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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)
Kokubunji	35°42.4′N	139°29.3′E	25.5°N	205.8°	Vertical Sounding (I)
Yamagawa	31°12.1′N	130°37.1′E	20.4°N	198.3°	Vertical Sounding (I)
Okinawa	26°16.9′N	127°48.4′E	15.3°N	196.0°	Vertical Sounding (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°	Radio Receiving (P)

A. IONOSPHERE

Ionospheic observations are carried out at the above four 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 descriptivel etter 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 Scaiing

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 I-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 transmisson 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 normnal *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 200, 500 and 2800 MHz are carried out at Hiraiso. The observation equipment consists of two parabolic antennas, one with 10-meter diameter for 200 MHz measurements and one with 2-meter diameter for 500 and 2800 MHz measurements, 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 are tabulated separately for 200 and 500 MHz measurements. 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 200, 500 and 2800 MHz 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.

B3. Summary Plots of $F_{10.7}$ at Hiraiso

The 10.7 cm solar radio flux at Hiraiso is plotted over a one month period. The 10.7 cm flux ($F_{10.7}$) is determined by adjusting the 10.7 cm radio flux measured at Hiraiso to the Pentincton 10.7 cm radio flux. The figure on the right-hand side shows the $F_{10.7}$ index estimated at Hiraiso.

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 600 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 for 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	innuenced 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.

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

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 par hour from JJY (Japan Standard Wave) staion. The conditions are denoted as follows:

N normal,
U unstable,
W disturbed.

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 ($\Delta\ \phi$) 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. 1993

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	52	63	52	53	41	A	A	71	61	81		69		77	80	71	78	61	48	52	43		34	34
2	37	35	34	35	35	71	60	65	84	69	A	82	80	81	70	70	66	58	63	54	54	53	51	49
3	54	47	47	44	47	48	A	65	73	76	77	71	84	79	67	77	72	64	51	53	49	46	47	47
4	34	44	46	45	47	30	52	66	67	83	73	80	80	84	65	76	58	60	52	52	54	52	49	48
5	38	38	34	37	37	35	52	58	64	74	76	84	81	75	70	73	70	49	53	54	53	54	52	49
6	44	44	48	49	51	51	63	62	67	79	77	78	73	87	79	90	85	70	49	55	54	55	58	58
7	52	36	53	54	55	52	61	64	82	83	97	88	78	90	76	74	66	59	57	63	61	58	54	53
8	52	52	53	52	53	52	52	64	50	72	73	77	75	80	71	73	73	79	A	63	A	48	A	A
9	40	A	38	35	36	35	50	59	80	90	82	71	79	77	77	78	86	83	88	54	58		27	30
10	38	A	25	A	30	A	A	66	73		87	84	71	79	65	71	88	73		51	43	43	34	34
11	A	34	34		A	A	A	59	78	80	88	84	77	89	70	76	71	62	53	50	44	34	38	A
12	A	43	42	42	40	38	62	76	79	87	92	88	100	76	68	68	72	67	58	54	51	52	54	46
13	43	41	43	40	31	32	52	69	78	86	105	90	81	84	73	78	82	73	60	50	49	47	48	31
14	46	40	43	45	37	40	54	84	84	87	87	88	88	84	77	84	77	62	48	52	53	54	54	52
15	43	44	42	43	47	38	51	71	77	80	77	84	88	80	78	77	84	51		43	37	30	35	40
16	38	38	41	41	37	40	51	65	78	88	88	87	81	86	84	90	77	52	53	48	40	46	46	40
17	50	48	48	52	50	52	58	80	64	80	88	108	90	88	85	77	75	65	54	53	54	54	55	58
18	55	53	53	54	54	54	88	84	83	88	97	101	96	96	82	80	79	64	57	52	54	53	54	51
19	54	54	52	53	47	41	52	66	84	90	90	87	85	86	72	80	72	72	54	54	A	52	26	52
20	50	50	48	47	44	49		58	84	N		87	86	78	72	75	80	67	54	A	51	46	43	48
21	50	48	61	54	54	53	62	64	66	78	80	88	89	86	83	84	75	72	54	51	52	52	28	37
22	53	54	54	54	52	46	52	63	77	86	87	90	84	90	80	78	90	66	47	44	47	46	46	43
23	42	48	47	46	47	N	52	64	74	87	88	101	98	88	80	80	84	76	68	66	A	A	43	47
24	34	39	44	42	40	34	48	88	89	89	108	88	88	86	88	103	78	54	42	30	43	46	49	49
25	43	49	48	47	48	A	53	66	73	89	86	87	97	80	84	87	77	56	A	47	45	46	37	46
26	46	34	41	30	35	C	A	66	78	76	96	88	84	80	77	89	85		52	54	52	42	44	43
27	43	48	44	40	42			58	53	A	77	85	101	78	78	87	85	72	53	58	52	49	52	48
28	32	29	28	A	A	A	A	A	76	82	88	86	77	71	78	74	73	A	A	53	51	52	A	44
29	42	40	42	43	33	34	34	A	61	70	74	77	88	71	71	69	71	54	40	A	38	34	48	43
30	43	43	42	41	40	34	42	54	66	71	83	90	80	66	N	68	65	A	36	40	37	40	36	38
31	38	42	43	40	37	41	79	57	80	78	78	N	78	65	62	64	66	71	A	A	A	A	A	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	31	28	29	23	23	29	31	28	28	30	30	31	30	31	31	28	25	28	27	27	28	29
MED	43	44	44	44	42	41	52	65	77	82	87	87	84	80	77	77	77	64	53	52	51	48	46	46
U Q	51	48	48	52	49	52	61	70	80	87	89	88	88	86	80	84	84	72	57	54	54	53	52	49
L Q	38	38	41	40	37	35	51	60	66	77	77	82	79	77	70	73	71	58	48	50	43	46	36	39

HOURLY VALUES OF FES AT WAKKANAI

OCT. 1993

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	26	84	G	32	39	50	32	G	G	G	65	G	60	G	37	G	G	42	G	G	G	32	G
2	G	G	29	38	29	G	G	38	80	G	72	G	G	G	G	G	G	G	G	36	26	33	25	G
3	G	G	G	G	G	G	37	38	G	38	G	G	G	G	G	G	G	G	G	27	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	24	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	85	G	G	G	G	33	G	G	G	G	G	G
7	G	31	G	G	G	G	G	G	36	46	G	G	G	G	G	G	G	G	38	31	32	59	58	26
8	G	G	G	G	G	G	G	G	49	45	G	G	G	G	G	G	G	37	50	67	65	60	44	34
9	38	40	117	G	G	24	G	85	G	46	40	G	G	G	G	G	31	42	36	53	G	G	24	
10	24	60	40	40	48	53	56	32	37	G	50	G	G	G	G	G	G	25	G	G	G	G	G	G
11	57	G	G	24	27	27	29	38	G	G	G	G	G	G	G	35	G	G	G	G	34	30	44	38
12	35	37	34	33	33	30	36	38	37	G	G	G	G	G	G	G	52	32	36	36	G	35	33	32
13	31	32	30	30	G	G	G	G	G	G	G	G	G	G	G	G	G	33	30	26	G	G	G	G
14	G	G	G	G	G	G	29	G	G	G	63	G	G	G	G	37	G	41	G	28	G	G	G	40
15	G	G	G	G	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	30	G	G	G	G
16	G	G	24	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	30	G	G
17	G	G	28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	56	58	29	G	G
18	G	G	G	G	G	26	G	G	G	38	46	G	G	G	G	38	G	32	88	34	34	G	G	G
19	G	G	G	G	G	G	G	37	35	50	G	G	G	G	G	G	G	G	35	48	65	40	46	33
20	130	G	G	G	G	32	G	33	45	G	G	G	G	G	G	G	G	31	60	65	60	46	34	32
21	29	32	41	29	26	23	G	33	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
22	28	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G	28	26	25	G	28	28	G	G
23	G	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	G	G	37	53	78	94	53	G
24	G	26	31	G	27	G	27	38	52	39	G	G	G	G	G	33	30	127	33	35	G	G	G	G
25	G	G	G	28	36	49	31	49	36	G	G	G	56	G	G	47	G	32	31	32	G	30	G	G
26	G	G	G	G	22	242	38	31	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G
27	G	G	G	G	G	G	39	G	38	92	110	93	47	G	G	56	62	G	27	G	28	G	G	G
28	G	G	G	37	36	39	51	70	58	G	G	45	G	G	41	G	52	97	92	28	54	54	60	28
29	27	26	33	G	26	G	30	59	G	G	G	G	G	G	38	49	G	64	57	59	G	G	G	G
30	24	29	G	G	G	G	G	G	46	G	G	G	G	84	G	G	32	38	40	32	G	G	G	G
31	G	G	G	G	G	G	G	34	51	G	G	38	G	39	G	G	G	G	47	40	36	38	33	33
	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	30	31	31	31	30	31	31
MED	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	13	30	30	G	G	G	G
U Q	27	26	30	24	27	27	31	38	38	38	G	G	G	G	G	33	G	33	40	40	34	35	33	28
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. 1993

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	14	17	23	17	42	45		54		26	28	20	30	20	17	18	15		20	15
2	15	15	15	17	15	17	20	16	24	46	26	51	48	46	20	44	24	18	18	16	16	17	16	14
3	16	15	15	16	15	16	17	17	18	27	46	44	45	44	18	34	30	17	15	16	15	15	15	15
4	15	16	16	15	14	16	20	30	42	45	45	50	45	45	34	29	26	18	18	15	16	15	16	15
5	16	15	14	15	15	15	20	17	30	20	26	44	46	23	30	30	23	18	18	15	15	15	14	15
6	15	14	14	14	15	15	26	23	18	45	45	44	42	28	46	27	24	16	16	16	17	15	16	16
7	16	16	15	15	14	15	24	16	20	20	30	30	24	47	34	29	27	20	16	15	15	16	15	16
8	15	14	15	15	15	15	20	17	27	28	22	21	43	46	23	20	18	17	16	15	15	16	16	15
9	17	15	18	14	15	16	18	20	20	20	28	24	42	21	21	30	23	16	16	15	14		17	15
10	15	15	14	15	15	15	16	20	18	28	26	28	27	20	44	27	29	17	21	15	15	14	18	16
11	16	15	15	16	17	18	16	18	18	42	22	42	45	41	17	16	26	16	17	21	15	16	16	15
12	16	15	15	17	16	15	17	18	22	20	22	22	20	21	18	21	17	16	17	21	16	16	16	16
13	15	14	14	15	15	15	20	26	35	34	45	45	26	20	23	17	23	23	15	15	15	14	15	15
14	15	15	15	15	15	15	16	26	23	28	42	23	34	42	18	18	24	17	17	17	16	17	16	16
15	15	15	16	15	16	15	18	23	18	30	44	45	43	36	32	29	23	17	20	16	18	22	17	16
16	17	15	15	16	15	15	21	23	29	45	43	47	45	46	42	47	27	17	16	15	16	17	15	16
17	17	15	15	16	15	16	20	24	29	33	23	44	44	45	30	26	24	18	16	15	15	15	15	15
18	15	15	17	15	15	15	18	18	20	24	21	22	24	44	24	20	22	17	18	16	15	17	15	16
19	16	15	14	15	14	15	18	17	18	21	24	22	26	21	28	27	21	17	17	15	14	15	15	15
20	15	15	15	15	15	15		22	16	24	44	24	34	46	28	26	22	20	18	18	16	15	15	15
21	17	15	24	15	15	15	17	18	17	22	24	21	43	30	29	27	24	17	15	15	16	15	24	16
22	15	15	15	14	15	15	20	17	18	24	23	42	44	33	46	22	17	16	15	15	18	15	15	15
23	15	15	15	15	16	15	17	18	28	18	44	45	44	35	30	18	26	17	15	16	17	16	16	15
24	14	15	15	15	14	17	18	21	18	21	20	20	44	18	32	18	20	16	15	17	17	15	16	16
25	16	15	15	15	16	15	16	16	17	17	22	46	22	20	21	21	21	16	17	17	17	16	16	16
26	16	16	15	15	16	C	18	17	18	30	33	34	23	22	28	24	22		16	15	15	15	16	16
27	15	15	15	15	15	17	18	18	23	18	18	18	22	22	18	16	17	16	15	15	16	15	15	15
28	15		15	15	14	15	16	16	16	28	32	20	20	17	16	16	17	21	15	16	16	15	16	15
29	16	15	15	14	15	15	17	16	27	29	18	21	26	26	21	17	21	16	15	15	16	15	15	15
30	15	16	15	14	15	15	18	23	17	18	23	41	33	21	18	26	16	16	15	16	15	16	16	15
31	15	15	15	15	14	15	16	16	16	29	17	17	34	16	16	27	20	17	15	15	15	16	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	30	30	31	31	31	30	31	30	31	31	31	31	30	31	31	31	29	31	31
MED	15	15	15	15	15	15	18	18	20	28	26	34	38	28	28	26	23	17	16	15	16	15	16	15
U Q	16	15	15	15	15	16	20	23	27	33	43	45	44	44	32	29	26	18	17	16	16	16	16	16
L Q	15	15	15	15	15	15	17	17	18	20	22	22	26	21	18	18	20	16	15	15	15	15	15	15

HOURLY VALUES OF FOF2 AT KOKUBUNJI

OCT. 1993

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	44	47	48	41	34	28	51	68	83	76	75	91	102	90	82	75	79	72	64	57	A	59	57	49
2	58	43	44	41	41	32	68	60	72	80	75	74	76	77	73	79	68	76	66	69	47	44	A	47
3	43	43	44	43	41	48	54	80	68	70	76	81	87	87	78	78	83	81	68	61	44	46	46	48
4	44	48	46	43	41	44	54	58	77	72	78	85	76	84	75	86	70	73	67	52	49	50	46	47
5	A	54	44	47	39	37	64	68	76	60	71	70	88	92	82	86	74	66	64	60	58	61	51	51
6	57	58	48	43	40	41	61	70	68	61	70	80	86	86	90	96	100	82	47	49	46	51	52	61
7	50	44	43	42	43	50	68	78	90	88	91	84	85	80	86	87	78	71	62	56	51	56	51	A
8	47	50	46	50	58	48	74	78	85	67	80	91	78	80	85	86	90	87	67	59	70	41	47	A
9	41	49	48	42	41	43	61	92	77	77	85	86	80	81	96	91	92	100	110	84	56	48	42	42
10	A	46	A	A	A	A	54	94	105	82	106	96	82	A	A	84	91	81	67	43	A	A	56	A
11	41	44	58	42		26	47	83	98	78	93	100	91	84	92	90	74	72	49	A	46	46	43	43
12	37	A	44	A	41	A	60	83	92	97	92	94	96	88	78	70	66	82	73	62	55	52	54	59
13	51	47	54	47		43	76	80	88	91	83	104	92	84	81	75	76	74	69	54	A	47	48	46
14	42	43	44	44	38	51	64	94	81	93	96	114	101	84	87	84	71	70	63	54	57	56	61	48
15	46	46	44	46	40	48	71	71	91	79	85	96	91	88	92	81	79	78	56	48			44	48
16	43	50	48	41	38	29	54	80	92	80	76	96	105	95	104	91	78	68	61	43	44	43	43	47
17	47	44	44	43	44	43	52	73	82	80	81	102	110	95	86	87	84	73	54	47	48	47	48	50
18	47	48	44	41	42	37	57	82	80	92	99	111	101	90	91	98	92	79	60	46	47	43	43	46
19	52	50	50	51	48	43	71	80	91	102	90	101	110	98	80	82	90	78	55	51	A	45	45	A
20	48	46	47	41	42	45	54	67	92	107	107	103	88	95	106	86	74	80	66	54		48	44	48
21		A	A	50	41	46	49	71	73	82	91	106	98	96	96	86	76	69	41	47	50	47	48	39
22	47	44	47	43	46	43	60	82	82	84	87	96	88	88	92	87	80	71	50	41	46	51	44	43
23	43	44	43	42	48	36	53	87	80	80	88	107	114	82	97	95	93	71	66	61	55	48		52
24	38	37	34	41			48	69	90	113	86	95	96	86	106	111	71	52	46	46	43	43	46	46
25	A	42	43	42	38	31	58	66	82	92	91	107	104	95	86	90	81	55	A	A	44	45	43	A
26	46	42	32	41	29		47	76	78	102	114		125	96	91	83	66	57	70	49	60	46	A	A
27	46	44	51	43	42	48	56	69	76	84	98	90	117	107	92	91	92	93	54	A	48	48	33	A
28	A	A	43	41	38	42	51	93	94	114	100	107	102	95	85	86	76	74	67	56	46	55	A	A
29	41	A	A	38	41	43	54	58	83	83	86	102	101	82	78	82	74	A	46	44	40	A	38	A
30	43	44	37	50	49	26	46	73	90	86	94	110	95	82	75	68	68	69	A	40	43	36	A	A
31	44	44	36	36	38	32	61	77	75	76	86	76	76	82	87	79	59	67	A	A	35	35	A	40
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	28	29	27	27	31	31	31	31	31	30	31	30	30	31	31	30	28	27	25	28	25	21
MED	45	44	44	42	41	43	56	77	82	82	87	96	95	88	86	86	78	73	64	52	47	47	46	47
U Q	47	48	48	45	43	46	64	82	91	92	94	104	102	95	92	90	90	80	67	59	55	51	51	49
L Q	43	44	43	41	38	32	52	69	77	77	80	86	86	82	81	81	71	69	54	46	44	44	43	44

HOURLY VALUES OF FES AT KOKUBUNJI

OCT. 1993

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	28	G	G	G	G	46	47	54	46	G	37	49	33	G	40	G	G	G
2	G	G	G	G	G	G	G	35	41	G	55	51	G	G	G	G	G	27	27	G	G	G	28	G
3	G	G	G	G	G	G	G	G	G	G	51	G	G	G	G	50	40	46	25	G	31	25	G	G
4	G	G	G	G	G	G	30	50	G	44	48	G	G	G	G	G	G	31	54	34	29	G	G	30
5	45	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	41	59	36	G	G	24	G	G
6	G	G	G	G	G	G	26	36	G	50	46	58	50	46	57	G	G	G	26	26	43	33	59	26
7	G	G	27	G	G	G	28	G	G	G	50	42	46	44	43	G	G	56	55	56	56	59	60	67
8	41	44	27	G	37	48	40	48	38	G	G	41	G	G	G	G	60	40	G	G	G	27	25	36
9	32	G	27	26	G	G	G	55	G	55	51	46	48	G	40	G	40	36	44	25	G	G	26	G
10	50	29	41	34	26	27	G	35	72	58	51	67	61	76	92	60	67	60	36	85	58	58	28	34
11	G	G	G	G		G	G	G	38	G	41	G	G	G	G	G	G	G	56	74	40	32	29	28
12	27	26	26	34	60	51	37	G	G	G	59	44	G	47	G	G	G	27	G	G	G	25	103	86
13	29	26	25	G		G	G	G	G	G	G	G	G	G	G	G	33	31	35	48	52	34	27	24
14	G	G	G	G	G	G	26	37	G	G	G	G	G	G	G	G	G	27	40	24	26	G	G	28
15	G	G	28	G	G	G	G	G	58	44	G	G	G	G	G	G	36	31	24	G	G	G	G	G
16	G	G	G	G	G	G	48	G	G	G	G	G	G	G	G	G	G	27	33	G	27	G	G	G
17	G	G	G	G	G	G	25	32	46	48	G	51	G	G	G	61	61	54	26	34	G	40	46	G
18	G	24	G	G	G	G	48	G	40	55	G	44	44	48	44	42	G	G	30	34	41	40	29	G
19	G	G	G	G	G	G	G	122	45	44	G	G	G	G	42	G	G	G	37	59	92	41	36	59
20	40	G	G	G	G	G	G	33	45	44	62	G	G	G	40	G	54	54	45	G	G	G	G	G
21		58	47	28	G	23	25	31	37	G	42	G	G	G	G	G	35	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	G	51	42	50	G	G	G	G	30	G	G	26	34	G	G
23	G	G	G	G	G	G	G	G	36	40	G	G	G	G	G	G	G	G	G	32	G	G		G
24	G	G	G	G			G	G	62	G	G	57	G	G	G	G	34	G	24	28	28	29	G	24
25	26	39	29	24	G	G	G	G	48	G	45	G	G	G	G	G	30	44	61	56	34	39	34	38
26	29	28	G	G	G		25	41	62	60	62		G	G	G	G	G	49	94	54	72	57	59	49
27	38	33	26	G	24	G	30	40	48	48	G	G	G	56	G	G	G	G	G	94	G	57	G	60
28	50	40	34	26	24	G	24	G	G	G	42	84	67	72	59	G	34	36	38	60	33	32	72	42
29	33	54	60	42	37	G	34	36	73	G	41	57	62	44	56	80	58	60	54	40	40	36	28	25
30	G	G	G	G	G	G	21	G	G	G	45	G	G	G	G	G	36	G	48	G	52	34	37	30
31	25	G	G	G	G	G	G	G	34	G	G	G	40	43	46	G	30	26	58	44	28	28	34	38
	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	31	31	28	29	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	30	31
MED	G	G	G	G	G	G	24	G	36	G	41	G	G	G	G	G	30	31	35	28	28	29	28	25
U Q	32	28	27	G	G	G	30	36	46	44	51	46	46	44	43	G	40	49	48	54	41	39	36	38
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

OCT. 1993

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

OCT. 1993

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				76				65		70	67	90	112	112	95	92	75	84	79					
2		52						85	77	75	86	94	107		92	90	84	75	87	80				
3									84	85	67	77	112	108	112	95	82	91		51	A			
4				33				57	77	90	80	73	92	103	93	91	85	78	88	A	A			
5								89	72	77	66	67	86	98	97	90	88	86						
6								87		69	84	80	87	95	92	110	112	91	89		64	69		
7							56	85	90	100	84	84	91	91	100	108	100	81			A		A	A
8	A		A	54	79			62	77	76	78	A	91	88	92	103	90	88	89			53		
9				53				88	86	86	75	78	95	98	113	103	103	101	106	89				
10								85	108	104	94	111	93	77	90		89	98	85	A	A	A		
11				39				66	86	100	105	100	107	104	106	111	87	77		80	A			
12	A	A	A	A	46			73	87		91	88		111	95	77	84	85		59	63		77	
13				48				88	87	102	98	100	111	108	104	90	83	80	90	101	65			
14								80	85	95	104	107	120	104	102	91	76		100	76				
15								67	78	88	92	94	108	112	108	107	77	85	110					
16					59			63	76	76		108	122	106	112	107	90	66	77			A		
17								59	72	85	90	92	110	102	107	104	104	88	80	A				
18								62	77	89	105	96	92	97	100	112	111	78	58					
19				47				86	82	83	90	104	117	131	122	97	85	77	89					
20			43	43				89	87	108	97	95		122	132	107	86	78	88					
21								83	87	81	101	105	103	110	119	104	90	65	87					
22					65			85	86	87	91		104	101	109	96		75	64	N				
23								78	84	78	79	107	117	103	104	106	101		66		A			
24								63	83	111	102	107	101	110	116	111	83	66						
25								57	80	101	111	108	117	111		107	88	89		67			78	
26		59						90	86	98	117	130	112	98	97	95	76	A	61	88	80		A	
27								53	79	91	110	111	122	112	104		119	88	A			A		
28					70			80	88	111	125	104	112	131	105		87	96	103		A		A	
29				N				83	109	73	88	100	113	107	95	98	86	76	A	A		54		
30								81	85	93	104	116	102	97	90	78	83	55	54		A	65		
31	A				55			59	86	96	105	108	105	91	105	107	78	66	63	75				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								30	29	30	30	29	29	30	30	28	30	28	22	10				
MED								80	85	88	92	100	107	104	104	103	86	80	87	78				
U Q								85	87	100	104	107	112	111	109	107	90	88	89	88				
L Q								63	77	78	84	89	94	98	95	91	83	75	66	67				

HOURLY VALUES OF FES AT YAMAGAWA

OCT. 1993

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	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	G	G
2	G	G	G	G		G		G	38	51	G	52	G	G	G	G	G	G	32	G	G	G	G	G
3	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	37	G	37	112	G	G	G
4	G	G	G	G	G	G	G	G	60	54	56	G	G	G	G	44	51	40	G	72	96	G	G	G
5	G	G	G	G	G	G	G	33	38	43	G	48	50	46	58	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G		G	57	55	53	G	69	46	G	G	71	G	58	84	G	G
7	G	G	G	G	G	G	G	30	39	45	59	43	G	G	G	G	G	39		G	71	G	69	92
8	59	G	32	30	G	G	G	G	78	78	48	79	G	G	G	G	G	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	34	41	45	G	G	67	G	42	G	G	80	46	83	G	G	G	G
10	G		G	G	G	G		G	G	G	57	61	50	58	G		44	58	92	69	50	39	G	G
11	G	G		G	G	G		G	49	57	G	G	G	44	G	G	G	46	G	51	41	G	G	G
12	41	38	34	47	30		G	31	G		G	55	G	G	44	G	G	81	G	38	42	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	38	46	44	62	52	66	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G
16	G	G	G	G	G	G	G	30	G	G		49	G	G	G	G	G	G	G	G	G	38	G	G
17	G	G		G	G	G	G	G	36	G	G	G	G	G	50	G	G	G	G	49	G	G	G	G
18	G	G	G		G	G	G	G	G	G	45	G	G	G	G	G	G	G	G	G	G	G	G	G
19	G	G	G	G		G	G	G	G	G	G	G	G	59	G	54	G	50	G	G	G	G	G	G
20	G	G	G	G	G	G	G	G	G	59	44	68	G	44	G	G	G	40	40	G	G	G	G	G
21	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	G	G		49	G	44	G	G	G	34	G	G	G	G	G
23	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	G	G	G	44	G	109	G	G	G
24	G	G	G	G	G	G	G	G	40	43	43	45	G	G	44	42	38	60		G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	42	61	60	78	G	60	55	31		G	G	G	G	G
26	G	G	G	G	G	G	G	34	44	44	G	44	G	G	G	G	G	64	G	40	82	G	72	G
27	G	G	G	G	G	G	G	G	42	48	51	G	67	G	G		G	37	61	G	G	77	G	G
28	G	G	G	G	G	G	G	G	44	53	52	51	54	53	G		G	48	G	G	86	G	69	G
29	G	G	G	G	G	G	G	G	34	38	G	44	56	G	G	G	38	70	113	68	G	G	G	G
30	G	G	G	G			G	G	G	G	40	50	G	G	G	54	48	G	68	G	45	G	G	G
31	52	G	G	G	G	G	G	G	G	G	51	G	G	G	G	G	G	36	G	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	30	29	30	28	28	28	30	30	30	30	30	31	31	31	28	31	31	28	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	18	G	G	44	G	G	G	G	G	34	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	40	46	48	52	50	44	G	G	G	48	42	38	50	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

OCT. 1993

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	24	26		21	24		24	24		38	43	43	44	44	44	39	28	43	22			28		
2	29	20	22	18				24	20	34	43	30	44		43	36	33	26	18	18				
3			21		21				40	35	28	38	45	38		39	33	23		20		27	26	
4				18				38	29	38	38	44	45		44	34	21	17	21	27	29		26	
5								22	24	29	28	30	33	26	41	39	20	17		26				22
6							22	26		53	34	38	37	42	35	30	29	34	23	23	22	24		
7						22	22	23	21	22	27	27		44	41	54	18	26			21		22	21
8	21	22	23	20	20			29	26	28	34	35	44	48	40	39	33	23	22			29		
9				24	23		27	29	21	28	42	38	42	39	28	35	32	43	18	35		30		
10								23	39	33	33	34	36	36	44		29	20	23	20	27	18	23	
11				26				42	42	22	36	42	44	28	27	24	29	17		49	23			33
12	24	22	21	17	17			24	29		39	26		44	33	42	30	20		30	29			27
13				26				29	32	36	35	38	43	39	37	39	28	20	39	26	24			
14							26	24	24	26	32	32	35	39	39	36	30			26				30
15				28	24			22	32	34	42	44	42	40	39	34	30	18		43				
16					24			23	29	34		35	45	44	59	32	29	23	27	23				
17					24			27	30	34	55	40	44	40	34	34	30	24	26	28	34			
18			26					26		38	36	59	38	42	43	32	38	24	32					
19				29				30	58	34	39	42	39	32	43	27	29	22	27			24		
20			27	26	23			28	44	30	42	28	23	27	44	36	44	20	20	23				
21		27			23			26	28	54	39	42	38	36	40	35	29	32	34			34		
22				26	23			24	27	36	38		33	70	38	35		27	24	26				
23					27			23	24	34	54	42	41	40	37	38			24		28			
24								27	24	29	28	33	37	42	28	27	23	20		22				
25	26	27						24	24	35	27	28	27	28	14	26	21	22		28				
26								22	26	29	38	26	41	55	40	35	27	22	24	26	26	36	26	
27					23			24	26	44	35	36	34	38	37		28	22	35			33	29	
28				24	28			28	24	26	28	30	33	32	54		28	23	24		27	36	28	
29				26	26			27	24	34	54	28	28	42	40		27	26	28			29		
30		26	24					24	27	26	26	39	41	44	56	29	23	27	27		24	27		
31	33				22			26	28	53	30	44	37	41	42	36	35	21	26	36				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT				14	16			30	28	30	30	30	29	29	30	27	29	29	22	20	12	13		
MED				25	23			25	27	34	36	37	39	40	40	35	29	23	24	26	26	29		
U Q				26	24			28	31	36	42	42	44	44	43	39	31	26	27	29	28	33		
L Q				20	22			24	24	29	30	30	34	36	37	32	27	20	22	23	23	25		

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

OCT. 1993

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	36	53	42	31	N		28	66	78	77	67	85	117	131	124	107	97	82	72	32	A	A	43	54
2	53	44	34	28	29	32	32	62	75	85	90	116	140	142	145	137	122	110	90	80	66	33	A	43
3	35	38	43	36	35	32	26	64	72	74	71	77	115	146	162	145	141	121	87	66	62	A	23	42
4	38	44	54	32		A	29	62	73	82	76	76	101	111	112	111	107	119	105	75	43	A	A	A
5	37	32	26	31	30	26	A	66	75	70	74	77	84	96	121	118	118	107	90	83	55	26	26	26
6	38	31	34	32	28	28	31	76	66	66	70	90	91	96	108	121	137	N	90	52	34	A	38	A
7	44	42	35	37	35	37	38	66	78	91	84	87	105	112	132	144	145	144	108	83	67	78	54	43
8	26	49	35	32	26	35	31	59	70	87	91	75	103	107	111	122	111	110	79	52	45	53	32	37
9	37	42	43	50	40	25	28	66	90	103	87	79	94	111	120	120	121	122	121	87	84	86	54	75
10	63	34	37		26	26		72	108	102	104	111	103	81	107	105	94	92	90	64	A	A	A	53
11	42	32	34	36	A		A	66	80	88	111	85	108	89	144	132	146	95	87	87	88	89	86	55
12	54	62	51	50	35	32	31	68	84	81	97	112	76	119	122	91	93	108	82	85	79	80	78	54
13	43	44	38	44	28	B	29	67	84	90	94	110	122	110	121	128	113	92	91	73	88	66	66	65
14	64	56	37	A				61	85	92	116	101	126	89	121	113	91	88	90	87	62	A	38	56
15	60	54	58	55	41	31	34	63	76	85	74	94	130	139	118	122	110	95	123	90	66	66	54	37
16	34	40	47	36	29			54	66	78	75	115	124	101	127	122	N	93	78	49	35	41	35	38
17	37	35	42	36	35		26	54	70	80	89	75	91	91	120	126	90	92	71	N	A	52	A	43
18	46	35	35	31	28		N	54	71	88	92	111	92	90	123	144	146	125	87	78	54	44	A	A
19	42	34	54	52	42	30	28	61	84	90	103	81	141	129	145	157	143	119	86	A	44	44	41	38
20	36	40	44	36	29		30	66	88	75	92	92	91	79	142	142	134	80	89	61	55	55	52	43
21	36	41	42	42	37	31	34	61	71	82	94	79	83	111	126	143	145	131	90	74	74	66	63	A
22	52	54	49	35			26	62	77	75	92	86	104	112	108	125	89	91	85	78	54	58	53	38
23	A	A	35	40			26	73	80	71	88	83	79	110	124	109	118	90	90	82	85	83	42	34
24	34	30	36	26				52	81	91	109	88	92	126	123	117	101	91	82	76	52	42	42	44
25	36	34		28			26	52	75	90	N	119	123	134	140	140	123	89	84	81	66	85	86	65
26	66	54		31	29	35	32	61	88	91	83	100	81	94	92	90	86	72	64	66	62	A	32	42
27	A	38	38	38	31	32	31	52	78	88	79	79	92	90	112	110	102	93	84	58	66	A	57	30
28	A	37	34	35	32	35	37	60	72	74	119	110	93	125	114	112	122	85	110	66	66	52	38	A
29	43	34	A	44	A	A	28	66	75	76	85	92	124	139	113	143	119	92	76	62	54	A	66	63
30	62	44	52				26	53	81	90	76	103	112	92	112	123	93	76	74	52	38	38	38	A
31	31	A	32	40	A	N		54	73	90	112	122	123	126	124	109	92	74	54	66	42	33	62	43
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	28	28	20	15	23	31	31	31	30	31	31	31	31	31	30	30	31	29	28	22	26	25
MED	40	40	38	36	30	32	29	62	77	85	90	90	103	111	121	122	116	92	87	74	62	54	48	43
U Q	52	46	45	41	35	35	32	66	84	90	97	110	123	126	127	140	134	110	90	82	66	78	62	54
L Q	36	34	35	31	28	28	26	54	72	76	76	79	91	92	112	111	94	89	79	61	48	42	38	38

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

OCT. 1993

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	31	39	G	41	G	47	G	49	48	44	47	30	37	58	66	G	30
2	28	24	G	G	G	G	G	34	36	42	43	G	45	68	G	G	42	55	60	40	31	30	29	28
3	23	G	G	G	G	G	G	31	40	38	43	44	46	G	60	55	39	39	31	31	40	32	29	24
4	26	G	G	G		30	G	38	48	49	82	77	68	70	58	61	106	60	59	32	29	38	44	37
5	32	37	34	26	24	24	28	33	41	58	66	47	50	56	45	41	52	161	46	34	90	32	33	33
6	G	G	G	G	G	G	G	40	42	50	48	72	84	72	49	42	43	54	36	70	36	59	38	40
7	34	29	26	G	G	G	G	32	47	44	68	72	45	51	52	46	49	43	40	43	32	40	34	28
8	32	85	66	34	33	G	G	29	44	54	47	74	G	G	G	50	44	40	37	26	33	24	37	33
9	25	G	26	G	33	24	G	34	44	60	83	90	79	46	48	G	G	34	36	32	43	68	30	40
10	G	G	G	G	G	G		29	40	40	46	46	55	G	G	51	55	43	28	84	40	83	44	36
11	30	29	26	38	24		30	38	44	G	G	G	G	G	G	G	41	G	34	33	29	35	34	26
12	26	33	40	28	30	25	24	33	36	45	46	67	G	44	G	G	42	45	58	59	48	34	36	G
13	44	35	26	23	G	B	G	36	G	G	G	G	G	G	62	G	G	51	35	31	39	34	26	32
14	28	26	34	26				28	37	G	43	G	G	G	G	G	G	44	54	48	40	41	39	G
15	G	G	G	G	G	G	G	G	35	44	58	G	G	G	G	G	G	38	39	26	G	G	G	G
16	G	G	G	G	G			28	37	G	G	G	G	G	G	G	G	G	44	G	G	G	G	33
17	G	32	G	G	G	G	G	49	39	44	42	G	56	78	54	43	G	38	40	34	41	39	44	G
18	G	G	28	23	G		G	33	82	42	48	54	60	G	G	G	37	G	G	G	G	38	35	33
19	G	G	G	G	G	G	G	30	40	G	51	G	G	43	G	G	52	34	44	46	32	G	G	G
20	G	G	G	G	G	G	G	30	35	46	G	G	G	G	G	G	G	31	35	26	24	33	G	G
21	G	G	G	G	G	G	G	29	38	44	G	G	G	G	G	G	G	G	G	G	G	G	G	30
22	29	G	27	G		G	G	28	34	G	G	G	62	54	43	47	44	36	31	G	28	26	33	G
23	39	26	G	G			G	31	37	G	G	G	G	G	G	G	38	G	G	G	G	G	24	28
24	G	G	G	G				29	38	40	G	G	G	G	G	40	45	33	39	36	39	30	G	G
25	G	G	G	G			G	G	G	G	44	53	G	G	G	40	G	G	36	G	G	30	G	33
26	25	G		G	G	G	37	30	36	G	G	51	G	51	68	G	45	31	30	32	79	70	40	59
27	72	26	25	26	G	G	G	28	37	G	54	G	G	G	G	G	50	44	68	G	G	31	46	37
28	34	30	G	G	G	G	G	G	39	42	G	G	G	42	G	G	38	36	32	38	G	56	37	40
29	29	33	36	36	37	29	25	G	G	G	42	67	G	G	51	46	63	78	90	44	38	65	34	44
30	G	26	G				G	G	36	G	G	G	G	G	G	G	44	60	G	G	G	38	G	45
31	G	36	34	30	32	G		G	G	G	G	G	G	G	G	47	41	39	G	G	27	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	30	24	21	26	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	25	G	G	G	G	G	G	30	38	40	43	G	G	G	G	G	42	39	36	32	32	34	33	30
U Q	30	30	27	26	24	12	G	33	41	44	48	54	50	51	49	46	45	47	44	40	40	41	37	37
L Q	G	G	G	G	G	G	G	28	36	G	G	G	G	G	G	G	G	31	30	G	G	26	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

