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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 Scaling

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

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972 " and its revision of chapters 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

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

UD \ HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	35	40	40	34	40	42	61	59	76	78	83	86	74	76	78	89	78	54	A	31	A	32	38	37
2	30	43	38	35			64	52	68	81	78	88	89	74	68	65	64	53	48	48	47	41	A	38
3	40	38	44	43	40	37	59	56	92	76	80		65	66	66	64	63	51	40	40	A		35	38
4	37	30	37	38	35	C	65	66	83	77	75	90	87	89	81	83	78	73	66	25	49	52	52	52
5	43	49	43	42	35	38	71	53	53	56	54	67	69	66	67	70	58	50	26	38	26	30	32	34
6	38	40	34	40	A	37	A	53	63	77	77	77	74	66	68	70	66	54	43	42	38	A	36	A
7	30	A	34	35	26	A	54	52	74	74	80	82	71	70	65	65	71	53	35	A	A	A	A	32
8	A	A	A	34	34	28	A	64	72	72	78	78	76	76	73	88	62	A	22	38	37	A	A	A
9	A	A	37	36	38	32		60	81	A	89	A		87	76	70	63	52	29	38	38	37	43	43
10	37	42	40	26	38	34	34	64	84	75	86	65	83	77	68	78	72	52	37	37	43	40	40	40
11	42	A	48	52	47	43	65	64	85	81	83	78	87	76	70	78	64	41	28	38	40	32	28	38
12	30	43	44	47	44	31	89	62	84	80	74	76	80	76	66	68	54	A	A	34	A	31	34	A
13	34	37	37	37	40	41	38	71	71	84	74	78	77	84	80	71	66	A	28	38	35	30	34	35
14	30	37	38	36	37	34	71	64	88	90	90	85	85	N	77	84	64	53	38	34	34	30	30	31
15	32	31	32	35	32	37	65	65	67	89	86	90	88	77	76	80	60	A	35	A	43	40	35	
16	42	26	44	47	51	47	65	64	87	77	88	73	82	83	63	77	77	A	37	34	A	46		36
17	28	A	A	37	35	43	N	54	70	78	86	90	96	76	75	70	66	54	30	37	38	32	35	34
18	30	36	34	35	36	38	85	62	76	72	80	82	76	78	78	67	57	35	40	40	34	A	30	30
19	29	30	35	N	26	N	87	52	88	78	86	111	96	108	88	84	63	54	A	30	36	36	34	35
20	41	47	49	54	44	51		64	63	73	75	90	90	77	72	82	58	35	32	A	A	35	34	42
21	38	42	38	52	53	52	53	66	66	80	70	85	82	90	77	78	58	A	34	32	A	A	A	38
22	37	34	37	37	37	36		51	62	65	74	82	78	75	78	80	62	A	29	23	30	46	30	A
23	34	37	36	37	36	37	31	58	57	62	62	66	67	78	83	76	A	A	A	A	A	29	A	A
24	35	A	26	35	37	30	71	54	66	72	70	71	72	72	71	52	63	A	25	30	25	28	35	30
25	37	37	37	35	36	34	31	51	49	59	66	62	76	72	71	73	48	54	38	31	30	29	32	35
26	34	26	35	37	37	36		54	65	72	66	77	84	71	64	55	52	43	31	34	A	36	34	37
27	A	38	26	42	42	48	76	48	65	72	76	72	78	70	85	88	61	38	40	A	46	A	40	40
28	40	43	42	44	45	48		71	59	66				64	61	64	51	43	32	34	34	34	34	34
29	37	35	34	37	37			58	85	66	70	59	74	88	62	68	55	54	34	26	30	29	30	32
30	32	36	35	37	34	37		51	64	78	88	88	68	66	71	65	53	A	40	34	36	34	22	38
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	24	28	29	28	25	20	30	30	29	29	27	28	29	30	30	29	20	26	25	21	23	24	24
MED	35	37	37	37	37	37	65	58	70	76	78	78	78	76	72	72	63	52	34	34	36	34	34	36
U Q	38	42	41	42	41	43	71	64	84	79	86	88	86	80	78	80	66	54	40	38	41	40	35	38
L Q	30	34	34	35	35	34	53	53	64	72	72	72	74	70	67	67	57	43	29	31	32	30	31	34

HOURLY VALUES OF FES AT WAKKANAI

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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	24	G	G	32	43	59	G	G	G	G	G	G	59	G	G	G	G	38	60	45	58	34	24	32
2	24	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	57	G
3	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	38	34	G	G	G	32		G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	55	38	31	G	25	G	G
5	G	G	26	27	G	G	26	G	G	G	G	G	G	G	G	39	G	34	33	G	G	G	G	G
6	G	G	28	30	41	40	58	58	G	G	G	G	G	G	G	G	G	31	37	G	G	27	28	37
7	32	32	23	24	24	36	58	40	66	50	G	60	G	G	G	G	G	G	27	40	60	44	58	23
8	35	60	32	G	30	32	59	56	G	G	G	40	60	40	50	58	52	68	28	58	55	69	72	60
9	58	36	33	31	31	G	G	G	37	83	68	95	120	84	54	39	39	40	38	G	G	G	G	G
10	23	G	24	34	28	26	28	G	G	48	38	46	45	45	39	G	G	G	G	G	G	40	37	33
11	32	58	25	34	28	26	30	G	G	40	45	57	G	G	G	G	34	33	34	G	31	G	G	G
12	G	G	G	G	G	28	G	G	G	G	G	G	G	G	G	54	39	40	82	72	49	30	G	39
13	G	G	G	G	G	32	34	G	G	G	G	G	G	G	G	G	G	58	50	32	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	56	59	34	28	G	28	G
16	27	26	29	26	G	G	G	G	G	G	G	G	58	G	G	52	39	53	150	24	33	36	G	G
17	41	41	36	40	G	G	G	G	G	G	G	G	G	G	G	G	36	44	38	G	G	G	G	G
18	G	G	G	24	G	G	G	G	G	G	G	G	G	36	G	30	36	29	28	30	40	38	G	G
19	G	G	G	G	G	G	G	29	G	48	47	102	G	G	G	G	52	55	36	27	G	G	G	G
20	G	G	28	G	G	G	G	G	32	G	G	G	G	G	G	G	33	36	39	55	59	57	G	30
21	G	G	G	G	G	36	G	26	G	G	G	G	54	G	G	54	30	72	48	37	58	66	34	G
22	G	24	G	G	G	G	G	36	G	39	G	38	G	G	36	36	34	78	32	G	38	69	40	33
23	G	G	26	G	26	G	G	29	G	34	48	G	60	41	G	G	72	36	32	39	39	26	36	33
24	49	35	33	33	G	28	G	29	57	55	56	84	53	43	G	36	38	57	33	G	G	39	40	33
25	36	29	G	G	G	G	G	G	G	36	G	G	G	G	G	35	28	32	G	24	36	25	G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	36	33	26	G	G	G	48	36	24	28
27	32	26	33	G	G	G	G	46	G	G	G	G	46	36	G	G	33	G	G	35	G	39	36	30
28	26	G	G	G	G	30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
29	25	G	G	25	G	G	G	G	48	G	39	G	G	G	G	G	G	30	G	G	26	G	G	G
30	G	G	G	G	G	G	G	30	G	36	80	G	36	G	G	G	G	57	34	60	58	34	35	32
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	36	33	24	30	30	G	G
U Q	32	26	28	27	24	28	G	29	G	36	38	38	46	G	G	36	36	55	38	37	48	39	36	32
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

NOV. 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	16	14	15	15	14	15	17	17	30	33	42	33	49	30	32	26	24	16	15	15	15	15	15	16
2	15	15	14	15	15	15	17	16	20	18	39	21	33	29	18	17	20	18	15	15	15	15	15	15
3	15	14	15	14	14	15	15	24	20	20	21	45	33	44	32	22	16	18	17	16	29		16	15
4	15	14	15	14	14	C	17	24	17	21	32	18	42	21	20	27	18	16	14	15	15	15	15	15
5	15	15	14	15	15	15	16	28	24	18	40	39	38	30	21	16	16	16	15	15	17	18	15	15
6	16	14	15	15	15	14	16	16	24	32	20	20	18	18	16	26	18	16	15	15	15	16	15	15
7	15	15	15	16	15	16	16	16	17	18	26	22	46	38	27	27	18	14	15	15	15	15	15	15
8	15	15	15	14	15	15	16	16	17	29	42	22	18	21	16	16	16	17	16	15	15	15	16	15
9	15	14	15	14	15	14	18	22	17	18	20	21	23	18	17	17	15	18	15	15	15	15	15	15
10	15	14	15	14	14	15	17	22	28	28	18	26	23	18	23	27	16	16	15	15	15	16	15	15
11	15	15	15	15	14	15	18	21	27	18	23	27	32	28	17	23	16	16	16	16	16	15	20	15
12	16	14	15	15	15	14	16	20	27	30	39	36	40	45	27	20	16	16	15	16	16	15	15	15
13	15	14	15	14	14	14	15	23	28	40	42	43	40	32	28	24	18	15	15	15	15	16	15	15
14	16	15	15	15	15	15	16	21	30	43	45	40	45	30	40	24	18	18	15	15	15	15	15	15
15	15	15	15	15	15	15	20	20	26	21	23	29	20	30	22	28	18	16	15	15	15	15	14	16
16	16	14	15	15	15	15	18	21	27	29	21	21	22	18	21	18	18	16	15	17	15	15	16	15
17	15	14	15	15	15	15	18	20	26	18	21	23	22	27	27	22	17	16	15	15	15	15	14	15
18	15	15	15	15	15	15	16	20	18	18	41	35	21	20	20	27	16	17	15	17	16	15	16	15
19	18	15	15		15	15		20	18	17	17	20	21	32	32	26	20	17	15	16	15	16	16	15
20	15	14	15	14	16	14	17	20	18	18	21	35	45	32	18	23	16	16	15	16	20	17	15	15
21	16	15	15	15	14	14	17	16	20	27	39	29	29	18	29	18	15	16	14	15	15	15	16	17
22	15	15	15	15	14	14	21	16	21	18	22	20	21	29	22	18	17	16	16	16	15	16	15	15
23	15	15	15	15	15	14	16	17	26	20	20	21	20	18	26	18	17	16	15	15	15	15	15	15
24	15	17	16	20	15	15	20	18	17	18	20	18	20	18	28	20	17	20	18	16	15	15	15	14
25	16	15	14	15	14	14	17	18	24	17	18		18	21	17	20	16	16	15	15	15	18	16	15
26	15	15	15	15	15	15	21	21	26	16	20	18	18	17	17	16	16	16	15	15	14	14	16	15
27	15	15	15	15	15	14	17	21	26	17	17	18	18	17	17	22	16	17	15	15	14	15	18	16
28	15	16	16	14	15	15	26	20	27	46	48	52		21	27	23	18	22	16	14	15	15	15	15
29	15	15	16	15	15			18	24	17	18	30	30	33	26	24	22	18	15	17	15	15	16	15
30	15	15	16	15	14	15	20	17	28	27	23	30	45	44	45	30	21	16	15	15	15	15	16	16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	30	28	28	30	30	30	30	29	29	30	30	30	30	30	30	30	30	29	30	30
MED	15	15	15	15	15	15	17	20	24	19	22	26	23	28	22	22	17	16	15	15	15	15	15	15
U Q	16	15	15	15	15	15	18	21	27	29	39	35	40	32	28	26	18	17	15	16	15	16	16	15
L Q	15	14	15	14	14	14	16	17	18	18	20	20	20	18	18	18	16	16	15	15	15	15	15	15

HOURLY VALUES OF FOF2 AT KOKUBUNJI

NOV. 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	37	35	49	34	30	56	53	76	85	80	76	84	92	90	97	91	74	A	A	38	A	A	37	A
2	A	49	38	42	40	29	54	68	78	80	84	86	86	80	92	83	60	58	29	46	43	43	44	A
3	A	A	36	40	41	38	56	74	77	77	76	86	76	81	84	83	66	47	42	47	37	38	38	35
4	37	43	44	48	41	55	44	79	80	78	62	90		101	67	66	92	78	66	66	A	A	A	A
5	48	A	A	42	A	38	57	80	94	82	68	92	92	72	81	80	74	54	50	A	A	A	44	46
6	36	41	35	34	35	34	47	60	79	96	97	79	88	87	76	76	71	55	56	48	43		37	A
7	A	40	33	38	40	31	42	72	79	90	78	77	92	93	84	70	67	60	42	46	41	46	37	34
8	56	34	51	34	35	38	48	76	80	87	92	85	71	76	80	83	64	68	50	A	34			37
9	A	35	44	A	A	A	53	87	87	70	77	94	82	80	82	81	82	88	A	A	38	35	35	
10			37	35	36	35	49	82	83	75	80		84	86	73		56	57	60	38	38	28	A	43
11	A	34	46	48	40	A	60	87	83	80	85	87	80	82	91	83	66	A	A	A	A	A	A	38
12	43	38	36	47	44	23	42	76	83	90	81	91	66	92	77	70	60	42	61	38	35	23	A	A
13	43	36	44	37	35	38	52	69	71	61	85	81	84	75	76	92	66	52	38	46	46	26	35	43
14	35	44	58	37	55	37	38	76	78	85	96	107	96	80	92	83	69	58	50	43	51	A	28	35
15	56	A	50	38	38	51	48	92	92	95	96	90	86	91	86	72	63	53	43	38		48	A	43
16	A	A	A	41	41	47	45	66	68	78	90	97	84	82	105	85	74	58	48	32	A		A	37
17	46	43	44	42	51	25	44	58	66	86	86	97	82	91	78	82	59	58	62	35	47	A	37	A
18	35	37	51	43	41	41	38	59	70	84	76	71	76	84	87	77	80	63	40	46	46		28	30
19	35	28	34		24		A	61	93	88	113	90	108	115	97	82	86	53	44	A	A	49	47	36
20	37	37	44	41	57		31	58	68	84	93	87	88	84	72	70	87	58	45	51	38	36	37	34
21	46	38	44	46	47	47	46	61	66	67	71	86	92	97	81	68	68	53	54	46	38	51		32
22		38	48	44	43	42	34	59	69	68	71	82	73	82	84	66	68	40	51	46	34	28	38	31
23		43	34	35	34	38		58	61	61	66	81	66	62	80	82	67	52	44	A	45		43	
24	28	38	42	48	40	30		53	51		73	76	62	78	71	72	59	A	A	28	A	A		29
25		31		23	38	38	18	54	58	70	58	76	63	66	66	73	67	A	A		A	A		
26	32		A	35	38	38	34	57	61	61	82	74	61	72	67	62	61	46	40		35		29	A
27		A	A	A	36		35	72	57	62	81		81	84	69	68	61	56	37		32	35	19	
28			30	30		A		51	67	74	78	69	75	62	64	61	58	42	38	31	A	A		30
29	30	A		32	34	35	35	58	67	61	72	88	69	66	84	67	62		A	40	30	A		
30		35	40			A		49	62	61	66	93	83	72	67	64	54	52		A	34			
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	21	24	26	26	23	25	30	30	29	30	28	29	30	30	29	30	25	23	20	20	13	17	17
MED	37	38	44	39	40	38	45	67	74	78	79	86	82	82	80	76	66	55	45	44	38	36	37	35
U Q	46	42	47	43	41	42	52	76	83	85	86	90	88	90	86	83	74	58	54	46	44	47	40	40
L Q	35	35	36	35	35	34	36	58	66	67	72	80	72	75	72	68	61	52	40	38	34	28	32	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

NOV. 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	26	24	25	G	G	G	24	30	64	40	58	55	50	56	46	49	72	95	70	34	48	53	42	50
2	45	32	29	25	25	30	25	30	G	40	47	48	45	G	G	G	G	29	33	31	25	G	36	47
3	35	34	25	G	23	28	G	34	39	G	G	G	G	G	G	G	G	G	33	26	G	G	30	29
4	50	G	G	G	G	G	G	G	34	43	40	G	G	G	G	G	32	32	60	56	38	53	40	30
5	G	41	26	30	55	G	G	43	49	58	42	51	G	53	54	35	47	G	31	56	58	49	30	G
6	G	G	G	G	G	G	G	56	G	G	G	47	G	G	G	37	44	40	37	G	G		G	45
7	48	30	27	G	G	G	26	G	37	G	G	G	G	G	G	G	G	29	29	G	G	G	G	G
8	G	27	G	G	G	G	G	G	39	G	G	G	G	G	38	47	G	29	26	39	28			G
9	32	31	33	46	32	41	31	29	35	96	60	52	G	58	47	59	31	87	60	49	G	G	G	
10			G	G	46	G	24	G	38	G	G	G	G	G	G		G	G	G	G	G	27	29	G
11	58	51	58	56	34	28	25	G	36	40	43	G	G	G	61	62	34	80	78	50	49	46	30	G
12	26	G	G	G	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	49	39
13	G	37	G	G	G	G	G	G	G	G	G	46	50	G	G	G	44	91	30	G	31	26	G	G
14	G	G	G	G	G	G	24	G	G	G	G	G	G	G	G	G	34	G	G	25	G	36	G	G
15	G	24	G	G	27	G	G	G	G	46	G	61	57	G	49	34	33	G	G	G	G	G	42	G
16	34	34	51	30	G	33	32	48	G	G	G	G	G	G	41	G	G	G	30	29	30	G	28	25
17	G	G	G	G	G	G	G	28	G	G	42	42	58	39	50	G	42	35	32	33	G	23	G	58
18	30	G	G	G	31	30	28	48	G	G	41	G	G	G	37	G	36	G	24	40	G		G	G
19	G	G	G		G		37	31	G	43	56	93	40	G	G	G	29	32	26	37	33	G	G	24
20	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	38	38	G	37	42	G	G	28	G
21	G	G	G	G	G	G	G	G	G	G	G	48	G	44	50	52	G	G	24	G	G	G	G	G
22		G	G	G	G	G	27	37	49	G	G	46	46	46	40	37	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G		G	G	G	G	G	G	48	48	72	45	G	48	31	G		G	
24	G	G	G	G	G	G		G	G	G	G	93	G	48	48	47	41	44	47	G	33	59		G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	57	48		33	52		G
26	G		29	G	G	G	G	G	G	G	47	49	G	46	42	40	36	43	G		28		G	28
27		28	38	55	40		G	G	G	G	44	G	54	51	42	34	G	G	G		G	G	G	
28			G	G		24	G	G	G	G	G	G	G	G	G	34	G	G	G	G	28	34		G
29	G	28	G	G	G	G	G	G	G	G	G	44	G	56	73	34	32	G	32	G	G	34		
30	G	G	G	G		24	G	G	G	G	G	G	G	G	G	G	G	G		38	45	G		G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	30	29	28	28	28	30	30	30	30	30	30	30	30	29	30	30	29	27	30	25	24	26
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	39	34	32	G	30	29	G	G	G	G
U Q	32	31	26	G	26	24	25	30	36	40	42	48	40	46	48	43	38	40	42	39	33	41	30	29
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

NOV. 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								56	71	66	84	83	91	98	107	90	78	52	53			A	A	
2								84	78	70	82	84	76	86	111	105	87	A	76					
3								79	84	86	72	88	78	92	104	101	86	57						
4								65	78	77	67	83		112	82	65	98	92	86	79				
5								83	86	90	82	92	101	90	87	A	86	77			A			
6								60	77	98	105	90	85	103	96	78	83	66	64		54			
7								80	80	85	77	73	92	110	100	84	63	69	79					
8								59	74	88	86	87	77	73	A	100	76	86	88					
9									66	86	78	103	111	90	91	86	84	84	90					
10								75	66	77		83	80		94	84	78	86	79	53				
11								83	63	84	82	101	84	90	90	86	84	78	89					
12									86	77	97	102	72	77	99	91	78	79						
13								62	86	66	73	85	81	82	97	N	72	64	53					
14								53	85	77	86	106	102	97	92	96	76	85	42					
15									110	89	94	91	97	96	91	82	66	64	54					
16									81	83	88	96	85	97	122	108	102	88	55					
17								54	66	77	86	104		94	100	90	82	89						
18									84	88	77	76	78	90	88	85	89	84	49					
19									87	76	90	105	111	112	104	87	87	64	A	A				
20									81	78	85	90	87	83	78	83	87	87	51					
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								13	20	20	19	20	18	19	19	18	20	19	15					
MED								65	80	80	84	90	85	92	96	86	84	79	64					
U Q								81	85	87	88	101	97	98	104	96	87	86	86					
L Q								57	72	77	77	83	78	86	90	84	77	64	53					

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

NOV. 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	46	G	43	G	G	G	G	G	G	46	59	G
2				G	G	G	G	G	G	G	42	63	60	63	59	88	50	58	46	G	G	G	G	G
3	G	G	G	G	G	G		50	61	G	G	G	G	G	G	44	G	G	G	G	G	G	G	G
4	G	G		G	G	G	G	G	G	54	G	G	G	44	48	G	G	G	G	G	G	G	G	G
5	G		G				G	G	G	G	44	58	62	56	G	108	41	G	G	G	54	G	G	G
6	G	G	G	G	G	G	G	G	G	43	58	50	54	G	46	40	43	G	G	G	G	G	G	G
7	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G		G		G	G	G	41	45	46	43	47	88	G	G	G	G	G	G	G	G	G
9	G	G		G			G	G	G	G	58	G	G	G	G	G	60	G	G	G	G	G	G	G
10	G	G	G		G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G
11	G	G		G	G		G	G	G	G	G	G	G	G	46	58	51	46	G	G	G	G	G	G
12	G	G	G	G	G	G	G		G	G	G	G	44	56	44	50	55	G	G	G	G	G	G	G
13	G	G			G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
14	G	G	G	G	G		G	G	G	G	G	G	G	G	40	44	68	37	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	44	44	G	G	G	G	G	G	G	G	G	G	G
16	G	G		G	G	G	G		G	G	G	G	G	47	G	45	G	G	G	G	G	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	G		62	G	G	G	G	G	G	G	G	G	G
18	G	G	G		G	G	G	G	G	G	43	45	44	44	44	G	G	G	G	G	G	G	G	G
19	G	G	G	G	G	G	G	G	G	G	G	49	G	G	G	G	35	43	58	84	G	G	G	G
20	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21	G																							
22																								
23																								
24																								
25																					G	G	G	G
26	G	G				G	G	G																
27																								
28																								
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	19	14	15	17	15	20	19	20	20	20	20	19	19	20	20	20	20	20	20	21	21	21	21
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	G	42	45	44	47	45	44	46	G	G	G	G	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

NOV. 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								27	30	43	36	38	28	44	36	32	23	23	33			22		
2								26	29	52	29	40	43	26	28	24	28	24	22					
3								23	24		27	43	40	39	36	34	30	24			29			
4								24	28	36	41	44	39	28	23	35	28	27	27	30				
5							24	28	27	33	39	34	36	33	42	39	26				30			
6								26	29	24	26	36	36	28	28	27	24	24	30	26				
7								27	28	29	38	39	40	44	38	32	28	27	36					
8								26	28	26	29	29	30	30	28	34	27	26	27					
9								24	28	36	33	43	40	35	38	36	27	27	33					
10								30	28	29		39	42		40	45	29	30	36	33				
11							26	26	29	30	34	36	42	44	39	29	26	24	43			27		
12									27	33	35		44	35	27	27	18	28	29	23				
13								23	24	33	38	38	38	42	40	34	45	24	30					
14								24	26	29	37	42	43	39	42	33	27	24						
15								26	27	32	34	32	29		36	30	27	29	38					
16									33	34	34	39	43	38	38	29	24	27	26					
17									29	32	42			33	42	29	33							
18						27		24		30	35	30	38	32	28	30	26	22	26					
19										29	36	34	39	36	35	32	22	22	24	26				
20					26			28	26	34		37	43	35	35	33	29	27	27					
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								16	18	19	18	18	19	18	20	20	20	18	16					
MED								26	28	32	35	38	40	35	36	32	27	25	30					
U 0								27	29	34	38	40	43	39	39	34	28	27	34					
L 0								24	27	29	33	34	36	32	28	29	25	24	26					

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

NOV. 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	54	42	38	43	30			54	66	74	87	88	90	94	74	91	76	59	52	61	34	42	34	A
2	44	44	34	A				54	72	77	76	91	80	85	121	79		91	77	59	A	54	40	44
3	41	40	38	34	28	28	26	62	76	81	73	92	95	94	145	146	126	75	87	63	60	66	52	41
4	35	42	30	37	34	A		61	69	68	67	81	126	108	81	92	124	111	80	87	66	61	43	53
5	A	A	41	35	36	33	44	78	90	90	106	90	91	69	91	89	90	87	76	66	77	79	78	62
6	35	A	A	A	A			58	77	91	121	116	87	91	111	91	78	73	66	65	78	88	43	42
7	35	A	32	26	29	26		61	84	88	91	78	84	122	119	103	88	63	74	80	31	53	34	35
8		32	36		32	37	30	54	77	82	90	82	78	87	91	111	110	91	91	76	54	38	38	34
9	36	35		31	30	32	26	52	88	75	78	105		87	91	76	108	89	110	88	58	46	51	36
10		32	32		35	34	26	48	72	84	74	90	82	84	106	95	93	91	91	84	70	62	46	42
11	34	35	48	A		25	29	54	63	66	87	105	91	75	92	94	91	93	65	79	41		42	35
12	34	36	37	37	31			44	66	74	90	94	94	88	94	90		91	90	60	62	66	66	59
13	58	52	43	32	35		N	47	80	87	90	90	91	90	N	79	87	73	68	66	60	62	43	43
14	42	37	50	37	42	26	28	54	66	78	86	94	92	92	92	109	94	78	N	53	60	73	52	44
15	42	46	42	45	59	29	32	51	82	92	81	94	92	110	104	92	82	73	55	40	44	48	38	
16	34	34	34	36	44	35		46	71	82	90	94	92	125	148	156	127	131	84	61	71	66	54	40
17	36	35	36	52	54		N	50	73	77	86	92	91	75	92		94	93	77	62	62	66	66	35
18	47	43	46	39	51	54	45	44	61	90	92	84	85	91	81	93	117	122	82	42	47	42	37	30
19	30		32	35		52	45	54	82	88	86	86	116	112	83	98	92	84	77	67	43	43	41	43
20		31		32	43			53	70	85	90	82	88	90	90	87	94	94	74	37	43	54	54	31
21		29	30	30	31	31	30	42	61	76	80	90	91	91	93	94	94	90	87	74	74	78	66	43
22	34	31	34	40	42	26	A	42	62	69	81	90	84	85	75	118	90	87	86	66	58	62	47	54
23	47	44	42	36	36	31	N	43	66	64	87	76		91	87	100	80	78	84	64	34	53	50	42
24	34	31	34	37	42	35		42	66	77	90	95	91	76	88	92	86	80	76	43	29	38	46	36
25	36	32	32	34	32	34		38	66	70	87	88	94	74	87	83	81	70	62		41	52	42	36
26	32	32	34	35	36	26		38	54	70	87	93	90	82	76	67	66	66	66	60	66	53	34	30
27	A	30	A	31	A	A	26	45	55	61	78	105	81	95	94	85	78	88	68	54	53	28	42	38
28	31	32	35	36	37	29		43	60	86	90	112	N		74	84	84	81	66	66	60	42	43	29
29	28	28	A	35	44	31		42	66	72	78	86	93	91	90	95	94	77	54	54	53	54	38	
30		29	31	31	31	28	26	46	66	75	82	78	91	85	94	87	87	75	66	54	42	38	43	30
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	26	25	25	25	21	13	30	30	30	30	30	27	29	29	29	28	30	29	29	29	29	30	27
MED	35	34	35	35	36	31	29	49	68	77	87	90	91	90	91	92	90	86	76	63	58	54	43	40
U Q	42	42	41	37	42	34	38	54	77	86	90	94	92	94	99	99	94	91	85	70	64	66	52	43
L Q	34	31	32	32	31	27	26	43	66	72	80	86	85	84	85	86	83	75	66	54	42	42	40	35

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

NOV. 1993

LAT. 26.3N LON. 127.8E 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			33	39	G	G	G	G	G	G	G	39	39	49	46	G	G	G	38
2	32	29	25	40	G			32	40	G	46	G	G	G	G	58	38	G	40	39	84	30	G	29
3	G	34	24	G	G	G	G	G	G	G	G	46	G	G	G	G	38	42	44	40	33	G	G	G
4	G	G	G	26	G	29	G	29	33	G	G	G	G	G	G	G	40	38	G	G	G	43	34	G
5	48	38	G	G	G	G	G	G	G	43	53	44	G	G	48	56	46	35	G	G	G	33	29	G
6	G	39	40	33	26			G	G	38	41	44	G	G	G	G	54	64	38	40	G	G	24	G
7	25	39	G	G	24	G		G	34	38	42	G	G	G	G	G	G	G	G	G	32	G	G	G
8	G	G	G		G	G	G	G	G	37	46	G	G	43	G	G	35	G	35	39	34	25	G	G
9	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	30	G	G	G	G
10	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
11	G	G	G	27		G	G	G	G	G	G	G	G	G	G	G	38	43	72	37	G	G	G	G
12	G	G	G	G	G		G	G	G	G	G	G	G	44	G	G	G	84	40	32	G	G	G	G
13	G	G	G	G	G		G	G	34	38	G	G	G	G	G	54	38	39	34	G	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33
15	34	33	G	G	G	G	G	G	G	G	44	42	G	G	42	G	G	G	G	G	G	24	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	56	G	G	34	11	26	G	G	G	G
17	G	G	G	G	G		G	G	36	G	G	42	42	G	G	G	G	32	G	G	G	G	G	G
18	G	G	G	G	32	G	G	27	34	40	G	G	G	G	43	42	35	34	11	G	G	G	G	G
19	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	52	G	32	G	G	G	23	G
20	G	G	G	G	G			G	G	44	G	41	52	44	44	46	66	30	36	31	G	G	33	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	25
22	G	G	G	G	G	G	23	G	G	G	44	48	53	76	G	45	G	30	33	G	G	G	G	G
23	G	G	G	25	G	G	G	G	G	39	39	G	G	68	42	42	40	40	41	24	25	G	G	G
24	G	G	G	G	G	G		G	G	G	G	G	G	41	G	G	G	G	25	G	G	G	G	G
25	G	G	G	G	G	G		G	G	G	45	65	60	62	G	44	G	33	29	G	G	33	G	G
26	G	G	G	G	G	G		G	G	39	G	G	42	G	G	G	35	38	26	G	G	G	G	G
27	24	G	33	58	37	28	G	G	G	G	G	G	54	43	60	44	75	32	24	G	24	G	G	G
28	G	G	G	G	G	G		G	33	G	G	G	G	50	42	44	G	G	G	G	41	26	G	G
29	G	G	37	G	G	G		G	G	G	G	41	42	42	G	39	36	58	40	G	G	G	G	
30	G	G	27	G	G	G	G	G	G	G	G	42	41	G	G	41	48	42	G	G	35	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	28	29	23	20	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	35	32	28	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	33	38	42	42	41	43	42	44	40	39	38	31	24	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 OKINAWA

