991	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	46 C	0541.8	0542.0	3.3	780	150	-
	200	46 C	0542.1	0542.9	2.0	105	50	-
	200	46 C	0610.9	0611.5	5.0	1300	200	WL
	100	46 C	0611.0	0612.2	4.6	4000	1000	-
2	200	44 NS	0000E	0214	480D	50	20	WR
3	200	43 NS	0337	0512	165	80	30	MR
	200	44 NS	2050E	0657	670D	50	20	MR
4	200	44 NS	2050E	0133	670D	150	70	SR
5	200	44 NS	2050E	2130	670D	80	35	MR
6	200	44 NS	2050E	0700	670D	30	12	WR
24	200	8 S	0237.8	0237.9	0.5	1300	-	0
	200	27 RF	2208	2231.1	60	30	20	0
	200	46 C	2235.4	2235.6	1.5	1400	300	0
	100	8 S	2236.0	2236	0.8	1000D	-	-
25	200	43 NS	0013	0215	167	70	20	ML
	200	44 NS	2100E	2228	630D	500	50	ML
26	200	44 NS	2100E	0306	630D	400	80	SL
	200	46 C	2232.0	2233.0	2.5	3000	1000	-
27	100	46 C	0021.3	0021.4	1.3	350	270	-
	200	46 C	0021.3	0023.1	2.0	1500	150	-
	100	48 C	0538.4	0538.9	6.6	1000D	-	-
	200	48 C	0538.7	0538.9	8.0	33000	3000	WR
	200	44 NS	2100E	0414	630D	100	40	SL
28	200	44 NS	2100E	2130	500D	60	20	SL
29	200	42 SER	0127.5	0128.4	23	300	-	ML
	200	44 NS	2216E	2229	560D	80	40	ML
30	100	48 C	0208.0	0209.6	2.6	1000D	-	-
	200	48 C	0208.1	0209.6	3.0	11000	1500	SL
	100	48 C	0622.3	0622.9	35	1000D	-	-
	200	48 C	0622.4	0622.9	50	50000	400	WL

Note: No observations for 500 MHz due to equipment failure by lightning.