OCT. 1993

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15		15	15	14	17	23	29	28	28	29	24	16	15	14	14	15	15	15	15
2	16	15	15	15	15	15	15	14	15	27	24	23	29	27	26	18	17	17	14	14	14	15	15	16
3	16	15	15	15	14	15	15	15	14	16	18	23	29	27	27	20	18	15	14	14	14	14	14	15
4	15	15	15	15		16	15	15	16	14	20	23	23	21	23	18	16	14	15	15	14	14	14	15
5	15	15	14	14	15	15	15	15	14	16	17	23	29	26	23	24	16	14	14	15	15	15	15	15
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7	15	14	15	14	15	14	15	14	15	16	18	22	22	24	23	17	16	14	14	14	14	15	14	15
8	14	15	15	15	14	14	15	15	15	15	16	23	23	17	17	16	14	14	14	15	15	17	15	15
9	15	15	15	15	14	16	15	15	15	16	18	21	27	24	21	18	17	15	14	15	15	15	15	15
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12	18	18	14	15	14	14	16	16	24	28	30	47	28	24	30	35	29	22	15	16	15	15	16	16
13	16	16	14	16	16	B	17	21	30	35	42	49	48	48	35	36	32	24	18	16	15	16	15	14
14	15	15	15	18				15	18	26	29	47	30	52	28	48	32	17	14	15	16	15	20	26
15	22	17	17	17	15	15	15	23	23	26	29	50	49	48	48	36	29	15	15	15	15	15	16	16
16	27	17	18	17	17			15	18	29	46	46	49	49	49	42	30	26	15	18	16	16		18
17	15	17	18	17	20	18	17	24	17	26	29	49	36	35	53	35	17	17	16	17	17	16	16	21
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19	16	24	17	16	15	16	17	15	17	26	32	49	49	34	32	36	23	16	15	16	16	16	17	17
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21	17	16	16	15	15	17	16	15	16	28	28	51	49	46	45	40	32	24	16	16	16	17	22	16
22	15	18	17	21			16	15	18	24	29	30	35	30	32	28	22	17	15	18	16	16	15	16
23	16	16	16	16			16	17	17	23	29	32	48	47	32	34	23	26	21	21	16	16	16	17
24	17	16	18	20				16	21	28	28	49	52	30	29	28	26	16	15	15	15	15	21	23
25	18	21		20			17	21	17	33	27	28	47	45	44	28	30	22	14	17	18	16	18	17
26	18	16		18	18	15	15	15	28	32	46	36	46	35	32	29	22	18	15	16	16	17	15	16
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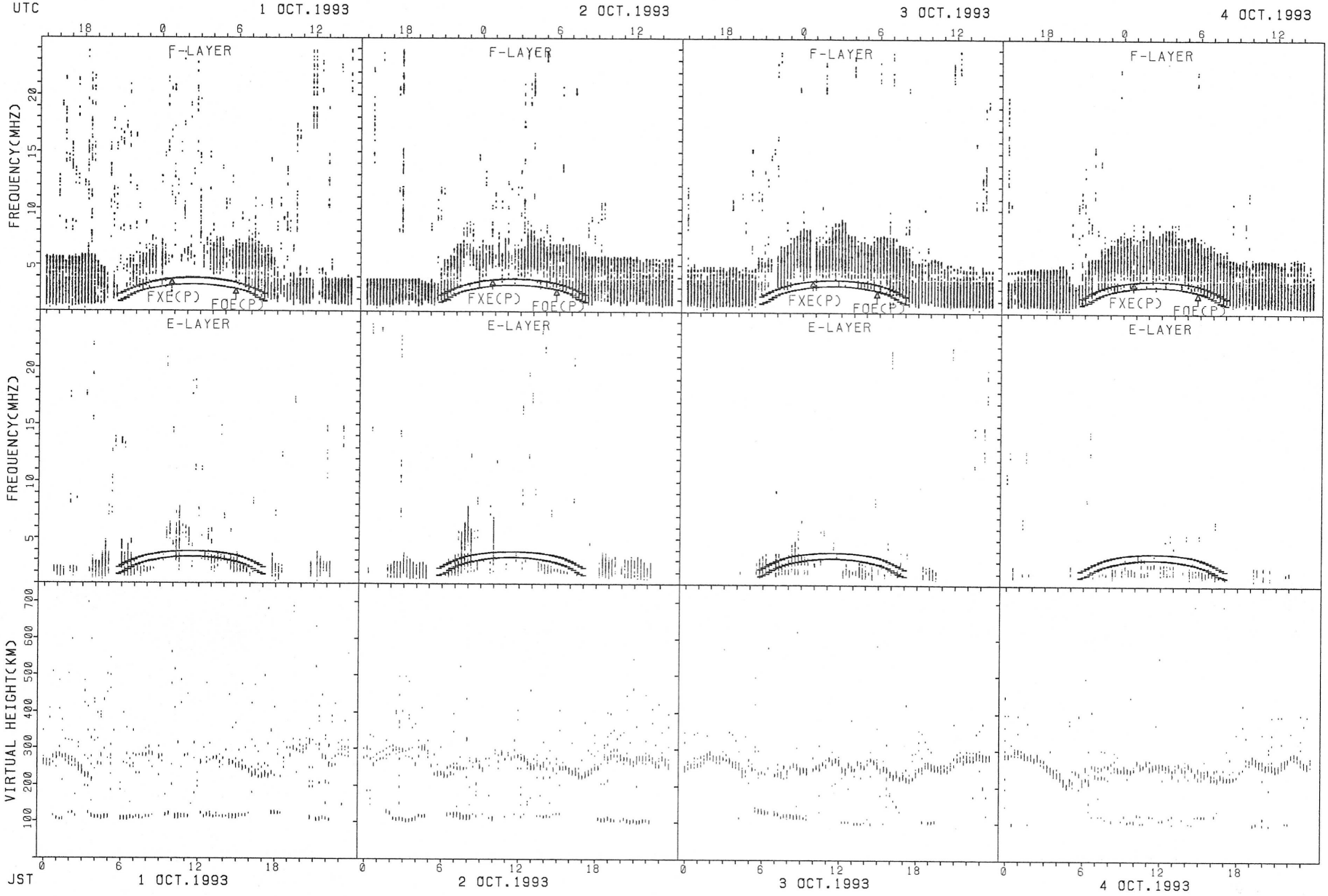
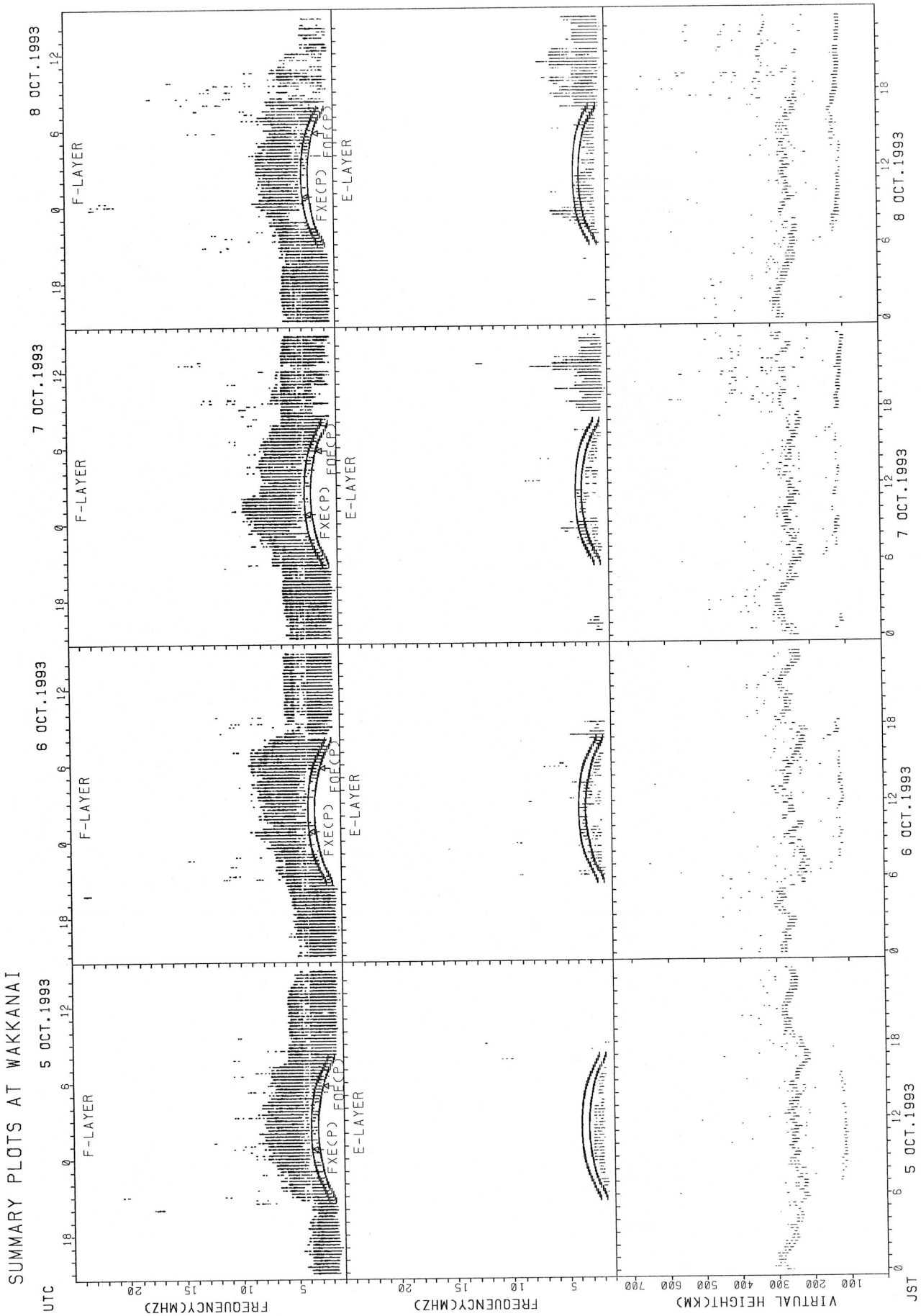
29	15	15	16	15	14	15	14	20	18	18	26	29	28	27	26	27	27	20	16	17	16	15	15	17
30	17	16	16				16	21	14	18	38	48	55	29	48	35	27	17	18	17	24	16	18	16
31	20	15	15	17	14	18		21	18	30	35	46	48	29	28	30	28	18	16	17	16	22	17	18
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	29	30	23	19	26	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	16	16	15	16	15	15	16	15	17	26	28	30	36	30	30	29	24	17	15	16	16	16	16	16
U Q	17	17	17	17	16	16	16	20	20	28	30	47	48	48	42	35	29	22	16	17	16	16	17	17
L Q	15	15	15	15	14	15	15	15	15	16	20	24	28	26	26	20	17	15	14	15	15	15	15	15

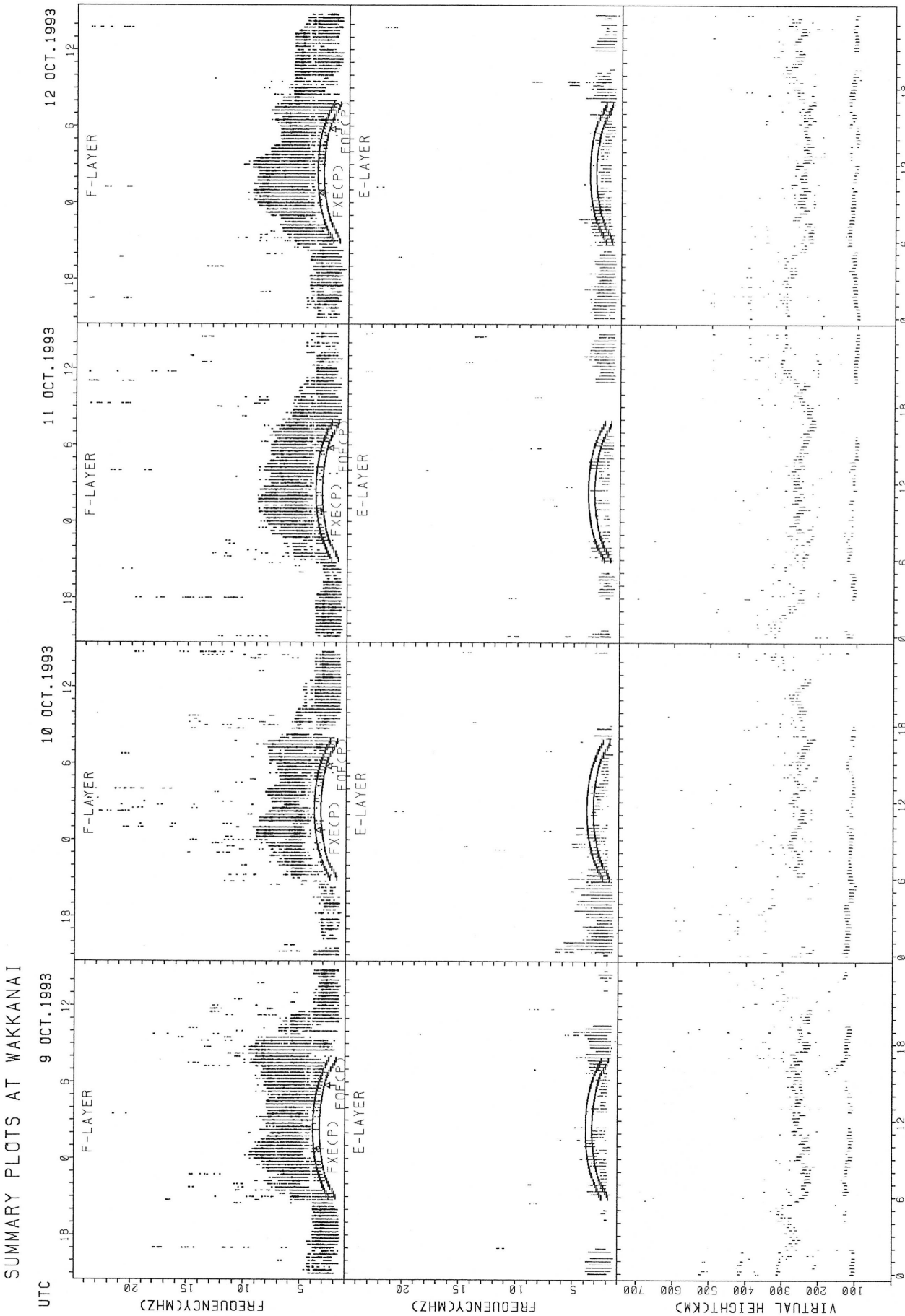
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

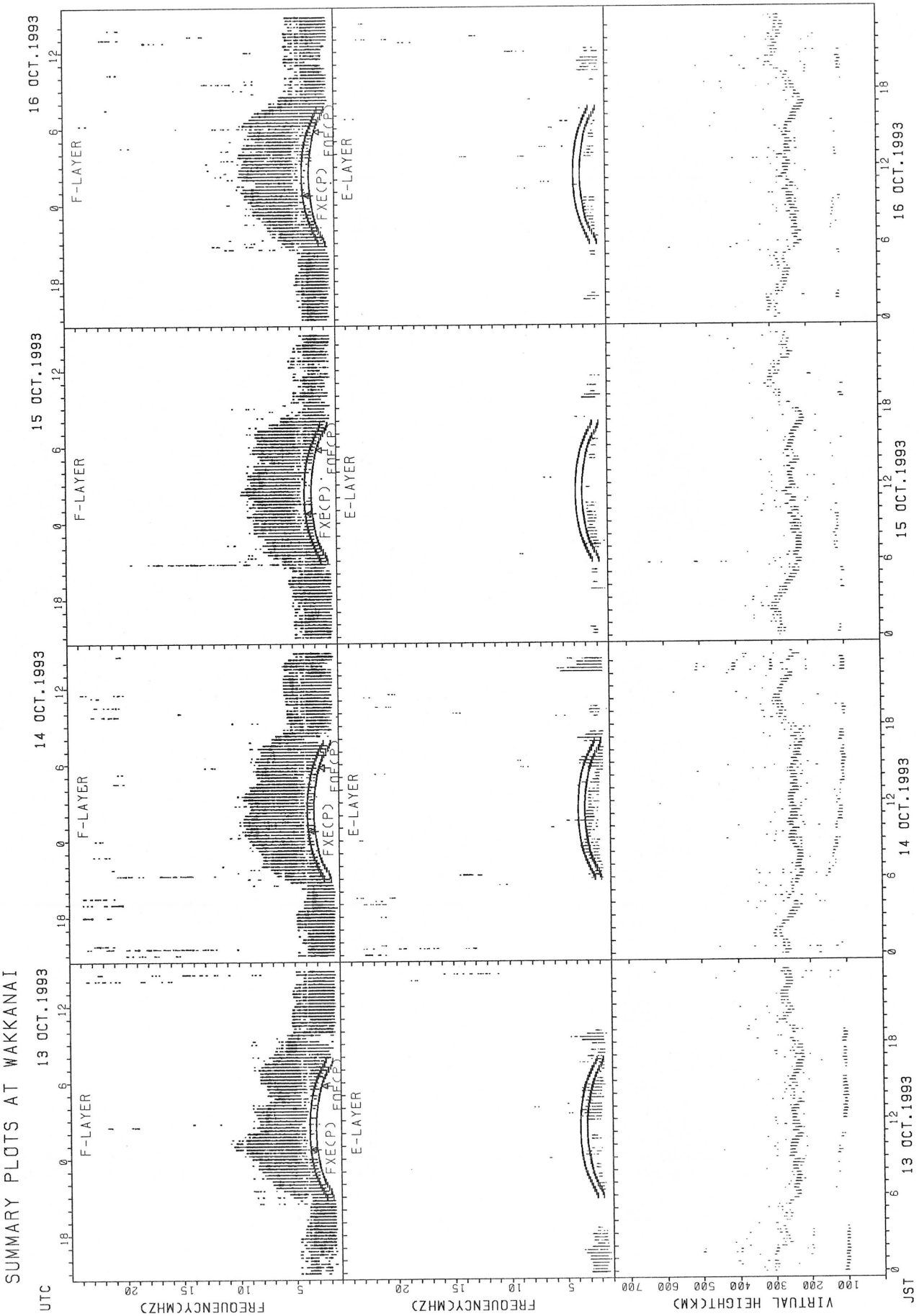
SUMMARY PLOTS AT WAKKANAI



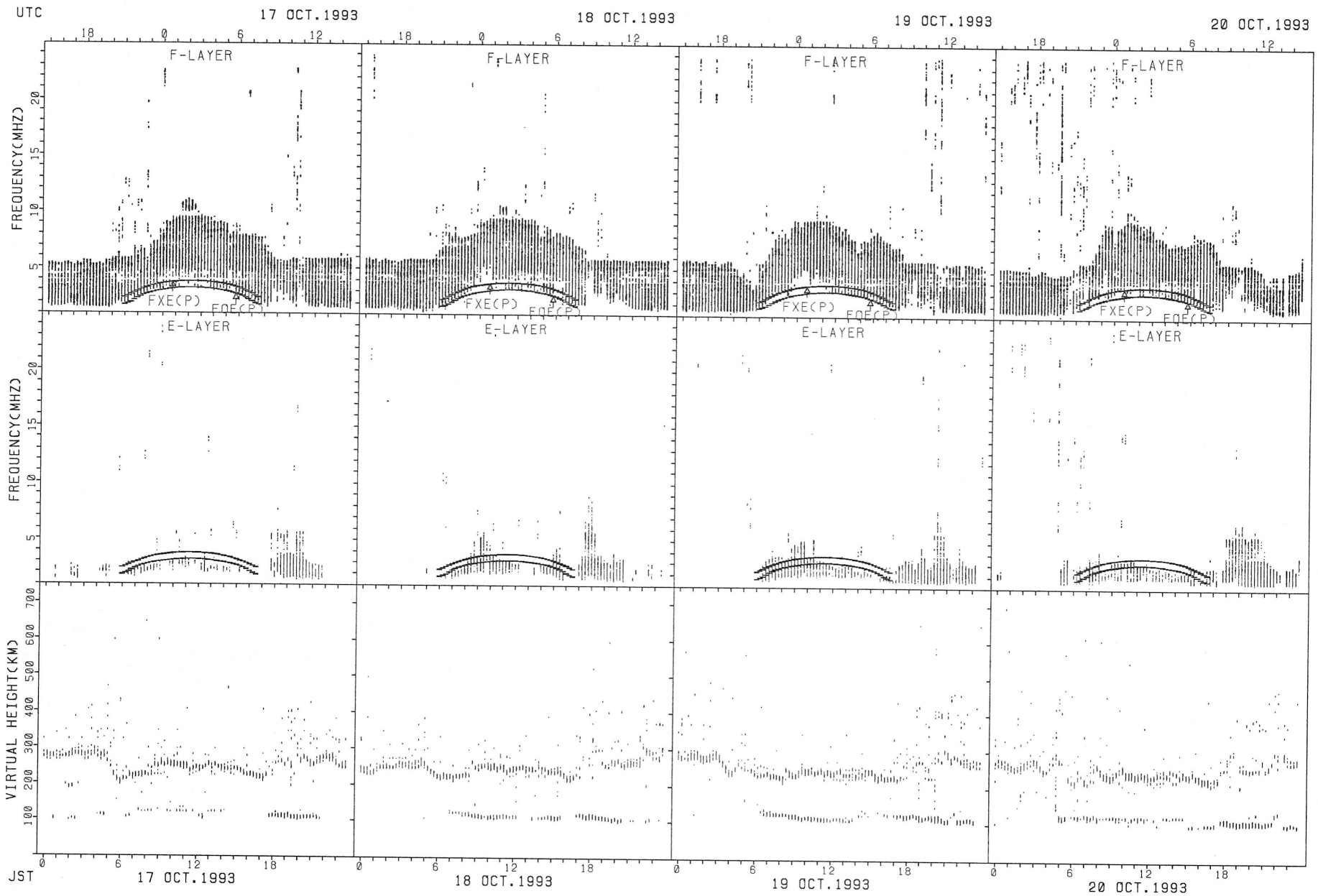
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
5 OCT.1993
6 OCT.1993
7 OCT.1993
8 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

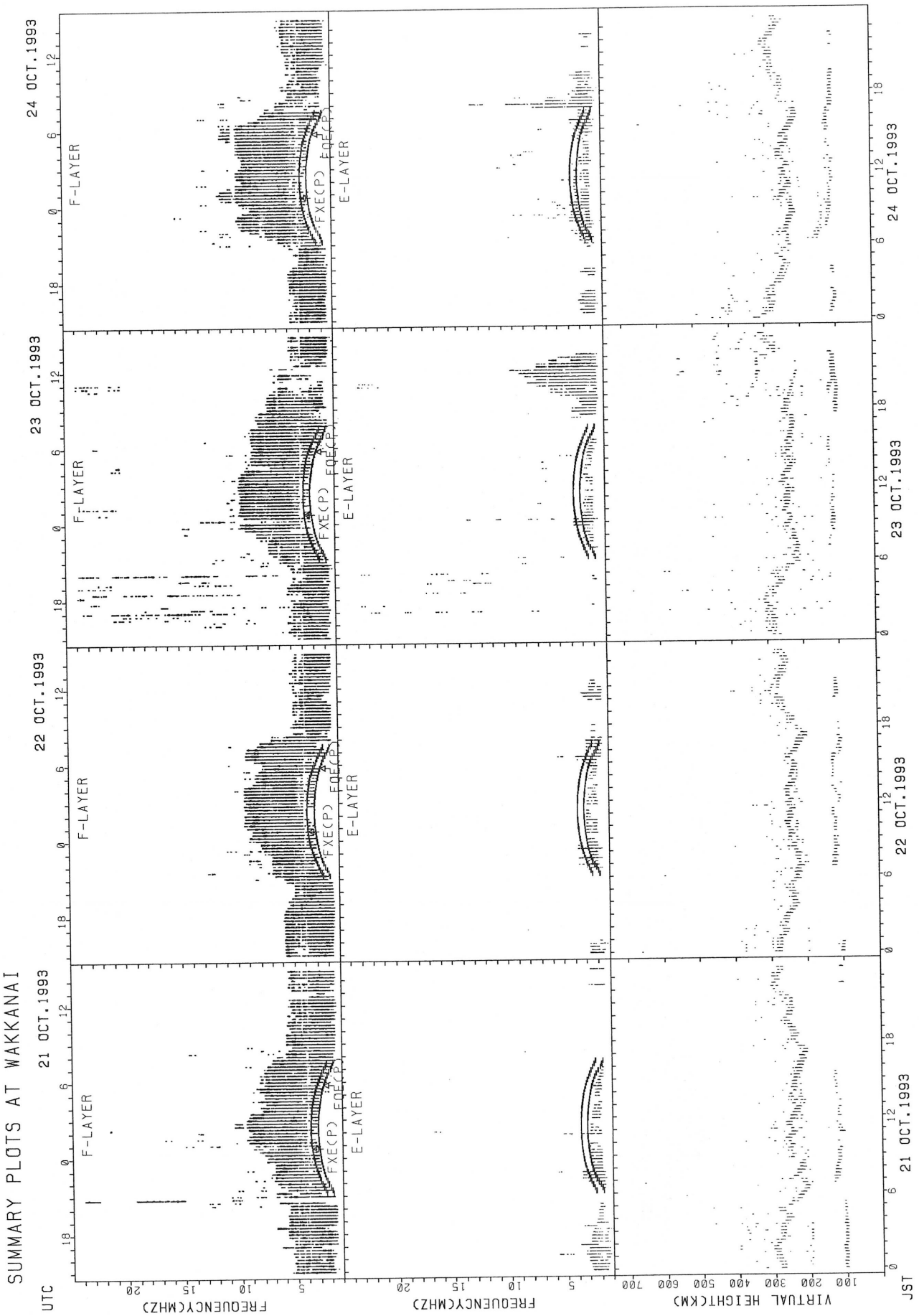

SUMMARY PLOTS AT WAKKANAI
UTC
9 OCT.1993
10 OCT.1993
11 OCT.1993
12 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

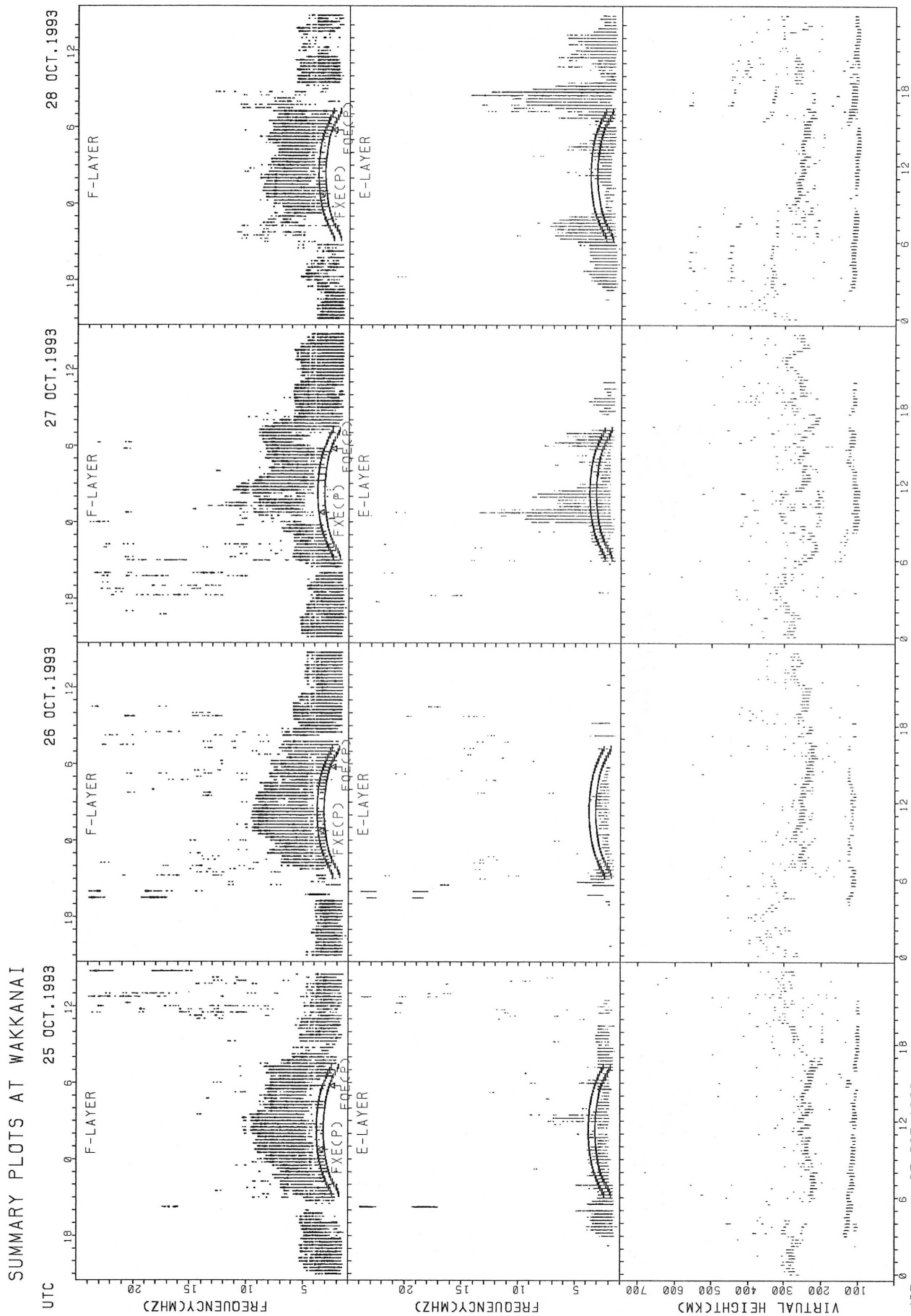

SUMMARY PLOTS AT WAKKANAI
UTC
JST
13 OCT.1993
14 OCT.1993
15 OCT.1993
16 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

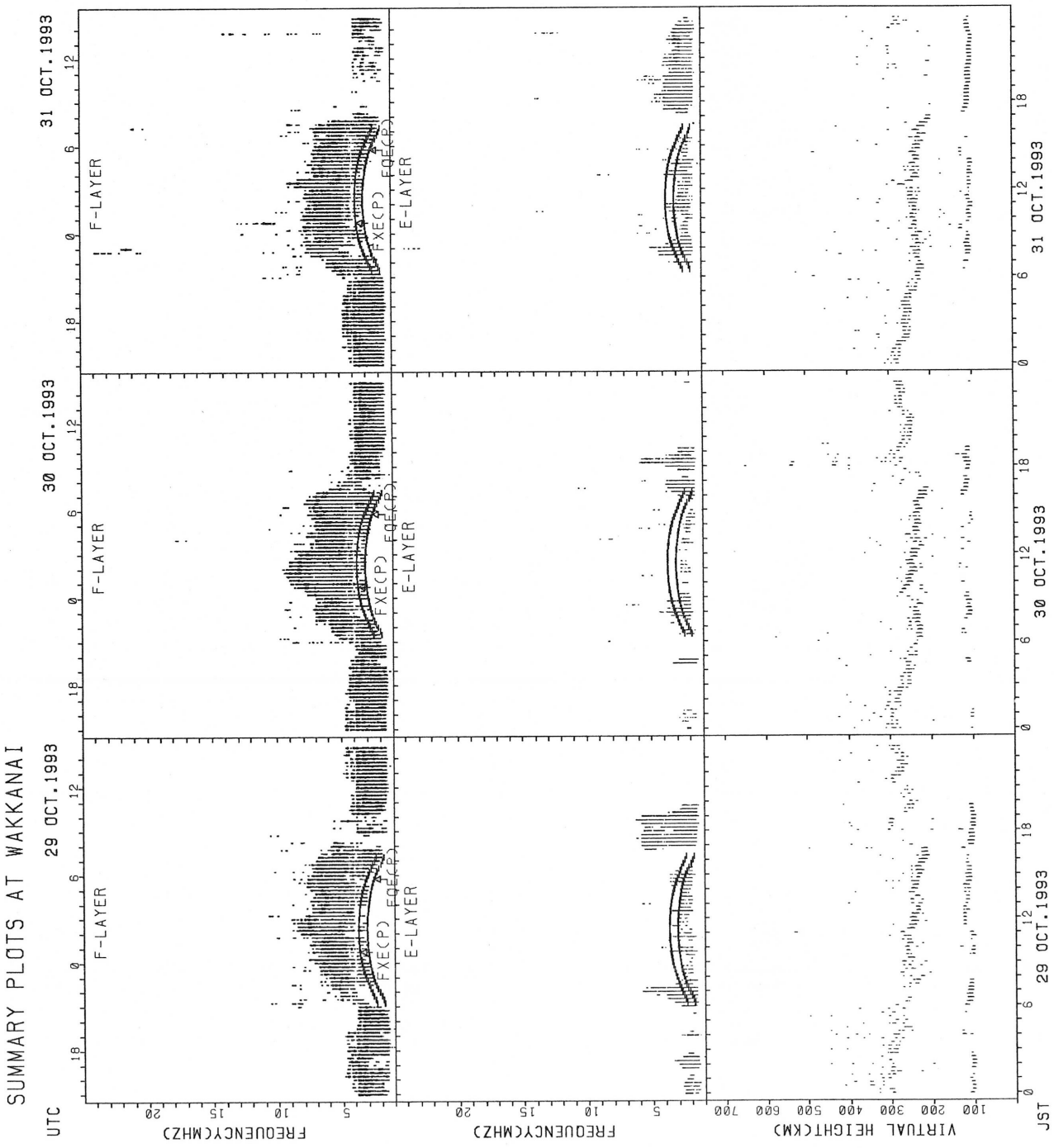
SUMMARY PLOTS AT WAKKANAI



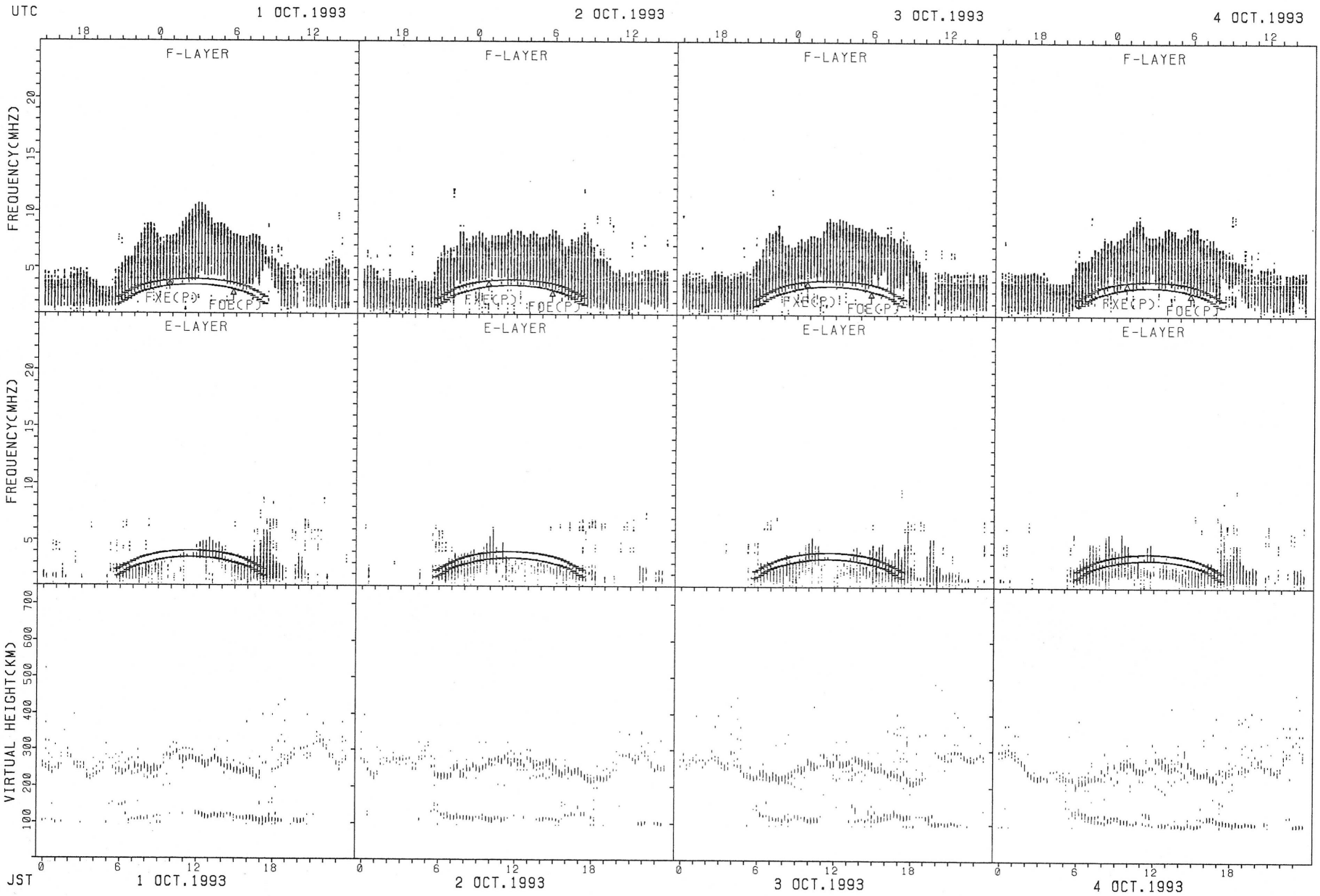
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
21 OCT.1993
22 OCT.1993
23 OCT.1993
24 OCT.1993
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