NOV. 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	18	17	17	16	16			15	26	40	47	36	50	47	32	29	22	18	16	16	15	16	15	15
2	15	15	16	15				16	18	28	29	45	29	28	54	21	15	16	15	14	16	15	22	15
3	18	15	18	16	16	15	15	15	16	20	33	24	24	27	46	33	27	20	15	17	15	15	16	15
4	16	20	17	14	20	17	27	15	15	32	35	49	48	39	48	46	26	17	16	15	17	15	15	16
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19	18		21	18		20	15	16	17	21	30	38	36	28	28	33	26	23	15	16	17	15	18	24
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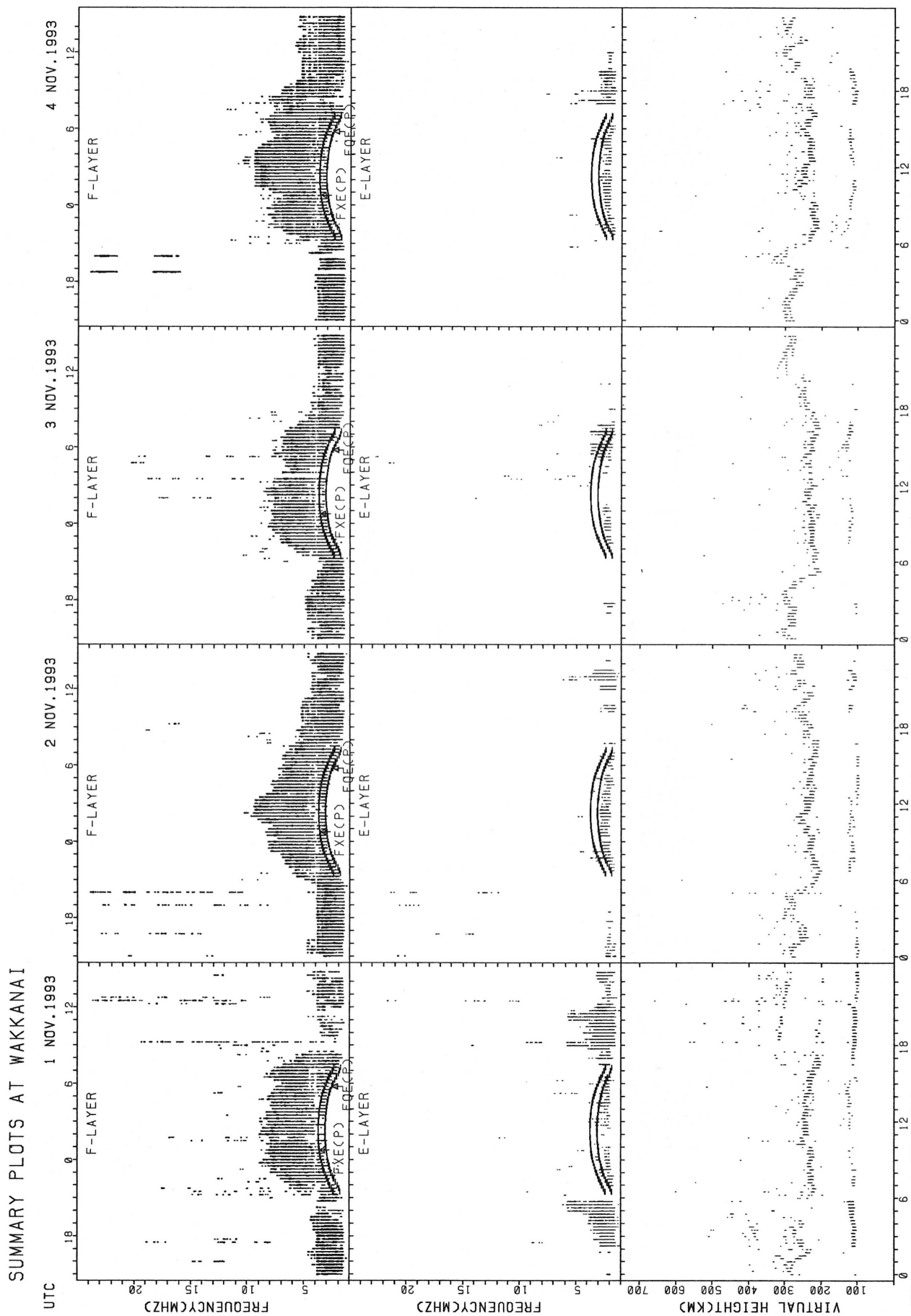
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT WAKKANAI
UTC
JST
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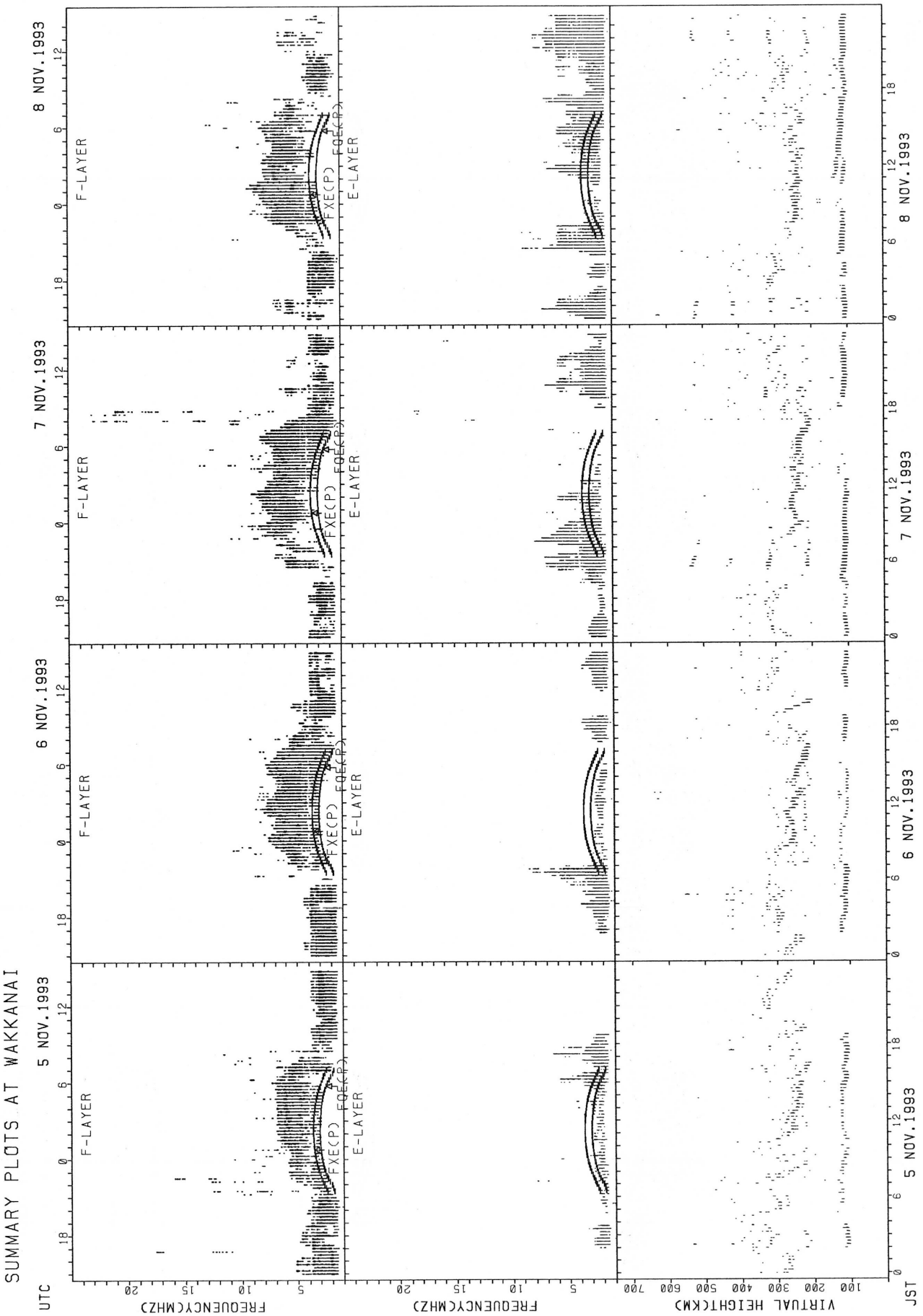
2 NOV.1993
3 NOV.1993
4 NOV.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE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E-LAYER
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FOE(P)
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VIRTUAL HEIGHT(KM)
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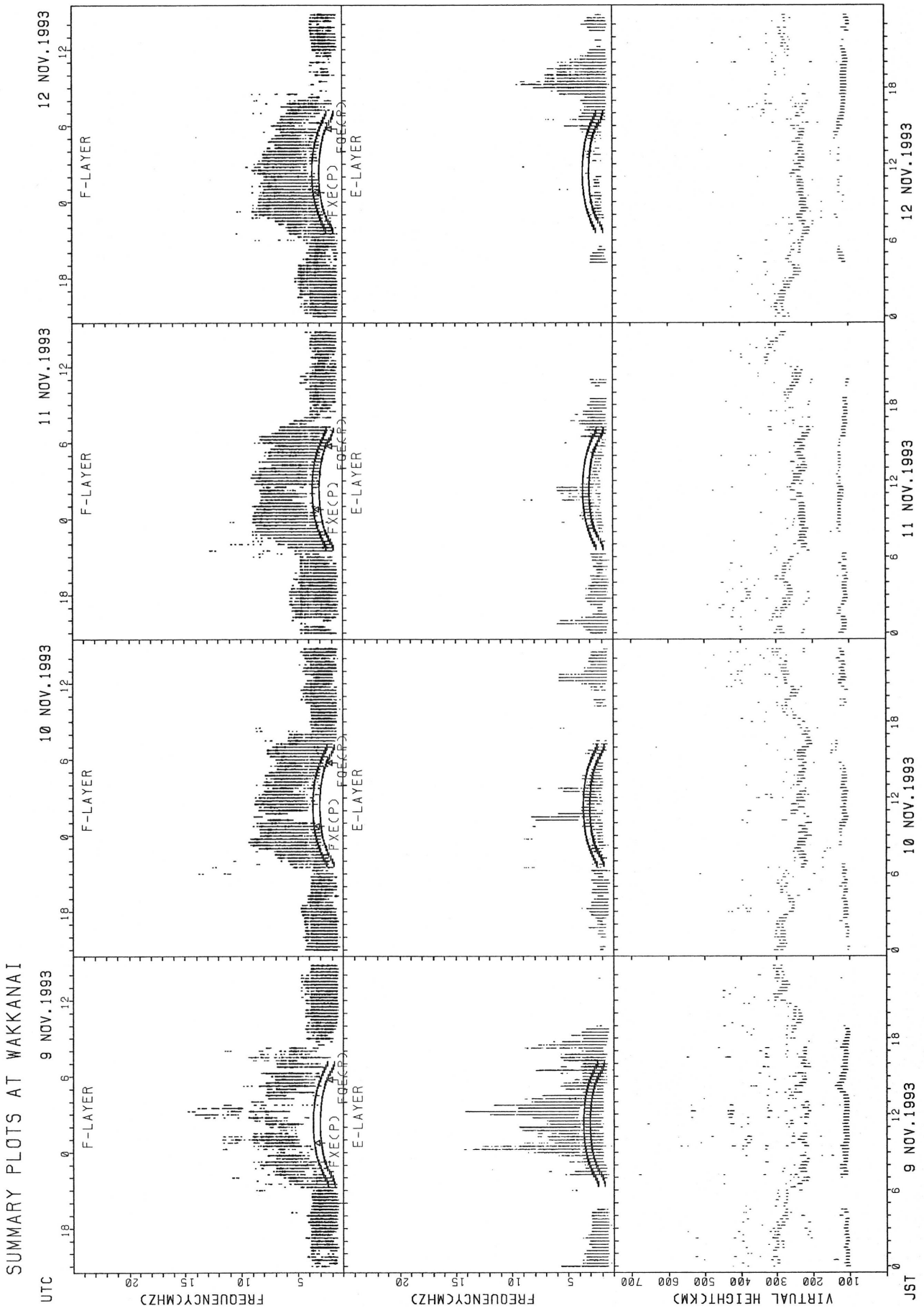
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
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F-LAYER
E-LAYER
FXE(P)
FOE(P)
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VIRTUAL HEIGHT(KM)
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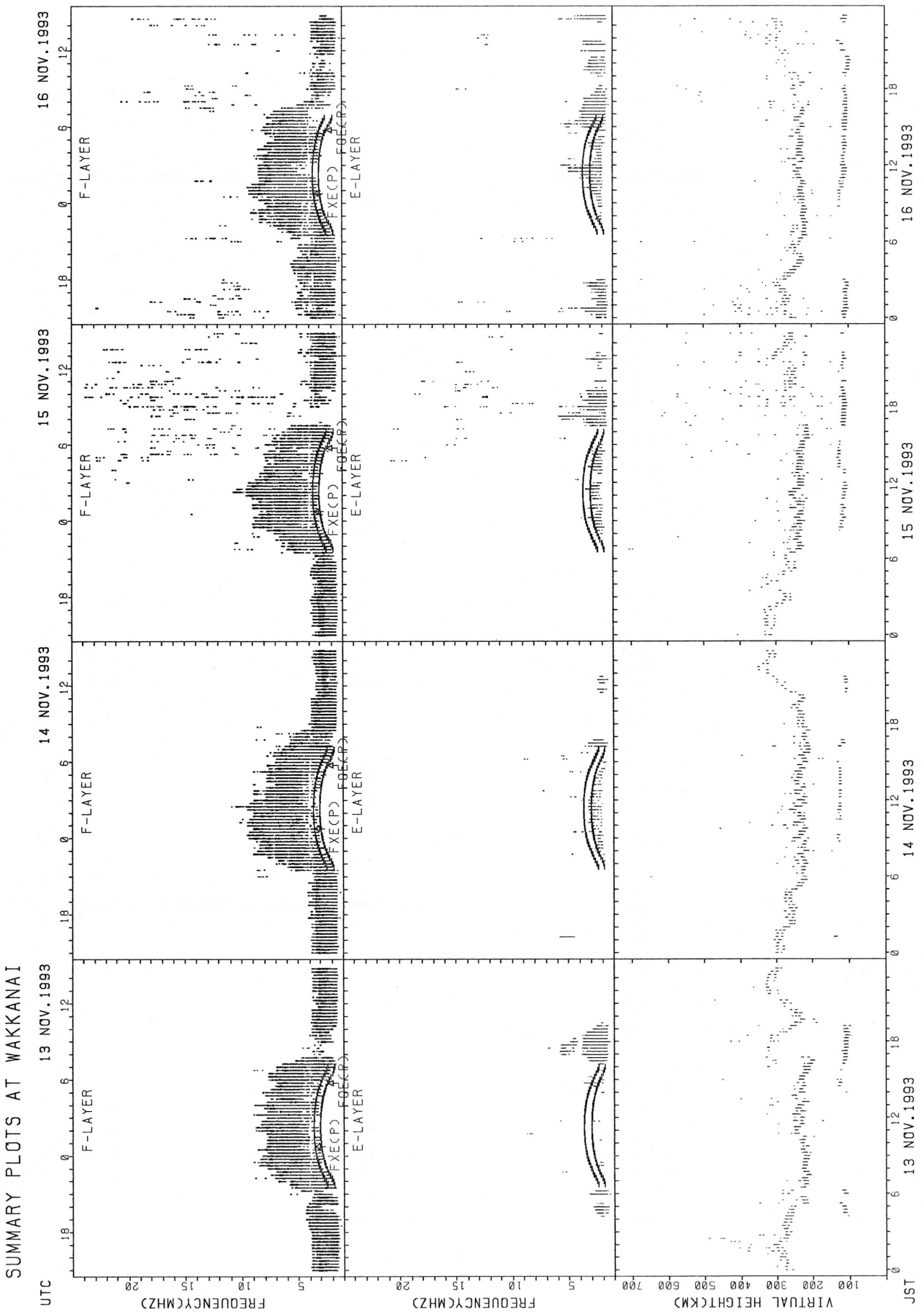
FOE(P); PREDICTED VALUE FOR FOE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F-LAYER
E-LAYER
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FOE(P)
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VIRTUAL HEIGHT(KM)
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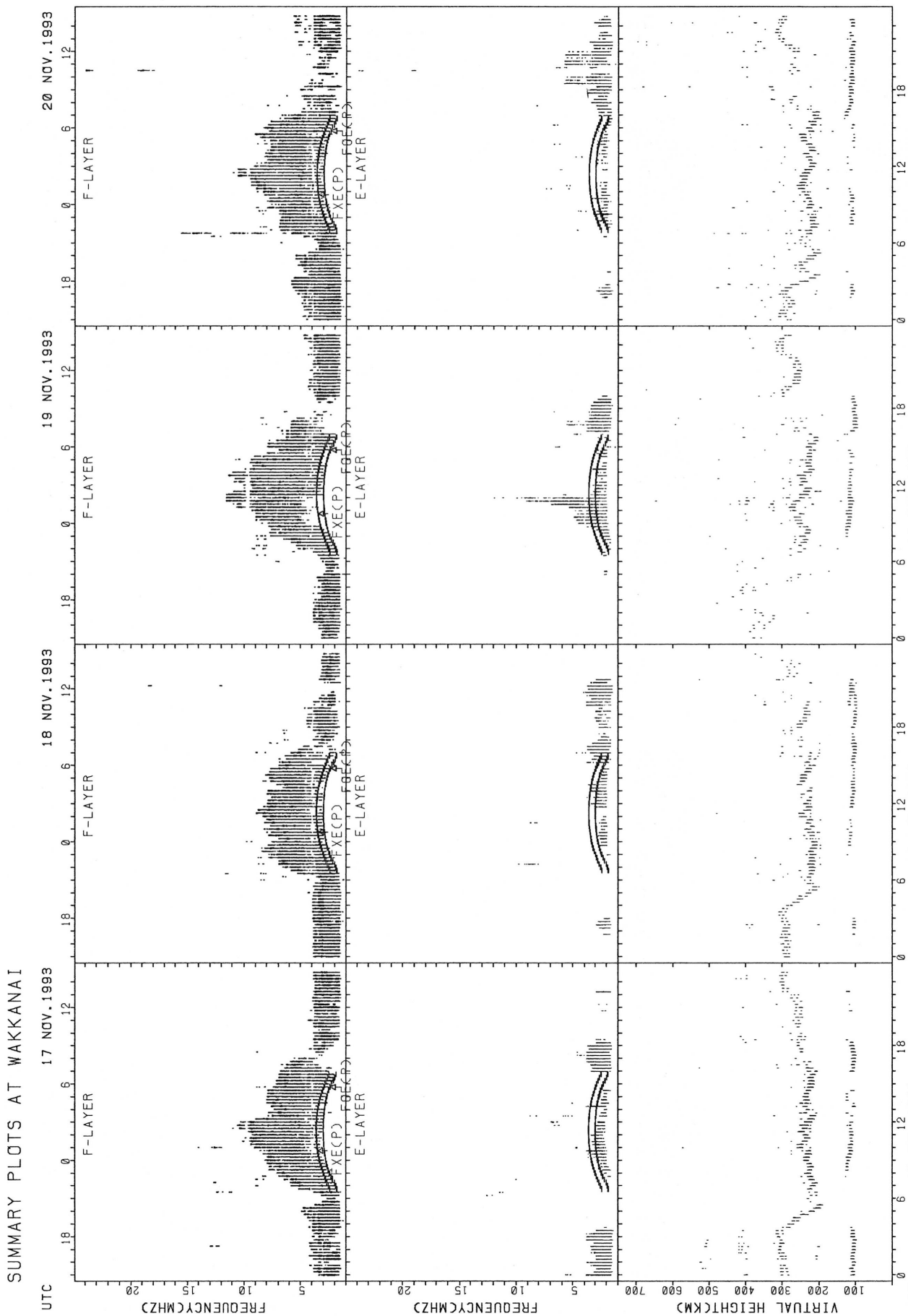
FOE(P): PREDICTED VALUE FOR FOE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19 NOV.1993
20 NOV.1993
F-LAYER
E-LAYER
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FOE(P)
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VIRTUAL HEIGHT(KM)
JST
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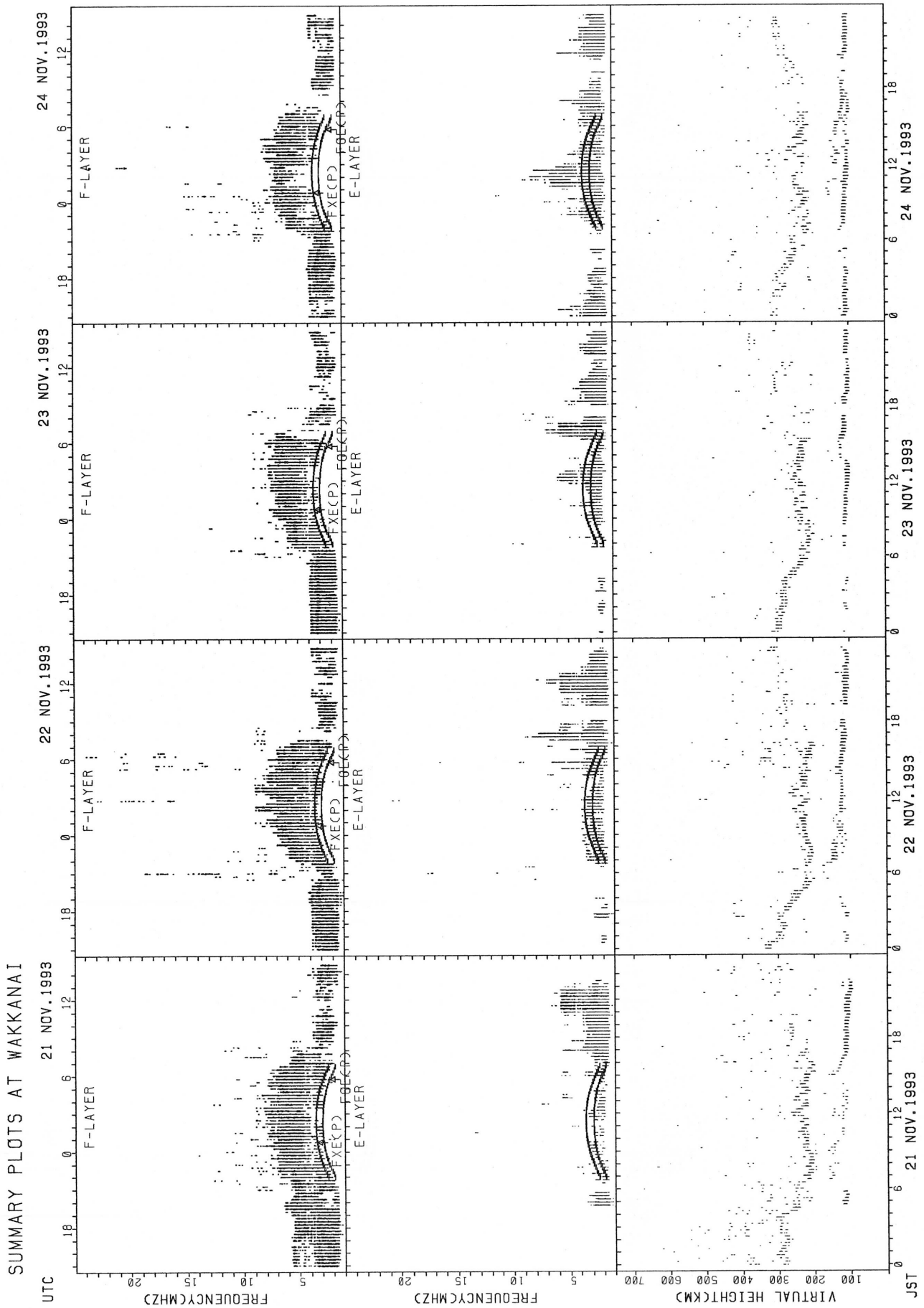
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UTC
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FOE(P)
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VIRTUAL HEIGHT(KM)
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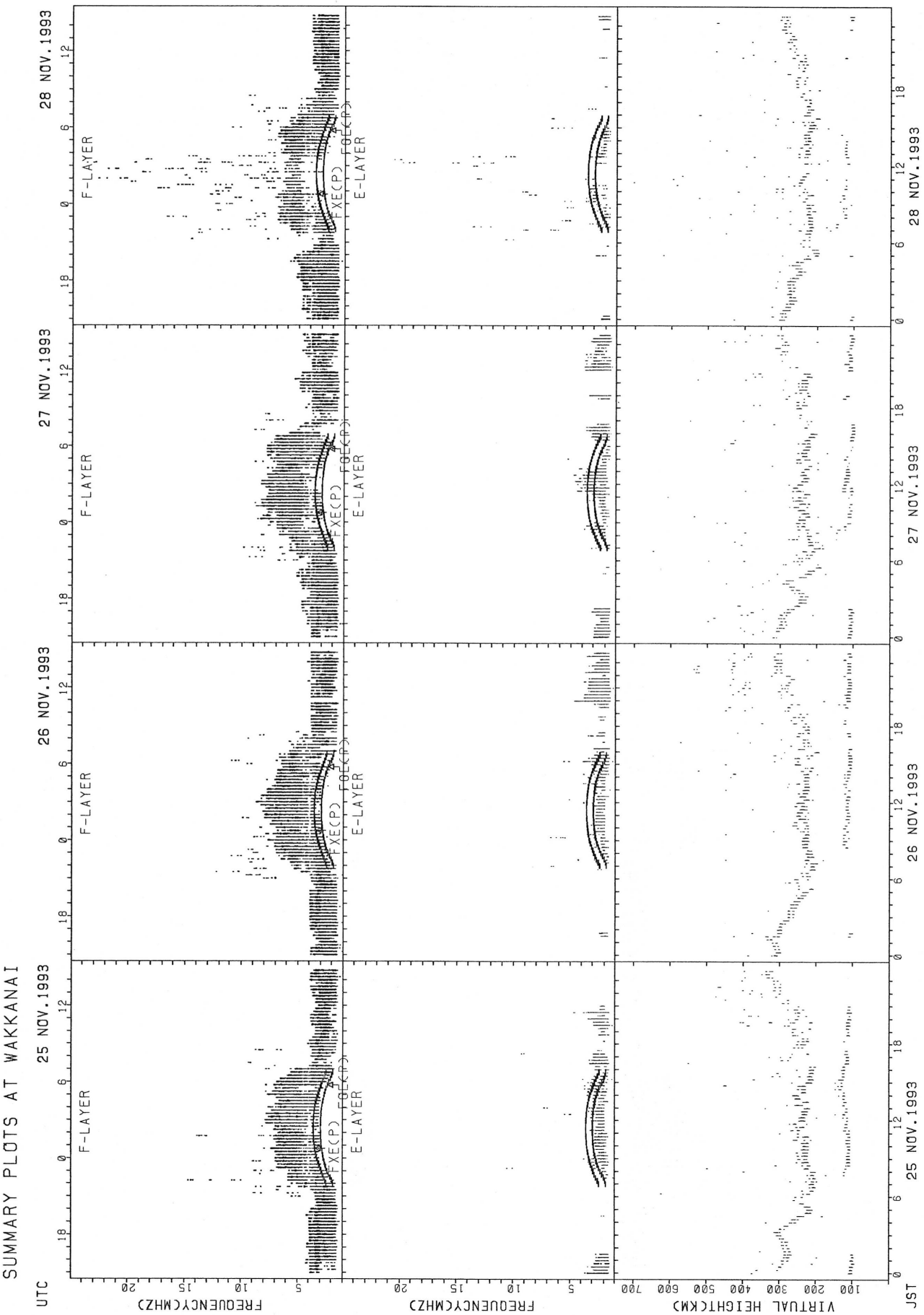
SUMMARY PLOTS AT WAKKANAI
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F-LAYER
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FOE(P)
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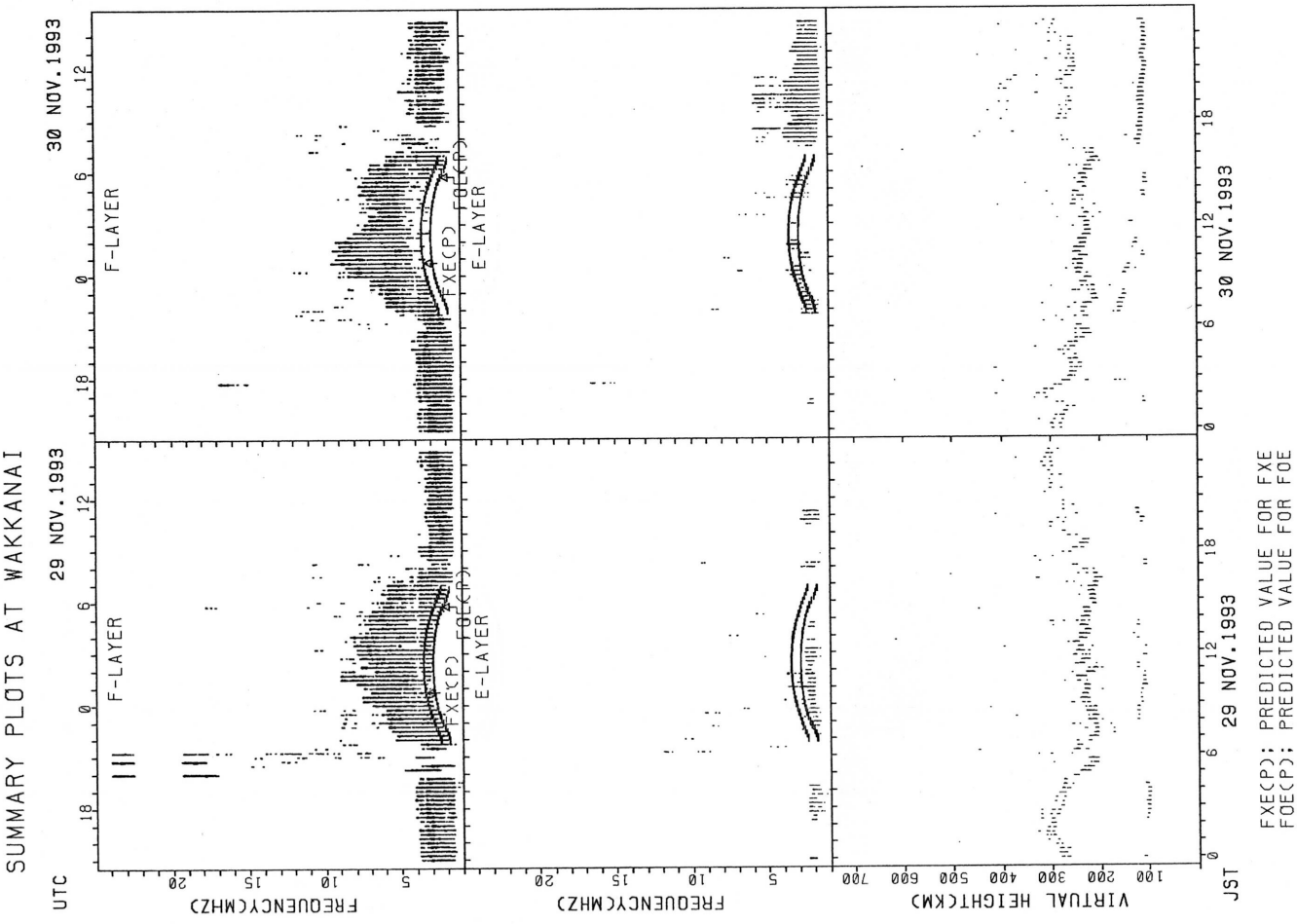
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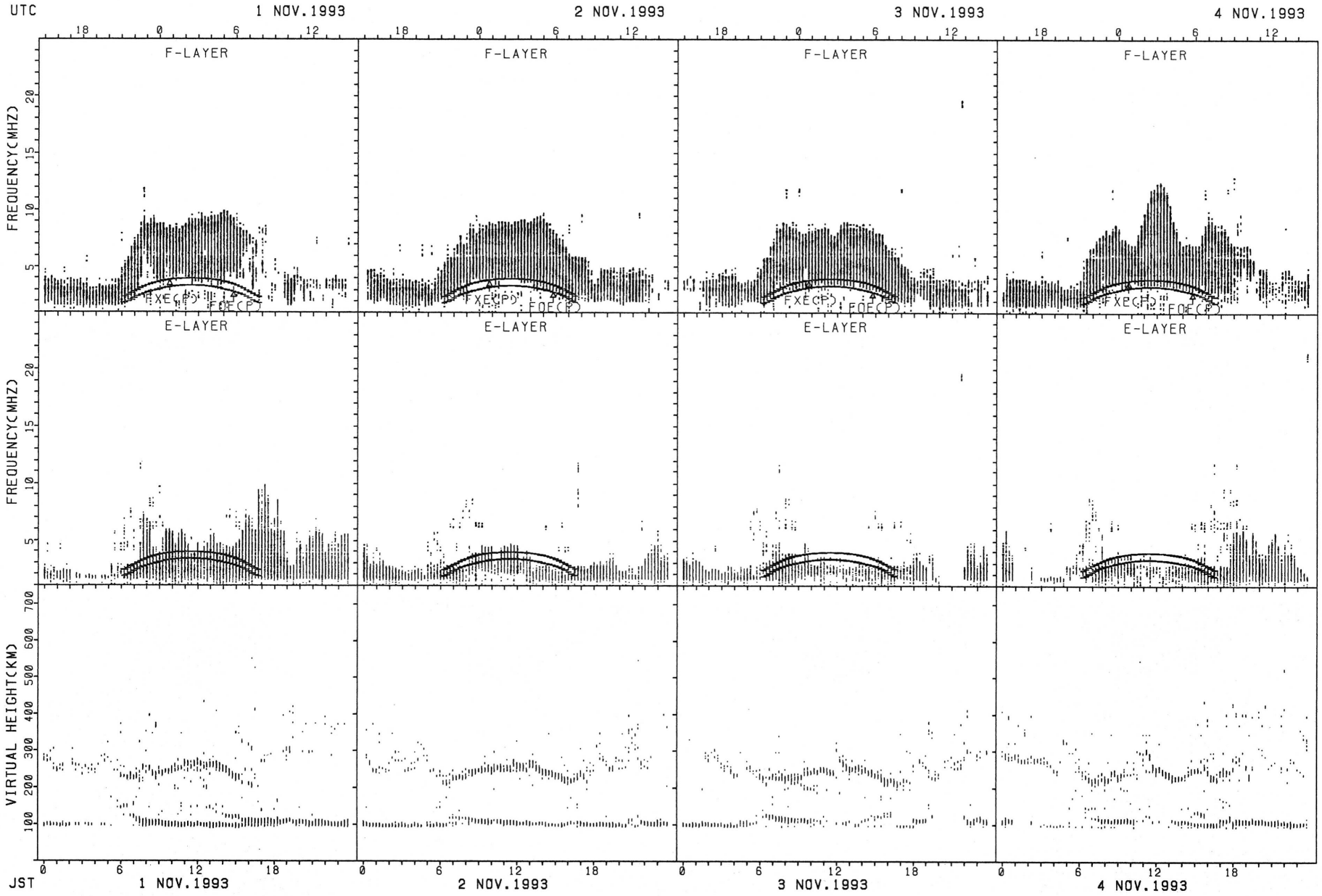
30 NOV.1993
UTC
JST
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



