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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

DEC. 1994

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	A	29	29	32	28	38	35		57	60	70	62	67	66	69	60	60	44			35	36	49	35
2	35	35	30	32	32	A	A	35	68	60	70	68	71	60	63	60	A		39	A	A	A	A	A
3	22	A	35	31	37	28	26	35	57	78	78	68	61	61	60	57	50			32	58	31	A	A
4	A	30	A		30	30	A	38	57	69	74		62	61	68	60	47	40	37	35	29	A		59
5	30		A	34	28	35		A	58	73	73	73	65	60	59	38	56	32	A		A	34	A	35
6	36	35	36	32	31	34		41	59	57	95	75	64	61		60	57		47	34	40	59		35
7	35	35	35	34	34	34	37	A	44	68	72	76	57	73	68	56	47		A	35	37	35	35	25
8	A	29	35	28	26	N	A	A	60	53	64	75	65	60	70	54	48	36	A	46		A	A	A
9	A	37	36	38	35	31		A	57	50	68	76	71	57	61	52	40	23	38	A	30		44	46
10	47	43	35	36	40	34	31	A	52	A	61	60	62	70	68	72	A	A	31	35	30	59	37	38
11	40	36	36	34	32	49		40	58	30	57	70	71	68	61	61	40	28	A	A	59	31	28	35
12	35	35	35	35	43	37	30		23	57	71	60	39	70	70	57		A	38	40	38	38	32	41
13	A		44		38	41	38		57	58	55	68	72	60	56	65	44	59		35	29	35	35	44
14	56	38		52	50	51	39	A	A	A	A	78	57	68		54	57	59	25	28	A	26	A	35
15	35	38	38	41	37		28		40	57	58	65	71	67	62	67	55	A	28	31	59	37		59
16	36	28	49		32	35	A	A	57	60	76	70	57	60	68	59	48	28	A		28	35	69	59
17	30	35	35	29	26	30	26	N	33	55	57		55	60	57	51	58	38		29	A	A	A	38
18	29	29		28				28	58	52	60	76	66	50	58	55	39	A	28	28	A	35	35	38
19	40	38		32		34	25	34	36	61	64	66	57	56	60	54	39			30	N	A		28
20	A	28	36	32	24	N	N	35	35	59	56	54	61	64	60	50	44	28	59		A	31	29	A
21	31	29	29	29	29		29		48	A	62	61	58	57	62	78	40	30	N		29	A		35
22		N	28	31	29	30	30		57	57	71	67	67	60	41	55	36	32	A	A	A	26	A	34
23	37	35	40	36	31	30	A	A	44	A	A	71	60	58	57	55	38	30	26	35	31	30	35	38
24	40	30	34	35	38		31	30	38	68	58		66	61	38	58	28	25	28	30	A	A	30	35
25	35	28			29	N	A	35	70	55	66	A		A	71	62	40	31	59	37	30	N	A	35
26	35	35	35	30	35	37	28	32	58	53	72	64	60	69	79	56	36	42	37	40	35	32	37	36
27	38	38	40	38	34	32	A	A	61	57		68	65	58	75	53	41	37		35	A	47	30	50
28	35	57	38	39	37	38	29	69	58	51	59	67	58		60	63	49	41	47	54	38	38		48
29		36	36		37	38	32	35	58	46	70	56	66	68	60	30	50	41	42	47	57	A	37	32
30	40	38	38	42	40	A	A	A	56	66	A	67	62	60	56	49	44	43	A	A	A	A	A	A
31	A	35	35	35		31	28	29	61	67	60	60	69	68	64	A	A	52		A	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	27	25	26	28	22	17	14	30	27	27	27	30	29	29	30	27	22	16	20	18	19	15	25
MED	35	35	35	34	33	34	30	35	57	57	66	68	63	61	61	56	44	36	38	35	35	35	35	36
U Q	40	38	38	36	37	38	33	38	58	66	72	73	67	68	68	60	50	42	44	38	40	38	37	45
L Q	35	29	35	31	29	31	28	32	44	53	59	62	58	60	58	54	40	30	28	30	30	31	30	35

HOURLY VALUES OF fEs AT WAKKANAI

DEC. 1994

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	34	G	26	G	24	G	G	G	G	G	41	37	G	G	40	27	29	33		32	37	33	24	26
2	34	27	G	G	G	37	40	G	G	G	40	G	G	G	G	38	43		73	69	64	39	38	37
3	G	27	G	34	33	60	71	34	28	34	G	G	G	G	G	G	26		G	G	G	33	64	42
4	35	32	31	24	G	25	29	34	56	33	37		G	G	G	G	G	G	G	35	44	29	G	G
5	G	G	28	G	G	G	G	30	30	44	G	G	G	G	G	G	36	G	32	G	33	38	27	G
6	G	G	G	G	G	G	G	29	43	33	44	G	48	G	G	G	G	G	G	G	G	G		G
7	G	G	G	G	G	G	28	48	35	G	G	G	G	G	G	G	28		33	57	G	G	29	28
8	34	G	G	G	G	28	39	37	28	G	G	G	G	G	G	34	32	29	34	G	G	35	42	31
9	32	30	27	26	G	G	28	34	39	G	G	G	G	G	G	G	36	G	28	45	30	G	30	26
10	G	G	G	G	26	27	36	43	32	65	G	G	G	G	G	G	34	27	G	G	33	38	26	28
11	G	G	G	G	G	G	G	G	41	G	G	G	G	G	G	27	30	42	36	38	G	G	G	G
12	G	G	26	26	G	G	G	G	30	31	34	G	G	G	G	G		57	47	26	32	41	30	31
13	27	G	G	G	26	26	G		33	48	40	G	G	G	G	G	30	33		37	36	37	37	54
14	32	G		G	G	27	35	40	78	46	76	34	43	G		41	11	G	36	34	32	34	39	G
15	G	30	24	26	G	24	G	32	G	31	G	G	50	G	G	G	36	28	31	G	G	29	G	27
16	G	25	28	G	31	G	30	30	29	G	36	G	34	G	G	G	29	32	33		G	29	26	G
17	G	G	G	32	31	32	29	G	44	53	46		G	G	G	G	G	34		28	26	24	29	G
18	G	G		G				30	41	40	G	34	G	G	35	42	40	36	32	34	32	G	26	G
19	G	G		G		G	G	24	34	38	G	35	G	G	34	G	G	G		G	G	26		G
20	26	G	G	G	G	G	G	36	29	61	G	G	35	G	G	28	G	25	G		29	G	G	29
21	G	G	G	G	G		G	11	G	60	53	G	46	G	G	G	G	G	G		32	28		G
22	G	G	G	G	G	G	G	G	36	G	40	G	G	G	34	37	36	34	34	27	32	G	54	G
23	G	G	G	G	G	27	26	29	28	34	35	G	42	G	G	35	30	34	G	G	G	G	34	G
24	G	G	G	G	G		G	G	27	36	36		37	35	38	35	26	30	33	G	58	43	30	G
25	24	G	31	32	26	24	30	34	34	41	54	40	G	36	38	33	26	G	G	G	G	G	24	G
26	G	28	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27
27	27	41	37	32	35	G	33	42	G	32		G	47	34	57	37	39	44		34	46	32	35	G
28	G	24	26	35	26	27	32	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G		26
29		G	G		G	G	G	G	28	G	G	60	G	G	G	G	G	28	30	26	25	38	30	33
30	33	29	26	31	58	30	26	40	28	36	45	41	G	37	G	G	G	G	38	32	57	50	58	30
31	34	G	29	G	G	G	G	G	33	57	36	34	G	G	G	60	52	106		65	42	45	33	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	28	30	29	28	30	30	31	31	30	28	31	31	30	31	30	28	25	28	31	31	27	31
MED	G	G	G	G	G	G	14	30	30	33	34	G	G	G	G	G	28	28	31	26	30	29	30	26
U Q	32	27	26	26	26	27	30	34	36	44	40	34	35	G	G	35	36	34	34	34	36	38	37	30
L Q	G	G	G	G	G	G	G	G	27	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT WAKKANAI

DEC. 1994

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

HOURLY VALUES OF foF2 AT KOKUBUNJI

DEC. 1994

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	35		31		25				56	67	63	80	84	58	71	63	48	48	41		A	A	A	29
2	35	A	A	N	38			A	63		61	63	70	70	63	70		41	35	51				
3				37	A	N		34	58	70	71	92	64	56	66	73	54	46	32	A	58	N		28
4	A	35	34	36	28	N		60	69	93	66	82	71	61	60	60	52	A	35		30	25	28	
5	49		35		32	29		69	84	63	74	64	70	65	64	56	50	28			59			49
6	35	49	31	31		29		57	56	70	70	68	64	66	65	55	62	31	45	50	A	A	36	
7	N	35		32		30			68	52	92		66	55	67	68	28		A	A		59	35	A
8		26		26	29	N	A	57	58	66	64	64	91		63	55	51	37	A		N		28	
9	30	30	35	31		26	N	47	59	42	57	71	56	69	61	60	55	40	A	43	56	30	59	A
10	A	35	35	41	40	A	36	57	60	56	60	83	71	69	58	63	56	38	35	35	35	56		29
11	35	A	35	30		30		56	61	67	56	69	80	71	56	74	51	34	A	A	35			69
12		N	35	35			35	68	57	67	68	76	82		65	65	61	37	37		N			34
13	38		30		34	29	31	65	57	64	62	68	72	70	70	64	63	34	35	32	59	N		N
14				28	31	29	59	57	57	60	67	61	76	39	66	65	45		A		34	35		30
15	29	N	35	32				46	56	60	62	54	68	78	69	60	58	40	A		31	35	59	32
16	35	36	34		30	N	59		51		76	82	67	64	64	61	N	A	39	47				
17		31	34	31	26			32	57	67	60	64	75	65	50	67	50	A	32	36		N		
18		31	28	28	30			56	56	70	67	62	74	63	38	54	50	40	31		59	56	35	29
19	N	35	35		34			58	69	66	46	73	60	54		57	58	37	43	35		59		
20	35	N	N		28	35	N	46	56	71	61	52	58	75	64	52	51		28		37	38	36	49
21	37	N	N	N	N		35	37	56	55	64	58	70	69	64	62	60	38			A	30	A	A
22	25	34		38	N	N		43	57	67	68	65	76	50	41	60	61		N	28		29	35	
23	28		35	A	35		29	45	28	51	59		52	78	55	48	56	A	31	N	34	N		
24	31		N	31	29	35	35	41	44	56	54	63	A	58	41	71	52	41	38	32	34	36	35	A
25		28	31		28	26	N	38	57	72	67	88	74	73	63	62	50	34		35	35			N
26	N		35	32	35		28	34	48	57	64	78	68	68	58		55	59	31	26				31
27	32	28	36	35		34	35	41	57	62	66	66	63	A	53	74	56	34	N	35	28	31		34
28	35	34	31	28	29	32	30	46	57	67	70	67	59	60	58	63	57	40		32	37	28	29	
29	31		29		28	29	59	36	48	58	82	63	71	61	62	58	48	38	46	43			A	
30	A	A	A	31	34	29	34	58	56	60	87	68	67	73	55		50	18	38	35	59	A	29	36
31	36	32	29	29	A	N	28	42	47	66	80	70	56	65	59	67	55	37	46	43	A		A	A
	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	15	21	20	20	14	14	27	31	29	31	29	30	28	30	29	29	23	19	17	17	14	12	13
MED	35	34	34	31	30	29	35	46	57	66	66	68	70	65	62	62	54	38	35	35	35	35	35	32
U Q	35	35	35	35	34	32	36	57	59	67	70	77	74	70	65	67	57	40	41	43	58	56	36	42
L Q	31	30	31	29	28	29	30	41	56	57	61	63	64	59	56	57	50	34	32	32	34	30	29	29

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT KOKUBUNJI

DEC. 1994

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	57	36	28	39
2	33	29	26	G	G		G	27	31		55	55	G	G	G	36		33	G	26	G			
3		G	G	G	24	G		29	39	41	39	38	G	G	G	37	31	29	34	46	28	G	G	26
4	29	G	G	G	G	G	G	63	G	36	G	G	G	G	G	G	G	27	G	G	G	G	G	G
5	G	G	G		G	G	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	38	44	G	G	G	38	G	G	41	G	30	34	25	29	27	26	G
7	G	G	G	G	G	G			G	48	G	G	40	G	G	G	G		30	25		31	30	32
8	25	G	G	G	G	G	25	34	32	G	G	G	40		G	32	32	26	38	34	33		G	G
9	G	G	G	G	G	G	G	29	G	G	G	G	G	36	G	G	30	27	34	G	G	G	G	40
10	39	28	G	28	23	28	30	32	41	50	40	G	G	G	G	G	G	24	G	G	G	G	G	G
11	G	52	29	G		G		27	32	G	44	53	G	G	G	G	54	54	30	25	G	G	G	G
12	G	G	G	G			G	38	G	G	G	43	G		G	G	G	26	G	G	G		G	G
13	G	G	G	G	G	G	G	G	33	G	G	G	G	G	G	G	G	G	G	G	G	G		G
14	G		G	G	G	G	G	36	32	G	G	G	G	G	G	G	40	G	26		G	G		G
15	G	G	G	G	G		G	26	G	G	36	G	38	39	G	G	G	28	28		G	G	G	G
16	G	G	G	G	G	G	G		G		G	G	37	G	G	32	G	38	25	G		G		
17	G	G	G	G	G			29	G	67	53	G	G	G	G	G	G	30	G	G	G	G	G	G
18		G	G	G	G			28	G	G	G	G	G	G	G	G	36	28	G	G	G	G	G	G
19	G	G	G	G	G			27	34	G	37	G	G	G		G	G	G	G	G		G	G	
20	G	G	30		G	G	G	24	33	G	G	G	41	G	G	G	31	G	G	G	G	G	G	G
21	G	G	G	G	G		G	33	40	G	G	38	46	G	37	47	31	32		G	40	G	36	26
22	G	G		G	G	G		26	G	G	G	40	G	G	40	G	G	G	G	G	G	G	G	
23	G	G	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	25	28	G	G	28		G
24	G	G	G	G	G	G	G	G	G	G	G	39	54	G	G	G	G	27	G	G	G	G	G	25
25		G	G	G	G	G	G	G	G	G	G	G	G	G	G	35	G	24		G	G			G
26	G	G	G	G	G	G	G	G	G	33	G	G	G	G	G		30	26	25	G	25			G
27	G	G	G	G	G	G	G	G	32	G	G	G	G	114	G	G	31	G	G	G	G	G	34	32
28	37	G	G	27	G	G	G	G	G	G	G	G	G	G	G	G	30	G	G	G	G	G	28	
29	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	34	
30	40	33	36	G	G	G	G	G	41	G	G	G	G	44	G		G	G	G	G	G	40	G	G
31	25	G	G	G	38	24	25	G	G	47	59	51	40	48	40	58	47	32	G	G	26		36	31
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	29	24	24	28	31	29	31	31	31	29	30	29	30	30	29	29	27	25	24	25
MED	G	G	G	G	G	G	G	26	G	G	G	G	G	G	G	G	G	26	G	G	G	G	G	G
U Q	13	G	G	G	G	G	G	30	33	17	36	38	38	G	G	32	31	29	28	G	25	G	28	26
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

DEC. 1994

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT YAMAGAWA

DEC. 1994

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	59	N		30	34	25	59	32	68	70	61	70	93	73	62	66	62	61	38	25	N	58	24	26
2	N		30	28		A	A	57	70	66	64	65	72	87	70		70	69	59	59	69	N	69	
3	N	26	30	60	29	N	49	57	68	68	76	76	76	68	77	65	66	53	A	A		26	28	26
4		23	59	30	59		N	58	67	93	73	84	84	76	71	67	61	50	49	69				N
5	26	29	59	28	31	26	17		68	79	73	68	70	76	80	83	67	56	23		49	49	N	26
6	26	31	28	49	N	N	49	32	68	69	72	75	71	66	71	63	62	66	A	A	A		49	30
7		26	49	56		N	25	35	69	83		83	64	58	73	78	66	79	59	49		N	29	
8	25	26		28	30	25	A	37	68	69	77	67	81	73	68	71	63	53	31	26	28	49	A	
9	A	A	37	23	31	29		49	57	68	67	79	73	66	74	67	67	58	31			N	69	
10			32	59	30	28	49		49	68	68	74	77	76	75	81	58	54	59	A	30	30	A	
11	N	26	29	30	29	31	35	32	69	68	66	67	71	72	60	72	66	59	32	23	28	59	69	28
12	24		31	31	N	26	N	69	56	68	59	73	75	86	73	72	66	53		26		49		
13		28	25	26	34	23	49	59	68	67	64	66	78	75	67	66	66	57	31	59	A	N	30	30
14	30	32	32		30	30	N		49	57	72	76	75	70	68	65	67	39	30	49	59	28	59	49
15	29	26	30	31	19	N		49	59	69	70	57	66	76	82	66	69	64	31	32	31	49		33
16			41	58	N		69	69	68	68	68	77	82	71	75	67	66	60	A			30	N	
17	26		28	26	N		N	35	57	60	67	66	70	62	63	68	58			32		59	23	30
18		28	35	59		26	59	69	66	69	68	67	80	72	66	68	62	57	40			28	24	
19	29		32	32	28		N	58	69	73	67	71	67	66	67	67	66	59	56		30	35	56	28
20	49	28	31	49	26	30	69	49	69	67	67	68	52	77	78	66	68	58	30	31	30			23
21		23	26	30	59	24	49	N	55	67	67	68	75	80	64	81	65	68	31	23	24	31	28	
22		A	N	26	30	26		49	57	69	67	73	68	72	71	67	71	59	26	23	31	35	49	
23		N	N	30		30	A	A		A	58	61			77	63	54	57	31				69	
24	69	N	26	26	31	26		31	A	62	56	68	63		68	68	68	59	59	25	49	23		28
25		26	31		30	26		59	55	70	67	83	82	62	68	74	66	62	35	60	58	49		N
26	N	29	25	26	30	N	49	69		68	62	70	91	80	67	66	67	65	30	30	59	A		N
27	69	N		N	49		69	69	61	62	71	59	56	A	66	57	70	67	25	18	49		26	N
28	A		26	N	25	25	59	59	61	89	66	70	68	64	63	68	66		24	26	49	24	N	49
29	25		30	28	25		34	49		69	75	74	68	74	70	68	67	67	32	54	59	49	A	
30	A	25	31	31	30	29	59	49	57	66	81	73	81	72	66	68	57	62	69	A	28	A	A	A
31	A	A		24		N	N	59		59	67	68	59	67	68	72	57	32	22	49		29		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	16	25	27	22	18	17	26	26	30	30	31	30	28	31	30	31	29	26	21	18	20	16	13
MED	29	26	31	30	30	26	49	53	66	68	67	70	72	72	68	68	66	59	31	31	40	35	40	28
U Q	54	28	33	49	31	29	59	59	68	69	72	75	80	76	74	72	67	64	49	51	58	49	64	31
L Q	25	26	28	26	29	25	42	37	57	67	66	67	68	66	66	66	62	55	30	25	30	28	27	26

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT YAMAGAWA

DEC. 1994

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	29	G	G	G	G	G	G	G	G	39	G	G	G	G	G	G
2	G		G	G	28	29	29	G	G	G	G	G	G	G	G		G	38	30	26	G	G	24	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	G	48	60	32	36	35	31	G	G	G	G
4	G	G	G	G	G	G	G	25	29	G	G	G	49	G	G	G	G	26	24	25	26	G	G	G
5	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G	32	30	28	31	27	G	G	G
6	G	G	G	G	G	G	G	G	29	G	G	G	G	G	G	34	G	37	36	31	29		32	G
7		G	G	G	G	G	G	24	31	G	G	G	39	G	G	G	G	36	G	G	G	G	G	G
8	G	G		G	G	G	23	28	38	G	G	G	G	G	G	G	G	G	G	G	32	33	23	G
9	32	29	G	G	G	G	G	24	29	G	37	G	38	39	G	G	G	28	28	29	G	G	G	G
10	G	G	G	30	G	G	G	G	38	G	G	G	G	G	36	G	32	29	25	31	G	G	32	
11	G	G	G	G	G	28	G	G	29	G	G	G	G	G	G	G	30	G	G	G	G	28	G	G
12	G	G	G	33	G	G	G	G	29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	28	G	G	G	G	G	G	G	G	29	28	26	25	G	G	G
14	G	G	G	G	G	G	G	11	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G		25	48	G	G	G	G	G	G	34	G	G	G	G	G	G	G	G
16	G	G	G	G	G		G	23	33	61	G	G	G	119	G	G	G	G	38	28	25	G	G	
17	G	G	G	G	G		G	G	29	G	G	G	G	G	37	G	G	G	G	G	G	G	G	G
18	G	G	G	G		G	G	G	31	G	G	38	G	G	G	G	G	G	G		G	G	G	G
19	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	48	G	G	G	G	G	G
20	G	G	G	G	G	G	G	G	39	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G
22		26	G	G	G	G	G	G	30	G	G	G	G	G	G	G	33	30	G	38	24	G	G	G
23		G	G	G		G	98	34	32	34	49	G	G	G	G	36	31	29	25	25	G	G	G	
24	G	G	G	G	G	G	G	24	33	G	G	G	G	G	G	G	G	G	G	29	G	25	23	G
25		G	G	G	G	G	G	G	31	G	G	G	G	G	G	G	34	G	G	G	G	G		G
26	G	G	G	27	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	34		G
27	G	G		G	G		G	G	31	G	G	G	G	62	G	35	38	28	G	G	G	G	G	G
28	28	28	33	G	25	G	G	G	29	G	G	G	G	G	G	G	G		29	28	G	G	G	G
29	G	22	G	G	G	G	29	G	30	G	G	G	G	59	G	G	G	25	G	G	G	G	31	G
30	31	G	G	G	G	G	G	G	G	G	G	G	38	58	84	51	39	30	G	30	G	24	28	24
31	39	34	32	26	G	G	G	G	28	G	G	G	G	G	60	G	31	G	29	G	G	G		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	30	29	31	29	28	30	31	30	31	31	31	31	31	31	30	31	30	31	30	31	30	28	27
MED	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G	G	26	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	23	32	G	G	G	G	G	G	G	31	30	28	29	24	G	12	G
L Q	G	G	G	G	G	G	G	G	29	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

DEC. 1994

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

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

HOURLY VALUES OF foF2 AT OKINAWA

DEC. 1994

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	59		46	30	43			A	62	84	67	66	92	96	80	76			61		69	58	69	46
2		69	A	44			A	A		92	79	70	72	124	100	83	92	86	70	49	48	A	69	49
3	46		44	46				39	A	93	92	92	83	81	66	92	83	64	46	59		A		
4	69		43	25				A	A	92	93	83	124	115	87	70	68		51	68	46	44	49	
5	46	41	27	32	30			A	62	93	79	81	100	104	117	134	104	76	71	58	A	47	43	
6		59		41	56	N			65	70	84	87	88	86	94	88	92	92	57		A		46	
7	31	46	44	44				A	A	91	124	125	88	83	91	124	108		58	44	A	A		
8		59	38	44	50	49	A	79	53	74	84	89	92	95	102	91	82	83	67	46				44
9	49	44	39	37	44	58		A	62	79	71	67	89	81	93	83	74	66	57	A	A			
10		44	59	46	44	31		36	45	74	90	91	72	98	92	111	92		94	57		38	46	
11		43	69	59	69		49		40	60	92	76	64	92	70	80	67	52	A	48	A		69	69
12		30	61	46	49			59	59	70	65	67	94	92	91	74	66		59	48	48			56
13	69		59		N		69		45	76	94	88	93	101	82	90	86	66	69		46		31	40
14	59	42	59	39	38	35	48	21	50	72	83	91	92	83	80	80	71	82	52	43	45	49	58	89
15	43	69	44	34	56		A		A	74	71	63	58	93	118		95	63	50	40	56	62	60	56
16	32	58		50	57				45	95	83	63	84	86	90	72	61	78	61	50	46	44	46	
17			35	59	39				54	92	66	79	59	71	71	80	93	78	64	46	61	53	46	69
18		69	40	40	59				58	94	81	84	78	77	66	83		67	50			44	43	
19	58	69	32		69				A	78	82	80	82	92	90	123	120	101	80	67	68	59	52	43
20		44	44	58	41	41		65	54	69	74	91	71	70	93	94	81	63	46	46			58	44
21			69	58	35			59		61	83	75	82	99	91	96	107	88	92	41		44		A
22			59	69	38	B		49	42	68	81	82	91	92	81	93	81	68	58	41	89		53	
23		32	N	N	69	69		59	39	58	84	58	80	58	78	94	72	58	46	44	69	41	59	46
24	59	59	35	36	41			A	49	78	92	58	74	57	74	88	92	50		69		53	61	
25		69	46	69	35		46		A	94	82	78	85	66	71	87	78	81	59	42	50	69	59	
26	38	69	46		A	69	A		41	68	81	70	91	91	92	83	96	77	57	43	69	50		
27			35		36	69	48		43	63	87	72	61	79	92	82	61	94	82	A	48	51	54	69
28	A	38	69	A		A		47	A	64	64	62	73	78	83	61	63	82	66		59	A		39
29		32		49	32	41		A	38	80	94	83	67	83	82	81	A	89	57	46	49	44	A	
30		A	32	32	27	31	A	A	40	74	82	77	83	92	94	83	74		54	46	44	46	A	
31			A	A	41	A		A	42	59	69		72	60	67	83	63	44	40	48	53	49	59	69
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	21	25	24	24	10		10	22	31	31	30	31	31	31	30	28	25	29	24	19	19	21	15
MED	49	46	44	44	42	45		54	47	74	82	78	83	86	90	83	82	77	58	46	50	49	54	49
U Q	59	69	59	54	56	69		59	58	92	90	87	91	95	93	93	92	84	68	53	68	53	59	69
L Q	40	41	36	36	37	35		39	42	68	74	67	72	78	78	80	69	63	51	43	46	44	46	44

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT OKINAWA

DEC. 1994

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G		G	48	42	35	G	39	39	39	G	40	G		33	22	G	G	G	G
2	G	G	42	G	G		48	34		G	G	G	39	45	G	40	G	28	26	26	G	48	G	32
3	24	G	G	G			G	G	46	G	G	G	G	44	54	43	40	41	47	G	21	37	G	G
4	G	G	G	G			G	48	44	57	38	50	G	G	48	38	G		23	G	45	G	G	
5	G	G	G	G	G	G	G	45	32	46	40	44	68	40	G	38	38	44	29	24	32	33	G	G
6	G	G	G	G	11	G	G	G	42	34	G	38	G	G	G	G	G	44	33	38	58	G	G	G
7	44	24	G	G	G			47	46	39	36	48	G	42	G	G	G		29	46	43	42	G	G
8	G	G	G	G	G	G	45	43	37	43	44	G	40	G	G	G	G	G	30	G	G		G	G
9	G	G	G	G	G	G		22	48	G	46	68	G	39	42	G	44	36	40	59	32	24	G	G
10	G	G	G	26	G	G	G	G	44	G	G	G	G	40	G	42	38		G	27	G	42	G	G
11		G	G	G	24		G	G	32	G	G	G	G	48	45	45	40	33	41	G	25	G	G	G
12		G	G	G	G		G	G	61	G	36	45	G	40	G	G	G	60	32	26	28	G	G	G
13	G	G	G	G	G	G	48	G	G	G	36	G	45	49	40	48	40	60	34	28	G	G	G	G
14	G	34	G	G	G	G	G	G	42	G	G	G	G	G	38	G	36	41	G	G	G	G	G	G
15	G	G	G	G	G	11	33	G	44	G	G	G	G	45	G		39	55	32	34	G	G	28	G
16	G	G	G	G	G	G	G	G	G	G	46	G	90	66	58	58	G	43	30	48	G	G	G	G
17			G	G	G			G	42	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
18	G	G	G	G	G	G	G		41	G	36	G	46	G	G	G	G	27	24	G		G	G	G
19	G	26	G		G	G	G	G	29	35	G	46	39	57	39	36	34	G	11	G	G	G	G	G
20	G	G	G	G	G	G	G	G	39	37	G	G	G	41	45	G	33	27	26	G	G	G	G	G
21	G		G	G	G			G		85	G	G	38	G	G	G	36	30	32	26	G	G	97	29
22	G	G	G	G	G	B	G	G	G	40	46	47	G	G	G	G	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G	G	45	37	G	G	51	G	46	62	45	G	G	G	G	G	G	G
24	G	G	G	G	G	G	G	43	85	G	40	G	45	G	G	45	41	42	34	G	G	44	G	G
25		G	G	G	24	G	G	G	32	38	G	G	49	48	40	39	36	43	40	32	G	G	G	G
26	G	G	G	G	25	G	47	G	40	38	G	46	46	56	G	G	G	G	11	G	G	G	G	
27	G		G		G	G	G	G	40	55	39	G	G	G	41	41	G	G	G	32	22	44	G	G
28	24	G	G	60	G	23	G	G	37	61	G	40	38	G	G	G	G	G	24	27	G	32		G
29		G		G	G	G	G	33	G	G	G	G	G	G	38	39	94	32	22	G	G	G	23		
30	G	39	38	38	41	44	32	32	39	G	G	G	G	G	78	64	68		32	G	29	G	38	G
31	G	G	55	46	41	26		31	40	G	G		50	85	156	59	70	66	44	24	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	28	30	29	29	21	26	30	29	31	31	30	31	31	31	30	31	26	31	31	30	30	30	28
MED	G	G	G	G	G	G	G	G	40	G	G	G	G	39	G	38	34	32	29	22	G	G	G	G
U Q	G	G	G	G	G	G	G	33	44	39	38	44	45	45	45	43	40	43	33	28	25	32	G	G
L Q	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	11	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