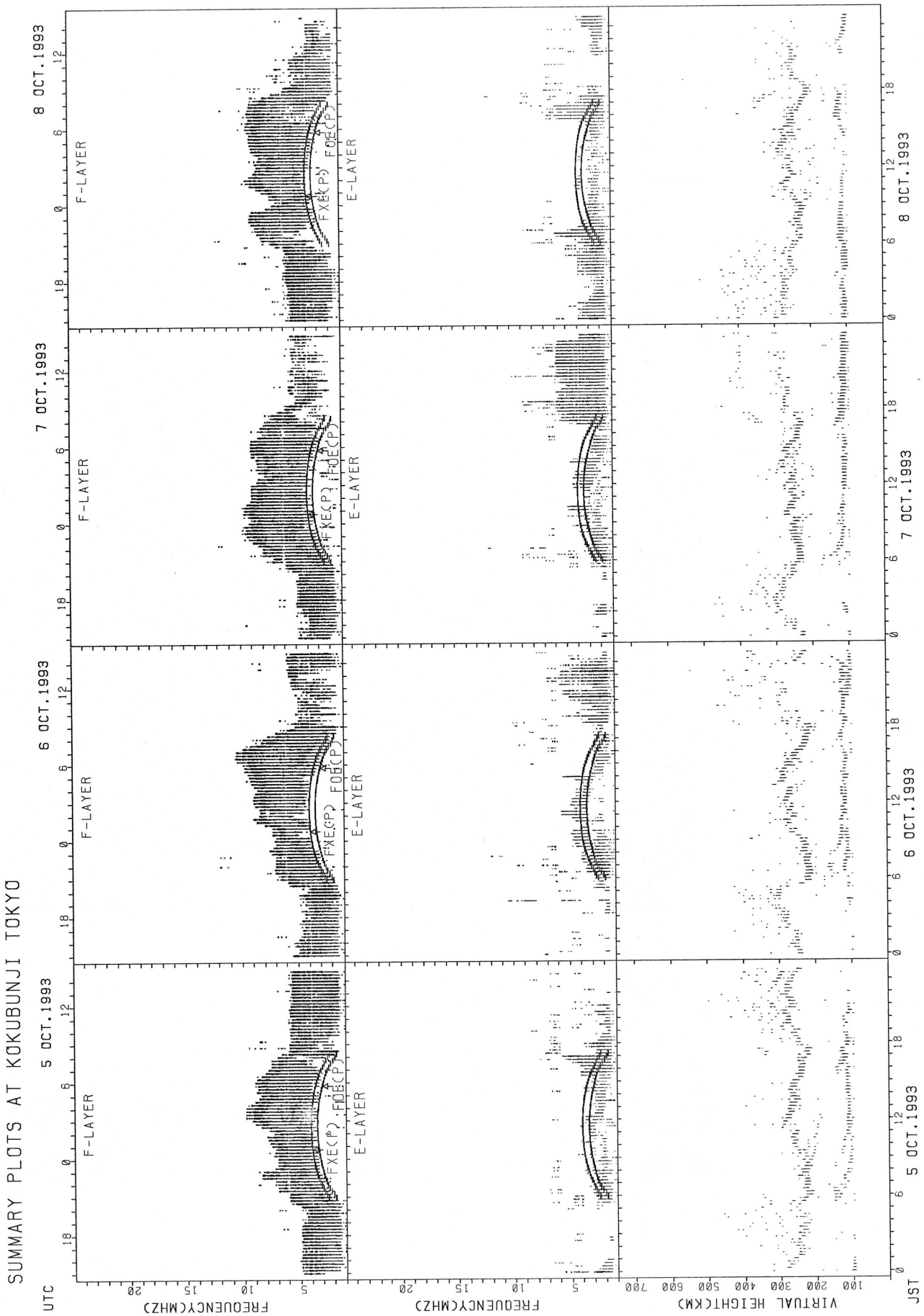

SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 OCT.1993
26 OCT.1993
27 OCT.1993
28 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

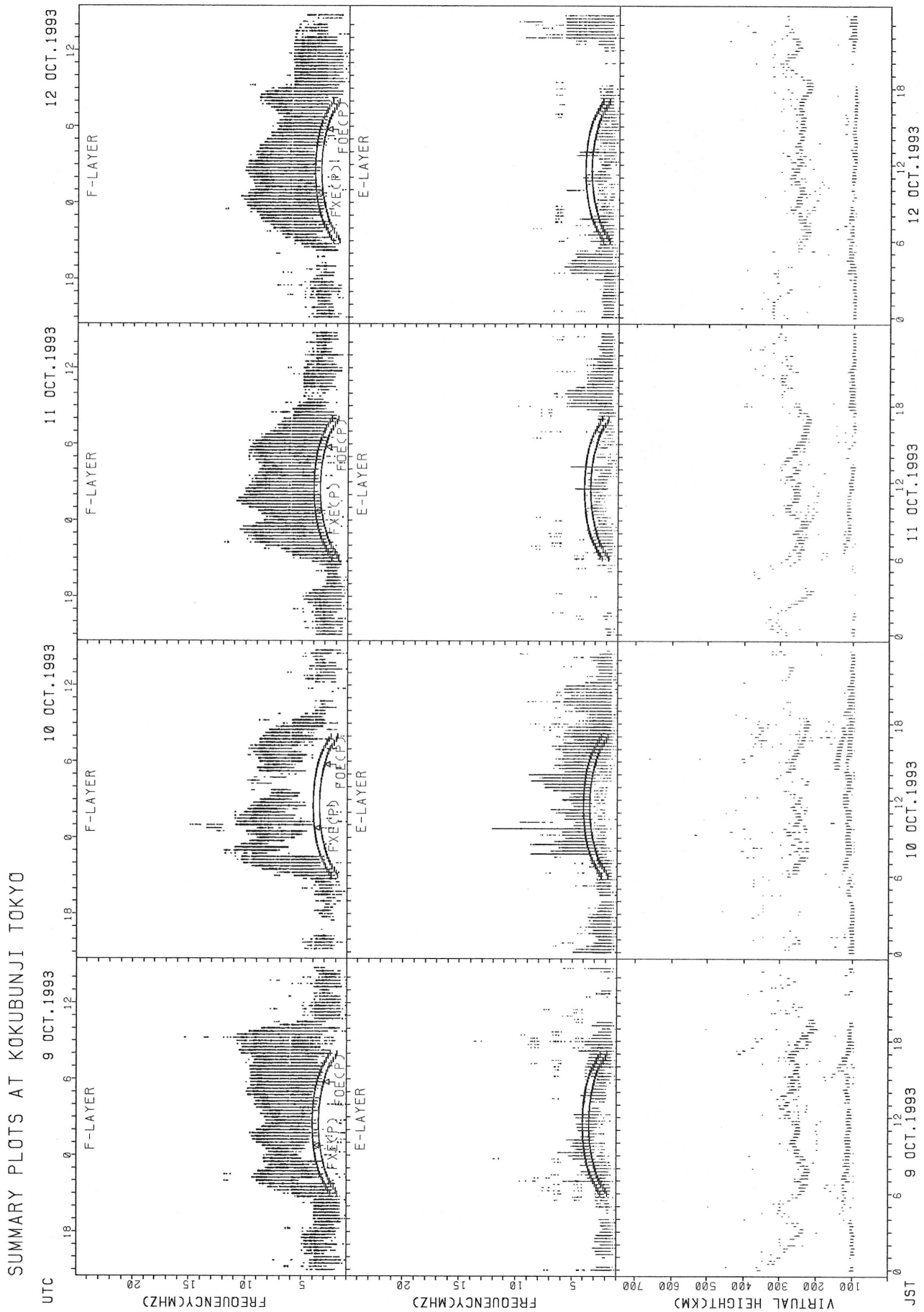

SUMMARY PLOTS AT WAKKANAI
UTC
29 OCT.1993
30 OCT.1993
31 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

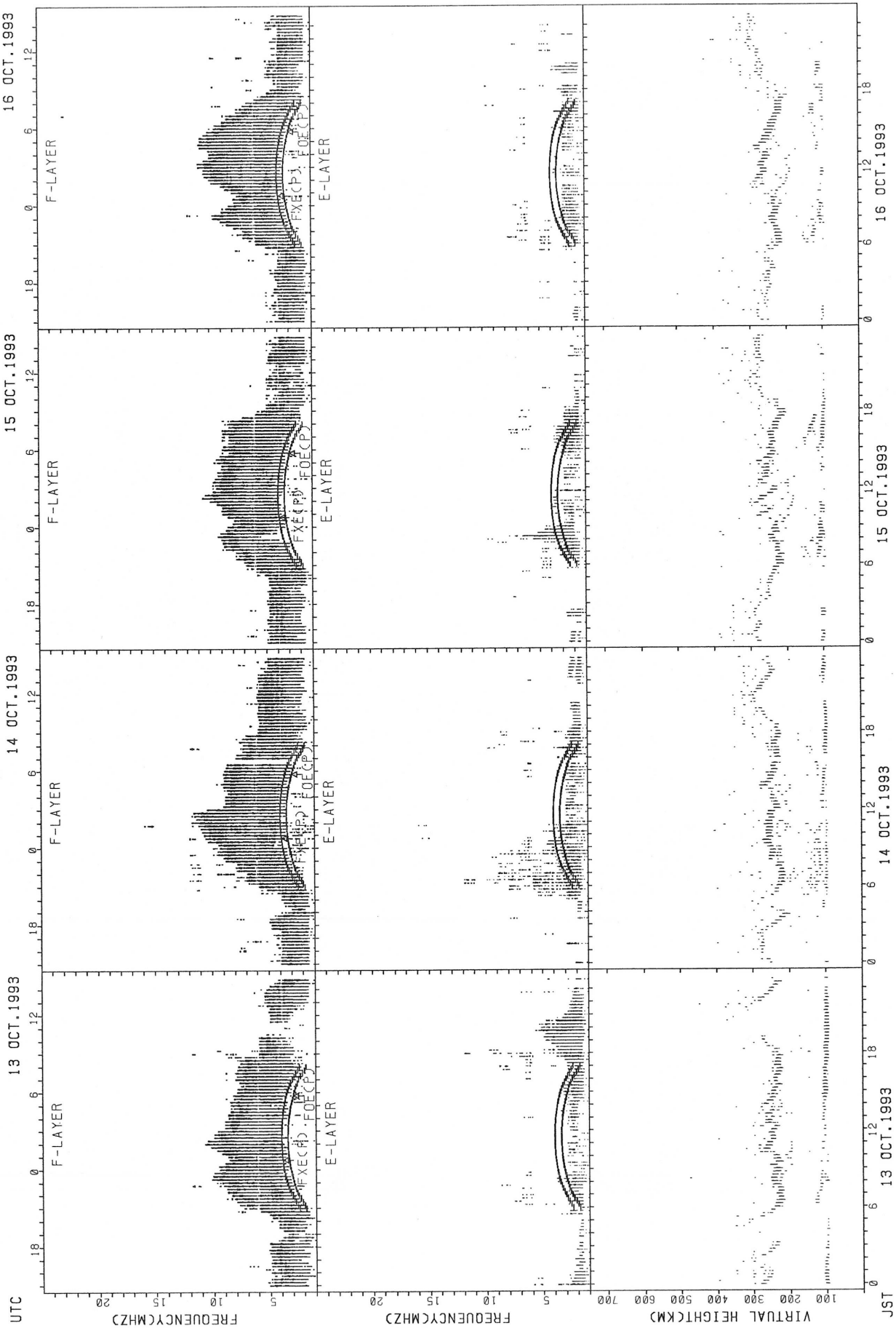
SUMMARY PLOTS AT KOKUBUNJI TOKYO

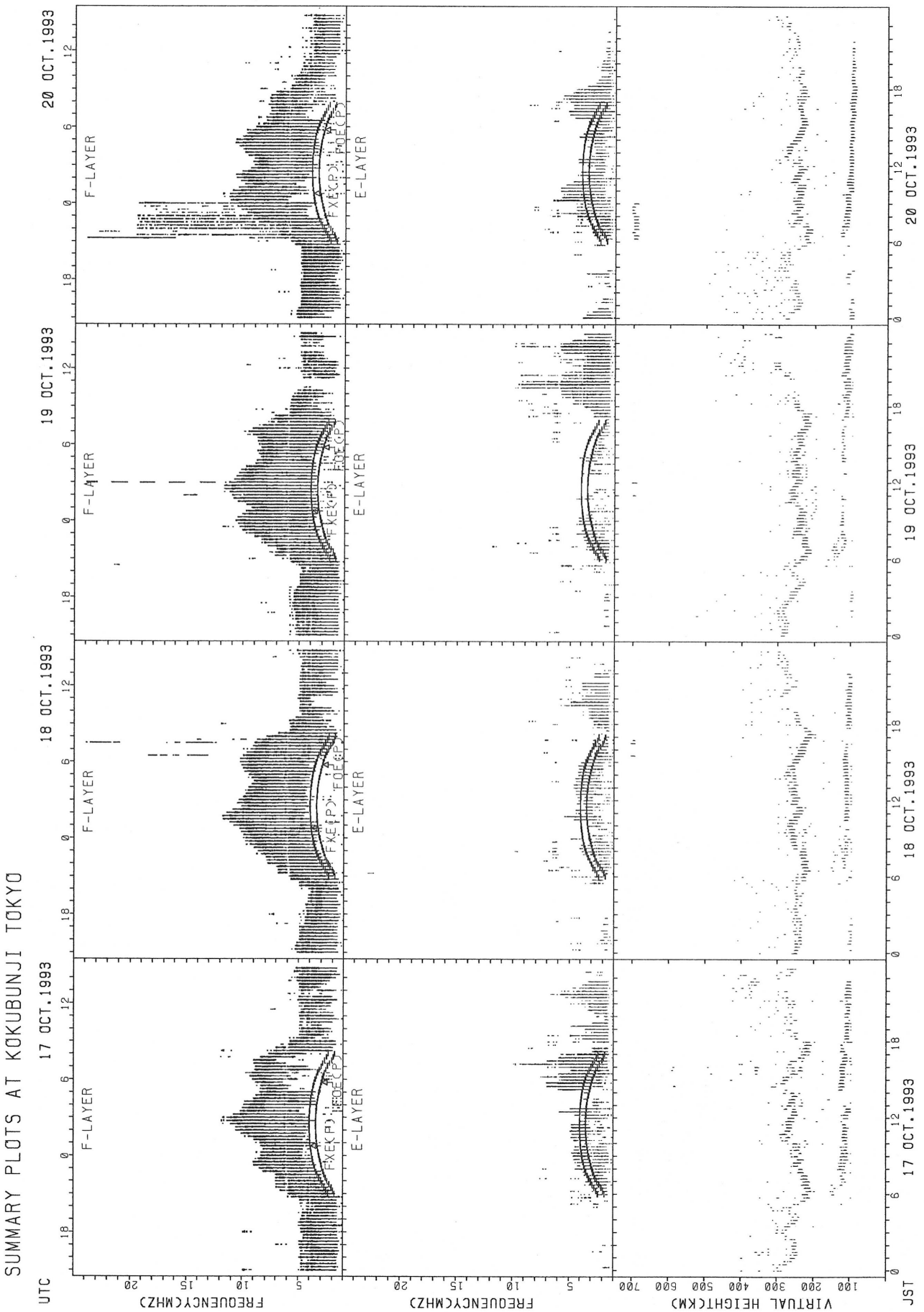


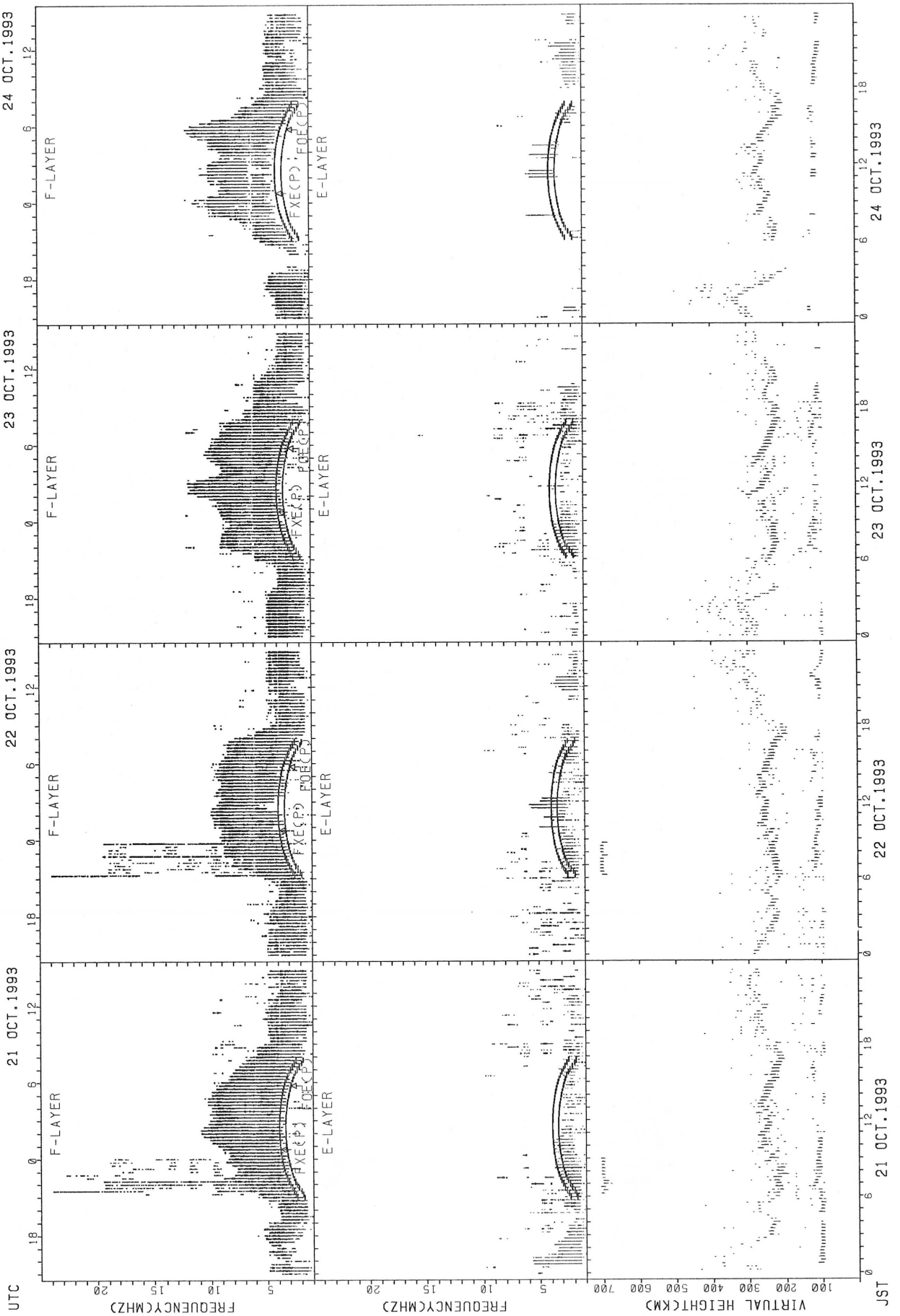
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 OCT.1993
6 OCT.1993
7 OCT.1993
8 OCT.1993
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

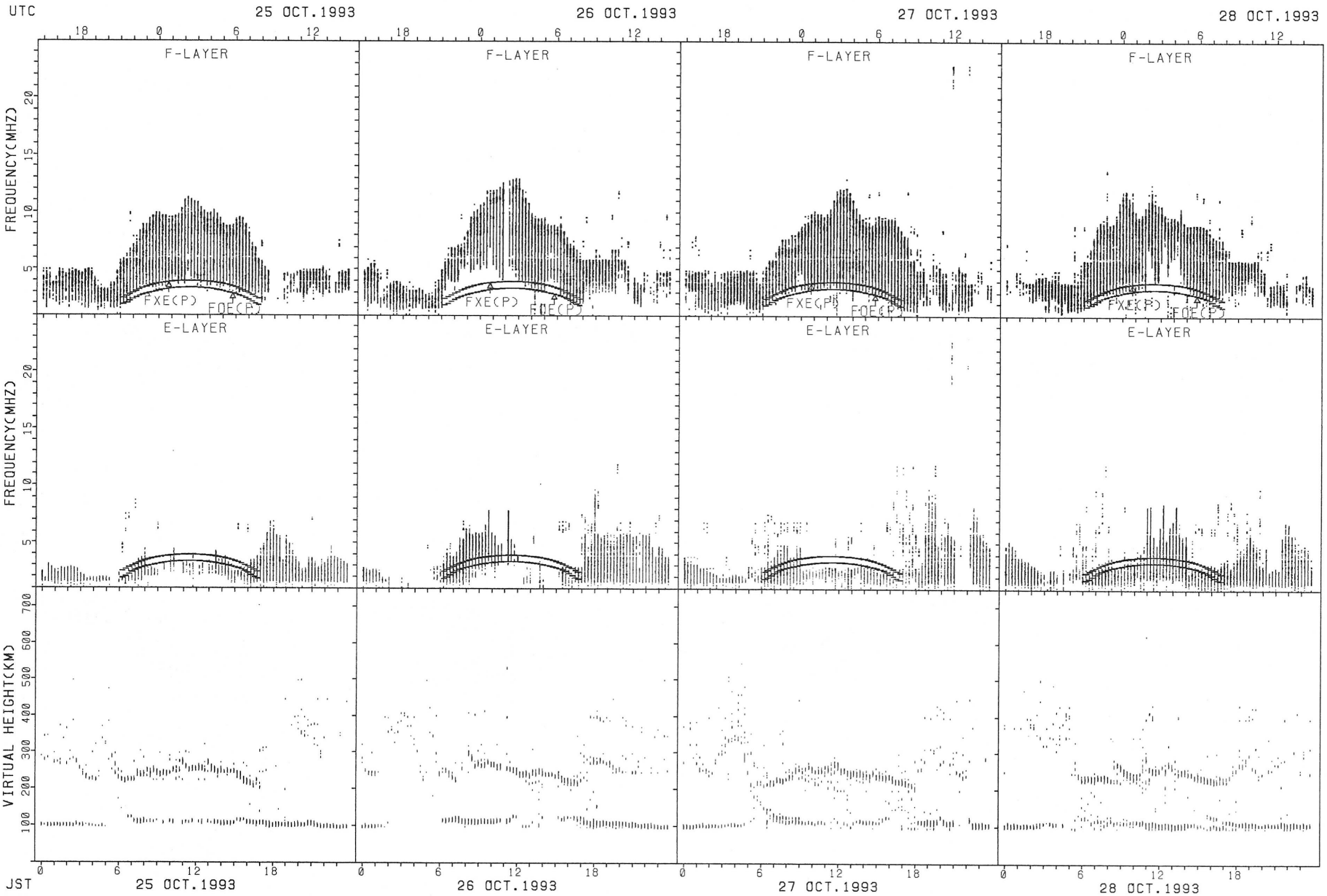

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
9 OCT.1993
10 OCT.1993
11 OCT.1993
12 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
13 OCT.1993
14 OCT.1993
15 OCT.1993
16 OCT.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

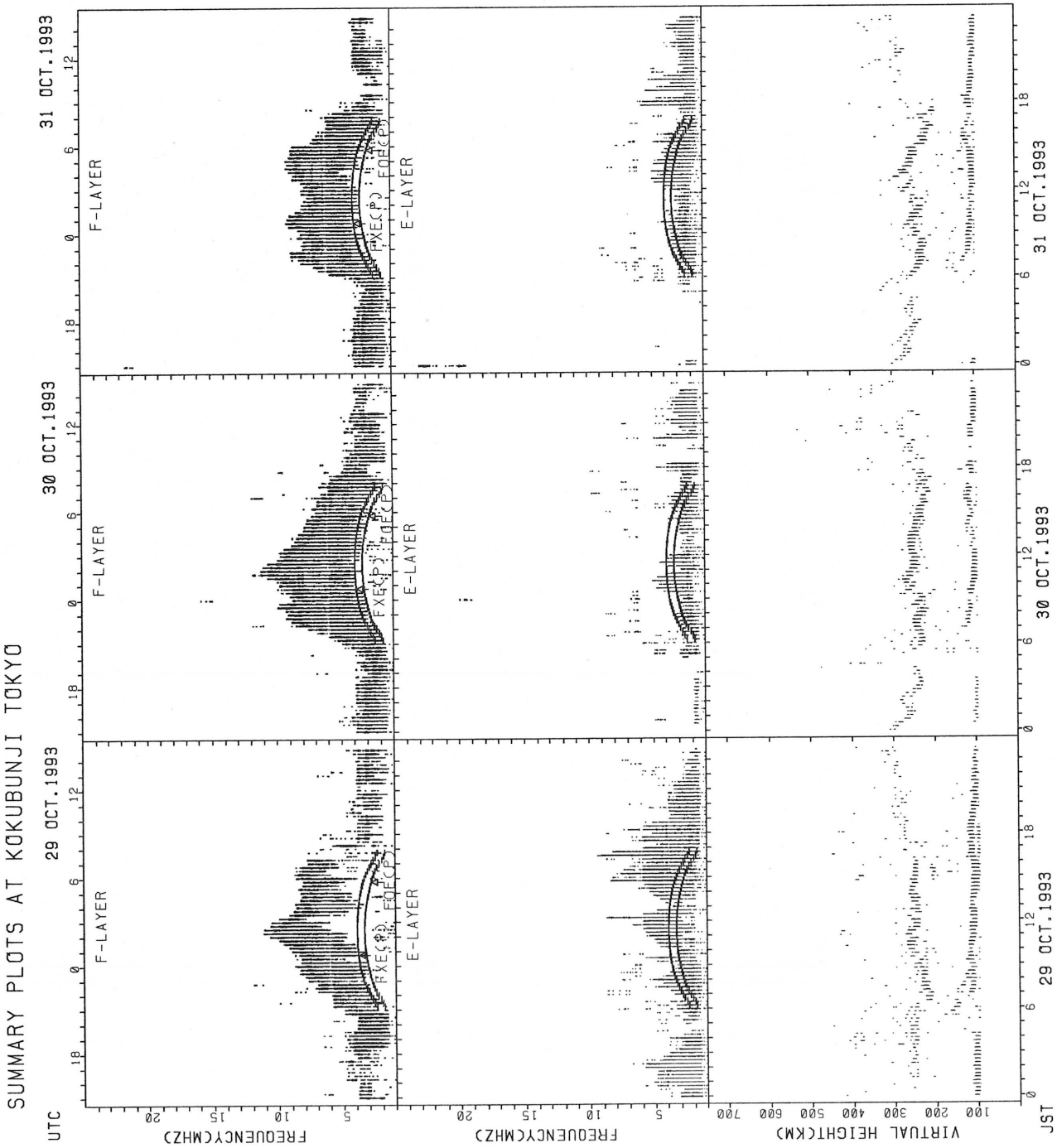

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
17 OCT.1993
18 OCT.1993
19 OCT.1993
20 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 OCT.1993
22 OCT.1993
23 OCT.1993
24 OCT.1993
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

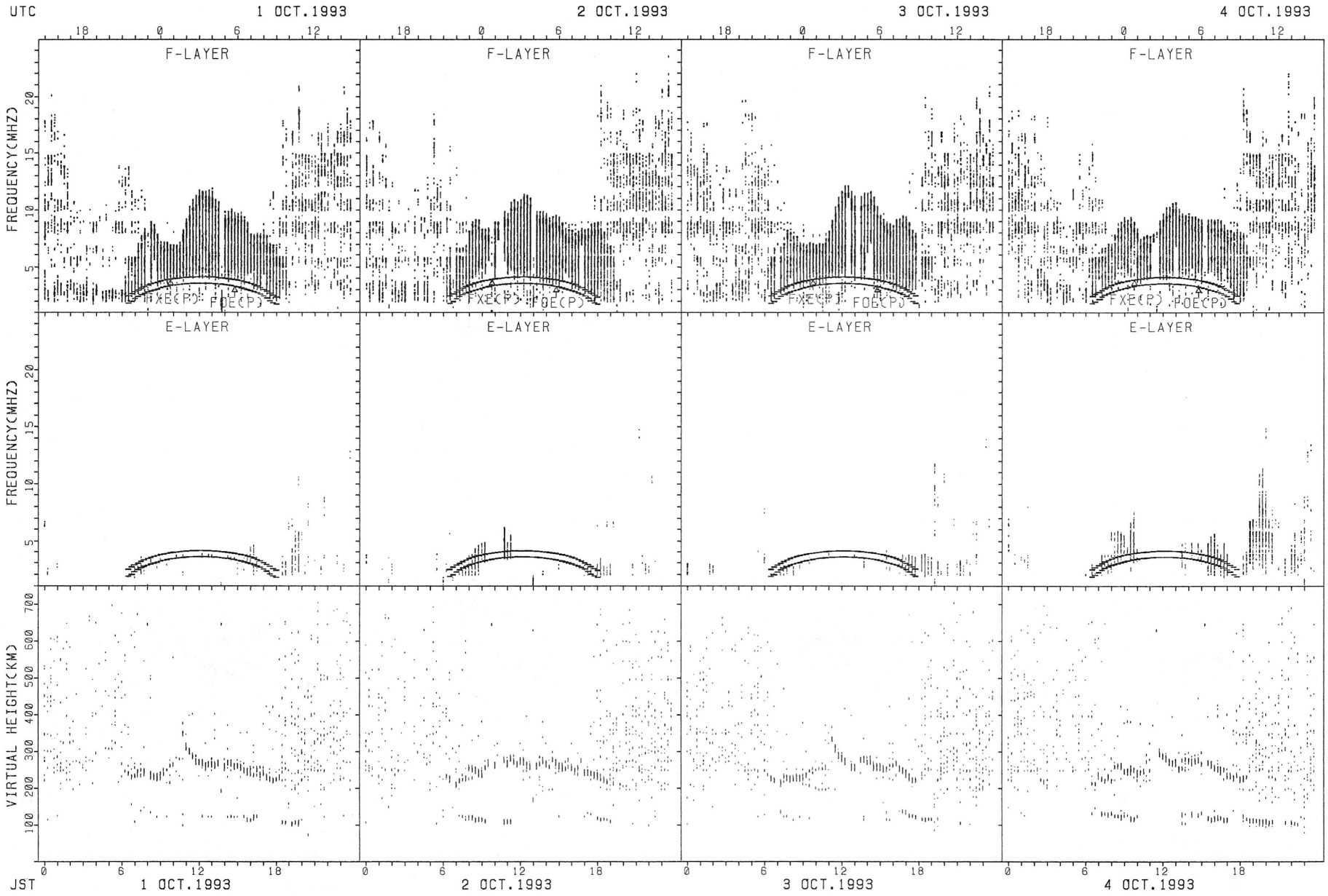
SUMMARY PLOTS AT KOKUBUNJI TOKYO



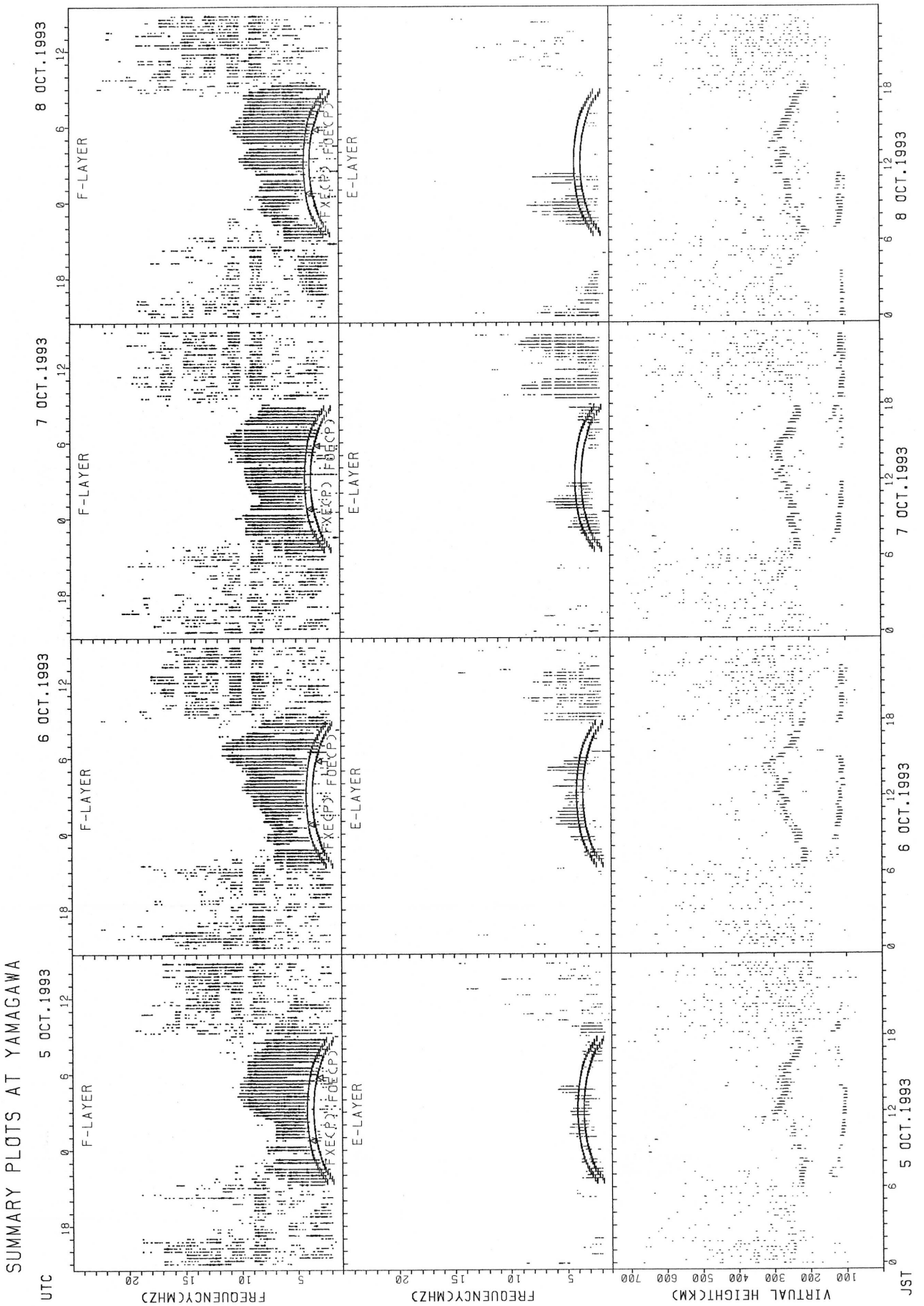
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

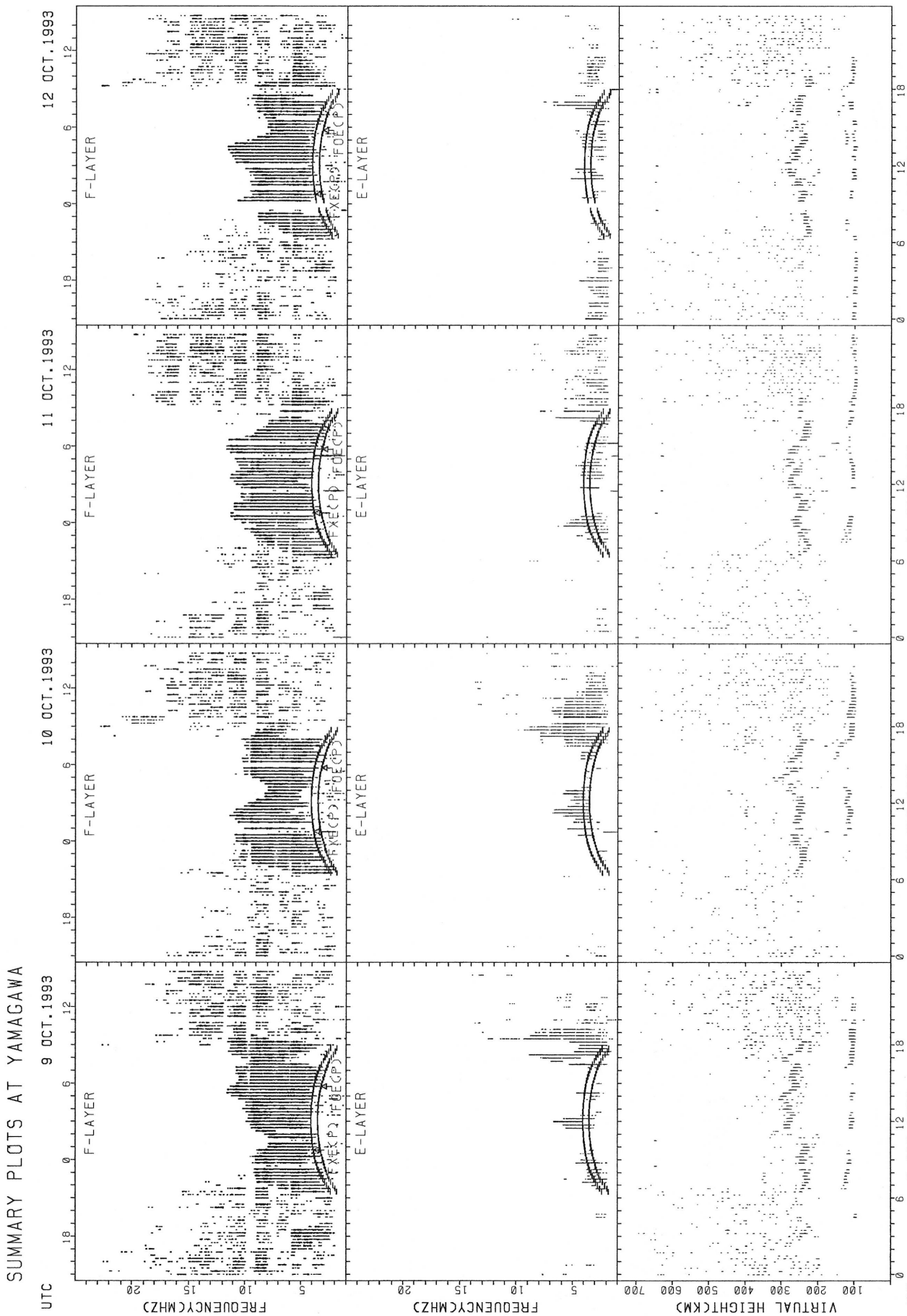

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
29 OCT.1993
30 OCT.1993
31 OCT.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