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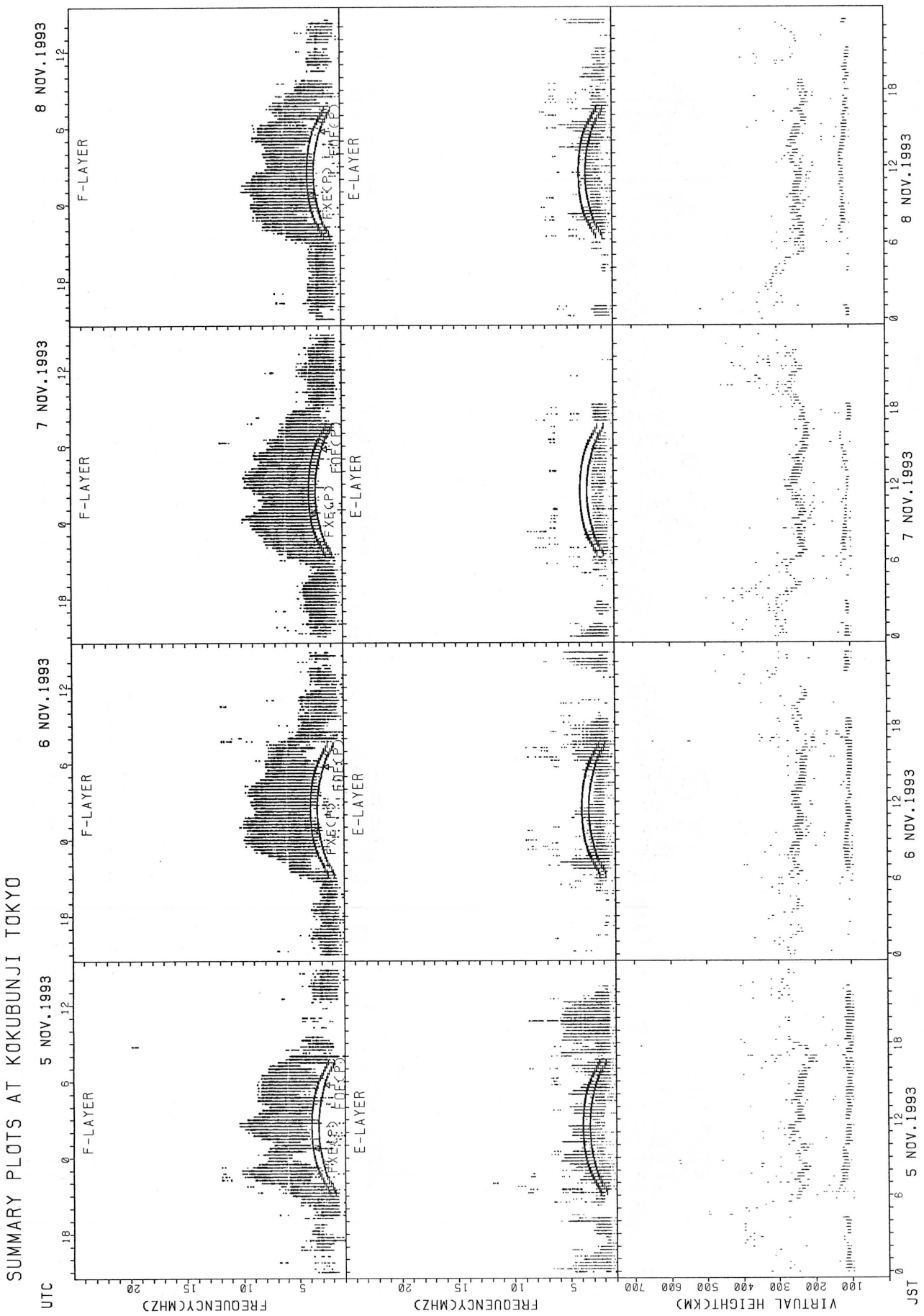
SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 NOV.1993
6 NOV.1993
7 NOV.1993
8 NOV.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
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VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
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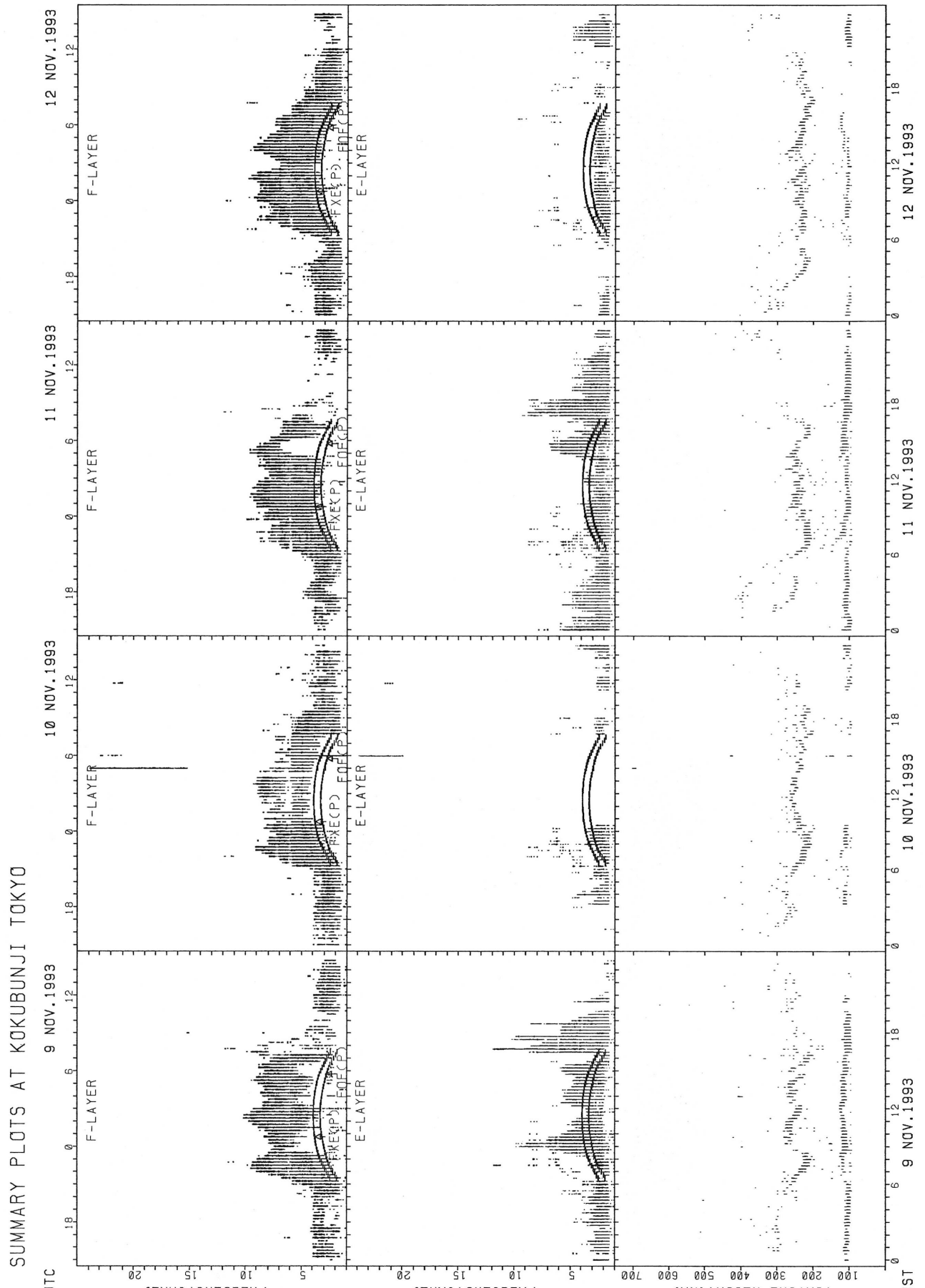
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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10 NOV.1993
11 NOV.1993
12 NOV.1993
F-LAYER
E-LAYER
FXE(P)
FOE(P)
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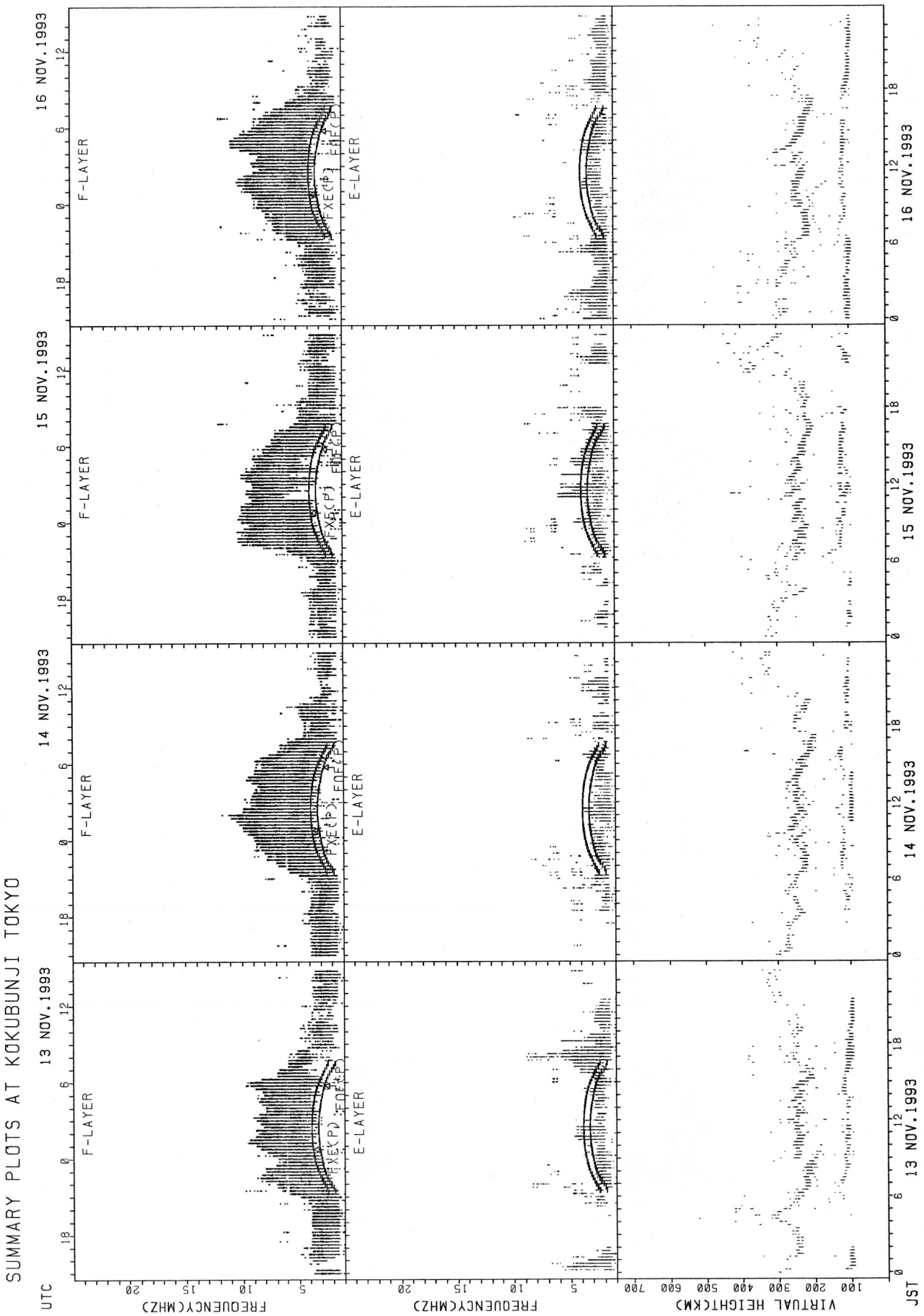
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE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13 NOV.1993
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16 NOV.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); FOE(P)
FXE(P); FOE(P)
FXE(P); FOE(P)
FXE(P); FOE(P)
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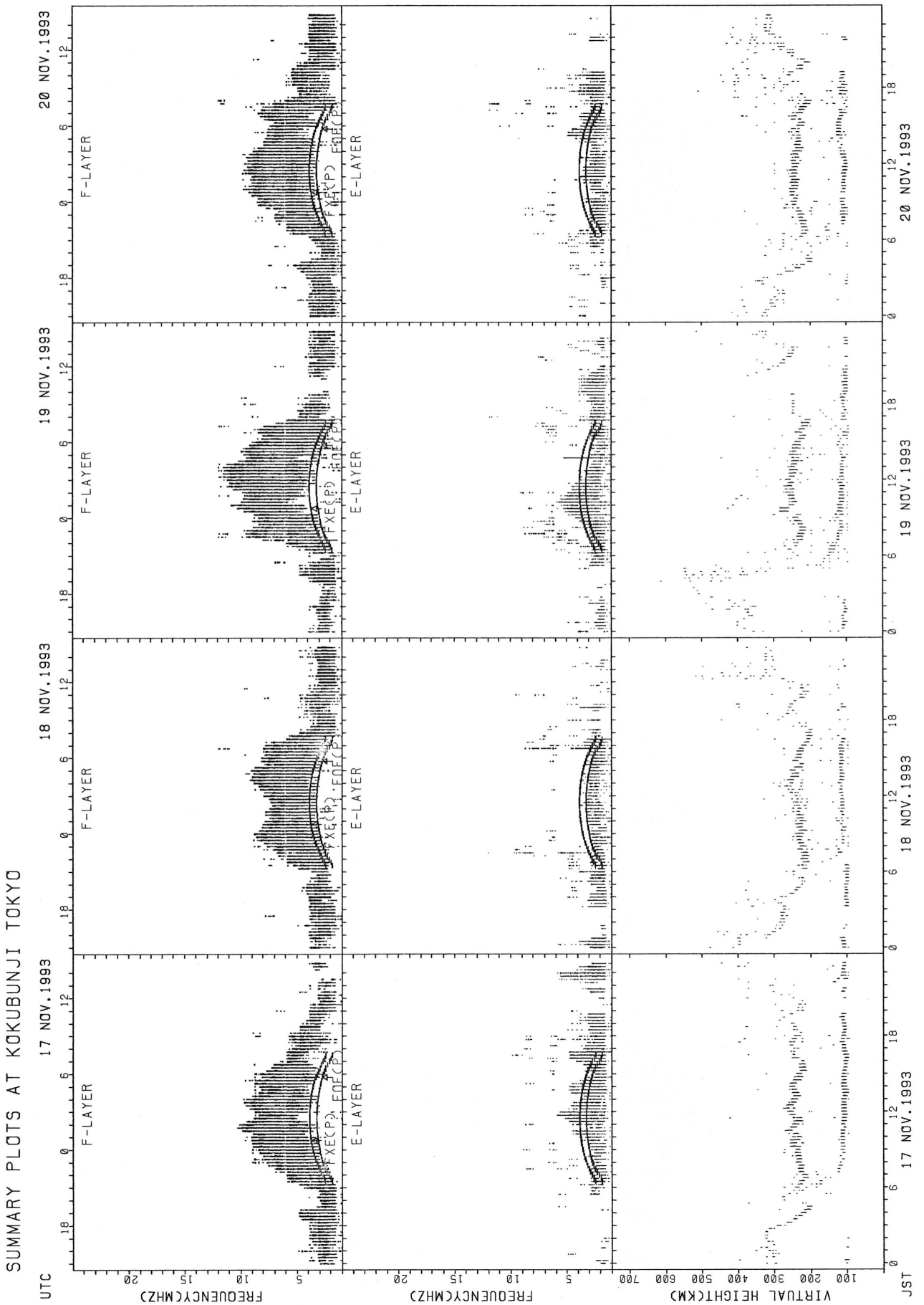
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
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17 NOV.1993
18 NOV.1993
19 NOV.1993
20 NOV.1993
F-LAYER
E-LAYER
FREQUENCY(MHZ)
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FXE(P)
FOE(P)
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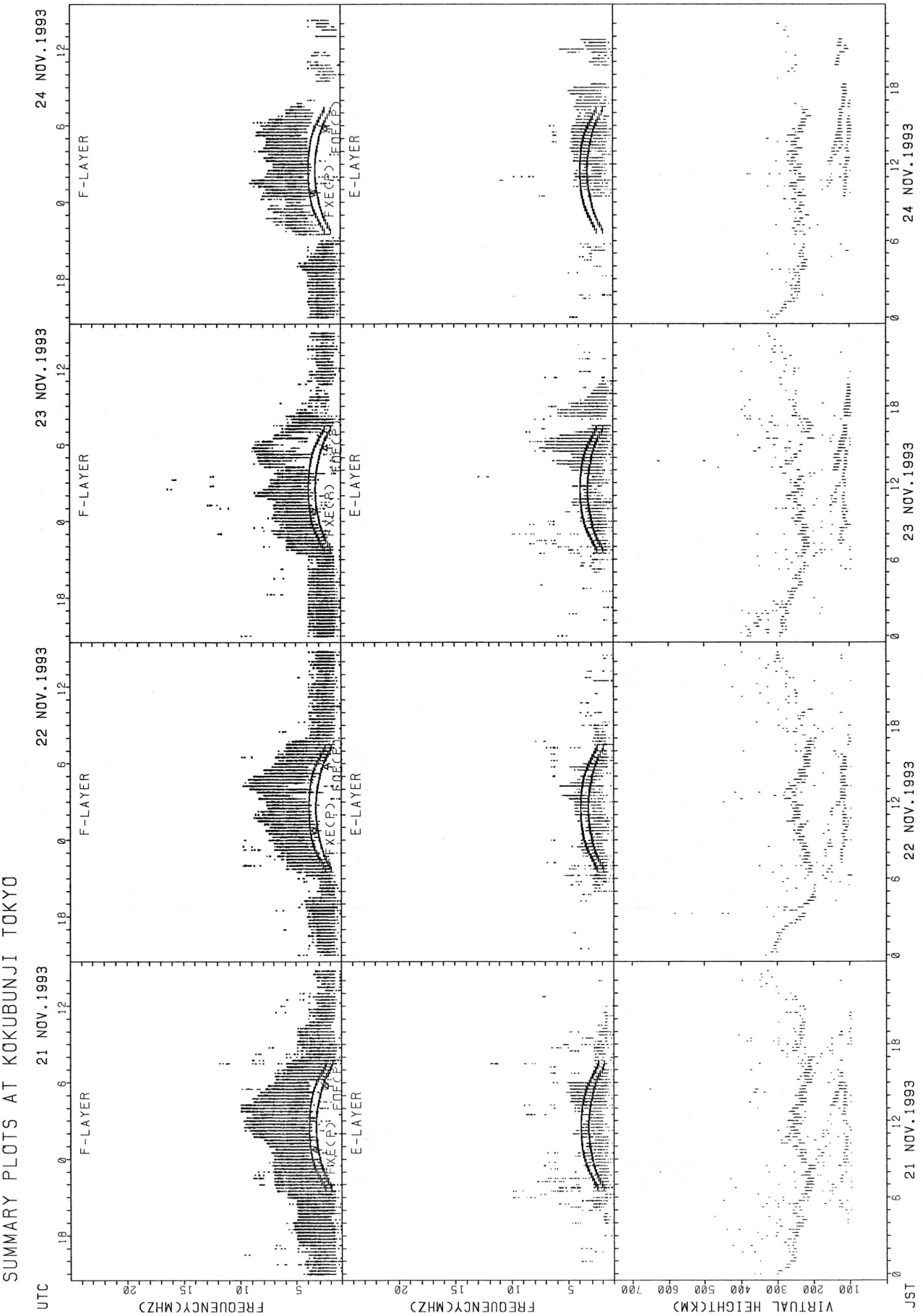
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
21 NOV.1993
22 NOV.1993
23 NOV.1993
24 NOV.1993
F-LAYER
E-LAYER
FXE(P); FOE(P)
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VIRTUAL HEIGHT(KM)
JST
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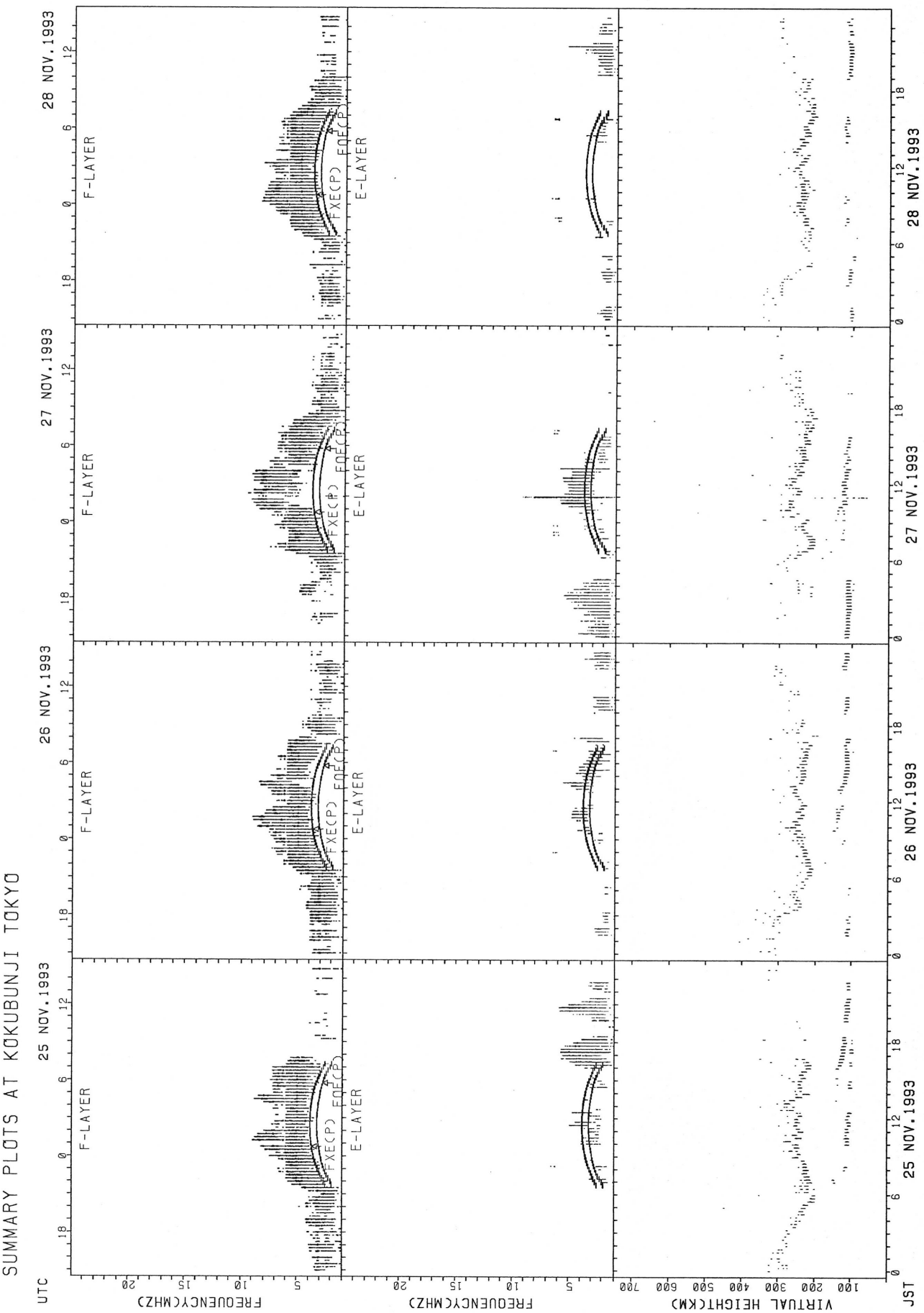
FOE(P); PREDICTED VALUE FOR FOE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UTC
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F-LAYER
E-LAYER
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FOE(P)
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VIRTUAL HEIGHT(KM)
JST
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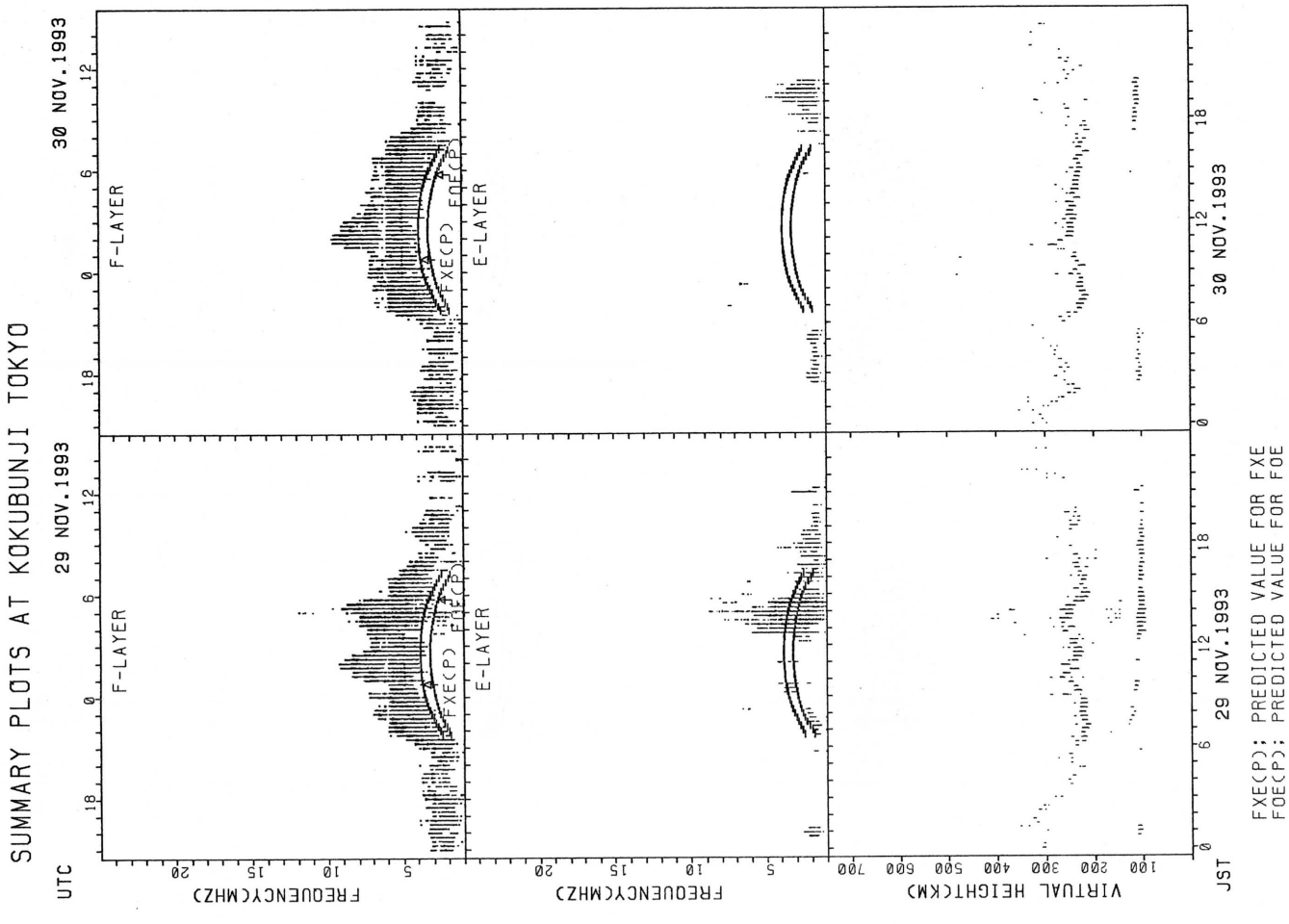
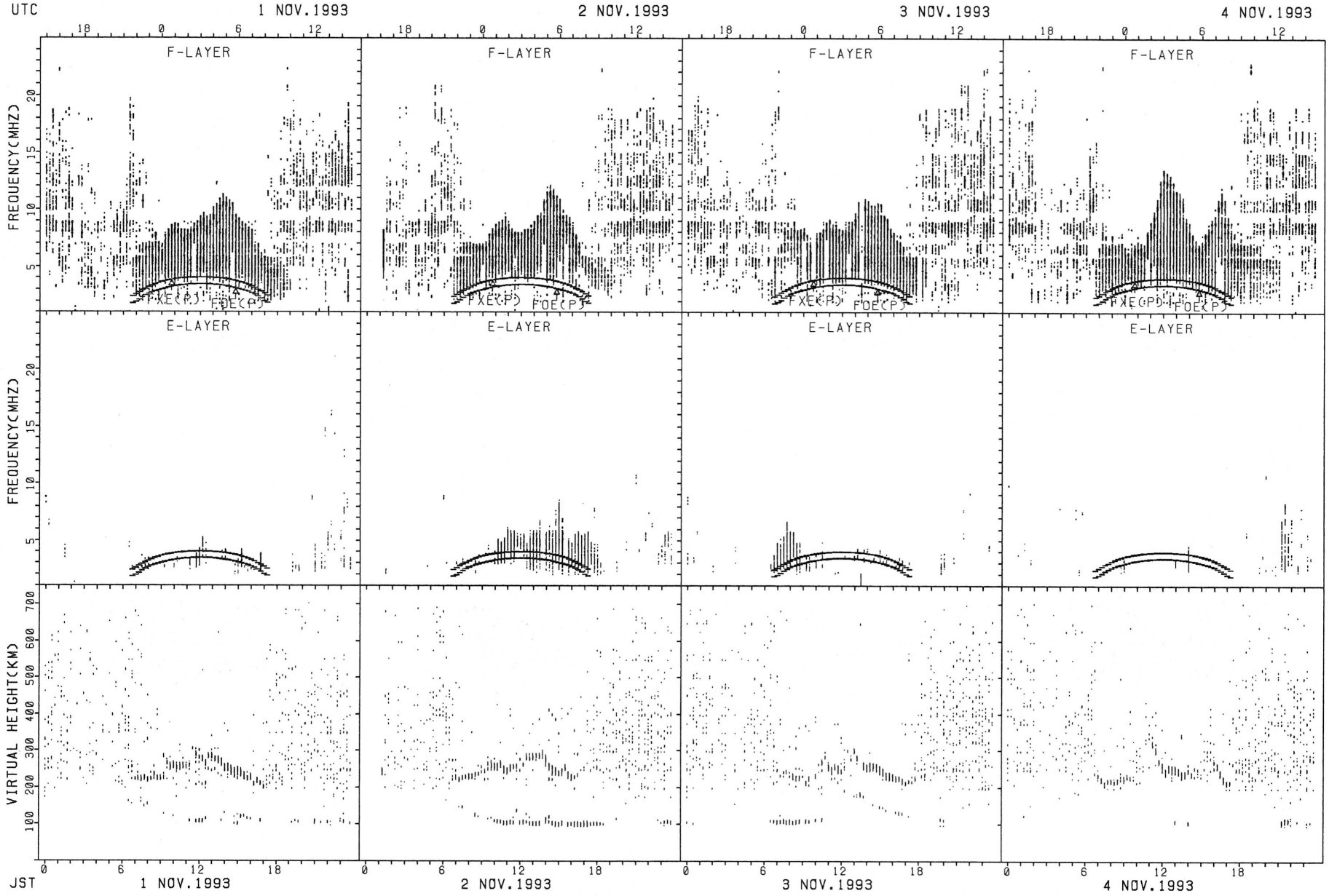