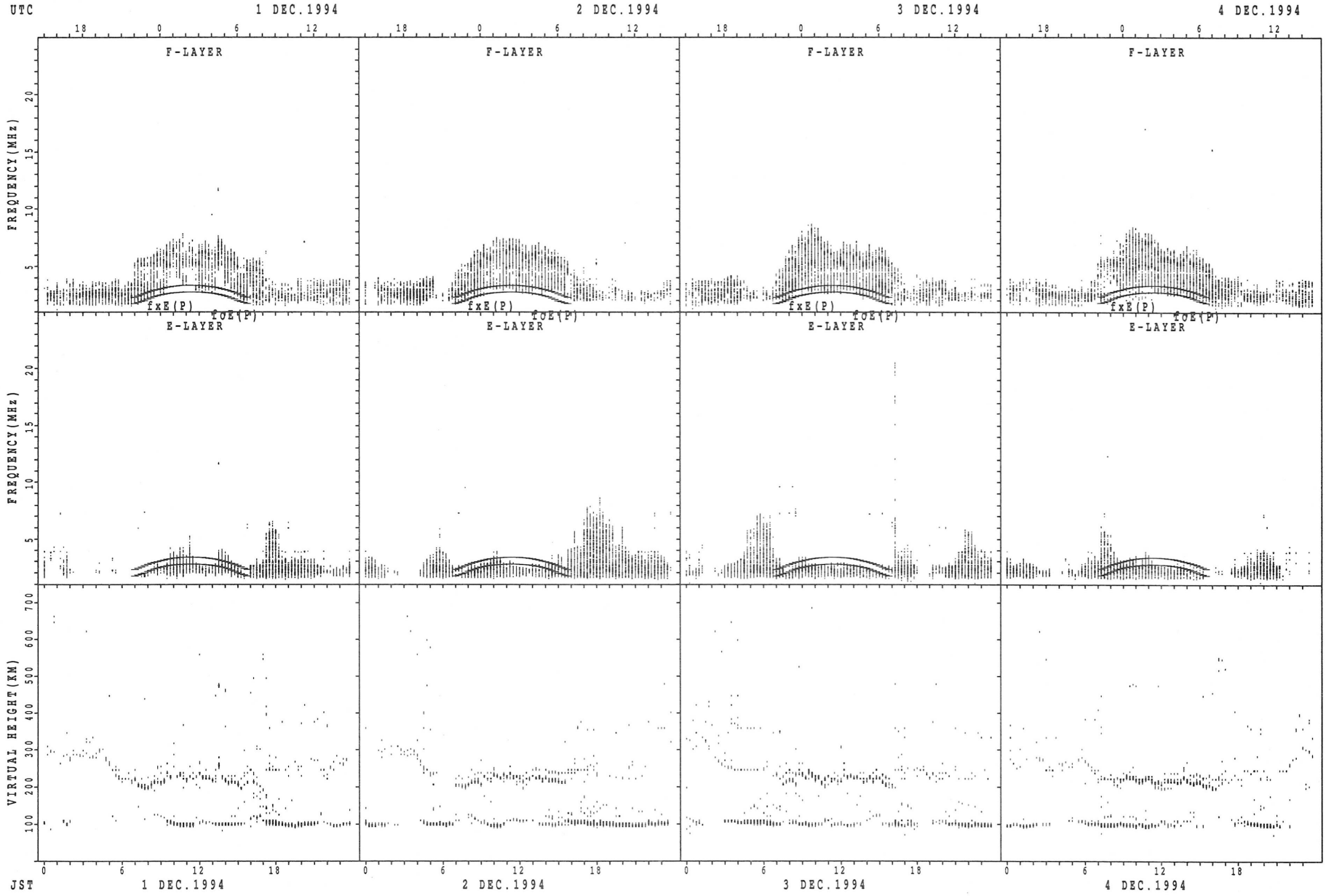
HOURLY VALUES OF fmin AT OKINAWA

DEC. 1994

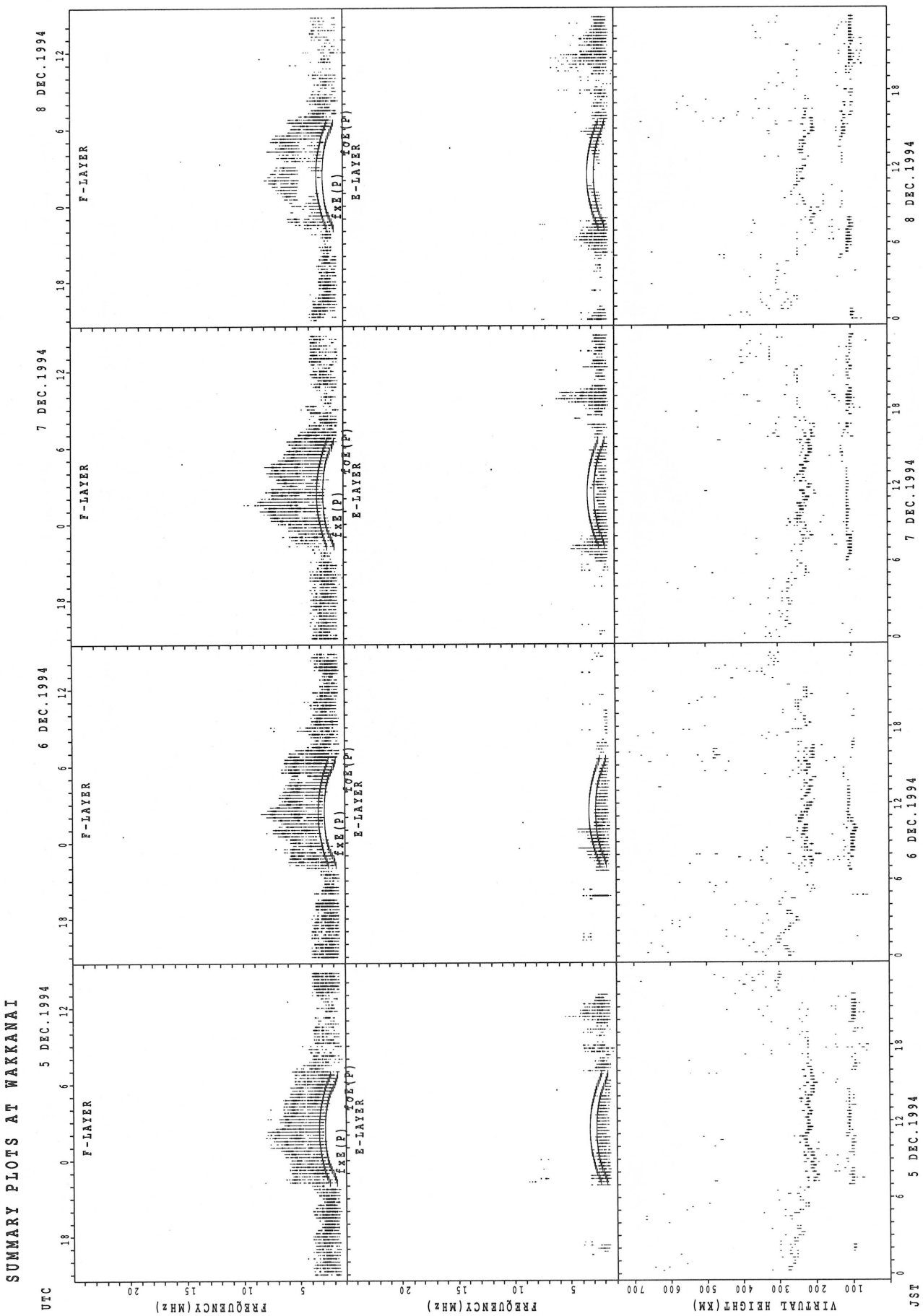
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

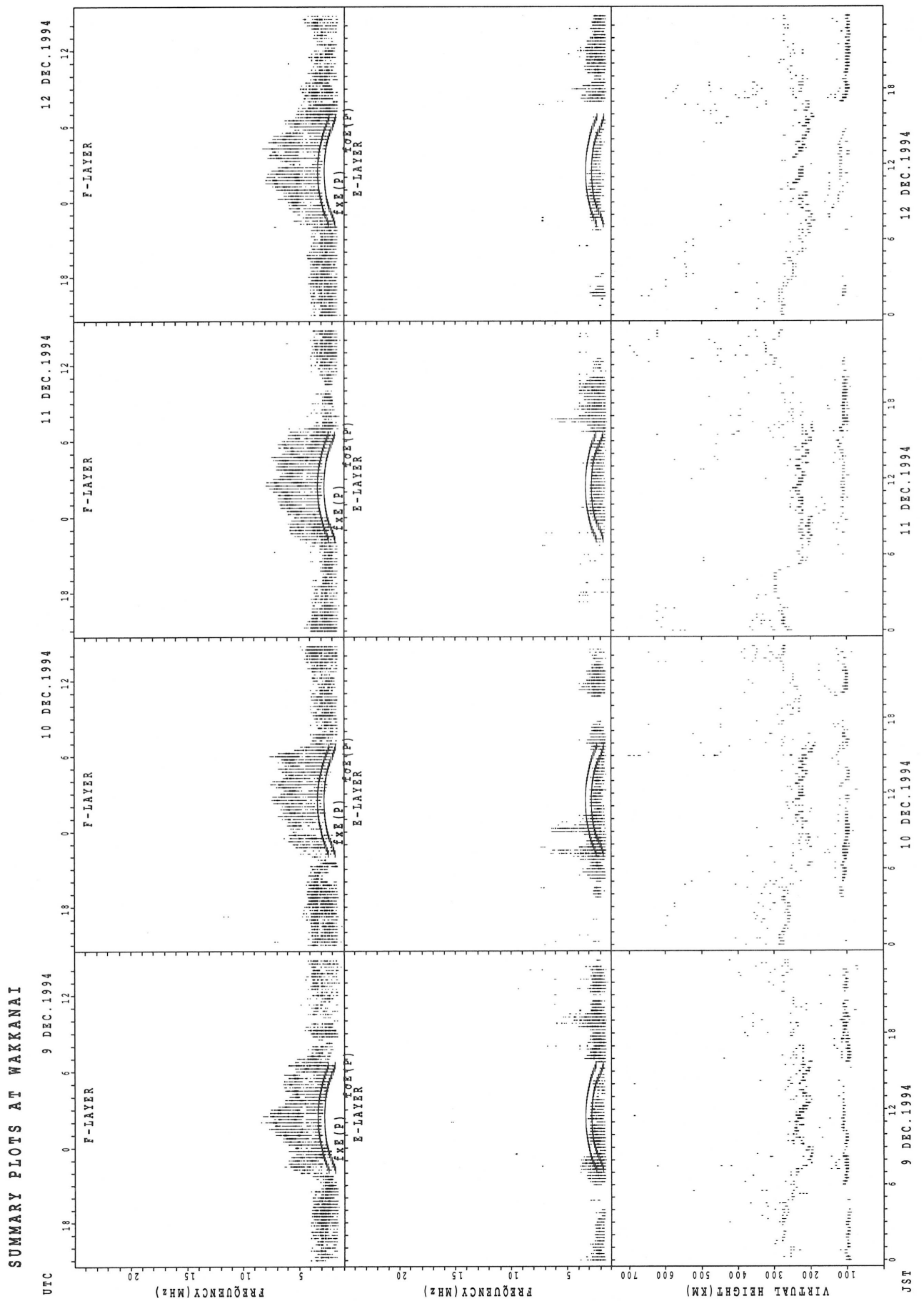
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	15	14			15	14	14	16	16	17	20	17	14	14		14	15	15	15	17	15
2	18	14	15	14	15		15	14		14	15	15	18	15	14	14	15	14	14	14	15	14	14	14
3	15	15	15	15			16	16	15	14	16	17	16	15	14	14	15	14	14	14	15	14	14	15
4	15	16	15	15	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

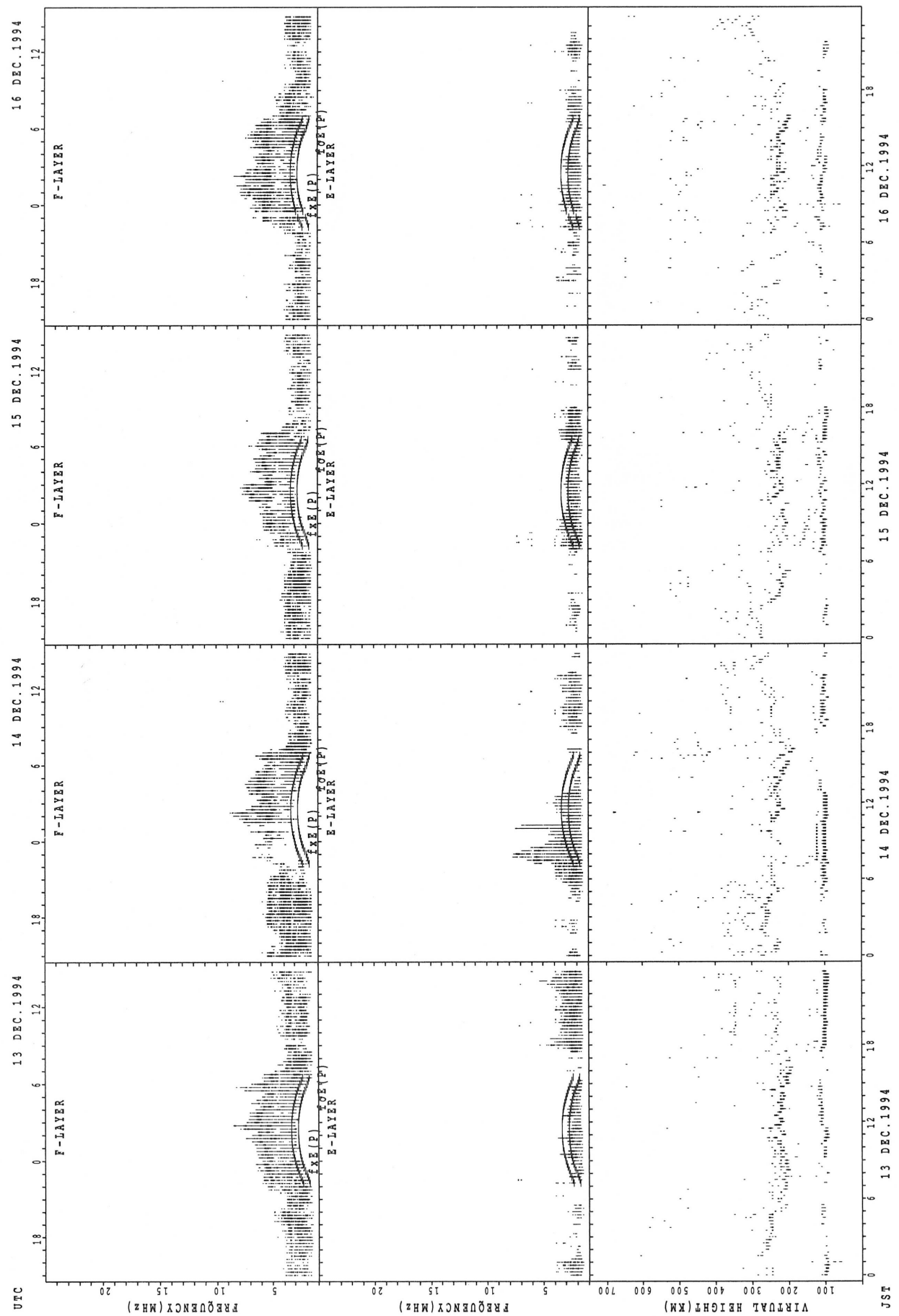
SUMMARY PLOTS AT WAKKANAI



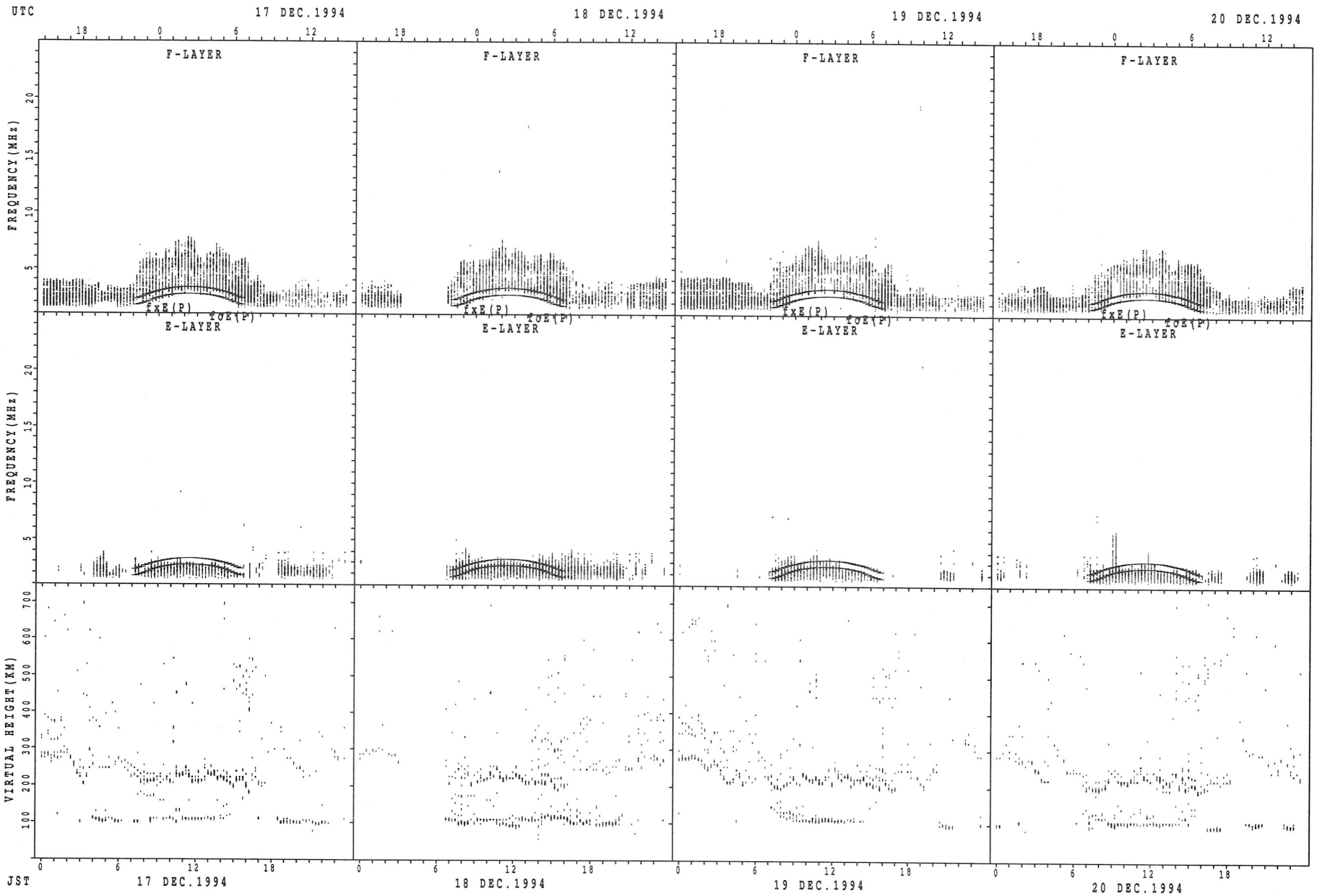
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
5 DEC.1994
6 DEC.1994
7 DEC.1994
8 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

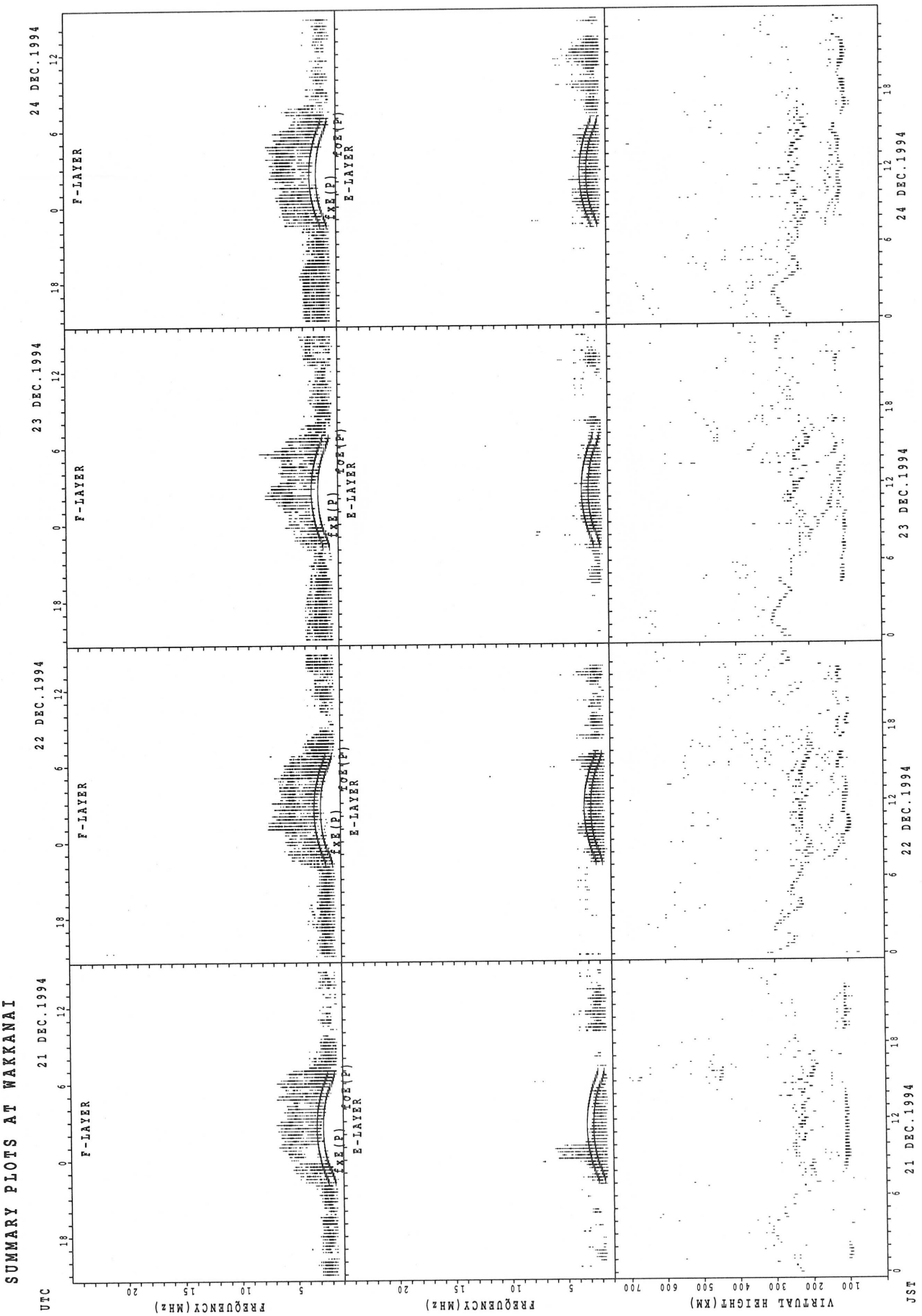

SUMMARY PLOTS AT WAKKANAI
UTC
JST
9 DEC.1994
10 DEC.1994
11 DEC.1994
12 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

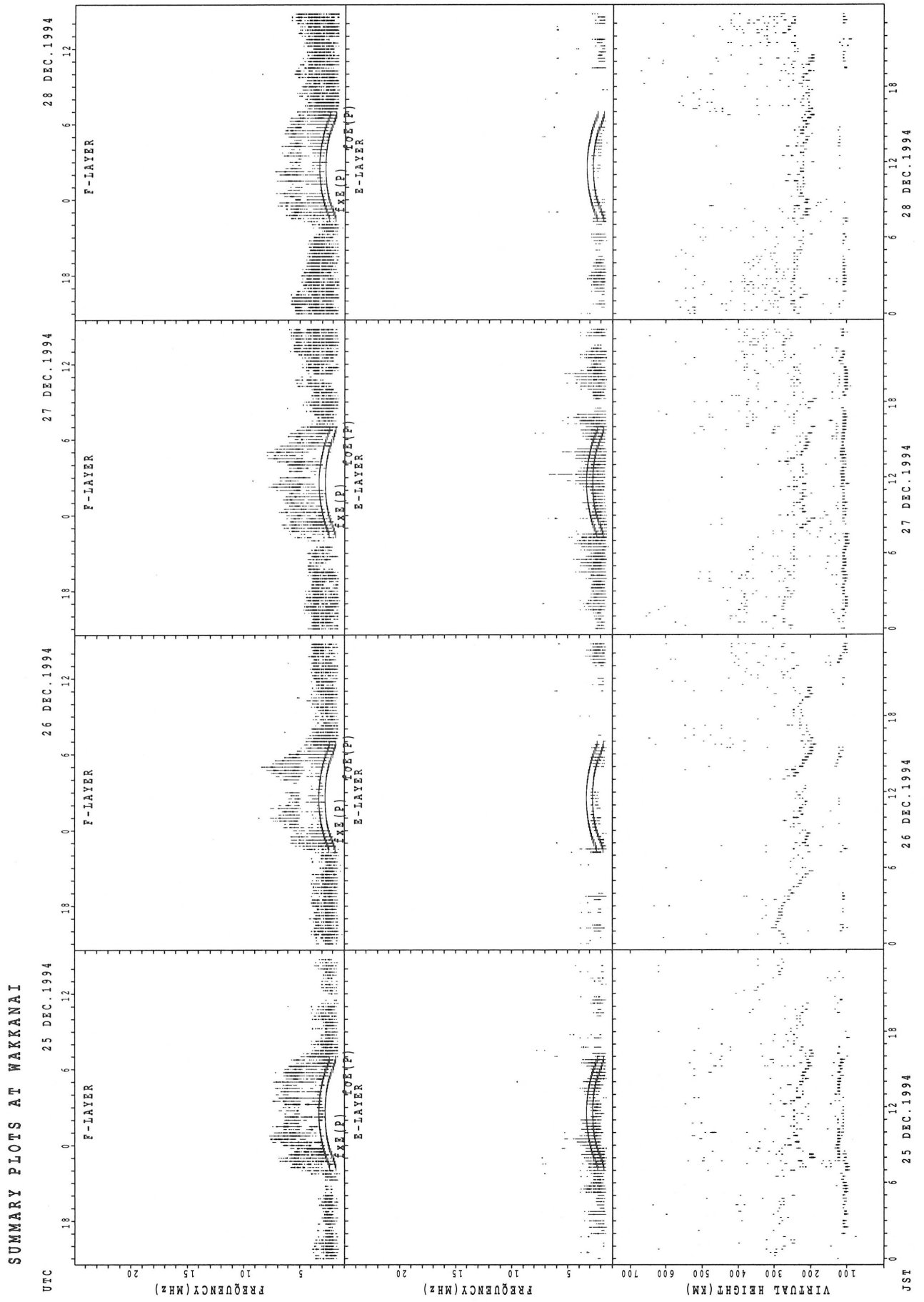

SUMMARY PLOTS AT WAKKANAI
UTC
JST
13 DEC.1994
14 DEC.1994
15 DEC.1994
16 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