C. RADIO PROPAGATION

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

OCT 1991 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	-4	7	5	6	11	5	ES -25	ES 8	ES 6	ES -4	-10	ES -25	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	ES -25	ES -3	-4	ES -16	ES -4	ES -25	ES -4	ES -4	ES -4	ES -4	ES -4	ES -7	-2	ES -4	ES 1	ES -10	ES -10	ES -10	ES -10	ES -10	ES -10	ES -4	1	ES -25
3	ES -25	3	5	2	6	ES 1	ES -4	ES 9	ES 9	ES 1	ES 1	ES 1	ES 1	ES -4	ES -2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES 1	-12
4	ES -25	ES -4	ES 3	ES 6	19	ES 5	ES 6	ES 13	ES 14	ES -4	ES -4	ES -25	ES -10	-2	0	-2	2	4	6	ES -25	-12	ES -25	ES 1	-10
5	1	ES 5	ES -10	5	4	ES 5	ES 5	ES 6	ES 11	ES -4	ES -25	ES -4	ES -4	ES -7	1	ES -4	ES -4	ES -25	ES -25	ES -25	ES -25	-16	-2	1
6	ES -25	ES 5	5	9	9	17	ES 6	ES 6	ES 11	ES -4	ES -25	ES -25	ES -25	ES -25	6	10	ES -25	ES -25	ES -25	2	9	ES -25	-7	C
7	ES -25	ES 7	ES 1	3	8	6	7	11	14	ES -10	ES -25	-10	-2	ES -25	ES -10	6	9	9	9	6	-10	-10	ES -4	ES -4
8	ES 2	ES 6	7	6	ES 1	ES 3	ES 4	ES 6	12	ES 14	-6	5	8	13	18	6	ES -25	ES -25	ES -25	ES -25	-2	ES -25	-2	1
9	ES -25	1	ES 4	11	5	ES 1	ES 7	ES 9	ES 9	ES 13	ES -25	ES -25	ES -4	ES -25	ES -4	-4	ES -25	ES -25	ES -25	ES -25	-10	-2	-4	-7
10	-10	ES 6	6	10	4	5	11	ES 6	13	19	19	-2	-2	ES -10	13	-10	-5	-4	3	-4	-4	-5	ES 1	ES -6
11	ES -25	7	1	ES -2	11	1	ES 3	ES 8	ES 13	ES -4	ES -10	ES -16	-4	ES -25	18	6	5	13	ES -16	ES -10	ES -4	1	1	-4
12	ES -25	1	5	8	8	7	13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	19	13	13	S	ES -4	-2	2	4	-4	-2	ES -25	ES -25	3	-3	-7	ES -25	ES -25	1	-2
15	-4	6	8	11	13	18	15	9	ES 11	ES -3	ES -5	ES -4	ES -2	-1	5	4	-4	5	3	-2	-4	4	6	4
16	4	13	9	8	15	19	14	ES 17	ES 15	-2	ES -10	ES -4	ES -10	-2	2	-4	1	-2	1	-16	-4	-2	7	1
17	3	S	9	12	14	16	14	S	S	ES -10	ES -10	ES -10	ES -25	-10	3	5	5	6	4	ES -25	-7	-1	5	1
18	1	ES 9	ES 9	15	15	19	24	ES 13	ES 18	ES 21	ES -4	ES -25	-7	-7	3	6	4	5	3	-1	-10	2	-4	-2
19	2	3	10	15	16	17	17	19	14	ES 16	ES -25	ES -4	4	ES -10	19	15	9	6	7	5	-10	ES -25	4	-4
20	-3	6	2	4	9	18	18	6	ES 6	-2	-2	5	-3	8	5	7	6	11	9	-16	-2	1	5	1
21	1	1	10	12	14	1	ES 2	6	6	ES -4	ES -2	ES -10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	13	10	11
22	4	7	17	1	ES -4	1	ES 1	5	ES 3	ES 8	ES -6	ES -4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-16	-2	1	4
23	6	7	8	11	16	13	ES 11	ES 17	ES 14	ES -16	ES -25	-10	-16	-16	-1	ES -25	-10	ES -25	ES -25	ES -25	-6	1	ES -25	ES -25
24	-2	ES 6	7	8	14	10	14	ES 11	ES 11	ES 11	ES -2	1	ES -4	3	18	11	5	ES -25	ES -25	ES -25	-4	-4	-4	ES -25
25	-10	ES 6	8	ES 3	20	15	13	ES 9	ES 11	13	2	ES 1	1	2	14	ES -4	ES -4	ES -4	ES -4	ES -4	ES -4	9	6	8
26	5	ES 5	5	11	5	ES 1	ES -4	ES -2	ES 5	ES -10	ES -4	ES -4	ES -10	ES -10	ES -16	ES -16	ES -16	ES -16	ES -25	ES -16	ES -16	ES -16	ES -16	ES -16
27	ES -25	8	ES -25	8	8	12	7	13	13	-2	ES -4	ES -4	2	-16	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-10	0	-10
28	1	-16	ES 7	11	14	13	8	12	ES 13	ES -16	-10	ES -16	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -4	ES -4
29	-4	ES 13	13	6	13	11	13	13	16	ES -4	ES -10	ES -25	ES -25	ES -4	ES -4	-10	ES -25	ES -25	ES -25	ES -25	ES -25	2	ES -25	ES -4
30	3	7	12	9	13	C	C	ES -4	ES 16	ES -25	ES -25	ES -25	ES -25	-10	6	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-10	-4	-16
31	-2	5	6	13	12	5	ES 8	ES 13	ES 18	ES -16	ES -25	ES -10	ES -10	ES -25	ES -25	19	-16	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -4
CNT	29	28	29	29	29	29	29	28	27	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28
MED	US -3	ES 6	US 6	8	11	7	US 8	ES 9	ES 12	ES -4	ES -6	ES -7	ES -4	ES -10	US 1	US -4	ES -10	ES -25	ES -25	ES -25	US -10	US -5	ES 0	US -4
UD	4	ES 9	12	13	16	19	17	ES 17	ES 16	ES 16	ES 1	2	4	3	18	11	6	9	7	2	-2	4	6	4
LD	ES -25	ES -3	ES -4	ES 1	ES 1	ES 1	ES -4	ES -2	ES 5	ES -16	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