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
29 NOV.1993
30 NOV.1993
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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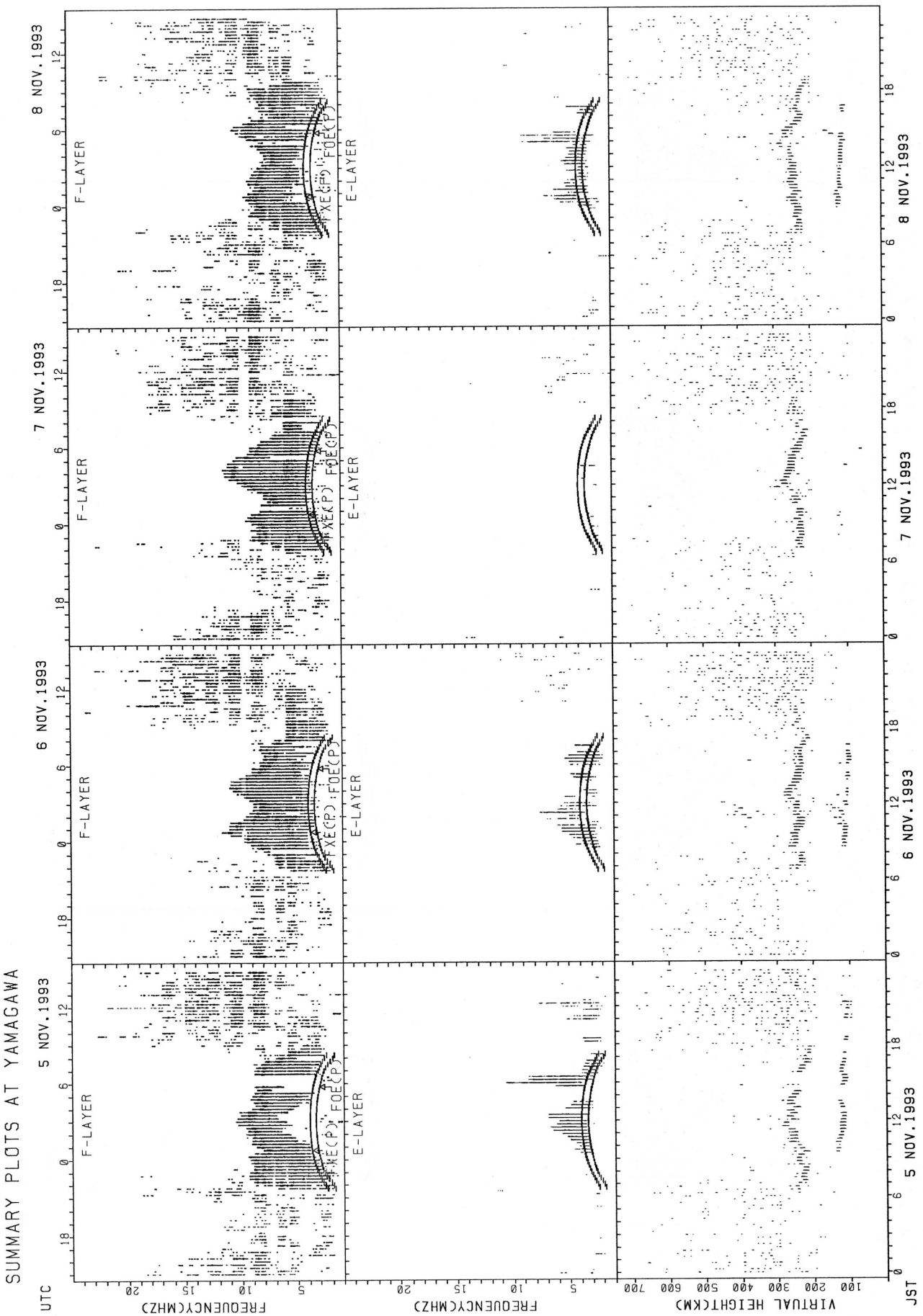
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
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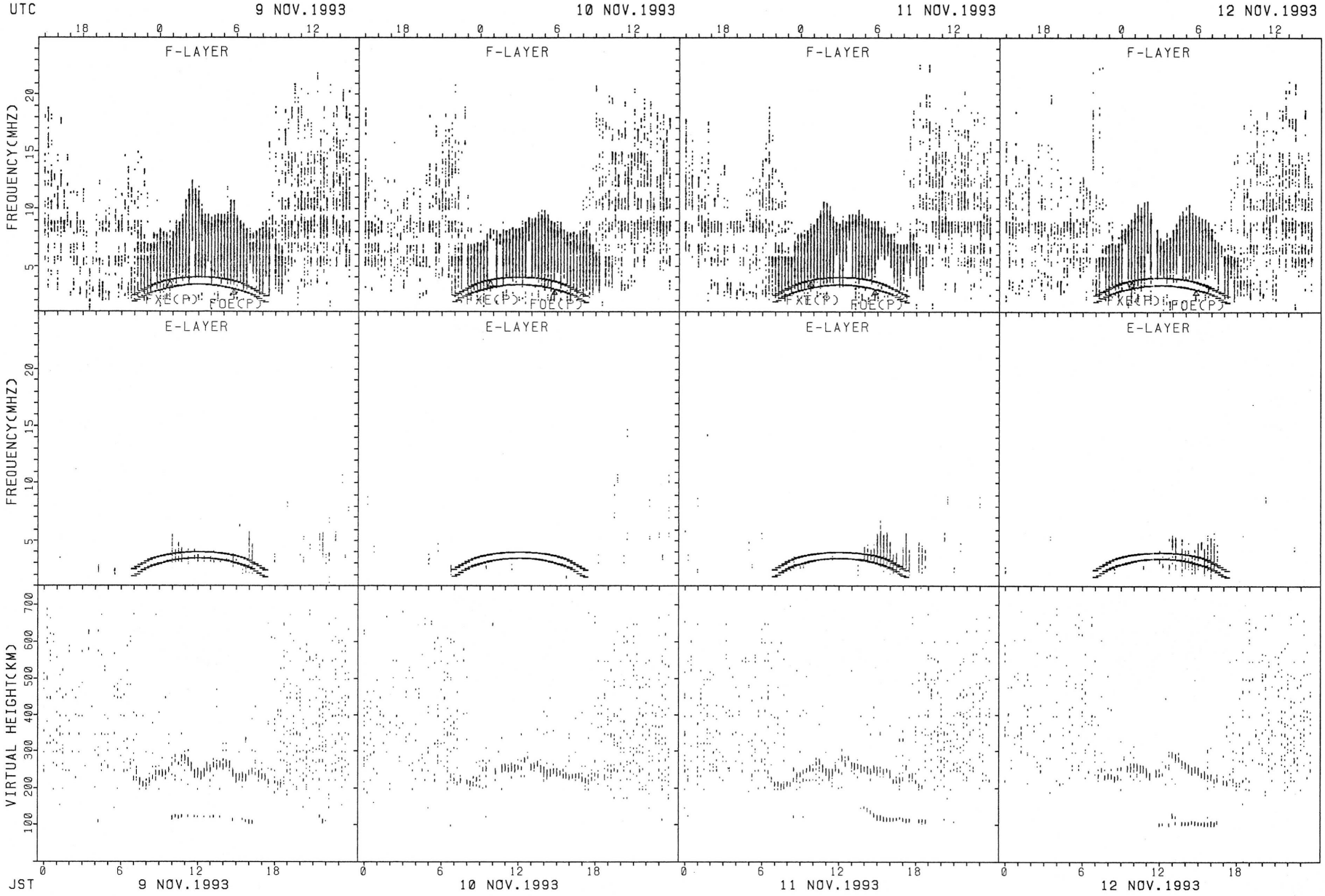
7 NOV.1993
8 NOV.1993
F-LAYER
E-LAYER
FXE(P); FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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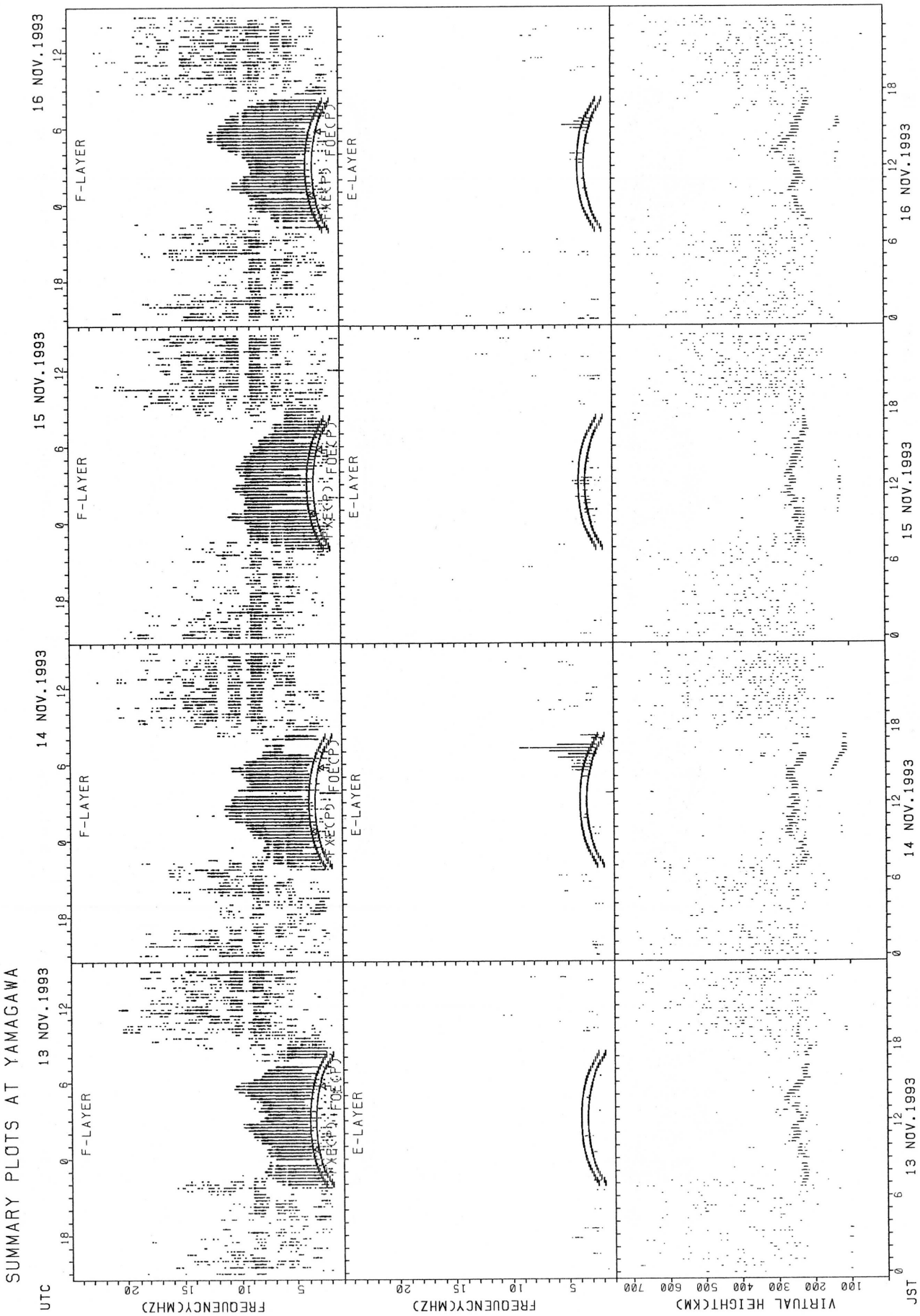
SUMMARY PLOTS AT YAMAGAWA
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E-LAYER
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UTC
JST
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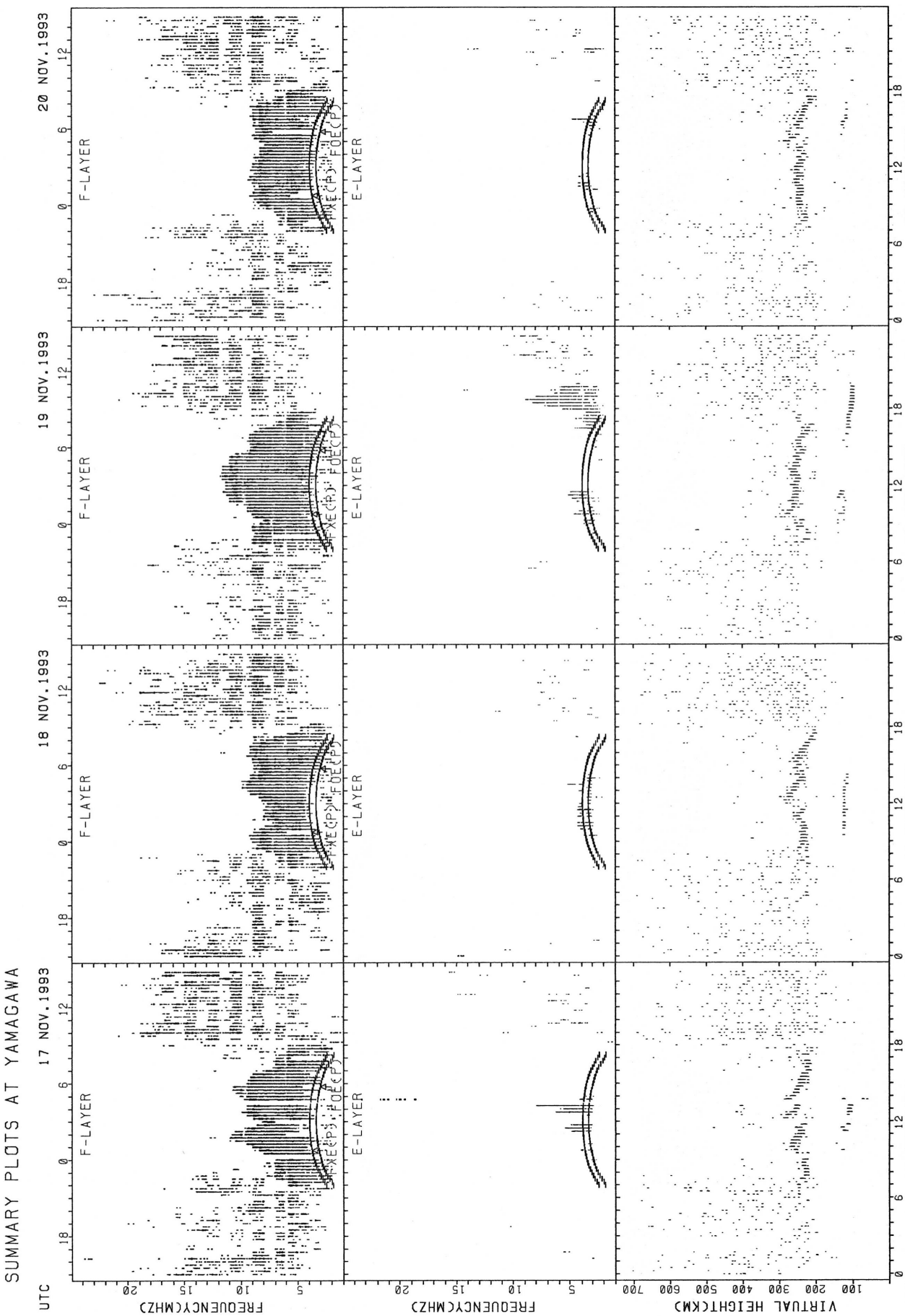
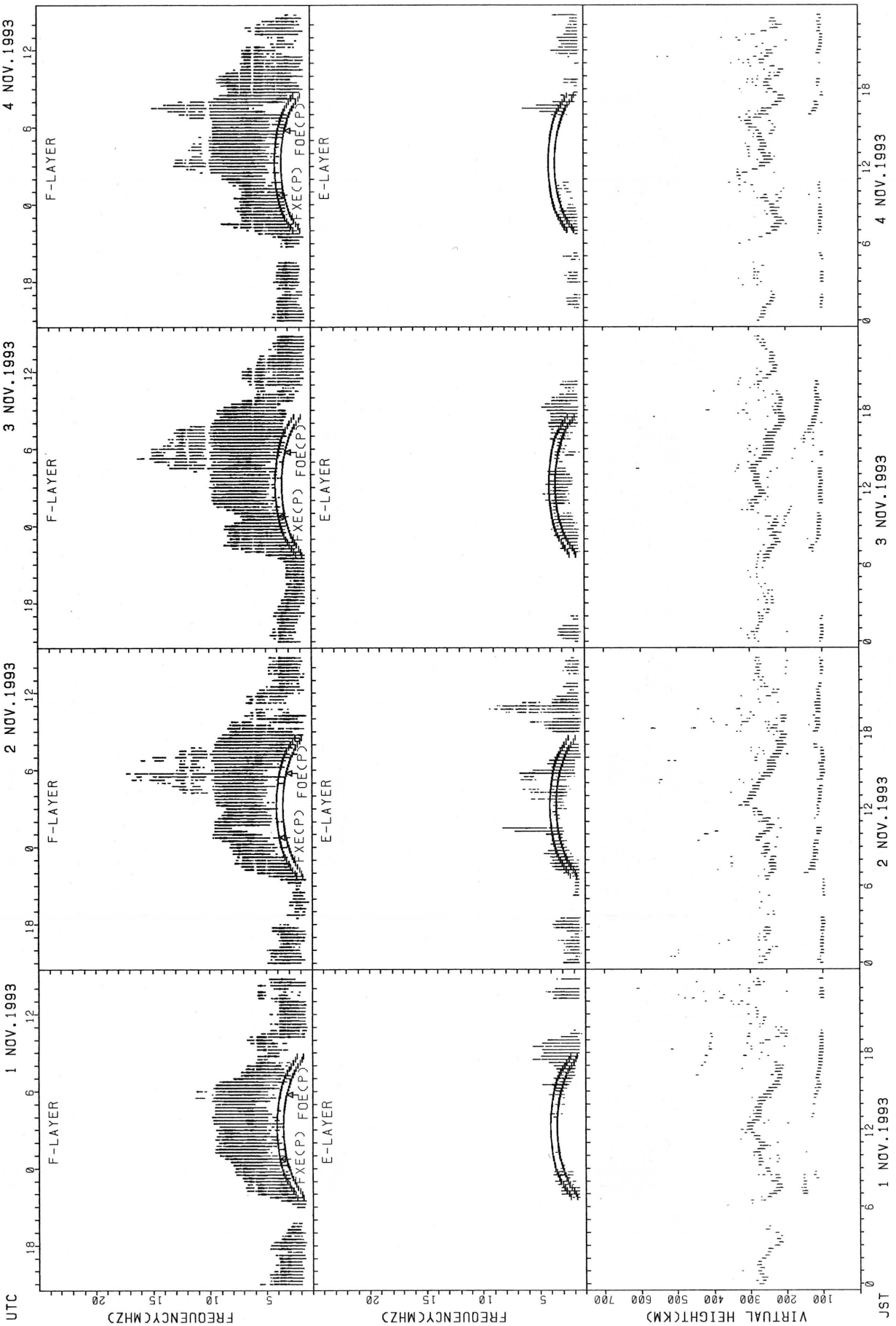


Notes : No data of Summary Plots were collected on November 21 to 30, 1993 at Yamagawa.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3 NOV.1993
4 NOV.1993
F-LAYER
E-LAYER
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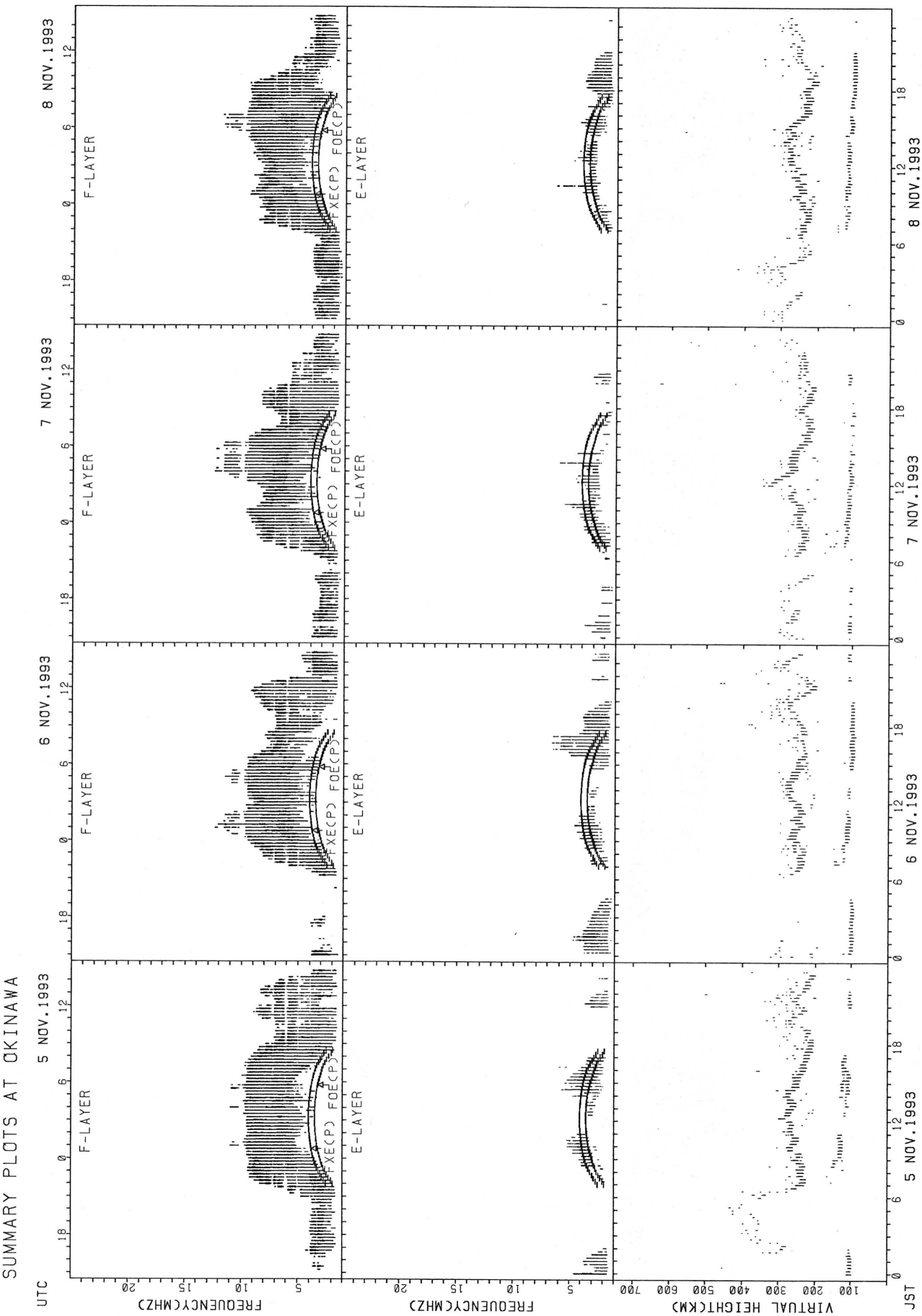
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
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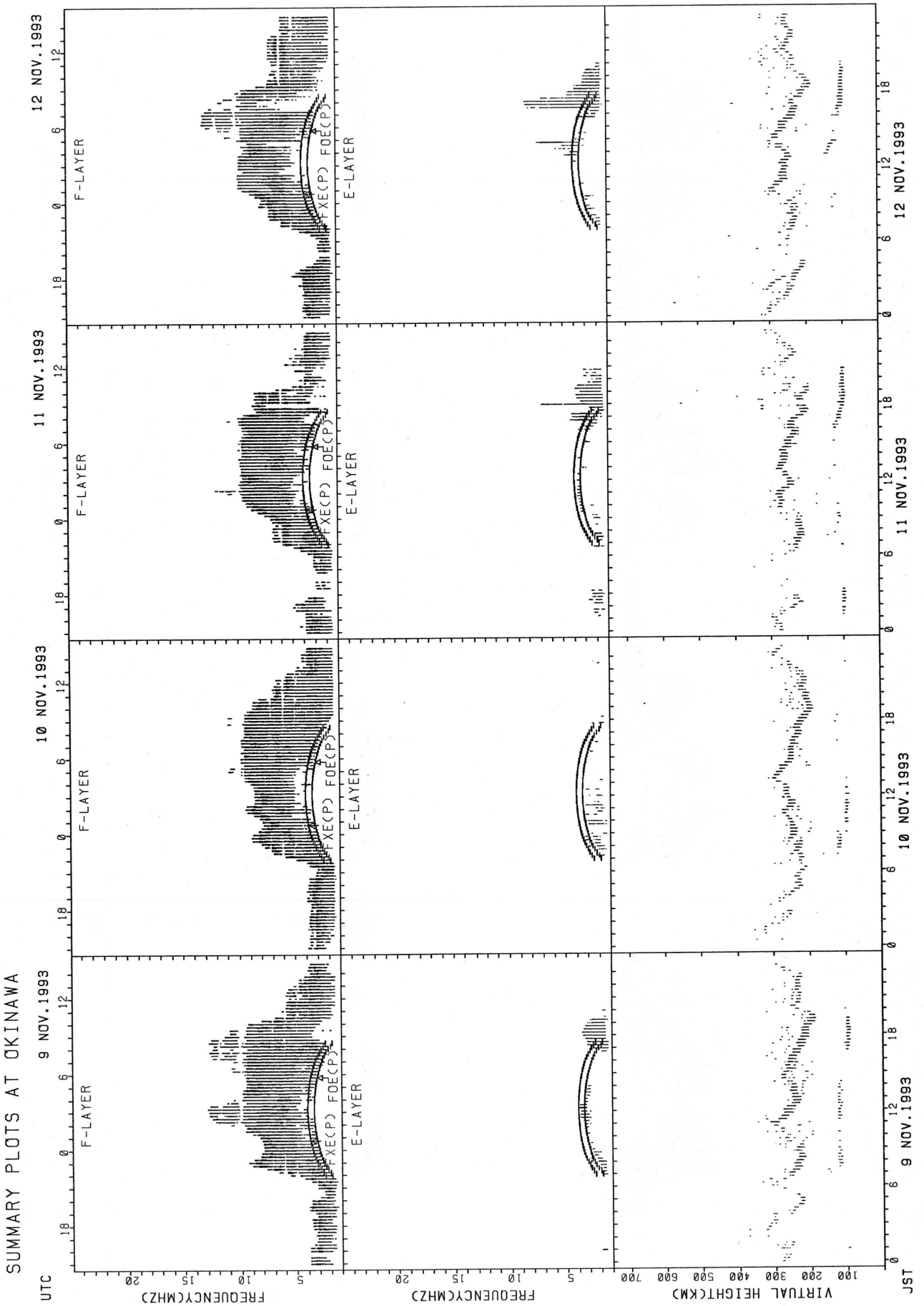
SUMMARY PLOTS AT OKINAWA
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FREQUENCY(MHZ)
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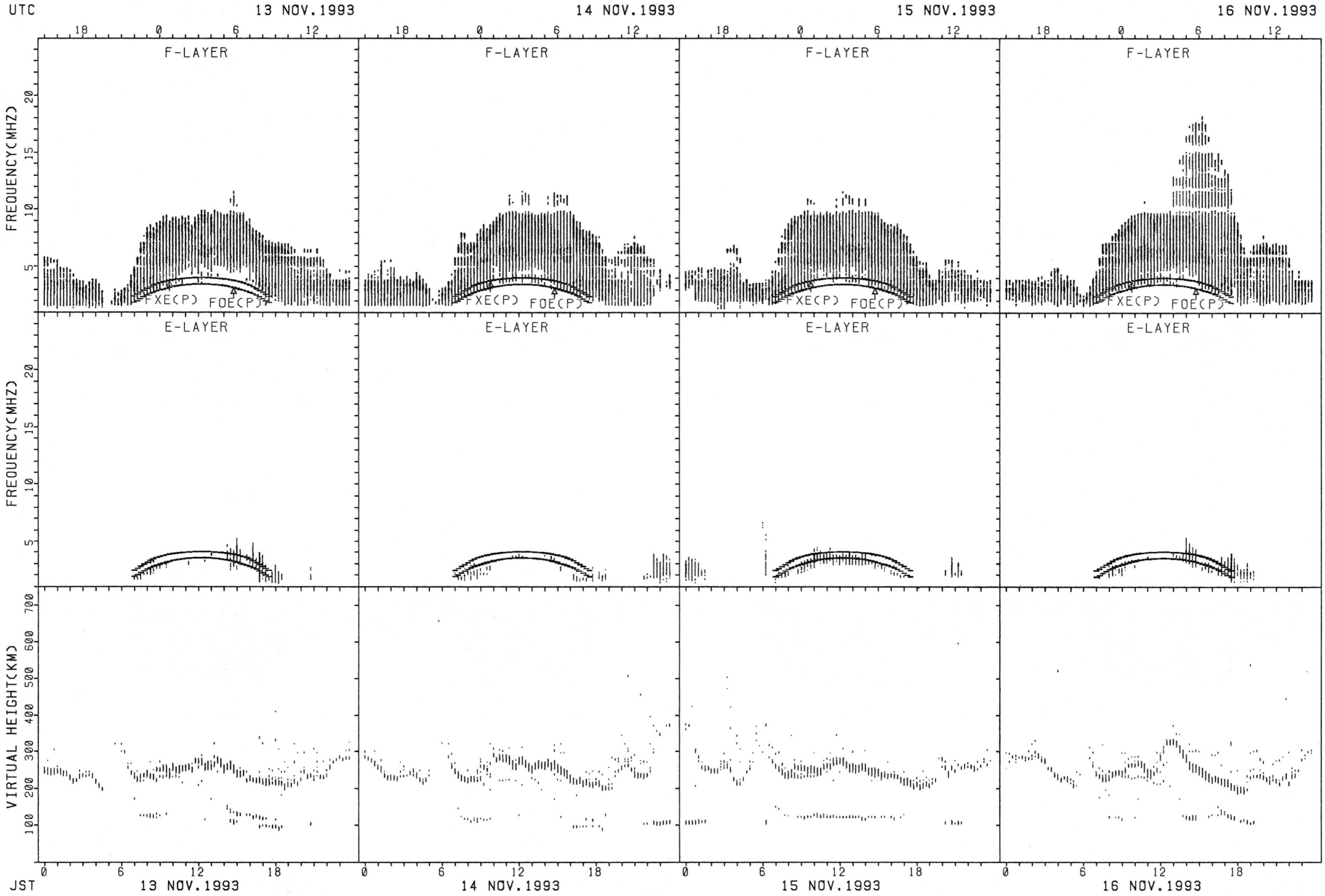
SUMMARY PLOTS AT OKINAWA