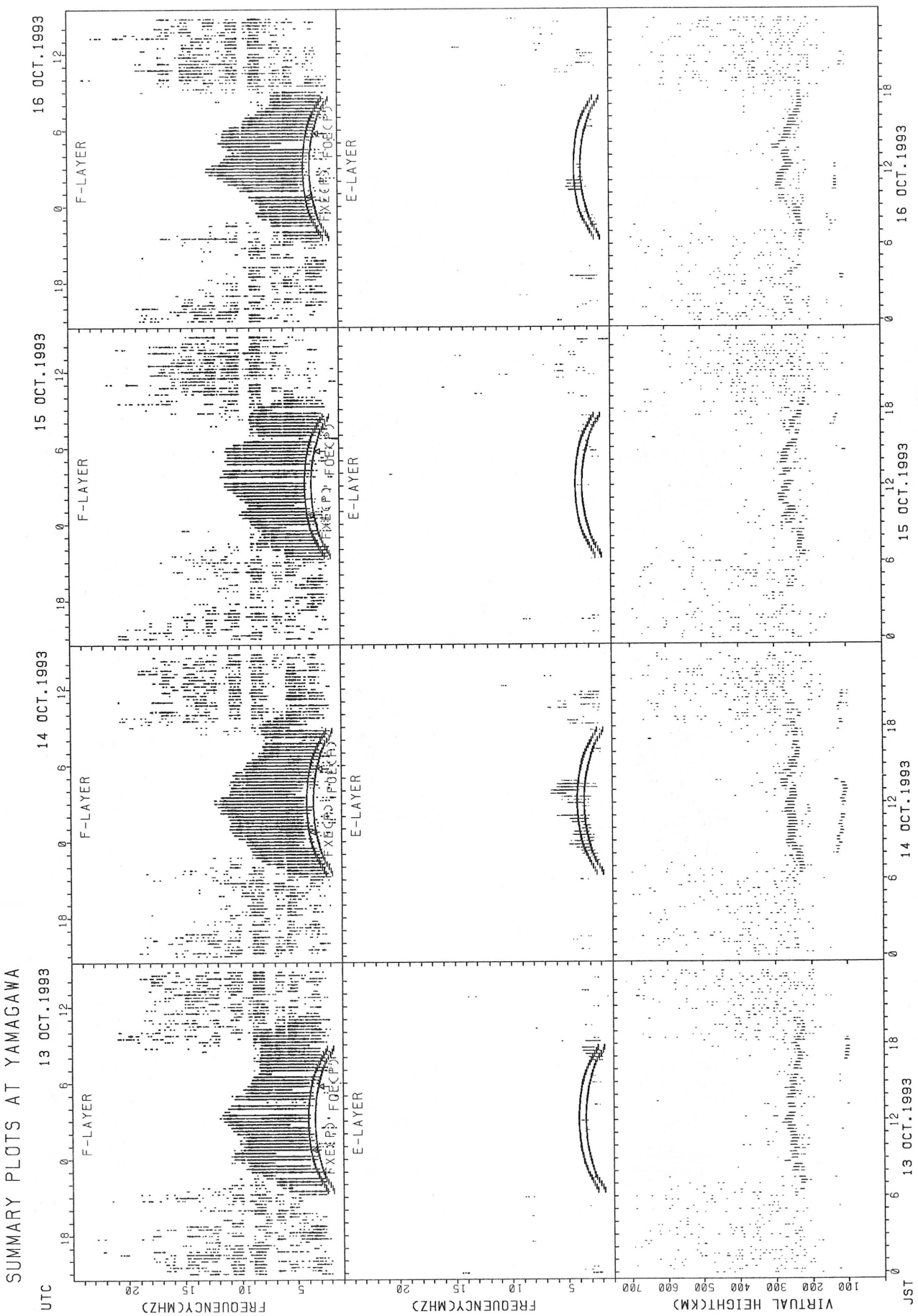
SUMMARY PLOTS AT YAMAGAWA



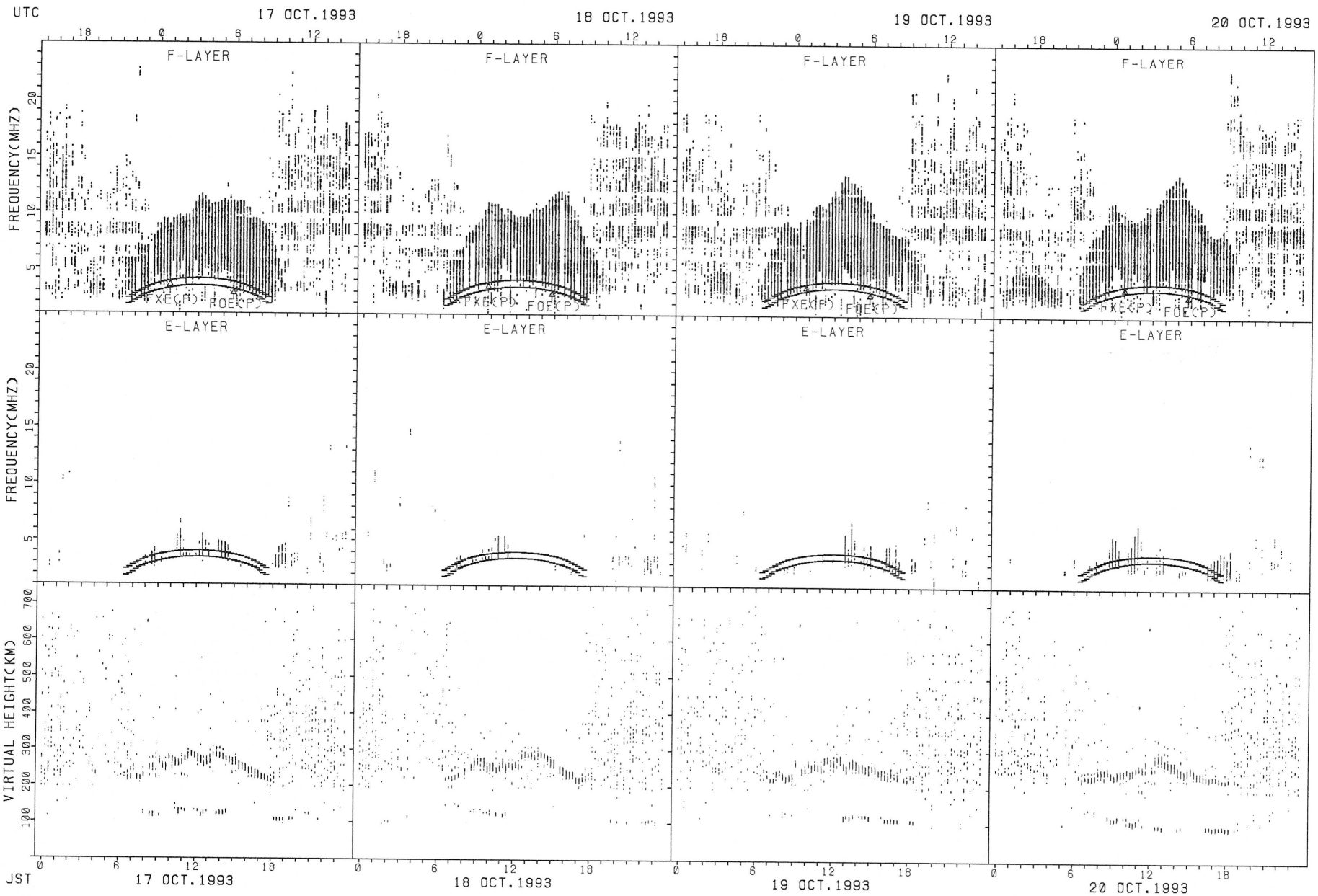
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
5 OCT.1993
6 OCT.1993
7 OCT.1993
8 OCT.1993
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

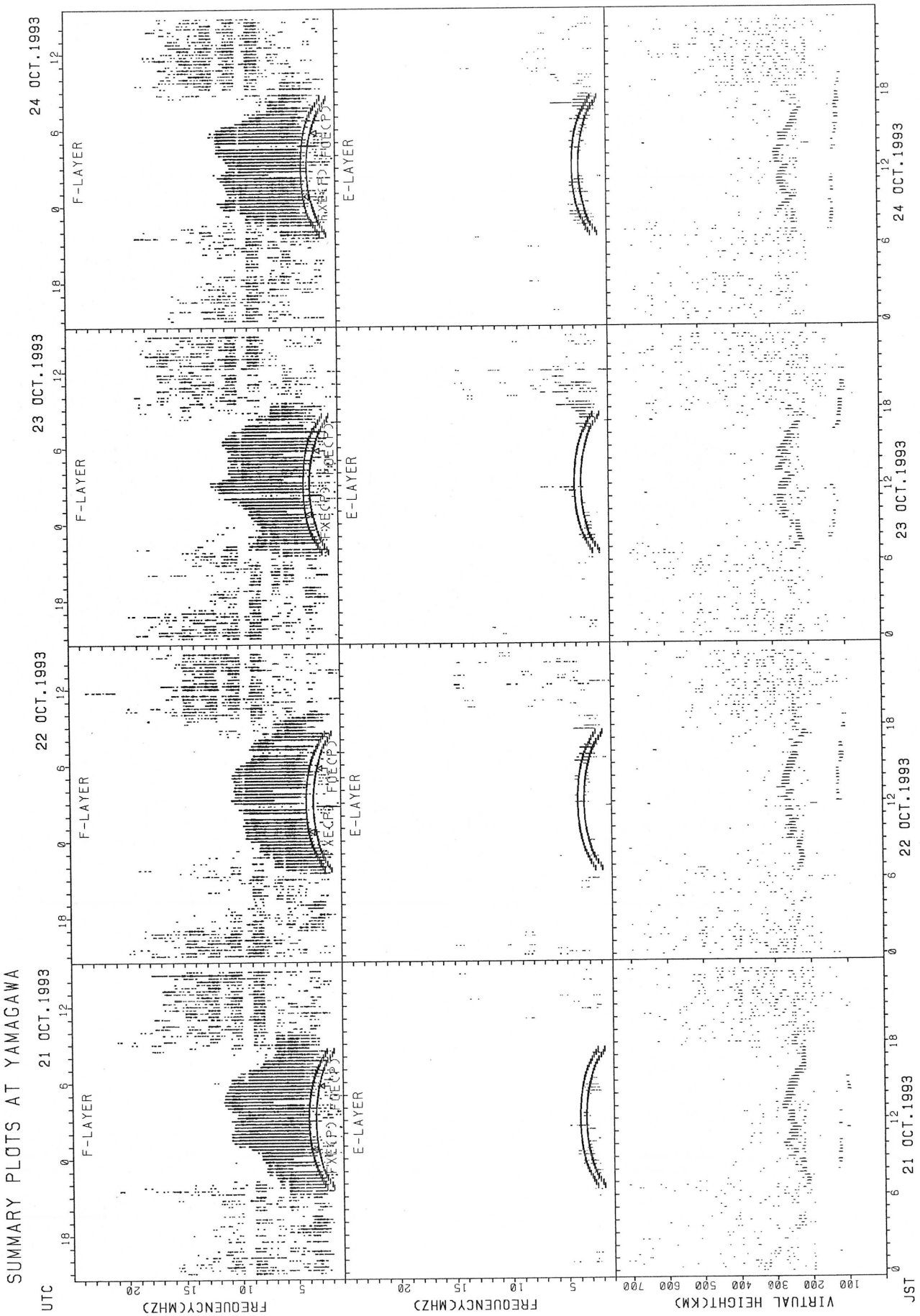

SUMMARY PLOTS AT YAMAGAWA
UTC
9 OCT.1993
10 OCT.1993
11 OCT.1993
12 OCT.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE
JST

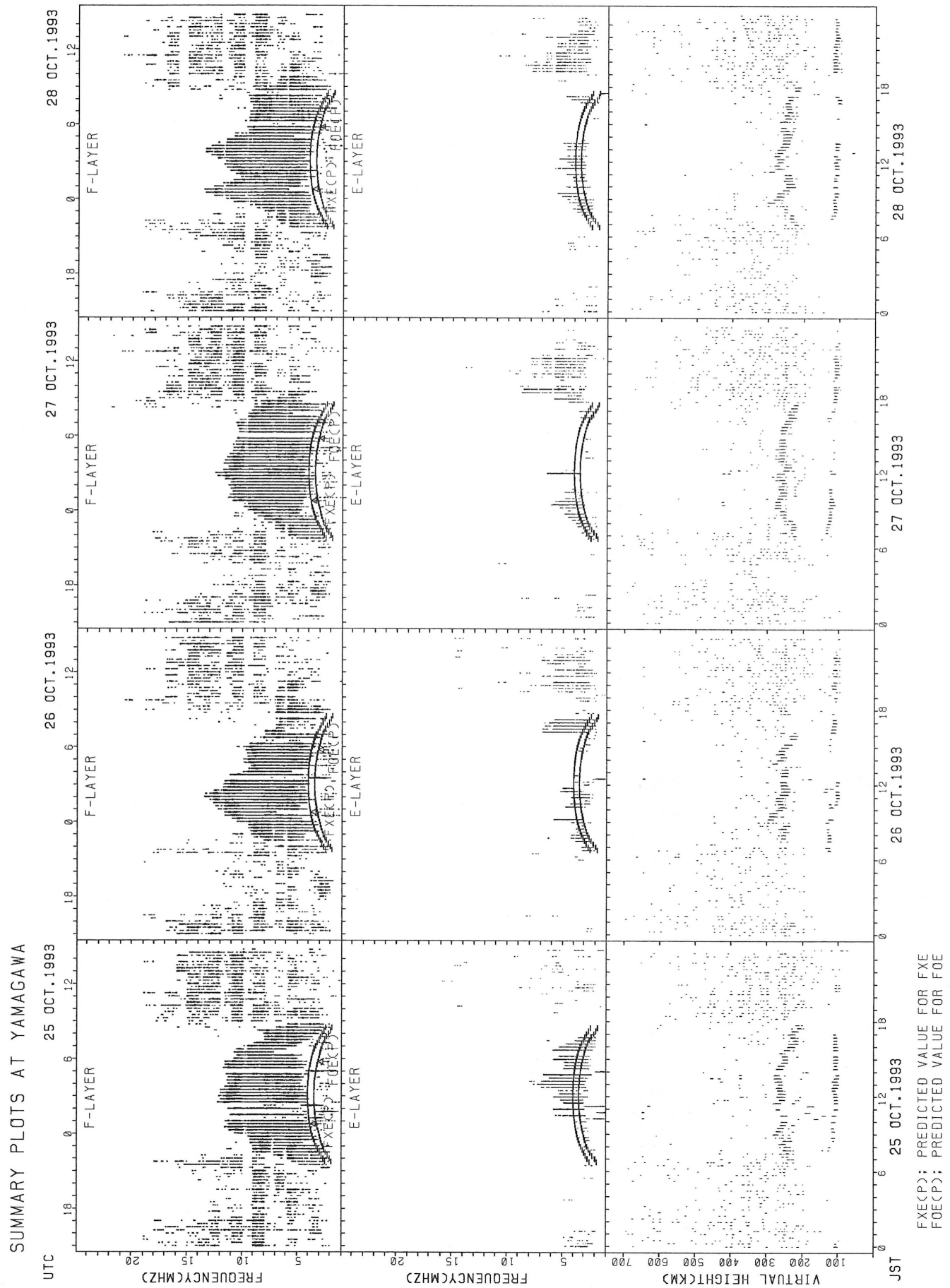

SUMMARY PLOTS AT YAMAGAWA
UTC
13 OCT.1993
14 OCT.1993
15 OCT.1993
16 OCT.1993
F-LAYER
E-LAYER
FXE(P), FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

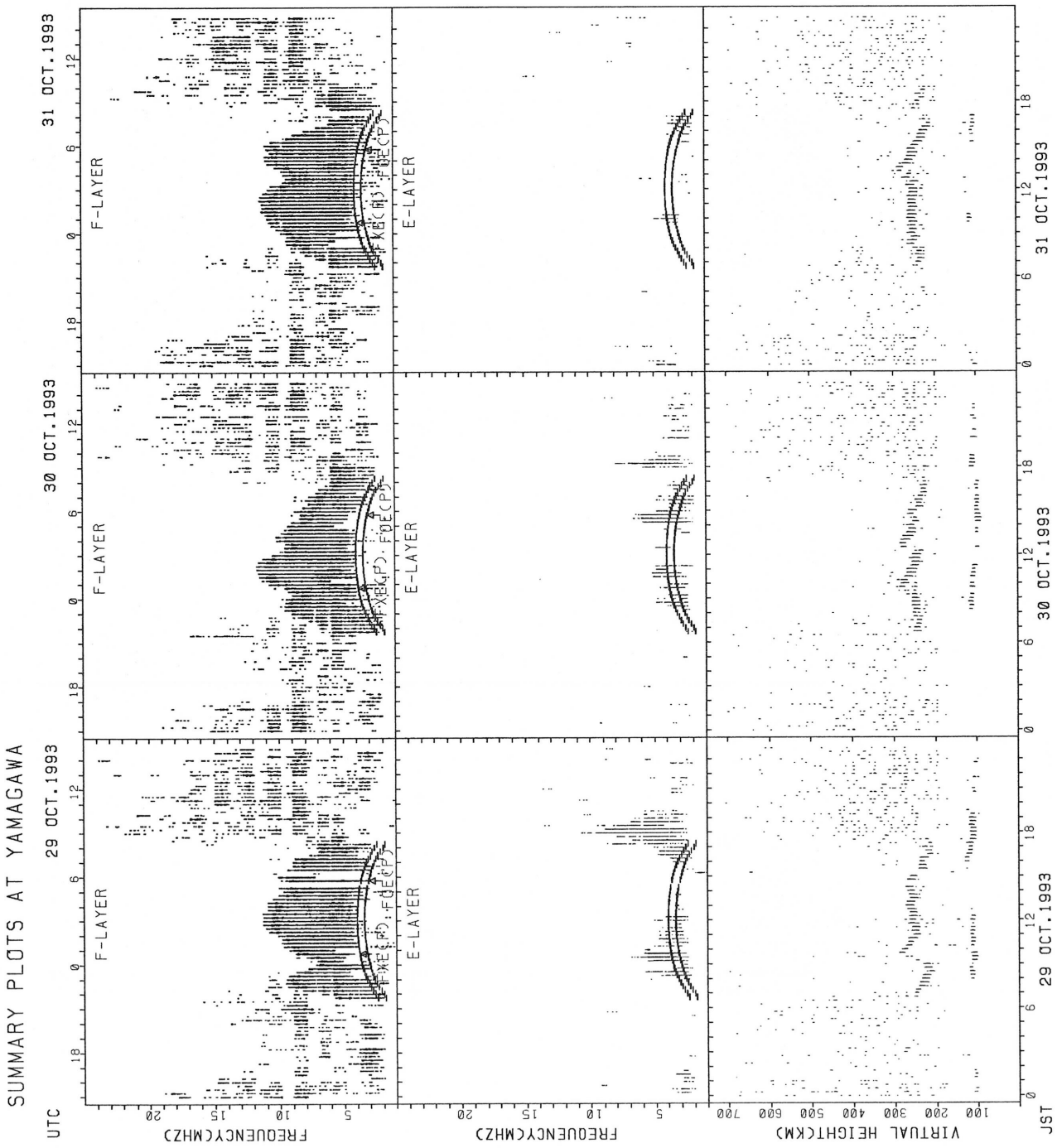
SUMMARY PLOTS AT YAMAGAWA



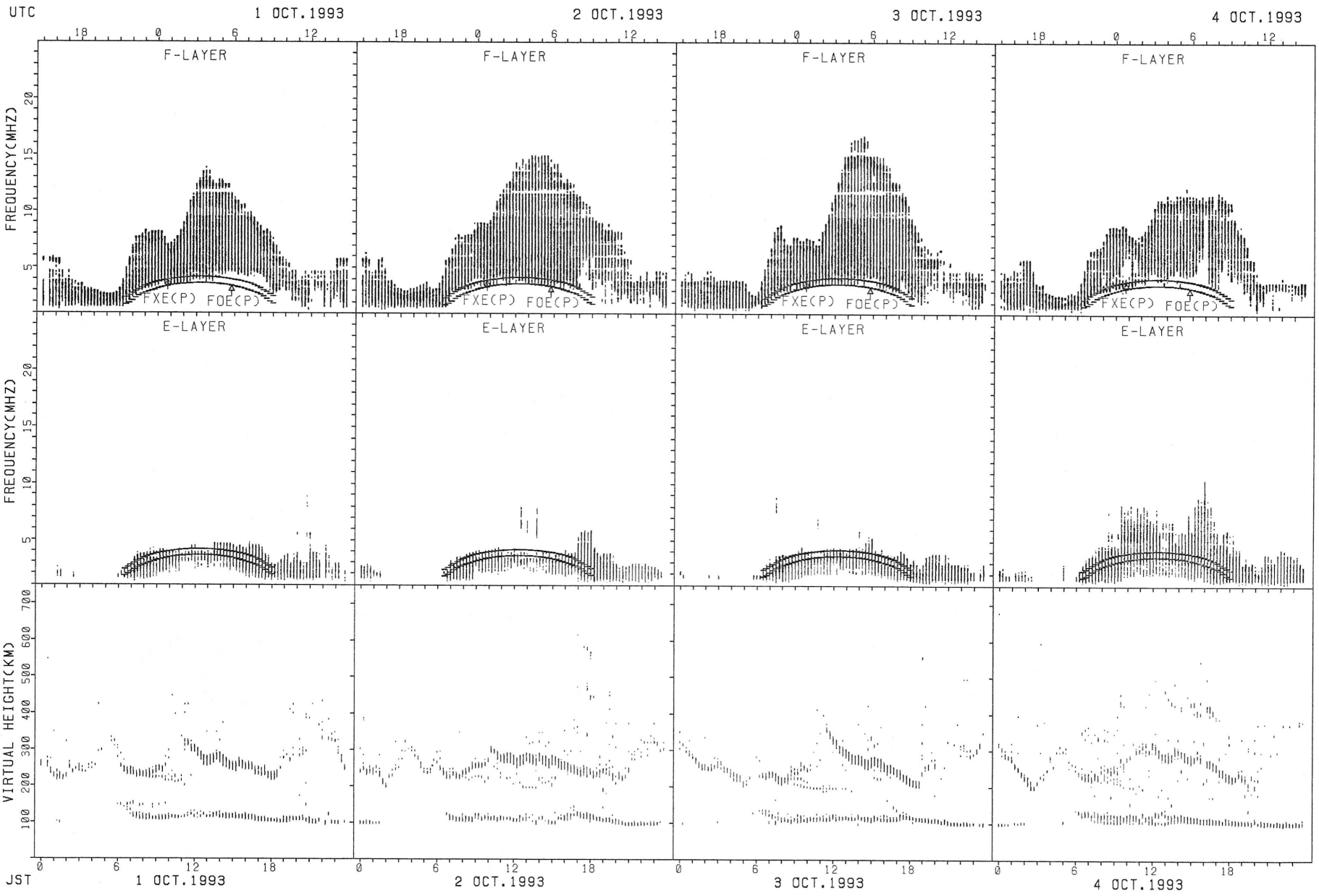
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
21 OCT.1993
22 OCT.1993
23 OCT.1993
24 OCT.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

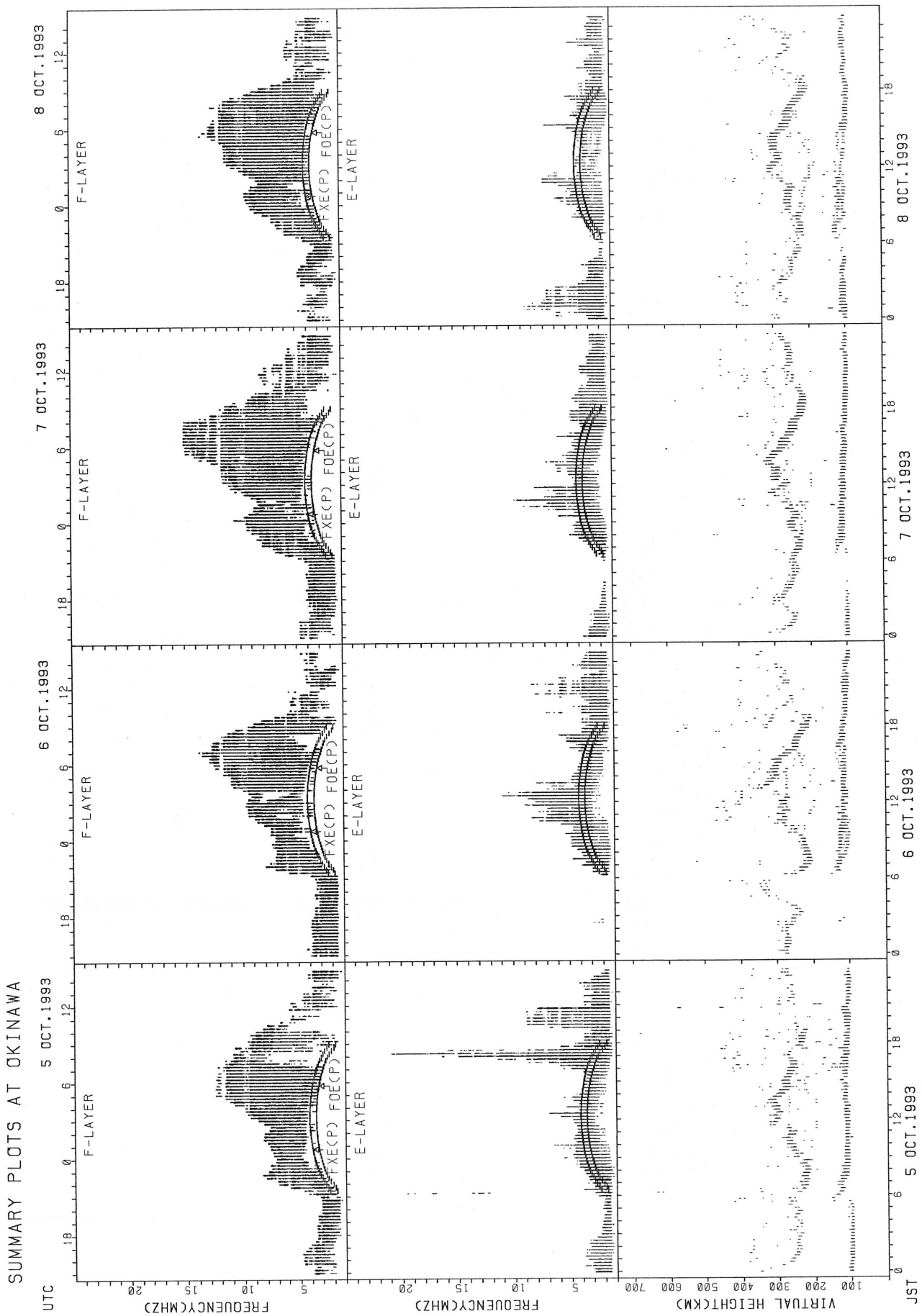

SUMMARY PLOTS AT YAMAGAWA
UTC
25 OCT.1993
26 OCT.1993
27 OCT.1993
28 OCT.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P), FOE(P)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

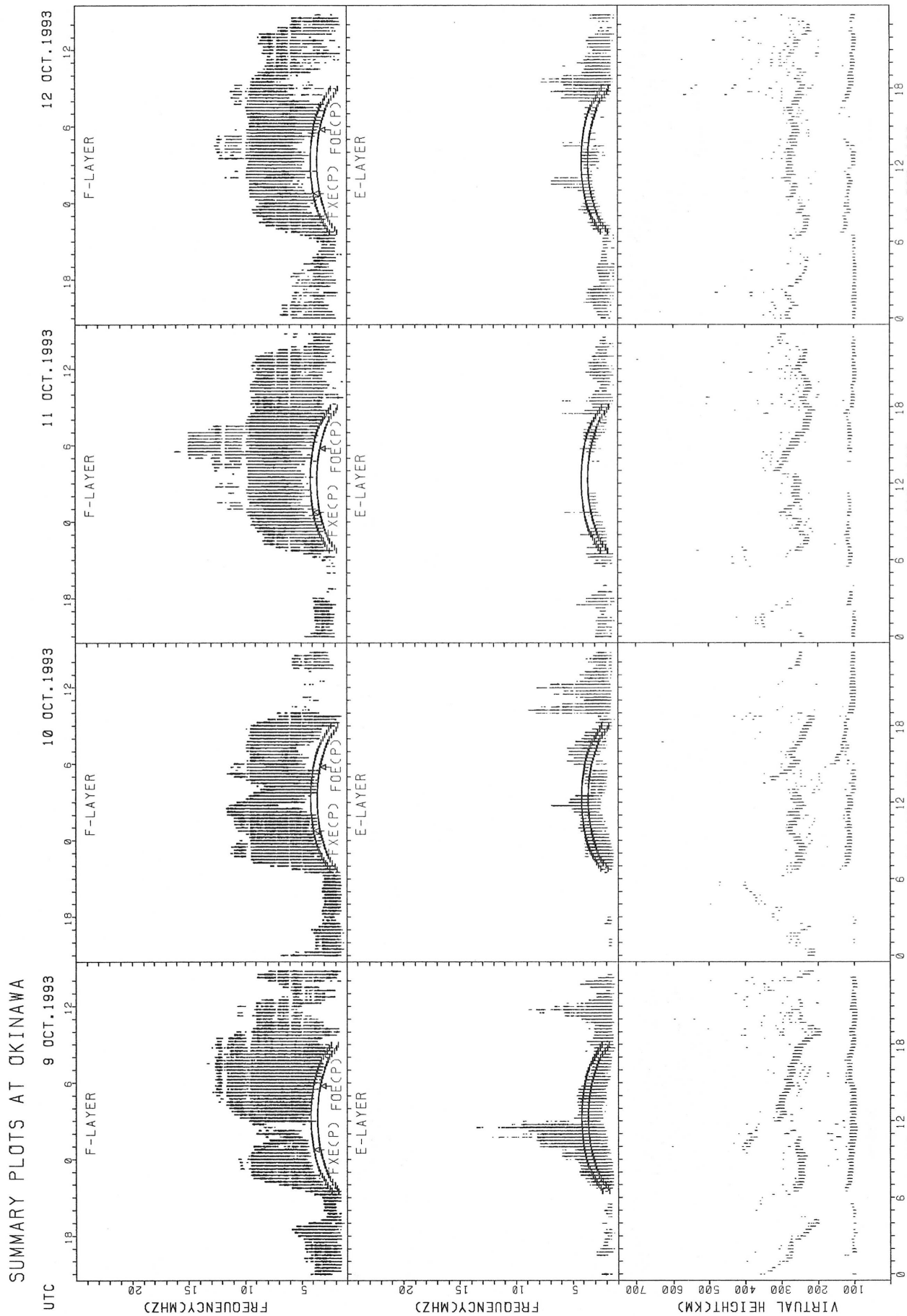

SUMMARY PLOTS AT YAMAGAWA
UTC
29 OCT.1993
30 OCT.1993
31 OCT.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P). FOE(P)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

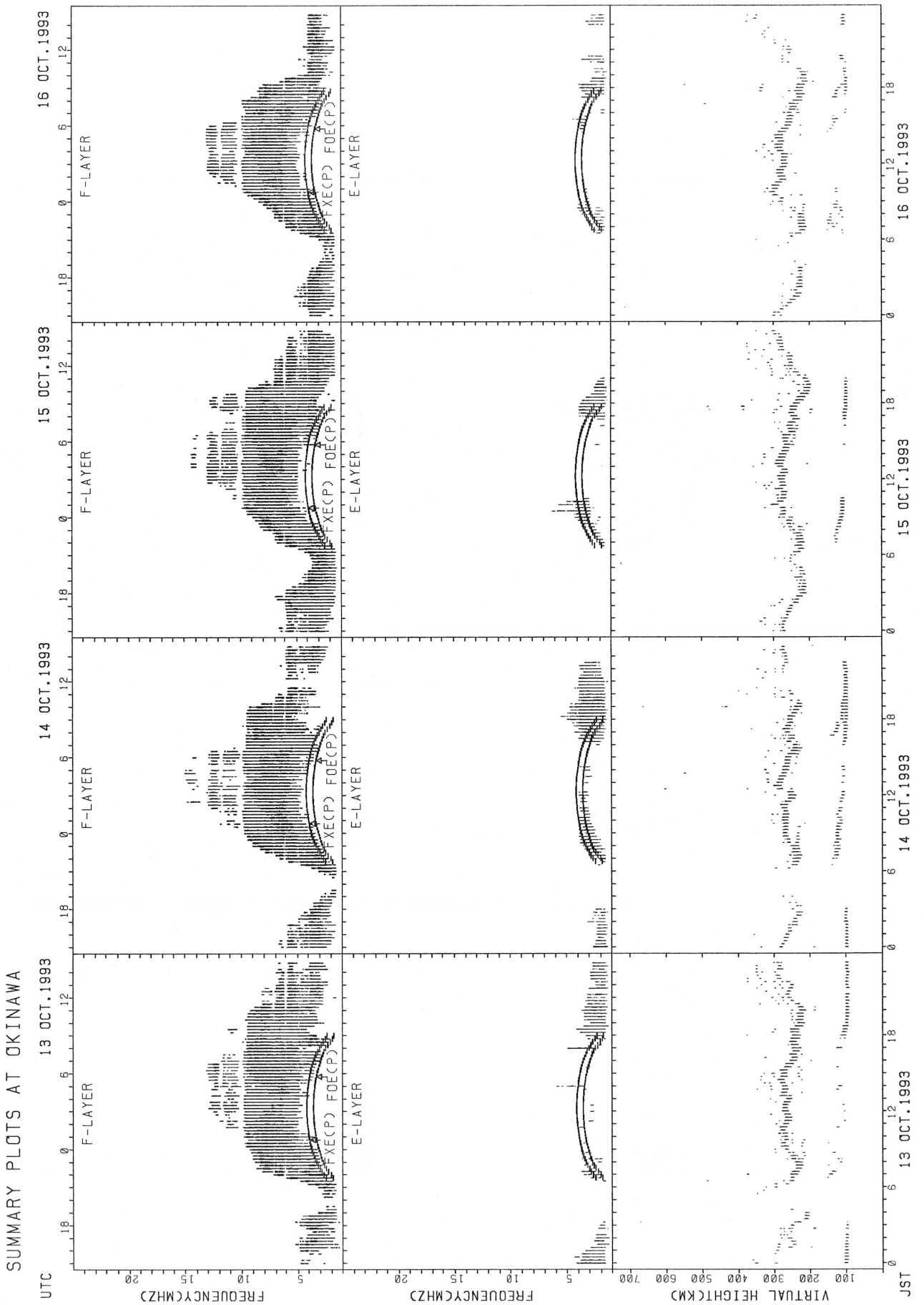
SUMMARY PLOTS AT OKINAWA



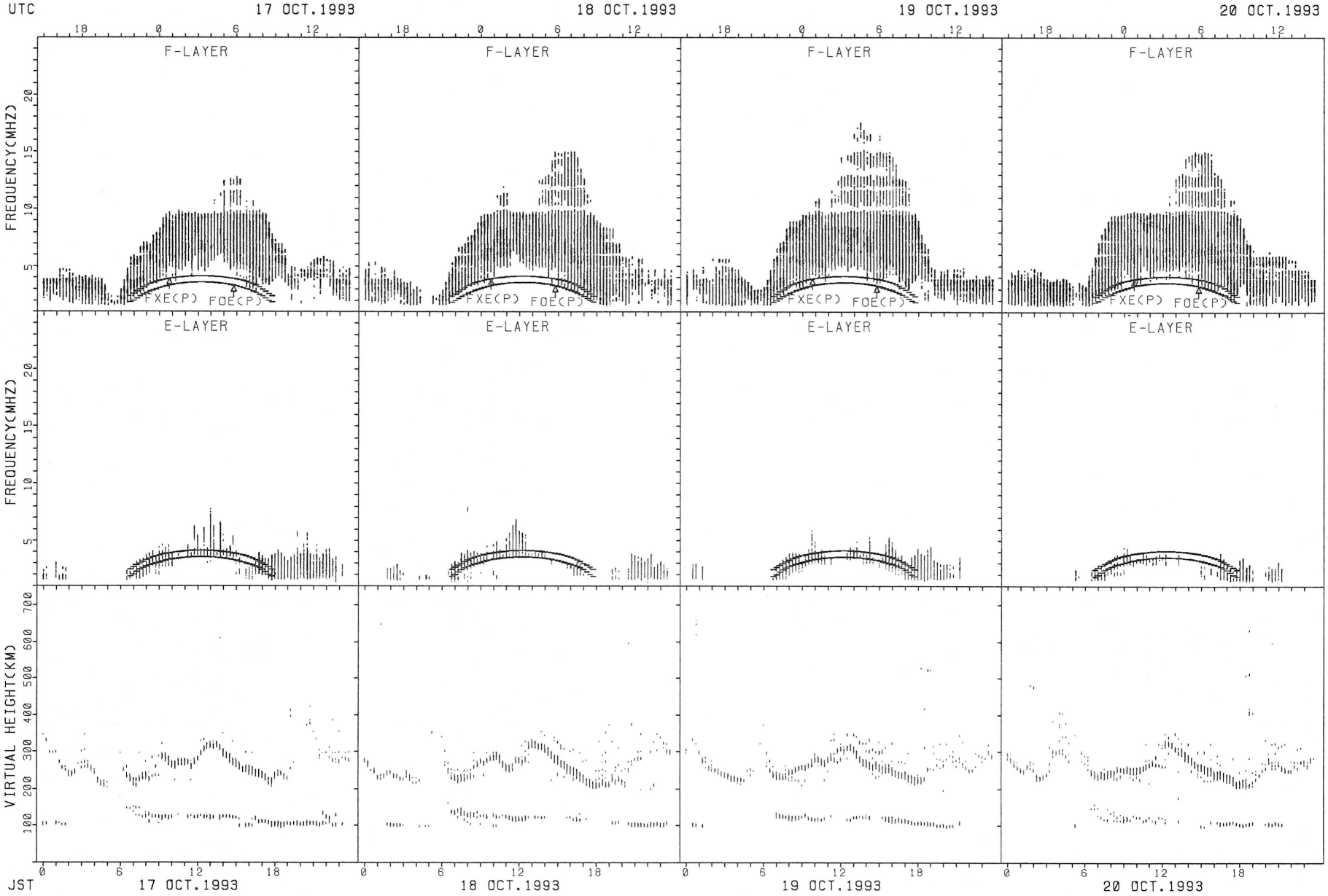
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
5 OCT.1993
6 OCT.1993
7 OCT.1993
8 OCT.1993
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
9 OCT.1993
10 OCT.1993
11 OCT.1993
12 OCT.1993
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