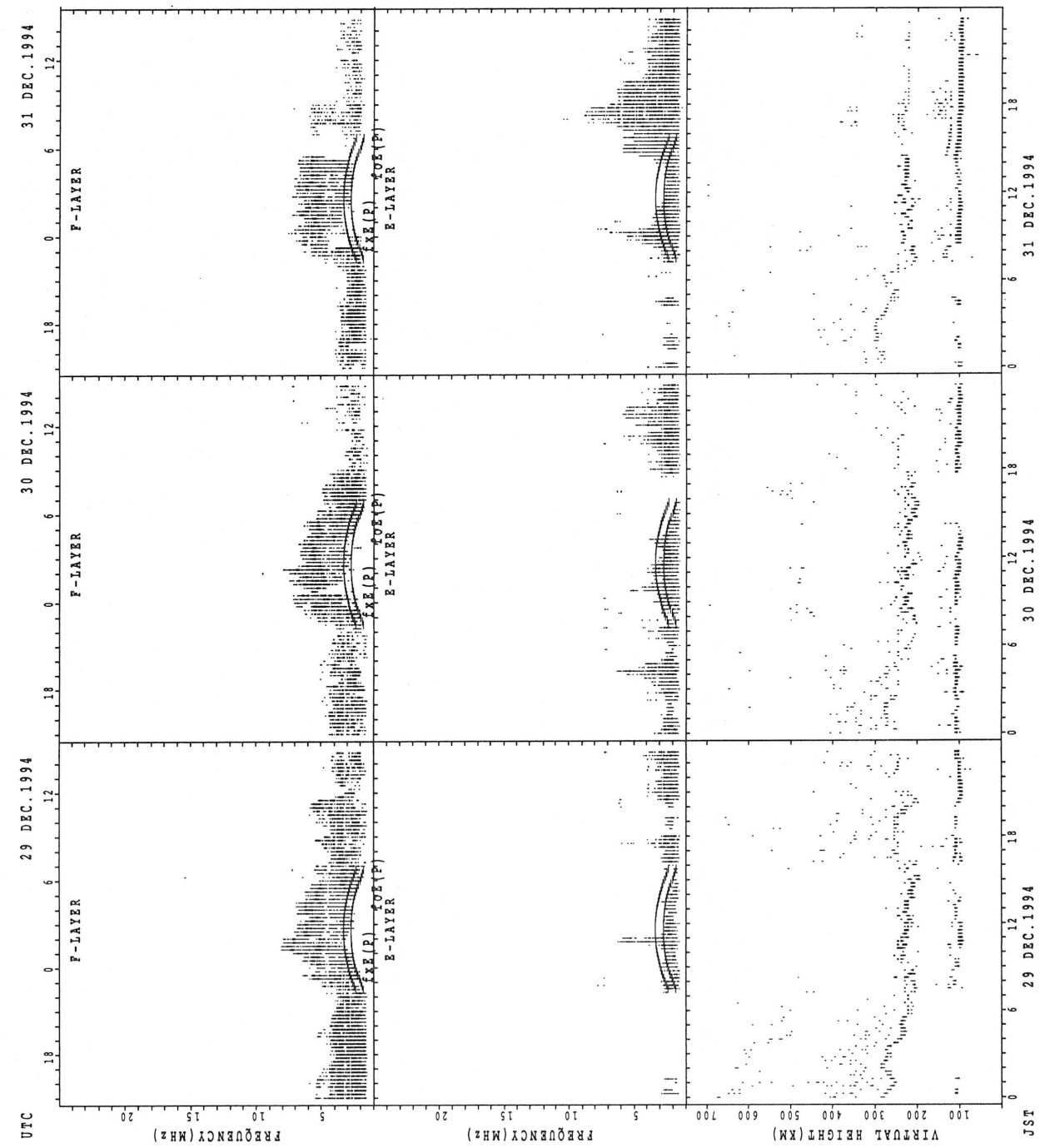
SUMMARY PLOTS AT WAKKANAI



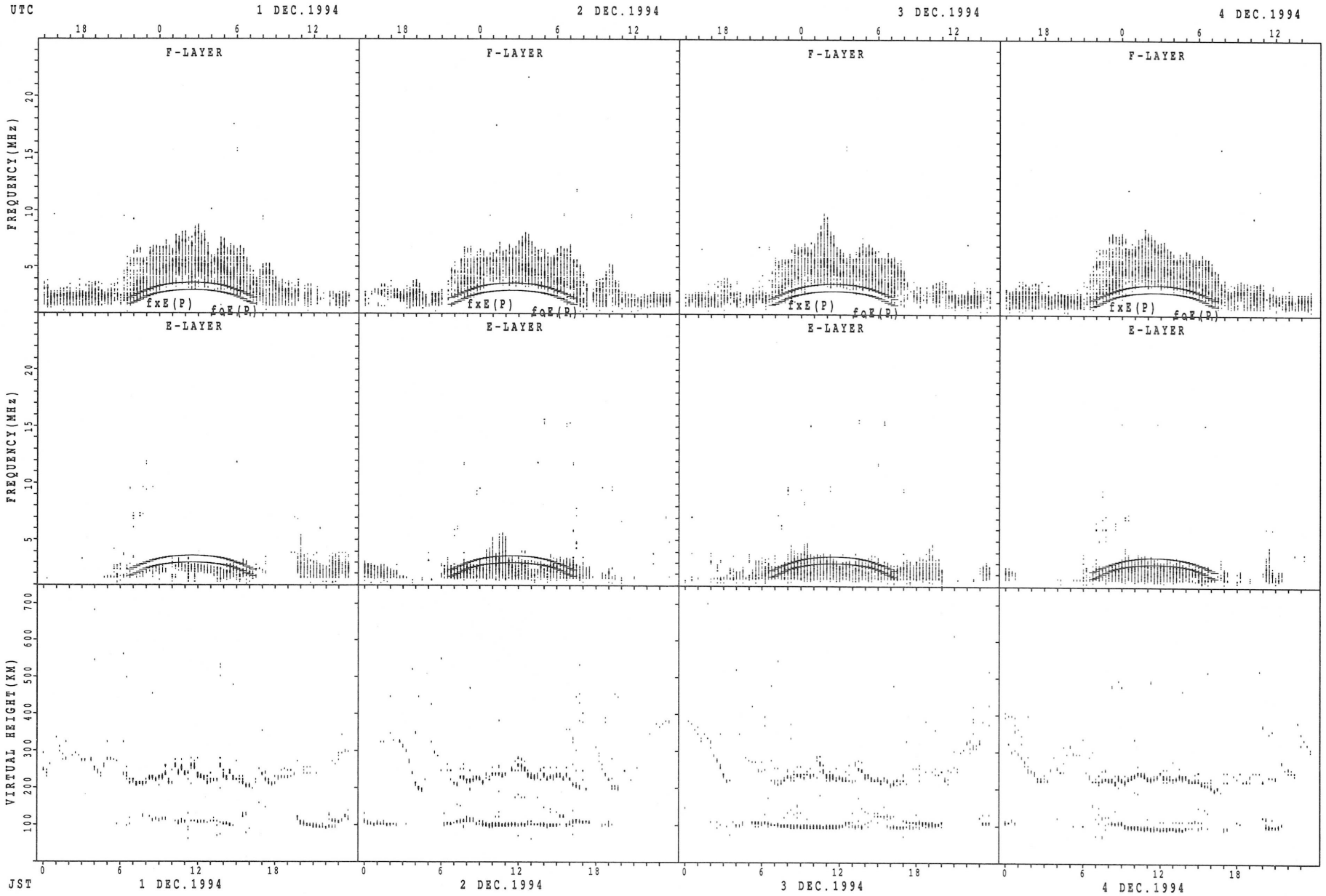
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
21 DEC.1994
22 DEC.1994
23 DEC.1994
24 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

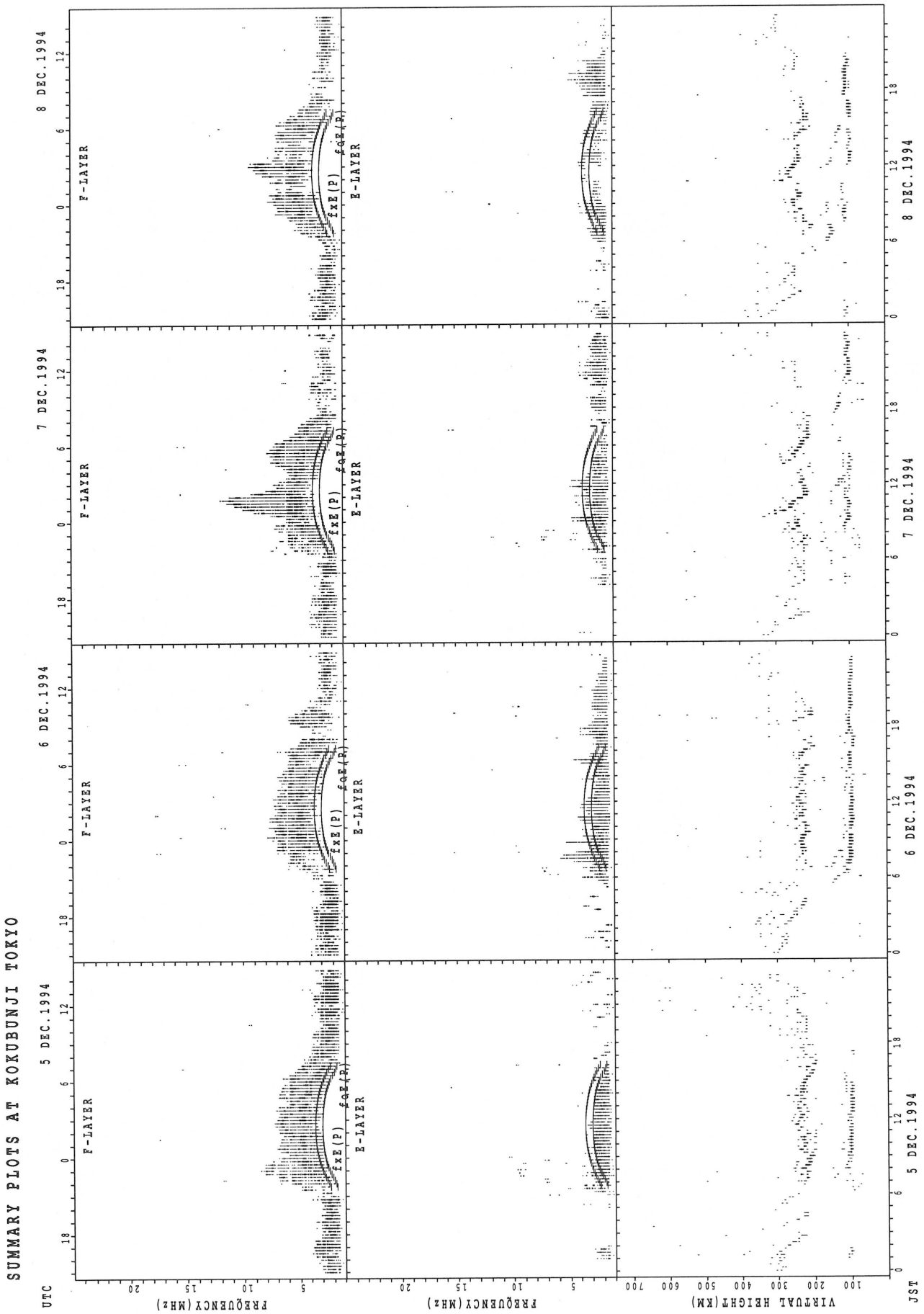

SUMMARY PLOTS AT WAKKANAI
UTC
JST
25 DEC.1994
26 DEC.1994
27 DEC.1994
28 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
29 DEC.1994
30 DEC.1994
31 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

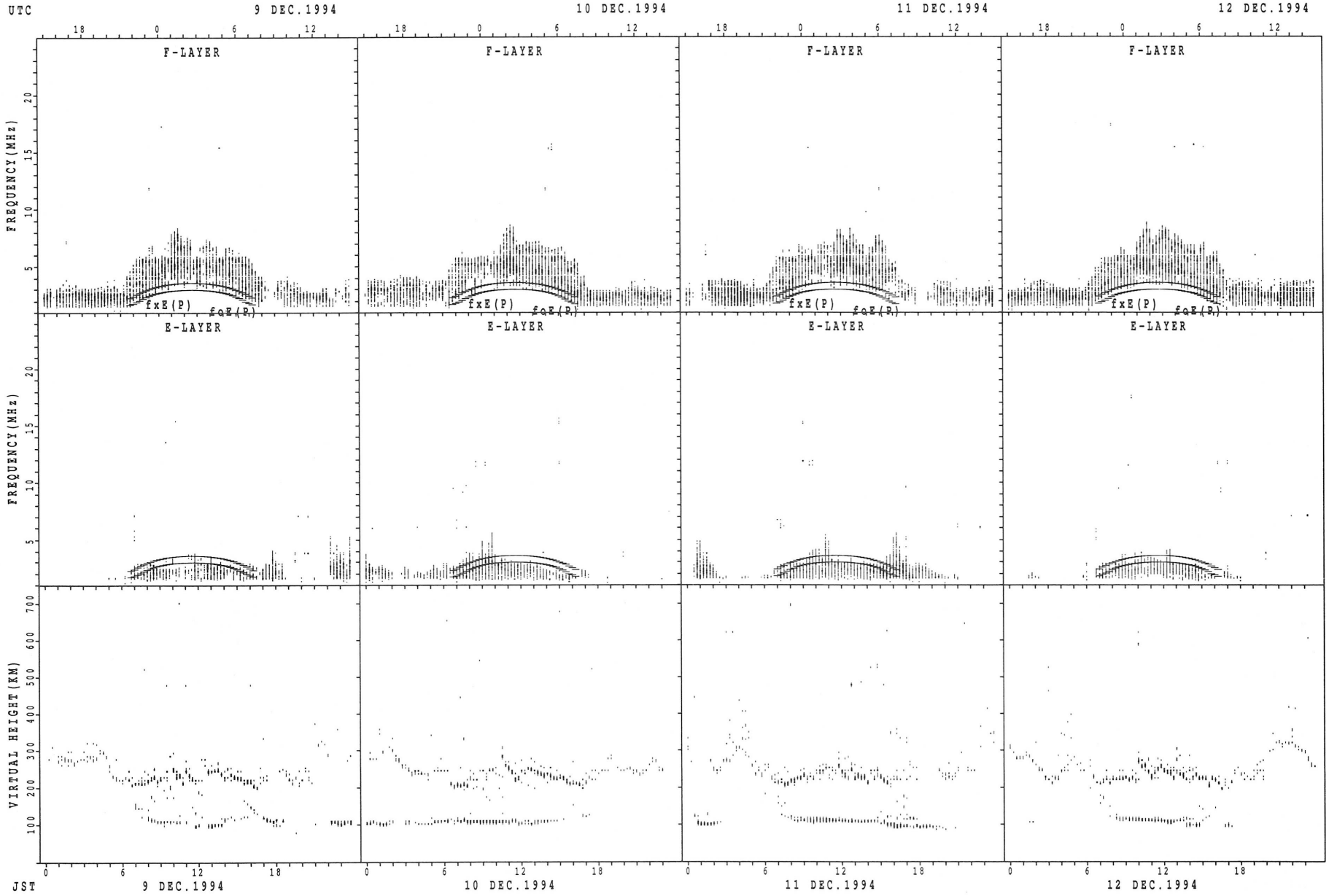
SUMMARY PLOTS AT KOKUBUNJI TOKYO



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

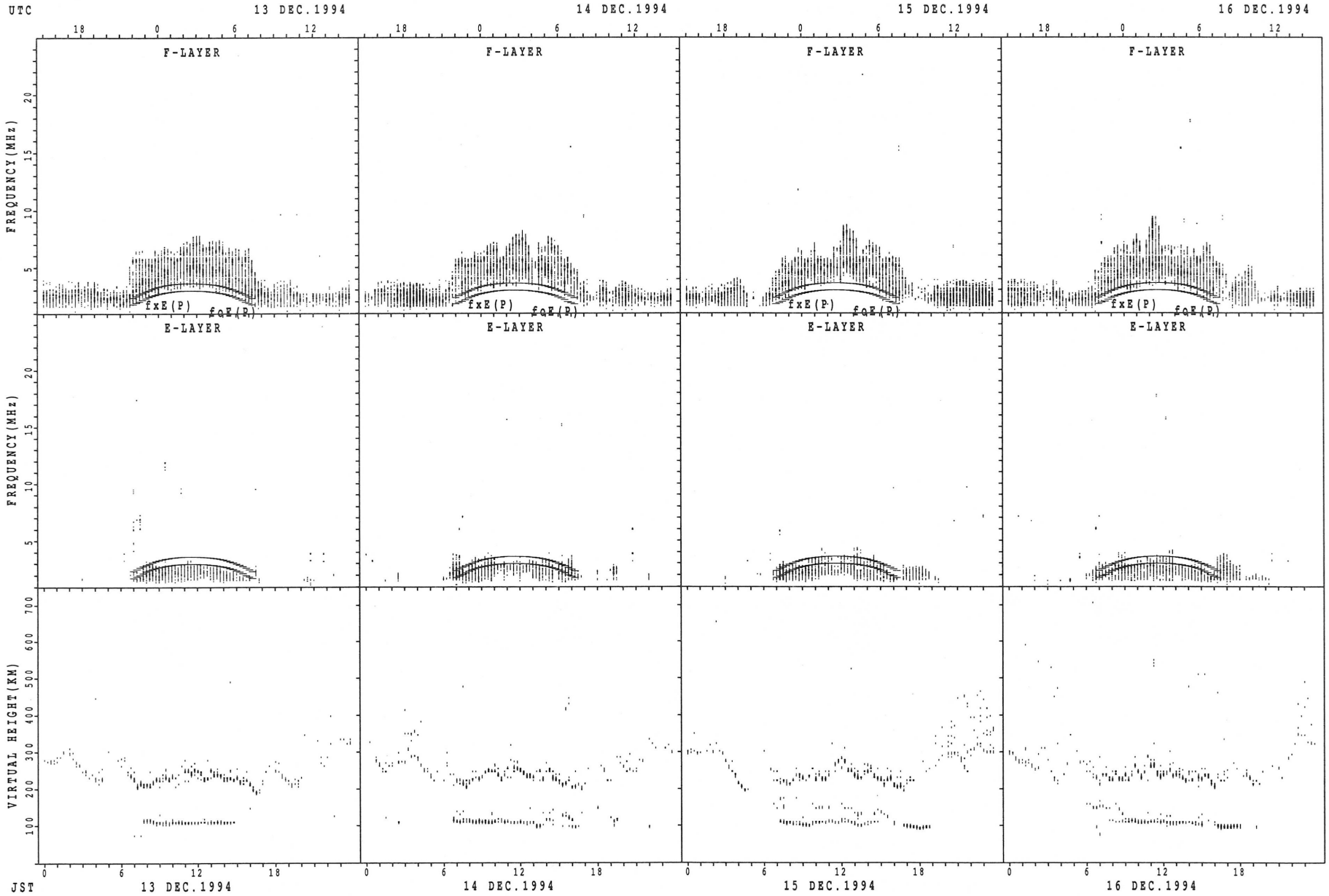

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 DEC.1994
6 DEC.1994
7 DEC.1994
8 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



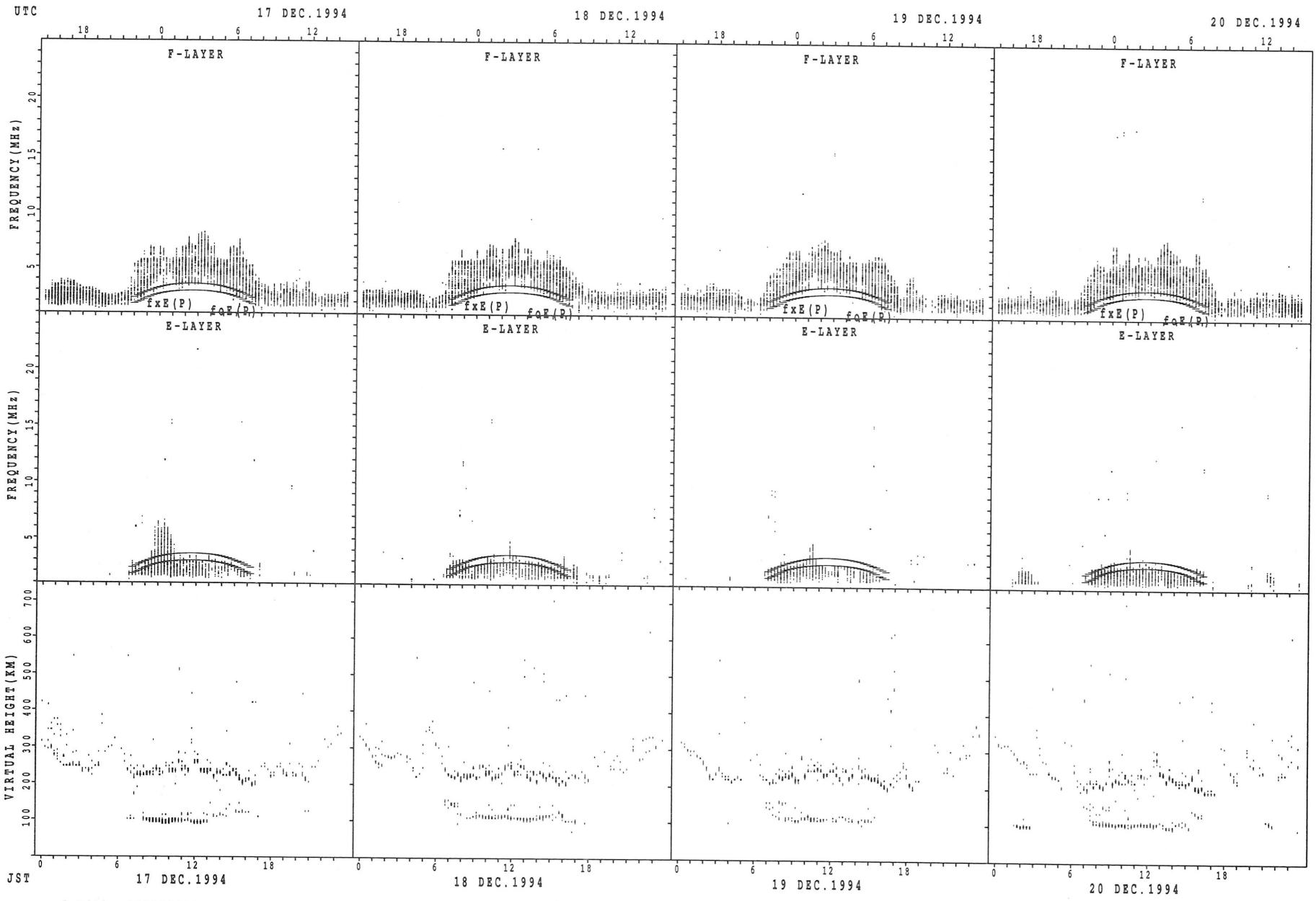
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