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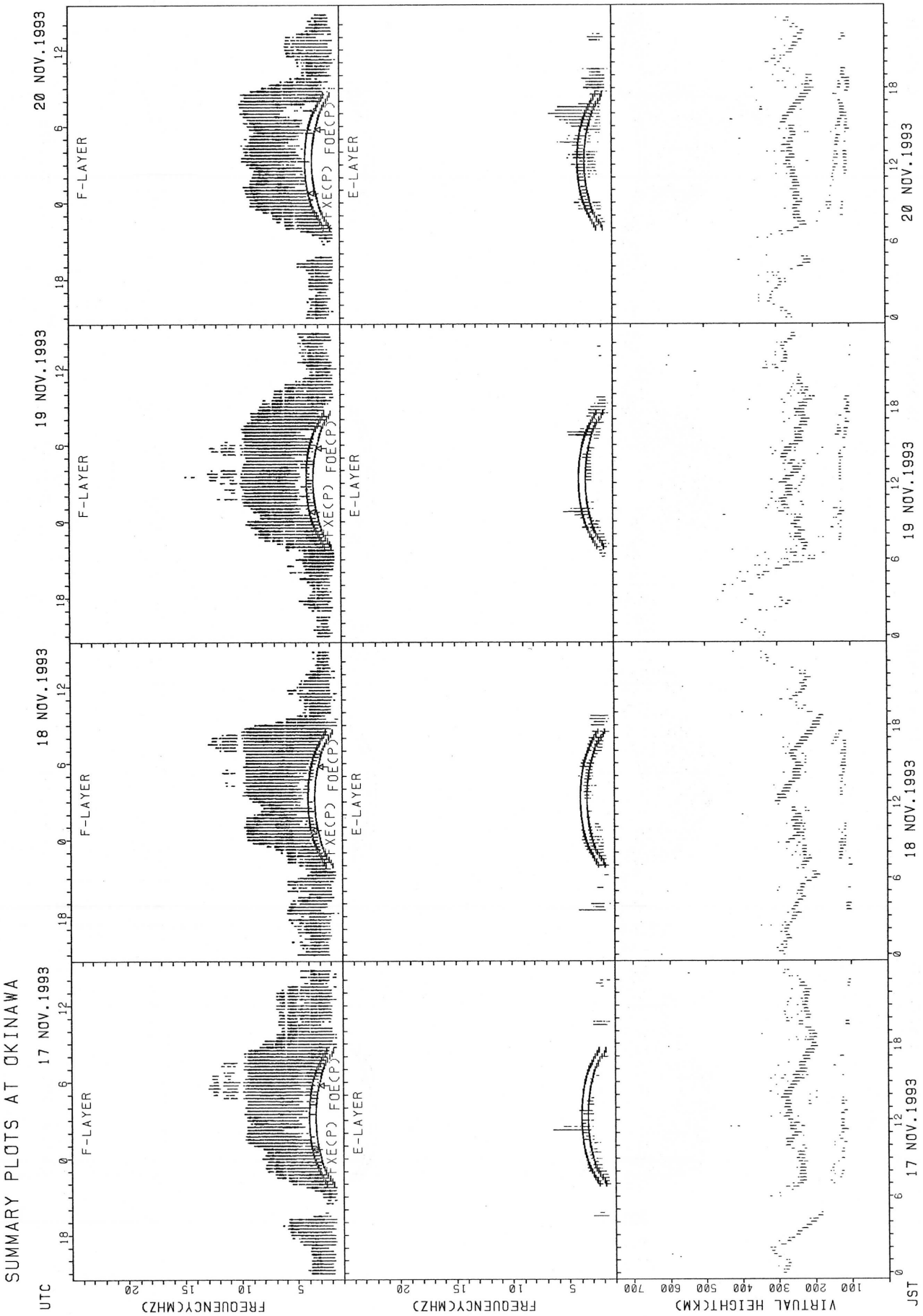
SUMMARY PLOTS AT OKINAWA
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JST
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E-LAYER
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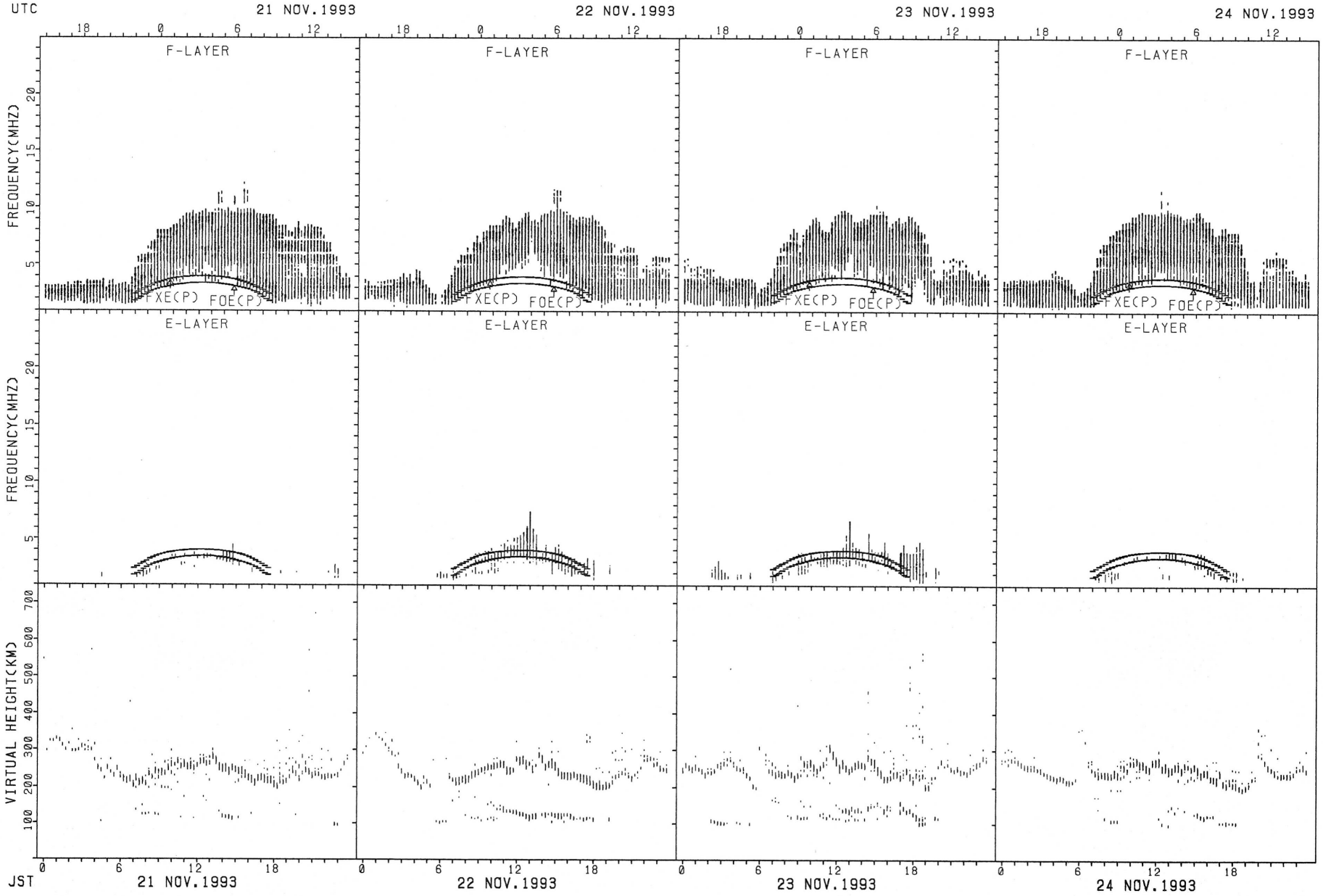
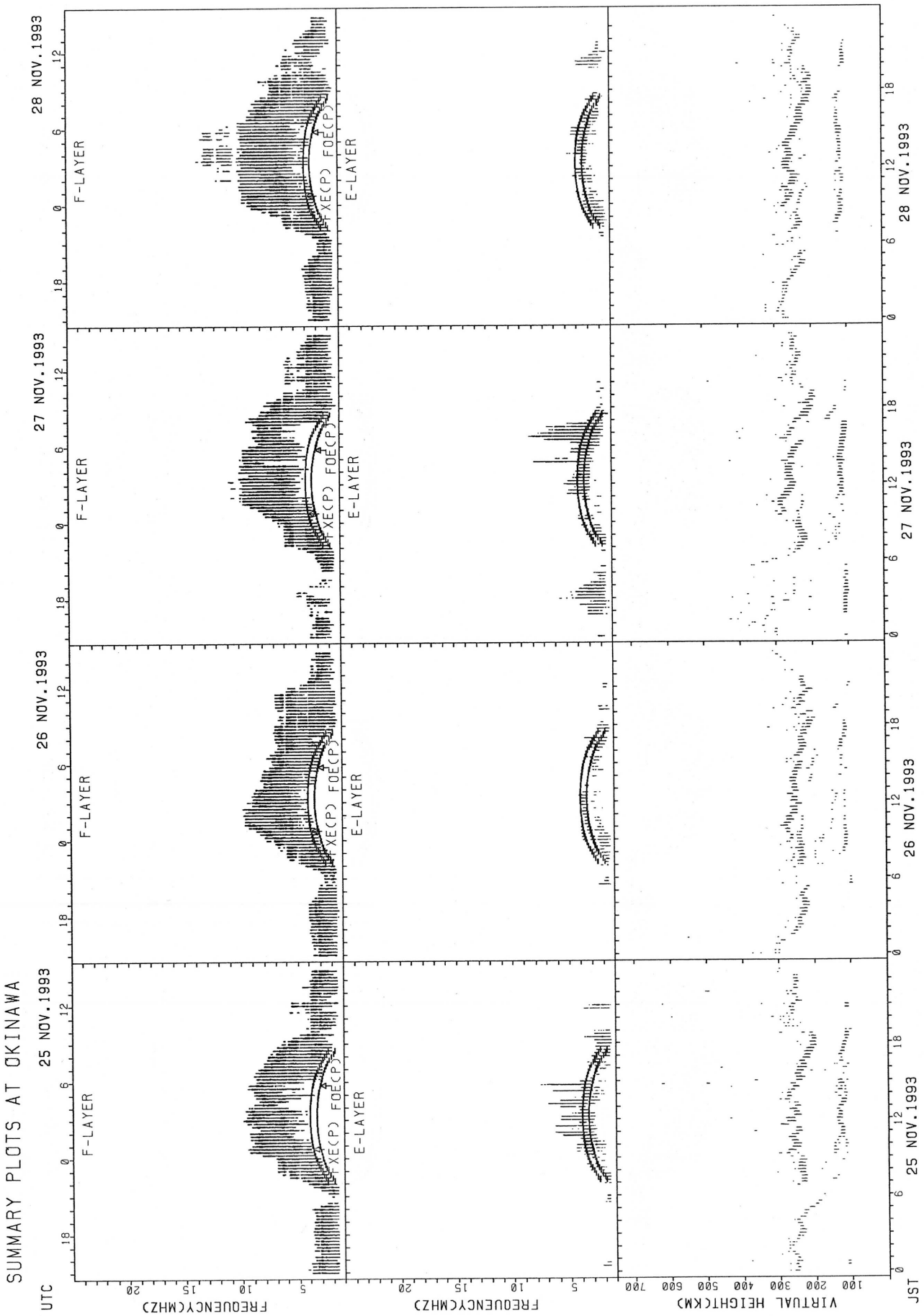
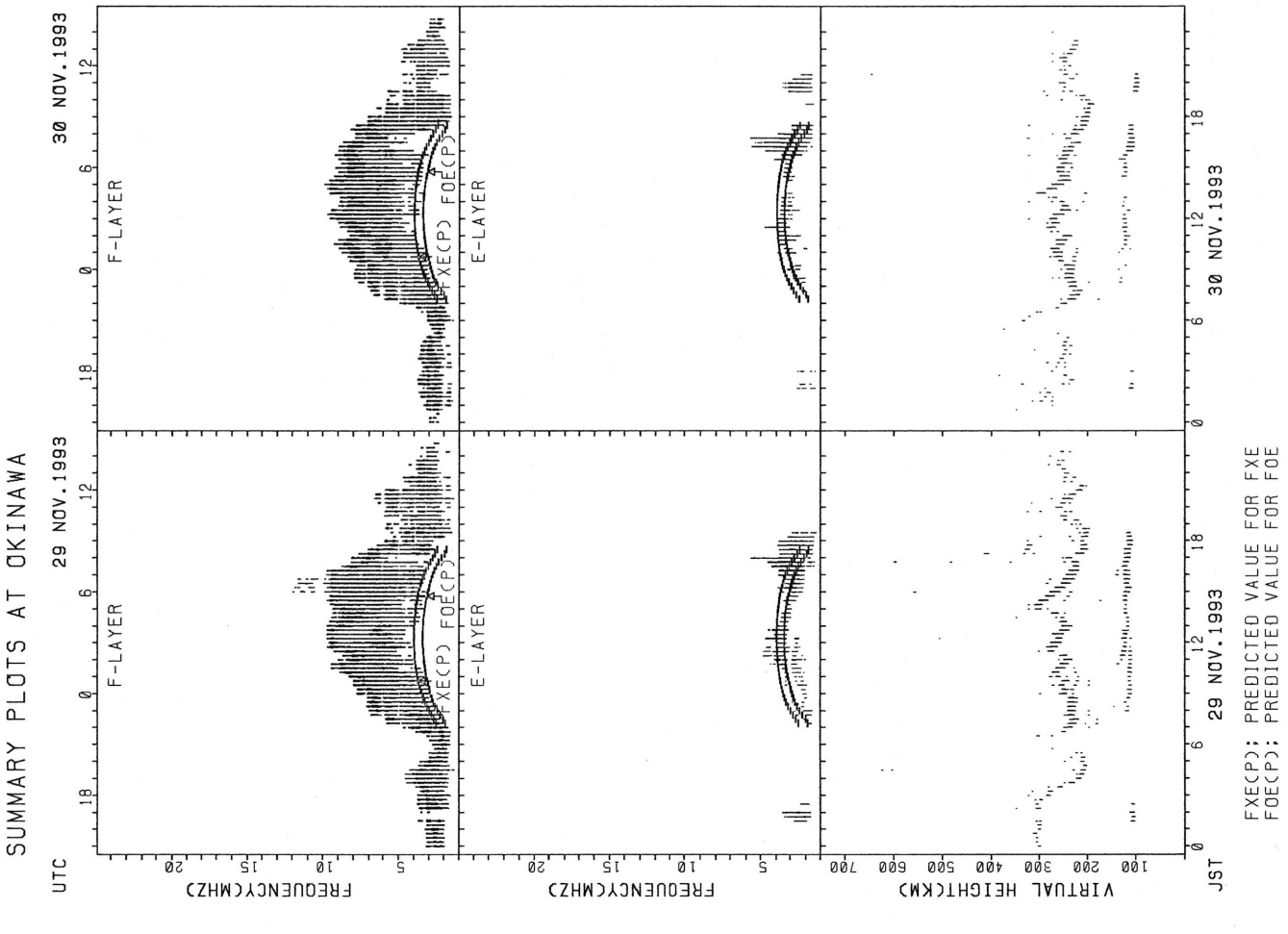
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
JST
25 NOV.1993
26 NOV.1993
27 NOV.1993
28 NOV.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 OKINAWA
UTC
29 NOV.1993
30 NOV.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

NOV. 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									26	28	25	26	29	28	29	27								
MED									239	235	244	252	244	245	248	238								
U Q									254	253	259	256	254	257	257	252								
L Q									228	227	233	240	235	234	240	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	15	12	15	13		12		11		11			10			13	18	23	22	17	18	20	15	14
MED	109	107	111	111		115		143		117			123			127	115	115	113	113	113	113	109	108
U Q	113	110	113	112		121		157		147			135			143	125	115	121	115	115	116	115	113
L Q	107	106	107	107		114		117		113			113			115	111	111	111	109	109	110	107	105

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								16	25	26	25	11		26	29	25	12							
MED								245	236	244	250	246		251	248	240	233							
U Q								257	244	248	262	260		262	254	248	246							
L Q								235	223	240	241	238		244	244	233	227							

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	11	14	11		10		13	12	11		12	15		12	18	18	19	15	22	17	15	13	12	11
MED	107	107	109		107		107	134	115		114	117		121	115	113	113	109	107	109	111	109	106	105
U Q	109	113	111		113		148	166	121		122	137		137	129	123	121	117	111	110	115	111	109	115
L Q	101	101	103		103		103	118	111		110	109		108	111	109	109	105	105	104	103	106	104	103

MONTHLY MEDIANS OF H'F AND H'ES

NOV. 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			11		10		10	18	25	27	28	12		11	30	29	29	21	21	13	11	12	10	10
MED			109		109		112	204	230	242	235	130		125	246	236	228	218	177	109	113	110	107	106
U Q			111		113		153	250	253	248	263	158		137	260	241	238	245	307	191	133	138	111	115
L Q			103		103		105	125	118	153	116	116		109	129	123	123	112	110	109	107	107	105	103

H'ES

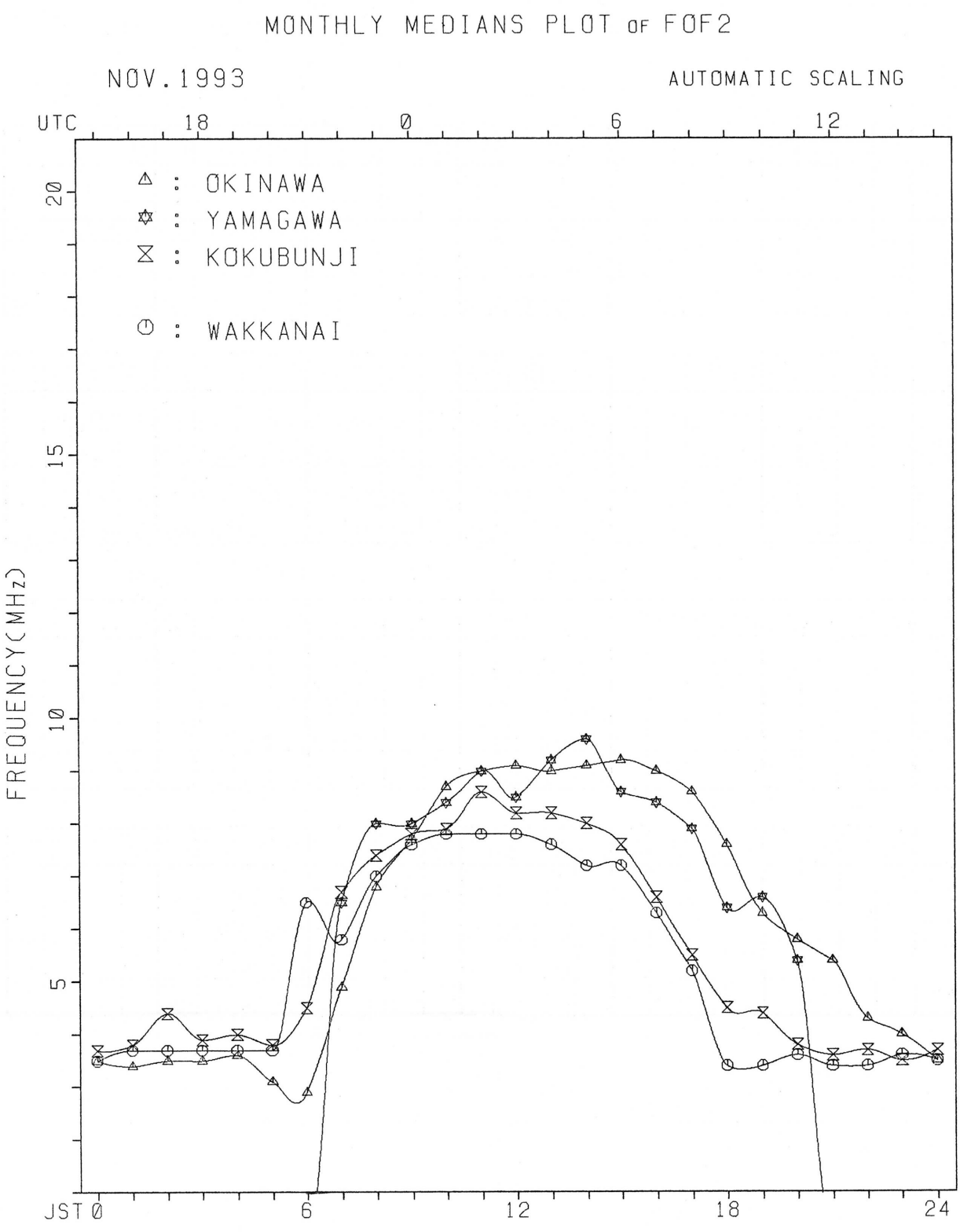
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT			10					11	11	13	17	18	17	19	20	19	19	15	13	12	11	11	10	
MED			109					246	250	248	260	125	113	121	250	240	236	226	266	110	113	111	107	
U Q			111					270	262	268	270	139	125	131	263	246	250	264	379	191	133	163	111	
L Q			103					183	234	216	127	117	107	109	115	119	115	117	206	109	107	107	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									24	27	27				19	30	31	29	20					
MED									246	254	262				258	246	234	232	238					
U Q									257	260	274				272	260	244	240	244					
L Q									236	246	248				250	240	226	220	220					

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										10	11	11		11	10	13	18	20	19	12				
MED										131	131	123		129	121	121	120	119	111	106				
U Q										165	153	131		139	125	132	133	132	119	115				
L Q										119	113	119		117	119	117	113	114	103	101				


MONTHLY MEDIANS PLOT OF FOF2
NOV.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

NOV. 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

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	X 41	X 40	X 38	X 37	X 35	X 34													X 42	42	X 43	X 43	43	44
2	X 45	X 45	X 38	X 40	X 38	X 37													X 42	X 49	X 45	49	X 47	X 41
3	X 40	X 40	X 41	X 43	X 42	X 40													X 42	X 46	X 39	X 39	X 37	X 39
4	X 41	X 40	X 39	X 39	X 39	X 34													X 72	X 72	X 48	A	X 49	X 41
5	X 44	X 44	X 41	X 44	A	X 40													X 46	X 41	X 48	X 36	X 38	X 38
6	X 36	X 36	X 34	X 35	X 36	X 34													X 49	X 47	X 48	X 32	X 40	X 41
7	X 42	X 41	44	44	45	X 38												X 63	X 45	X 42	X 44	X 44	X 40	X 35
8	X 36	X 40	X 38	X 38	X 38	X 40												X 70	X 49	A	X 38	X 39	X 38	X 35
9	X 38	X 39	X 40	X 41	X 39	X 41												X 64	X 45	X 40	X 40	X 39	X 37	X 36
10	X 37	X 38	X 41	X 40	X 38	X 37												X 57	X 53	X 42	X 44	X 38	X 38	X 39
11	X 39	X 41	X 41	X 49	X 41	X 39												X 59	X 47	A	X 39	X 36	X 37	X 37
12	X 38	X 40	X 41	X 43	X 45	X 34												X 53	X 44	X 41	X 38	X 32	X 31	X 38
13	X 40	X 41	X 42	X 39	39	X 38												X 56	X 40	X 45	X 40	X 38	X 39	X 39
14	X 40	X 41	X 40	X 44	X 40	X 39												X 54	X 46	X 50	X 40	X 31	X 35	X 35
15	X 38	X 38	X 38	X 42	X 36	X 36												X 50	X 48	X 40	X 35	X 41	43	X 44
16	X 44	X 44	X 47	X 43	X 45	X 45	X 48											X 59	X 42	X 37	X 36	X 32	X 33	X 33
17	X 37	X 36	X 38	X 39	X 48	X 33	X 40											X 54	X 56	X 43	X 39	X 33	X 34	X 36
18	38	X 39	X 39	X 38	X 40	X 41	X 40											X 48	X 37	X 42	X 43	X 32	X 36	X 34
19	X 34	X 34	X 35	X 29	X 32	35	X 26											X 50	X 46	X 34	X 37	X 41	X 42	X 37
20	X 40	X 40	X 39	X 42	X 54	X 29	X 38											X 59	50	55	X 40	X 40	41	X 39
21	X 42	X 44	X 45	50	54	48	53											X 46	X 47	X 48	X 38	X 33	X 31	X 33
22	X 34	X 37	X 37	X 43	X 44	X 33	X 33											X 42	X 38	X 40	X 38	X 37	X 34	34
23	X 36	X 38	X 39	X 39	X 39	X 38	X 36											X 54	X 41	X 36	X 34	X 34	X 35	X 38
24	X 38	X 41	X 39	X 38	47	X 37	X 33											X 45	0 X 33	X 37	X 40	A	X 34	X 36
25	X 37	X 38	X 40	X 42	X 44	X 41	X 34											X 43	A	X 43	X 39	A	X 37	X 36
26	X 39	X 40	X 39	X 41	X 42	X 41	X 39											X 50	X 45	X 35	X 38	X 35	X 34	X 36
27	X 33	X 37	X 39	X 45	X 47	X 34	X 38											X 56	X 36	X 34	X 38	X 36	X 33	X 33
28	X 32	X 34	X 35	X 36	X 43	X 33	X 33											X 48	X 44	X 37	X 34	A	X 34	X 34
29	X 35	X 36	X 35	X 38	X 39	X 35	X 37											X 47	X 37	X 46	X 37	A	X 36	0 X 35
30	X 38	X 40	X 44	X 38	X 36	X 34	X 39											X 57	X 35	X 40	X 40	X 40	X 33	X 37
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	15											24	29	28	30	25	30	30
MED	X 38	X 40	X 39	X 40	X 40	X 37	X 38											X 54	X 45	X 42	X 39	X 37	X 37	X 36
U Q	X 40	X 41	X 41	X 43	X 45	X 40	X 40											X 58	X 48	X 46	X 43	X 40	X 40	X 39
L Q	X 36	X 38	X 38	X 38	X 38	X 34	X 33											X 48	X 40	X 38	X 38	X 33	X 34	X 35

NOV. 1993 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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	35	34	32	31	29	28	42	69	81	83	78	82	91	89	96	81	73	49	36	F 36	37	37	F 37	F 36
2	39	39	32	34	32	31	41	61	71	79	83	84	85	84	87	72	58	53	36	43	39	F 37	41	35
3	34	34	35	37	36	34	44	71	78	77	76	79	75	81	79	76	60	48	36	40	33	33	31	33
4	35	34	33	33	33	28	36	H 66	78	77	67	92	119	99	65	67	85	77	66	66	42	I A 42	43	35
5	38	38	35	38	I A 35	34	53	72	98	74	68	87	92	71	80	78	73	52	40	35	42	31	32	32
6	30	30	28	29	30	28	38	58	78	94	98	84	87	H 89	74	74	71	52	43	41	42	26	34	35
7	36	35	F 33	F 34	F 36	32	44	69	79	87	79	76	89	87	82	69	61	57	39	36	38	J R 38	34	29
8	30	34	32	32	32	34	40	71	78	85	88	84	69	74	79	78	63	64	43	I A 37	32	33	32	29
9	32	33	34	35	33	35	43	80	84	Z 70	75	93	87	79	83	79	69	J R 58	39	34	34	33	31	30
10	31	32	35	34	32	31	40	R 74	75	73	I C 75	77	85	89	74	67	67	51	47	36	38	32	32	33
11	33	35	35	43	35	33	44	75	72	77	V 84	85	78	81	90	74	63	53	41	I A 30	34	31	31	31
12	32	34	35	37	39	28	33	65	72	85	79	89	64	89	75	69	56	46	38	35	32	26	25	32
13	34	35	36	33	F 32	32	42	71	74	64	84	82	82	73	75	89	62	50	34	39	34	32	33	33
14	34	35	34	38	34	33	39	62	76	83	94	106	88	78	87	78	64	48	40	44	34	25	29	29
15	32	32	32	36	30	30	36	73	92	95	96	89	86	91	84	72	64	44	42	34	29	35	35	38
16	38	38	41	37	39	39	42	68	72	76	88	96	83	86	103	84	72	54	36	31	30	26	27	27
17	31	30	32	R 33	42	27	34	57	70	78	85	96	81	89	78	76	60	48	50	37	33	V 27	28	30
18	31	33	33	32	34	35	34	59	70	82	72	69	73	84	86	76	72	42	31	36	37	V 26	F 25	28
19	28	28	29	23	26	F 27	U R 20	58	90	79	R 103	94	106	110	92	80	78	44	40	28	31	35	36	31
20	34	34	33	36	48	24	32	53	64	79	90	87	88	83	71	68	78	53	F 43	47	34	34	33	33
21	36	39	39	F 41	F 45	F 41	F 44	67	70	64	69	85	92	H 100	80	67	61	40	41	42	32	27	25	27
22	28	31	31	37	38	27	27	52	60	69	68	73	72	87	81	63	57	36	32	34	32	31	28	F 27
23	J R 30	32	33	J R 33	33	32	30	58	64	63	Z 65	82	69	62	79	R 76	61	47	35	31	28	28	29	32
24	32	35	33	32	38	31	27	57	62	U R 62	72	H 72	66	77	72	71	59	39	27	32	34	I A 27	28	30
25	31	32	34	36	38	35	H 28	53	62	69	70	75	64	69	J R 68	71	64	37	A	37	33	I A 32	31	R 30
26	33	34	33	35	36	35	33	54	66	68	80	72	66	72	70	H 58	60	44	39	29	32	J R 29	28	30
27	U R 27	32	33	39	41	28	32	R 63	55	62	80	I C 88	80	83	68	68	64	50	30	R 28	32	30	R 27	J R 27
28	J R 26	28	29	30	37	27	27	50	61	74	78	68	75	63	64	59	54	42	38	R 31	28	I A 32	J R 28	28
29	29	30	29	32	33	29	31	57	64	68	71	87	67	70	81	60	55	41	R 31	40	31	I A 30	30	U R 29
30	32	34	38	32	J R 30	28	33	60	63	68	64	94	82	73	67	62	55	51	28	34	34	J R 34	J R 27	31
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30
MED	32	34	33	34	34	31	36	62	72	76	78	84	82	83	79	72	63	48	39	36	34	32	31	30
U Q	34	35	35	37	38	34	42	71	78	82	85	89	88	89	84	78	71	53	42	40	37	34	33	33
L Q	30	32	32	32	32	28	32	57	64	68	71	77	72	73	72	67	60	44	34	32	32	27	28	29

NOV. 1993 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	U L 430									
2										L	U L 460	U L 430	U L 450	U L 430	L	L								
3									L	L	U L 450	L 440	L	U L 450	L	L								
4								L	L	L	L	L	L	L										
5								L	L		L	L	L	L		L								
6									L	L	L	U L 460	L 470	L	L	L								
7									L	L	L	L	L	L	L 410	L								
8								L	L	U L 440	U L 470	U L 430	U L 450	L	L									
9									U L 380		L	U L 460	L	L	L									
10									L	L		L	L	L	L									
11									L	L	L	L	L	L										
12								260		L	L	L		L	L									
13								L	L	U L 440	L	L	L	L	L	L								
14										L	U L 470	U L 470	U L 440	L	L	L								
15								L	L	L	L		L	L	U L 400	L								
16								220		L 340	U L 410	L	L	U L 500	L	L								
17										L	L	L	L	L	L	L								
18								L	L	L	L	L	L	L	L	L								
19											L	L	L	L	L	L								
20									L		L	L	L 390	L										
21											U L 400	L	L	L										
22										L	L	L	L	U L 440	U L 400	L								
23									L	L	L	U L 460	U L 430	L	L									
24								L			L	L	L	L										
25									L	U L 410	L	L	L		L									
26											L 460	L	L		U L 430									
27											U L 440		L	U L 410	L									
28										L	U L 430	L 420	U L 430	L	L									
29									L	U L 490	U L 460	L	L 430	L	L	L								
30										L	U L 400	L	L	L	L									
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	1	5	11	8	8	5	5									
MED								240	U L 380	U L 440	U L 450	U L 450	U L 435	U L 440	U L 410									
U Q										U L 465	U L 460	U L 460	U L 450	U L 475	U L 430									
L Q										L 375	U L 410	U L 430	L 430	U L 420	U L 400									

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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							B	A 225	A	A	A	A	335	A	A	A	A	A						
2							A	A 210	265	A	A	A	A	A	275	245	A	B						
3							B	A	A	300	315	330	U R 330	U R 310	300	245	205	B						
4							B	R 210	A	A 300	A	R 340	B	R	295	250	A 205	B						
5							B	190	255	U A 305	A	A	R 320	A	A	A 235	A	B						
6							B	A	A	A	315	A	U R 320	305	A	A	A	B						
7							B	A	260	305	R 305	320	320	R 320	280	235	190							
8							B	210	A	A	R 310	A	A	A	A	A	A							
9							B	A	A	A	A	A	A	U A 315	A	A	A							
10							B	205	A	A	C	C	C	C	C	C	C							
11							B	205	A	A	A	325	A 325	305	A	A 240	A							
12							B	185	255	295	320	320	R 325	320	270	250	A							
13							B	200	265	290	R	330	330	315	310	270	A							
14							B	200	265	280	310	325	330	315	280	255	A							
15							B	205	255	290	310	320	325	305	280	A	A							
16								170	250	290	310	320	A	A	A	235	B							
17								H 210	265	A 270	A	A	A	305	A	235	A							
18								200	270	300	A	A	320	A	A	250	A							
19							K 145	A	260	295	A	A	A	A	265	225	170							
20								170	245	290	315	325	320	300	270	240	A							
21								165	245	280	305	325	325	325	270	250	185							
22								170	260	290	300	310	315	A	A 245	A	A							
23								185	250	290	305	325	320	305	275	250	A							
24								B	R	C	320	A	310	305	290	A	A							
25								160	250	285	A	A	R	R 325	300	A 260	185							
26								155	240	R 270	R 320	335	A	320	A	A	A							
27								200	245	315	320	I C 325	310	A	A	255	I C 185							
28								B	R	U R 290	A	R	B	B	A	A	A							
29								175	R 250	A	A	A	A	A	A	A	A							
30								B	R	R	B	B	R	B	B	B	B							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	22	19	20	15	15	17	16	15	18	7							
MED							K 145	200	255	290	310	325	320	312	280	248	185							
U Q								205	265	300	320	330	328	320	295	250	205							
L Q								170	250	288	305	320	320	305	270	235	185							

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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

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	24	22	24	E B 13	17	18	18	25	J A 52	J A 34	55	J A 50	J A 43	49	J A 39	J A 43	J A 67	J A 74	J A 64	J A 27	J A 40	J A 33	J A 34	J A 45
2	J A 36	J A 24	28	J A 18	24	20	J A 18	25	G	J A 34	J A 41	J A 41	J A 40	36	G 21	G 20	20	J A 22	J A 26	J A 24	24	J A 21	J A 29	J A 40
3	J A 28	J A 28	23	22	22	J A 21	18	J A 27	J A 33	G 24	G	G 25	G 26	G	G	28	24	J A 19	J A 27	J A 20	E B 13	E B 14	J A 22	J A 23
4	J A 41	E B 13	E B 13	19	19	E B 15	E B 14	G	30	35	37	G	E B 34	G 30	G 28	30	25	J A 26	J A 54	53	J A 30	51	40	28
5	20	J A 33	J A 20	J A 24	55	E B 15	E B 14	27	J A 42	57	36	J A 44	G 31	J A 45	J A 47	29	J A 42	J A 54	J A 23	J A 49	J A 52	J A 44	23	E B 13
6	E B 14	E B 14	E B 13	E B 13	19	E B 14	J A 16	J A 50	34	33	G 29	J A 41	G 24	G 25	31	36	43	J A 34	J A 33	E B 14	E B 13	E B 13	E B 13	J A 38
7	J A 35	J A 26	J A 21	J A 22	21	E B 15	J A 20	21	J A 32	G 28	G	G	G 23	G 22	31	28	G	J A 22	J A 22	E B 12	E B 13	E B 13	E B 12	E B 14
8	20	J A 21	E B 12	E B 14	20	17	E B 13	G 19	J A 33	J A 30	G 30	34	35	35	36	J A 42	24	J A 21	J A 19	38	J A 21	J A 21	E B 16	E B 15
9	J A 25	J A 24	J A 26	36	27	J A 29	J A 23	21	29	J A 92	J A 54	J A 49	37	J A 51	J A 41	J A 53	24	82	J A 51	J A 42	E B 11	B J A 19	E B 12	E B 14
10	E B 15	E B 14	E B 14	E B 14	J A 40	19	J A 16	G	J A 31	J A 31	C	E C 38	E C 42	E C 42	E C 34	E C 37	E C 28	E B 14	19	E B 13	E B 14	J A 21	J A 23	J A 19
11	J A 52	J A 44	J A 51	J A 52	J A 31	27	J A 18	G	J A 31	J A 35	J A 36	35	36	33	J A 54	60	J A 27	J A 76	J A 71	50	J A 42	J A 35	J A 23	E B 14
12	23	21	19	20	E B 12	E B 15	23	G 18	G	G 23	G 25	G 25	G 26	G	G	G	20	E B 13	E B 12	E B 13	17	E B 13	J A 42	J A 34
13	E B 12	J A 29	21	E B 13	E B 13	E B 15	E B 14	23	G	G 27	G 28	J A 43	J A 44	36	G 28	G	J A 37	J A 84	J A 23	22	30	24	E B 15	E B 14
14	E B 14	E B 13	E B 13	20	19	J A 19	21	G	G 25	33	35	34	G 29	G 22	G	G	27	E B 14	J A 19	23	20	J A 21	17	20
15	E B 14	23	22	E B 14	22	E B 14	E B 15	G	30	38	34	J A 55	36	34	J A 42	J A 30	J A 27	E B 14	E B 13	E B 14	E B 13	E B 13	J A 35	E B 13
16	J A 28	J A 25	J A 46	J A 23	19	23	J A 26	G	G	G	G	37	35	J A 32	34	G 22	E B 20	E B 12	B J A 24	J A 22	J A 24	20	27	20
17	20	E B 13	18	E B 12	E B 13	E B 14	E B 14	G	G	30	35	35	J A 53	J A 34	J A 43	G 24	J A 35	J A 27	J A 24	J A 26	E B 13	22	18	J A 53
18	J A 24	20	E B 12	E B 12	J A 24	21	J A 21	G	G	31	34	34	G	33	30	G 24	J A 32	E B 14	J A 21	J A 34	E B 13	E B 11	J A 20	18
19	20	23	20	E B 13	E B 14	E B 15	K 15	23	28	36	J A 50	J A 46	33	31	G	G	22	J A 23	J A 19	J A 30	J A 26	20	18	21
20	E B 12	J A 16	E B 12	18	E B 12	J A 13	J A 13	G	G 23	34	34	35	34	G	37	32	J A 32	E B 14	J A 33	J A 36	E B 12	E B 14	J A 23	E B 11
21	E B 14	E B 13	E B 12	E B 14	17	E B 13	E B 13	20	G	37	35	40	36	37	J A 43	J A 46	20	E B 15	J A 16	J A 20	18	E B 13	E B 14	E B 13
22	E B 13	E B 13	E B 14	E B 13	E B 12	E B 14	J A 14	23	31	34	34	38	39	J A 42	34	J A 33	21	E B 13	18	E B 13	E B 13	E B 14	E B 13	E B 12
23	E B 13	E B 12	E B 12	E B 13	E B 13	E B 13	E B 12	G	G	34	34	38	34	41	J A 41	J A 67	42	E B 14	J A 42	J A 24	E B 12	E B 13	E B 11	E B 16
24	E B 13	E B 14	E B 13	E B 14	E B 12	E B 13	E B 13	E B 21	G	E C 38	35	44	36	J A 42	J A 42	J A 40	34	J A 37	J A 40	E B 13	J A 27	J A 54	E B 12	E B 14
25	E B 18	E B 14	E B 12	E B 12	E B 12	E B 12	E B 13	G	27	G	35	35	G 26	G 26	34	31	31	J A 51	46	21	J A 29	J A 47	J A 21	J A 19
26	18	E B 14	J A 22	21	20	E B 13	E B 13	G	28	G	40	42	35	40	42	39	34	J A 36	E B 12	J A 18	J A 23	E B 13	E B 13	J A 29
27	J A 22	J A 22	J A 34	J A 48	J A 34	E B 13	E B 15	22	31	G	40	C	J A 47	J A 44	J A 37	J A 29	E C 28	E B 14	E B 14	E B 12	18	E B 13	E B 12	E B 13
28	20	22	E B 13	21	20	24	E B 13	E B 17	G	G	33	G 31	E B 37	B E B 34	29	27	19	E B 14	E B 13	20	27	35	20	J A 21
29	21	27	E B 13	E B 11	E B 13	E B 15	E B 14	G	G	30	J A 36	36	34	J A 50	J A 65	J A 28	32	J A 22	J A 37	21	18	34	E B 14	E C 20
30	E B 12	E B 13	E B 12	23	18	22	18	E B 20	G	G	E B 35	E B 36	G	E B 35	E B 31	E B 30	E B 19	E B 13	B J A 21	J A 34	J A 40	E B 14	E B 13	E B 13
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	20	21	16	16	19	E B 15	15	G	28	32	35	36	34	34	34	30	26	J A 22	J A 23	22	19	20	18	18
U Q	J A 24	J A 24	J A 22	J A 22	22	20	J A 18	23	J A 31	35	36	J A 42	J A 37	J A 42	J A 42	J A 39	34	J A 36	J A 37	J A 34	J A 27	J A 33	J A 23	J A 23
L Q	E B 14	E B 14	E B 13	E B 13	E B 13	E B 14	E B 13	G	G	G	G	G 34	G	G	G 29	G	21	E B 14	E B 19	E B 14	E B 13	E B 13	E B 13	E B 14