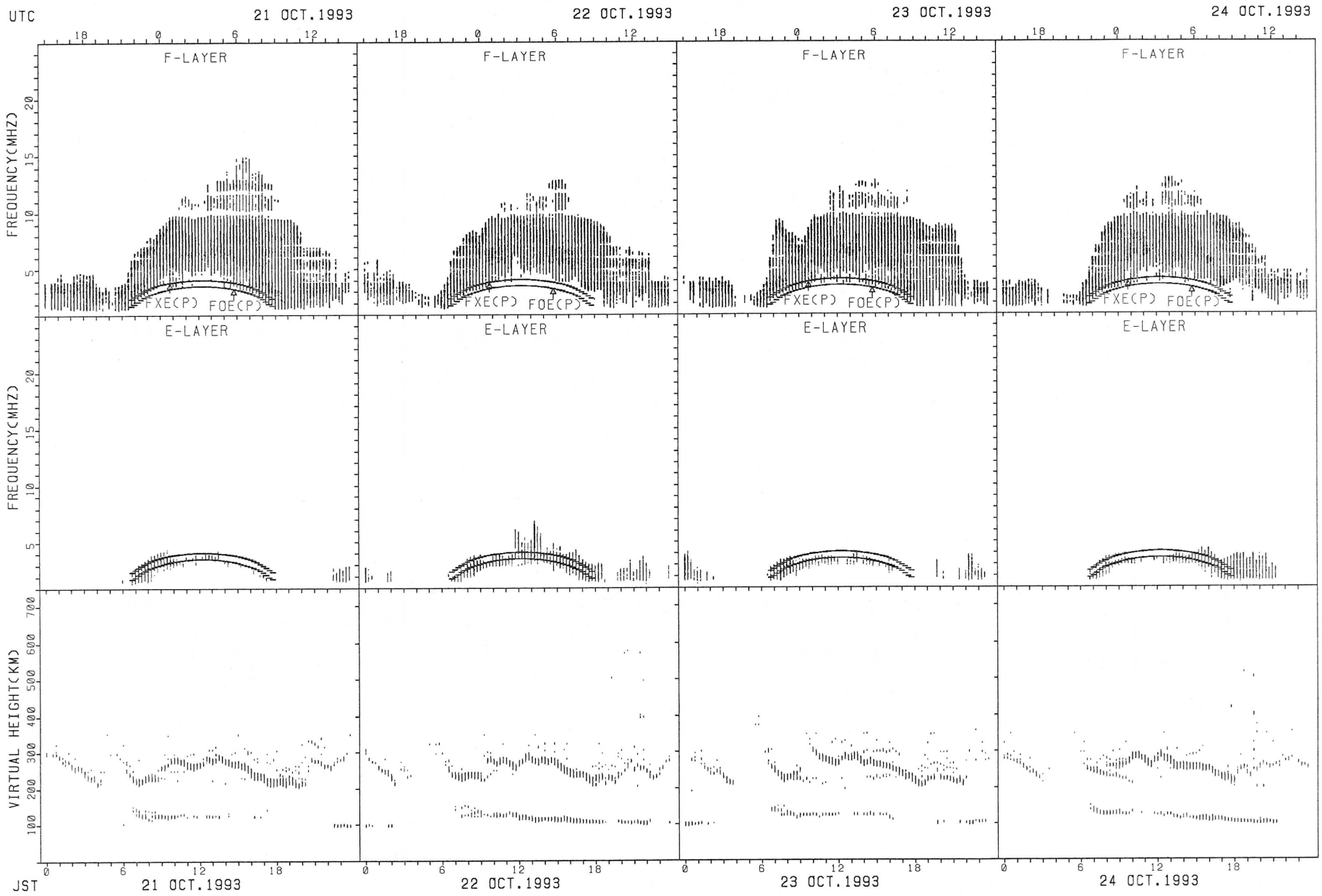

SUMMARY PLOTS AT OKINAWA
13 OCT.1993
14 OCT.1993
15 OCT.1993
16 OCT.1993
UTC
JST
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



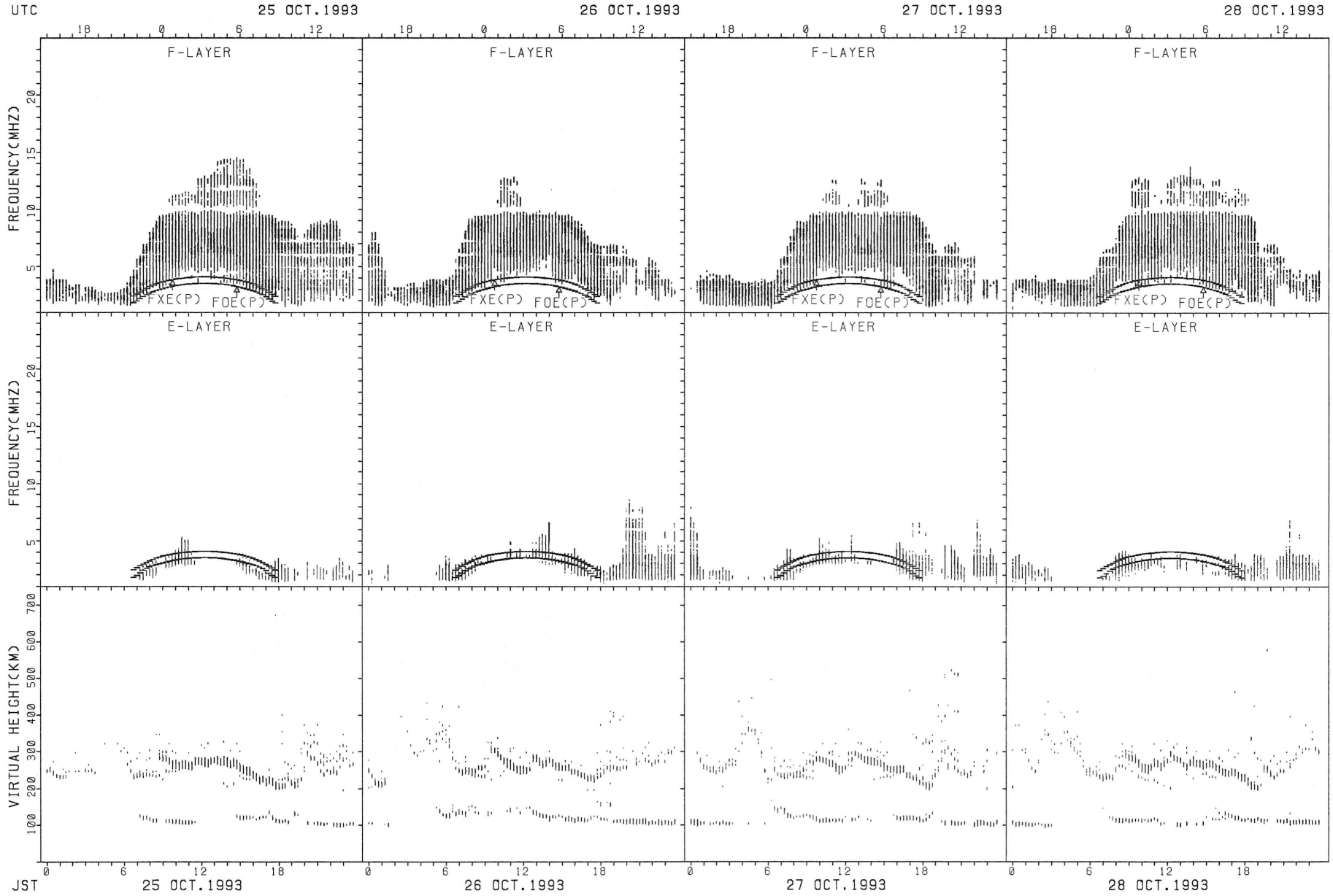
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

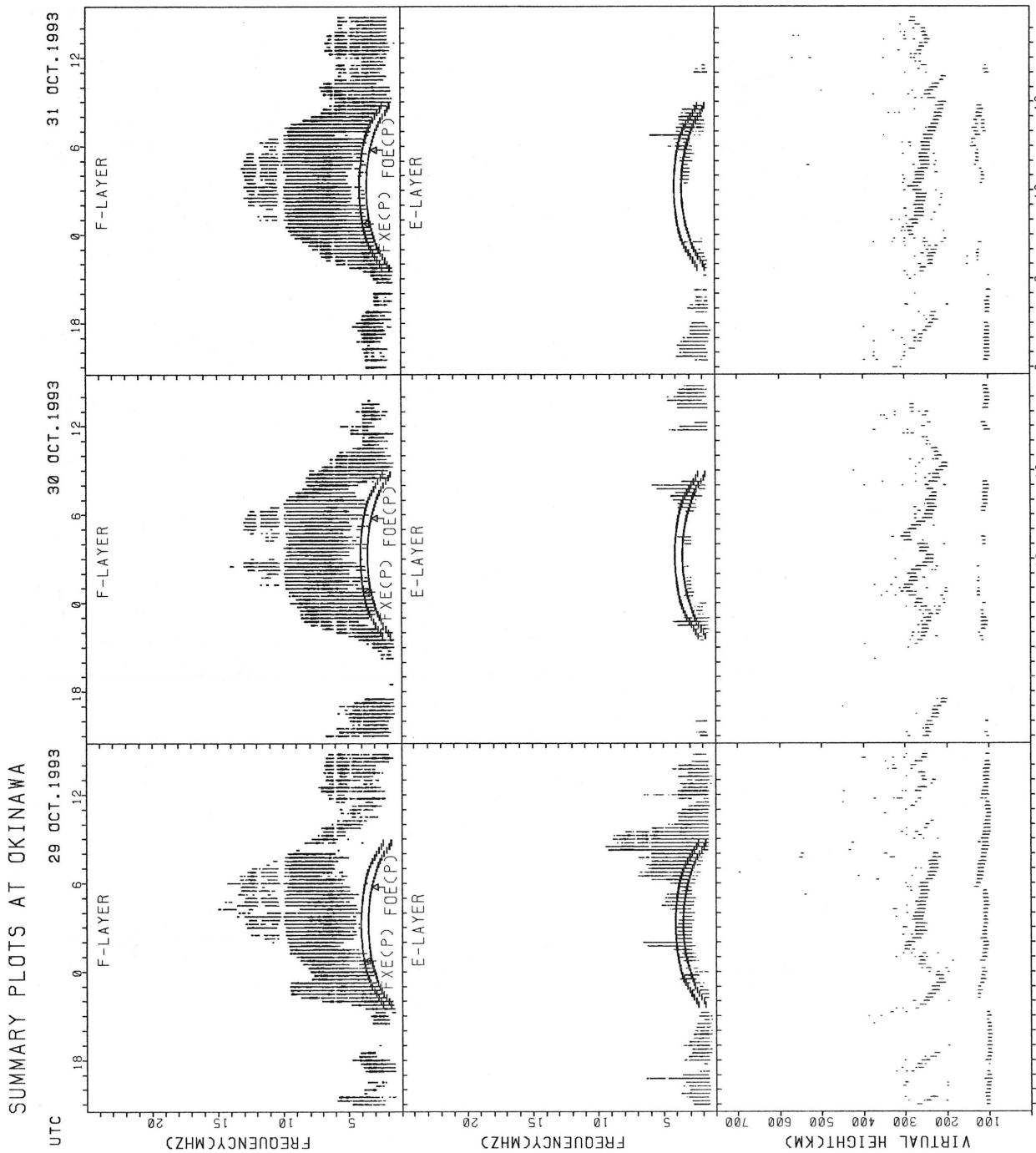


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
29 OCT.1993
30 OCT.1993
31 OCT.1993
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

MONTHLY MEDIANS OF H'F AND H'ES

OCT. 1993 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								14	27	23				13	28	29	30	11						
MED								247	248	254				256	261	258	249	258						
U Q								258	262	264				261	269	264	262	274						
L Q								234	238	236				243	250	248	240	244						

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	10	11		11	13	12	17	13									16	19	20	15	14	12	10
MED	108	108	109		115	115	124	119	119									113	117	111	113	109	109	107
U Q	129	111	127		125	120	142	129	121									122	121	117	119	113	113	109
L Q	105	105	105		111	109	117	114	111									110	111	108	107	107	107	107

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								24	29	22					21	31	27	19						
MED								243	242	244					254	250	246	244						
U Q								252	251	258					266	260	256	252						
L Q								232	233	236					250	238	236	236						

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	11	12				17	13	17	12	17	14	10	10	11		17	22	25	19	20	21	18	18
MED	103	103	103				137	119	117	113	111	112	110	110	111		121	113	109	109	107	107	105	103
U Q	105	105	106				155	136	120	122	116	117	115	115	115		129	119	113	115	110	111	107	107
L Q	100	101	102				110	117	113	111	109	109	105	105	107		112	107	106	105	105	105	103	101

MONTHLY MEDIANS OF H'F AND H'ES

OCT. 1993 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								22	26	29						28	29	23	19	14				
MED								250	241	252						252	244	244	254	310				
U Q								274	252	260						260	252	256	286	366				
L Q								240	236	242						247	236	234	238	248				

H'ES

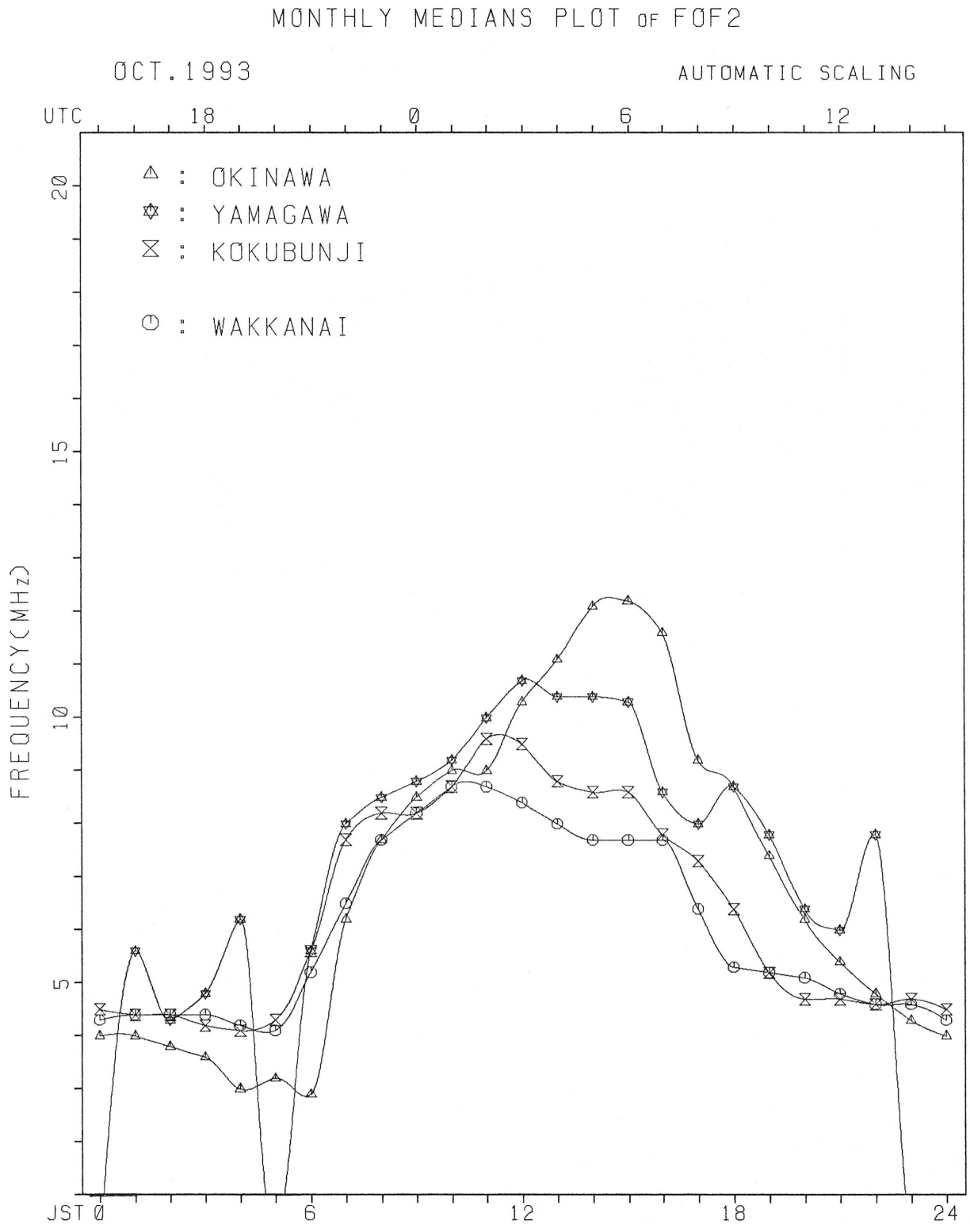
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									15	15	14	16	10					18	11		11			
MED									125	119	118	111	115					112	111		113			
U Q									131	129	125	114	119					117	117		117			
L Q									119	117	113	109	107					109	109		105			

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								14	29	30						24	30	31	29	15				
MED								253	248	260						256	246	234	234	238				
U Q								264	261	274						262	250	244	243	256				
L Q								242	234	250						251	238	226	226	230				

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	13	10				25	27	17	19	13	12	12	12	14	22	25	26	22	22	25	21	22
MED	103	103	103	104				135	123	121	115	117	118	116	117	118	117	113	109	107	103	105	103	103
U Q	107	107	105	105				139	131	125	119	124	120	124	119	125	125	118	113	113	111	110	106	105
L Q	101	101	99	101				127	115	114	113	112	112	105	107	115	111	110	107	105	101	102	101	101


MONTHLY MEDIANS PLOT OF FOF2
OCT.1993
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
◷ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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 47	X 46	X 45	X 46	X 39	X 34													X 59	X 54	X 54	X 52	X 54	X 57
2	X 51	X 47	X 44	X 43	X 41	X 40													X 70	X 57	X 49	X 49	X 49	X 51
3	X 48	X 45	X 44	X 47	X 43	X 46													X 66	X 48	X 49	X 49	X 49	X 49
4	X 48	X 49	X 49	X 47	X 40	X 40													X 64	X 56	X 52	X 53	X 48	X 49
5	X 51	X 51	X 48	X 49	48	45													X 60	X 58	59	60	57	56
6	X 53	X 52	X 47	X 47	X 45	48													X 54	X 49	X 50	X 54	58	X 61
7	X 51	X 47	X 45	48	X 47	X 49													X 61	X 53	X 56	X 54	X 53	52
8	53	54	54	57	56	55													X 64	X 49	X 56	X 48	X 41	X 43
9	X 44	X 47	X 50	X 47	X 40	X 41													X 109	X 87	X 45	X 43	X 43	X 40
10	X 43	X 43	X 33	X 38	X 38	X 38													X 69	X 47	O X 46	X 46	X 46	X 42
11	X 43	X 42	X 42	X 46	X 30	X 31													X 57	X 50	X 50	X 48	X 45	X 46
12	X 42	X 43	X 47	X 44	X 44	X 43													X 75	X 61	X 60	X 62	X 59	X 55
13	X 55	X 49	X 50	X 50	X 42	X 45													X 67	X 60	X 48	X 52	X 54	X 53
14	X 45	X 45	X 46	X 49	X 37	X 40													X 65	X 59	X 59	X 59	X 59	X 53
15	X 50	X 50	X 48	X 48	X 48	X 49													X 55	X 43	X 47	X 47	X 48	X 46
16	X 45	X 45	X 43	X 42	X 43	X 37													X 46	X 47	X 46	X 46	X 46	X 48
17	X 47	X 48	X 47	X 47	X 48	X 45													X 59	X 49	X 51	X 51	X 48	54
18	X 54	51	X 47	X 43	X 43	X 40													X 57	X 49	X 53	X 50	X 48	X 50
19	X 54	X 54	X 54	X 55	51	X 47													X 61	X 55	X 48	50	50	50
20	52	51	X 47	49	49	50													X 69	X 55	X 45	X 46	X 45	X 45
21	X 45	X 46	X 47	X 54	X 46	X 41													X 52	X 51	X 53	X 50	X 47	X 48
22	X 50	X 49	X 50	X 48	X 44	X 39													X 48	X 46	X 48	X 50	X 48	50
23	50	49	50	47	X 40	X 39													X 68	X 62	X 57	X 44	X 39	X 41
24	X 42	42	43	47	X 32	X 29													X 48	X 50	X 48	50	X 48	X 44
25	X 45	X 46	X 46	X 47	X 43	X 35													A	49	50	50	X 47	X 48
26	X 49	X 47	X 40	X 37	X 33	O X 27													X 68	X 66	X 64	X 49	A	48
27	X 44	X 49	X 42	49	46	50													X 54	X 48	X 49	X 53	X 45	X 47
28	X 47	X 44	X 41	X 41	43	X 40													X 63	X 63	X 49	X 44	A	X 47
29	X 39	X 41	A	44	X 43	X 40													X 43	X 43	X 44	X 41	X 40	X 41
30	X 41	X 44	X 41	X 40	X 33	X 34													X 48	X 45	X 47	X 45	X 41	X 39
31	X 41	X 40	X 41	X 39	X 37	X 33													X 36	X 34	X 34	X 39	X 39	X 40
	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													30	31	31	31	29	31
MED	X 47	X 47	X 46	X 47	X 43	X 40													X 60	X 50	X 49	X 50	X 48	X 48
U Q	X 51	X 49	X 48	X 49	46	46													X 67	X 58	X 54	X 52	X 52	X 52
L Q	X 44	X 44	X 43	X 43	X 39	X 37													X 54	X 48	X 47	X 46	X 45	X 44

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	42	40	39	40	33	28	49	62	81	70	74	89	101	88	82	73	72	65	53	48	48	46	48	51
2	45	41	38	37	35	34	60	61	69	78	74	73	79	76	72	79	69	75	64	51	43	43	43	45
3	42	39	38	41	37	40	55	77	66	69	75	80	85	86	80	78	77	73	60	42	43	43	43	43
4	42	43	43	41	34	34	49	58	72	73	80	85	75	83	73	82	69	64	58	50	46	47	42	43
5	45	45	42	43	F 40	F 35	56	66	77	66	70	70	87	91	80	85	73	64	54	52	F 50	F 48	F 47	F 50
6	47	46	41	41	39	F 39	59	V 67	V 70	65	69	78	84	81	89	96	100	76	48	43	44	J R 48	F 51	55
7	45	41	39	F 40	41	43	66	75	89	86	90	83	84	79	79	85	78	70	55	47	50	48	Z 47	45
8	F 44	45	F 46	F 48	F 48	F 48	70	77	84	65	73	89	77	78	84	88	86	82	58	43	50	42	35	37
9	38	41	44	41	34	35	57	87	74	76	85	85	78	86	94	90	90	98	103	81	39	37	37	34
10	37	37	27	32	32	32	53	98	104	88	105	96	81	U R 65	79	82	89	79	63	41	40	40	40	36
11	37	36	36	40	24	25	46	79	98	77	92	99	91	82	92	90	72	63	51	44	44	42	39	40
12	36	37	41	38	38	37	54	72	83	97	91	93	95	88	78	68	69	81	69	55	54	56	53	49
13	49	43	44	44	36	39	64	78	88	90	82	102	H 89	82	80	74	76	72	61	54	42	46	48	47
14	39	39	40	43	31	34	56	69	82	87	101	111	100	82	86	82	73	69	59	53	53	53	53	47
15	44	44	42	42	42	43	62	71	85	77	83	95	89	88	88	81	79	79	48	37	41	41	42	40
16	39	39	37	36	37	31	54	71	92	78	75	96	104	93	102	91	77	62	40	41	40	40	40	42
17	41	42	41	41	42	39	56	65	80	79	79	101	109	93	80	86	83	71	53	43	45	45	42	F 46
18	48	44	41	37	37	34	56	R 74	79	91	104	109	99	89	91	97	88	73	51	43	47	44	42	44
19	48	48	48	49	F 42	41	60	73	91	101	89	105	108	97	79	80	89	70	55	49	42	F 41	F 40	F 40
20	F 44	43	41	F 42	F 40	F 41	54	62	88	106	105	102	88	95	102	84	73	73	R 63	49	39	40	39	39
21	39	Z 40	41	48	40	35	50	70	70	80	89	104	97	96	96	85	74	60	46	45	47	44	41	42
22	44	43	44	42	38	33	48	75	82	84	88	95	87	87	91	86	80	71	42	40	42	J R 44	V 42	41
23	F 42	41	F 40	F 40	34	33	51	83	81	77	87	R 106	113	80	97	94	83	68	62	57	52	38	33	35
24	36	F 34	F 34	F 37	R 25	23	46	R 65	90	J R 109	86	100	100	87	104	111	70	51	42	44	42	F 42	42	38
25	39	40	40	41	37	29	50	67	83	96	91	107	103	98	85	89	76	52	I A 41	40	F 43	F 42	41	42
26	43	41	34	31	27	21	42	69	V 73	101	114	I C 122	123	97	89	82	69	54	62	60	58	43	I A 40	F 42
27	38	43	36	F 39	F 36	F 41	42	62	72	82	98	96	117	106	88	89	91	77	48	42	43	47	39	41
28	41	38	34	35	34	34	53	81	85	111	98	106	101	93	84	84	75	67	57	57	43	38	I A 38	41
29	33	35	I A 37	36	37	34	43	58	72	81	84	102	100	81	78	81	72	I A 54	37	37	38	35	34	35
30	35	38	35	34	27	28	41	70	87	82	92	107	93	81	73	66	65	61	42	39	41	39	35	33
31	35	34	35	33	31	27	40	75	73	75	84	74	74	81	86	81	59	54	30	28	28	33	33	34
	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	42	41	40	40	37	34	54	71	82	81	87	96	93	87	85	84	76	70	54	44	43	43	41	42
U Q	44	43	42	42	40	39	57	77	88	91	92	105	101	93	91	89	83	75	61	52	48	46	43	45
L Q	38	38	36	37	33	31	48	65	73	76	79	85	84	81	79	81	72	62	46	41	41	40	39	38

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	U L 440	U L 470	L 480	U L 500		L	L	L							
2									L	U L 450	L	L	U L 480	L	L	U L 420								
3								L	U L 410	L	U L 500	U L 550	U L 480	U L 470	U L 470	L								
4								310	L	U L 440	L	L 460	L	L	L	L								
5								L	U L 420	L	U L 470	U L 450	L 490	L 480	L	U L 420								
6									L	L	L	U L 470	L 480	L	L	U L 430	U L 340							
7								L	L	U L 450	U L 470	U L 500	L	L	L	U L 440								
8									U L 430	U L 440	U L 500	L	U L 480	L	L	L	L							
9									L	L	U L 500	U L 480	L	U L 500	U L 470	L								
10								L			L													
11								L	L	U L 440	L 480	460	L 430	L	U L 470	L	L							
12								L	L	U L 430	L 470	L	U L 500	L	L									
13									L	L	L 460	L 430	L	L	U L 500	L								
14									L	L	U L 470	L 480	L 470	L	L									
15								L	L	L	L 480	L 500	L	L	L	L								
16									L	L		U L 500	U L 480	L	U L 470	L								
17									L	L	U L 460	L	U L 470	L	L									
18										U L 480	L 470	U L 480	U L 440	L	L	L								
19									L	L	U L 430	L	L	L		L								
20									L	L	L	U L 480	L	L	U L 440	L								
21										L	U L 440	L 460	U L 440	L	L	U L 400								
22									L	L	L	L		L	U L 480	L								
23								L	L	L	L	U L 540	U L 480	L	U L 480	L								
24									L		L	L	L	U L 480	L	L								
25										L	L	L 500	L	U L 490	U L 430	L	L							
26													L 410		L		300							
27										L	L	L	L 500	U L 440	L	L	L							
28									L	U L 480	U L 470				L	L								
29									L	U L 420	L			L										
30									L	L	U L 490	L 450	L	U L 440	L	L								
31									L	U L 390	L	U L 450	U L 460	430	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	3	11	17	19	16	9	9	5	2							
MED								310	U L 420	U L 440	U L 470	U L 480	U L 480	U L 470	U L 470	U L 420	320							
U Q									U L 430	U L 450	U L 485	U L 500	U L 485	U L 485	U L 480	U L 435								
L Q									U L 410	U L 430	U L 465	L 460	U L 465	435	U L 455	U L 410								

OCT. 1993 FOF1 (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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							170	245	290	R 320	R	A 340	340	A	A 325	A	A	A						
2							170	A	U A 280	A	A	A	R	R	R	R	245	170						
3							A	255	295	A	A	A	R	340	330	285	235	160						
4							A	245	300	A	A	U R 350	R 340	U R 345	U R 330	300	255	A						
5							170	250	290	320	A	A	A	U R 335	R	305	260	A						
6							150	250	295	325	R 340	A	A	A	A	290	245	B						
7							165	250	295	A	A	A	A	A	A	285	B	A 160						
8							A	A	A	A	R	345	U R 330	R	330	295	230	A						
9							155	A 225	A 270	A	A	A	A	R 340	A	295	245	B						
10							A	A	A	A	A	A	U R 330	U A 325	A	305	A	A						
11							B	265	285	R	A	R	A	R	320	275	230	B						
12							A	220	A	295	B	R 325	R	A	A	280	240	A						
13							B	235	R 285	B	R	U R 340	R	350	R 315	A	A	A						
14							A	250	280	U A 305	A	U A 335	R	R	R	280	235	B						
15							160	A 235	A	A	R	U R 335	R 340	B	U R 320	275	225	A						
16							145	240	A	R 310	R 320	R	B	R	B	275	230	B						
17							155	245	290	300	U A 315	A	A	R	305	270	220	B						
18							A	235	265	305	A 320	A	A	A	A	A	A	B						
19							145	240	A 265	A 305	B	A	R 335	A	A	275	235	B						
20							U R 150	215	A	A	A	A	R	R	A	A	A	A						
21							A	230	A	R	A	R	U R 335	B	B	275	210	B						
22							125	235	285	R	A	A	A	330	U R 320	R	235	B						
23							B	230	A 270	A	R	R	U R 340	B	R	265	215	B						
24							B	235	A	B	B	A	B	R	A	R 270	A	B						
25							B	220	A	R	R 320	A	R	A	A	R 260	A 210	B						
26							125	A	A	U A 270	A 300	C	A	R	290	B	215	B						
27							B	200	260	A	R 330	U R 335	R 330	R	R 305	270	205	B						
28							A	210	270	U A 300	A	A	A	A	A	265	210	B						
29							B	205	265	295	A	A	A	A	A	A	A	B						
30							B	225	270	290	A	U R 315	A	R	305	A	A	B						
31							B	205	A	A	R	R	A	A	A	255	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						•	13	27	20	13	7	9	9	7	12	22	21	3						
MED							155	235	282	305	R 320	U R 335	R 335	340	320	275	230	160						
U Q							168	245	290	315	R 330	U R 342	R 340	345	328	290	242	170						
L Q							145	220	270	295	A 315	U R 330	U R 330	330	305	270	215	160						

OCT. 1993 FOE (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	21	20	E B 15	E B 13	E B 12	17	21	28	32	G 21	G 32	39	40	J A 47	39	33	30	J A 42	J A 28	20	J A 33	E B 14	E B 13	E B 13
2	E B 14	E B 12	E B 12	E B 14	E B 13	E B 11	G	J A 29	34	39	J A 49	J A 44	G 33	G 33	G 31	G 25	G	20	J A 19	18	E B 13	E B 14	J A 21	J A 17
3	E B 13	E B 14	E B 13	E B 14	E B 12	E B 12	21	28	33	34	J A 45	35	G	38	37	J A 42	J A 33	J A 39	22	J A 15	30	24	18	E B 14
4	18	E B 13	E B 14	E B 12	E B 12	E B 13	21	J A 45	G	J A 39	J A 43	G 28	39	39	G 25	G 20	G 17	J A 24	36	33	28	24	E B 13	28
5	J A 28	20	E B 12	E B 14	E B 11	E B 12	23	28	33	35	34	36	34	G	G 31	G	34	54	34	18	21	21	18	E B 13
6	17	E B 12	E B 12	E B 14	19	19	16	30	33	43	39	J A 51	J A 43	38	J A 50	G	G 15	20	J A 20	21	J A 37	J A 28	J A 54	33
7	20	E B 11	J A 24	E B 12	E B 11	J A 21	20	28	33	34	J A 44	35	J A 39	38	J A 38	G 26	E B 30	J A 50	J A 48	J A 49	J A 50	J A 54	J A 54	J A 61
8	J A 34	J A 29	J A 20	21	J A 29	J A 35	J A 34	J A 41	30	34	G	G 30	G 27	G	G	G	J A 53	J A 36	E B 13	E B 13	E B 13	J A 21	J A 19	35
9	J A 26	J A 16	J A 20	25	J A 21	20	16	J A 47	33	J A 48	J A 44	J A 40	J A 42	G	35	32	32	J A 30	42	19	E B 15	E B 13	J A 20	E B 15
10	50	J A 22	J A 34	J A 29	24	J A 21	J A 21	28	72	J A 51	50	66	J A 54	J A 70	J A 85	J A 54	J A 60	J A 53	J A 29	J A 44	J A 52	J A 51	J A 21	J A 31
11	20	E B 13	E B 14	E B 13	J A 17	18	21	G	33	G	37	G 32	37	G 31	G	G	28	E B 17	J A 49	J A 54	J A 36	J A 26	J A 22	J A 21
12	26	24	25	J A 29	J A 54	J A 44	J A 32	26	35	33	J A 52	36	G 25	J A 40	32	G 20	G 22	27	22	E B 13	17	J A 19	J A 98	J A 81
13	J A 22	J A 18	J A 18	20	E B 15	17	E B 16	G	33	E B 34	G	G 30	G 27	G	G	33	26	24	J A 28	42	J A 45	J A 26	J A 21	23
14	21	E B 14	E B 13	E B 14	E B 14	19	21	G	32	35	34	G 28	G 30	G 26	G 21	G 24	26	J A 22	23	J A 17	27	18	20	J A 21
15	J A 19	17	J A 21	16	18	E B 13	G	28	J A 53	J A 40	G 26	G	G	E B 34	G	31	32	24	21	18	E B 13	E B 13	E B 13	J A 18
16	E B 14	19	E B 12	E B 13	E B 12	E B 14	20	G	31	G 25	G	G	E B 34	G	E B 34	33	28	J A 21	J A 27	J A 21	J A 21	E B 13	E B 13	E B 13
17	E B 13	E B 14	E B 13	E B 14	E B 13	E B 13	G	28	J A 40	J A 41	36	J A 44	36	G 28	35	J A 53	J A 53	43	J A 19	J A 27	J A 20	34	J A 45	E B 13
18	E B 13	22	E B 14	E B 13	E B 13	E B 12	J A 21	G	34	34	34	J A 37	38	J A 42	J A 38	34	24	E B 13	J A 22	J A 28	J A 35	J A 35	J A 23	E B 13
19	E B 15	E B 12	21	19	E B 14	E B 13	18	29	J A 38	38	E B 34	37	G	33	42	G	G	19	J A 30	J A 54	J A 85	J A 36	J A 30	J A 53
20	J A 38	14	E B 15	E B 15	J A 17	E B 13	G	27	J A 38	J A 41	J A 55	36	G 30	G 30	33	31	52	J A 50	J A 38	23	23	20	E B 13	17
21	E B 13	J A 51	J A 29	J A 21	E B 15	21	24	G	30	G 28	35	G 32	G 25	E B 34	E B 34	G	28	20	17	E B 13	J A 19	E B 15	E B 13	E B 14
22	E B 14	E B 12	E B 13	E B 14	E B 13	E B 13	G	G 21	30	G 29	50	35	49	G 25	G	G	G	23	E B 14	E B 13	J A 20	J A 28	J A 17	J A 20
23	20	18	19	E B 12	E B 14	18	E B 14	27	J A 30	34	G 31	G	37	E B 35	G	G	24	E B 13	E B 14	J A 27	E B 13	E B 13	E B 13	E B 14
24	E B 13	E B 14	18	E B 12	E B 12	E B 14	E B 18	26	J A 55	E B 39	E B 39	J A 54	E B 41	G 33	34	G	28	17	22	J A 21	J A 22	28	E B 13	24
25	25	J A 21	J A 22	23	18	19	18	25	J A 43	G 27	J A 39	34	G 26	34	31	G 23	25	J A 35	J A 54	J A 51	J A 27	J A 33	J A 27	J A 32
26	J A 23	J A 22	J A 14	E B 13	E B 13	E B 13	17	J A 36	60	J A 54	J A 54	C	40	G 19	34	E B 35	G	J A 26	J A 86	J A 47	J A 54	J A 51	57	J A 42
27	J A 31	J A 26	25	20	23	E B 13	J A 20	J A 34	J A 41	J A 42	G 27	G	G	G 28	G	G	G	E B 13	E B 13	J A 82	J A 50	J A 49	E B 12	J A 53
28	48	J A 34	J A 27	J A 19	22	E B 13	J A 17	G	35	33	34	84	J A 61	71	J A 52	30	27	J A 30	J A 33	J A 53	31	30	J A 65	J A 36
29	J A 26	J A 47	J A 56	J A 36	35	E B 12	J A 28	32	J A 48	34	34	55	60	36	54	83	J A 53	58	J A 47	J A 34	J A 34	J A 30	J A 21	23
30	E B 13	20	18	21	17	E B 13	J A 14	G	G 25	G	J A 40	G 29	37	G 25	G	28	J A 30	E B 13	J A 40	E B 13	J A 42	J A 29	J A 31	J A 23
31	J A 17	E B 13	E B 13	E B 13	E B 13	E B 14	E B 15	25	28	28	G 29	G 27	35	37	J A 39	32	23	J A 19	J A 53	J A 38	J A 20	J A 21	J A 28	J A 32
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	20	18	18	E B 14	E B 14	E B 14	18	28	33	34	36	35	36	E G 33	34	G	28	24	J A 28	J A 23	J A 27	J A 26	J A 21	23
U Q	J A 26	J A 22	J A 22	21	19	19	J A 21	J A 29	J A 40	J A 40	J A 44	J A 40	40	38	J A 38	33	J A 32	J A 39	J A 40	J A 44	J A 37	J A 33	J A 30	J A 33
L Q	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	G 15	G	31	G	G	G 32	G 33	G 31	G	G	G	E B 19	20	E B 18	E B 20	E B 18	E B 13	E B 14