C. RADIO PROPAGATION

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

OCT 1991 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	-8	ES 4	5	14	17	26	30	26	29	23	6	-4	-3	6	-4	ES -25	-10	ES -25	ES -25	ES -25	ES -25	-4	ES -25	-2
2	ES -25	-4	5	7	19	26	19	19	18	23	6	1	18	22	1	ES -10	ES -10	ES -10	ES -10	ES -10	8	5	ES -25	-4
3	ES 6	ES -25	-1	9	13	19	30	30	25	25	14	3	ES 3	ES -4	ES -25	ES -25	ES -25	3	ES -25	3	13	4	-4	-6
4	1	5	9	11	22	25	21	23	24	23	19	13	15	-10	ES -25	ES -25	-12	20	18	4	1	3	1	ES -25
5	-4	ES 5	-2	13	19	29	27	25	24	27	24	19	15	-4	-4	-4	ES -25	ES -25	ES -25	8	4	1	1	1
6	ES 6	5	4	7	20	24	24	28	24	24	13	ES -10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	1	C	-4
7	-3	ES 6	-1	18	16	26	31	25	14	19	27	19	-4	17	-3	ES -25	ES -25	13	14	13	7	1	-4	-4
8	ES -25	6	6	10	14	25	27	22	30	14	25	25	4	-10	ES -25	ES -25	ES -25	5	ES -25	8	14	-2	-4	ES -25
9	-3	1	2	11	14	17	24	32	27	18	24	-4	-10	-10	-4	ES -25	ES -25	-16	-16	6	8	-4	-1	4
10	-7	ES 1	6	14	19	23	30	31	26	23	13	1	-4	-10	-10	ES -25	ES -4	13	25	1	13	7	-7	-5
11	9	5	7	16	21	23	28	24	30	30	6	5	ES 1	1	-4	1	5	25	-7	6	6	3	1	-1
12	9	1	2	12	19	23	23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	24	30	31	36	23	19	21	2	-2	-2	ES -25	ES -25	21	12	11	13	6	-2	1
15	-2	1	9	15	23	31	26	24	28	25	12	14	24	5	19	ES -25	2	16	26	11	9	14	4	6
16	6	11	9	18	25	27	29	31	35	26	25	20	24	20	13	-10	ES -4	20	25	6	13	6	5	-1
17	3	ES -3	13	21	21	30	29	31	32	23	17	24	6	3	18	ES -25	ES -25	27	5	12	12	10	5	8
18	6	11	16	17	21	26	29	31	31	28	23	15	16	17	1	ES -25	-4	23	19	5	7	11	3	8
19	3	3	13	19	22	25	25	31	29	25	21	30	2	-1	-3	-4	-3	14	26	7	13	15	11	4
20	7	11	18	20	25	27	30	35	31	26	29	26	27	27	19	14	31	18	-2	9	14	13	9	6
21	11	13	6	19	24	30	30	26	26	16	26	13	3	5	-4	-4	-4	-4	13	-4	10	8	1	2
22	5	5	18	20	25	29	27	26	31	26	17	20	-16	-16	ES -25	ES -25	ES -25	ES -25	ES -25	5	5	7	7	5
23	13	7	13	24	24	24	30	30	28	16	30	24	28	21	-4	-16	-10	-4	ES -25	5	18	5	-4	-1
24	5	4	ES -25	13	22	20	29	33	32	30	26	10	2	ES -4	-1	1	-4	2	19	3	13	10	ES -25	-2
25	-1	9	11	13	21	24	28	32	28	27	25	5	1	2	7	ES -4	ES -4	ES -4	ES -4	ES -4	12	9	4	4
26	5	1	-2	14	24	30	32	31	30	25	11	1	0	-7	ES -16	ES -16	ES -16	-10	-10	-4	ES -16	ES -16	ES -16	ES -16
27	5	11	ES -10	12	21	ES -10	24	26	27	26	25	31	12	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	5	10	7	0	-4
28	-10	-16	13	13	24	30	32	32	24	24	29	-4	-10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	14	2	6	3
29	8	8	11	19	25	30	23	29	34	32	29	27	30	30	23	4	-4	19	6	-16	11	-16	3	-1
30	9	12	14	19	19	C	23	26	30	30	31	13	3	-4	-10	ES -25	ES -25	ES -25	ES -25	3	13	6	1	-4
31	-2	5	9	16	23	28	25	28	26	33	23	3	-4	-4	-7	-4	-10	4	ES -25	5	13	3	3	ES -4
CNT	29	29	29	29	29	29	30	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29
MED	US 5	US 5	7	14	21	26	28	29	28	25	23	13	US 3	-2	-4	ES -25	ES -10	3	US -7	5	11	5	1	-1
UD	9	11	16	20	25	30	31	32	34	30	29	27	27	22	19	1	2	23	25	11	14	13	7	6
LD	ES -10	ES -4	-2	9	14	19	23	23	24	16	6	-4	ES -10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -16	-4	ES -25	ES -16