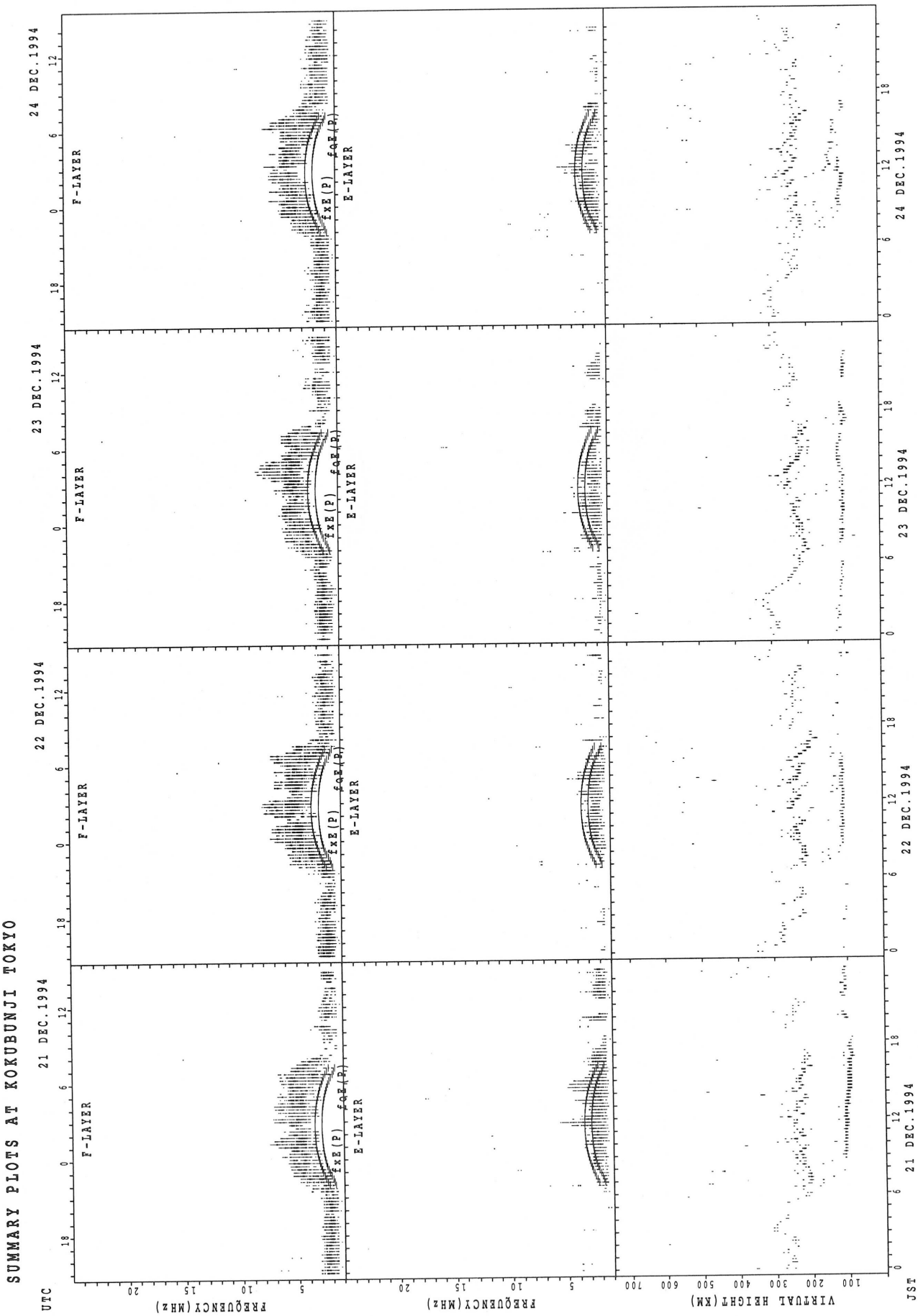


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

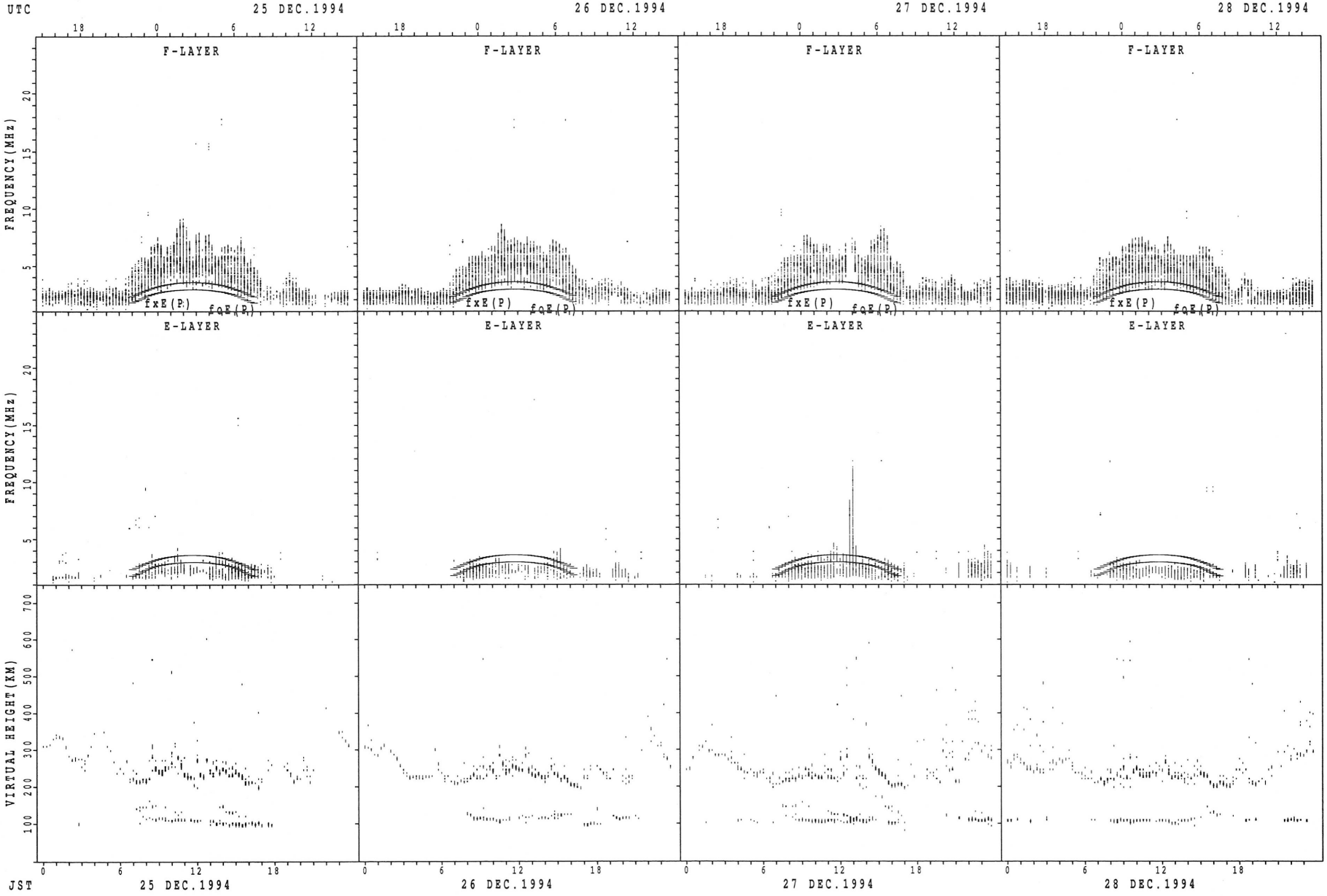
SUMMARY PLOTS AT KOKUBUNJI TOKYO



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

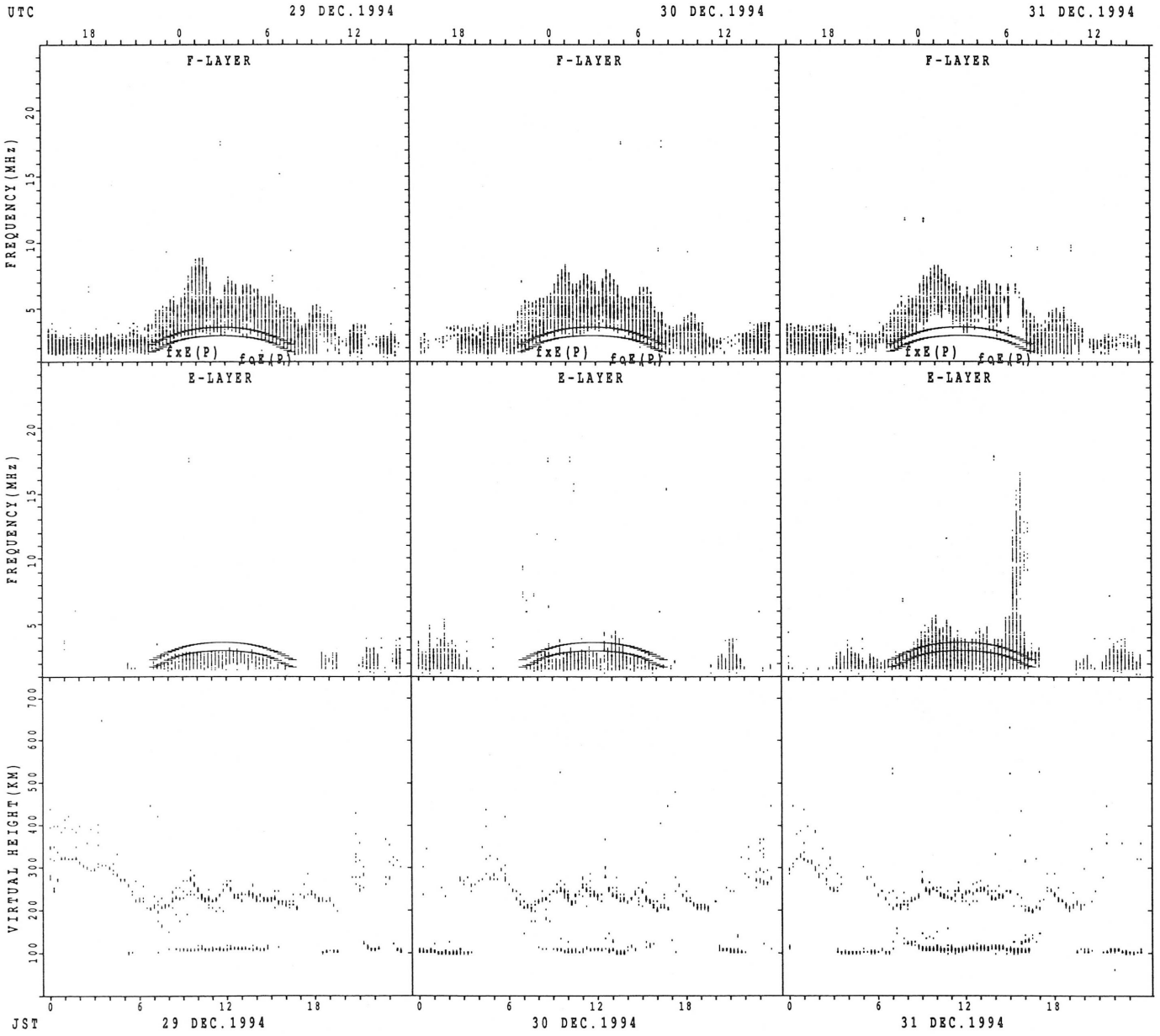

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 DEC.1994
22 DEC.1994
23 DEC.1994
24 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



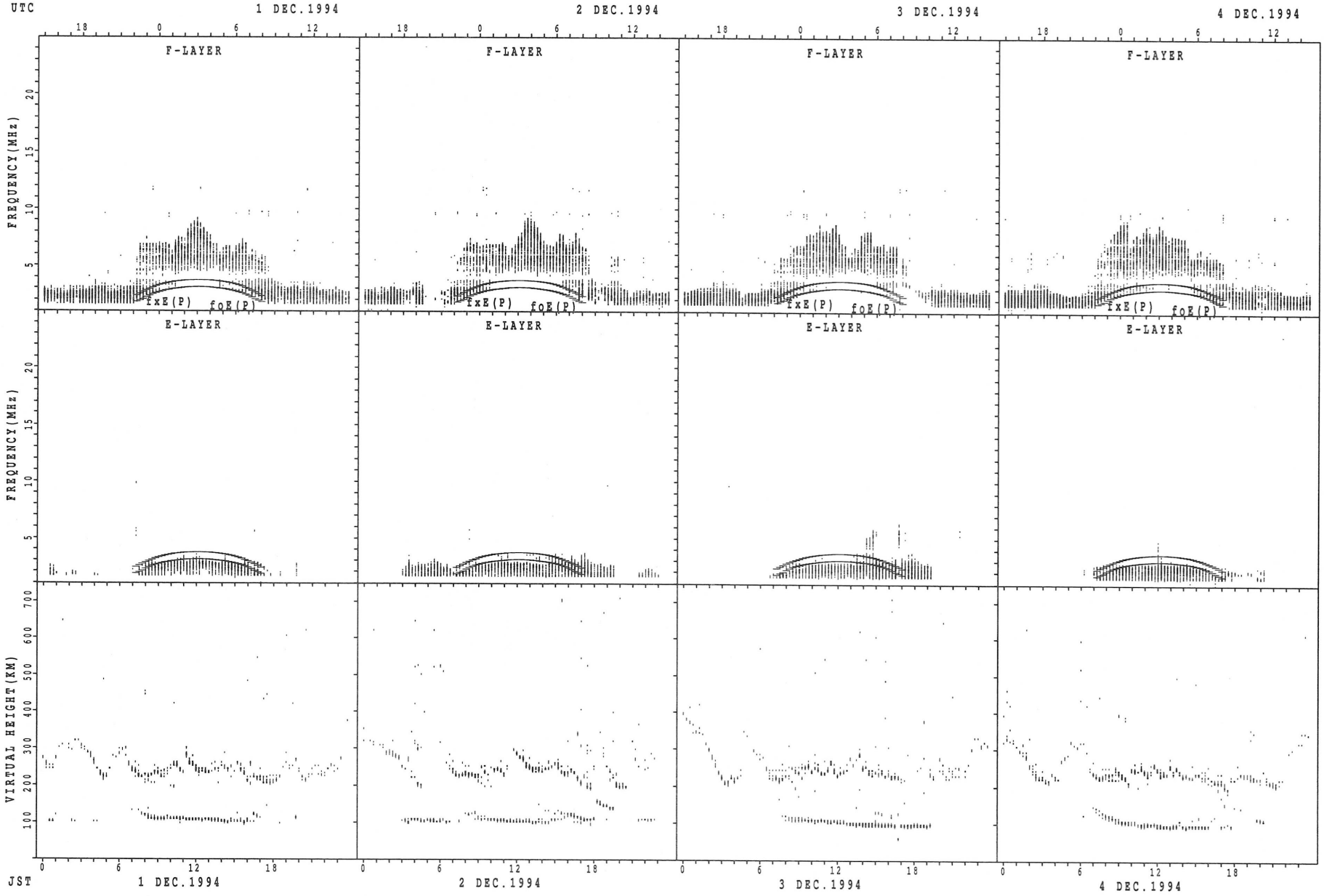
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



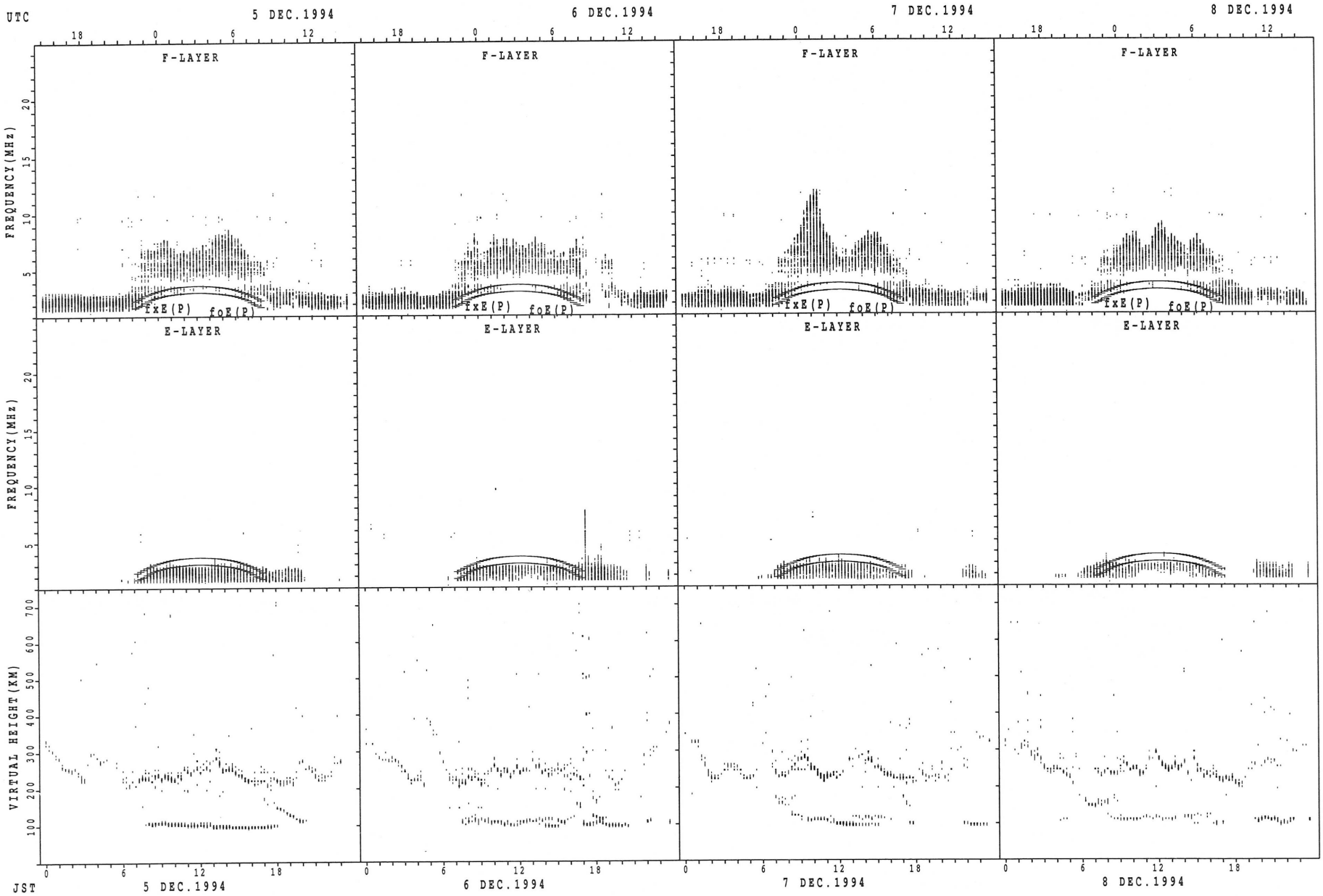
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA



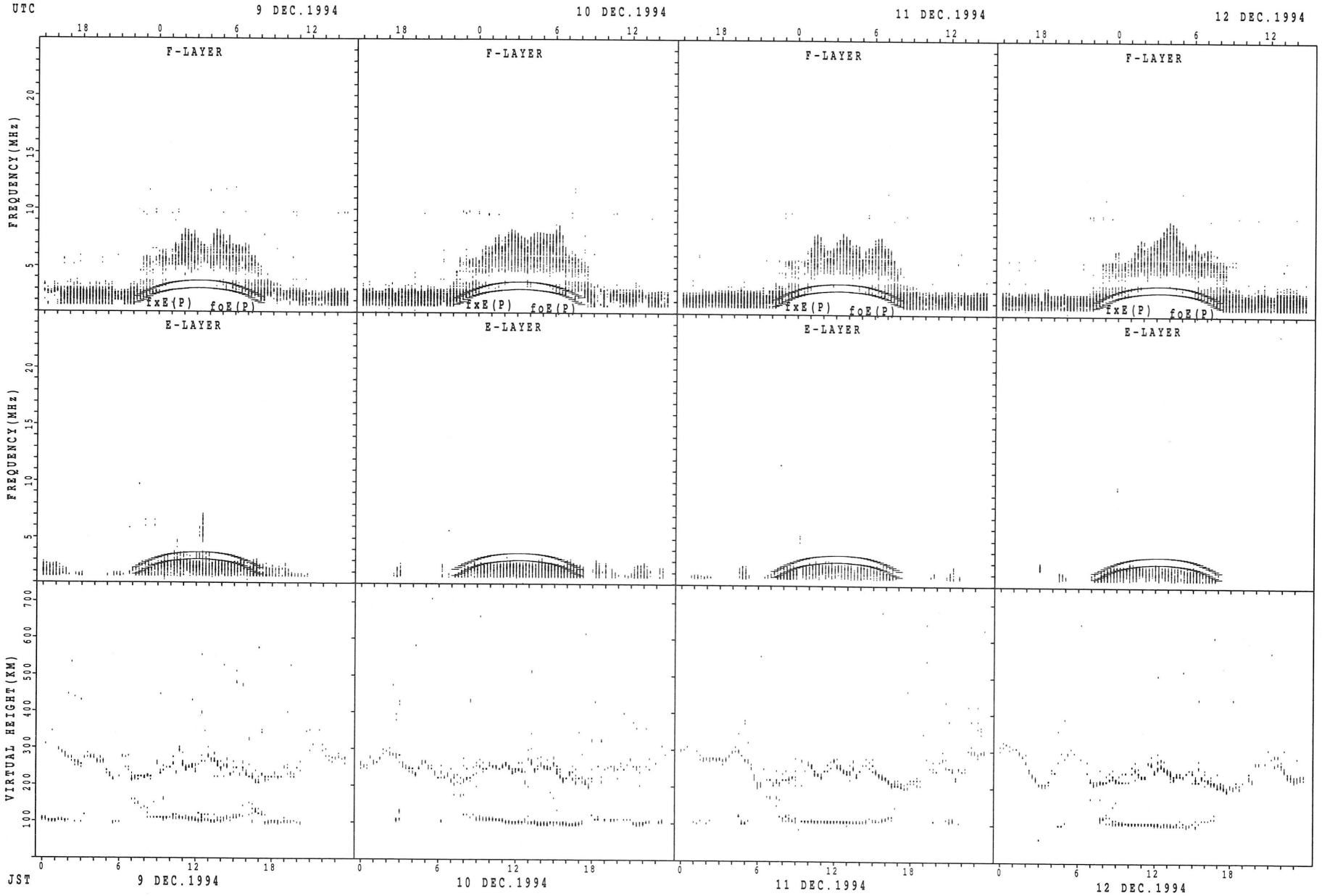
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT YAMAGAWA

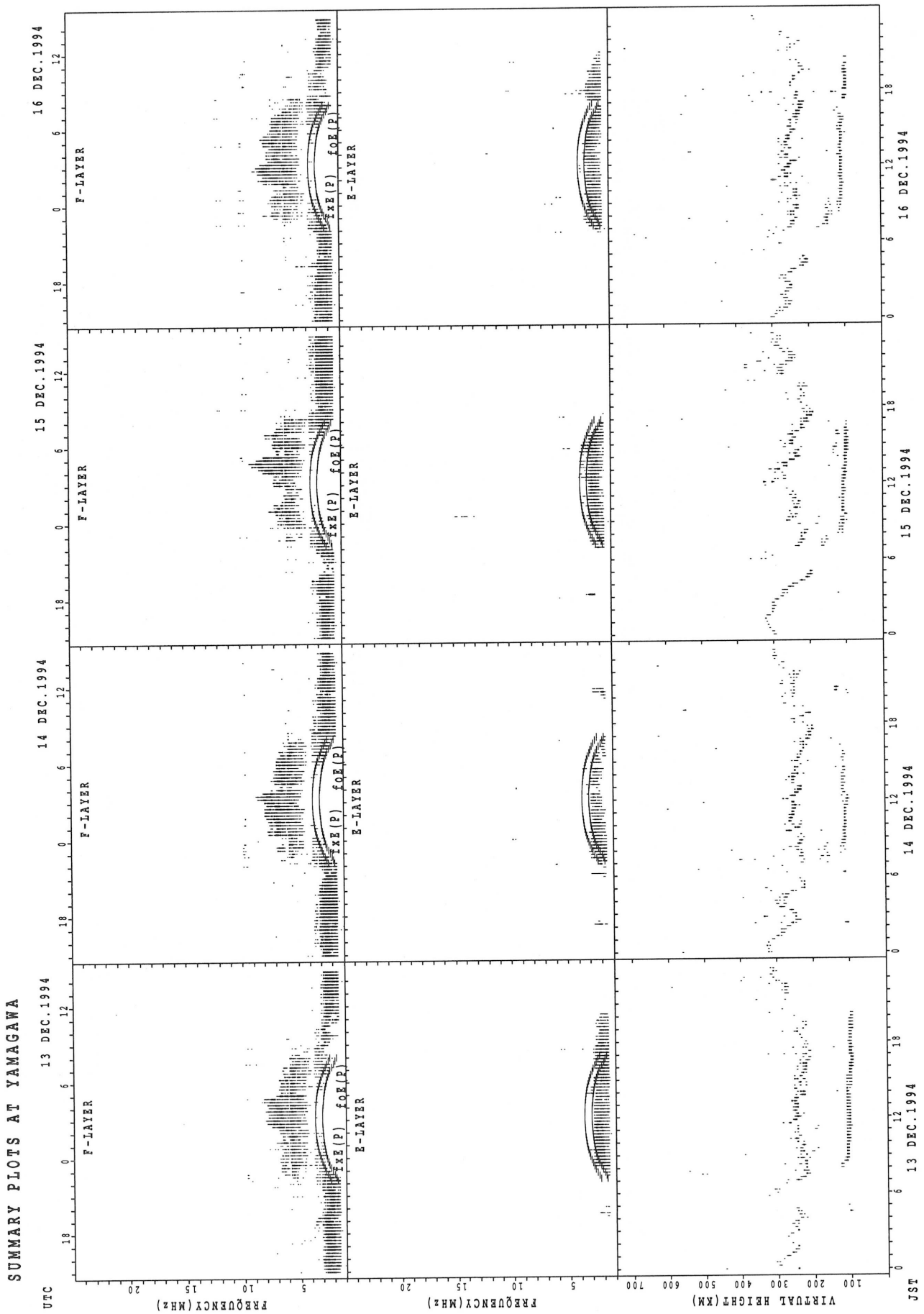


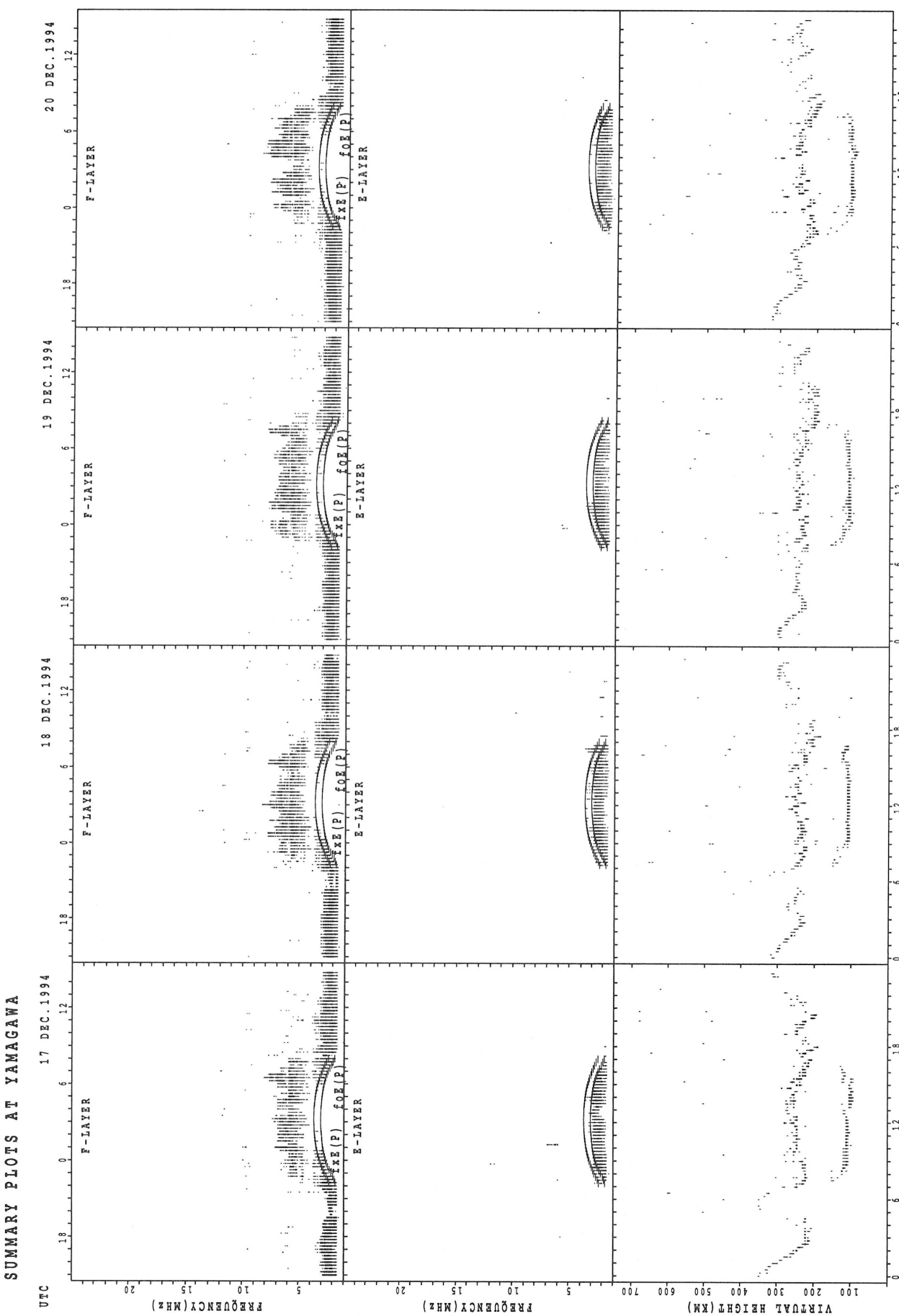
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