OCT. 1993 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	16	E B 15	E B 15	E B 13	E B 12	16	20	27	31	G 21	U G 32	38	40	45	38	32	29	37	15	E B 14	18	E B 14	E B 13	E B 13
2	E B 14	E B 12	E B 12	E B 14	E B 13	E B 11	G 26		33	36	44	43	G 33	U G 33	U G 31	U G 25	G	20	17	16	E B 13	E B 14	18	16
3	E B 13	E B 14	E B 13	E B 14	E B 12	E B 12	18	27	31	34	40	35	G	36	35	36	27	34	E B 14	15	20	E B 13	E B 13	E B 14
4	E B 13	E B 13	E B 14	E B 12	E B 12	E B 13	18	27	G	34	36	G 27	37	38	G 24	G 20	G 15	20	27	23	24	16	E B 13	19
5	22	E B 13	E B 12	E B 14	E B 11	E B 12	21	27	33	34	34	36	34	G	G 31	G	30	26	27	E B 13	E B 13	E B 13	E B 12	E B 13
6	E B 13	E B 12	E B 12	E B 14	E B 13	E B 12	G 28		31	37	38	42	41	U Y 38	45	G	G 13	20	E B 12	14	33	18	22	E B 13
7	E B 13	E B 11	15	E B 12	E B 11	E B 14	20	27	32	34	35	U Y 35	37	36	34	G 23	E B 30	42	38	22	27	26	30	27
8	19	15	16	E B 13	13	17	18	36	29	34	G	G 26	G 27	G	G	G	27	18	E B 13	E B 13	E B 13	15	15	25
9	17	E B 13	17	18	E B 13	E B 12	G 14	44	30	40	37	35	36	G	34	31	29	23	29	16	E B 15	E B 13	17	E B 15
10	34	19	17	20	E B 14	15	18	26	69	49	40	58	50	50	64	49	58	40	18	16	35	24	20	23
11	E B 15	E B 13	E B 14	E B 13	15	16	18	G	31	G	34	U G 32	35	U G 31	G	G	U Y 28	E B 17	29	30	22	15	16	16
12	19	18	18	22	20	34	22	24	30	33	E B 34	G 27	G 25	36	32	G 19	G 21	18	E B 12	E B 13	16	16	20	23
13	17	16	15	E B 13	E B 15	E B 11	E B 16	G	31	E B 34	G	G 30	U G 27	G	G	33	25	21	23	34	35	24	16	E B 14
14	E B 14	E B 14	E B 13	E B 14	E B 14	E B 14	18	G	31	34	34	G 27	G 30	U G 26	U G 21	G 19	25	17	17	17	22	16	18	18
15	14	E B 13	20	15	18	E B 13	G	27	29	33	G 26	G	G	E B 34	G	31	28	20	16	16	E B 13	E B 13	E B 13	15
16	E B 14	16	E B 12	E B 13	E B 12	E B 14	18	G	31	G 23	G	G	E B 34	G	E B 34	32	27	17	E B 14	E B 13	18	E B 13	E B 13	E B 13
17	E B 13	E B 14	E B 13	E B 14	E B 13	E B 13	G	27	35	39	35	41	U Y 35	G 28	35	41	34	34	16	23	18	20	14	E B 13
18	E B 13	E B 13	E B 14	E B 13	E B 13	E B 12	17	G	33	34	34	36	37	40	34	34	24	E B 13	18	20	28	19	18	E B 13
19	E B 15	E B 12	16	15	E B 14	E B 13	17	26	36	36	E B 34	36	G	33	37	G	G	17	27	16	36	20	19	20
20	23	13	E B 15	E B 15	15	E B 13	G	26	34	35	43	36	U G 30	G 30	33	31	45	42	36	21	19	17	E B 13	15
21	E B 13	16	24	20	E B 15	15	18	G	29	U G 28	34	U G 32	G 24	E B 34	E B 34	G	26	17	16	E B 13	15	E B 15	E B 13	E B 14
22	E B 14	E B 12	E B 13	E B 14	E B 13	E B 13	G	G 20	30	G 28	43	34	43	G 24	G	G	G	21	E B 14	E B 13	16	22	E B 13	16
23	17	15	E B 13	E B 12	E B 14	E B 14	E B 14	25	30	33	U G 31	G	36	E B 35	G	G	24	E B 13	E B 14	20	E B 13	E B 13	E B 13	E B 14
24	E B 13	E B 14	E B 12	E B 12	E B 12	E B 14	E B 18	U Y 26	40	E B 39	E B 39	41	E B 41	G 33	34	G	U Y 27	17	E B 12	19	20	20	E B 13	18
25	19	19	20	17	16	E B 13	16	25	32	G 27	G 27	34	G 25	34	31	G 22	24	21	A A 54	23	20	21	20	26
26	19	18	13	E B 13	E B 13	E B 13	16	33	52	50	54	C	37	G 18	32	E B 35	G	17	34	30	36	15	A A 57	30
27	17	17	E B 14	E B 13	15	E B 13	17	27	34	33	G 26	G	G	U G 28	G	G	G	E B 13	E B 13	24	E B 13	21	E B 12	35
28	24	27	19	15	E B 12	E B 13	15	G	31	31	33	68	58	64	35	29	25	21	29	41	25	20	A A 65	27
29	20	28	A A 56	25	15	E B 12	25	26	32	31	33	47	50	36	44	42	36	A A 58	17	20	20	23	17	E B 14
30	E B 13	E B 12	E B 13	E B 13	E B 12	E B 13	E B 14	G	G 20	G	32	G 28	34	G 24	G	27	27	E B 13	20	E B 13	16	19	29	19
31	17	E B 13	E B 13	E B 13	E B 13	E B 14	E B 15	23	28	U Y 28	U G 29	G 25	34	36	34	28	22	E B 13	17	23	15	E B 13	16	23
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	E B 14	E B 14	E B 14	E B 13	E B 13	17	26	31	34	34	34	34	E G 33	32	G	26	20	17	17	19	16	16	16
U Q	19	16	17	15	15	14	18	27	33	36	38	38	37	36	35	32	29	26	27	23	25	20	20	23
L Q	E B 13	E B 13	E B 13	E B 13	E B 12	E B 12	G	G	30	G 28	G	G 32	G 33	G 31	G	G	G	E B 17	E B 14	E B 14	E B 15	E B 14	E B 13	E B 14

OCT. 1993 FBES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	13	15	15	13	12	15	13	13	15	16	21	23	29	27	22	18	13	13	13	14	12	14	13	13
2	14	12	12	14	13	11	13	15	15	27	24	21	19	30	19	20	13	12	14	13	13	14	14	14
3	13	14	13	14	12	12	13	11	14	22	24	27	27	26	17	14	13	11	14	12	12	13	13	14
4	13	13	14	12	12	13	14	13	14	21	19	21	21	19	18	12	13	13	14	12	13	14	13	12
5	14	13	12	14	11	12	12	13	13	20	20	22	15	20	20	17	13	12	14	13	13	13	12	13
6	13	12	12	14	13	12	13	13	13	16	27	20	18	20	24	13	11	15	12	13	14	15	14	13
7	13	11	14	12	11	14	15	11	13	14	20	26	21	21	19	15	30	12	13	13	13	13	13	12
8	13	12	12	13	11	12	12	13	13	14	20	19	22	31	26	17	13	12	13	13	13	13	12	14
9	13	13	12	13	13	12	13	13	13	21	22	26	27	24	19	16	14	14	13	13	15	13	13	15
10	13	13	12	14	14	13	13	14	15	20	20	33	29	19	13	19	15	12	13	12	12	13	13	13
11	15	13	14	13	13	14	16	14	15	21	21	22	20	18	22	16	12	17	14	14	13	13	13	12
12	14	12	12	12	12	14	13	12	15	21	34	18	17	13	13	13	12	13	12	13	13	13	14	12
13	12	13	13	13	15	11	16	14	13	34	24	20	20	34	20	13	14	15	14	14	12	12	14	14
14	14	14	13	14	14	14	12	15	17	24	25	22	26	21	20	13	15	15	12	13	14	13	13	14
15	12	13	13	13	13	13	13	12	14	20	21	23	24	34	29	12	12	13	13	13	13	13	13	12
16	14	12	12	13	12	14	12	13	14	14	15	23	34	22	34	19	12	13	14	13	14	13	13	13
17	13	14	13	14	13	13	13	12	12	13	16	20	17	23	27	17	15	14	14	13	14	14	12	13
18	13	13	14	13	13	12	13	13	19	20	24	30	14	27	22	19	16	13	13	14	13	14	13	13
19	15	12	14	13	14	13	13	15	19	20	34	24	22	29	20	18	14	15	14	13	12	13	13	12
20	13	11	15	15	13	13	14	13	14	14	20	20	20	15	18	13	14	14	14	13	14	12	13	14
21	13	13	13	12	15	13	12	13	15	16	25	23	22	34	34	19	16	14	13	13	12	15	13	14
22	14	12	13	14	13	13	10	15	15	18	23	23	23	21	22	21	14	15	14	13	13	14	13	13
23	13	13	13	12	14	14	14	13	14	15	20	29	31	35	16	15	12	13	14	14	13	13	13	14
24	13	14	12	12	12	14	18	16	24	39	39	30	41	30	21	22	13	13	12	13	13	12	13	13
25	13	11	12	12	12	13	13	14	20	20	23	22	21	21	20	13	12	13	12	14	12	11	13	13
26	13	14	12	13	13	13	11	14	13	14	26	C	19	15	19	35	15	12	12	13	15	13	11	13
27	13	14	14	13	12	13	14	14	13	15	15	16	17	15	17	14	13	13	13	13	13	14	12	13
28	13	14	13	12	12	13	12	14	12	15	18	20	22	20	15	13	11	13	14	13	13	14	14	14
29	14	13	14	14	12	12	17	13	14	16	21	19	22	18	21	18	11	14	13	14	13	12	11	14
30	13	12	13	13	12	13	14	13	14	19	20	16	14	19	15	14	13	13	13	13	13	12	13	14
31	13	13	13	13	13	14	15	15	14	13	20	19	19	16	16	14	14	13	12	13	12	13	13	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	13	13	13	13	13	13	13	14	19	21	22	21	21	20	16	13	13	13	13	13	13	13	13
U Q	14	14	14	14	13	14	14	14	15	21	24	24	26	29	22	19	14	14	14	13	13	14	13	14
L Q	13	12	12	12	12	12	12	13	13	15	20	20	19	19	17	13	12	13	13	13	12	13	13	13

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	310	300	290	305	335	300	345	335	345	355	320	310	325	335	340	340	350	355	320	300	275	265	280	310
2	295	330	300	315	320	295	360	345	355	360	340	325	330	325	330	355	330	340	340	345	290	300	295	320
3	285	300	295	305	310	330	345	345	375	350	335	310	315	330	330	340	345	350	355	330	300	300	295	300
4	290	295	325	345	330	355	380	360	350	325	335	355	315	330	320	340	340	335	340	325	295	305	295	285
5	300	310	310	340	F 325	F 320	360	365	380	345	335	325	320	330	315	345	350	345	320	315	F 305	F 300	F 285	F 310
6	335	310	305	295	285	F 300	360	V 355	V 340	360	325	345	330	310	305	315	340	345	345	295	290	J R 290	F 285	315
7	340	300	295	F 295	295	320	350	335	345	355	340	325	335	315	325	340	345	350	340	315	315	300	Z 305	285
8	F 295	305	F 295	F 320	F 325	F 310	350	365	370	385	325	345	320	310	325	340	350	360	350	320	305	305	285	270
9	270	290	320	330	300	290	335	360	355	345	335	345	320	325	325	325	320	320	335	365	275	310	280	285
10	A 305	340	260	285	290	275	300	345	340	325	325	335	350	U R 310	315	325	340	345	355	305	A 290	280	305	290
11	295	280	305	345	335	275	315	335	340	345	320	330	320	310	325	340	345	345	335	305	300	300	300	290
12	295	295	300	280	310	A 320	335	350	350	335	340	315	325	330	340	340	330	330	335	300	280	310	315	310
13	305	300	300	335	275	285	350	360	340	355	305	335	H 325	325	330	340	335	345	330	320	285	285	295	325
14	300	300	295	330	355	300	350	365	340	340	335	335	355	325	335	340	340	325	320	295	290	290	310	295
15	300	305	300	315	325	325	365	365	360	355	330	325	320	325	325	335	335	355	355	295	295	305	315	300
16	310	305	310	335	345	305	350	360	370	360	315	325	320	310	335	355	360	360	335	300	305	295	290	285
17	300	315	310	295	320	305	365	360	350	350	325	325	325	325	325	320	345	355	345	300	300	300	305	F 305
18	315	320	325	320	330	305	340	R 350	325	330	325	345	330	325	315	325	345	365	325	300	285	315	305	300
19	295	295	300	310	F 320	300	350	355	350	350	325	330	330	335	335	335	345	345	340	325	A 315	F 305	F 275	F 290
20	F 320	325	320	F 300	F 295	F 290	335	345	335	340	345	335	325	325	345	355	350	345	R 350	335	315	310	310	305
21	305	Z 280	295	345	340	285	335	365	345	350	330	330	330	325	335	360	355	355	345	305	295	310	285	300
22	300	315	325	330	340	315	350	370	360	340	320	335	330	335	330	340	345	360	320	290	315	J R 305	V 285	290
23	F 290	300	F 275	F 305	295	305	330	355	355	330	325	R 315	340	310	325	335	355	335	325	310	320	325	290	300
24	310	F 285	F 300	F 355	R 360	310	350	R 350	315	J R 345	325	310	335	310	320	355	360	335	310	310	305	F 295	320	300
25	305	315	305	340	360	295	340	355	335	345	320	325	330	330	340	340	365	360	A	290	F 270	F 295	285	285
26	310	335	275	255	290	385	320	350	V 285	315	315	I C 325	335	330	345	350	360	330	320	315	350	330	A	F 290
27	310	305	315	F 285	F 275	F 330	330	350	345	335	340	310	325	335	340	335	340	345	325	275	300	300	300	A 305
28	280	295	270	280	285	275	340	350	350	335	335	320	335	335	345	355	355	340	335	325	330	295	A	300
29	290	280	A	295	320	305	340	350	345	350	330	325	340	340	340	345	360	A	320	315	305	305	295	295
30	300	305	305	335	320	300	340	340	345	340	320	335	335	345	350	350	355	360	335	310	305	305	310	285
31	305	325	320	335	335	290	320	365	370	350	360	345	335	340	350	375	380	375	360	325	295	305	305	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	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	29	31
MED	300	305	300	315	320	305	345	355	345	345	325	325	330	325	330	340	345	345	335	310	300	300	295	300
U Q	310	315	310	335	335	320	350	360	355	355	335	335	335	335	340	350	355	355	345	325	305	305	305	305
L Q	295	295	295	295	295	290	335	345	340	335	320	325	320	315	325	335	340	340	325	300	290	295	285	285

OCT. 1993 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	U L 395	U L 355	L U L 365	U L 365	A	L	L	L							
2									L	U L 355	L	L	U L 365	L	L	U L 345								
3								L	L	L	U L 355	U L 325	U L 365	U L 370	U L 365	L								
4								435	L	U L 395	L	L 385	L	L	L	L								
5								L	L	L	U L 380	U L 405	L 365	L 355	L	U L 355								
6									L	L	L	A	L 365	L	L	U L 360	U L 375							
7								L	L	U L 370	U L 365	U L 365	L	L	L	U L 350								
8								A	L	U L 395	U L 380	L	U L 380	L	L	L	L							
9									L	L	U L 350	U L 365	L	U L 335	L	L								
10								L	A	A	L		A	A	A	A	A							
11								L	L	U L 395	L 365	400	395	L	U L 335	L	L							
12								L	L	U L 375	L 390	L	U L 360	L	L									
13									L	L	L 410	L 440	L	L	L	L								
14									L	L	U L 365	L 375	L 375	L	L									
15								L	L	L	L 375	L 360	L	L	L	L								
16									L	L		U L 360	U L 365	L	L	L								
17									L	L	U L 380	L	U L 375	L	L	A								
18										L	L 375	U L 355	U L 400	L	L	L								
19									L	L	U L 400	L	L	L		L								
20									L	L	L	U L 385	L	L	U L 340	L								
21										L	U L 375	L 375	U L 395	L	L	U L 375								
22									L	L	L	L		L	U L 350	L								
23								L	L	L	L	U L 345	U L 380	L	L	L								
24									L		L	L	L	U L 375	L	L								
25										L	L	L 360	L	U L 360	U L 375	L	L							
26									A	A	A	C	L	425	L		410							
27										L	L	L	L 350	U L 390	L	L	L							
28									L	U L 330	L	A	A	A	L	L								
29									L	U L 390	L	A	A	L	A			A						
30									L	L	U L 360	L 375	L	U L 365	L	L								
31									L	U L 395	L	U L 385	U L 380	390	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		10	16	18	16	9	5	5	2							
MED								435		U L 392	U L 375	L 370	U L 370	U L 370	U L 350	U L 355	392							
U Q										U L 395	U L 380	U L 385	U L 380	390	U L 370	U L 368								
L Q										U L 370	U L 362	U L 360	L 365	U L 358	U L 338	U L 348								

OCT. 1993 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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									255	245	285	265	265	260	260	250	245							
2									235	250	265	270	275	285	260	250								
3								220	225	255	270	305	265	265	275	255								
4								225	260	265	265	245	260	265	L 285	255								
5								225	225	235	265	260	280	265	270	255								
6									225	240	275	255	280	265	290	270	235							
7								240	245	240	255	250	265	305	270	260								
8								225	225	225	275	260	265	285	265	260	250							
9									230	235	265	250	290	285	270	260								
10								250	A 255	245	265		245	A	A 305	270	255							
11								260	255	235	280	250	H 250	260	275	250	230							
12								255	250	250	245	270	255	260	245									
13									240	230	235	255	250	255	275	245								
14									255	250	255	255	230	255	265									
15								225	240	230	260	270	H 250	260	275	255								
16									235	240		275	265	260	255	240								
17									235	245	255	270	255	270	260	255								
18										260	265	240	255	260	275	250								
19									250	235	240	255	250	250		245								
20									245	250	245	255	250	275	250	235								
21										240	255	260	255	270	255	235								
22									235	265	275	260		255	270	245								
23								225	230	L 255	255	295	255	H 255	270	240								
24									285		260	L 275	265	275	265	230								
25										245	255	270	255	270	250	250	215							
26									H 305	270	270	I C 260	250	235	245		220							
27										260	255	265	265	240	245	245	240							
28									235	265	235	285	255	A 265	250	240								
29									250	245	265	265	245	L 270	255			A						
30									230	230	265	245	250	250	245	235								
31									220	235	245	250	260	260	255	225								
	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	27	30	30	30	30	30	30	27	8							
MED								225	240	245	262	260	255	262	265	250	238							
U Q								250	255	255	265	270	265	270	275	255	248							
L Q								225	230	235	255	255	250	255	255	240	225							

OCT. 1993 H'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	255	250	285	250	225	290	245	235	230	225	205	230	235	A	A 255	240	A 240	A 225	225	265	315	285	315	265
2	275	225	265	265	250	285	230	230	230	A 250	A	A	205	225	230	235	240	240	215	215	255	280	280	250
3	260	270	265	270	260	235	225	225	225	205	A 235	H 190	225	235	H 215	240	245	235	215	225	A 295	275	290	270
4	285	290	260	220	235	230	H 205	205	230	215	220	230	215	250	230	235	240	225	240	250	A 285	255	250	A 305
5	300	260	245	240	215	255	215	225	225	215	205	205	190	205	H 225	240	235	225	A 245	245	275	265	275	260
6	240	250	275	275	305	295	215	215	210	220	220	A	A 240	A 245	A	235	235	220	215	280	E A 325	280	330	255
7	220	250	285	285	275	250	235	225	230	225	205	225	H 205	A 215	245	230	240	235	A 250	260	275	A 290	A 295	A 355
8	295	265	270	265	245	265	230	A	225	225	205	H 180	205	210	240	235	245	225	205	245	255	230	275	E A 365
9	350	300	265	240	265	300	245	245	220	A 235	205	200	215	220	255	250	250	260	245	205	H 235	235	330	265
10	A	240	375	A 350	310	320	275	240	A	A	A	A 240	A	A	A	A	A	230	220	235	A	A 335	280	A 325
11	285	310	285	235	250	340	250	245	230	220	215	205	205	250	215	240	230	225	A 250	A 300	290	260	275	305
12	290	310	285	A 330	275	A	235	230	220	210	210	225	H 195	220	H 205	240	250	250	220	240	290	260	260	285
13	275	260	285	240	285	300	235	230	230	225	210	200	H 205	230	215	230	240	235	230	A 270	E A 355	320	285	250
14	255	280	270	240	220	275	225	220	220	225	215	H 205	205	220	210	235	230	235	220	260	295	290	260	240
15	275	285	290	275	250	245	215	225	215	210	185	185	H 200	H 185	240	235	240	225	205	250	275	280	275	275
16	265	260	255	250	235	265	220	220	235	215	225	205	205	H 185	245	235	220	215	215	270	265	280	280	290
17	290	255	250	285	250	265	220	215	230	A 235	220	275	215	230	240	A	240	220	210	A 270	265	260	280	295
18	255	240	240	230	235	235	225	H 225	230	225	215	225	215	A 245	225	A 245	230	215	220	240	310	255	265	275
19	285	275	290	265	235	245	235	225	230	220	200	215	240	220	A 245	230	235	225	240	235	A	285	A 340	335
20	280	245	255	250	285	275	220	215	A 240	235	A	220	210	235	225	240	A 235	235	A 235	240	260	265	255	275
21	285	355	305	235	220	275	225	220	215	220	215	210	205	H 205	250	235	225	215	220	260	280	255	275	285
22	285	260	240	225	235	250	220	225	210	225	A 245	H 200	A 250	H 200	230	235	235	210	210	270	265	A 305	280	325
23	280	275	305	255	220	285	235	230	220	215	210	210	235	230	H 215	235	225	215	215	250	225	220	260	280
24	285	315	305	230	215	E B 280	225	220	A 250	245	B 250	235	B 255	245	230	245	220	205	250	275	275	295	245	265
25	285	275	270	255	225	300	235	225	235	225	210	215	225	210	225	205	235	205	A	A 315	330	310	305	A 345
26	275	240	360	380	320	245	245	A 235	A	A	A	C	A 255	215	H 205	235	215	225	A 280	270	A 235	235	A	E A 330
27	270	275	245	295	325	240	215	215	230	235	225	H 205	205	H 210	225	235	235	220	210	A 325	255	275	240	A
28	A 315	A 310	A 365	325	310	335	230	230	235	220	230	A	A	A	A	235	225	220	245	E A 280	240	275	A	335
29	285	A	A	A 330	255	250	240	215	230	200	210	A	A	220	A	240	225	A	245	275	275	A 295	295	300
30	300	255	260	235	230	295	230	240	225	225	215	215	H 195	240	230	230	225	220	235	255	265	270	A	A 315
31	285	255	255	235	250	300	255	225	230	205	230	215	215	215	240	245	215	215	235	E A 300	275	290	285	330
	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	31	31	30	31	30	29	29	27	26	28	28	27	29	30	30	30	31	29	31	28	30
MED	285	262	270	255	250	272	230	225	230	225	215	212	212	220	230	235	235	225	222	258	275	275	280	285
U Q	285	285	290	285	275	295	235	230	230	225	225	225	230	235	240	240	240	235	245	A 275	292	290	292	A 325
L Q	270	250	255	235	230	250	220	220	220	215	205	205	205	H 210	H 215	235	225	215	215	240	258	260	262	265

OCT. 1993 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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

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							140	115	115	115	A	110	130	120	115	115	115	A						
2							130	A	120	A	A	A	A	A	A	A	120	135						
3							A	120	115	A	120	A	110	120	115	115	115	130						
4							A	120	115	115	115	120	120	A	A 120	110	A 120	A						
5							135	120	115	115	115	A	A	115	A	115	115	A						
6							150	115	A 120	110	125	115	115	110	120	120	120	B						
7							B 150	115	115	115	115	A	A	A	A	A 120	B	115						
8							A	115	115	A	110	A 120	115	E B 140	120	115	115	A						
9							140	120	115	A	115	A	A	115	A	115	120	B						
10							A	120	120	115	A	A	B 125	120	120	115	A	A						
11							B	120	115	115	A	A	A	A	115	115	A 125	B						
12							A	A	A	A 130	B	A	A	A	A	A 115	A 125	A						
13							B	120	115	B	115	A 130	A	B	115	A	A	A						
14							A	120	115	120	120	A 120	A	A	A	120	120	B						
15							150	A	A	A	A	115	115	B	B	115	A 120	A						
16							140	115	A 130	A 120	110	120	B	115	B	120	130	B						
17							145	A 130	115	110	115	A	A	A	B	120	120	B						
18							A	115	115	A 130	120	A	A	A	A	A	A	B						
19							140	120	120	120	B	125	115	A	A	120	120	B						
20							145	120	115	A	A	A	A	A	A	A	A	A						
21							A	120	A	A	A	A	120	B	B	120	120	B						
22							140	E A 145	A 130	A	A	A	A	A 130	125	120	120	B						
23							B	120	115	A	A	125	B	B	115	115	120	B						
24							B	125	A	B	B	A	B	A	A	120	A	B						
25							B	A 135	A	A 130	A 125	A	A	A	A	A 120	A	B						
26							B 165	120	115	115	115	C	A	115	115	B	120	B						
27							B	120	115	115	A 120	110	115	A	120	115	125	B						
28							A	120	115	115	A	A	A	A	A	A 125	E A 140	B						
29							B	A	A 120	115	A	115	A	A	A	A	A	B						
30							B	125	120	120	A	E A 125	A	E A 130	115	115	120	B						
31							B	130	A	A	A	E A 135	A	A	A	120	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							13	27	25	19	15	14	10	11	13	25	22	3						
MED							140	120	115	115	115	119	115	118	115	115	120	130						
U Q							150	120	A 120	A 120	120	125	120	E A 130	120	120	A 120	135						
L Q							140	120	115	115	115	115	115	115	115	115	120	115						

OCT. 1993 H'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 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	110	105	B	B	B	105	150	160	160	105	120	130	125	115	120	125	115	105	110	120	105	B	B	B
2	B	B	B	B	B	B	G	120	120	120	110	110	120	120	115	115	G	140	120	100	B	B	100	105
3	B	B	B	B	B	B	140	160	125	120	110	120	G	165	140	125	125	125	120	120	105	105	105	B
4	100	B	B	B	B	B	130	125	G	120	115	110	130	190	100	105	105	115	110	105	105	110	B	100
5	105	100	B	B	B	B	135	150	135	130	125	115	115	G	115	G	135	120	115	130	120	115	110	B
6	110	B	B	B	110	110	105	150	150	120	120	115	115	115	110	G	100	130	120	120	120	105	115	130
7	100	B	110	B	B	155	160	160	150	125	115	120	110	110	115	110	B	120	115	110	110	110	110	110
8	110	105	110	110	100	105	115	110	115	115	G	110	105	G	G	G	125	120	B	B	B	115	110	100
9	105	105	105	105	120	125	120	110	125	115	110	110	110	G	115	165	135	115	110	110	B	B	105	B
10	105	105	110	105	105	115	115	120	110	110	115	110	115	110	110	140	135	125	115	110	105	105	105	100
11	100	B	B	B	120	105	190	G	125	G	115	115	110	110	G	G	150	B	110	105	105	110	105	105
12	100	100	105	115	110	110	110	140	110	120	110	105	105	105	100	100	105	100	105	B	110	110	105	105
13	100	105	100	100	B	100	B	G	125	B	G	110	110	G	G	100	105	105	105	100	100	100	100	105
14	100	B	B	B	B	115	145	G	135	120	125	110	110	110	110	105	150	100	100	100	100	100	105	105
15	105	105	100	105	100	B	G	150	125	110	110	G	G	B	G	160	140	130	100	100	B	B	B	115
16	B	100	B	B	B	B	140	G	125	110	G	G	B	G	B	140	140	100	110	115	110	B	B	B
17	B	B	B	B	B	B	G	150	125	120	120	115	115	110	155	120	120	110	110	110	110	105	105	B
18	B	100	B	B	B	B	105	G	125	130	130	110	110	110	110	110	110	B	110	105	105	100	105	B
19	B	B	100	100	B	B	160	140	120	120	B	120	G	120	120	G	G	120	110	115	120	110	110	110
20	100	145	B	B	105	B	G	130	115	120	100	115	100	105	105	105	100	100	95	100	95	100	B	100
21	B	105	105	105	B	105	105	G	115	110	110	110	110	B	B	G	125	110	100	B	105	B	B	B
22	B	B	B	B	B	B	G	115	E G 175	120	110	110	105	110	G	G	G	110	B	B	110	110	125	105
23	100	100	100	B	B	130	B	140	130	115	115	G	E G 185	B	G	G	135	B	B	110	B	B	B	B
24	B	B	120	B	B	B	B	135	110	B	B	110	B	120	115	G	115	120	120	110	110	105	B	105
25	105	105	105	105	100	100	175	G	110	110	115	110	110	115	110	110	170	110	100	120	105	110	100	100
26	95	100	105	B	B	B	160	115	110	110	110	C	130	105	145	B	G	120	110	110	105	105	100	100
27	100	105	105	105	105	B	160	130	125	125	110	G	G	110	G	G	G	B	B	110	125	110	B	105
28	105	105	105	110	110	B	125	G	145	135	115	105	105	105	105	150	130	110	115	110	110	110	110	105
29	110	115	105	105	105	B	150	140	125	125	120	110	110	110	105	100	110	115	115	110	110	105	105	110
30	B	105	100	105	105	B	130	G	115	G	105	105	105	105	G	120	120	B	120	B	110	105	100	100
31	105	B	B	B	B	B	B	160	110	110	110	110	105	140	110	125	120	110	110	105	105	100	100	100
	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	19	17	13	13	13	22	22	30	27	26	26	25	23	21	20	25	26	27	26	26	24	22	22
MED	105	105	105	105	105	110	138	140	125	120	115	110	110	110	110	118	125	115	110	110	108	105	105	105
U Q	105	105	108	108	110	120	160	150	130	120	120	115	115	120	118	132	135	120	115	115	110	110	110	105
L Q	100	100	100	105	102	105	115	120	115	110	110	110	105	110	108	105	110	110	105	105	105	105	100	100

OCT. 1993 H'ES (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

OCT. 1993 TYPES OF ES 135°E MEAN TIME (G.M.T. + 9H)

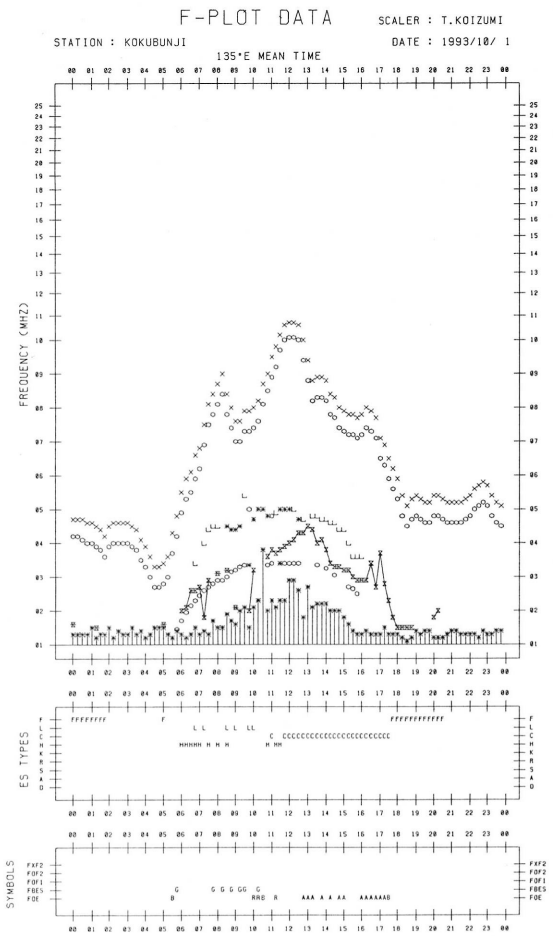
LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

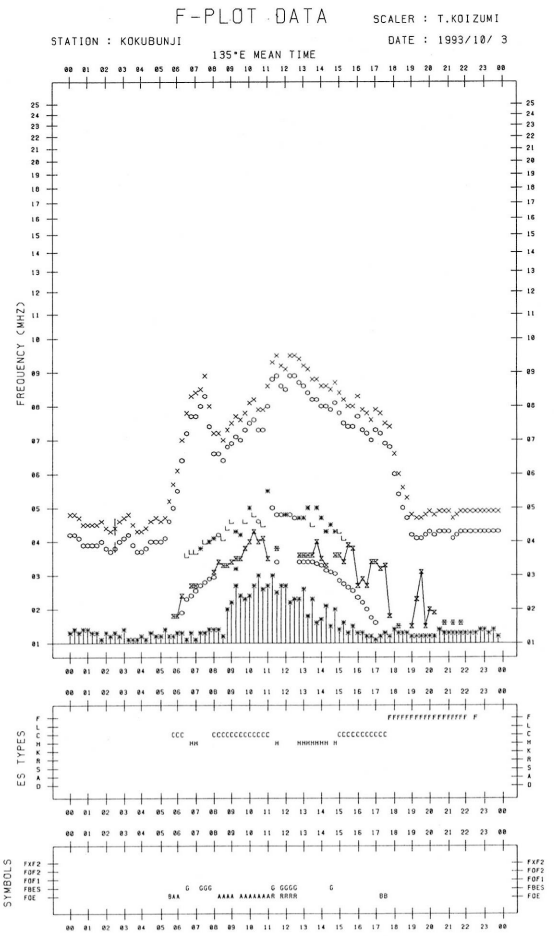
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 1	F 2				F 1	H 1	H 1	H 1	L 1	L 1	C 1	C 1	C 2	C 1	C 1	C 2	C 3	F 1	F 1	F 2			
2								C 1	C 1	CL 11	CL 21	C 1	L 1	L 1	L 1	L 1		H 1	F 1	F 1			F 2	F 1
3							C 1	H 1	C 1	C 1	C 2	C 1		H 1	H 1	C 1	C 1	C 3	F 1	F 1	F 5	F 2	F 1	
4	F 1						C 2	C 1		C 1	C 1	L 1	CL 11	HL 11	L 2	L 1	L 1	C 2	F 4	F 4	F 2	F 1		F 4
5	F 3	F 2					C 2	H 1	H 1	H 1	CL 11	C 1	CL 11		L 1		H 1	C 2	F 3	F 1	F 2	F 2	F 1	
6	F 1				F 1	F 1	L 1	H 1	HL 11	H 2	C 1	C 2	C 2	C 2	C 2		L 1	C 1	F 1	FF 12	F 5	F 2	FF 22	FF 22
7	F 1		F 1			FF 11	H 1	H 1	H 1	C 1	C 1	L 1	L 1	L 2	CL 11	L 1		C 3	F 3	F 2	F 3	F 3	F 3	F 3
8	F 2	F 2	F 2	F 1	F 2	F 2	CL 21	C 3	C 1	L 1		L 1	L 1				C 2	C 2				F 1	FF 11	F 5
9	F 2	F 1	F 2	F 3	FF 11	F 1	L 1	C 3	C 1	C 2	C 2	C 2	C 1		L 1	H 1	H 2	C 3	F 4	F 1			F 1	
10	F 4	F 3	F 3	F 4	F 2	F 2	L 1	C 1	C 3	C 2	C 2	C 2	C 2	CL 31	CL 31	H 2	HL 32	CL 33	FF 22	F 2	F 3	F 4	F 2	F 4
11	F 1				F 1	F 1	H 1		C 1		L 1	L 1	L 1	L 1			HL 11		F 3	F 2	F 3	F 2	F 3	F 2
12	F 2	F 2	F 3	FF 21	FF 21	F 3	L 2	HL 12	L 2	CL 11	L 1	LH 11	L 1	L 1	L 1	L 1	L 1	L 1	F 1		F 1	F 2	F 5	F 3
13	F 2	F 2	F 1	F 1		F 1			CL 11			L 1	L 1			L 2	L 1	L 2	F 2	F 3	F 2	F 2	F 1	F 1
14	F 1					F 1	C 1		H 1	C 1	C 1	L 1	L 1	L 1	L 1	L 1	H 1	L 2	F 1	F 1	FF 11	F 1	F 2	F 2
15	F 1	F 1	F 1	F 1	F 1			HL 11	CL 11	L 1	L 1					HL 11	HL 11	HL 21	F 1	F 1				F 1
16		F 1					H 1		CL 11	L 1						H 1	H 1	L 2	F 1	F 1	F 2			
17								HL 11	CL 21	C 2	CL 11	CL 21	C 1	L 1	H 1	C 3	C 2	C 2	F 2	F 3	F 1	F 3	F 2	
18		F 1					L 1		C 1	CL 11	C 1	C 2	LL 11	L 2	C 1	C 2	C 1		F 1	F 3	F 3	F 2	F 2	
19			F 1	F 1			H 1	H 1	C 2	C 2		C 1		L 1	L 1			C 1	F 4	F 2	FF 13	F 2	F 2	FFF 23
20	F 3	F 1			F 1			C 1	C 2	CL 11	L 2	CL 11	L 1	L 1	L 2	L 1	L 4	L 2	F 3	F 1	F 1	F 1		F 1
21		F 2	F 3	F 2		F 2	L 1		C 1	L 1	L 1	L 1	L 1				C 1	C 1	F 1		F 1			
22								L 1	HL 11	L 1	L 2	L 1	L 2	L 1				C 1			F 1	F 4	F 1	F 1
23	F 1	F 1	F 1			F 1		H 1	C 1	C 1	L 1		H 1				H 1			F 2				
24			F 1					C 1	C 2			C 1		L 1	L 1		C 2	L 1	F 1	F 2	F 2	F 3		F 1
25	F 2	F 2	F 4	F 2	F 1	F 2	H 1	HL 11	L 1	L 1	L 1	L 1	L 1	L 1	L 1	L 1	HL 11	L 3	F 3	FF 13	F 2	F 2	F 2	F 2
26	F 2	F 1	F 1				H 1	C 2	C 3	C 3	C 2		CL 11	L 1	H 1			CL 11	FF 31	F 3	F 2	F 2	F 3	F 3
27	F 2	F 2	F 2	F 1	F 3		H 2	H 2	C 3	C 1	L 1			LL 11						F 2	F 1	F 3		F 3
28	F 3	F 3	F 5	F 2	F 2		CL 11		H 1	H 1	CL 11	C 3	L 3	L 4	L 2	HL 11	CL 22	CL 22	F 3	F 5	F 5	F 4	F 3	F 4
29	F 3	FF 23	F 4	F 5	F 2		HC 21	HL 11	CL 21	C 1	C 1	C 3	C 3	L 1	L 2	L 3	L 3	C 5	F 2	F 2	F 2	F 3	F 2	F 1
30		F 1	F 1	F 1	F 1		C 1		L 1		L 1	L 1	L 1	L 1		C 1	C 2		F 2		F 3	F 2	F 4	F 3
31	F 2							H 1	L 2	L 1	L 2	L 1	L 2	HL 22	L 2	C 1	C 2	C 1	F 2	F 3	F 2	F 2	F 2	F 2
	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																								