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

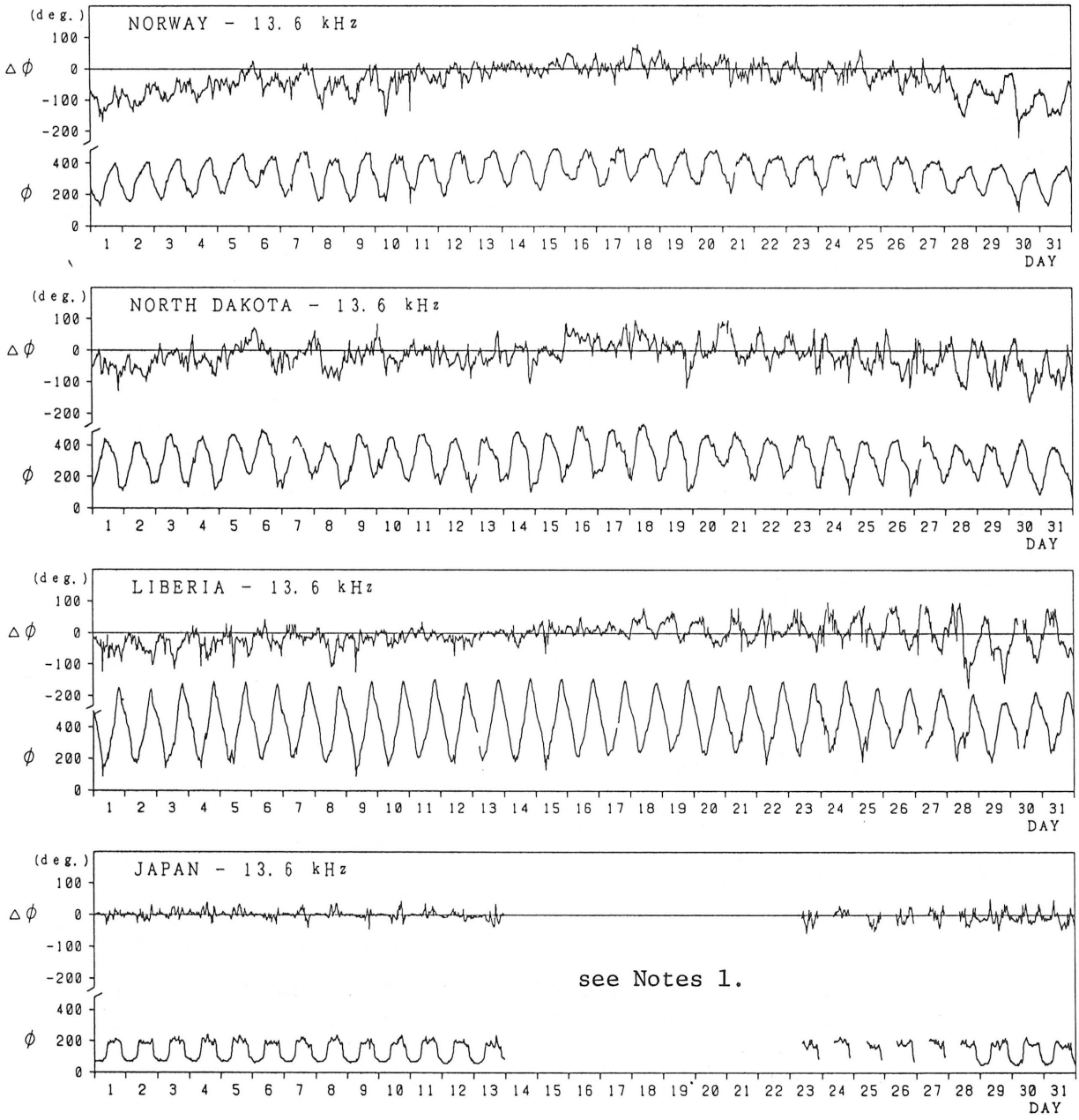
Time in U.T.