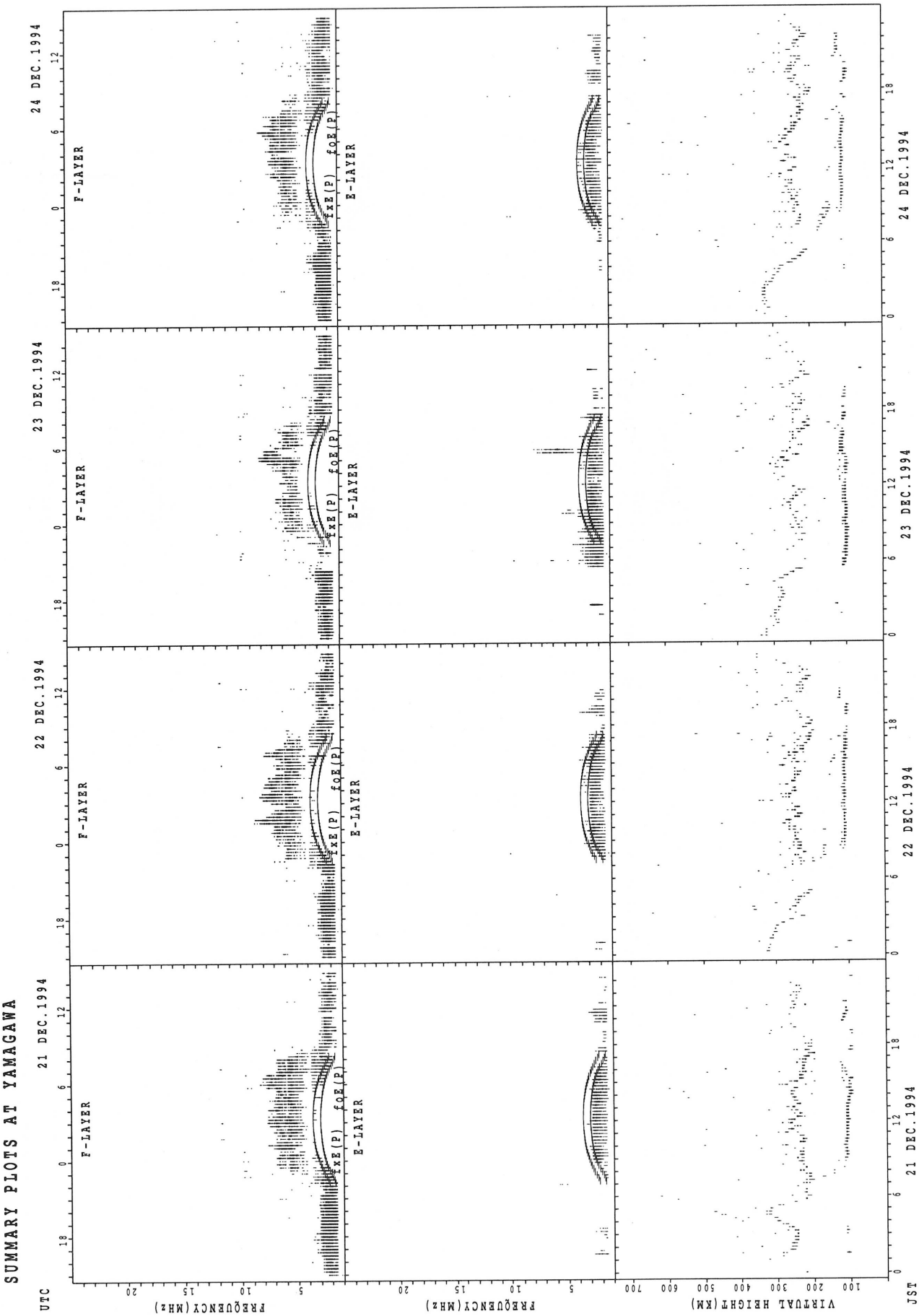
SUMMARY PLOTS AT YAMAGAWA



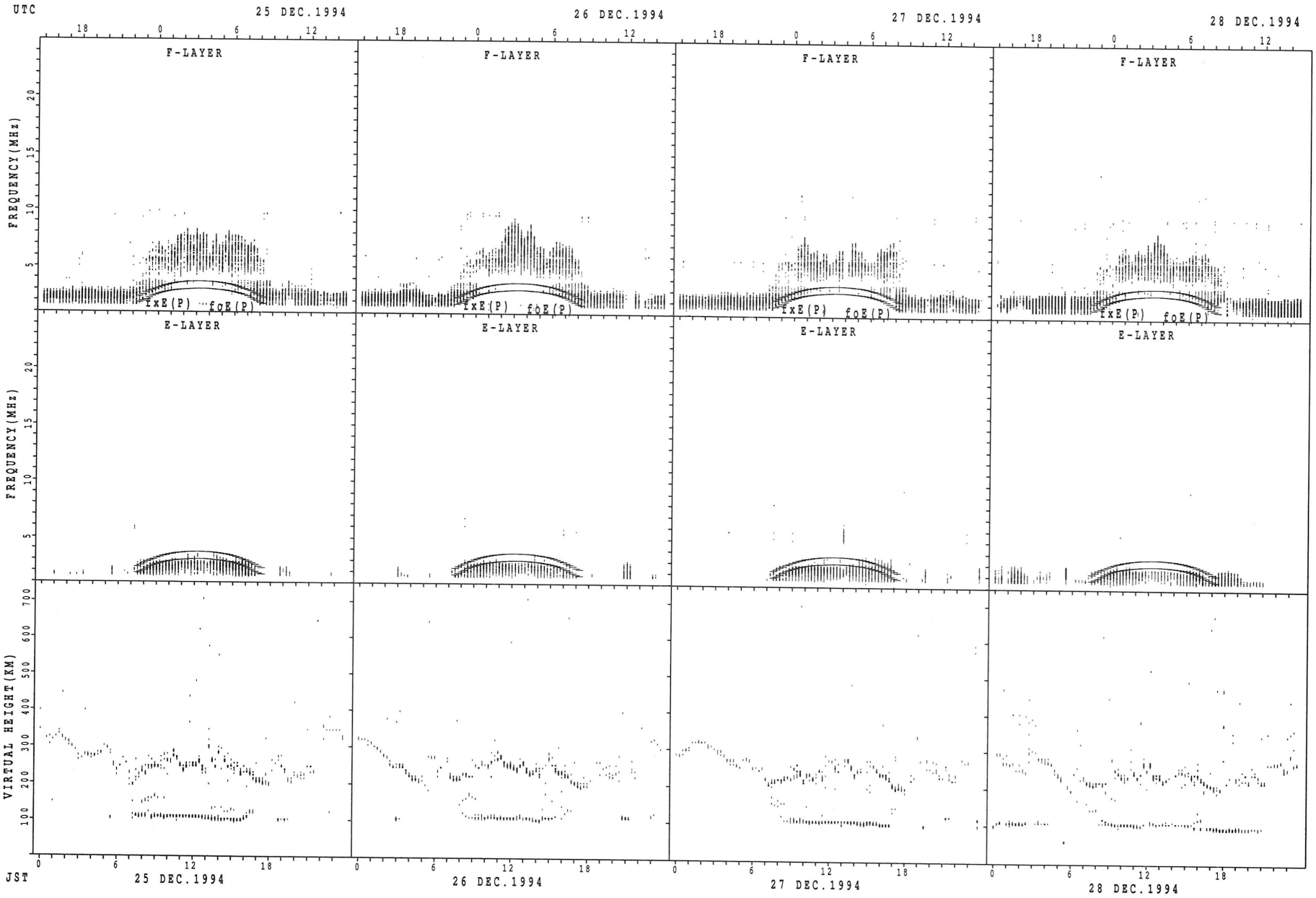
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
13 DEC.1994
14 DEC.1994
15 DEC.1994
16 DEC.1994
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

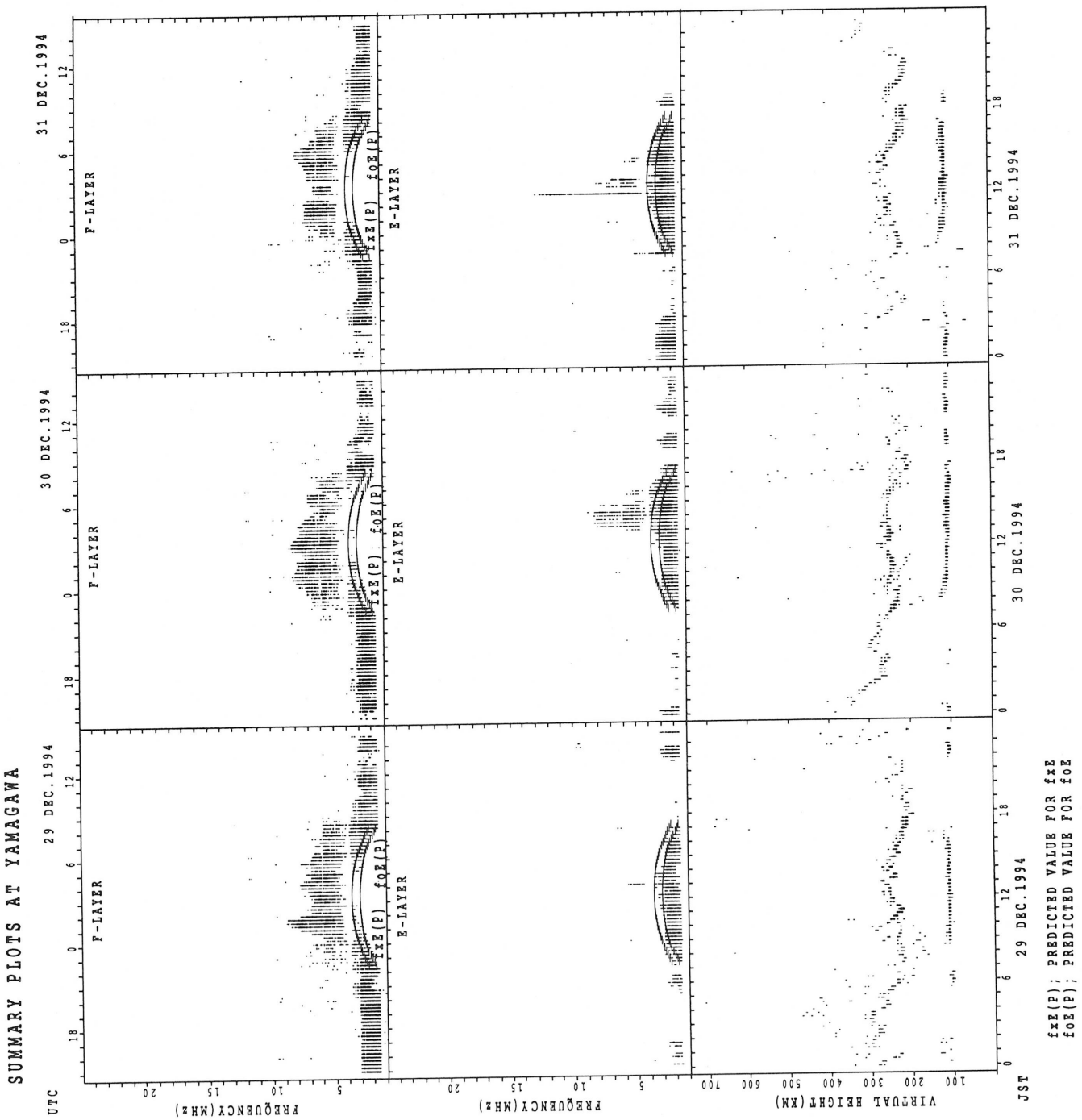

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
17 DEC.1994
18 DEC.1994
19 DEC.1994
20 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT YAMAGAWA
UTC
21 DEC.1994
22 DEC.1994
23 DEC.1994
24 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

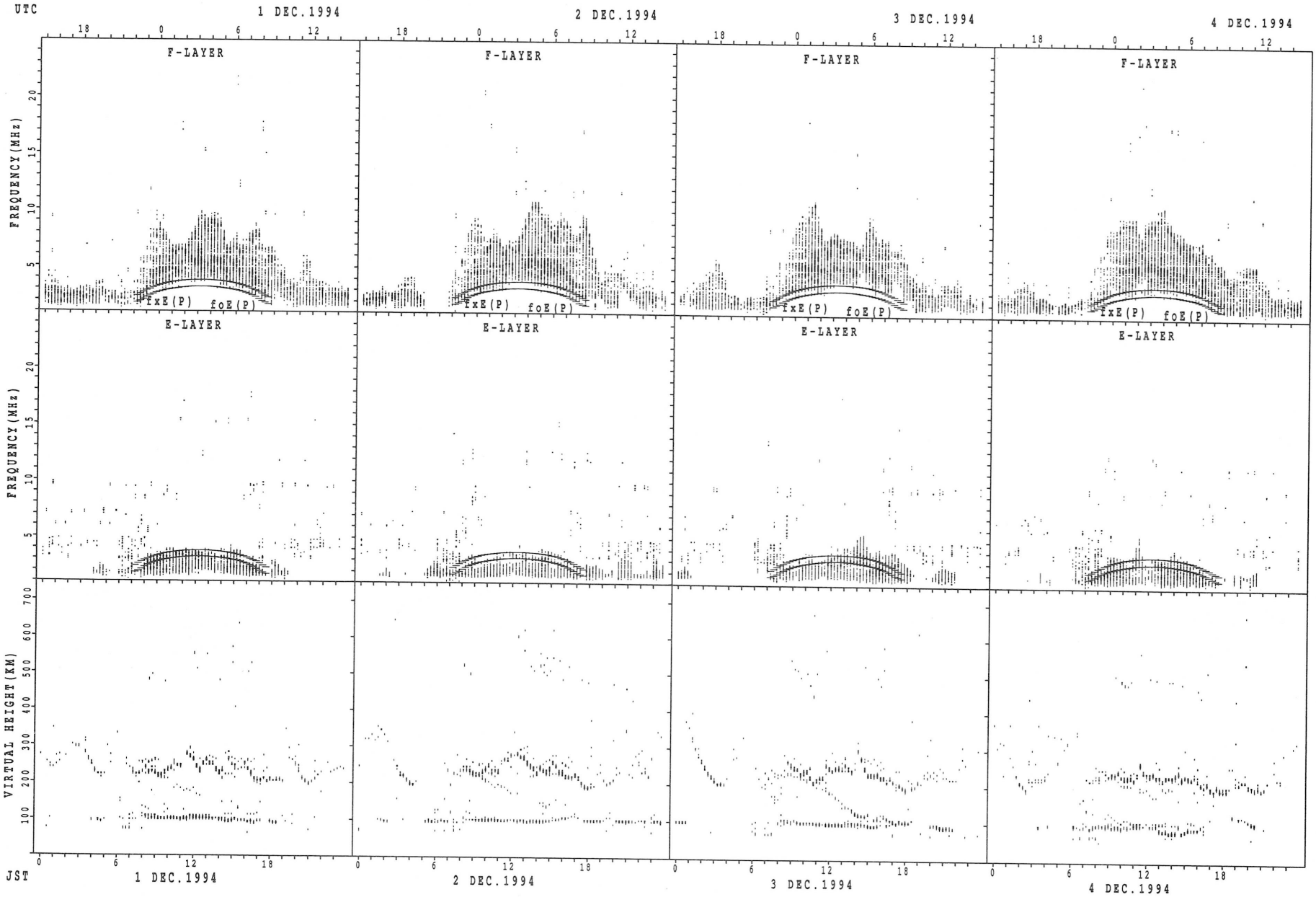
SUMMARY PLOTS AT YAMAGAWA



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

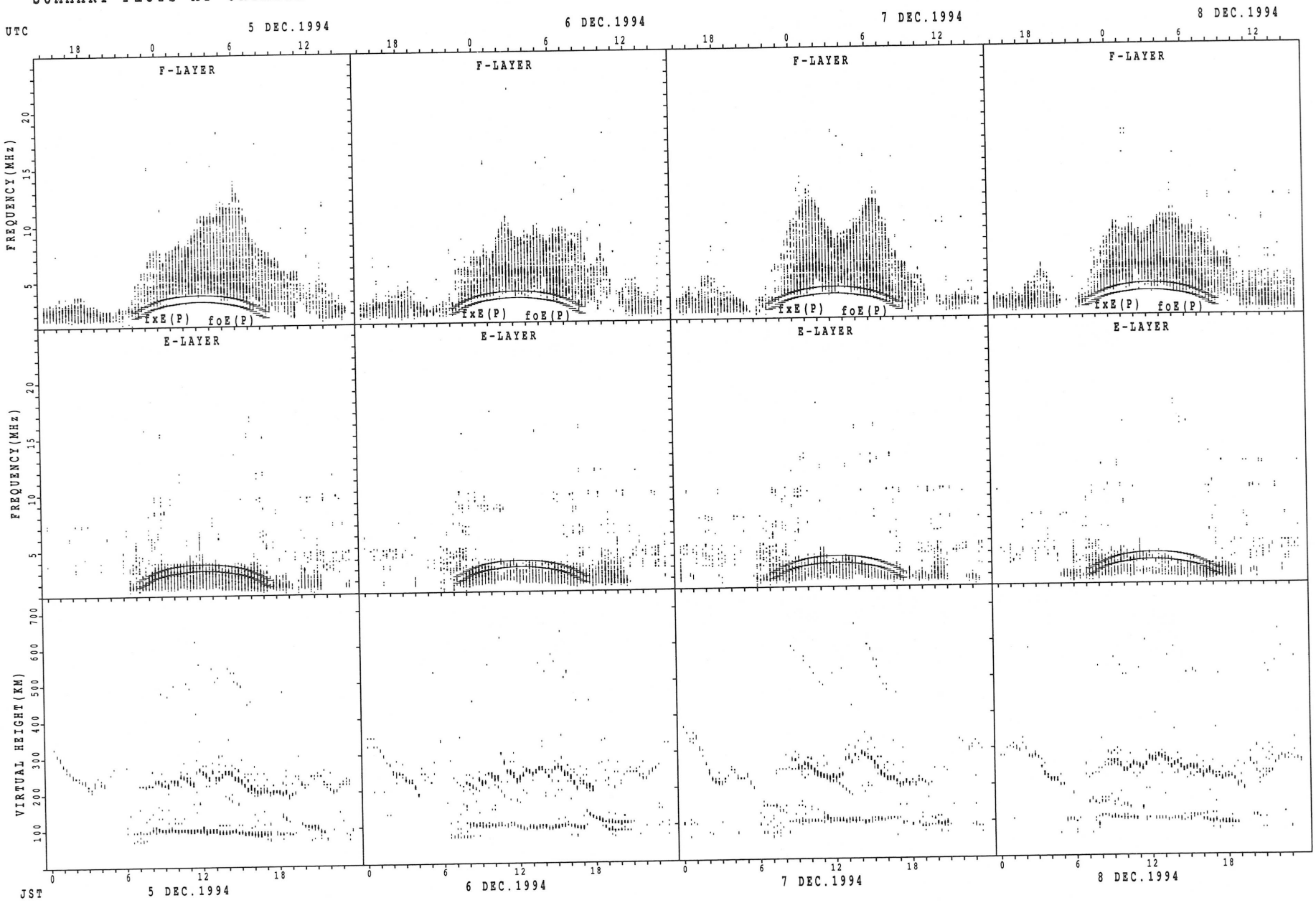

SUMMARY PLOTS AT YAMAGAWA
UTC
29 DEC.1994
30 DEC.1994
31 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



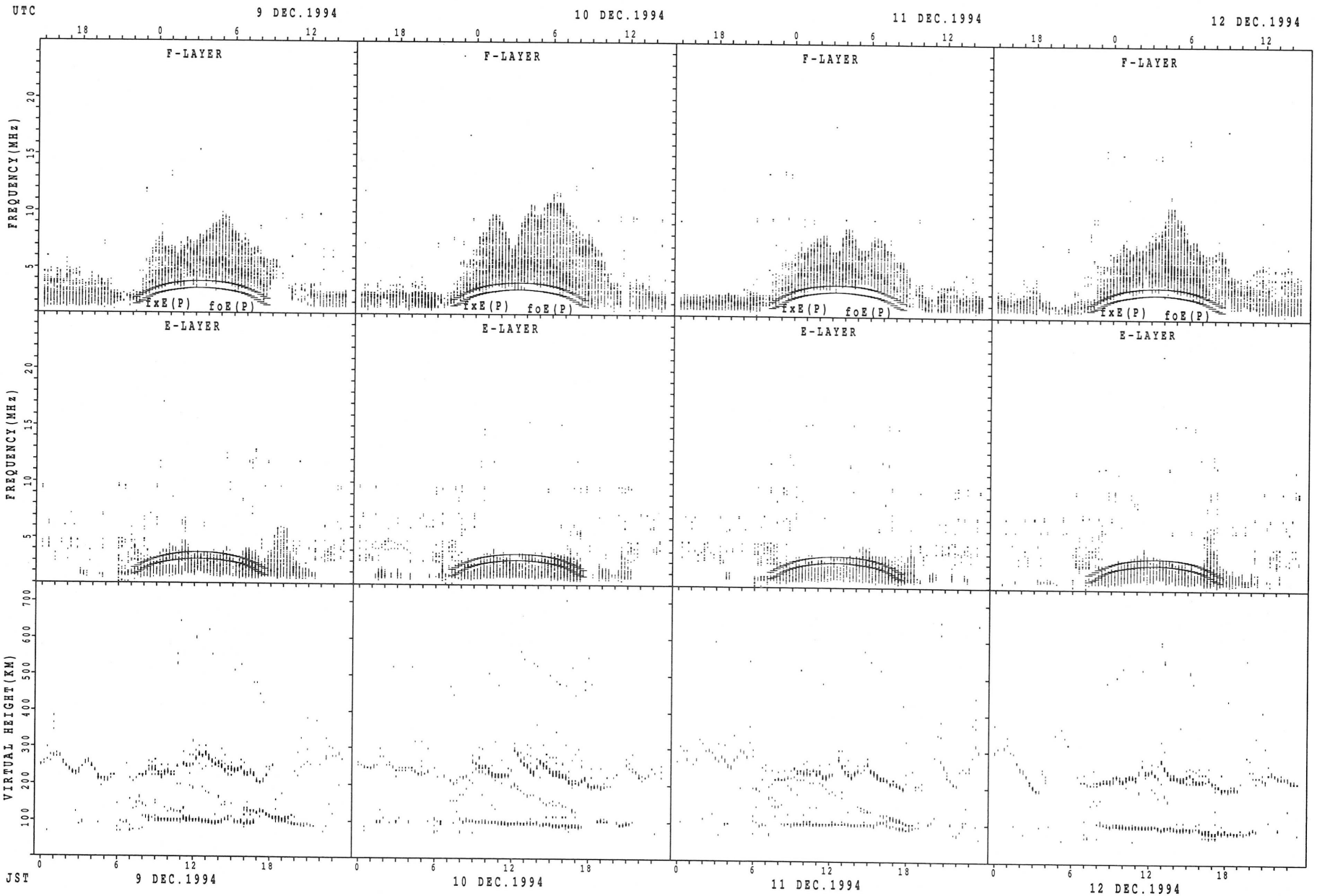
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA