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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	17	E B 12	16	E B 13	E B 13	E B 14	16	25	43	33	35	39	G 27	35	34	38	44	43	30	E B 15	27	18	19	22
2	23	19	17	E B 13	E B 13	E B 13	16	23	G	33	36	34	35	33	G 21	G 20	20	17	19	20	17	15	20	21
3	23	23	E B 14	E B 12	E B 13	19	E B 14	24	29	G 24	G	G 25	G 24	G	G	28	22	E B 13	20	17	E B 13	E B 14	E B 12	E B 14
4	16	E B 13	E B E B 13	E B 12	E B 13	E B E B 15	E B 14	G	29	35	36	G	E B 34	G 30	G 27	30	25	23	30	41	22	A A 51	34	21
5	16	24	17	20	A A 55	E B E B 15	E B 14	25	29	46	34	40	G 30	34	45	27	27	15	16	18	20	20	17	E B 13
6	E B 14	E B 14	E B E B 13	E B 13	E B 14	E B E B 14	E B 14	34	27	30	G 27	33	G 24	G 23	29	29	36	15	16	E B 14	E B 13	E B 13	E B 13	31
7	23	15	15	E B 14	E B 14	E B E B 15	E B 13	21	G 23	G 27	G	G	G 23	G 22	31	26	G	18	18	E B 12	E B 13	E B 13	E B E B 12	E B 14
8	E B 13	16	E B 12	E B E B 14	E B 12	E B E B 13	E B 13	G 18	26	30	G 28	34	34	33	30	31	21	16	16	A A 38	20	20	E B 16	E B 15
9	20	20	20	23	18	24	16	21	26	51	37	34	34	41	35	44	23	42	29	21	E B 11	E B E B 12	E B 12	E B 14
10	E B 15	E B E B 14	E B E B 14	E B E B 14	16	E B 13	E B E B 13	G	27	30	C	E C 38	E C 42	E C 42	E C 34	E C 37	E C 28	E B 14	E B 12	E B 13	E B 14	18	20	16
11	15	22	20	18	17	E B 13	15	G	28	30	34	G	35	33	52	49	23	43	28	A A 50	30	24	15	E B 14
12	16	E B 14	E B E B 15	E B 13	E B 12	E B E B 15	E B 13	G 17	G	G 21	G 23	G 25	G 25	G	G	G	20	E B 13	E B 12	E B 13	16	E B 13	19	19
13	E B 12	25	E B 14	E B E B 13	E B 13	E B E B 15	E B 14	21	G	G 26	G 28	34	G 28	36	G 26	G	34	32	19	14	21	18	E B 15	E B 14
14	E B 14	E B 13	E B E B 13	E B 14	E B 13	E B E B 13	E B 15	G	G 19	33	33	34	G 28	G 22	G	G	25	E B 14	17	E B 13	E B 13	18	E B 14	E B 14
15	E B 14	15	15	E B 14	E B 14	E B E B 14	E B 15	G	29	37	34	52	35	33	33	28	25	E B 14	E B 13	E B 14	E B 13	E B 13	15	E B 13
16	21	24	29	17	E B 12	18	18	G	G	G	G	34	34	32	31	G 20	E B 20	E B 12	16	18	20	E B 13	20	16
17	E B 13	E B 13	E B E B 14	E B 12	E B 13	E B E B 14	E B 14	G	G	30	34	33	32	G 26	29	G 20	27	17	E B 13	19	E B 13	16	16	20
18	17	E B 14	E B E B 12	E B 12	18	E B 13	16	G	G	31	32	32	G	32	30	G 23	20	E B 14	E B 14	21	E B 13	E B E B 11	E B 13	E B 14
19	E B 14	16	E B 12	E B E B 13	E B 14	E B E B 15	K 15	21	27	32	33	34	33	U Y 31	G	G	20	15	16	22	21	E B 12	15	15
20	E B 12	E B 12	E B E B 12	16	E B 12	E B E B 14	E B 13	G	G 20	33	34	34	34	G	35	31	29	E B 14	17	17	E B 12	E B E B 14	E B 12	E B 11
21	E B 14	E B E B 13	E B E B 12	E B 14	E B 13	E B E B 13	E B 13	18	G	36	35	38	34	37	38	40	20	E B 15	E B 13	15	16	E B 13	E B 14	E B 13
22	E B 13	E B E B 13	E B E B 14	E B 13	E B 12	E B E B 14	E B 14	22	30	34	33	36	36	35	32	26	20	E B 13	16	E B 13	E B 13	E B E B 14	E B 13	E B 12
23	E B 13	E B 12	E B E B 12	E B 13	E B 13	E B E B 13	E B 12	G	G	33	33	35	34	37	34	57	37	E B 14	22	20	E B 12	E B E B 13	E B 11	E B 16
24	E B 13	E B 14	E B E B 13	E B 14	E B 12	E B E B 13	E B E B 13	E B 21	G	E C 38	34	37	35	37	39	36	34	34	23	E B 13	22	A A 54	E B 12	E B 14
25	E B 18	E B 14	E B E B 12	E B 12	E B 12	E B E B 12	E B 13	G	26	G	35	35	U G 26	G 26	33	30	28	31	A A 46	U Y 21	27	A A 47	19	16
26	E B 12	E B 14	20	E B 13	E B 12	E B E B 13	E B 13	G	27	G	40	42	34	39	40	36	27	33	E B 12	16	19	E B 13	E B 13	16
27	18	15	29	35	30	E B 13	E B 15	21	30	G	37	C	39	37	33	G 23	E C 28	E B 14	E B 14	E B 12	E B 13	E B 13	E B 12	E B 13
28	15	17	E B 13	17	18	22	E B 13	E B 17	G	G	U Y 33	U G 31	E B 37	E B 34	U Y 29	U Y 27	U Y 19	E B 14	E B 13	E B 13	18	A A 35	20	14
29	E B 13	14	E B 13	E B 11	E B 13	E B E B 15	E B 14	G	G	30	34	36	32	34	34	25	30	19	16	17	15	A A 34	E B 14	E C 20
30	E B 12	E B 13	E B 12	E B 13	18	E B 14	E B 13	E B 20	G	G	E B 35	E B 36	G	E B 35	E B 31	E B 30	E B 19	E B 13	E B 12	30	19	E B 14	E B 13	E B 13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 14	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	G	G	30	34	34	33	32	32	28	24	15	16	17	16	E B 14	E B 14	E B 14
U O	17	17	16	14	16	15	15	21	28	33	35	36	35	36	34	36	28	23	20	21	20	A A 20	19	16
L O	E B 13	E B 13	E B 12	E B 13	E B 12	E B 13	E B 13	G	G	G	G	G 32	G 28	G	G 29	G	20	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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	12	11	13	13	14	13	15	15	13	14	13	14	22	13	12	13	13	15	15	14	13	13	14
2	13	15	13	13	13	13	12	15	15	25	26	21	20	17	14	15	14	14	15	14	14	13	14	14
3	13	15	14	12	13	13	14	14	13	16	19	20	20	20	15	16	14	13	13	12	13	14	12	14
4	13	13	13	12	13	15	14	15	15	18	21	26	34	22	16	14	13	14	12	14	15	12	12	14
5	13	14	12	13	12	15	14	13	15	16	22	18	22	20	13	14	12	12	13	14	14	13	15	13
6	14	14	13	13	14	14	14	14	14	17	18	16	20	20	14	14	12	13	14	14	13	13	13	14
7	13	12	11	14	14	15	13	14	15	21	16	19	16	15	14	14	14	13	14	12	13	13	12	14
8	13	12	12	14	12	13	13	14	14	13	21	20	22	21	12	14	15	11	13	14	13	15	16	15
9	13	13	12	13	12	14	13	14	14	14	17	21	21	20	16	16	12	14	14	14	11	12	12	14
10	15	14	14	14	14	13	13	12	15	12	C	E C 38	E C 41	E C 42	E C 34	E C 37	E C 28	14	12	13	14	13	15	13
11	14	15	14	13	13	13	13	15	14	14	14	14	17	16	19	14	13	17	13	14	13	14	13	14
12	13	14	15	13	12	15	13	15	15	16	17	17	18	17	15	15	14	13	12	13	13	13	13	13
13	12	13	14	13	13	15	14	13	15	19	21	21	20	19	20	17	15	16	14	12	14	14	15	14
14	14	13	13	14	13	13	15	13	14	14	21	13	13	15	14	16	15	14	14	13	13	14	14	14
15	14	14	12	14	14	14	15	12	13	17	20	21	19	19	20	15	14	14	13	14	13	13	13	13
16	14	12	14	14	12	13	13	12	14	15	21	21	21	21	18	15	20	12	13	12	13	13	13	12
17	13	13	14	12	13	14	14	14	13	18	19	13	17	17	13	13	13	12	13	14	13	13	14	12
18	14	14	12	12	14	13	13	13	14	20	20	17	23	22	13	15	13	14	14	13	13	11	13	14
19	14	14	12	13	14	15	12	14	13	19	20	20	19	20	16	14	12	12	14	14	14	12	12	12
20	12	12	12	12	12	14	13	13	14	14	16	14	16	15	14	12	13	14	13	14	12	14	12	11
21	14	13	12	14	13	13	13	12	14	16	15	21	20	20	15	14	13	15	13	12	14	13	14	13
22	13	13	14	13	12	14	14	14	13	13	14	18	22	21	15	13	13	13	14	13	13	14	13	12
23	13	12	12	13	13	13	12	12	12	13	16	16	17	17	19	13	13	14	13	11	12	13	11	16
24	13	14	13	14	12	13	13	21	20	E C 38	20	20	20	15	12	14	14	15	13	13	13	11	12	14
25	18	14	12	12	12	12	13	12	16	17	21	21	20	22	22	17	13	12	14	16	16	13	13	12
26	12	14	13	13	12	13	13	13	12	19	22	20	20	20	18	15	15	15	12	13	13	13	13	14
27	11	13	13	14	13	13	15	13	21	20	20	C	24	23	14	14	E C 28	14	14	12	13	13	12	13
28	12	12	13	13	15	13	13	17	13	20	30	30	37	34	16	19	13	14	13	13	13	12	13	13
29	13	12	13	11	13	15	14	13	15	22	29	30	22	21	13	12	11	12	14	14	13	14	14	E C 20
30	12	13	12	13	12	14	13	20	15	17	35	36	27	35	31	30	19	13	12	13	12	14	13	13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	13	13	13	13	13	14	13	14	14	16	20	20	20	20	15	14	13	14	13	13	13	13	13	14
U Q	14	14	14	14	13	14	14	15	15	19	21	21	22	22	18	16	15	14	14	14	14	14	14	14
L Q	13	12	12	13	12	13	13	13	13	14	16	16	18	17	14	14	13	13	13	13	13	13	12	13

NOV. 1993 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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

H / D	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	315	335	320	330	325	315	330	350	345	340	330	325	325	330	340	360	385	365	310	F 300	300	305	F 285	F 300
2	295	335	305	320	315	310	345	355	340	340	350	340	330	330	345	360	360	345	290	325	305	F 285	325	305
3	300	305	305	320	355	340	355	355	365	360	340	350	320	340	340	350	365	340	320	325	335	315	295	300
4	310	300	305	315	340	310	335	H 345	365	355	310	285	320	355	335	310	330	320	325	335	275	A	290	275
5	285	285	265	270	A	270	315	325	365	335	355	330	350	350	345	345	355	350	310	300	335	280	290	310
6	315	295	340	295	330	295	315	335	330	345	340	345	345	H 345	350	355	360	345	335	300	345	320	285	310
7	310	295	F 305	F 305	F 340	295	325	345	345	340	355	345	340	345	350	350	350	345	335	310	320	J R 355	315	315
8	285	305	300	295	305	330	315	350	345	360	355	350	345	350	335	355	330	345	350	A	300	325	330	310
9	305	310	295	300	300	295	315	350	390	Z 320	340	330	340	335	330	335	375	J R 315	320	345	320	330	325	315
10	295	275	310	330	315	295	330	R 360	375	340	I C 340	345	340	345	350	350	335	340	335	330	325	335	300	290
11	285	295	300	345	330	290	340	370	380	360	V 335	345	350	335	350	360	365	335	350	A	A 285	295	300	290
12	280	295	305	335	360	345	320	355	360	350	340	360	335	340	350	355	365	330	335	360	350	330	A 270	280
13	300	330	335	325	F 290	325	335	360	365	335	335	325	340	335	335	375	360	335	310	325	340	305	295	295
14	295	315	310	335	330	310	320	350	330	340	330	345	340	330	355	340	380	365	325	345	375	315	285	280
15	290	290	300	315	310	290	310	325	355	335	340	330	325	345	350	365	355	330	325	320	345	315	285	280
16	290	310	280	300	305	310	325	370	355	340	335	360	330	310	335	345	355	350	360	320	310	325	310	275
17	300	300	290	R 305	365	310	335	360	360	345	340	355	330	360	335	355	370	335	350	345	345	V 300	310	285
18	300	295	315	330	330	365	340	370	365	360	370	370	330	335	345	360	370	370	300	330	355	V 315	F 345	305
19	285	270	275	245	245	F 310	U R 350	315	355	340	R 355	315	320	330	335	340	355	350	330	350	280	305	335	285
20	280	295	295	285	370	305	340	360	375	355	345	330	345	360	345	365	345	360	F 310	340	375	315	290	290
21	295	305	315	F 330	F 335	F 310	F 340	365	360	350	350	340	340	H 340	360	375	355	335	320	340	310	350	325	290
22	300	290	315	345	375	315	330	350	365	365	350	345	325	335	375	370	345	350	340	350	300	305	300	F 305
23	J R 330	295	300	J R 340	345	345	305	355	350	370	Z 345	345	330	340	350	R 365	370	330	375	315	310	310	305	315
24	295	310	345	335	345	330	320	350	370	U R 365	340	H 345	330	350	325	370	370	350	A	315	345	A	315	310
25	300	315	310	320	330	355	H 335	355	385	365	340	355	345	310	J R 370	355	390	380	A	350	315	A	300	R 300
26	290	290	295	305	335	325	360	355	340	330	350	365	345	340	360	H 360	360	370	320	335	325	J R 315	325	290
27	U R 285	285	A 300	A 340	365	290	315	R 370	350	355	330	I C 325	325	360	360	340	350	355	345	R 345	315	320	R 300	J R 280
28	J R 285	295	305	315	340	335	335	350	355	345	355	365	355	340	360	360	370	355	330	R 360	310	A	J R 300	300
29	310	295	295	315	330	315	350	365	370	360	345	365	355	350	340	365	350	335	R 310	345	340	A	305	U R 325
30	285	295	350	320	J R 315	295	335	370	375	365	325	350	350	360	360	350	365	365	355	A 330	325	J R 345	J R 305	285
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	28	28	30	25	30	30
MED	295	295	305	320	330	310	332	355	360	348	340	345	340	340	348	355	360	345	328	332	322	315	300	298
U Q	300	310	315	330	345	330	340	360	370	360	350	355	345	350	355	365	370	355	342	345	345	328	315	310
L Q	285	295	295	305	315	295	320	350	350	340	335	330	330	335	335	350	350	335	315	320	310	305	290	285

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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	L	L	L	L	U L 365	A								
2										L	U L 365	U L 385	U L 370	U L 365	L	L								
3									L	L	U L 380	L 380	L	U L 355	L	L								
4								L	L	L	L	L	L	L										
5								L	L	A	L	L	L	L	A	L								
6									L	L	L	L	L 375	L	L	L								
7									L	L	L	L	L	L	L 375	L								
8								L	L	L	U L 375	U L 385	U L 375	L	L									
9									L	A	L	U L 365	L	L	L	A								
10									L	L	C	L	L	L	L									
11									L	L	L	L	L	L	A									
12								400		L	L	L		L	L									
13								L	L	U L 400	L	L	L	L	L	L								
14										L	U L 345	U L 365	U L 380	L	L	L								
15								L	L	L	L	A	L	L	U L 380	L								
16								430		L 425	U L 380	L	L	U L 360	L	L								
17										L	L	L	L	L	L	L								
18								L	L	L	L	L	L	L	L	L								
19											L	L	L	L	L	L								
20									L		L	L	L 410	L										
21											U L 415	L	L	L										
22										L	L	L	L	U L 380	L	L								
23									L	L	L	U L 370	U L 390	L	L	A								
24								L			L	L	L	L										
25									L	U L 365	L	L	L		L									
26											A	L	L		A									
27											U L 360	C	L	A	L									
28										L	U L 385	L 405	U L 385	L	L									
29									L	U L 330	U L 360	L	L 390	L	L	L								
30										L	U L 410	L	L	L	L									
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2		4	10	7	8	4	3									
MED								415		U L 382	U L 378	U L 380	U L 382	U L 362	U L 375									
U Q										L 412	U L 385	L 385	L 390	U L 372	U L 380									
L Q										U L 348	U L 360	U L 365	U L 375	U L 358	U L 365									

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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

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										245	260	270	270	265	255	225								
2										250	245	250	260	265	245	235								
3									220	225	245	250	UL 300	250	255	235								
4								215	220	225	275	300	255	230										
5								270	225	240	235	255	240	240	245	240								
6									270	245	255	240	255	250	235	235								
7									240	225	230	245	255	250	245	225								
8								245	240	240	245	235	245	255	260									
9									210	A 245	250	265	235	260	260	A 250								
10									215	255	IC 245	255	260	255	235									
11									215	235	255	235	235	250	250									
12								235		255	240	240		260	240									
13								225	220	250	255	250	270	255	245	225								
14										250	260	250	255	255	245	235								
15								265	225	260	245	255	275	245	245	225								
16								215		235	255	235	285	305	250	230								
17										235	235	240	255	245	250	230								
18								215	230	230	230	230	285	255	245	235								
19											250	260	260	250	245	230								
20									225		240	250	240	235										
21											255	250	265	250										
22										240	240	240	255	265	225	215								
23									235	250	275	260	250	245	250	235								
24								245			255	225	260	260										
25									225	250	255	235	250		220									
26											260	235	260		230									
27											275	IC 260	265	240	230									
28										260	240	230	260	255	235									
29									225	260	270	245	240	250	265	215								
30										240	240	245	240	245	235									
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								9	16	24	30	30	29	28	26	17								
MED								235	225	245	250	248	255	250	245	230								
UQ								255	232	250	255	255	265	258	250	235								
LQ								215	220	235	240	235	248	245	235	225								

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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	280	245	270	245	240	270	235	230	230	220	225	230	H 210	235	A 245	A	215	A	E A 310	280	A 335	300	A 320	A 315
2	315	245	250	260	255	280	225	225	230	235	225	225	215	215	225	230	215	225	265	260	255	325	255	A 285
3	A 320	A 325	280	255	230	250	230	235	225	215	205	190	H 190	215	240	240	210	210	A 245	255	220	265	270	280
4	295	280	275	275	250	315	255	215	215	225	235	H 205	240	240	225	250	245	235	250	A 255	A 300	A	E A 355	A 305
5	300	A 350	335	355	A	365	250	245	240	A	215	A 250	255	235	A	235	225	205	245	290	240	340	285	270
6	255	290	225	295	240	300	260	235	H 215	240	215	220	215	H 215	225	220	225	205	235	245	235	240	305	A
7	A 295	275	290	285	245	265	255	H 230	230	225	H 200	H 195	H 200	235	225	215	220	215	215	245	255	240	260	255
8	320	295	290	310	280	235	245	240	H 215	220	225	210	205	H 215	225	235	225	215	210	A	300	270	250	260
9	305	290	305	310	295	A 320	260	235	210	A	A 245	220	215	A 255	A 245	A	215	A	A 280	255	260	245	255	265
10	300	335	275	260	265	280	255	225	220	H 210	I C 225	225	C	E C 250	235	240	235	205	225	225	255	235	A 295	285
11	325	A 330	305	245	240	310	255	220	225	210	220	H 175	235	235	A	A 235	215	E A 270	235	A	A	A 320	290	320
12	335	285	285	250	220	225	255	195	225	H 205	215	215	220	H 190	240	235	215	205	215	235	235	235	A	A 340
13	295	A 280	240	250	285	280	245	220	215	200	H 190	H 200	235	240	225	245	215	E A 255	255	245	250	275	305	310
14	295	265	270	240	245	275	250	225	225	250	215	225	205	200	250	235	210	205	240	235	215	285	325	345
15	315	315	285	275	255	295	255	240	230	230	220	A	225	240	235	240	215	215	230	220	220	260	325	325
16	315	A 305	E A 335	295	270	245	250	185	H 215	205	200	225	220	235	240	230	215	205	220	255	255	260	325	340
17	305	305	310	285	220	270	235	215	235	225	230	215	205	235	225	235	215	225	220	225	225	250	290	A 360
18	335	315	285	265	275	215	225	230	215	225	215	215	H 195	220	235	235	220	205	265	255	220	245	280	310
19	335	365	340	465	440	255	225	235	220	235	A 250	225	210	240	225	240	220	220	230	A 275	370	290	255	280
20	315	290	275	310	220	290	240	215	220	245	250	230	215	230	230	225	230	205	260	245	210	250	285	310
21	305	260	255	250	230	235	220	210	215	230	210	240	H 230	260	235	210	215	210	245	235	230	230	270	325
22	310	305	285	230	220	260	245	210	220	235	235	220	230	240	235	220	215	195	230	225	245	255	275	290
23	290	280	265	265	235	230	215	220	220	220	H 220	235	225	230	A 250	A	215	220	225	A 250	280	245	260	315
24	310	275	245	240	225	235	255	210	215	240	230	235	235	A 250	245	225	220	E A 280	A	260	260	A	265	280
25	305	290	280	255	245	225	H 205	215	225	235	240	240	235	235	230	240	220	A 250	A	250	E A 305	A	310	320
26	310	310	A 315	300	245	255	225	215	225	240	A	A	220	255	A	230	225	A 235	240	225	270	260	280	310
27	A 355	320	A	E A 320	235	260	265	215	220	235	A 240	C	A	A	235	235	230	220	220	230	255	250	270	310
28	315	320	300	290	250	E A 290	235	210	230	240	230	215	240	225	240	230	210	215	235	225	270	A	A 290	290
29	290	305	310	265	250	235	235	220	235	210	225	255	210	235	A 250	A 230	220	215	260	240	235	A	275	290
30	295	285	235	265	270	285	265	225	230	230	210	B 250	240	245	230	230	210	220	220	A	265	220	260	310
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	30	29	30	30	30	30	28	29	27	28	29	27	27	30	28	28	27	29	25	29	29
MED	308	292	282	265	245	265	245	220	222	228	225	225	220	235	235	235	215	214	235	245	255	255	280	310
U Q	315	315	305	295	268	290	255	230	230	235	232	235	235	240	A 240	240	225	A 225	252	255	270	280	305	320
L Q	295	280	268	250	232	235	230	215	215	218	215	H 215	210	222	225	230	215	205	222	230	232	242	262	282

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	A	A	A	A	A	A 125	A	A	A	A	A						
2							A	A 120		A	A	A	A	A	115	120	A	B						
3							B	A	A	A 130	115	A 120	115	115	115	115	130	B						
4							B	120	A	A	A	120	B	A	A 130	A 125	A	B						
5							B	120	115	115	A	A	E A 140	A	A	A	A	B						
6							B	A	A	A	A 130	A	120	A 115	A	A	A	B						
7							B	A	A	A 130	110	110	120	120	115	120	130							
8							B	A 140	A	A	A 135	A	A	A	A	A	A							
9							B	A	A	A	A	A	120	120	115	A	A							
10							B	120	A	A	C	C	C	C	C	C	C							
11							B	135	A	A	A	120	A	A 125	A 120	120	A							
12							B	E A 160	110	120	A 120	A 125	A 125	115	115	125	A							
13							B	130	115	A 130	A	120	E A 130	A 130	A 130	120	A							
14							B	120	A 140	115	120	A 125	E A 130	A 115	110	125	B 140							
15							B	130	120	120	A 125	115	120	110	120	A	A							
16								130	120	125	120	120	A	A	A	A 130	B							
17								130	115	115	115	A	A	A 130	A	A 125	A							
18								130	115	115	115	115	115	A	A	E A 145	A							
19							K 150	A	115	115	115	A	A	A	110	120	135							
20								135	A 130	115	A 125	E A 140	A 125	115	115	115	A							
21								135	120	115	115	115	115	120	A 135	120	135							
22								B 170	120	115	115	A 135	120	A	120	A	A							
23								130	120	115	115	120	120	115	115	120	A							
24								B	125	C	A 135	A	A 125	A 125	A 120	A	A							
25								135	A 140	115	A	A	A	Y 125	125	A	A 120							
26								155	120	120	120	120	120	120	A	A	A							
27								160	B 135	120	A	I C 120	125	A	A	E A 150	C							
28								B	120	120	A	A	B	B	A	A	A							
29								145	125	A	A	A	A	A	A	A	A							
30								B	120	120	B	B	120	B	B	B	B							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	20	21	20	17	16	19	16	17	16	6							
MED							K 150	131	120	118	120	120	120	120	115	120	132							
U Q								142	125	120	A 125	A 122	E A 125	A 125	A 122	A 125	A 135							
L Q								130	115	115	115	118	120	115	115	120	130							

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

IONOSPHERIC DATA STATION KOKUBUNJI

NOV. 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	100	100	105	B	105	105	140	175	110	105	100	100	100	100	100	120	110	110	110	110	110	105	105	100
2	100	100	100	100	105	100	105	175	G	110	110	105	105	105	110	100	110	110	100	105	100	105	110	105
3	100	100	100	100	100	110	115	120	115	115	G	110	105	G	G	160	135	100	115	115	B	B	120	120
4	110	B	B	105	100	B	B	G	185	150	165	G	B	110	110	140	120	115	120	110	110	110	110	105
5	120	115	110	110	110	B	B	130	120	120	115	110	115	105	105	125	115	120	105	110	110	110	110	B
6	B	B	B	B	110	B	125	110	110	115	110	105	110	105	105	105	105	115	105	B	B	B	B	110
7	105	120	110	115	115	B	115	120	115	110	G	G	110	110	170	160	G	105	100	B	B	B	B	B
8	115	110	B	B	105	100	B	120	115	115	120	120	120	120	115	110	110	110	105	100	110	105	B	B
9	110	110	105	105	120	100	105	120	120	110	110	115	125	115	115	110	110	105	105	105	B	115	B	B
10	B	B	B	B	110	110	110	G	110	110	C	C	C	C	C	C	C	B	105	B	B	105	100	110
11	115	115	110	110	105	110	110	G	120	110	105	130	175	E G 160	115	110	115	110	110	105	105	105	110	B
12	105	105	110	110	B	B	115	110	G	105	105	110	110	G	G	G	120	B	B	B	105	B	115	105
13	B	100	105	B	B	B	B	E G 165	G	115	110	125	120	155	120	G	110	105	105	110	95	100	B	B
14	B	B	B	115	120	115	110	G	120	E G 190	130	135	100	100	G	G	120	B	115	115	115	115	115	110
15	B	105	110	B	105	B	B	G	140	125	145	115	120	140	120	125	120	B	B	B	B	B	110	B
16	105	100	105	105	110	105	100	G	G	G	G	155	120	120	115	120	B	B	110	105	100	105	100	100
17	105	B	100	B	B	B	B	G	G	130	115	110	110	110	110	110	105	110	110	110	B	110	115	110
18	110	115	B	B	105	105	105	G	G	130	120	120	G	120	120	115	115	B	120	110	B	B	120	115
19	120	110	105	B	B	B	K 150	140	160	130	120	115	115	110	G	G	145	110	115	105	105	110	110	105
20	B	115	B	100	B	B	180	G	110	190	175	160	E G 180	G	130	125	115	B	115	110	B	B	110	B
21	B	B	B	B	110	B	B	150	G	195	170	165	160	160	140	125	180	B	110	130	100	B	B	B
22	B	B	B	B	B	B	165	160	165	155	160	150	130	125	120	120	145	B	105	B	B	B	B	B
23	B	B	B	B	B	B	B	G	G	160	155	150	150	140	130	120	115	B	105	105	B	B	B	B
24	B	B	B	B	B	B	B	B	G	C	170	110	155	135	130	125	120	120	115	B	130	110	B	B
25	B	B	B	B	B	B	B	G	E G 170	G	115	110	110	110	145	140	140	125	120	120	115	110	110	115
26	110	B	110	110	115	B	B	G	180	G	140	135	125	130	120	115	115	115	B	120	115	B	B	120
27	115	115	115	110	110	B	B	E G 200	160	G	140	C	120	120	115	120	C	B	B	B	110	B	B	B
28	110	110	B	120	110	105	B	B	G	G	125	120	B	B	120	120	120	B	B	120	115	110	115	115
29	120	110	B	B	B	B	B	G	G	130	115	115	115	105	105	105	110	105	120	105	110	115	B	C
30	B	B	B	110	110	110	110	B	G	G	B	B	G	B	B	B	B	B	115	110	110	B	B	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	18	15	15	20	12	16	14	18	23	25	25	25	24	24	24	25	17	25	22	19	17	17	15
MED	110	110	105	110	110	105	112	128	120	118	120	115	118	115	118	120	115	110	110	110	110	110	110	110
U Q	115	115	110	110	110	110	132	165	160	150	150	135	128	132	125	125	120	115	115	115	115	110	115	115
L Q	105	100	105	105	105	102	108	120	115	110	110	110	110	108	110	110	110	105	105	105	105	105	110	105

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

IONOSPHERIC DATA STATION KOKUBUNJI

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

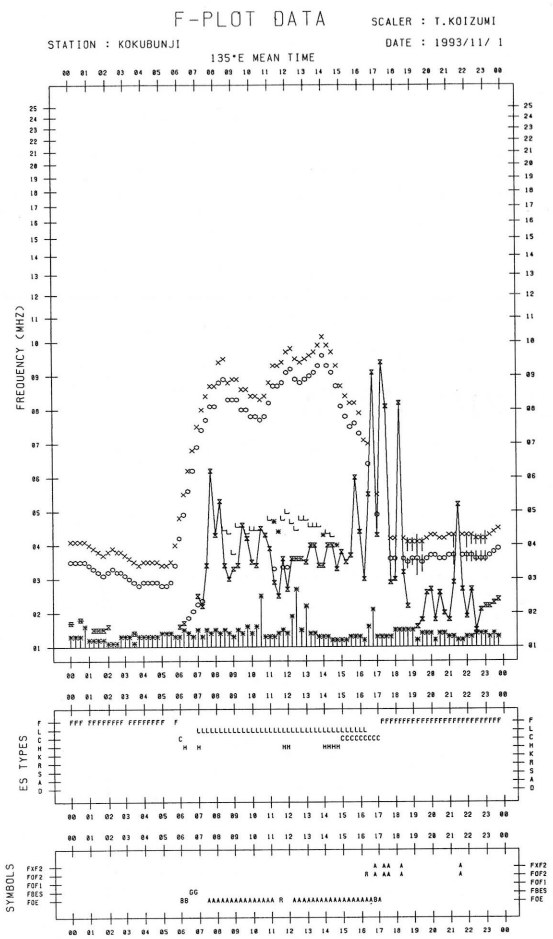
LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