Oct.	Whole Day	W W V				W W V H				Conditions				Principal Geomagnetic Storms		
		00	06	12	18	00	06	12	18	00	06	12	18	Start	End	Range
1991	Figure	06	12	18	24	06	12	18	24	06	12	18	24	h m	h	nT
1	3-	4	-	1	2	4	3	3	2	N	N	N	N	1813	----	188
2	3o	2	3	4	3	3	3	4	3	U	U	U	U	----	24	
3	3o	3	-	3	2	3	4	3	3	N	N	N	N			
4	4o	4	-	5	3	4	4	4	3	N	N	N	N			
5	3+	3	-	4	3	4	4	3	3	N	N	N	N			
6	3o	4	-	4	3	4	3	2	2	N	N	N	N	09.9	----	90
7	4-	3	4	4	4	3	4	4	4	N	N	N	N	----	----	
8	4-	4	4	5	3	3	4	3	3	N	N	N	N	----	----	
9	3+	3	-	3	4	3	3	3	4	N	N	N	N	----	08	
10	4o	4	4	4	4	4	4	4	4	N	N	N	N			
11	4o	3	3	5	4	4	4	4	4	N	N	N	N			
12	C	C	C	C	C	C	C	C	C	N	N	N	N			
13	C	C	C	C	C	C	C	C	C	N	N	N	N			
14	4o	C	4	4	4	C	4	4	4	N	N	N	N			
15	4+	4	4	5	5	4	4	5	5	N	N	N	N			
16	4+	4	4	5	5	4	4	5	4	N	N	N	N			
17	4+	4	-	5	4	4	4	5	5	N	N	N	N			
18	4+	5	-	5	4	4	4	5	4	N	N	N	N			
19	4+	4	5	5	4	4	4	5	4	N	N	N	N	0350	----	131
20	5-	4	4	5	5	4	5	5	5	N	N	N	N	----	----	
21	3+	4	3	1	4	4	4	4	4	N	N	N	N	----	----	
22	3o	4	-	1	4	4	3	2	4	N	N	N	N	----	20	
23	4o	4	-	3	4	4	4	4	4	N	N	N	N			
24	4o	4	5	5	3	3	4	4	4	N	N	N	N			
25	4+	4	5	4	5	4	4	4	4	N	N	N	N			
26	3+	4	-	2	3	4	4	3	3	N	N	N	N			
27	3o	3	4	3	3	3	4	2	3	U	U	U	U			
28	3o	4	4	1	3	4	4	2	3	U	U	U	U	1054	----	327
29	4o	4	4	3	4	4	4	5	4	U	U	U	U	----	C	
30	4-	4	-	3	3	4	4	3	4	U	U	U	U			
31	4-	4	-	3	3	4	4	4	4	U	U	U	U	1650	----	152

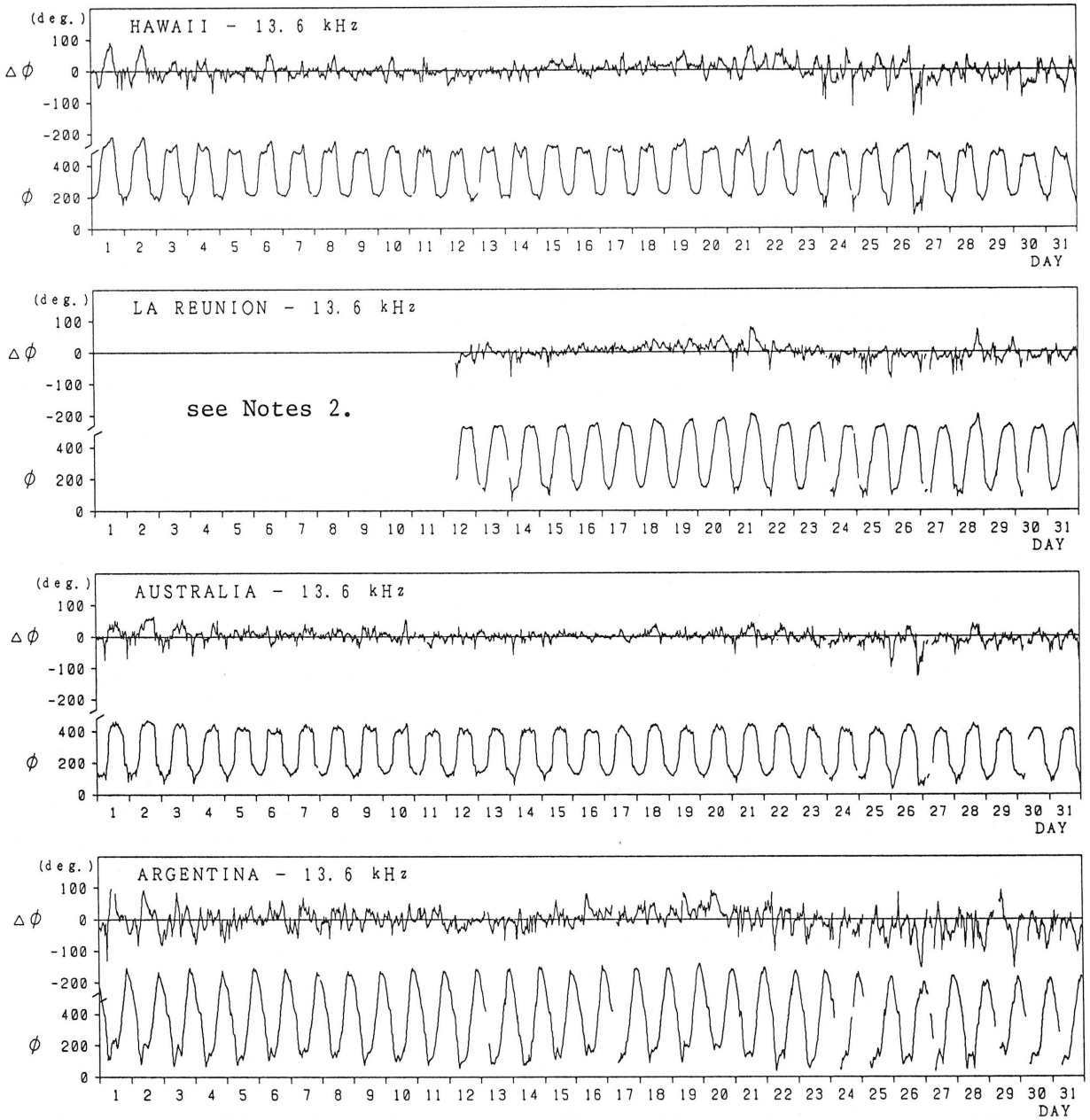
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo October 1991