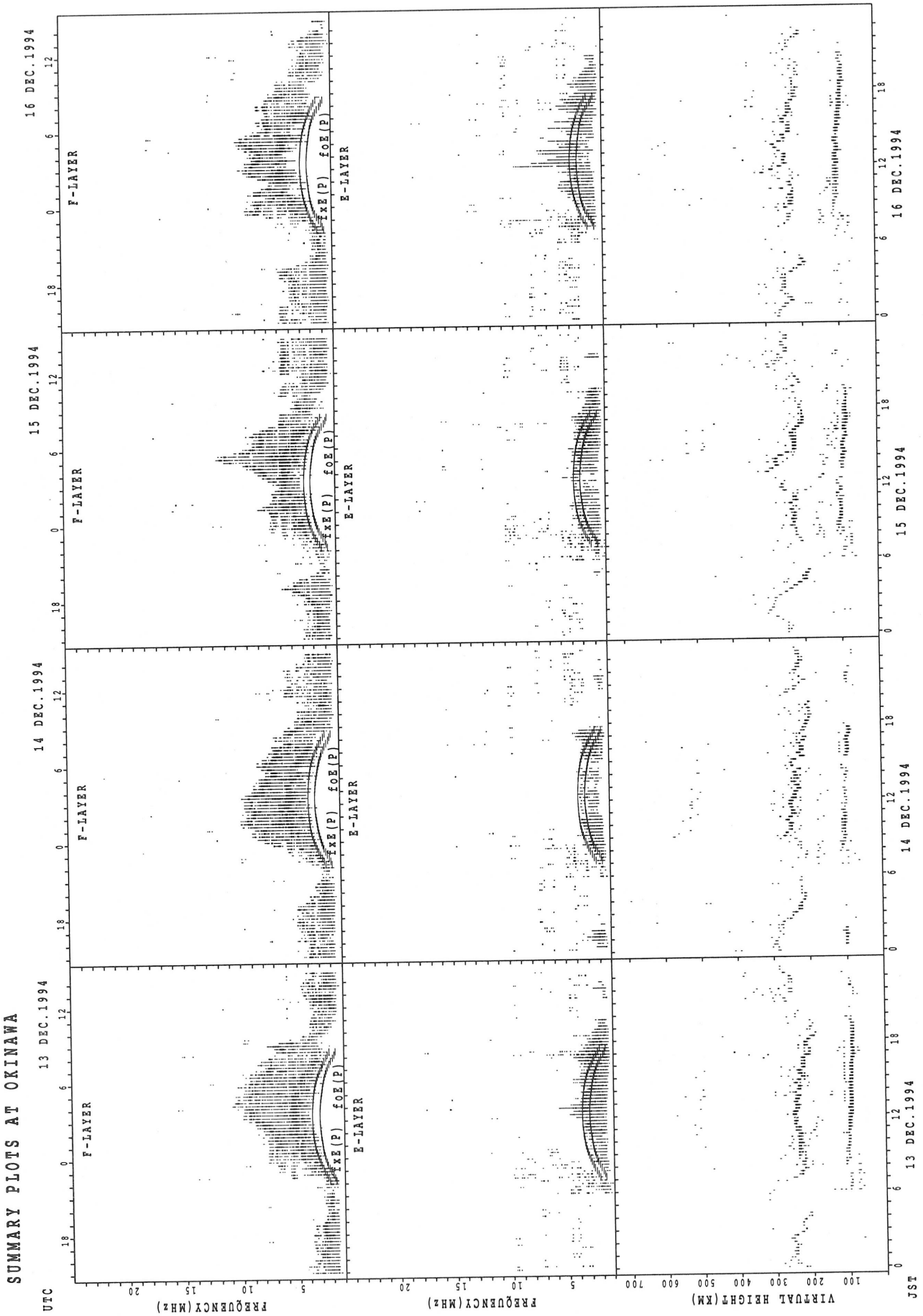


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

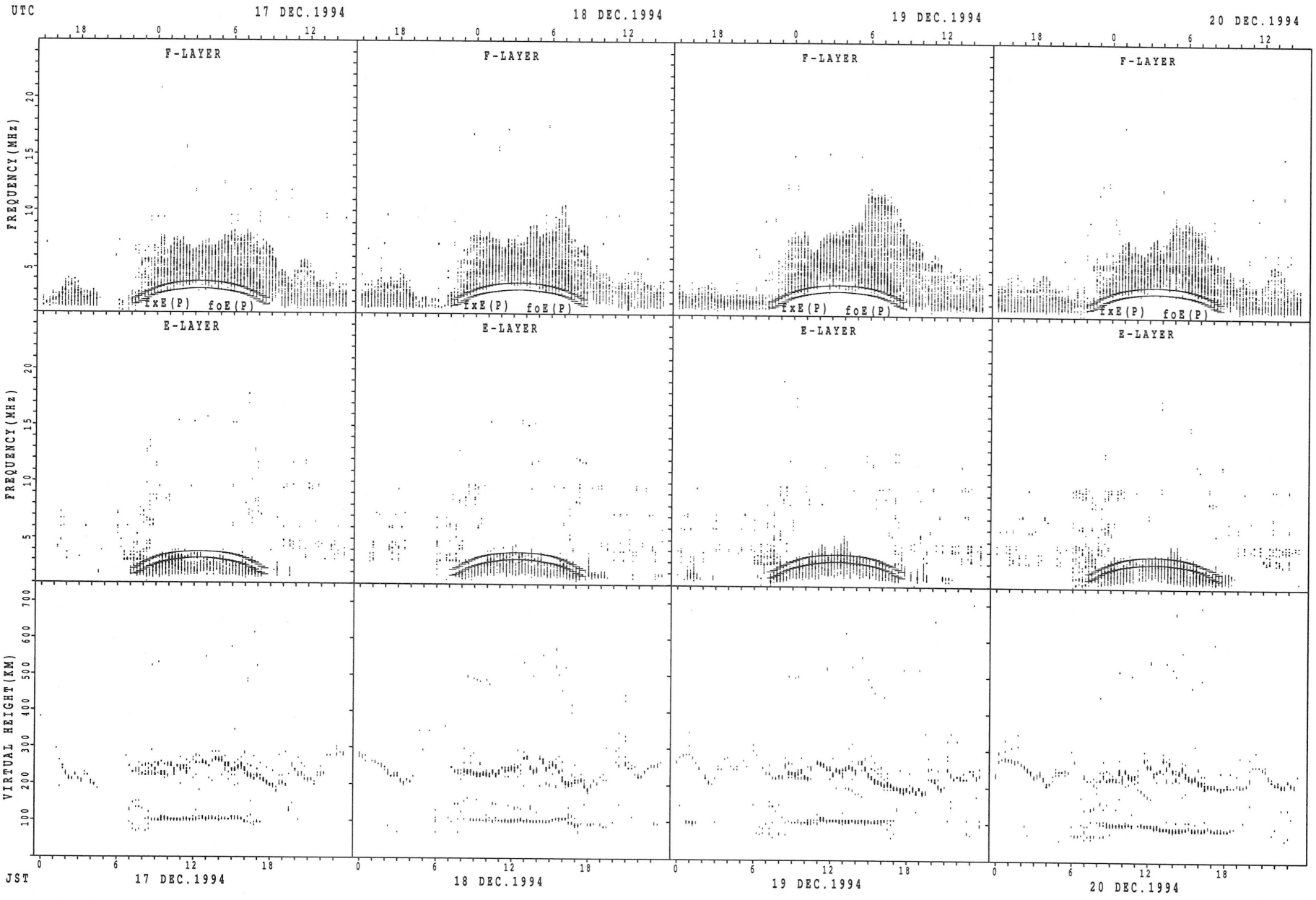
SUMMARY PLOTS AT OKINAWA



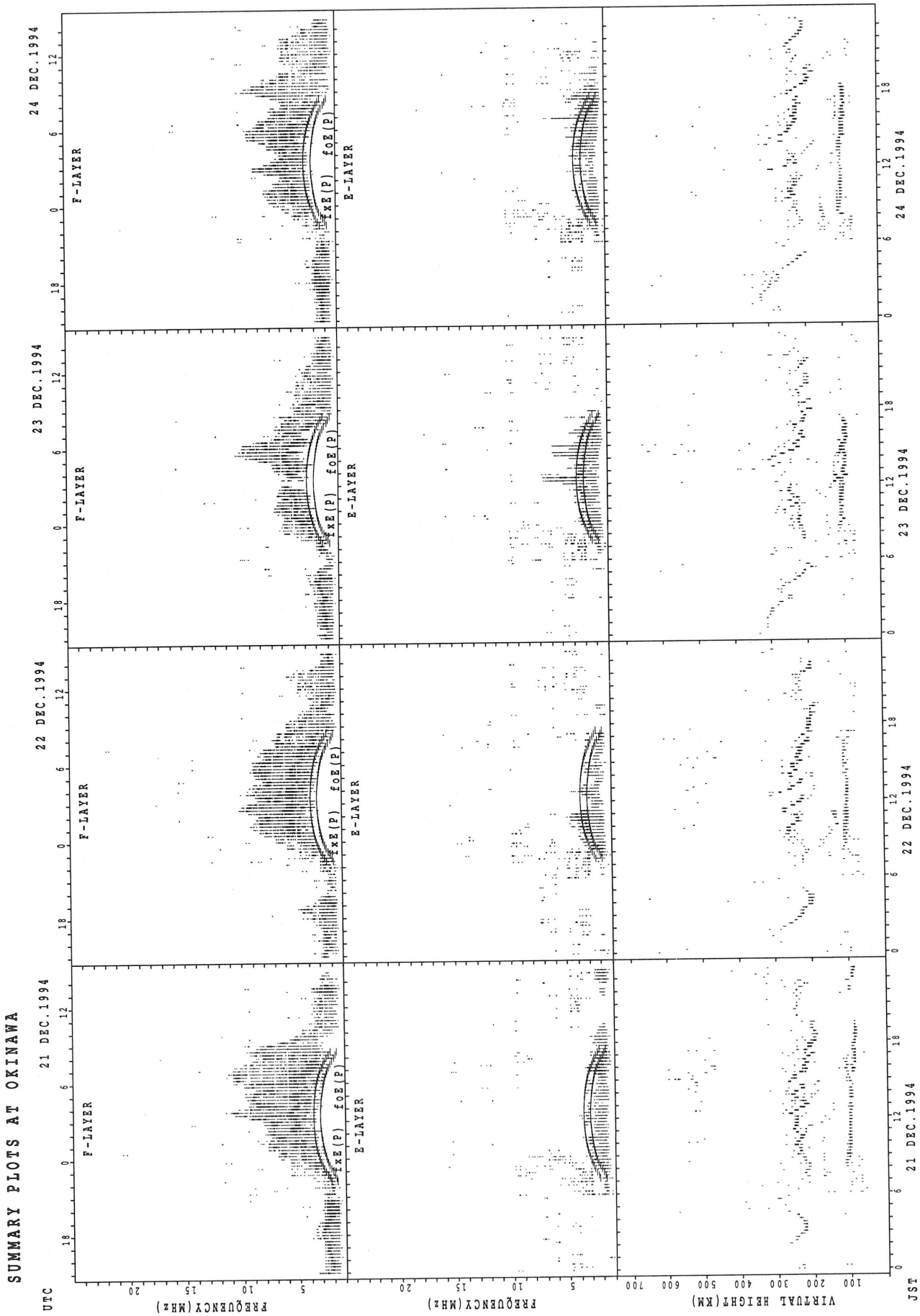
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
13 DEC.1994
14 DEC.1994
15 DEC.1994
16 DEC.1994
UTC
JST
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

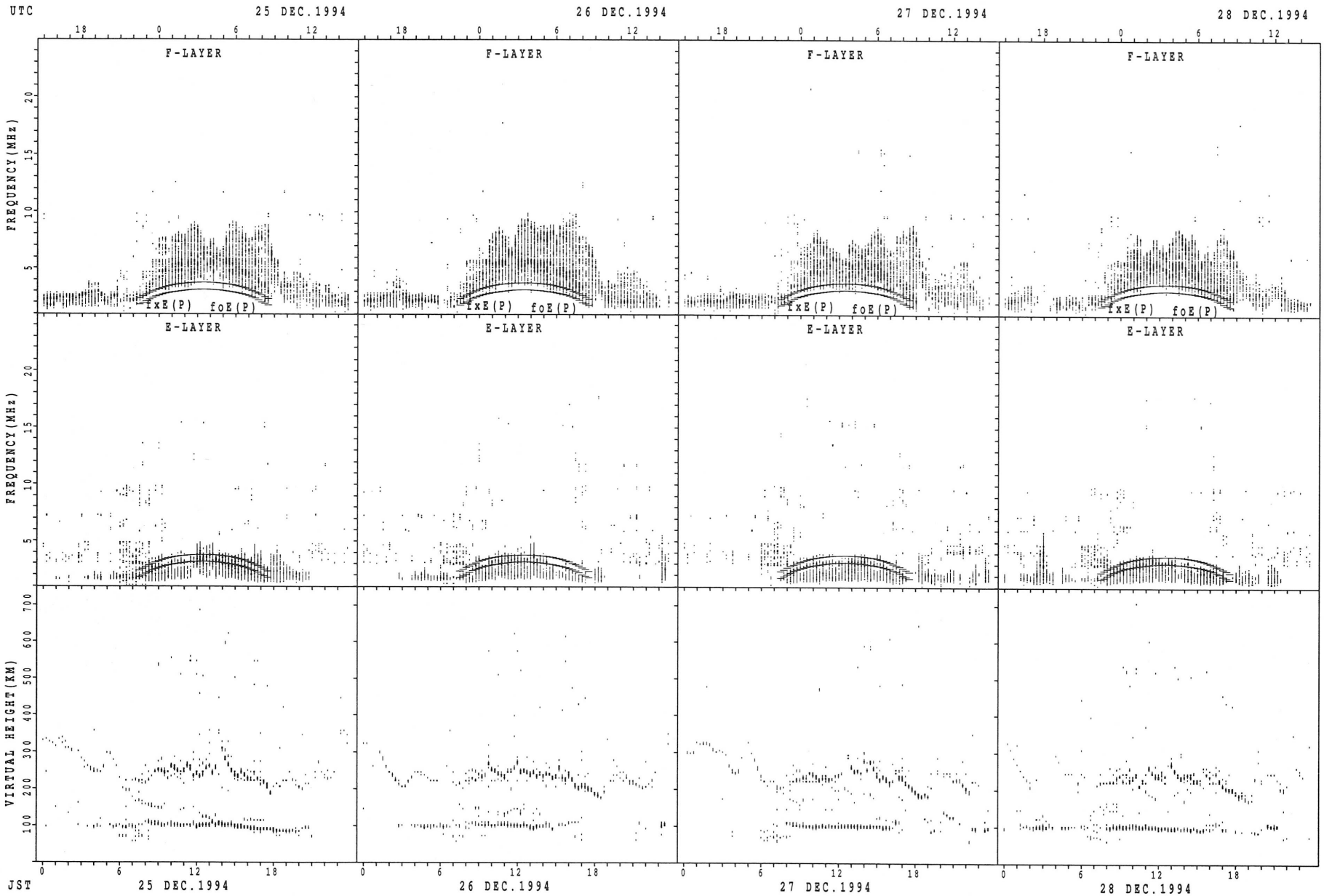
SUMMARY PLOTS AT OKINAWA



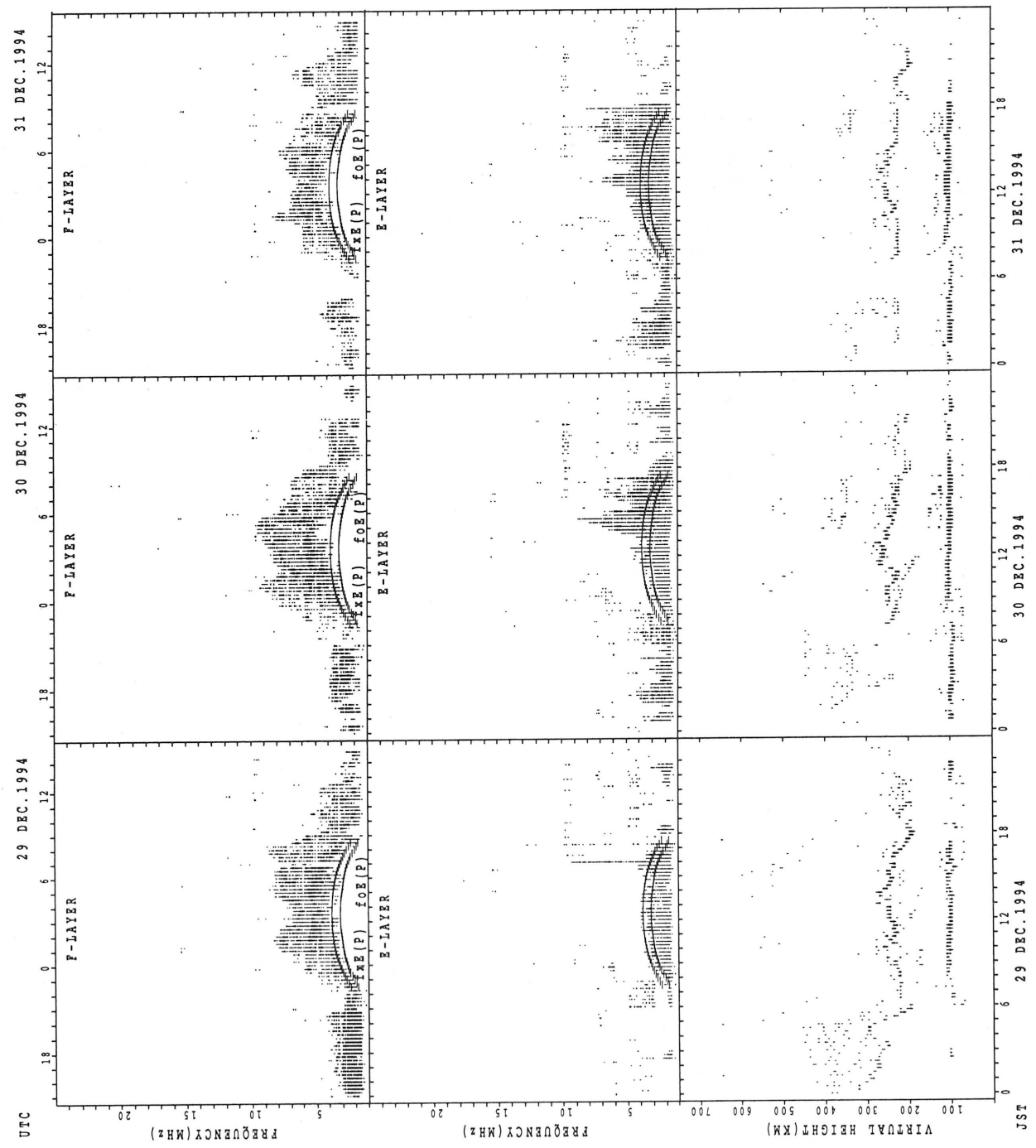
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
JST
21 DEC.1994
22 DEC.1994
23 DEC.1994
24 DEC.1994
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT OKINAWA



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT OKINAWA
UTC
29 DEC.1994
30 DEC.1994
31 DEC.1994
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

DEC.1994 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											17	23	21	19	17									
MED											248	238	234	248	242									
U Q											256	248	242	258	255									
L Q											237	228	230	242	232									

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	10	12	10	11	13	15	18	24	20	16					13	19	17	15	16	20	20	22	16
MED	103	103	104	107	113	111	107	105	117	125	109					119	107	109	101	105	104	102	105	102
U Q	106	111	112	109	115	116	111	111	137	160	129					122	119	117	107	108	110	105	113	105
L Q	98	99	98	103	109	104	105	105	104	106	96					112	101	101	97	103	99	97	101	100

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										14	21	23	23	19	15	11								
MED										248	248	240	252	254	248	248								
U Q										250	258	262	270	266	264	258								
L Q										242	240	232	246	240	240	240								

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								18	13								12	19	11					
MED								152	131								124	101	103					
U Q								161	167								135	113	131					
L Q								113	111								102	97	97					

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									10	19	26	24			27	27	19							
MED									249	258	258	250			254	256	242							
U Q									260	264	270	257			268	264	262							
L Q									248	240	244	238			246	248	236							

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									26								10	16	12	14				
MED									150								106	111	108	105				
U Q									163								109	139	117	113				
L Q									121								99	100	100	99				

MONTHLY MEDIANS OF h'F AND h'Es

DEC.1994 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

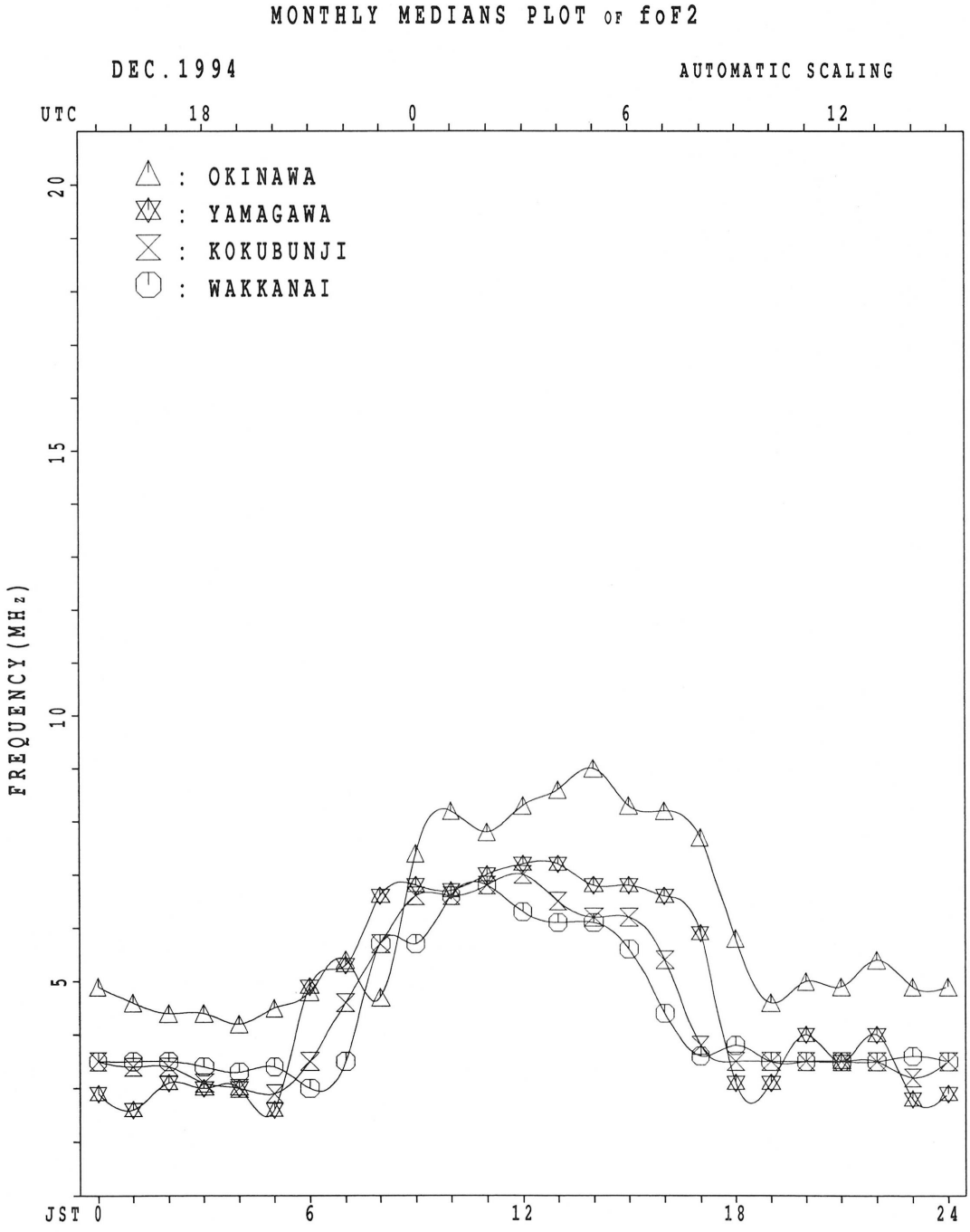
STATION OKINAWA LAT. 26.3N LON. 127.8E

h'F

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										21	29	10			29	30	26	21						
MED										240	246	248			252	238	230	234						
U Q										256	252	260			257	252	238	260						
L Q										230	235	232			238	234	222	225						

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	25	15	12	11	15	17	15	17	17	18	25	16	10			
MED								97	137	137	115	113	113	109	107	107	101	93	95	93	106			
U Q								151	154	153	132	131	147	170	129	136	113	107	103	107	113			
L Q								95	120	107	105	105	105	97	105	99	95	89	91	89	95			


MONTHLY MEDIANS PLOT OF foF2
DEC.1994
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

DEC.1994 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 40	X 34	X 37	X 35	X 38	X 36	X 44											X 54	X 45	X 39	X 40	A	X 33	34
2	X 34	X 34	X 35	X 34	X 43	X 28	X 29											X 46	X 38	X 56	37	X 29	X 28	X 31
3	X 31	35	X 34	43	X 29	X 32	A											X 51	X 37	X 39	X 41	X 31	X 31	38
4	34	37	X 37	X 34	X 31	X 29	X 33											X 42	X 39	X 39	X 40	X 34	X 31	X 32
5	X 34	X 36	41	X 30	X 38	34	X 37											X 44	X 38	X 37	X 35	X 33	37	X 29
6	X 33	X 34	X 36	39	39	36	X 40											X 48	X 50	X 55	O X 34	X 31	X 35	X 34
7	X 41	X 38	X 37	X 37	X 37	39	X 35											X 44	X 35	X 35	X 40	X 34	X 34	X 33
8	X 36	X 36	X 38	X 32	33	X 28	X 27											X 41	O X 36	X 34	X 39	X 31	X 31	X 34
9	X 34	X 36	X 37	X 36	X 35	X 34	X 33											X 45	X 37	X 45	X 36	X 31	X 34	X 35
10	X 41	X 40	X 40	X 44	X 44	X 39	X 40											X 43	X 33	X 33	X 35	X 37	X 32	X 33
11	X O 34	X 34	X 42	41	40	X 36	X 32											X 32	X 31	X 34	X 39	X 31	X 34	X 33
12	X 34	X 34	X 38	X 39	35	X 32	X 33											X 37	X 41	X 37	X 32	X 37	39	X 37
13	X 37	X 37	X 36	X 37	X 39	X 34	X 34											X 36	X 39	X 44	X 31	X 30	X 30	X 34
14	X 35	X 40	X 38	X 38	40	X 34	X 33											X 39	X 33	X 34	X 39	X 36	X 31	X 34
15	X 34	X 35	X 38	X 36	X O 43	X 29	X 25											X 46	X 30	X 34	39	43	40	40
16	40	X 39	X 39	X 35	X 34	X 31	X 31											X 45	X 46	X 52	X 31	X 34	X 31	38
17	X 36	40	41	X 36	X 32	28	X 27											O X 39	X 39	46	X 37	X 33	X 27	X 29
18	36	X 34	X 33	X 31	X 34	X 26	X 28											X 44	X 31	X 34	X 35	X 33	X 35	42
19	X 36	X 36	X 37	37	X 38	X 25	X 25	36										X 42	X 49	X 32	X 31	X 34	X 30	X 27
20	X 32	X 34	X 36	X 32	X 37	X 36	X 30											X 39	X 34	X 35	X 38	X 39	X 38	37
21	X 35	X 33	X 36	X 31	X 32	X 30	X 32											X 40	X 27	X 33	X 34	X 33	X 28	X 29
22	33	X 33	X 33	X 35	X 33	35	R											X 38	X 33	X 34	X 34	X 31	X 36	X 29
23	X 31	X 33	36	X 31	X 34	X 36	X 33											X 32	X 36	X 34	X 41	X 34	X 31	X 35
24	39	X 37	X 37	X 34	X 34	X 33	X 34											X 46	X 38	X 38	X 47	X 35	X 35	X 32
25	X 34	X 34	X 37	X 35	33	X 33	X 33											X 39	O X 29	X 42	X 34	X 25	X 26	X 28
26	X 32	X 33	X 33	X 36	X 36	X 30	X 32											X 40	X 38	X 38	X 38	O X 28	X 27	X 34
27	X 34	X 34	X 36	X 38	X 38	X 37	X 35											X 47	34	39	36	46	35	39
28	41	40	40	X 34	X 34	37	X 36											X 45	X 37	X 43	X 32	34	33	40
29	40	37	39	38	35	40	X 34											X 44	X 53	X 47	X 29	39	O X 30	37
30	X 35	36	38	X 38	X 37	X 38	X 39											X 38	X 45	X 43	X 29	A	38	41
31	40	40	41	40	X 34	X 34	X 34											X 43	X 51	X 48	X 38	X 28	34	35
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	29	1										31	31	31	31	29	31	31
MED	35	36	37	36	35	34	33	36										43	37	38	36	33	33	34
U Q	39	37	39	38	38	36	35											45	41	44	39	36	35	37
L Q	34	34	36	34	34	30	30											39	33	34	34	31	30	32

DEC.1994 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	34	28	31	S 29	J S 32	30	38	J R 66	57	65	67	78	85	59	71	62	47	48	39	33	33	A	27	F 27
2	28	28	29	28	J R 37	22	S 23	J S 50	J R 65	64	61	63	68	68	62	62	67	40	32	50	26	S 23	22	25
3	U S 25	25	28	S 36	23	26	A	J R 51	58	69	J R 70	92	63	57	65	62	56	45	31	33	35	25	25	F 28
4	F 26	F 28	31	28	25	23	S 28	56	J R 75	78	69	82	70	60	J R 64	59	51	36	33	33	34	28	25	26
5	28	30	F 31	24	32	25	31	J S 60	80	64	65	65	69	64	65	61	49	38	32	31	S 29	U S 27	F 28	U S 23
6	27	S 28	29	F 31	29	F 28	S 34	S 49	56	70	73	68	60	65	65	56	62	42	44	49	28	25	29	S 28
7	35	32	31	31	31	F U S 28	28	53	S 59	57	94	108	68	55	69	66	46	38	29	29	34	28	28	27
8	J S 30	S 30	S 32	26	24	22	21	52	H 56	66	63	69	90	64	65	61	51	35	30	28	33	25	25	28
9	28	30	31	30	29	28	27	48	57	56	75	70	55	69	60	58	53	39	31	39	30	25	28	29
10	35	34	34	38	38	33	34	54	56	57	61	81	65	67	64	64	51	37	27	27	29	31	25	27
11	28	S 28	36	F 33	F 31	30	26	51	S 61	65	59	66	79	73	54	73	51	26	25	29	33	26	28	27
12	28	28	32	33	F 26	26	J S 27	47	55	60	68	78	82	H 73	66	68	60	31	35	31	26	31	F 30	31
13	31	31	30	31	33	28	S 28	S 59	57	58	60	68	74	70	66	63	62	30	33	38	25	24	25	28
14	29	34	32	32	32	28	28	54	54	60	66	66	75	62	67	65	50	33	J R 27	28	33	30	25	28
15	28	29	32	30	37	23	19	45	48	62	68	54	69	77	65	65	56	39	24	28	F 31	F 32	F 30	F 30
16	F 32	33	33	29	28	25	25	J S 43	57	66	76	81	68	66	64	61	56	40	40	46	25	28	26	28
17	30	F 31	F 33	30	26	F 18	21	J R 48	S 62	R 65	59	68	74	66	54	62	50	S 33	33	33	31	27	21	23
18	27	28	27	25	28	20	22	54	59	62	70	63	76	68	J R 58	59	49	38	25	28	29	27	29	F 30
19	30	30	31	27	J R 32	19	19	43	55	66	66	73	65	61	C	58	59	36	43	26	24	28	24	21
20	26	28	30	26	31	30	24	45	56	71	J R 61	61	58	74	65	54	H 55	33	28	29	32	33	32	F 27
21	29	27	30	25	26	24	26	J S 41	51	59	65	57	69	J R 68	68	61	56	34	J R 21	27	28	27	23	23
22	F 24	27	27	29	J S 27	23	R	J S 42	52	68	67	J R 69	75	J R 51	58	60	53	32	27	28	28	26	30	23
23	25	27	28	25	28	30	27	J S 44	52	51	56	51	J R 59	80	71	47	56	S 26	J R 30	28	35	28	25	29
24	F 31	31	S 31	28	28	27	28	J S 38	45	54	56	62	61	58	57	61	58	40	32	32	J S 41	29	28	26
25	28	28	S 31	29	25	27	27	46	57	71	66	89	74	72	62	60	49	33	23	J S 36	28	19	20	J R 22
26	26	27	27	30	30	24	26	J S 38	47	55	63	78	67	67	59	68	55	34	32	32	32	22	21	28
27	28	28	30	32	32	S 31	29	J S 42	53	56	65	67	62	72	56	72	54	41	F 24	F 33	F 27	37	F 25	F 28
28	F 32	F 32	F 28	28	28	F 31	29	45	54	68	71	67	60	61	57	J R 65	52	40	32	37	26	F 27	F 24	F 31
29	F 28	F 26	F 26	F 24	25	F 27	28	J S 40	48	57	85	68	69	62	61	57	47	38	47	41	23	F 32	24	F 26
30	29	F 29	F 31	32	31	32	33	48	52	58	81	70	66	71	53	64	46	32	39	37	23	A	28	F 34
31	F 33	F 32	F 30	F 34	28	28	28	J R 40	52	65	80	70	61	65	H 62	69	57	37	45	42	32	22	F 27	F 24
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	29	31	31	31	31	31	31	31	30	31	31	31	31	31	31	29	31	31
MED	28	28	31	29	29	27	27	48	56	64	66	68	68	66	64	62	53	37	32	32	29	27	25	27
U Q	31	31	32	32	32	30	28	53	58	66	71	78	74	71	65	65	56	40	35	37	33	30	28	28
L Q	27	28	29	27	26	23	24	43	52	57	61	65	62	61	58	59	50	33	27	28	26	25	24	25