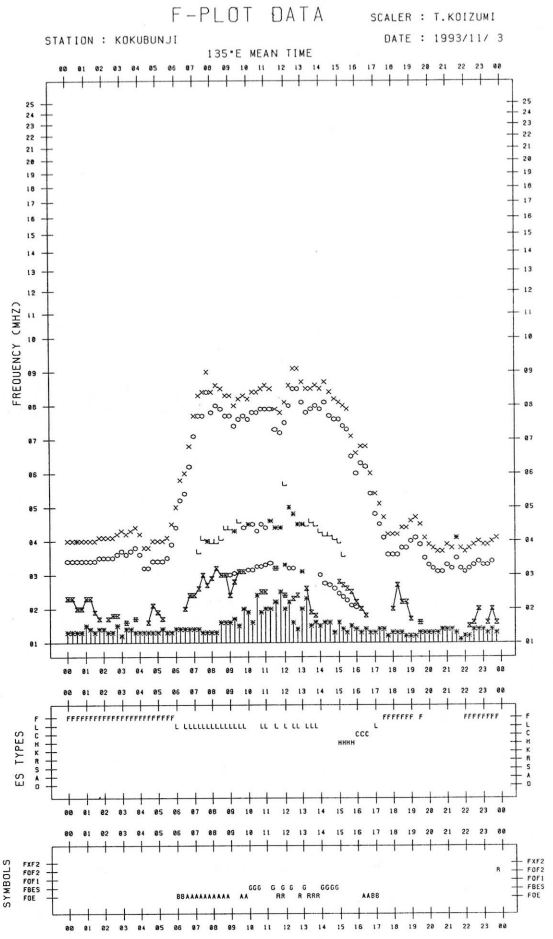
H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 2	F 1	F 1		F 1	F 1	C 1	HL 12	L 3	L 2	L 2	L 2	LH 11	L 3	LH 11	CL 22	CL 31	C 4	F 3	F 1	F 3	F 3	F 3	F 4
2	F 2	F 3	F 3	F 2	F 2	F 2	L 2	HL 11		L 2	L 2	L 1	L 1	L 1	L 1	L 1	L 1	L 2	F 3	F 3	F 2	F 1	F 2	F 2
3	F 4	F 3	F 2	F 2	F 2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

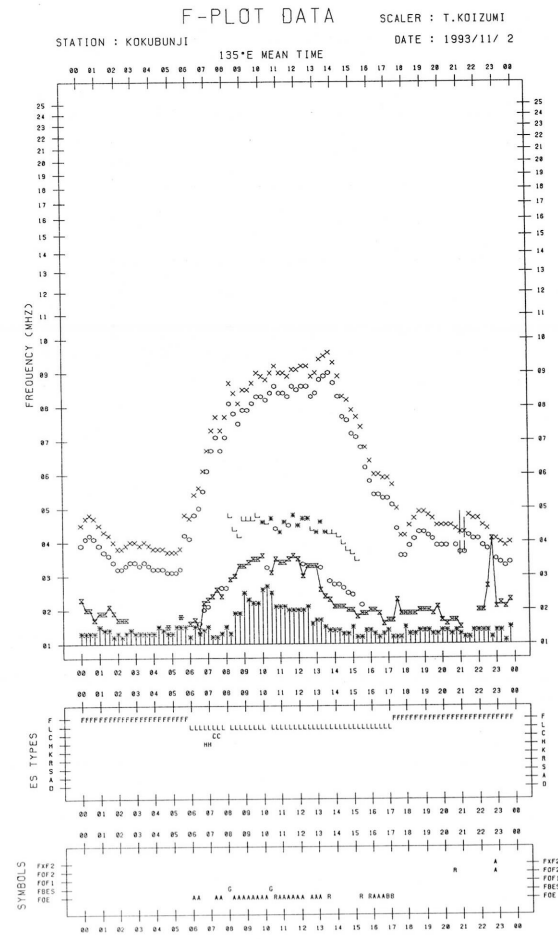
NOV. 1993 TYPES OF ES COMMUNICATIONS RESEARCH LABORATORY, JAPAN

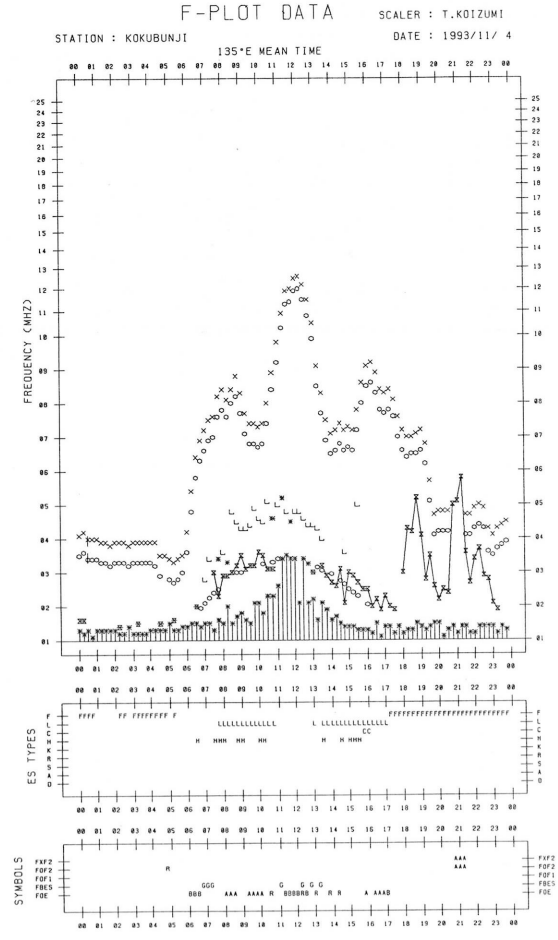
f-PLOTS OF IONOSPHERIC DATA

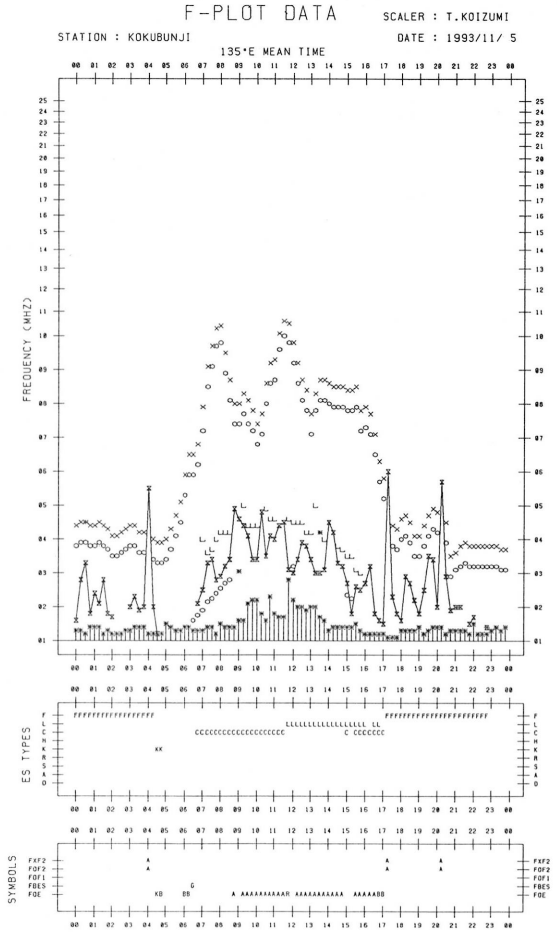
KEY OF F-PLOT	
|	SPREAD
⬡	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
*, Y	FMIN
∧	GREATER THAN
∨	LESS THAN

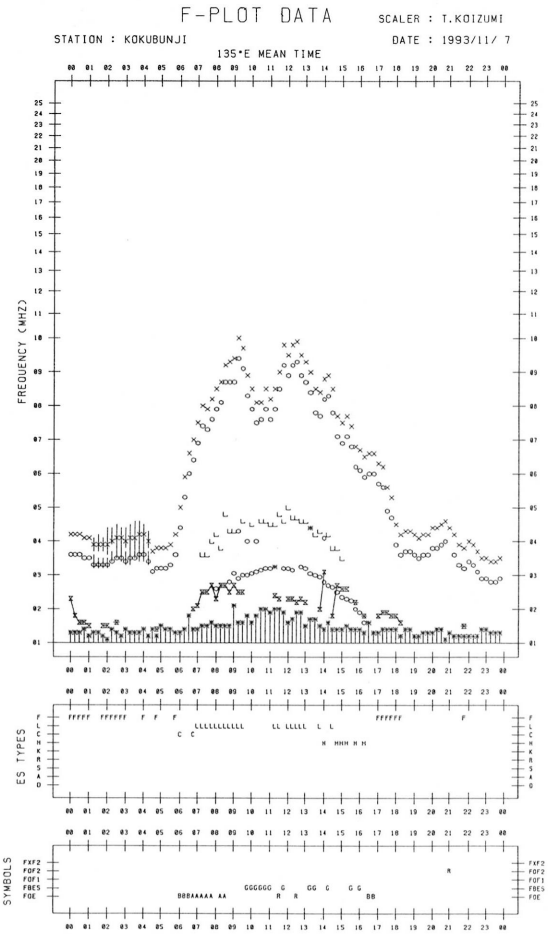

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

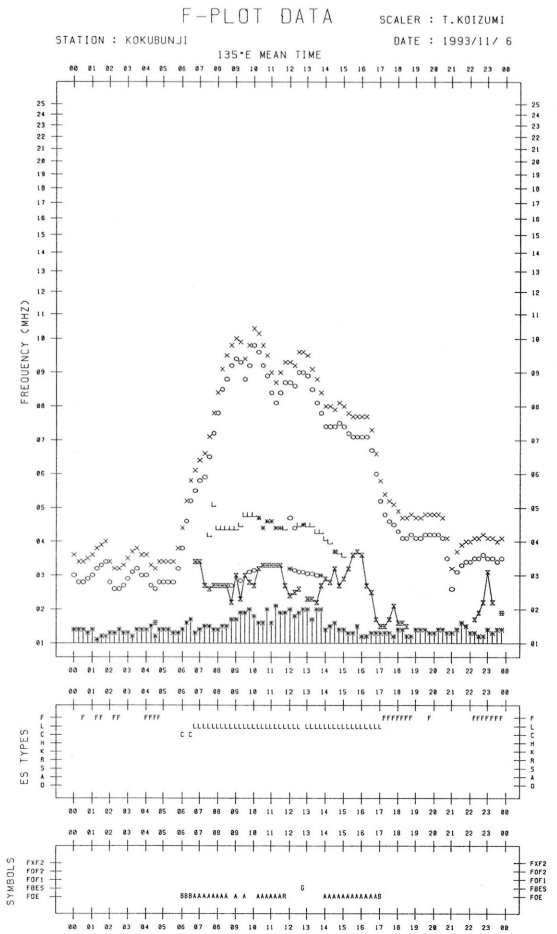

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

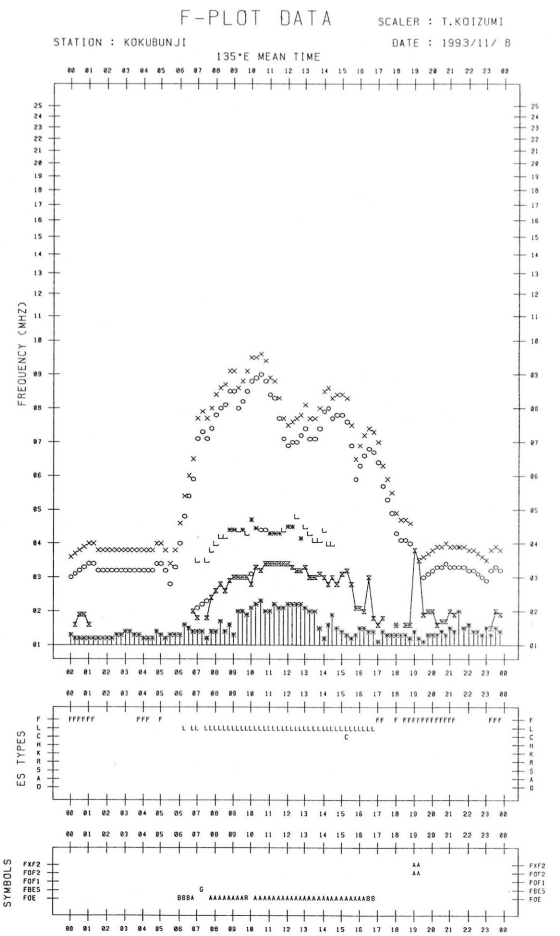

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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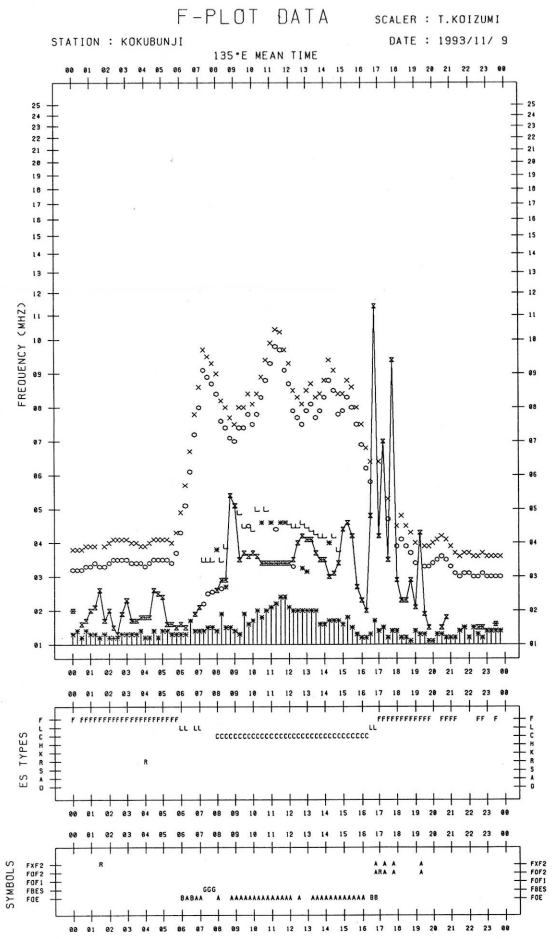
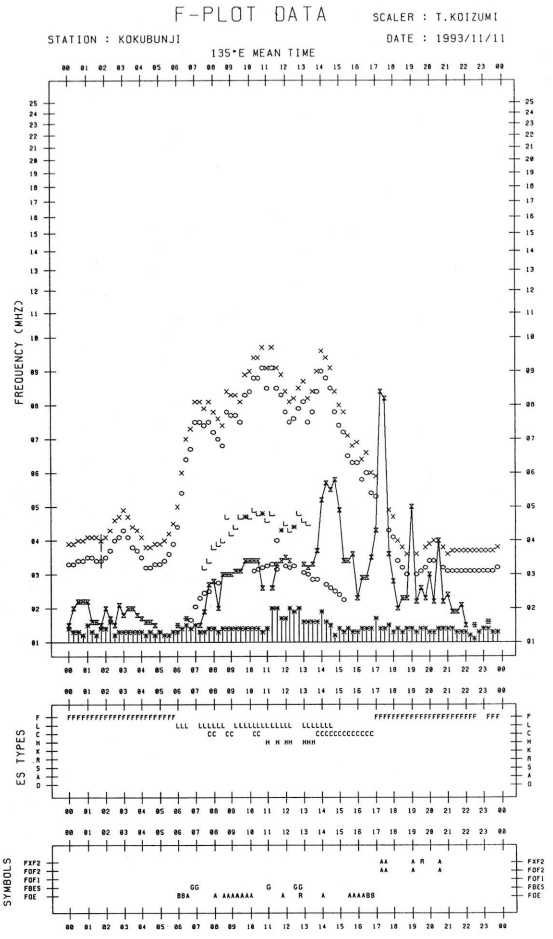
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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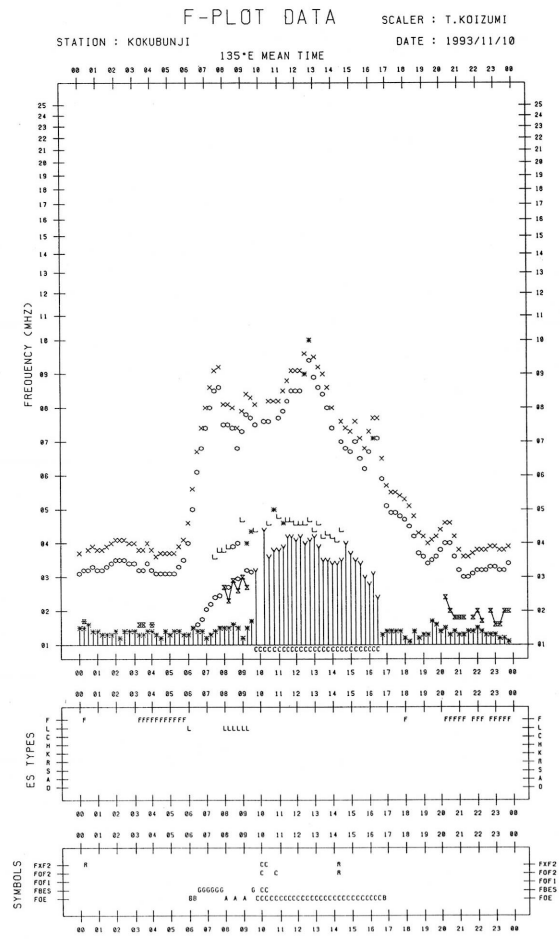
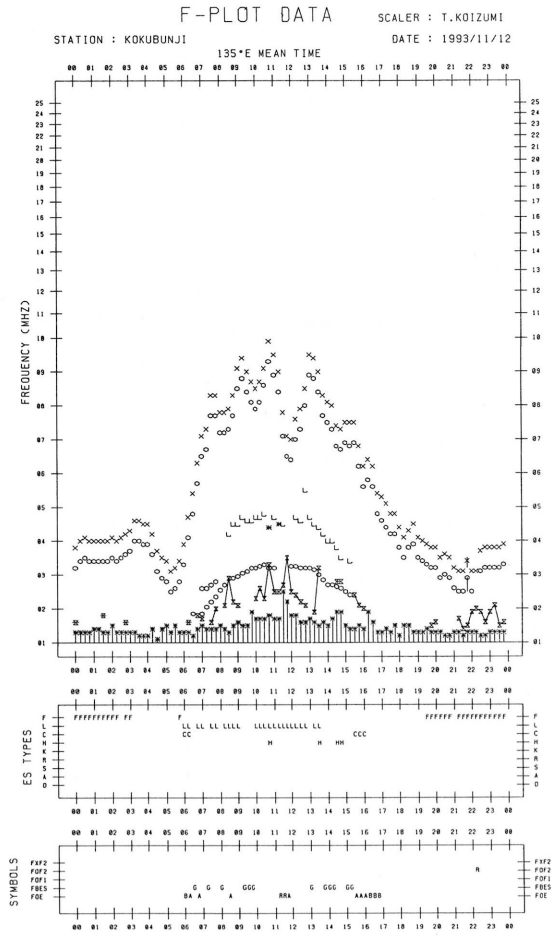
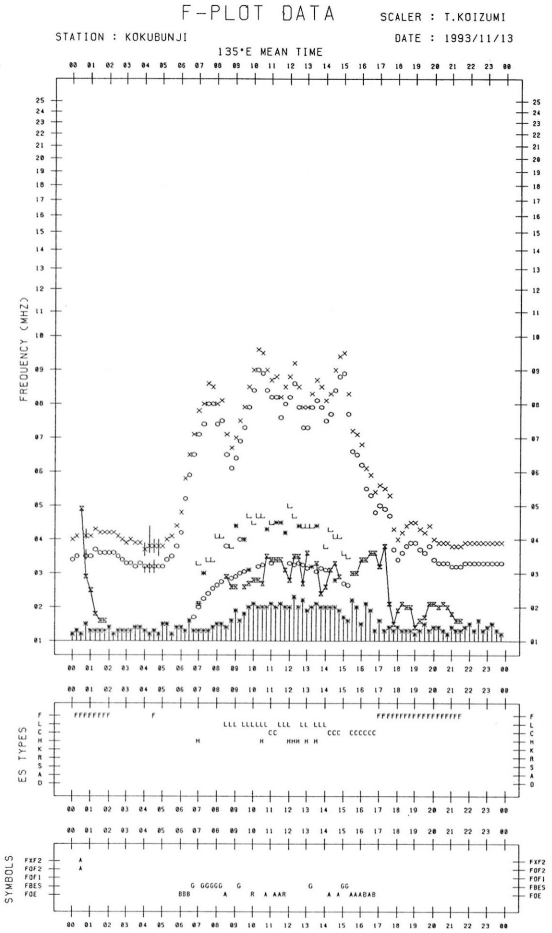
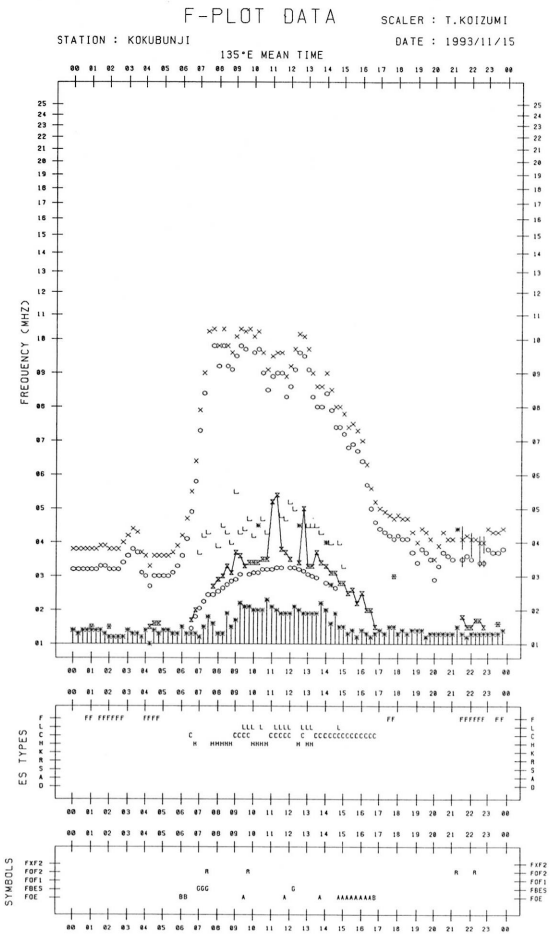
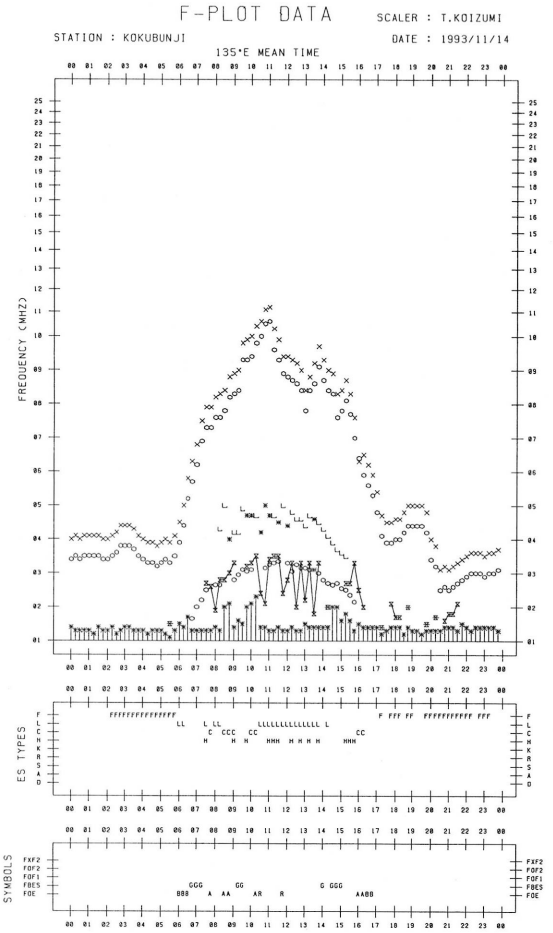
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