Inubo October 1991



Notes: 1. As for JAPAN - 13.6 kHz, no record during October 14 - October 28, due to the maintenance of transmitter.
2. As for LA REUNION - 13.6 kHz, no record during September 30 - October 12, due to the maintenance of transmitter.

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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Oct.28/0452	Oct.30/0015	Oct.28/1447	182.2
Oct.30/0424	Oct.30/2230D	Oct.30/0800	207.0
Oct.30/2230E	Nov.02/2145	Oct.31/1558	174.6

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Oct. 1991	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS	BBC						
1			19		7	0612	18	1	1+	x	x
1			27			2227	29	3	2	x	
2		>10	16			0124	6	1	1+	x	x
2	x	16	10			2227	28	3	1-	x	
3			16			0140	29	2	1+	x	
4		x	7			0003	17	2	1-	x	
4		x	13			0024	38	2	1	x	
7			9			0123	17	2	1-	x	x
9			12	3		0629	27	2	1	x	
12			7			0504	15	1	1-	x	
12					10	1005	15	1	1-	x	
12			8			2212	10	2	1-	x	
12			6			2352	18	1	1-	x	
14			19	x		0316	17	2	1+	x	
14			12			0359	18	2	1	x	
14					9	1055	8	1	1-	x	
15			15			0126	16	2	1	x	x
15			6	x		0700	17	2	1-	x	x
21			11	x		0057	14	1	1-	x	
21	x	x	12			0238	33	2	1	x	
22			8			0640	13	2	1-	x	
23			12			0105	24	2	1	x	
23				6		0735	13	2	1-	x	
24	7	15	21			0043	30	2	2-	x	
24		x	6			0121	9	1	1-	x	x
24		>30	>17	x		0235	45	1	1+	x	x
24		>27	28			2232	42	2	2+	x	
26			13			0007	22	2	1	x	
26		19				0029	26	3	1+	x	
26			16			2308	XX	3	1+	x	
27	x	x	17			0023	47	2	1+	x	
27	>38	>41	>16	x		0203	62	2	1+	x	x
27	>37	>53	20	x	x	0537	91	1	2-	x	
27		>42	8		5	1243	21	2	1-	x	
28	x	>32	13			0103	24	2	1	x	x
28				12		0702	4	1	1-	x	x
28				17		1230	18	1	1	x	
28				8		1302	16	2	1-	x	
28				9		1320	23	2	1-	x	
29			11	x		0016	32	2	1-	x	x
29			10	x		0055	17	2	1-	x	
29			6	x		0125	11	1	1-	x	
29			8	x		0135	25	2	1-	x	
30			>33	x	x	0615	87	2	3-	x	x
31			11			0048	18	2	1-	x	
31			7			0257	9	1	1-	x	
31			12			2318	24	2	1	x	

NOTE CO:Colorado(WWV) HA:Hawaii(WWVH) Aus:Australia Mos:moscow BBC:London
* Optical and X-ray Flares