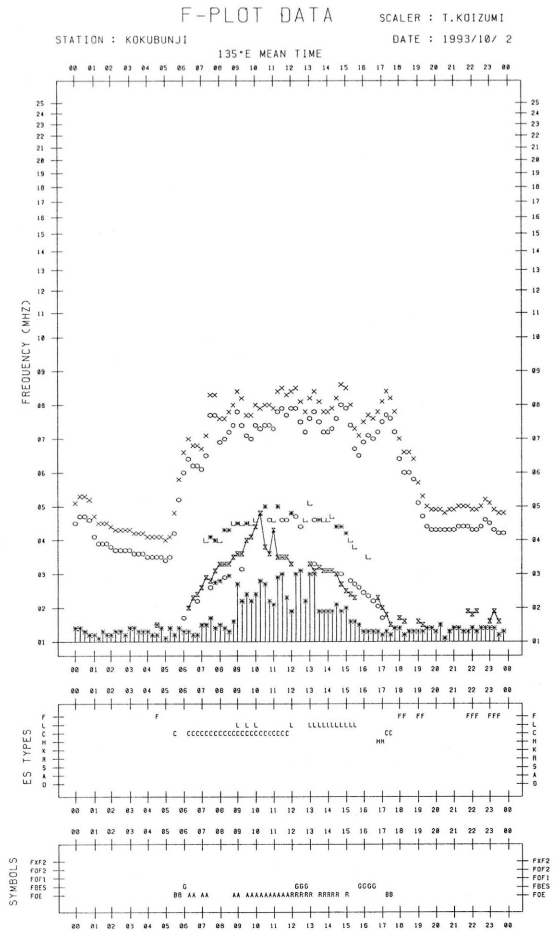
OCT. 1993 TYPES OF ES COMMUNICATIONS RESEARCH LABORATORY, JAPAN

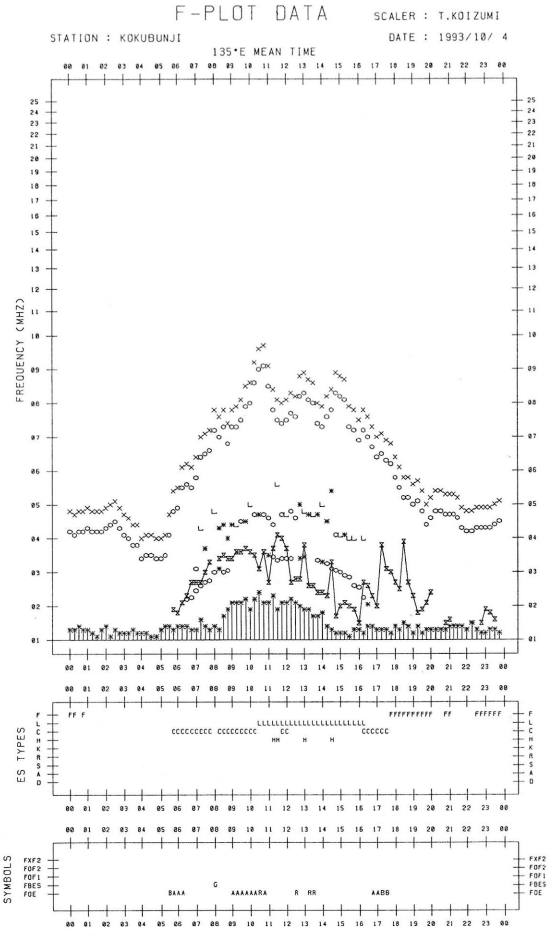
f-PLOTS OF IONOSPHERIC DATA

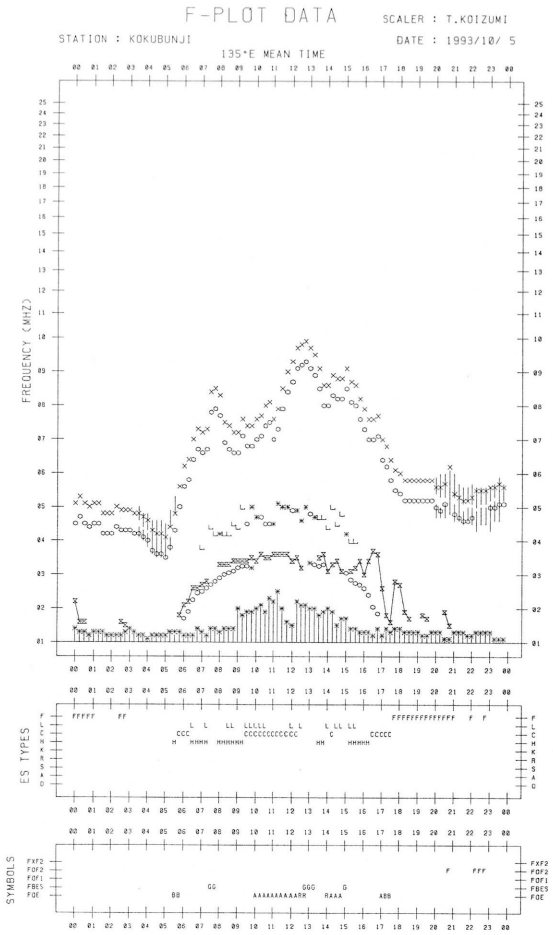
KEY OF F-PLOT	
I	SPREAD
⬡	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, ↑	FMIN
∧	GREATER THAN
∨	LESS THAN

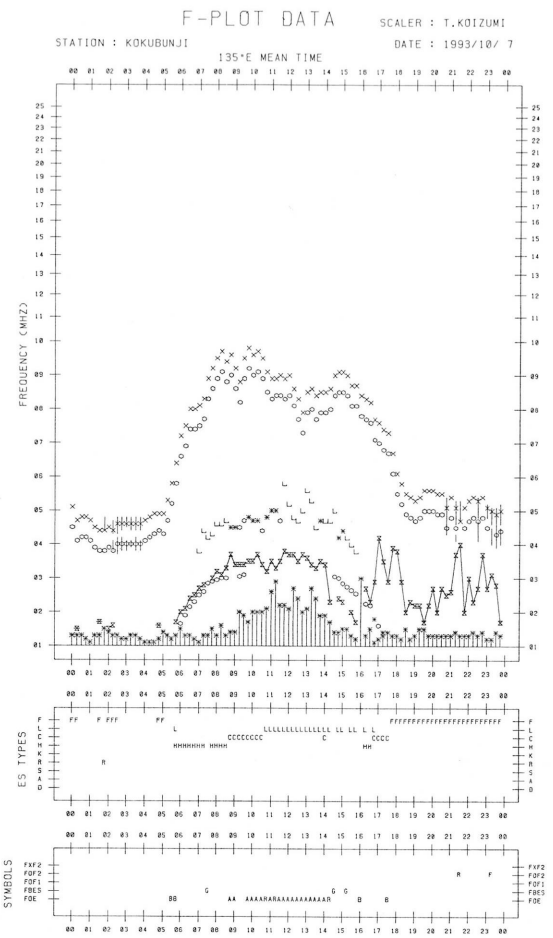

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

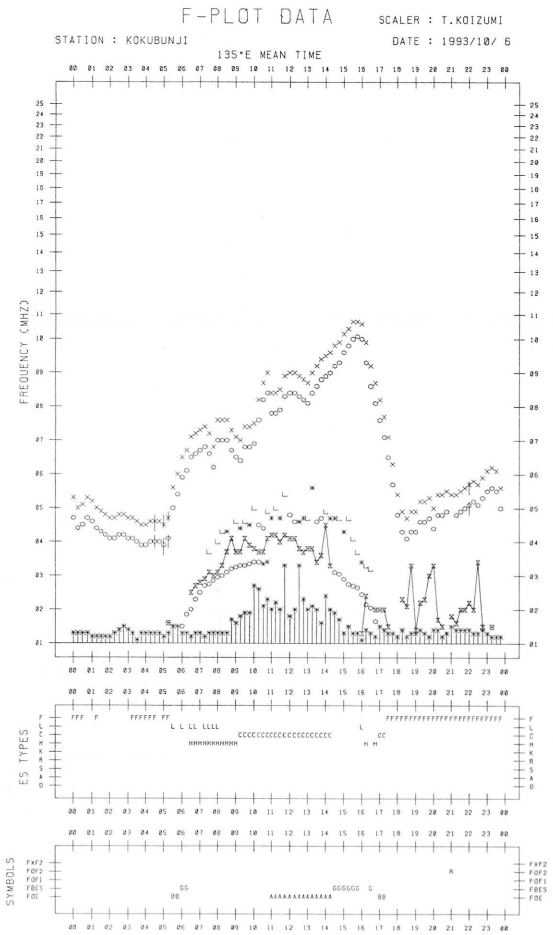

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

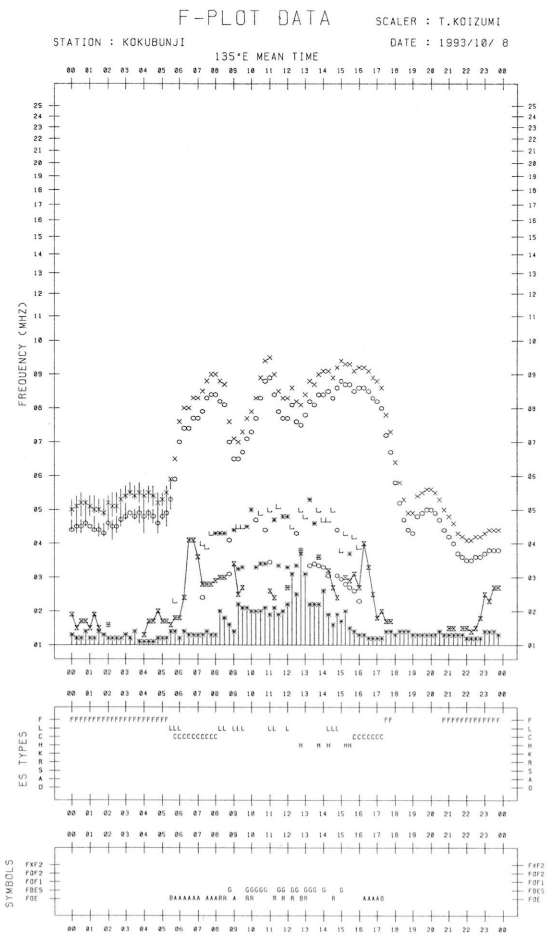

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

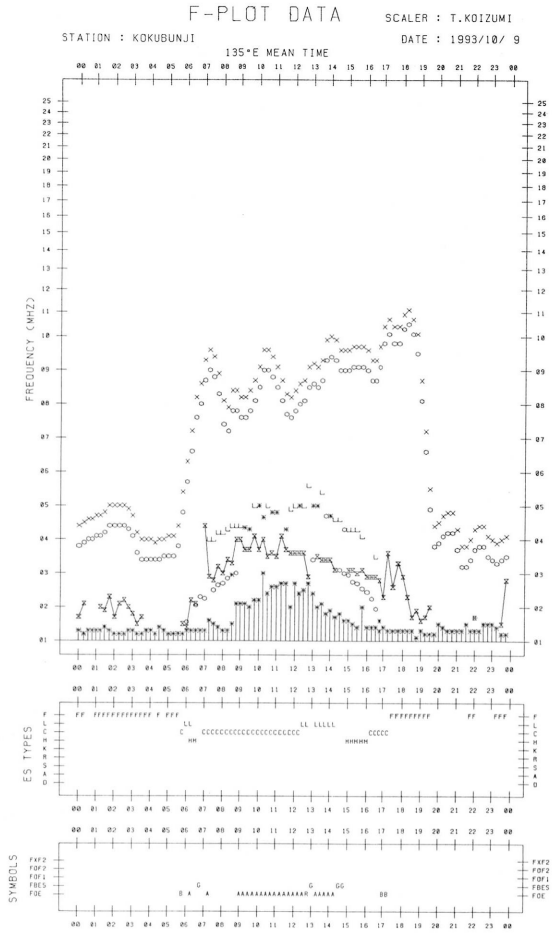

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

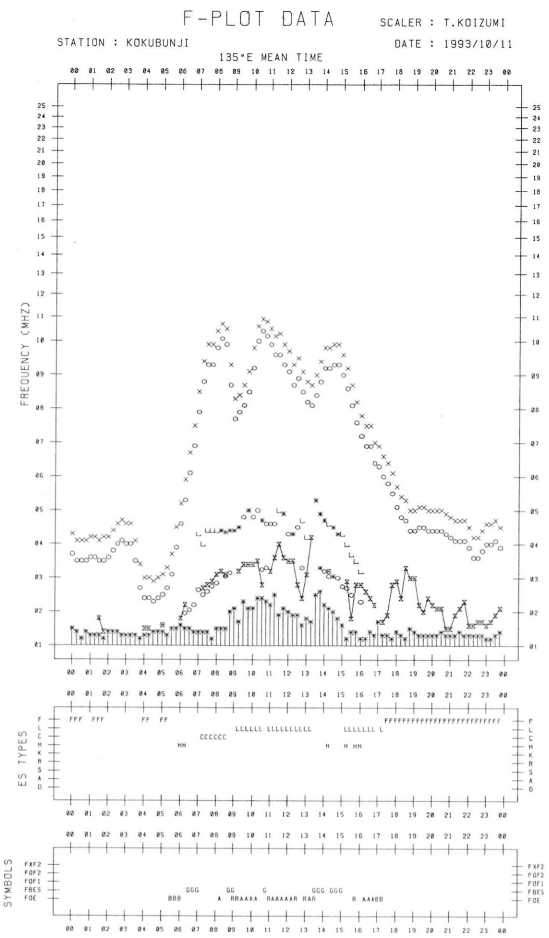

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

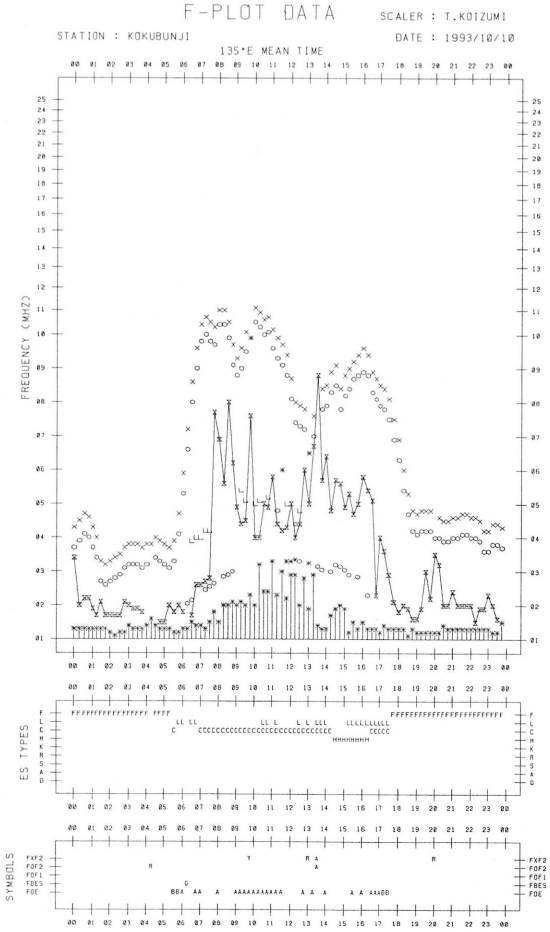

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

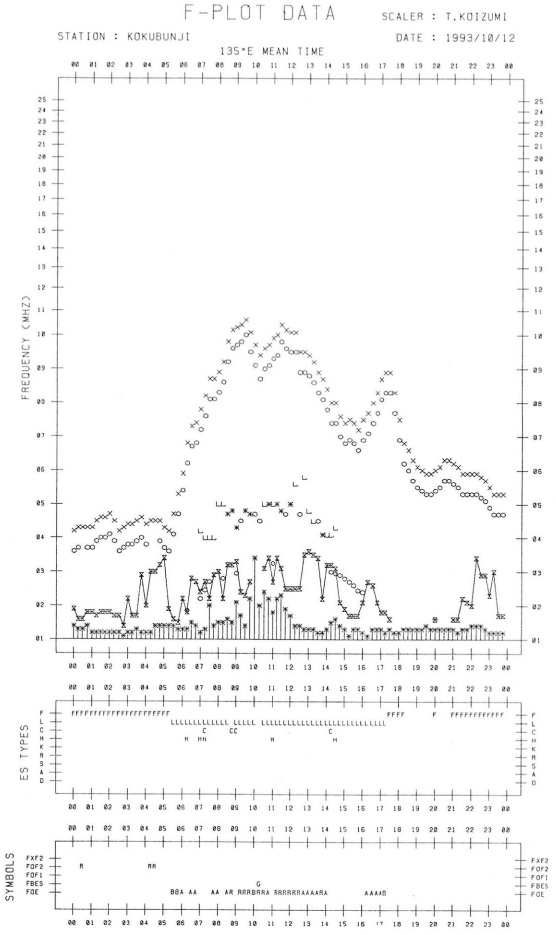

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

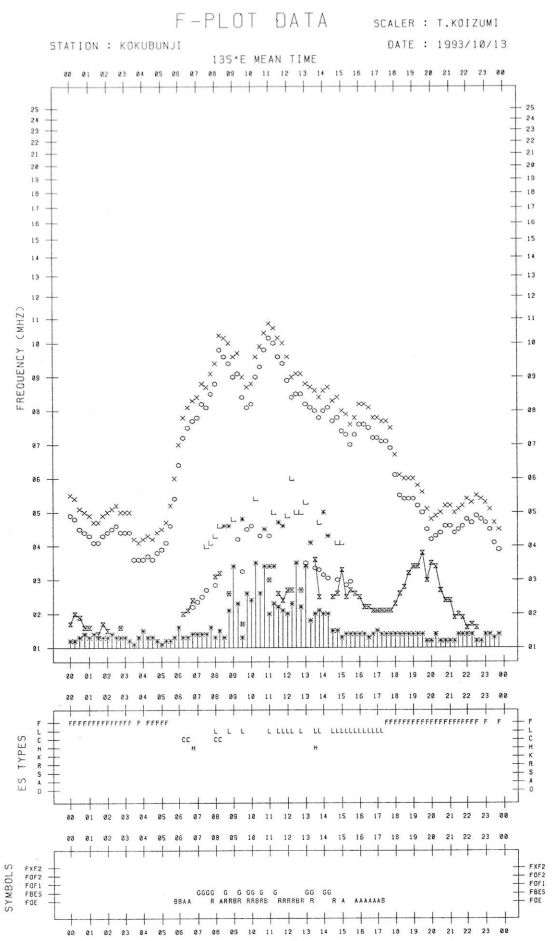

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

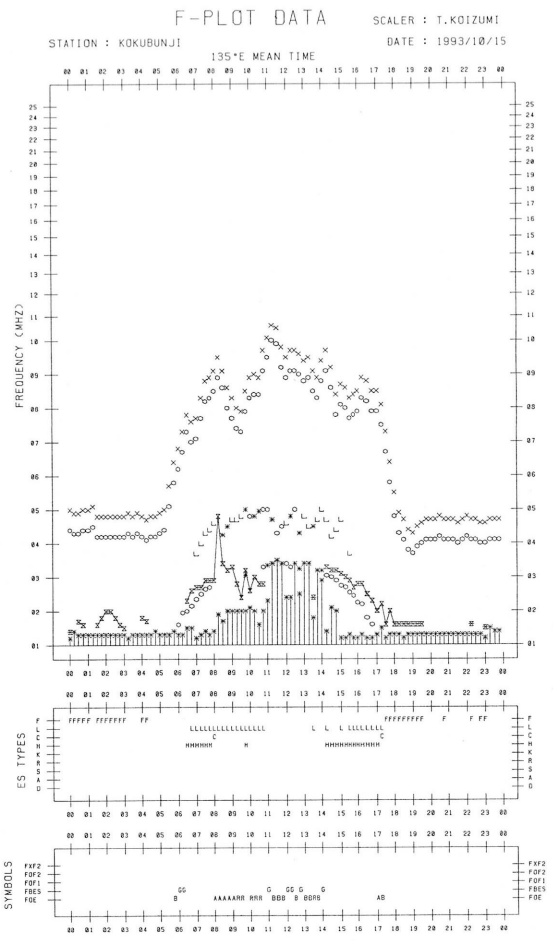

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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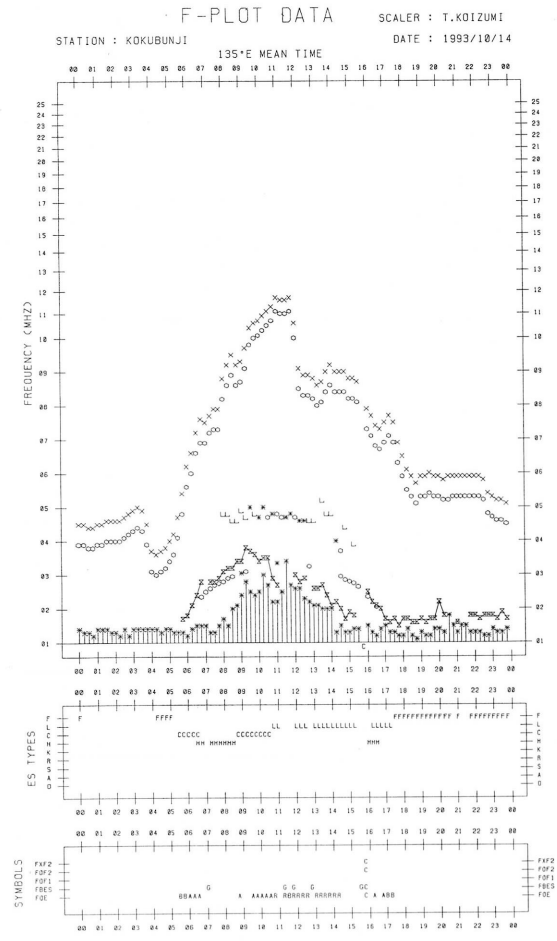
STATION : KOKUBUNJI
DATE : 1993/10/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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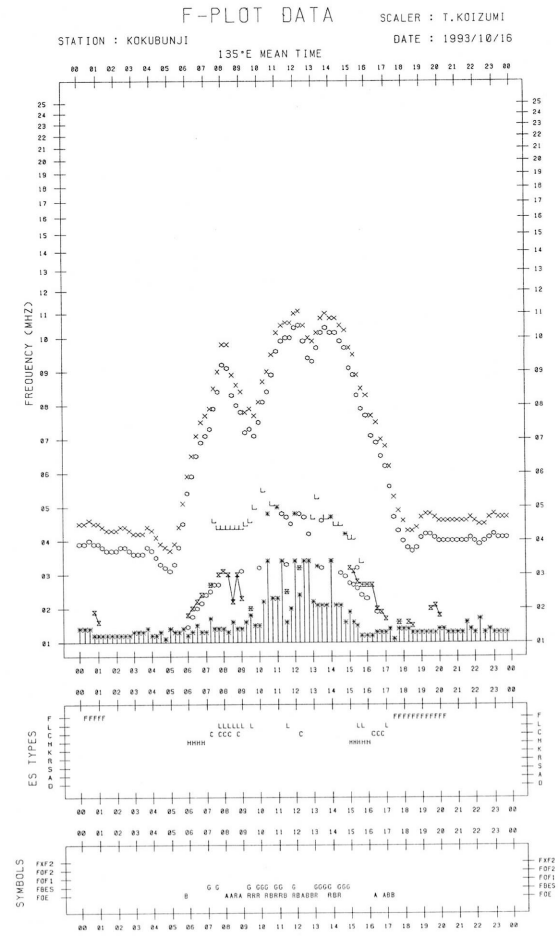
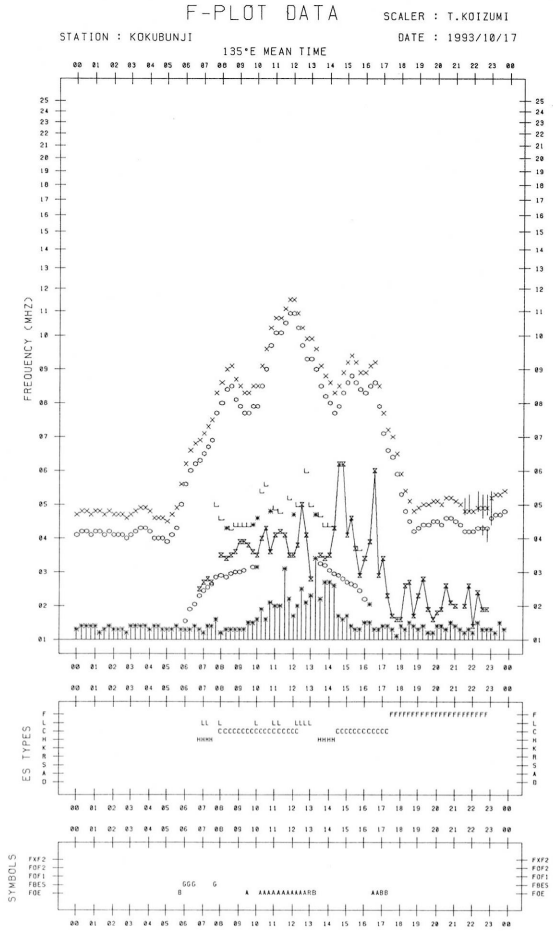
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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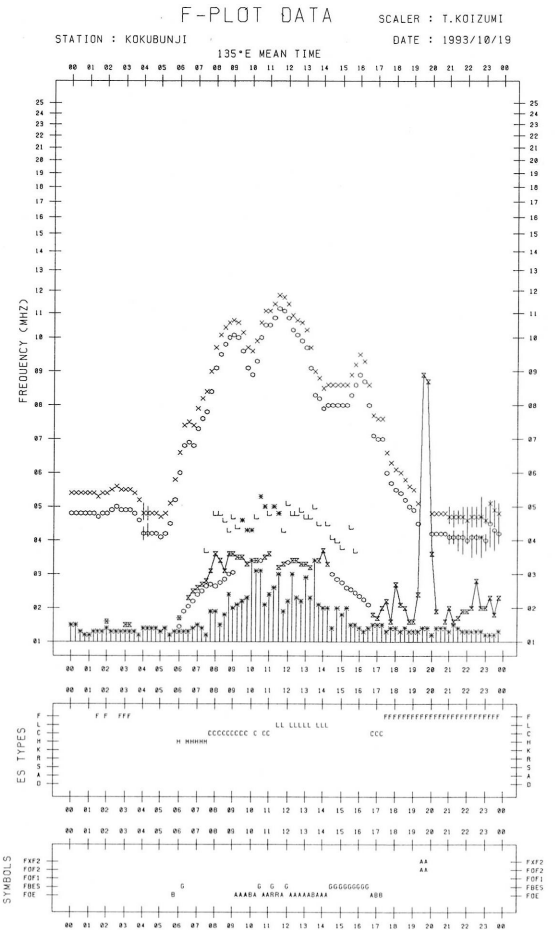
STATION : KOKUBUNJI
DATE : 1993/10/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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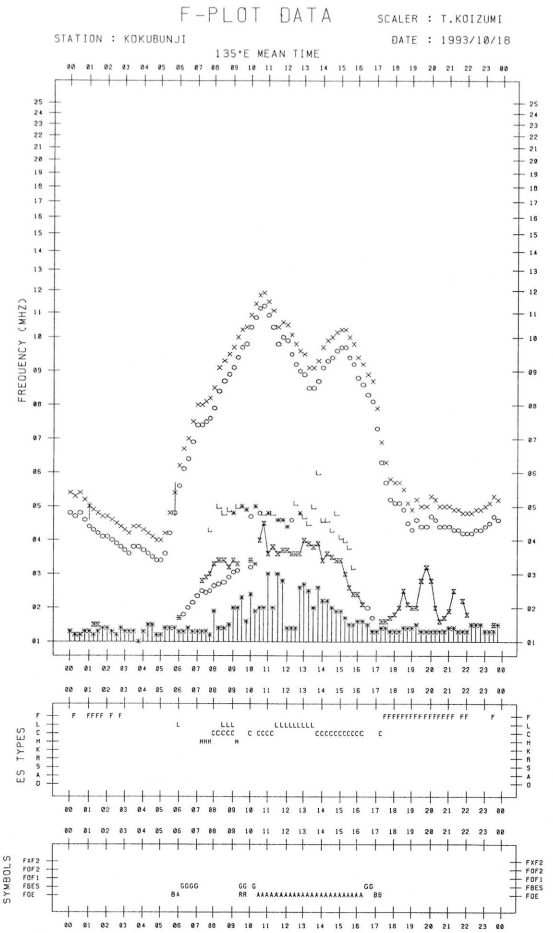
STATION : KOKUBUNJI
DATE : 1993/10/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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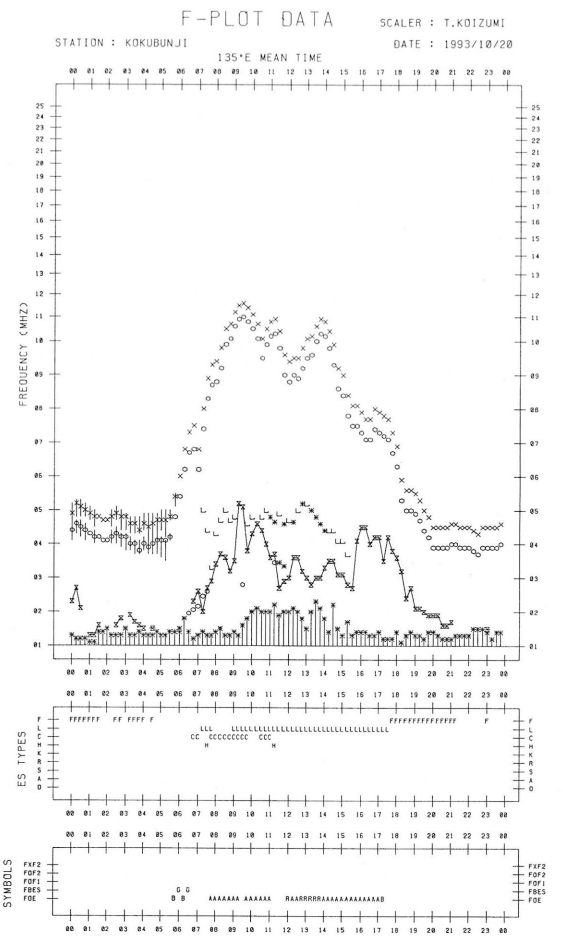
STATION : KOKUBUNJI
DATE : 1993/10/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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DATE : 1993/10/20
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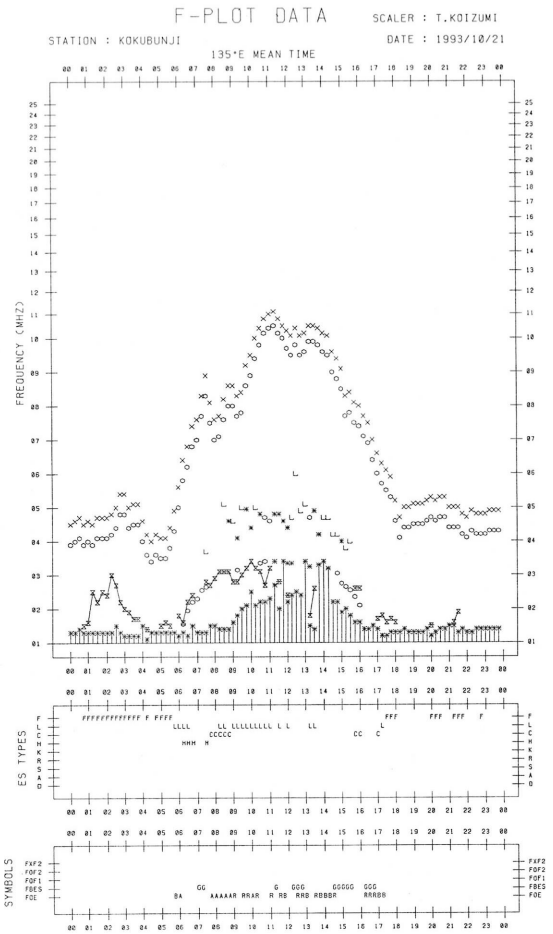
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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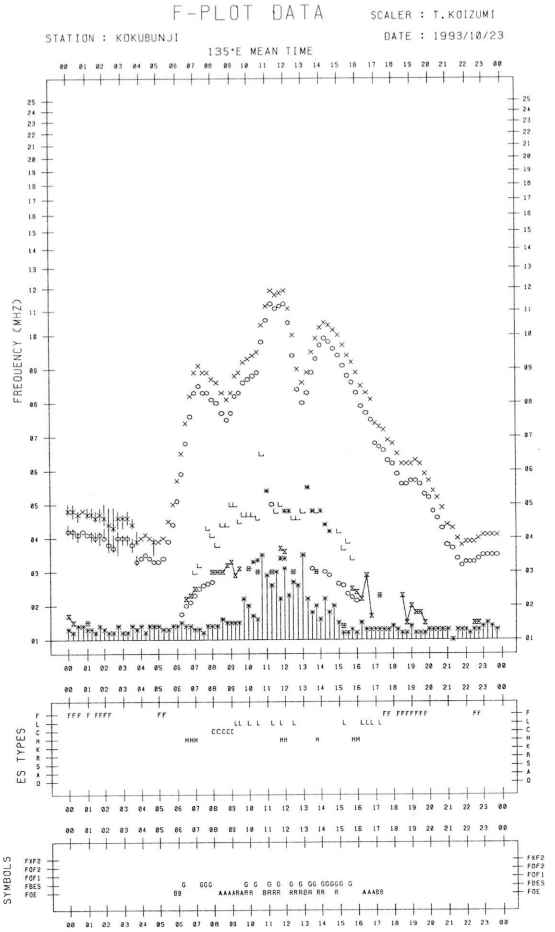
STATION : KOKUBUNJI
DATE : 1993/10/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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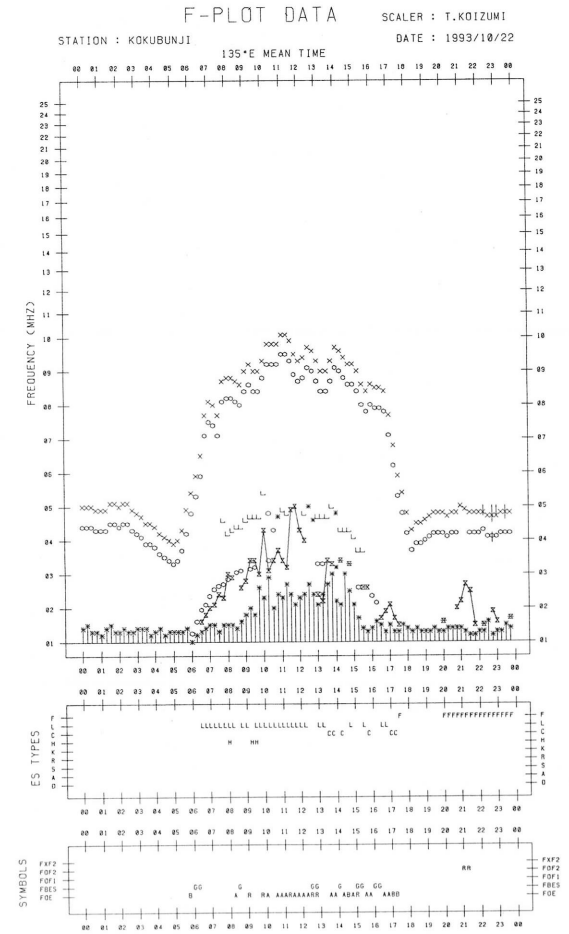
STATION : KOKUBUNJI
DATE : 1993/10/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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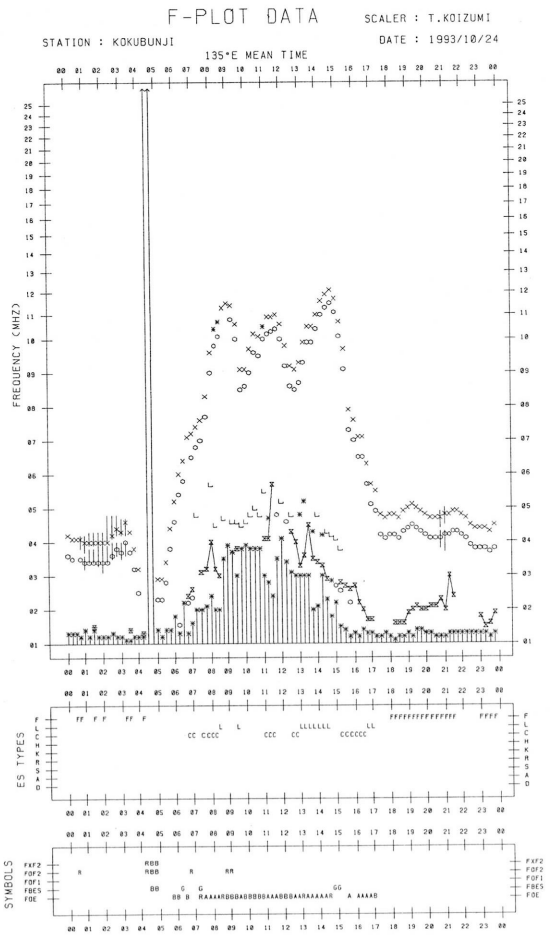
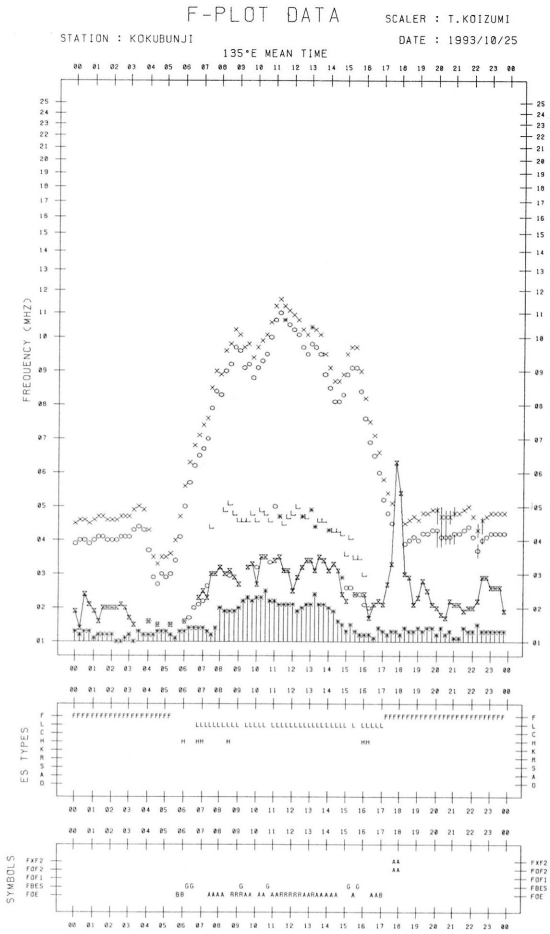
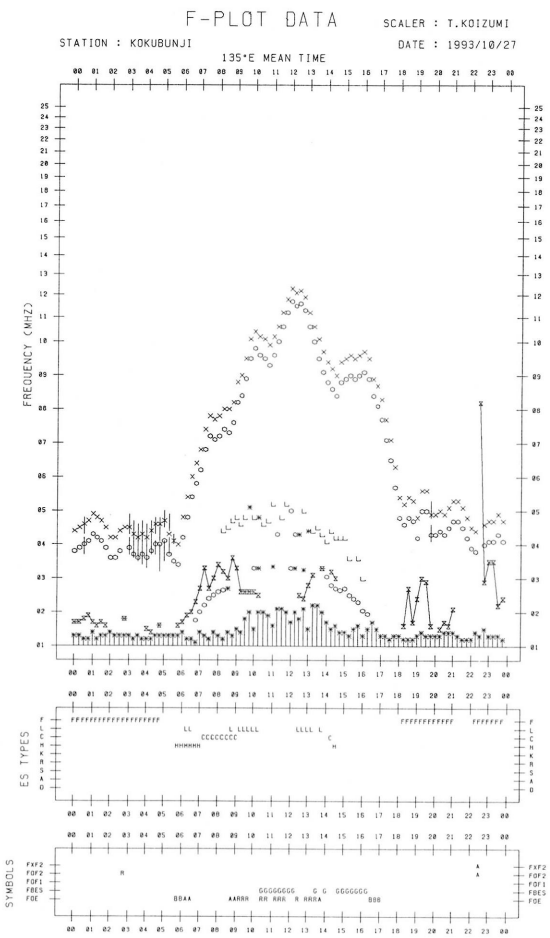
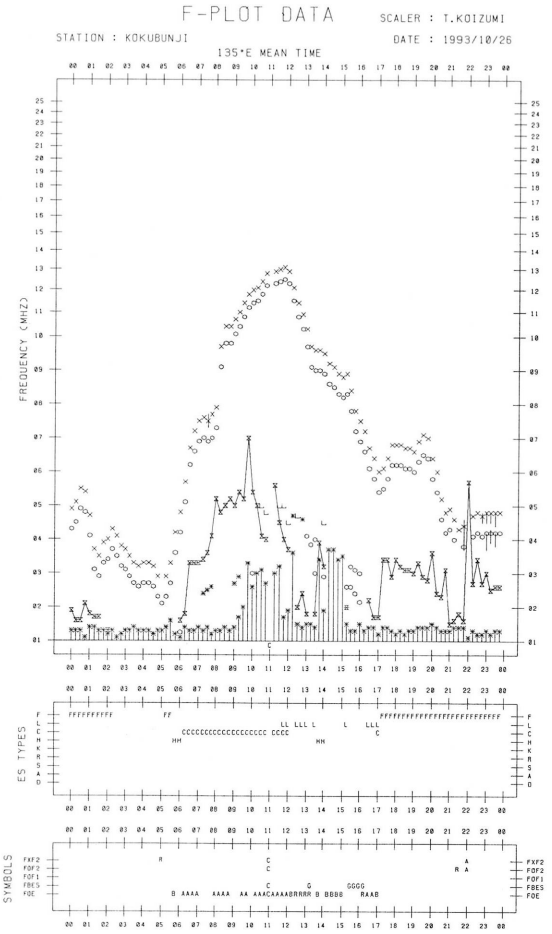
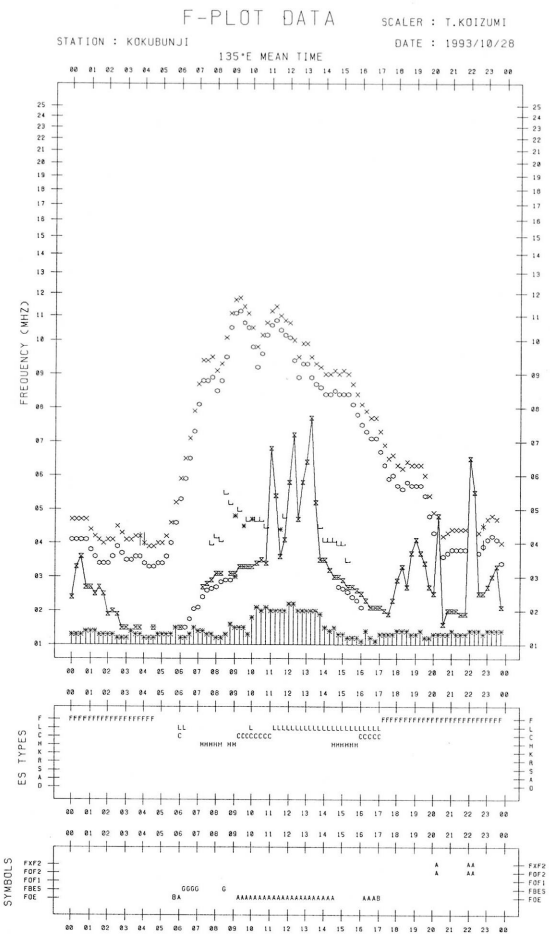
STATION : KOKUBUNJI
DATE : 1993/10/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