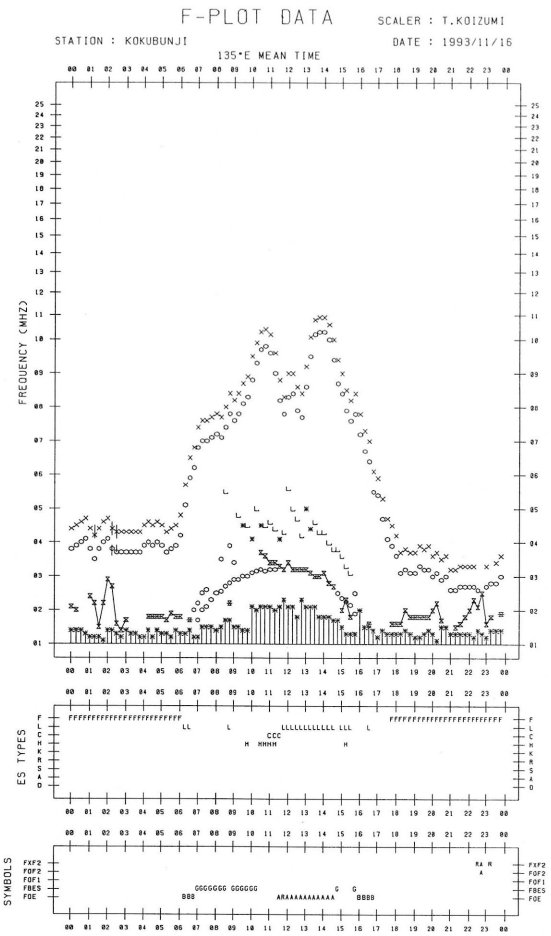

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/16
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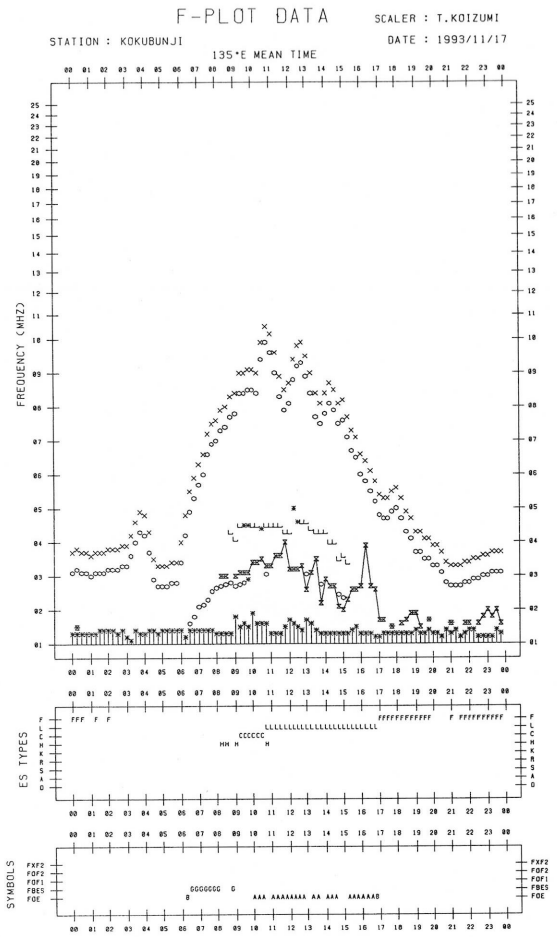
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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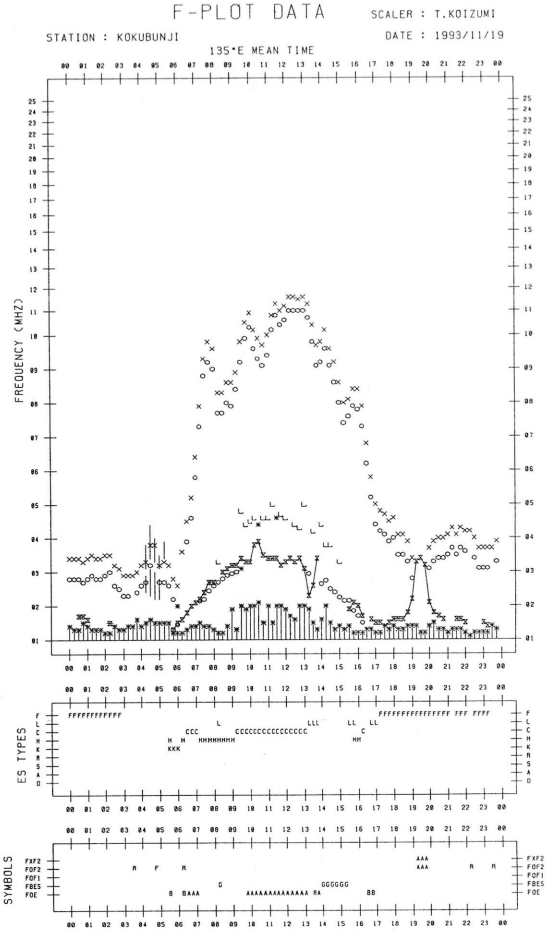
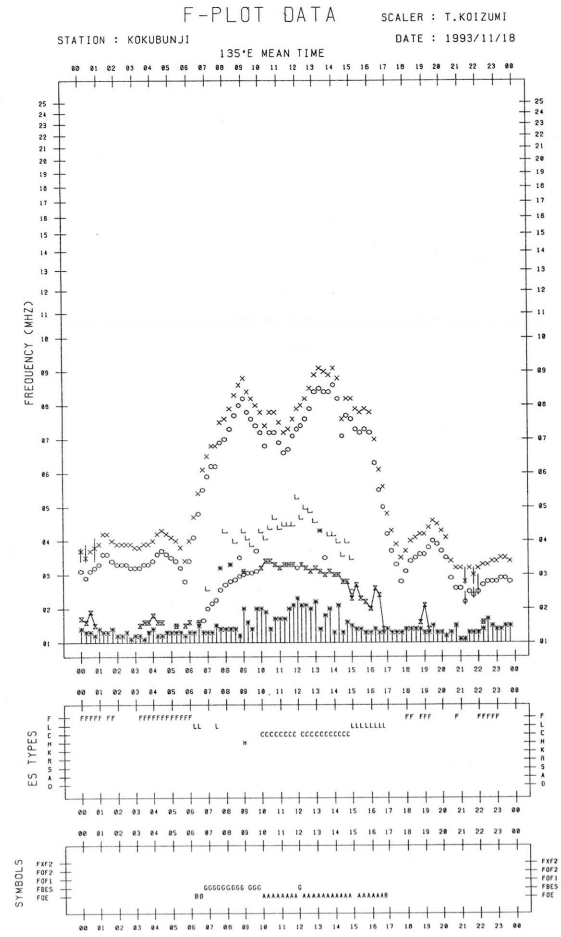
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
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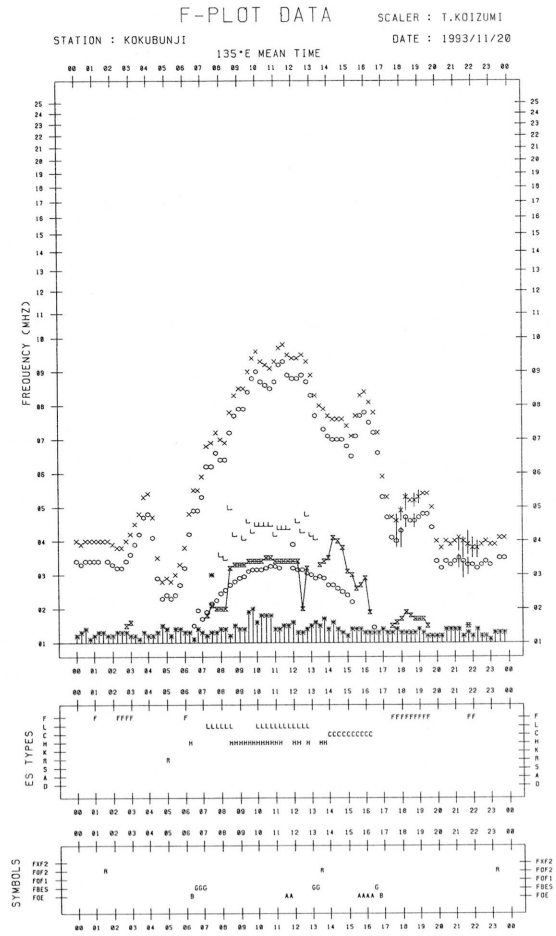
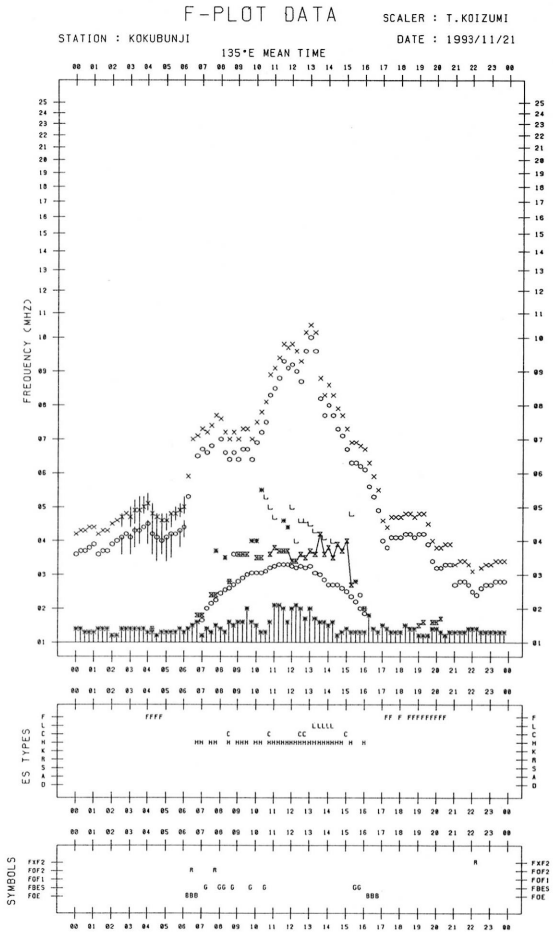
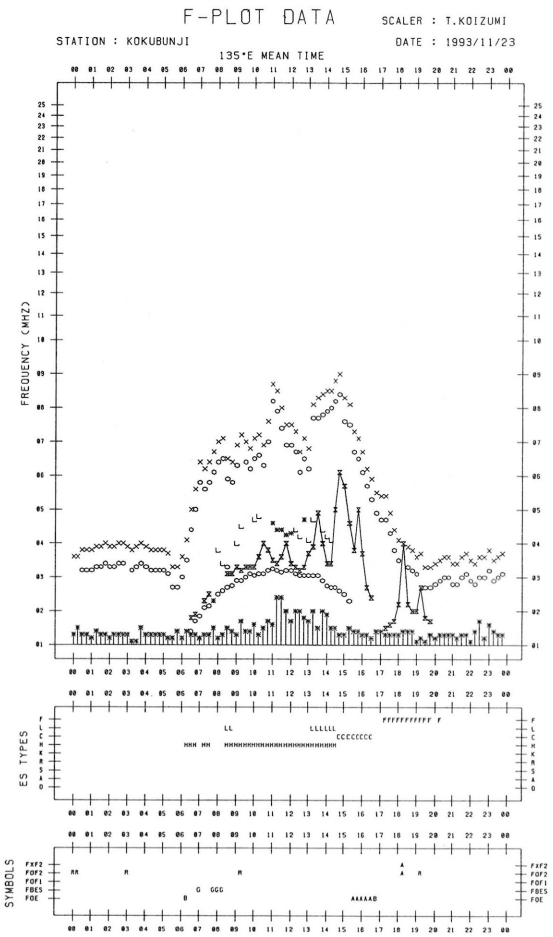
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
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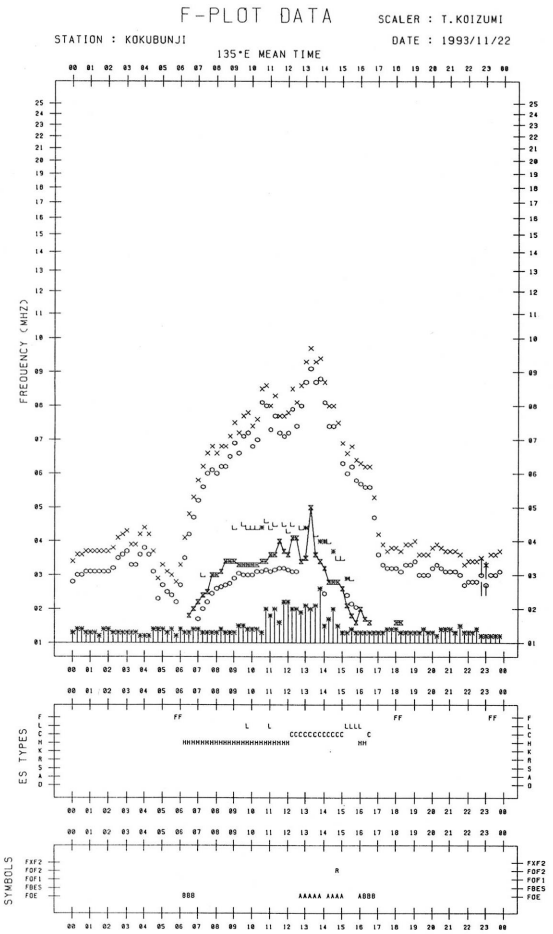
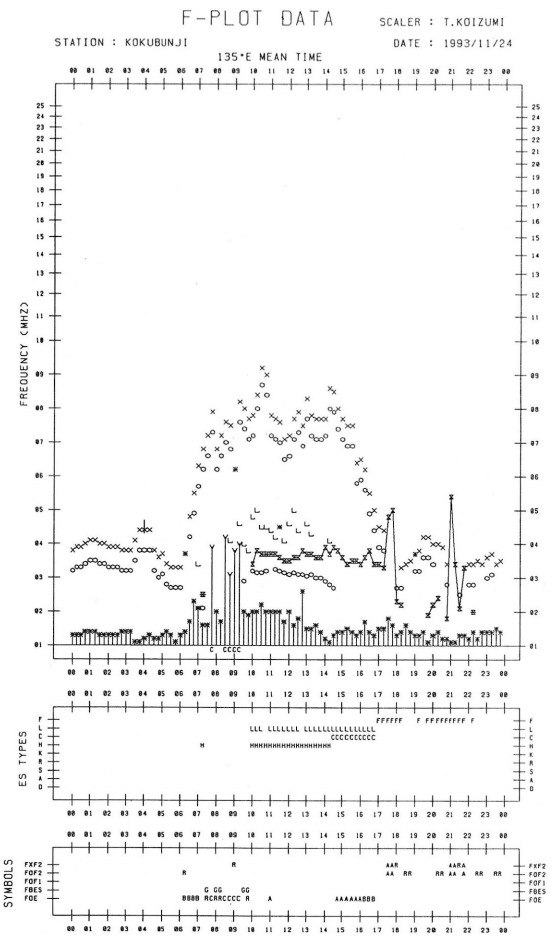
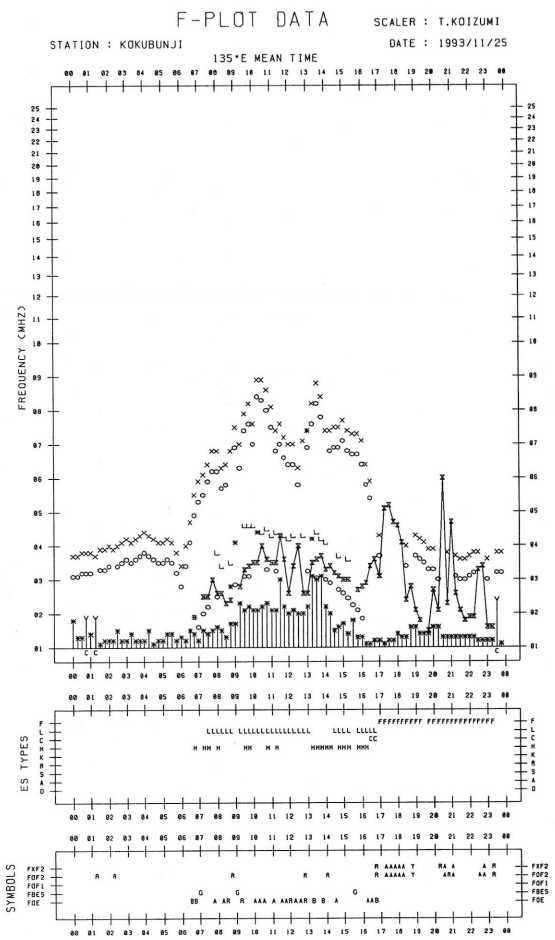
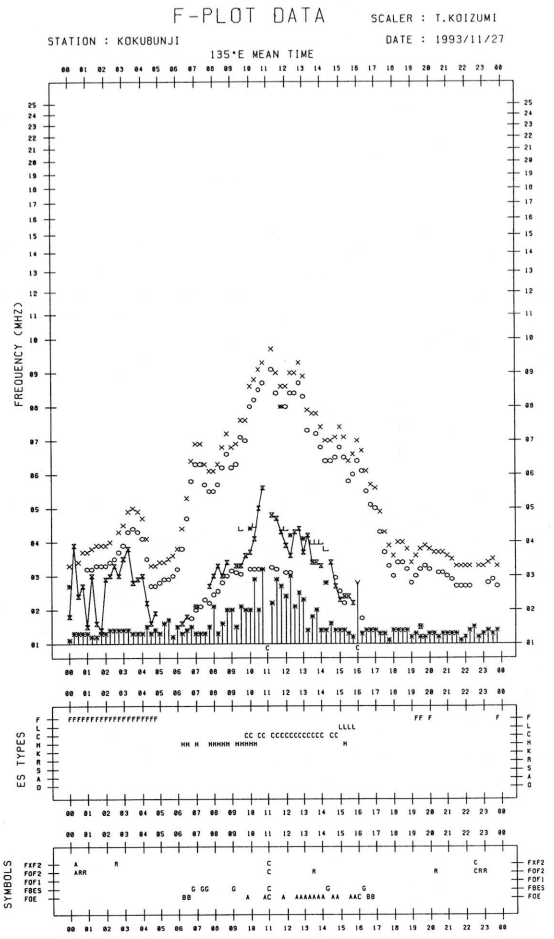
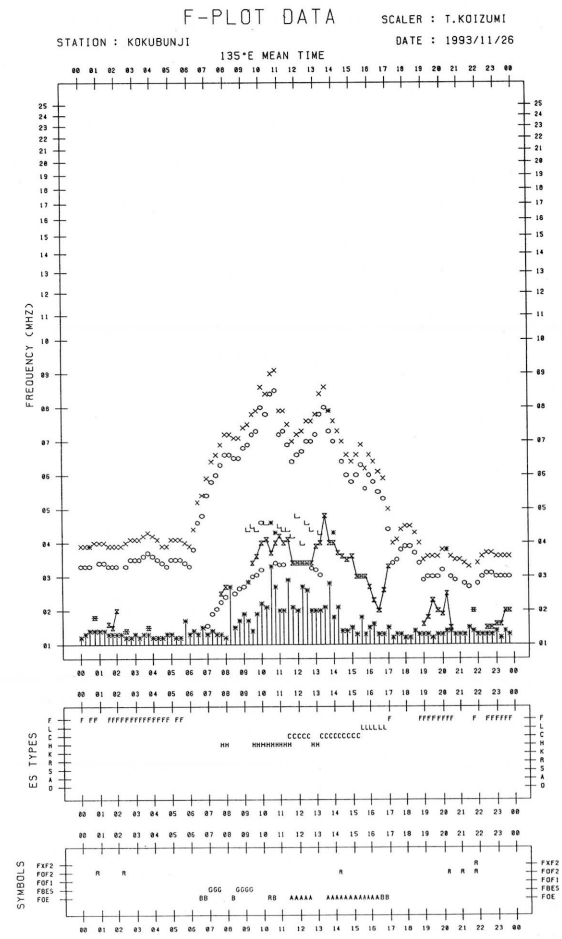
FOF2
FOF1
FBES
FOE

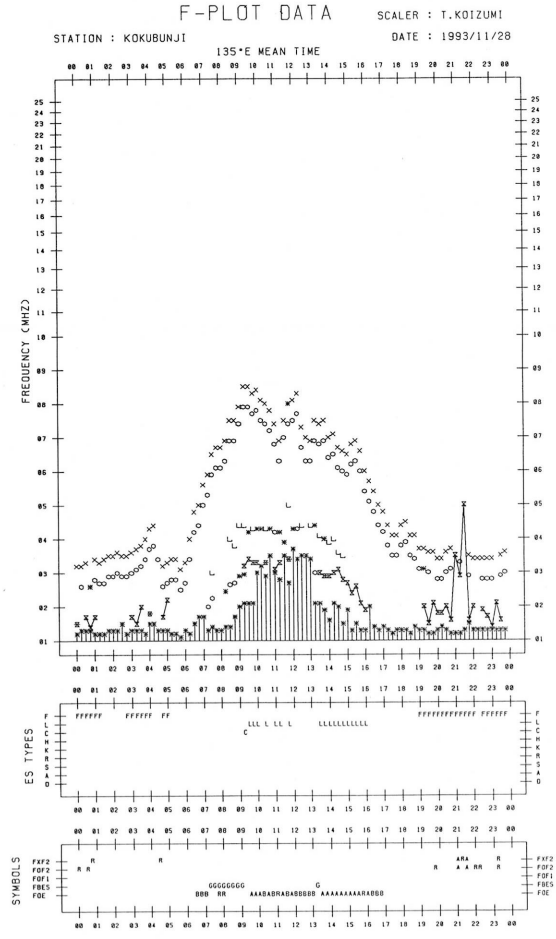

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

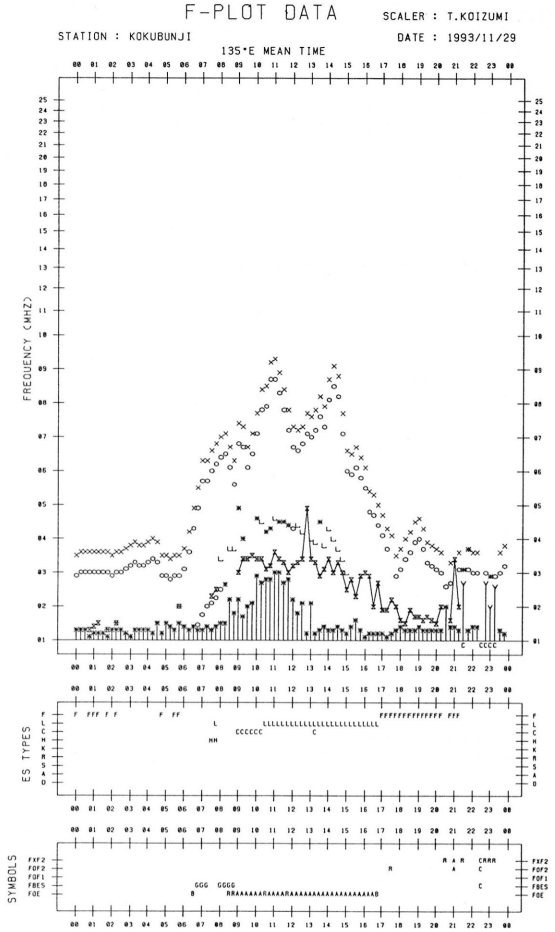

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

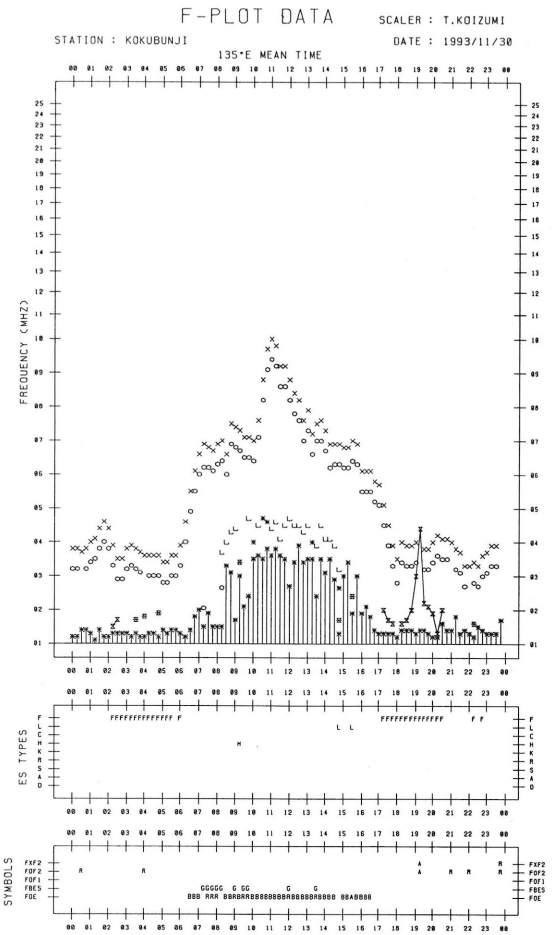

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1993/11/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
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 November 1993

Single-frequency total flux observations at 500 MHz

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

UT Date	00-03	03-06	06-09	21-24	Day
1	31	31	(29)	40	31
2	33	33	(33)	34	34
3	35	32	(31)	33	33
4	31	31	(30)	33	31
5	31	-	-	33	32
6	33	34	(35)	34	34
7	35	36	(34)	34	35
8	34	34	(34)	33	34
9	33	34	(34)	35	33
10	35	35	(34)	34	35
11	34	34	(34)	33	34
12	33	34	(33)	34	33
13	34	33	(33)	32	34
14	31	31	(31)	33	31
15	33	33	(33)	33	33
16	33	33	(32)	33	33
17	33	33	(33)	33	33
18	34	34	(33)	37	33
19	36	33	(33)	31	35
20	31	32	(32)	32	31
21	32	31	(31)	32	31
22	32	31	(30)	31	31
23	31	31	(30)	33	31
24	32	32	(32)	34	32
25	33	34	(35)	35	34
26	34	34	(33)	34	34
27	34	33	(32)	32	33
28	31	31	(30)	33	31
29	32	31	(31)	31	32
30	31	32	(32)	33	31

Note: No observations during the following periods.

5th 0133 - 0622

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso November 1993

Single-frequency observations

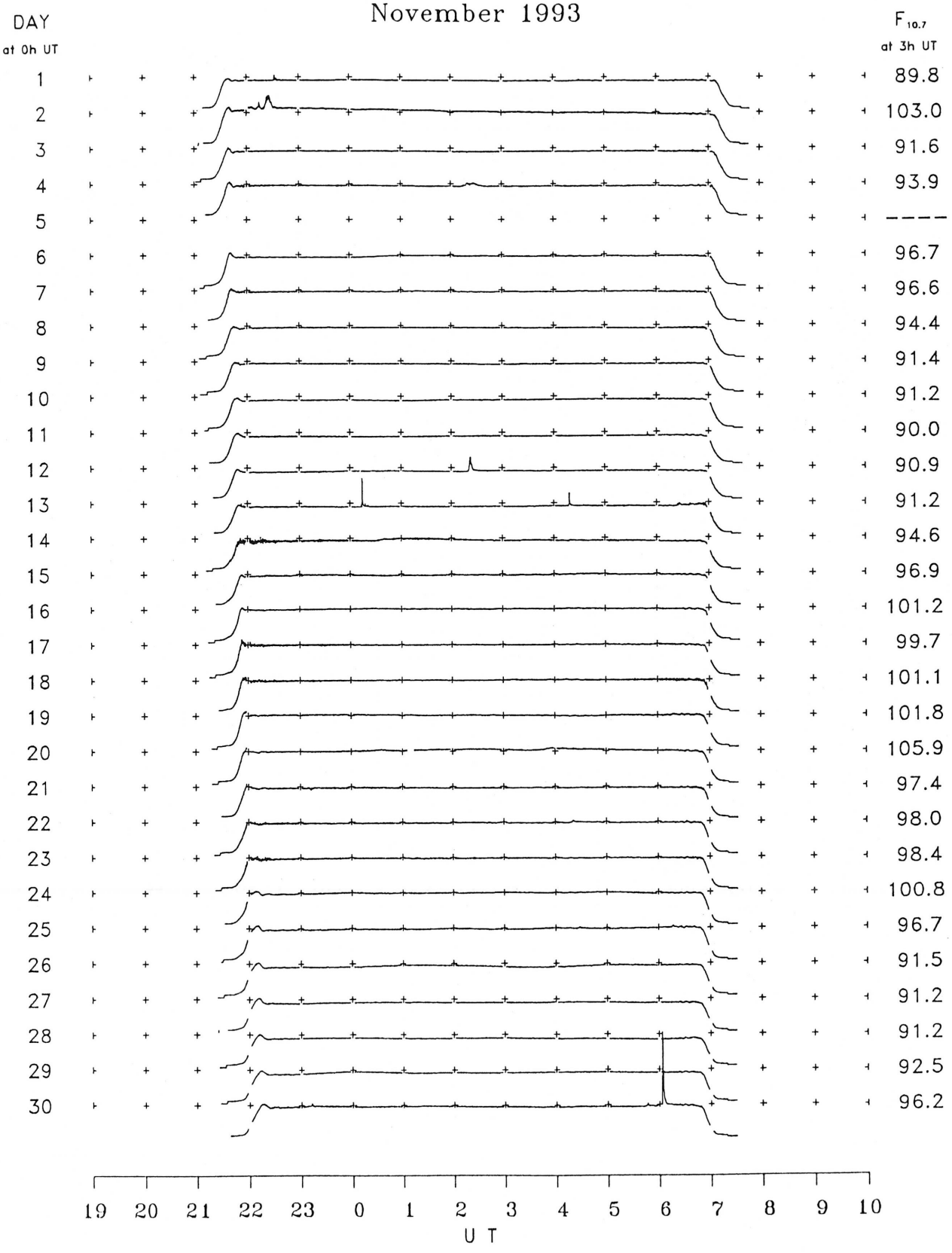
Normal observing period: 2120 - 0730 U.T. (sunrise to sunset)

NOV. 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	42 SER	0130.5	0132.5	2.0	12	-	WL
	500	46 C	0308.9	0309.1	1.5	14	6	WL
	500	8 S	0419.5	0419.6	0.6	10	-	WL
	500	42 SER	0429.1	0429.4	7.0	22	-	WL
	500	3 S	0510.0	0510.4	1.0	7	4	0
	500	42 SER	0621.7	0626.7	6.0	13	-	WL
	500	46 C	0721.0	0722.3	1.5	150	50	0
	2800	47 GB	2200.0	2226.6	35	82	17	SL
	500	48 C	2201.2	2206.8	40	370	70	ML
	500	27 RF	2305	2335.9	105	65	18	WL
2	500	42 SER	0311.5	0311.7	10	11	-	0
	500	42 SER	0527.7	0529.4	2.5	4	-	WL
4	2800	21 GRF	0212.0	0218.5	25	8	4	0
	500	42 SER	0310.0	0310.5	3.0	68	-	0
11	2800	8 S	0550.1	0550.2	0.2	18	-	0
12	2800	45 C	0220.7	0223.0	8.0	56	24	WR
	500	45 C	0221.1	0221.5	10	52	10	0
	500	42 SER	2151.7	2152.8	10	100	-	0
	2800	8 S	2159.6	2159.8	0.6	95	56	MR
	500	8 S	2223.3	2223.3	0.5	14	-	0
	500	8 S	2241.5	2241.8	0.6	22	-	0
	500	42 SER	2305.3	2308.5	3.5	27	-	0
	500	46 C	2347.7	2349.1	2.0	75	20	0
13	500	42 SER	0011.8	0013.9	15	90	-	0
	2800	42 SER	0012.9	0014.1	9.0	100	-	WR
	2800	3 S	0417.1	0417.7	2.0	33	20	0
22	2800	1 S	0418.9	0421.2	6.0	5	3	0
26	2800	1 S	0201.3	0201.5	1.0	8	4	0
29	2800	1 S	2311.5	2312.0	2.0	12	7	0
30	2800	1 S	0545.1	0546.4	2.5	8	4	0
	2800	47 GB	0602.9	0603.6	5.0	270	100	WR

B. Solar Radio Emission

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

November 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)

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

C. RADIO PROPAGATION

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

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

C. Radio Propagation

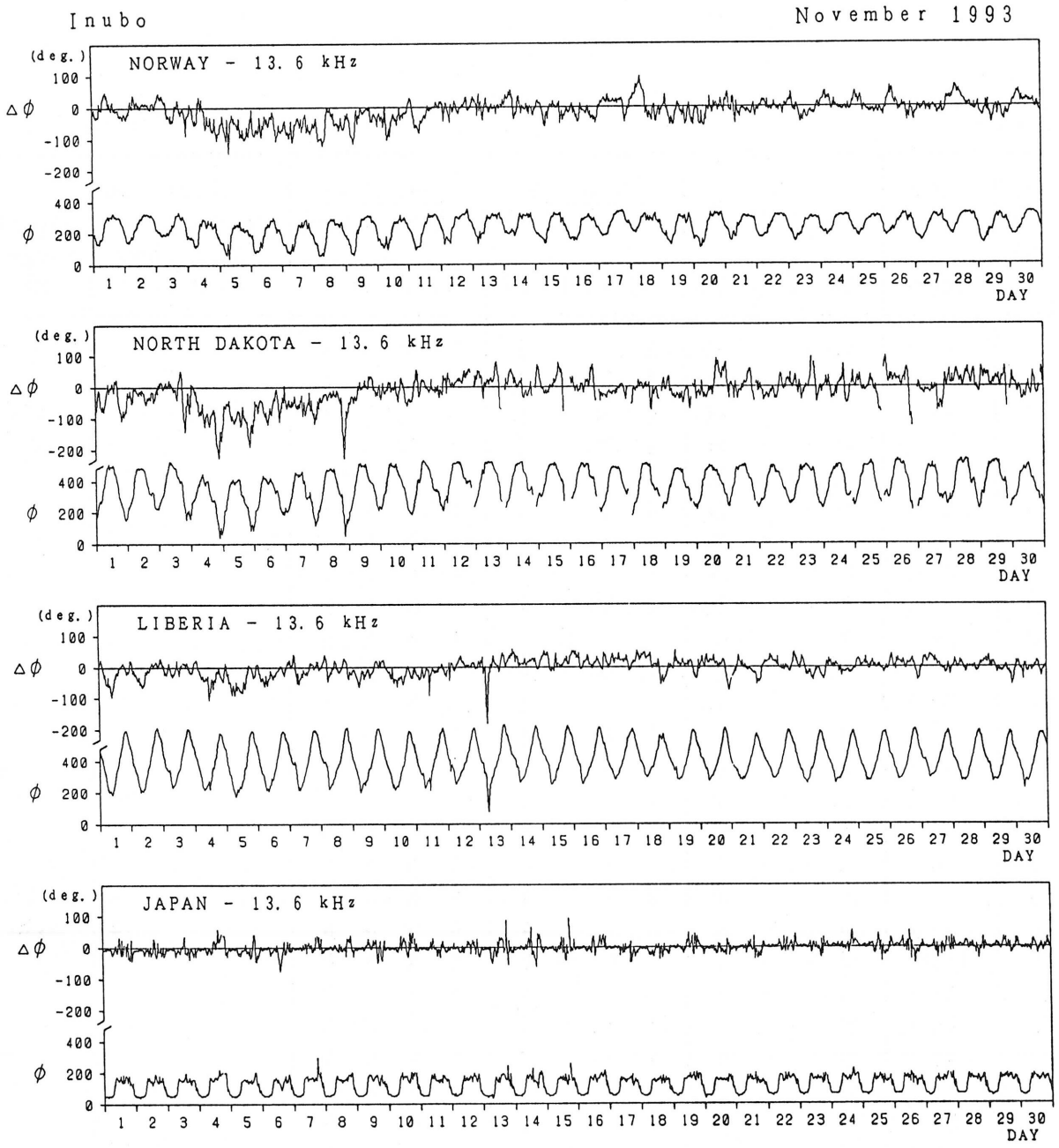
C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso — Time in U.T.

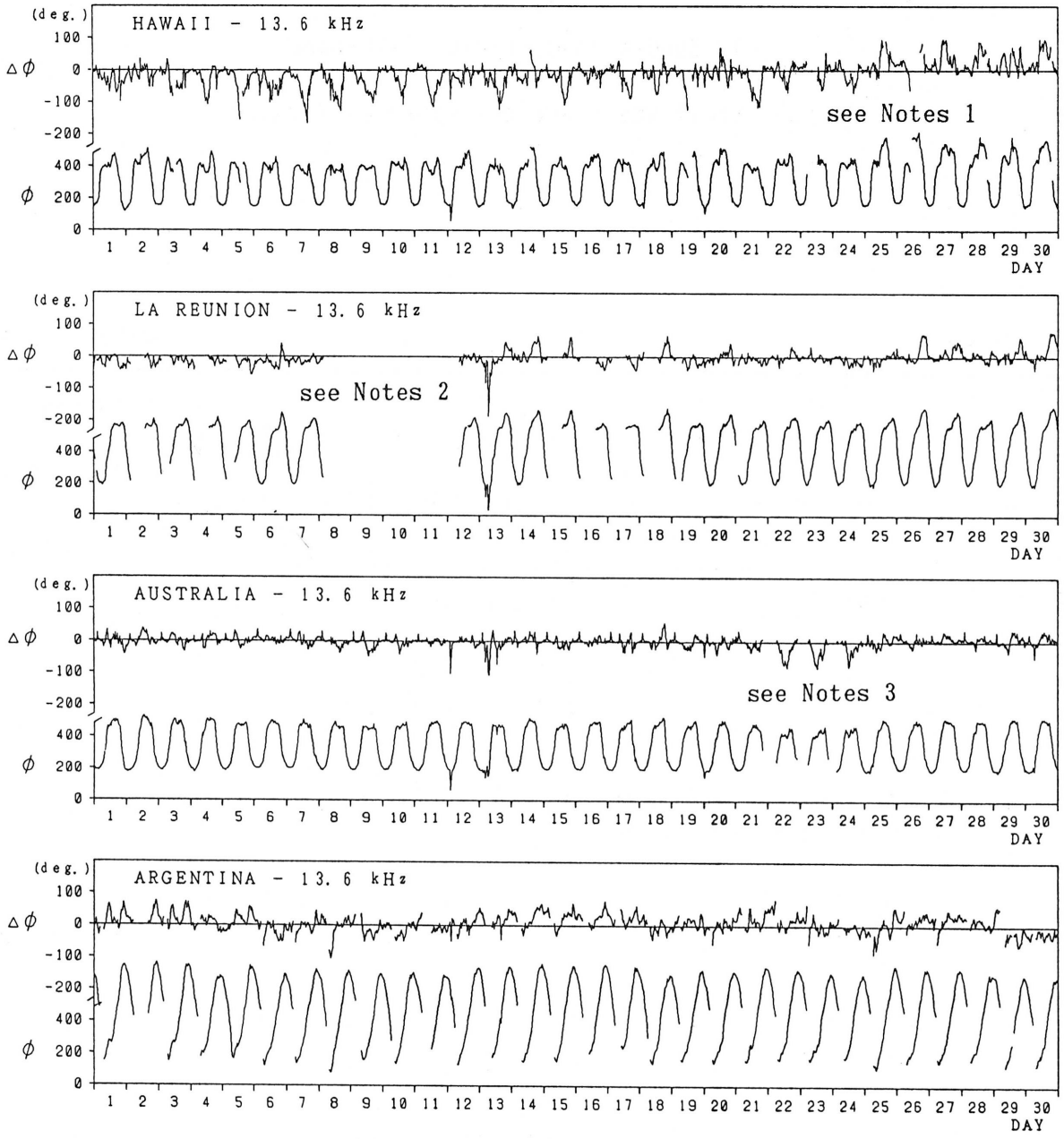
Nov. 1993	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Condition 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4- U	4U - - 4U	4 - - 3	N N N N			
2	4+ U	4U - - 4U	4 5U - 4	N N N N			
3	4+ U	4U - - 4U	4 5U - 4	N N N N	1756	----	171
4	4- U	4U - - 2U	4 5U - 4	N N N N	----	----	SSC
5	4- U	2U - - 3U	4u 5U - 4	N N N N	----	24	
6	4- U	3U - - 2U	4 5U - 4	N N N N			
7	3o U	2U - - 2U	4 - - 4	N N N N			
8	4- U	4U - - 3U	4 - - 4	U U U U			
9	4- U	3U - - 3U	4 5U - 4	N N N N			
10	3+ U	3U - - C	4 - C C	N N N N			
11	4- U	3U - - 2U	4 5U - 4	N N N N			
12	3+ U	2U - - 3U	4 - - 4	N N N N			
13	4- U	2U - - 4U	4 4U - 4	N N N N			
14	3+ U	3U - - 4	3 - - 4	N N N N			
15	4- U	4U - - 3U	4 - - 4	N N N N			
16	4+ U	4U - - 4	4 5U - 4	N N N N			
17	4o U	4U - - 4	4 - - 4	N N N N			
18	4- U	3U - - 4U	4 - - 4	N N N N	1212	----	125
19	5- U	5U - - 5	5 - - 4	N N N N	----	24	SSC
20	(4+)CU	5U - - C	4 C C C	N N N N			
21	4- U	3U - - 4	4 - - 4	N N N N			
22	4o U	3U - - 5	4 - - 4	N N N N			
23	4o U	4U - - 5	4 - - 3	N N N N			
24	4+ U	4U - - 5	4 - - 4	N N N N			
25	3+ U	3U - - 4	3 - - 4	N N N N			
26	4+ U	5U - - C	4 - C C	N N N N			
27	C	C - - C	C C C C	N N N N			
28	C	C - - C	C C C C	N N N N			
29	4- U	3U - - 4U	4 - - 4	N N N N			
30	3+ U	2U - - 3U	4 - - 4	N N N N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo



Inubo November 1993



Notes 1: As for HAWAII-13.6kHz, no record during 23 November 0520 UT to 1020 UT.

Notes 2: As for LA REUNION-13.6kHz, no record during 2-5 November 0300 UT to 1300 UT, 12 November and 15-19 November 0300 UT to 1300 UT daily, due to the maintenance of transmitter.

Notes 3: As for AUSTRALIA-13.6kHz, no record during 21-25 November 2000 UT to 0800 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.

Nov. 1993	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS	BBC						
12		>37	>32			0222	24	1 S	3-	x	C
13			6			0236	17	2 SL	1-	x	C
13			23			0414	21	2 SL	2-	x	C
20			27			0022	36	2 SL	2-	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

Nov. 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
2	31		–				0557	0650	0607
3		21			–		1233	1301D	1248
3		24			–		1301E	1345	1308
4			20	17	11		0217	0300D	0233
11		93	–				1114	1218	1131
12	54	65	–	142	112	77	0218	0508	0233
12			21				0833	0856	0838
12					22	–	1958	2013	2005
12					7		2200	2214	2204
12				25	27		2255	2320D	2306
12				14	18		2320E	0002	2326
13				16	16		0016	0032	0026
13				7	11		0102	0127	0110
13			7	7	7		0158	0210	0205
13	18	17	58	41	29		0236	0314	0245
13	53	69	126	90	50	35	0411	0542	0422
13	50	220	198	101		52	0612	0753D	0645
13	44	76	79				0752E	0900	0758
13		39	18				0933	0959	0939
13		18	7				1002	1027	1011
13		24					1530	1625	1605
13					9	–	2104	2123	2110
14	15			25	20	24	0036	0153	0102
14	15	28	23	20			0408	0500	0429
20	25	30	33	65	57	44	0018	0152	0033
20			18	13			0350	0451	0405
25			32	23			0346	0455	0404
25		26	29	28			0617	0713	0625
25		27	17				0810	0835	0820
25		22	7				0908	0938	0916
29			23	12	9		0323	0405	0331
29			7				1008	1033	1014
29				22	14		2311	2357	2320
30			13	10	12		0423	0527	0437
30	13	23	81	68	13	24	0604	0716	0612

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