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Oct.	S			P			A		
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1			—	—	12		0116	0144	0121
1			—	—	5		0308	0345	0316
1			—	—	6		0404	9438	0419
1	17		—	—			0524	0613D	0552
1	52	110	—	—		26	0610	0717	0622
1		83	—				1040	1136	1052
1		43	—				1144	1235	1159
1		23	—				1301	1334D	1307
1		19	—				1334E	1358	1339
1		16	—				1427	1502	1431
1	24		—	47	71	50	2228	2355	2251
2			—	13	7		0033	0053	0037
2	15	14	—	52	30	24	0124	0207	0127
2	13		—	10	5		0246	0319	0251
2			—	10	5		0333	0412	0345
2	14	34	—	56		10	0513	0614	0524
2			—	8			0646	0722	0651
2			—		14		2144	2221D	2154
2	22		—	18	47	26	2221E	2344	2240
3	24	27	—	60	39	29	0131	0252D	0151
3		16	—	28	9		0252E	0354	0307
3			—	17			0449	0537	0459
3	20	73	—	45			0605	0736	0631
3		37	—				1316	1421	1325
3			—		12		2036	2106	2046
3			—		20		2155	2323	2218
4		31*	—	86*	65*	57	0000	0218	0048
4			—	10	6		0245	0311	0256
4			—	8			0654	0756	0700
4		74	—				0935	1046	0949
4		31	—				1351	1446	1358
4			—		62	50	1921	1949D	1934
4			—		58		1949E	2121	1959
5			—	64	41		0125	0319	0209
5			—	12			0353	0432	0405
5			—	13			0552	0635	0610
5			—	6			0650	0705	0655
5			—	8			0712	0741	0717
5		49	—	14			0802	0900	0814
5		92	—				1022	1205	1105
6			—	14			0533	0612	0537
6		36	—				1350	1421	1359
6		36	—				1444	1517	1450
6		40	—				2249	2323	2256
7	21		—	—	9		0122	0153	0129

Inubo

Oct.	S			P		A			
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
7		53	—				1015	1121	1027
7			—		30	27	2203	2308	2216
8			—	—	6		0027	0101	0036
8			—	—	6	27	0122	0151	0132
8			—	38		14	0426	0514	0440
8		20	—				1252	1312	1257
8		21	—				1520	1541	1527
8			—		7		2257	2316	2303
9		20	—	13	12	15	0032	0110	0040
9	17	21	—	27	15	23	0148	0228	0152
9		21	—	57	14		0515	0630	0523
9		85	—	76			0633	0747	0651
10			—	20			0458	0535	0504
10		37	—	22			0719	0805	0729
10		20	—				1042	1116	1052
10		20	—				1447	1505	1453
11			—		22	28	2015	2059	2024
11			—	15	15		2350	0108	0004
12	37	43	—	79	32	19	0500	0614	0511
12	29	89	85				1005	1128	1019
12				14	56	45	2209	2351	2219
12				44	34		2353	0047	0003
13	—		54	46	25	—	0345	0452	0402
13	35	18	73	32			0658	0836	0704
13					19	21	1811	1830	1816
13					37		2008	2054	2020
13					53		2100	2208	2108
14			12	14	6		0140	0223	0144
14	12		21	18	10	17	0247	0317D	0255
14	36	31	115	71	41	39	0317E	0358D	0326
14	20	35	96	82	33	24	0358E	0514	0408
14			15	6			0643	0714	0648
14		63	76	32			0754	0907	0808
14		40	37				0917	1003D	0932
14		61	45	—			1003E	1052	1022
14		60	31	—			1054	1205	1103
14		22		—			1236	1305	1243
14		25					1454	1531	1506
14		14				35	1732	1807	1743
15				—	12	22	0108	0129D	0117
15	28	24	80	—	61	39	0125E	0304	0135
15			6	—			0312	0342	0323
15		47	79	—		22	0611	0659D	0620
15	29	103	131	—	12		0659E	0841	0708
15		48	48				0915	1024	0923

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Oct.	S			P			A		
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
15		36	8				1121	1202	1134
17			7	—			0442	0527	0452
18				18	9		0114	0146	0119
20			17	22	8		0232	0330	0257
20		15		5	6		2317	2334	2325
21				—	11		2357**	0048	0010
21		17	22	—	29	22	0057	0149	0105
21		16	17	—	14	26	0159	0233D	0217
21	26	32	86	—	45	56	0233E	0359	0251
21			31	—			0549	0704	0601
21			11				0853	0913	0857
21		38	9				1103	1209	1123
21		90	14				1251	1359	1259
21					24	27	2129	2208	2138
21				11	22		2232	2314	2238
22				8			0053	0120	0100
22			8	10			0219	0241	0224
22			11	11	8		0343	0422	0358
22			11	8			0459	0530D	0506
22			14	8			0530E	0605	0542
22		79*	106*	72	10		0628	0930	0645
22		29					1222	1321	1246
23	18		28	33*	18*		0059	0156	0120
23		20	27	28	11		0256	0401	0318
23	31*	33*	23	16			0618	0707	0638
23		33	14				0732	0753D	0747
23		72	55	25			0753E	0840D	0812
23		47	38				0840E	0916D	0856
23		48	37				0916E	0947	0926
23		34	14				1031	1132	1042
23					22	18	2222	2253	2225
24				9	8		0003	0024	0012
24	26	51	87	100	89	79	0032	0121D	0055
24			81	79			0121E	0236D	0125
24	91	133	300	205	165	118	0236	0406D	0242
24			26	—			0406	0459	0415
24			40	—			0523	0626D	0535
24		75	100	—		32	0626E	0721D	0633
24		31	46	—			0721E	0829	0733
24		15	18				0834	0848D	0839
24		26	27				0848E	0945D	0908
24		72	55				0945	1050	0956
24		78	—				1055	1207	1121
24		46					1312	1431	1335
24		24					1654	1743	1705