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	U L 430	L	L									
2										L	U L 390		L	L		L								
3									L		L	U L 415	L		L									
4									L	U L 415	L 405	U L 405	L	U L 395	L									
5									L		U L 405	U L 405	U L 415	L	L									
6										L	U L 420	U L 405	L	U L 415	L									
7									L	L	L	L 440	L	U L 355	L									
8										L	L	L		L		L								
9									L		370	U L 420	L	L	L									
10										365		405	L	L	L									
11										L		L	U L 405		L									
12										L	L 420	L	L	L 405	L									
13										L	L	U L 420	U L 445	L	L	L								
14											L	L	L	L	L	L								
15										L	L	L	L	L		L								
16										L	U L 415	405	L	L	L	L								
17										L	L	L 440	430	L		L								
18										L	L	L	L	L	L			L						
19												L	U L 415	L		280								
20										L	L	U L 395	L	U L 430	L	L								
21											L	L	L	L	L									
22										L 355	L	L 480	L	L	L	L								
23								L		L	390	405	L	U L 395	U L 405	L								
24											415	405				L								
25										L	L	L	405	U L 415		L								
26											L	L	U L 430	L	L									
27										L	L	L	U L 430		470	L								
28										L	U L 395	U L 405	L	U L 395	L									
29									L	L	U L 430	U L 405	U L 415	L	L	L	L							
30									L	L	U L 415	L 420	L	L	L	U L 330								
31										L	L	L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										3	12	17	10	8	2	2								
MED										365	U 410	U 405	U 422	U 400	438	305								
U Q										U 415	U 418	420	U 430	U 415										
L Q										355	392	405	U 415	U 395										

DEC.1994 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 1994 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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								165	230	265	A	A	305	305	275	215	A							
2								180	240	275	A	A	A	280	265	A	B							
3								A	A 225	A	A	A	315	290	265	225	175							
4								A	230	275	295	305	305	295	280	U S 230	A							
5								S	A	280	275	300	305	A	265	215	S							
6								A	A	A	295	305	A	275	A	215	B							
7								S	S	A	280	305	305	275	275	225	B							
8								A	225	275	290	R	305	A	A	A	A							
9								A	240	265	290	295	295	A	275	230	A							
10								A	A	A	A	305	300	280	A 275	215	A							
11								165	A	265	A 290	A	305	305	265	A	A							
12								180	240	265	280	A	A	300	280	225	160							
13								B	225	265	A	305	315	300	A	215	140							
14								A	240	A	290	315	300	300	275	A	A							
15								A	A	265	300	305	305	300	275	230	A							
16								A	230	265	290	300	300	290	275	240	S 155							
17								A	230	A	A	305	315	290	255	225	S							
18								B	230	255	300	315	315	300	275	240	A							
19								A	240	285	300	R 315	315	300	C	240	S							
20								B	225	290	295	305	305	295	275	A	A							
21								A	225	265	295	A	A	300	A	A	A							
22								B	230	275	300	305	290	280	U A 275	250	150							
23								B	A	255	A	290	305	290	A	250	A							
24								B	215	265	290	305	315	290	265	225	B							
25								A	230	250	280	305	R 305	275	275	240	A							
26								B	215	275	290	305	R 305	R 300	265	230	190							
27								S	200	265	290	305	295	290	A	240	A							
28								A	215	250	280	290	R 300	275	265	240	A							
29								A	215	250	290	300	300	300	265	230	180							
30								S 140	215	255	290	300	305	280	265	S 230	165							
31								B	A	A	A	A	300	A	A	A	A							
	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								5	23	24	23	23	27	27	23	24	8							
MED								165	230	265	290	305	305	290	275	230	162							
U Q								180	230	275	295	305	305	300	275	240	178							
L Q								152	215	260	290	300	300	280	265	225	152							

DEC. 1994 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 1994 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	21	J A 40	E B 12	J A 37	18	20	33	G	G	G	32	32	G 30	G	G 27	28	26	25	E B 11	E B 10	J A 56	J A 36	28	J A 35
2	35	J A 30	J A 32	20	J A 27	E B 12	E B 10	27	28	28	J A 49	J A 50	37	33	33	J A 32	J A 32	30	19	J A 22	18	22	J A 28	E B 11
3	E B 11	19	E B 10	18	23	J A 33	J A 46	30	J A 36	42	38	39	G 28	32	33	30	23	J A 35	J A 31	J A 39	J A 30	J A 10	E B 11	J A 22
4	J A 28	J A 34	18	E B 11	S 24	E B 10	26	J A 32	G	36	34	G 30	33	34	G 27	G	25	E B 11	25	20	28	26	E B 10	J A 17
5	E B 11	J A 30	25	E B 11	E B 12	S 17	S 28	J A 47	30	G	28	G	G	28	28	G 21	J A 31	J A 24	E B 10	E B 11	E B 10	S 26	E B 10	J A 26
6	26	S E B 26	E B 11	E B 11	E B 11	E B 11	S 32	37	J A 40	36	G 29	G 25	38	G 28	37	J A 41	23	29	J A 30	26	28	26	25	J A 31
7	E B 11	E B 11	E B 11	E B 11	J A 33	J A 33	S 28	J A 36	28	J A 42	34	39	40	33	G 27	31	25	28	J A 22	28	S 27	33	J A 36	J A 30
8	J A 31	E B 11	E B 10	E B 13	21	E B 10	24	J A 29	32	32	36	38	40	37	40	31	32	J A 22	J A 31	J A 32	J A 35	J A 20	24	E B 11
9	E B 10	J A 21	E B 12	J A 21	E B 11	E B 11	E B 11	20	G	32	35	34	G 24	42	35	G	23	J A 23	33	22	18	S 20	E B 10	J A 42
10	J A 36	29	23	27	21	J A 22	J A 25	J A 24	40	J A 44	41	33	G 23	G	33	G 22	21	J A 18	18	S 15	E B 11	E B 12	E B 10	E B 10
11	E B 10	J A 49	29	18	20	19	18	G	J A 25	G 26	38	J A 50	G	G	33	29	J A 48	J A 48	31	27	25	21	19	24
12	E B 11	J A 30	19	E B 11	J A 19	E B 10	29	19	G	33	33	37	33	G	G 28	26	G	J A 24	14	E B 10	19	14	17	E B 11
13	E B 11	26	E B 11	18	E B 10	18	E S 13	J A 32	J A 28	32	31	G	G	G	29	G	20	E B 11	20	21	18	19	E B 11	E B 11
14	E B 11	14	E B 10	16	E B 12	J A 25	16	J A 36	J A 27	30	30	34	36	34	33	28	J A 35	E B 11	24	J A 26	E B 10	17	25	E B 13
15	E B 11	E B 11	E B 10	21	21	J A 27	E B 13	24	30	38	38	37	37	40	34	30	J A 23	J A 23	29	22	E B 11	E B 12	E B 10	E B 10
16	E B 10	E B 10	E B 10	E B 12	20	19	21	31	31	34	34	35	38	J A 38	G	30	J A 18	J A 33	25	21	23	18	E B 12	E B 10
17	E S 14	E B 11	E B 10	18	E B 12	E B 11	E B 11	J A 35	29	J A 65	J A 48	G 28	36	35	G	G	J A 24	J A 28	E B 12	J A 20	E B 13	J A 38	E B 11	E B 11
18	E B 11	E B 11	16	E B 10	21	21	18	E B 14	G 21	G	37	37	37	33	32	30	J A 31	28	19	J A 24	E B 10	24	18	E B 10
19	24	19	E B 11	19	19	E S 13	E S 13	19	G 22	G 24	37	G 31	G	G	C	G 22	E S 18	E B 11	E B 11	E B 10	E S 15	E B 10	E B 11	E B 11
20	E B 12	18	32	23	18	E B 11	J A 33	E B 14	28	32	34	G 24	36	35	30	24	24	E B 11	E B 10	E B 12	E B 11	J A 23	16	E B 11
21	E B 12	E B 10	E B 11	E B 11	E B 11	E B 12	E B 12	25	28	32	37	J A 34	J A 49	34	40	J A 44	29	J A 39	23	E S 16	J A 39	E B 12	J A 32	24
22	23	17	14	19	E B 10	E B 10	E B 14	E B 18	G 20	31	36	34	34	31	J A 41	29	24	E B 10	21	E B 10	J A 33	E B 12	21	J A 20
23	18	20	19	26	23	19	E B 10	E B 13	J A 36	G J A 23	39	36	G	34	30	27	28	27	J A 26	E B 11	22	30	23	E B 10
24	E B 10	E B 11	J A 34	E B 11	E B 11	J A 38	E B 10	E B 14	28	33	G 23	34	J A 48	35	34	G	E B 16	J A 32	18	18	E B 11	E B 10	E B 12	26
25	E B 11	E B 10	18	E B 10	19	E B 11	J A 24	27	G	32	33	G	G	34	32	28	22	26	20	E B 11	E B 11	E B 10	E B 12	E B 12
26	E B 11	E B 11	E B 10	E B 11	E B 10	17	18	E B 15	27	32	32	35	G	G	G	35	G	28	J A 23	E B 12	25	21	E S 13	E B 10
27	E B 11	E B 12	20	E B 10	19	23	18	S 22	26	30	33	37	34	116	29	G	25	E B 10	J A 37	E B 11	16	18	33	J A 27
28	J A 33	16	22	27	E B 10	E B 11	E B 10	20	J A 23	31	G 24	G	G 22	G 22	G	G 22	20	E B 10	E B 11	27	15	J A 17	28	26
29	E B 11	E B 10	E B 10	E B 10	E B 10	16	E B 11	18	G 18	28	33	32	G	G 29	G 25	G	G	E B 11	E B 10	25	23	23	J A 32	J A 21
30	J A 36	33	J A 38	J A 26	E B 11	19	E B 10	G	G	G	33	33	G	38	G	31	. G	J A 22	21	E B 12	E B 10	44	19	E B 13
31	24	18	J A 24	19	J A 35	J A 20	28	E B 14	27	J A 41	J A 60	J A 52	41	J A 42	33	57	J A 131	J A 38	E B 11	E B 12	24	18	J A 31	J A 27
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	11	18	14	18	19	17	18	22	27	32	34	34	33	33	31	28	24	24	21	20	18	20	18	13
U Q	24	29	23	21	21	21	28	31	30	36	38	37	37	35	33	31	29	29	26	25	27	26	28	26
L Q	11	11	10	11	11	11	11	G	G	28	32	G	G	G	G	G	20	11	12	11	11	12	11	11

DEC. 1994 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 10	13	E B 12	E B 12	13	E B 12	E B 13	G	G	G	32	32	G 22	G	G 22	26	19	13	E B 11	E B 10	17	A A 36	16	E B 10
2	14	14	14	E B 11	E B 10	E B 12	E B 10	G	G 15	G 17	33	38	35	32	30	24	E B 14	23	E B 10	13	14	14	E B 10	E B 11
3	E B 11	E B 10	E B 10	E B 11	E B 10	E B 10	A A 46	17	G	28	36	31	G 18	31	32	23	20	17	14	18	13	E B 10	E B 11	E B 11
4	E B 10	E B 10	E B 11	E B 11	11	E B 10	13	20	G	G 18	G 18	G 19	G 23	G 22	G 18	G	20	E B 11	E B 10	14	12	E B 11	E B 10	E B 11
5	E B 11	12	E B 11	E B 11	E B 12	E B 10	15	E S 18	25	G	G 18	G	G	28	G 18	G	19	16	E B 10	E B 11	E B 10	16	E B 10	14
6	E B 12	E S 14	E B 11	E B 11	E B 11	E B 11	15	16	24	32	G 17	G 18	36	G 17	31	16	E B 14	E B 11	21	13	18	14	E B 10	15
7	E B 11	E B 11	E B 11	E B 11	E B 10	17	E B 11	19	25	27	33	37	35	29	G 16	24	18	14	E B 11	E B 11	13	18	E B 11	13
8	S 16	E B 11	E B 10	E B 13	E B 10	E B 10	13	21	29	32	33	35	40	34	31	29	18	13	20	12	20	13	E B 10	E B 11
9	E B 10	E B 10	E B 12	13	E B 11	E B 11	E B 11	19	G	30	34	32	G 19	31	30	G	19	E B 10	23	13	13	14	E B 10	24
10	18	E B 10	E B 11	13	14	14	E B 12	16	U A 30	29	30	33	G 17	G	28	G 16	18	E B 10	14	14	E B 11	E B 12	E B 10	E B 10
11	E B 10	22	12	14	E B 11	E B 10	13	G	23	G 21	34	35	G	G	29	22	22	16	18	13	14	E B 10	E B 10	13
12	E B 11	E B 12	E B 11	E B 11	E B 10	E B 10	15	G 14	G	30	32	33	33	G	G 17	G	G	E B 10	E B 11	E B 10	E B 13	E B 11	E B 10	E B 11
13	E B 11	E B 10	E B 11	12	E B 10	16	E S 13	E B 17	G 17	G 16	28	G	G	G	28	G	18	E B 11	12	E S 14	E B 12	E B 12	E B 11	E B 11
14	E B 11	E B 10	E B 10	14	E B 12	E B 11	13	20	G 20	27	G 23	34	33	33	32	25	25	E B 11	16	16	E B 10	14	17	E B 13
15	E B 11	E B 11	E B 10	14	E B 11	17	E B 13	18	25	G 18	33	35	34	35	31	26	18	13	17	E B 11	E B 11	E B 12	E B 10	E B 10
16	E B 10	E B 10	E B 10	E B 12	14	12	E B 11	21	27	28	32	33	36	33	G	27	G 14	14	13	E B 12	16	13	E B 12	E B 10
17	E S 14	E B 11	E B 10	E B 10	E B 12	E B 11	E B 11	16	G 18	33	32	G 20	G 20	34	G	G	18	18	E B 12	E B 13	E B 13	E B 13	E B 11	E B 11
18	E B 11	E B 11	E B 10	E B 10	13	E B 11	14	E B 14	G 16	G	33	34	36	U Y 33	G	G	23	E B 11	E B 11	13	E B 10	14	E B 10	E B 10
19	S 13	E B 11	E B 11	12	14	E S 13	E S 13	14	G 16	G 15	37	G 28	G	G	C	G 20	E S 18	E B 11	E B 11	E B 10	E B 15	E B 10	E B 11	E B 11
20	E B 12	E B 10	15	13	E B 11	E B 11	E B 10	E B 14	27	G 19	33	G 18	33	32	30	24	22	E B 11	E B 10	E B 12	E B 11	14	12	E B 11
21	E B 12	E B 10	E B 11	E B 11	E B 11	E B 12	E B 12	E B 13	27	29	33	32	33	33	33	29	18	14	14	E S 16	11	E B 12	13	17
22	E B 10	13	13	14	E B 10	E B 10	E B 14	E B 18	G 15	G 21	32	33	33	G 22	30	28	19	E B 10	14	E B 10	14	E B 12	14	E B 10
23	14	14	E B 10	14	13	13	E B 10	E B 13	25	G 18	32	33	G	32	U Y 30	G 22	14	15	E B 12	E B 11	13	E B 10	13	E B 10
24	E B 10	E B 11	E B 10	E B 11	E B 11	E B 10	E B 10	E B 14	23	31	G 18	32	38	34	30	G	E B 16	E B 11	14	13	E B 11	E B 10	E B 12	14
25	E B 11	E B 10	E B 10	E B 10	E B 11	E B 11	13	17	G	29	32	G	G	33	30	27	17	E B 12	13	E B 11	E B 11	E B 10	E B 12	E B 12
26	E B 11	E B 11	E B 10	E B 11	E B 10	E B 11	E B 10	E B 15	23	G 17	31	33	G	G	G	33	G	12	E B 10	E B 12	E B 13	17	E S 13	E B 10
27	E B 11	E B 12	E B 10	E B 10	E B 11	E B 10	E B 12	E B 15	25	G	31	32	34	U A 58	28	G	19	E B 10	E B 10	E B 11	12	13	13	12
28	E B 10	13	11	14	E B 10	E B 11	E B 10	16	G 14	G 18	G 20	G	G 19	G 18	G	G 17	18	E B 10	E B 11	E B 10	13	E B 10	E B 10	14
29	E B 11	E B 10	E B 10	E B 10	E B 10	E B 10	E B 11	E B 15	G 11	28	G 22	31	G	G 26	G 23	G	G	E B 11	E B 10	14	14	12	17	E B 10
30	16	17	18	E B 10	E B 11	E B 11	E B 10	G	G	G	30	G 20	G	33	G	26	G	15	14	E B 12	E B A 10	A 44	14	E B 13
31	E B 10	12	E B 10	E B 10	18	14	12	E B 14	24	31	36	34	33	33	30	36	37	14	E B 11	E B 12	E B 10	E B 10	17	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	11	11	10	11	11	11	12	16	G	G	32	32	G	31	28	22	18	12	12	12	13	12	10	11
U Q	12	13	11	13	12	12	13	18	25	29	33	34	34	33	30	26	19	14	14	13	14	14	13	13
L Q	10	10	10	11	10	10	11	G	18	18	28	G	G	G	G	G	14	11	11	11	11	10	10	10

DEC.1994 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

DEC.1994 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 1994 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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	335	305	320	S 355	J S 350	300	325	J R 360	365	365	310	365	375	365	365	350	385	340	350	350	325	A	335	F 295
2	310	320	290	300	J R 375	440	S 325	J S 385	J R 375	365	355	345	350	365	370	365	380	365	315	375	345	S 350	300	255
3	U S 285	310	295	S 365	325	330	A	J R 375	355	365	J R 320	370	355	325	365	370	365	380	335	350	350	315	290	F 290
4	F 275	F 310	360	375	350	330	S 335	370	J R 375	370	350	360	350	375	J R 360	360	375	340	350	360	375	345	350	300
5	325	340	F 325	330	350	300	360	J S 360	360	365	370	345	360	370	365	370	365	340	350	315	S 340	U S 325	F 330	U S 305
6	305	S 320	310	F 345	345	F 305	S 360	S 370	385	380	360	370	350	365	385	360	365	355	305	400	365	305	315	S 285
7	310	330	325	365	385	F U 340	S 400	355	S 365	355	340	380	370	335	350	365	370	360	335	335	320	325	290	310
8	J S 295	S 330	S 360	345	345	370	320	405	H 330	350	370	340	355	345	350	340	385	335	370	350	330	335	300	315
9	315	330	320	310	320	340	350	365	380	370	370	370	335	355	355	360	375	345	340	355	350	290	305	330
10	310	300	315	335	335	325	355	390	370	365	355	355	350	360	350	360	355	365	370	320	315	360	350	345
11	340	S 350	325	F 325	F 295	325	340	375	S 380	365	360	365	375	370	390	365	360	285	330	285	340	335	360	295
12	315	320	325	385	F 345	315	J S 335	380	370	375	345	370	350	H 350	350	340	355	385	355	330	315	300	F 290	320
13	320	330	305	360	360	300	S 320	S 365	375	375	380	340	365	340	380	360	385	360	310	365	360	280	315	285
14	300	330	320	290	310	330	290	370	350	340	360	345	355	375	325	375	385	355	J R 305	335	330	335	315	295
15	320	305	320	340	365	420	335	350	385	365	385	365	325	370	340	375	390	345	A 280	325	F 300	F 310	F 290	F 275
16	F 310	310	325	340	360	305	350	J S 365	340	360	360	350	370	350	355	345	380	380	340	385	345	355	315	275
17	305	F 315	F 330	330	345	F 330	315	J R 365	S 360	R 365	360	375	370	360	370	355	345	S 330	360	365	360	355	330	295
18	295	320	310	330	325	305	315	355	375	355	365	370	350	350	J R 395	360	375	360	370	320	330	335	325	F 315
19	305	310	335	350	J R 375	370	325	345	345	365	390	365	355	340	C	355	370	330	335	395	300	355	325	305
20	285	305	315	320	335	370	325	385	355	350	J R 335	405	355	365	370	355	360	395	310	355	325	335	325	F 325
21	350	325	335	300	315	325	400	J S 390	365	355	330	370	340	J R 335	355	360	385	380	J R 290	330	355	380	330	305
22	F 300	325	315	375	J S 375	345	R	J S 320	380	345	390	J R 330	375	J R 370	370	340	405	375	315	335	345	335	360	290
23	325	320	280	315	320	365	385	J S 385	380	390	380	355	J R 360	340	385	370	370	S 370	J R 335	330	345	360	320	300
24	F 310	325	S 310	345	365	350	360	J S 360	370	335	315	330	330	335	375	325	385	340	340	335	J S 355	315	415	300
25	315	290	S 325	345	285	310	345	365	380	375	350	370	360	370	350	360	360	390	350	J S 345	360	365	290	J R 305
26	325	310	325	365	365	330	355	J S 380	355	355	360	360	360	370	375	365	385	335	330	360	385	410	285	295
27	340	310	315	315	370	S 370	365	J S 360	375	360	380	380	350	A	310	365	380	380	325	F 325	F 290	345	F 290	F 315
28	F 315	F 330	F 315	355	315	F 325	370	365	370	340	330	385	330	375	355	J R 360	405	355	310	370	365	F 320	F 265	F 310
29	F 295	F 290	F 320	F 305	310	F 315	360	J S 380	350	320	350	390	330	345	380	370	355	340	340	365	335	F 325	340	F 300
30	315	F 300	F 305	325	305	320	335	390	360	355	370	335	370	365	370	350	385	335	355	365	360	A	F 300	305
31	F 295	F 290	F 325	F 315	310	310	340	J R 385	370	340	360	370	350	350	H 345	355	380	355	355	355	360	340	F 275	F 305
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	29	31	31	31	31	31	31	30	30	31	31	31	31	31	31	29	31	31
MED	310	320	320	340	345	330	340	370	370	365	360	365	355	360	365	360	375	355	335	350	345	335	315	300
U Q	320	330	325	355	365	350	360	385	375	365	370	370	365	370	375	365	385	375	350	365	360	355	330	310
L Q	300	305	310	315	315	310	325	360	355	350	345	345	350	345	350	355	365	340	315	330	325	318	290	295

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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	U L 380	L	L									
2										L	U L 415		L	L		L								
3									L		L	U L 375	L		L									
4									L	U L 390	L 415	U L 390	L	U L 380	L									
5									L		U L 380	U L 420	U L 395	L	L									
6										L	U L 405	U L 415	L	U L 385	L									
7									L	L	L	L 380	L	U L 425	L									
8										L	L	L		L		L								
9									L		390	U L 390	L	L	L									
10										440		385	L	L	L									
11										L		L	U L 390		L									
12										L	L 380	L	L	L 380	L									
13										L	L	U L 395	U L 365	L	L	L								
14											L	L	L	L	L	L								
15										L	L	L	L	L		L								
16										L	U L 375	385	L	L	L	L								
17										L	L	L 365	375	L		L								
18										L	L	L	L	L	L			L						
19												L	U L 385	L	C	440								
20										L	L	U L 410	L	U L 355	L	L								
21											L	L	L	L	L									
22										L 425	L	L 380	L	L	L	L								
23								L		L	405	425	L	U L 365	U L 380	L								
24											385	405				L								
25										L	L	L	395	U L 380		L								
26											L	L	U L 365	L	L									
27										L	L	L	U L 375	A	365	L								
28										L	U L 385	U L 370	L	U L 385	L									
29									L	L	U L 385	U L 405	U L 395	L	L	L	L							
30									L	L	U L 385	L 385	L	L	L	U L 395								
31										L	L	L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										3	12	17	10	8	2	2								
MED										425	U 385	U 390	U 382	U 380	372	418								
U Q										440	405	U 408	U 395	U 385										
L Q										U 390	382	380	U 375	U 372										

DEC.1994 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 1994 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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									215	230		230	230	220	230									
2										220	235		255	225		235								
3									230		315	225	230		230									
4									225	225	235	230	240	230	240									
5									230		225	240	235	230	235									
6										225	215	230	240	240	225									
7									255	230	255	215	230	230	250									
8										250	240	255		240		265 L								
9									220		245	250	250	240	235									
10										230		250	240	240	240									
11										230		225	240		210									
12										225	265	225	245	240	245									
13										225	235	250	245	245	220	230								
14											245	265	250	230	275	220								
15										235	220	245	280	235		220								
16										235	245	260	235	235	245	225								
17										235	235	235	260	230		235								
18										245	235	245	245	250	210		210							
19												250	245	240	C	230								
20										260	250 L	220	235	250	230	220								
21											275	225	265	250	250									
22										260	220	300	235	235	220	260								
23								210		220	235	250	255	255	220	225								
24											305	275				275 L								
25										235	260	235	270	245		240								
26											245	235	245	235	225									
27										240	230	225	275	A	365	240								
28										250	245	230	245	225	230									
29									215	285 L	245	220	265	245	225	230	210							
30									225	245	230	260	235	235	240	245								
31										270	245	225	235	250										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	8	23	27	30	29	27	23	16	2							
MED								210	225	235	245	235	245	240	230	232	210							
U Q									230	250	250	250	255	245	245	242								
L Q									218	225	235	225	235	230	225	225								

DEC. 1994 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 1994 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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	245	300	275	275	245	260	240	210	200	200	215	240	190	200	240	220	200	235	215	225	270	A	250	260
2	280	300	325	305	205	200	230	215	215	225	200	230	235	240	230	225	215	210	270	215	H 210	240	290	335
3	370	325	305	225	255	260	A	210	220	230	H 225	215	H 185	220	235	220	210	210	250	255	230	260	310	325
4	315	280	240	225	255	270	265	215	225	H 200	190	190	190	195	225	220	205	200	230	225	220	215	230	310
5	290	285	270	245	245	285	250	230	225	205	200	195	220	210	H 190	220	215	210	210	215	215	255	225	S 305
6	300	270	280	240	220	265	250	210	215	230	215	210	A	185	230	220	220	210	285	200	240	265	270	355
7	315	285	215	225	215	255	225	215	225	210	A 250	215	210	195	H 195	225	215	210	250	245	230	270	340	330
8	325	280	225	255	230	220	310	210	220	235	220	245	240	225	240	205	210	210	245	255	A 255	255	310	280
9	280	265	260	270	270	260	205	210	215	225	230	205	200	230	220	225	215	220	A 255	220	210	340	275	E A 350
10	285	265	285	250	235	225	225	205	210	195	220	210	215	H 200	215	225	210	215	225	255	240	225	240	230
11	270	A	245	265	285	250	230	210	215	215	230	A 220	225	225	210	225	210	E A 330	A 255	275	225	225	215	310
12	305	280	255	220	235	255	260	210	220	225	210	225	240	215	215	225	220	195	225	215	E B 265	E B 310	310	290
13	255	265	280	255	220	280	265	225	210	H 195	205	H 190	220	225	230	225	210	220	240	215	205	310	275	310
14	310	255	260	265	275	225	210	220	210	225	225	225	230	220	220	235	205	210	E A 305	225	260	245	310	310
15	290	295	290	275	210	205	270	220	210	H 175	240	210	250	245	245	225	210	200	A	230	280	285	275	295
16	290	260	250	260	215	285	250	220	225	210	220	210	235	235	215	220	205	205	235	205	245	235	270	325
17	310	275	235	240	225	285	310	220	220	A 230	210	205	205	235	230	210	205	A 250	215	220	220	210	275	335
18	325	270	255	260	260	275	305	225	210	225	225	220	255	235	210	225	210	205	205	230	235	240	260	280
19	305	280	260	230	215	215	E S 265	220	225	230	220	225	210	210	C	190	210	210	225	205	320	225	250	290
20	325	300	270	240	255	225	270	210	225	235	220	200	210	250	230	220	H 205	200	275	220	275	235	260	280
21	250	245	255	305	280	290	210	205	215	230	225	210	220	225	240	235	205	210	330	280	245	225	255	315
22	335	280	275	215	230	220	245	220	210	195	235	210	A 245	210	225	205	195	195	250	235	225	225	230	315
23	280	270	290	310	265	225	210	190	215	200	215	195	225	210	220	195	210	210	250	285	225	230	250	280
24	280	275	295	250	220	235	230	210	215	220	210	190	245	235	230	210	210	210	220	235	220	265	225	290
25	290	330	275	255	330	305	235	220	210	245	250	250	195	A 235	245	235	210	200	235	240	220	235	375	345
26	305	285	290	240	225	225	225	215	210	225	225	250	225	245	215	230	205	220	250	220	220	235	345	305
27	250	290	285	270	250	235	225	205	215	210	220	220	220	A	H 200	H 180	205	190	250	225	290	210	260	290
28	250	265	235	225	260	250	210	210	220	205	H 190	H 190	H 205	H 175	H 205	230	205	200	235	205	210	250	265	290
29	270	320	315	295	290	260	220	205	195	225	H 210	205	195	220	230	225	220	205	230	210	245	250	E A 290	270
30	305	320	325	265	260	280	240	210	215	200	210	210	225	250	220	215	200	225	225	205	210	A	280	260
31	270	305	285	250	A 325	290	230	205	215	245	A 250	235	220	225	225	240	215	205	240	205	205	235	335	A 340
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	30	31	31	31	31	31	30	30	30	31	31	31	30	31	31	29	31	31
MED	290	280	275	255	245	255	235	210	215	225	220	210	220	225	225	225	210	210	239	225	228	238	270	305
U Q	310	300	290	270	265	280	265	220	220	230	225	225	235	235	230	225	215	215	250	240	255	262	310	325
L Q	270	270	255	240	220	225	225	210	210	200	210	205	205	210	215	215	205	200	225	215	220	225	250	280