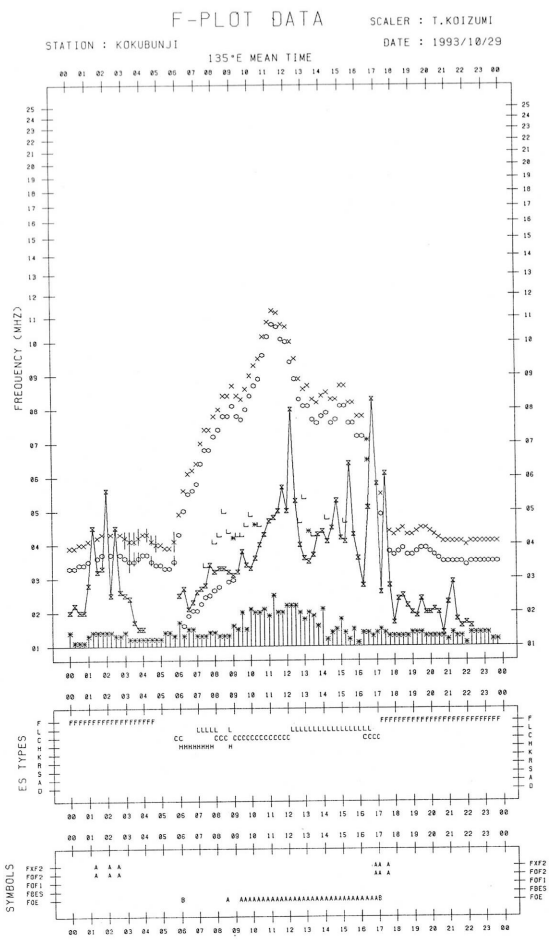

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

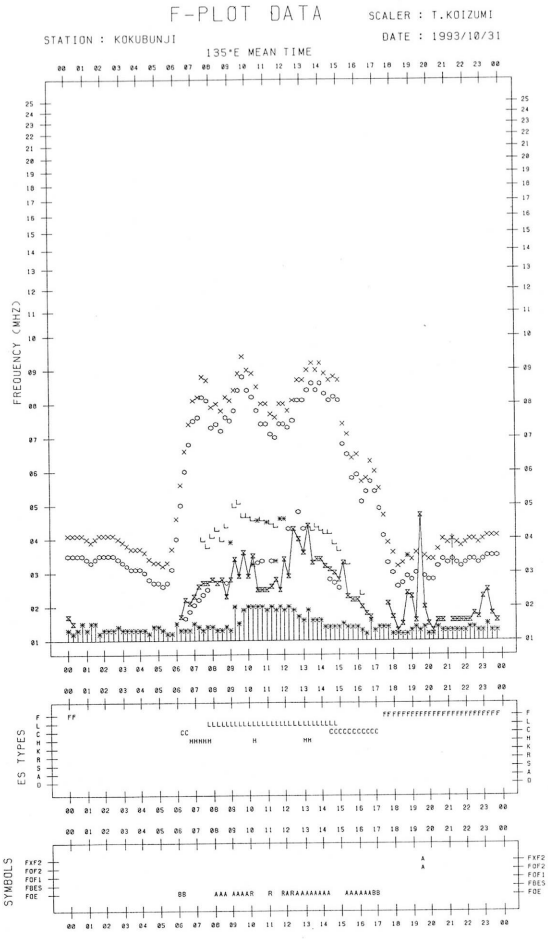

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

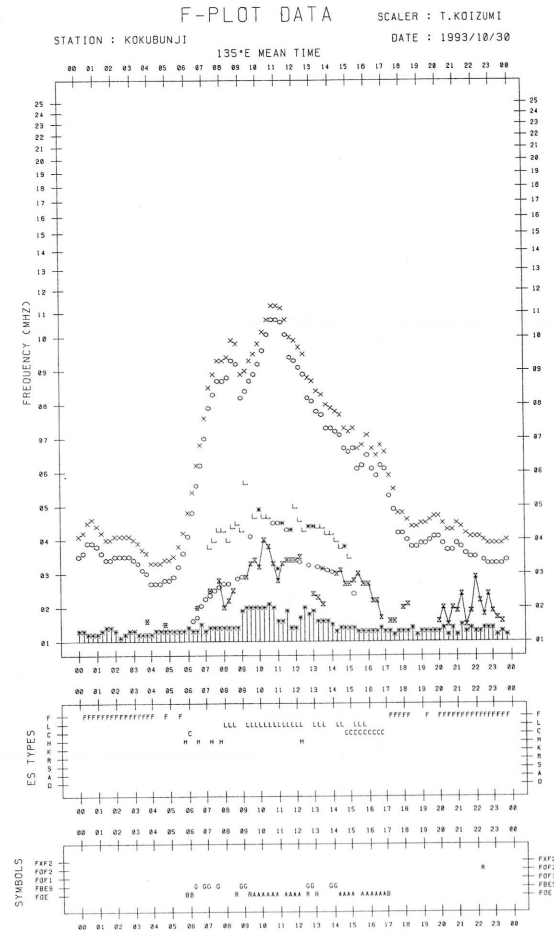

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/10/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Not available until system improvement is completed.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso October 1993

Single-frequency total flux observations at 500 MHz

Flux density: 10^{-22} $Wm^{-2}Hz^{-1}$

UT	00-03	03-06	06-09	21-24	Day
Date					
1	*	*	*	*	*
2	*	*	*	*	*
3	*	*	*	*	*
4	*	*	*	*	*
5	*	*	*	*	*
6	*	*	*	*	*
7	*	*	*	*	*
8	*	*	*	*	*
9	*	*	*	*	*
10	*	*	*	*	*
11	*	*	*	*	*
12	*	*	*	*	*
13	*	*	*	*	*
14	*	*	*	*	*
15	*	*	*	*	*
16	*	*	*	*	*
17	*	*	*	*	*
18	*	*	*	*	*
19	*	*	*	*	*
20	*	29	(29)	33	29
21	33	33	(33)	32	33
22	31	31	(31)	30	31
23	29	29	(29)	30	29
24	30	29	(29)	29	30
25	29	28	(28)	29	29
26	29	28	(28)	29	29
27	29	28	(28)	29	29
28	29	29	(28)	29	29
29	29	28	(28)	29	29
30	29	29	(29)	29	29
31	29	29	(29)	31	29

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso October 1993

Single-frequency observations

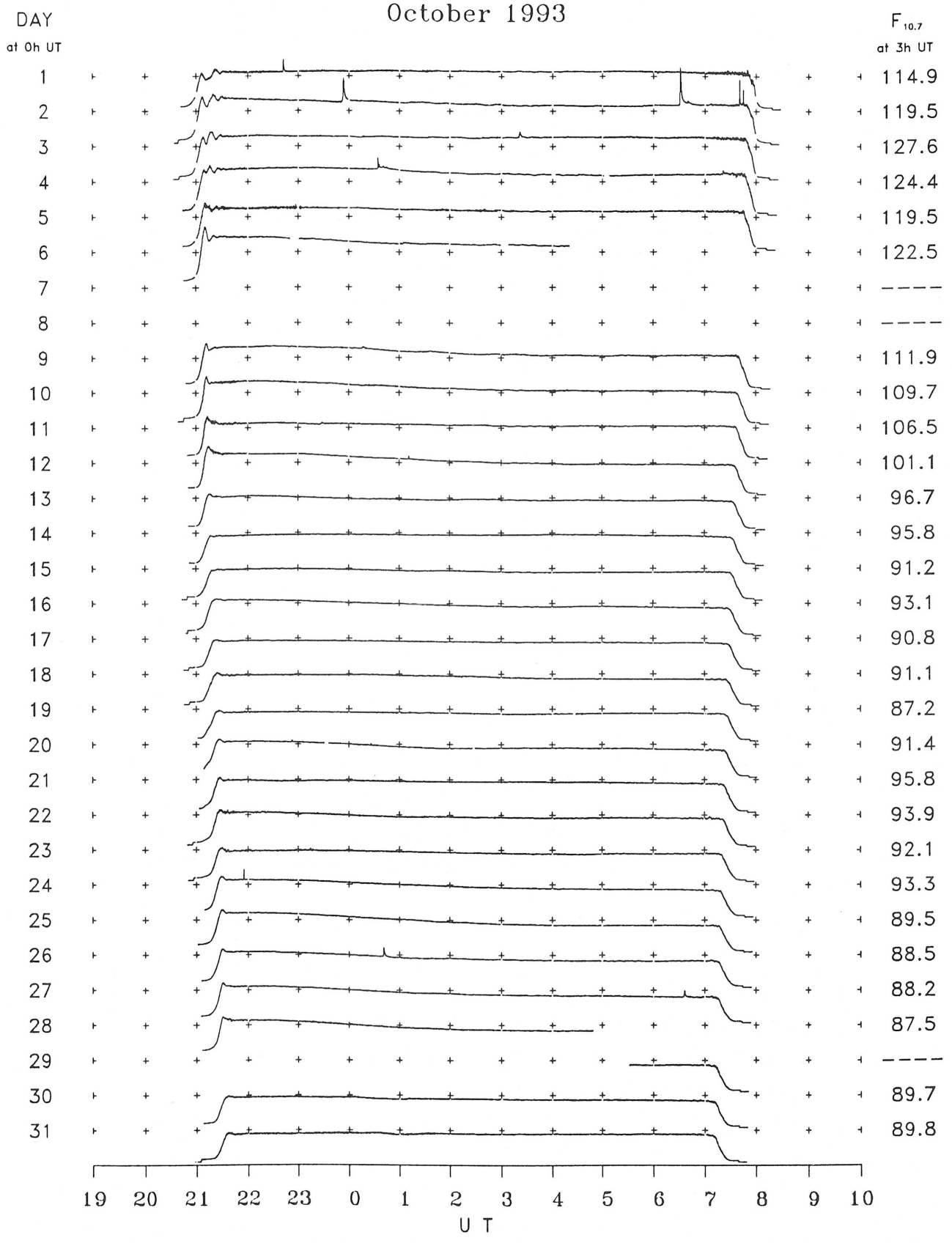
Normal observing period: 2050 - 0800 U.T. (sunrise to sunset)

OCT. 1993	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	500	46 C	0650.5	0651.4	2.0	13	7	WL
	2800	3 S	2351.2	2353.3	7.5	180	50	0
2	500	46 C	0630.7	0631.5	2.5	25	10	WL
	2800	45 C	0631.0	0631.7	13	105	70	0
	500	42 SER	0739.5	0739.8	6.0	45	-	WR
3	500	46 C	0319.8	0320.5	2.5	50	20	WL
	2800	2 S/F	0320.1	0321.1	6.5	16	5	0
4	2800	21 GRF	0033.6	0033.9	26	20	4	WL
	500	8 S	0033.8	0034.0	0.8	105	55	WL
9	2800	1 S	0016.0	0018.0	7.5	8	4	0
10	2800	1 S	2325.5	2328.0	5.0	4	2	WL
12	2800	8 S	0111.5	0112.0	0.7	10	6	0
20	2800	8 S	0026.5	0026.5	0.6	11	7	WL
23	2800	8 S	2154.5	2155.0	0.7	24	15	0
	500	8 S	2154.6	2154.8	0.5	4	-	0
26	2800	45 C	0040.1	0040.7	3.5	19	11	0
	500	46 C	0040.2	0040.6	2.8	9	4	0
27	2800	3 S	0635.7	0636.7	3.5	23	11	0
	500	1 S	0636.5	0636.8	1.5	6	3	0
29	500	42 SER	0152.2	0152.2	1.5	5	-	0
30	500	46 C	0010.8	0012.5	2.5	7	3	0
	500	8 S	0023.0	0023.0	0.3	11	-	0
31	500	42 SER	2231.5	2233.6	4.0	150	-	WL
	2800	45 C	2232.0	2232.2	3.0	15	7	0

B. Solar Radio Emission

B3. Summary Plots of $F_{10.7}$ at Hiraiso

October 1993



Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range ≧ 6°.

C. RADIO PROPAGATION

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

OCT 1993 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	-4	5	6	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	2	2	1	1
2	ES -25	-10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	5	-3	2	2
3	-5	-4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	0	ES -25	-1
4	-10	6	-10	1	-3	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-4	-1	1
5	-1	-4	5	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-6	-4	ES -4	-2
6	C	C	C	C	C	C	C	C	C	ES -4	ES -25	ES -25	ES -25	ES -25	ES -25	-6	ES -25	ES -25	-10	-4	-6	-2	ES 1	2
7	1	1	5	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES 1	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-2	-2	ES -2	-2
8	2	-2	ES -25	0	-2	1	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	-2	4	5	-2
9	-1	3	-1	4	ES -25	ES -25	ES -25	-3	ES -25	ES 1	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-10	-2	ES 5	ES -25
10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES 1	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-6	ES 3	-2
11	-7	1	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	5	5	0
12	-7	3	5	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES 3	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-2	8	1
13	-1	1	ES -25	ES -25	C	C	C	C	ES -25	ES 8	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-1	-4	-2	-2
14	-6	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	2	2	5
15	4	1	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-7	-2	-2	5
16	-4	1	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	-4	-2	3	ES -25	-5	-2	1	-2
17	1	-2	9	ES -25	ES -25	ES -25	ES -25	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-3	ES -25	-4	1	-10	1	2	3	-2
18	-4	0	2	-4	ES -26	ES -26	ES -26	ES -26	-3	ES -26	ES -26	ES -26	ES -25	ES -25	ES -25	ES -25	ES -25	-1	ES -25	ES -25	-2	-1	4	1
19	0	7	-3	-2	-3	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-6	ES -26	-1	-3	4	3
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21	6	0	3	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-3	3	-6	ES -26	5	3	3	3
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23	7	7	0	-2	-7	ES -26	ES -26	-5	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-11	ES -26	-5	3	3	0
24	2	5	0	10	1	ES -26	ES -26	-3	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-5	2	5	0
25	2	-5	-8	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	2	-7	-11
26	ES -26	ES -8	ES -5	ES -26	ES -26	-2	-11	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-2	-1	1	0
27	1	-1	13	11	5	ES -25	ES -25	ES -25	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-4	-3	ES -25
28	-10	ES -25	ES -25	-10	ES -25	ES -12	S	ES -10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-7	-7	0	2	-3
29	ES -25	-5	0	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-3	-2	-1
30	-4	-4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-3	1	1
31	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-3	1	1
CNT	30	30	30	30	29	29	28	29	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	-2	0	-4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-6	-2	US 1	0
UD	4	7	5	6	ES 1	ES -12	ES -25	-3	ES -25	ES 1	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-2	-3	-10	2	4	5	3
LD	ES -25	ES -25	ES -25	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -25	-4	ES -4	-11

C. RADIO PROPAGATION

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

OCT 1993 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	2	8	5	9	14	10	0	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	2	6	6	4	2
2	-10	-1	3	11	9	22	14	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	4	4	3	2	0
3	0	5	4	11	17	5	-5	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-8	4	-3	0	-1	-1
4	-2	4	8	6	11	11	4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-2	ES -25	-3	3	6	11	-12
5	-2	3	4	17	14	14	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	-1	8	6	1	-6
6	C	C	C	C	C	C	C	C	ES 1	ES -25	ES -25	ES -25	ES -25	-4	-1	ES -25	ES -25	ES -25	ES -25	-10	10	4	6	2
7	-1	3	6	16	8	8	13	10	2	5	ES -25	-12	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	3	5	-1	-2	-2
8	1	5	1	5	20	15	11	-4	ES -4	ES -25	ES -25	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-7	6	1	5	1
9	2	9	7	14	16	19	14	17	18	9	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-2	6	9	5	1	-1
10	10	5	6	8	12	10	17	-2	8	4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	3	6	5	5
11	5	8	12	11	11	17	2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-10	18	9	5	3
12	5	6	7	10	18	19	ES -25	-2	ES 3	8	5	-2	ES -25	ES -25	ES -25	ES -25	ES -25	6	ES -25	9	10	13	2	1
13	5	10	11	13	C	C	C	C	ES 8	-7	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	3	11	16	5	12
14	4	5	3	8	14	7	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-7	4	17	6	11	6
15	1	5	9	13	21	14	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	3	8	15	11	5	10
16	5	5	12	12	17	10	ES -25	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-4	17	6	7	5
17	13	5	12	12	21	20	13	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	17	-10	11	2	12	9	12
18	7	7	8	13	16	16	14	2	ES -26	ES -26	ES -26	ES -26	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	4	7	3	10	3
19	5	8	8	8	8	15	7	-5	-3	-11	ES -26	0	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	3	13	10	5	3
20	2	7	13	20	ES 15	0	-5	-4	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	17	3	8	14	-2
21	6	4	13	10	14	8	ES -26	-6	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-2	17	5	11	5
22	12	9	13	14	13	13	3	0	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	5	4	14	3	7
23	2	8	10	15	11	13	13	7	10	13	5	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-2	11	5	1	8
24	6	3	7	14	14	17	1	-1	-6	-5	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	-2	7	6	2	6
25	2	8	10	11	16	11	-5	ES -26	-5	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	6	15	8	2
26	ES -26	5	7	7	8	9	-2	-5	ES -26	6	7	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	3	2	9	4	-3
27	6	10	11	11	7	11	16	-4	13	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	7	9	9	9
28	7	3	6	11	8	14	S	2	-4	-1	-4	-4	ES -25	ES -25	ES -25	ES -25	ES -25	-3	7	1	5	3	-1	8
29	12	10	9	9	11	3	ES -25	5	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-1	6	7	0
30	6	7	9	9	9	-1	1	-1	-2	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	11	10	8	6
31	1	1	6	11	11	9	-4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	6	9	7	5
CNT	30	30	30	30	29	29	28	29	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	4	5	8	11	US 14	11	1	-4	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	1	7	6	5	3
UD	12	10	13	16	20	19	14	7	10	8	5	-2	ES -25	ES -25	ES -25	ES -25	ES -25	-2	-2	9	17	14	11	10
LD	-2	3	3	7	ES 8	3	ES -25	ES -25	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -26	ES -25	2	1	-1	-3

C. Radio Propagation

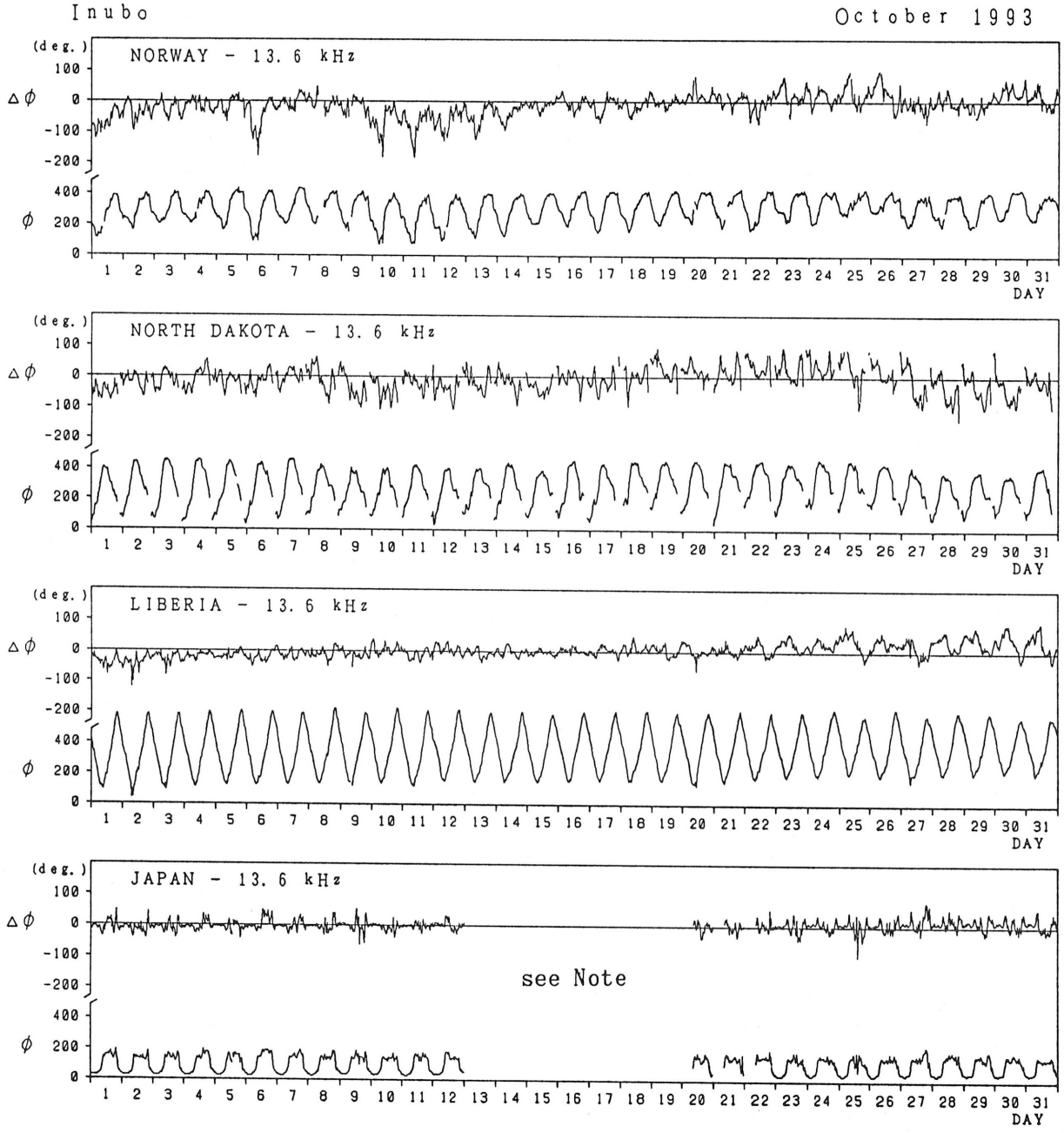
C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso — Time in U.T.

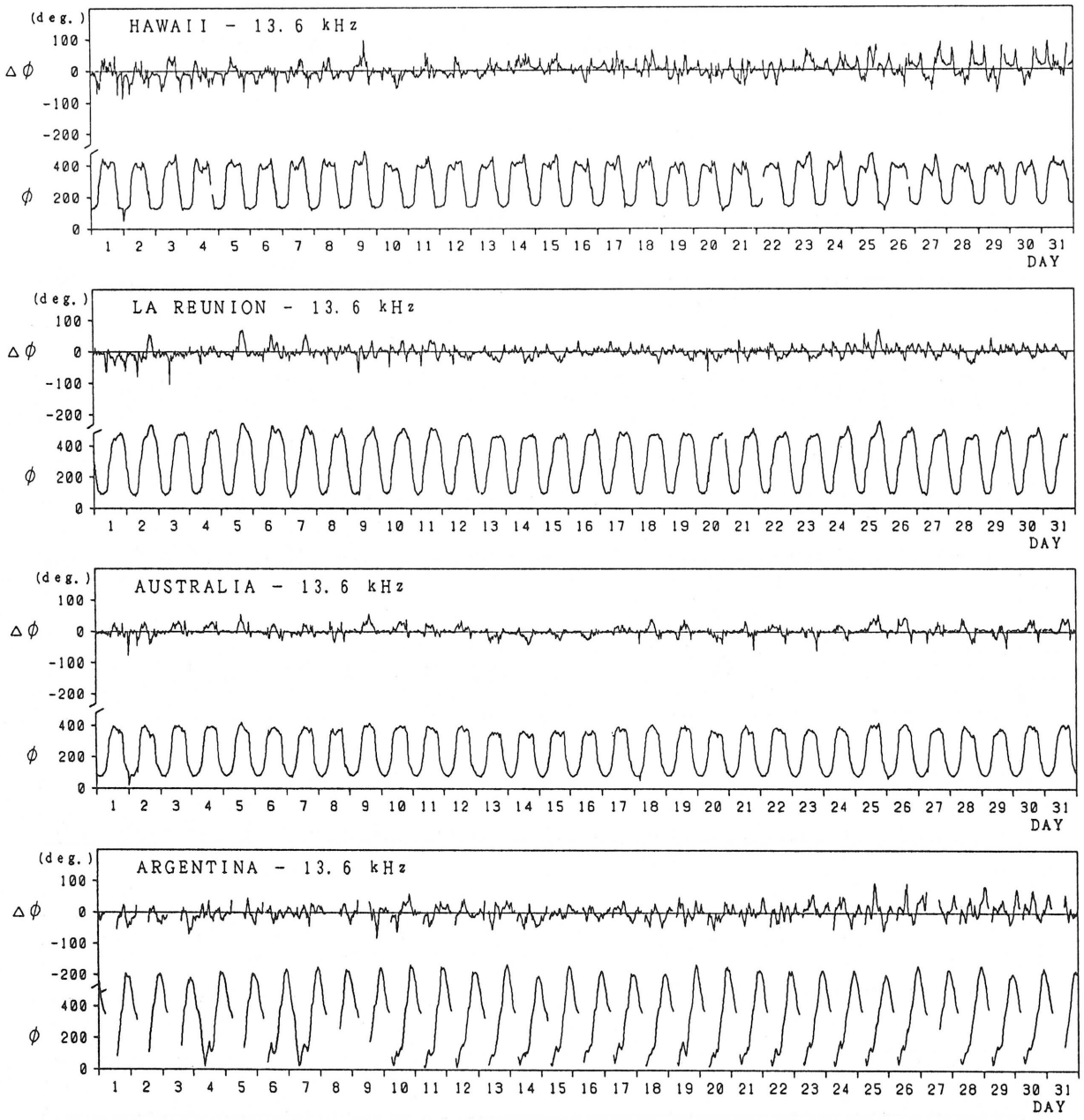
Oct. 1993	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Condition 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4-	4u - - 4	4 3u - 4	N N N N			
2	3+	2u - - 4	4 3u - 4	N N N N			
3	3+	3u - - 3u	4 2u - 4	N N N N			
4	4-	4u - - 3u	4 3u - 4	N N N N			
5	3+	4u - - 4u	4 1u - 4	N N N N			
6	4+	C - 5u 4u	C C 5u 4	N N N N			
7	4o	4u - - 4u	4 5u - 3	N N N N			
8	4+	4u - - 4	4 5u - 4	N N N N	23.4	----	163
9	4o	4u - - 3u	4 5u - 4	N N N N	----	----	
10	3+	2u - - 3u	4 5u - 3	N N N N	----	----	
11	4-	4u - - 4u	4 3u - 4	N N N N	----	18	
12	4o	4u - - 4u	4 4u - 4	N N N N			
13	4-	3u - - 4	4 - - 4	N N N N			
14	3o	3u - - 3u	4 1u - 4	N N N N			
15	3+	4u - - 4	4 1u - 4	N N N N			
16	4-	3u - 5u 4	4 2u - 4	N N N N			
17	4o	4u - 5u 4	4 3u - 4	N N N N			
18	4+	4u - - 4	4 5u - 4	N N N N			
19	4+	5u - - 4	4 5u - 4	N N N N			
20	4-	4u - - 4	4 3u - 4	N N N N			
21	4o	5u - 5u 4	4 2u - 4	N N N N			
22	4o	4u - - 4	4 4u - 4	N N N N			
23	4+	5u - - 4	4 5u - 4	N N N N			
24	4+	4u - - 4	4 5u - 4	N N N N			
25	4-	4u - - 3u	4 3u - 4	N N N N	06.1	24	108
26	4-	3u - - 4	3 4u - 4	U U U U			
27	4o	5u - - 3u	4 5u - 3	U U U U			
28	4o	3u - - 4	4 5u - 4	U U U U			
29	3+	3u - - 3u	4 3u - 3	U U U U			
30	3+	3u - - 3u	4 4u - 3	U U U U			
31	3-	2u - - 3u	4 2u - 3	U U U U			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo



Inubo October 1993



Note: As for JAPAN-13.6kHz, no record during 13 October 0000 UT - 22 October 0900 UT, due to the maintenance of transmitter.

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

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Oct. 1993	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS	BBC						
1			15			2352	24	1 S	1	x	C
7			5			0412	13	2 SL	1-	x	C
9			7			0807	18	2 SL	1-	x	C
9		>14				1906	34	2 SL	2-	x	C
26		>25	14			0040	18	1 S	1	x	C

NOTE CO:Colorade(WWV) HA:Hawaii(WWVH) AUS:Australia MOS:Moscow BBC:London
* Optical and X-ray Flares

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Oct. 1993	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	Ω/AU	Ω/H	Ω/ND	Start	End	Maximum
1				7	7		0012	0034	0020
1	–	24	27				0844	0945	0856
1	33	27	42	86	73	45	2346	0150	2359
2	55	110	121	71	14		0632	0740D	0641
2		74	36	19			0740E	0909	0755
2			14				0905	0923	0910
2		44	7				1213	1254	1221
3				5	5		0016	0053	0023
3				7			0256	0322	0308
3		24	13				0910	0926D	0923
3	21	108	88				0926E	1048	0937
3		12					1204	1220D	1210
3		20					1220E	1240	1230
3		34					1242	1317	1256
3				12	16	–	2031	2122	2041
4				12	9		0033	0114	0049
4				6	5		0132	0154	0140
4				10	14	–	2054	2128	2111
6				6	4		0106	0134	0115
6				7	5		0138	0207	0145
7	28	13	36	36	14		0413	0508	0422
7	11	13					1455	1515	1459
7				33	27	24	2134	2216	2142
8	61						1148	1238	1158
8		32					1417	1459	1424
9	18			8	6		0012	0039	0022
9	–	–	66				0808	0927	0816
9					53	26	1910	1945	1917
9				7	8	20	2240	2257	2244
10				5	9		2328	0010	2335
11		21	21				0902	0942	0910
12					11	–	2105	2111	2135
20			12			29	0750	0817	0755
20			35				0821E	0914	0828
20	22	97	90				0955	1026	1002
20		22					1216	1256	1255
24	10		12	12			0501	0536	0506
26	21	30	27	55	49	48	0041	0152	0049
27	36	65	67	49	18		0635	0730	0644
28	–		13				0752	0821	0806
30	10			6	6		0013	0039	0021
31		14					0832	0901	0838
31		51					1114	1236	1145

IONOSPHERIC DATA IN JAPAN FOR OCTOBER 1993
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