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Oct.	S			P		A			
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
24	57	46	60	134	159	141	2224E	0008D	2243
25				—	20		0008E	0137	0023
25			26	21	10		0300	0331	0309
25			60	38	19		0431	0611	0455
25	24	53	48	20			0704	0744D	0712
25		112	—	31			0744E	0855	0805
25		49	27				0900	0952	0918
25		108	38				1045	1305	1121
26	19	22	51	79	69	39	2346**	0030D	0017
26	28	20	71	—	41	52	0032E	0447	0050
26			6	5			0535	0553	0544
26		37	17	12			0606	0704	0617
26		15	11				0923	0949	0928
26		29	6				1121	1211	1138
26		79	10				1256	1353	1305
26					146	157	2019	2312D	2053
26	37			39	69	47	2312E	0022D	2327
26	59			22			2355E	0027D	0005
27	84	46	84	82	90	60	0022E	0203D	0043
27	93	128	294	189	167	123	0203E	0402	0215
27			12	8			0433	0504	0444
27		57	83	46	14	21	0516	0537D	0530
27	150	64	440	248	89	93	0537E	0743D	0547
27		32	68				0743E	0921	0802
27		46	8				1125	1225	1148
27		105	15				1256	1405	1307
27		22					1607	1655	1621
27					5		2241	2255	2243
27					5		2358	0021	0004
28				—	9		0030	0103D	0044
28	41	47	92	—	68	47	0103	0206D	0116
28			28	—	21	34	0205E	0233	0215
28	17	24	68	—	16		0349	0508	0401
28			27	—			0523	——	0530
28		82	75	—			0633	0712D	0648
28		70	72	—			0708E	0737D	0717
28		115	124	31			0737E	0851	0743
28		130	—				1228	1513D	1310
28		129					1513E	1751	1548
28					23		1939	2005	1947
28					41		2024	2120	2033
28					21	16	2133	2223	2140
28					5		2229	2249	2234
28			12	24	24	26	2302	2338D	2308
28	14		20	40	26	25	2339E	0016D	2343

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Oct.	S				P		A		
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
29	20	23		64	45	30	0016E	0128D	0036
29			44	39	25		0128E	0224	0143
29			5	6			0231	0253	0242
29			5	7			0341	0356	0346
29			14	9			0427	0447	0430
29			30	18			0457E	0550D	0504
29			34	20		19	0550E	0603	0557
29		16	9	8			0806	0824	0811
29		21	12				0858	0933	0904
29		85	57				0955	1056D	1005
29		28	11				1056E	1134	1101
29		41					1138	1230	1156
29					33*	36	2126	2202	2142
29				5	5		2248	2312	2255
30	8			5	2		0022	0054	0032
30				6	3		0147	0206	0154
30			5	7			0330	0347	0336
30	17	25	87	63	18	19	0425	0514D	0437
30			67	50	7		0514E	0611D	0524
30	77	—	342	194	54	50	0611E	1027	0634
30		25					0913	0947	0925
30		44					1016	1139	1036
30		77					1236	1356	1318
30					44		1912	1947D	1916
30					19		1948E	2005	1952
30					30		2018	2051	2025
30		15		7*	12*		2237	2305	2246
30				8	6		2336	2357	2341
31	20		40	57	35	27	0050	0121D	0058
31	10		34	37	21		0121E	0213	0126
31			50	45	19	14	0243	0342	0303
31			9	—			0528	0558	0534
31			10*	—			0654	0733	0710
31		47	50	20			0758	0842	0806
31	12	86	49				0908	1036	0917
31		20					1120	1152	1129
31					17		1941	2000	1945
31					14		2116	2135	2123
31					4		2233	2249	2239
31				16	24	51	2251	2317D	2301
31			17	56	51	100	2317E	0024D	2332

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