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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								130	115	115	A	A	115	110	E A 150	115	A							
2								135	140	135	A	A	A	A 140	125	A	B							
3								A	A 125	A	A	A	125	100	125	110	120							
4								A	115	130	120	120	115	115	115	115	A							
5								S	A	115	110	105	105	A	120	110	S							
6								A	A	A	115	115	A	110	A	A 125	B							
7								S	120	A	115	110	105	115	120	115	B							
8								A	140	115	115	115	115	A	A	A	A							
9								A	120	120	125	120	120	A	115	115	A							
10								A	A	A	A	115	110	110	105	130	A							
11								150	A	A 130	110	A	110	110	125	A	A							
12								150	115	110	110	A	A	110	110	115	140							
13								B	A 130	A 135	A	110	110	110	A	115	145							
14								A	E A 155	A	A 140	135	130	A 135	110	A	A							
15								A	A	125	125	110	110	110	120	125	A							
16								A	120	110	110	110	110	A 125	120	A 125	120							
17								A	E A 145	A	A	A 120	120	115	115	120	S							
18								B	A 155	110	115	110	110	A 135	115	A 130	A							
19								A	140	A 125	115	A	110	110	C	135	S							
20								B	A 135	135	A 130	120	A	115	115	A	A							
21								A	120	A 130	130	A	A	130	A	A	A							
22								B	140	140	125	A 135	E A 150	A 130	115	E A 140	145							
23								B	A	A 120	A	115	110	115	115	A 135	A							
24								B	130	120	125	120	110	125	115	110	B							
25								A	135	E A 145	A 130	110	115	110	E A 135	130	A							
26								B	135	A 140	115	110	110	115	115	110	130							
27								S	120	135	125	120	115	110	A	120	A							
28								A	125	A 135	A 125	115	120	110	110	A 140	A							
29								A	140	125	135	125	115	E A 155	125	125	130							
30								135	110	115	110	130	110	125	115	110	130							
31								B	A	A	A	A	A 125	A	A	A	A							
	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								5	24	24	23	23	26	27	24	24	8							
MED								135	128	125	120	115	111	115	115	119	130							
U Q								150	140	135	125	120	120	125	122	130	142							
L Q								132	120	115	115	110	110	110	115	115	125							

DEC.1994 h'E (KM)

IONOSPHERIC DATA STATION Kokubunji

DEC. 1994 h'Es (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	110	120	B	110	110	115	95	G	G	G	110	110	100	G	100	125	105	115	B	B	100	100	90	105
2	110	110	100	105	115	B	B	105	110	105	100	100	175	175	140	140	100	110	100	100	100	95	110	B
3	B	115	B	110	100	110	105	100	100	95	95	95	95	E G 170	140	125	125	120	110	105	105	B	B	115
4	110	125	110	B	110	B	100	100	G	110	100	95	95	95	95	G	130	B	115	95	125	100	B	140
5	B	110	100	B	B	100	110	110	140	G	100	G	G	120	100	100	110	120	B	B	B	105	B	110
6	125	105	B	B	B	B	100	110	100	115	100	95	95	95	95	100	95	95	105	105	95	95	95	120
7	B	B	B	B	110	110	105	100	125	100	160	135	125	140	95	150	125	110	130	120	125	95	105	100
8	110	B	B	B	110	B	155	140	175	155	185	180	155	95	125	125	95	100	110	110	105	130	115	B
9	B	110	B	110	B	B	B	140	G	E G 185	170	155	100	95	160	G	150	120	105	95	100	110	B	100
10	100	100	105	105	100	110	110	110	105	110	105	180	100	G	125	105	140	110	110	125	B	B	B	B
11	B	100	100	110	110	100	115	G	115	110	110	110	G	G	125	100	95	115	90	90	95	95	95	95
12	B	115	110	B	105	B	100	110	G	125	115	110	110	G	95	140	G	95	95	B	95	110	110	B
13	B	120	B	105	B	125	S	110	115	105	110	G	G	G	110	G	145	B	105	100	100	95	B	B
14	B	110	B	115	B	100	100	110	115	110	110	170	155	150	135	115	115	B	140	135	B	105	100	B
15	B	B	B	105	105	105	B	110	105	100	150	150	160	140	130	135	105	95	95	95	B	B	B	B
16	B	B	B	B	120	120	155	155	170	135	155	135	130	135	G	130	105	95	100	95	95	110	B	B
17	S	B	B	105	B	B	B	100	105	100	90	95	95	145	G	G	110	105	B	125	B	95	B	B
18	B	B	120	B	115	115	120	B	115	G	140	155	150	150	135	140	115	100	105	110	B	140	105	B
19	105	105	B	135	105	S	S	140	110	105	130	110	G	G	C	110	S	B	B	B	S	B	B	B
20	B	145	100	110	100	B	110	B	160	110	E G 180	100	175	190	E G 195	110	130	B	B	B	B	110	105	B
21	B	B	B	B	B	B	B	160	180	155	140	110	110	165	105	100	100	95	105	S	110	B	110	110
22	115	120	110	105	B	B	B	B	115	115	160	150	150	110	120	165	140	B	125	B	105	B	115	125
23	120	110	120	110	110	110	B	B	100	105	105	160	G	140	115	120	105	95	110	B	115	105	95	B
24	B	B	130	B	B	110	B	B	140	170	110	150	135	135	135	G	B	105	105	100	B	B	B	105
25	B	B	110	B	105	B	125	110	G	150	140	G	G	155	140	125	130	100	95	B	B	B	B	B
26	B	B	B	B	B	110	110	B	170	115	155	165	G	G	G	125	G	100	140	B	115	120	S	B
27	B	B	110	B	105	115	110	105	150	155	135	135	125	110	110	G	135	B	120	B	120	130	110	110
28	110	110	110	110	B	B	B	100	105	110	105	G	105	105	G	120	135	B	B	115	115	110	110	110
29	B	B	B	B	B	110	B	125	120	165	120	145	G	110	110	G	G	B	B	105	105	110	110	120
30	105	105	100	105	B	105	B	G	G	G	135	120	G	135	G	150	G	125	95	B	B	105	105	B
31	110	110	110	100	105	100	105	B	125	140	110	115	135	110	110	110	130	110	B	B	105	105	105	105
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	19	16	17	18	18	18	21	25	27	31	27	22	24	25	24	25	22	23	18	20	23	18	15
MED	110	110	110	110	108	110	110	110	115	110	112	135	125	135	118	125	115	105	105	105	105	105	105	110
U Q	112	120	110	110	110	115	115	132	145	150	150	155	150	150	135	138	132	115	115	115	115	110	110	120
L Q	108	105	100	105	105	105	100	102	105	105	105	110	100	110	102	110	105	95	100	95	100	95	100	105

DEC. 1994 h'Es (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.1994 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

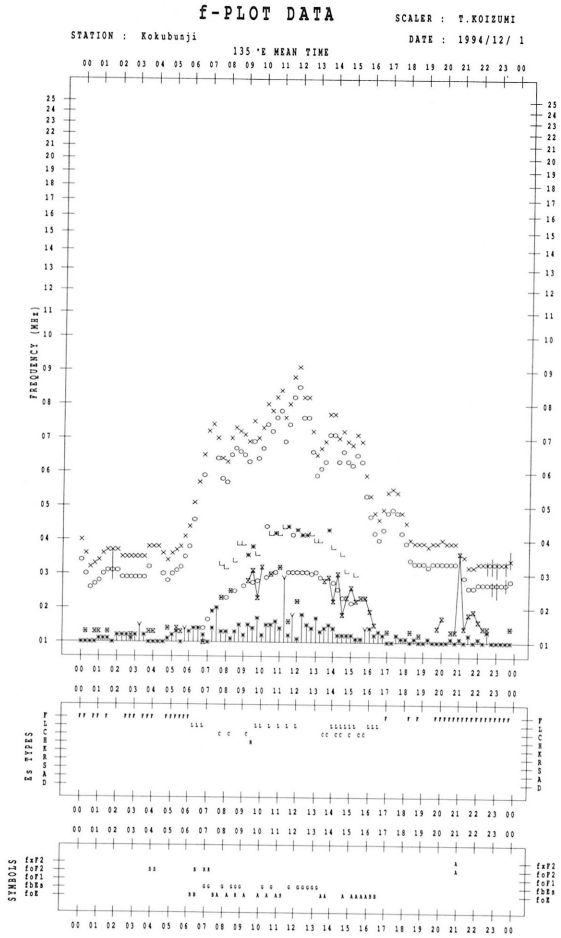
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

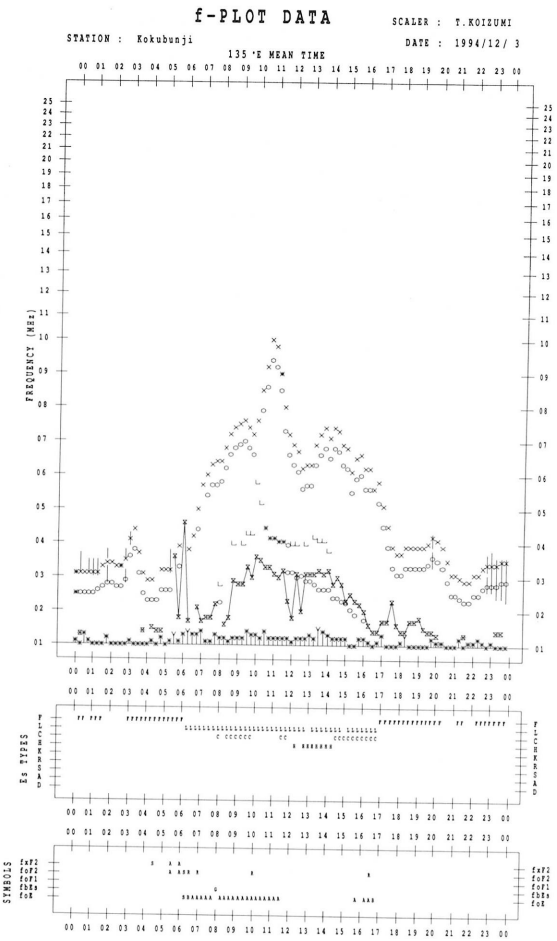
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F1	F2		F2	F1	F1	F2				L1	L1	L1		L1	CL11	L1	FF21			F2	F3	F2	F2
2	FF11	FF21	F2	F2	F1			L1	L1	L1	L3	L2	HL11	HL11	HL11	CL22	L2	F2	F1	F1	F1	F1	FF11	
3		F2		F1	F2	F1	F3	L2	LC31	LC32	L2	L2	L1	H1	HL11	C1	CL21	FF21	FF31	F2	F2			F1
4	F2	FF21	F1		F1		F1	LC11		L1	L2	L1	L2	L2	L2		C1		F1	F2	FF11	F1		FF11
5		FF21	F2			F1	F1	C1	CL11		L1			CL21	L2	L1	L1	F1				F2		F1
6	FF11	F1					F1	LC11	LC31	CL22	L2	L2	L2	L2	LH21	L2	L2	FF11	F4	F1	F2	F2	F2	FF11
7					F1	FF11	F1	L1	C1	LC21	HL11	HL12	C1	HL11	L1	H1	CL11	F1	F1	F1	F1	F3	F1	F2
8	F2				F1		F1	C1	HL11	HL11	HL11	H1	HL11	CC11	CL11	C1	L2	F2	F3	FF21	F3	F2	F1	
9		F1		F1				C1		HL11	HL11	HL11	L1	L1	H1		C1	F1	F3	F1	F1	F2		FF21
10	FF21	FF11	F1	F1	F1	FF22	F2	L1	LC31	L2	LC21	HL11	L1		CL12	L1	C1	F1	F1	F1				
11		F2	FF12	F1	F1	F1	F2		C1	L2	C2	C1			CL12	L2	LC31	FF32	F2	F2	F1	F1	F1	F2
12		F1	F1		F1		FF11	L1		C1	C1	C1	L1		L1	HL12		F1	F1		F1	F1	F1	
13		FF21		F1		F1		L1	L1	L1	L1				L1		H1		F1	F1	F1	F1		
14		F1		F1		F1	F1	LC21	L2	L1	L1	HL11	HL12	HL11	CL11	L1	CL11		F1	FF11		F1	F1	
15				F1	F1	F1		L1	L2	LH21	HL12	H1	H1	H1	CL11	HL12	LC11	F1	F3	F1				
16					F2	F1	FF11	C1	H1	H1	H1	HL11	C1	CL11		CL12	L1	F3	F1	F1	F1	F1		
17				F1				L2	L1	L2	LC21	L1	L2	HL11			L1	F1		F1		FF11		
18			FF11		F1	F1	F1		L1		C1	H1	H1	CL11	CL11	CL11	C2	F1	F1	F1		F1	F2	
19	F2	F1		F1	F1			C1	L1	L1	C1	L1				L1								
20		F1	F2	F1	F1		F1		HL11	L1	HL11	L1	HL11	H1	HL11	L1	C1					F1	F1	
21								C1	HL11	HL11	HL11	L1	LC21	HL11	L2	L2	L2	F2	F1		F2		FF11	F1
22	F1	F1	F2	F1					L1	L1	HL11	HL11	HL12	L1	C1	HL11	CL11		F1		F1		F1	F1
23	F1	F1	F2	F2	F1	F2			L2	L1	L2	HL11		HL11	C1	L1	L2	F1	F2		F1	F2	F1	
24			F1			F1			C1	H1	L1	HL11	H1	H1	H1			F1	F1	F1				F1
25			F1		F1		F1	C1		HL11	HL11			H1	HL11	CL12	CL12	FF11	F1					
26						F1	F1		H1	L2	H1	H1				C1		F1	FF11		F1	F1		
27			FF11		F1	F1	F1	L1	H1	HL11	CL11	CL11	CL11	C2	L1		HL11		F1		F1	F1	F3	FF21
28	F2	F2	F1	F1				L1	L1	L2	L1		L1	L1		L1	C1			F1	F1	F1	F2	F1
29						F1		L1	L1	HL11	L1	HL11		L1	L1					F1	F1	F2	F3	F1
30	F2	FF31	F4	FF21		F1					C1	LH11		CL11		H1		F1	F1			F4	F2	
31	F1	F1	F1	FF11	F4	F3	F2		C1	HL11	CL11	LC11	CL11	L2	C2	C3	CL23	FF11			F1	FF11	F3	F3
	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																								

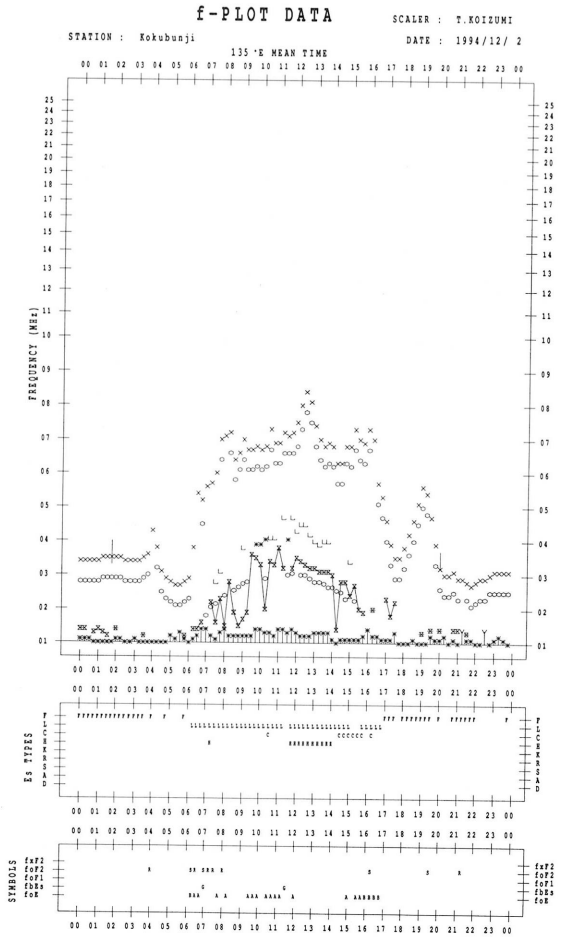
DEC.1994 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

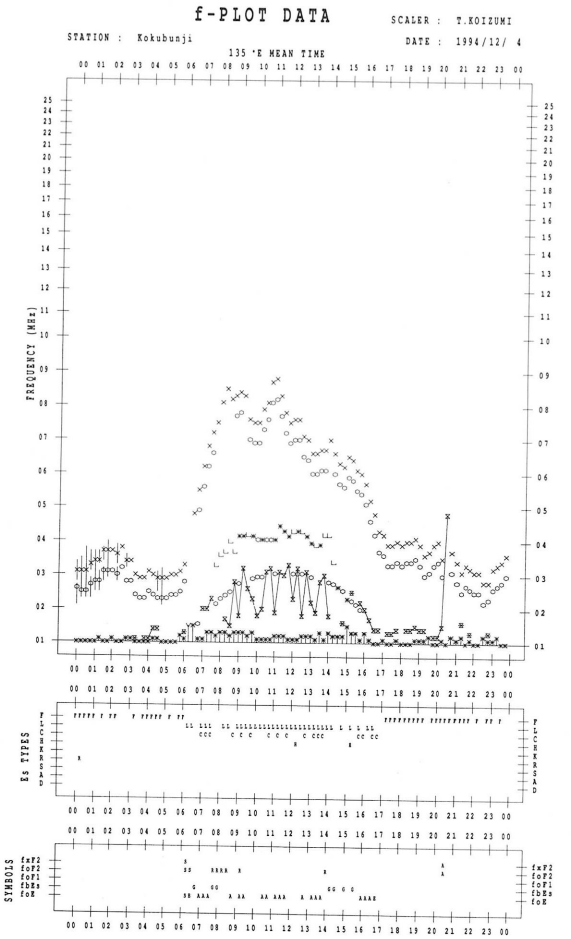
f-PLOTS OF IONOSPHERIC DATA

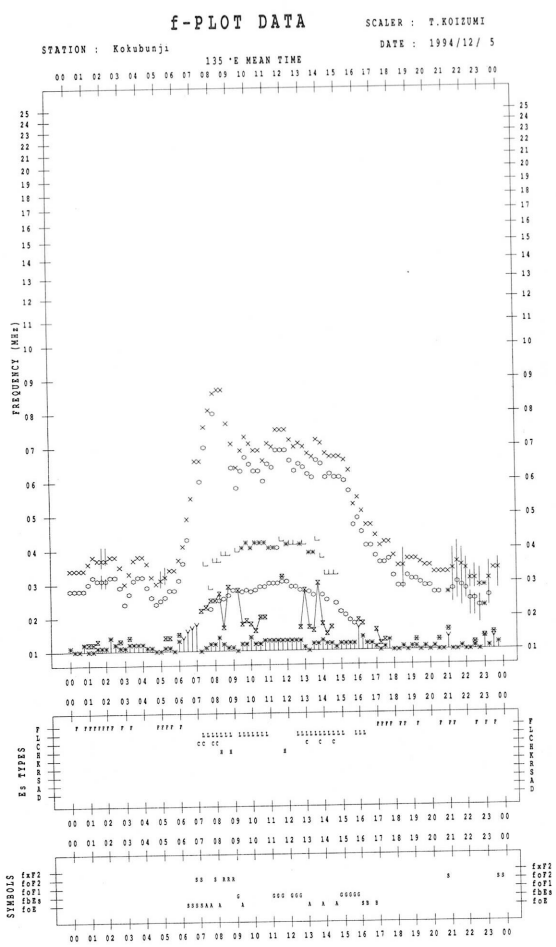
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

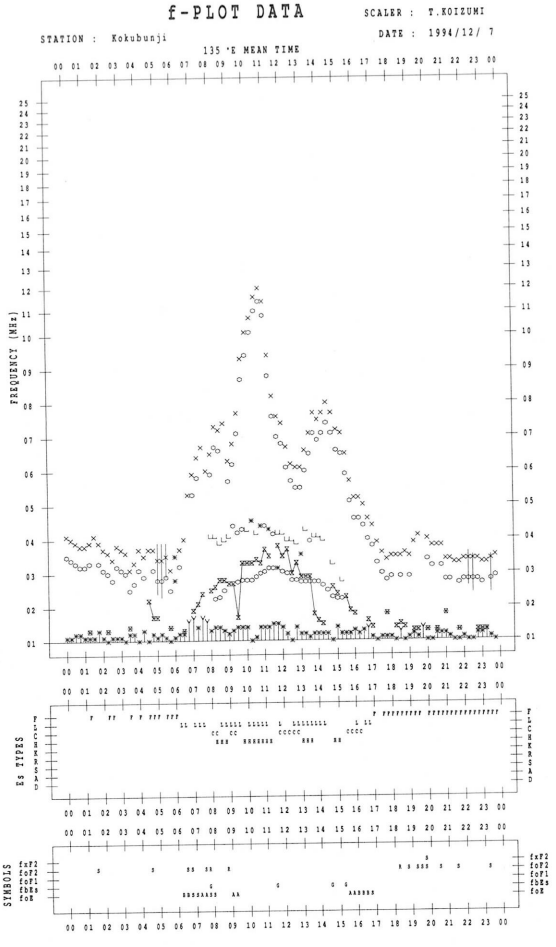

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/ 1
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

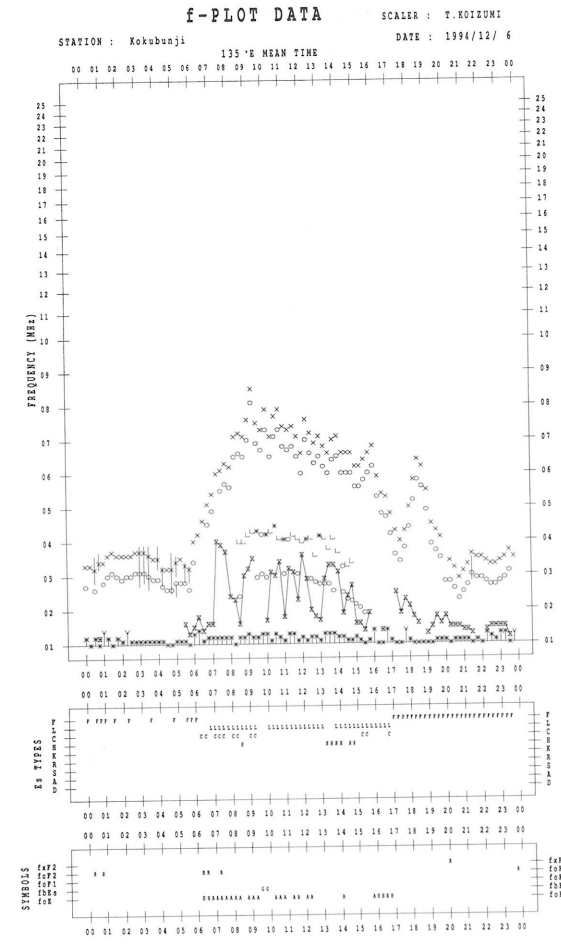

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/ 3
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

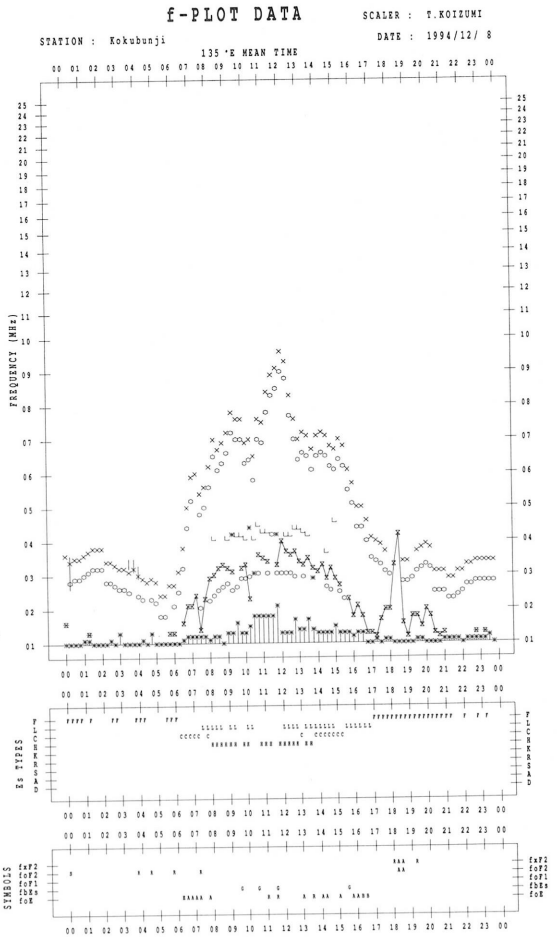

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/ 2
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

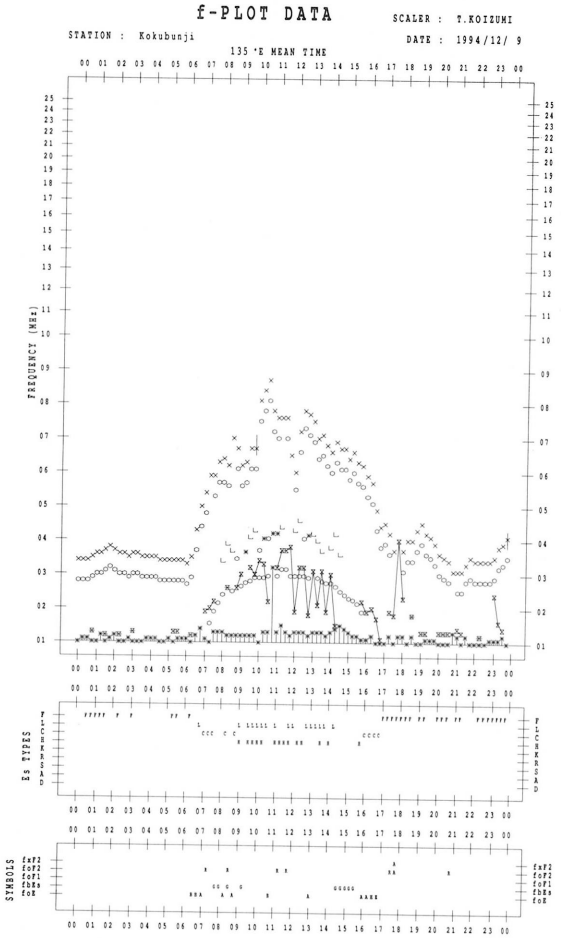

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/ 4
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

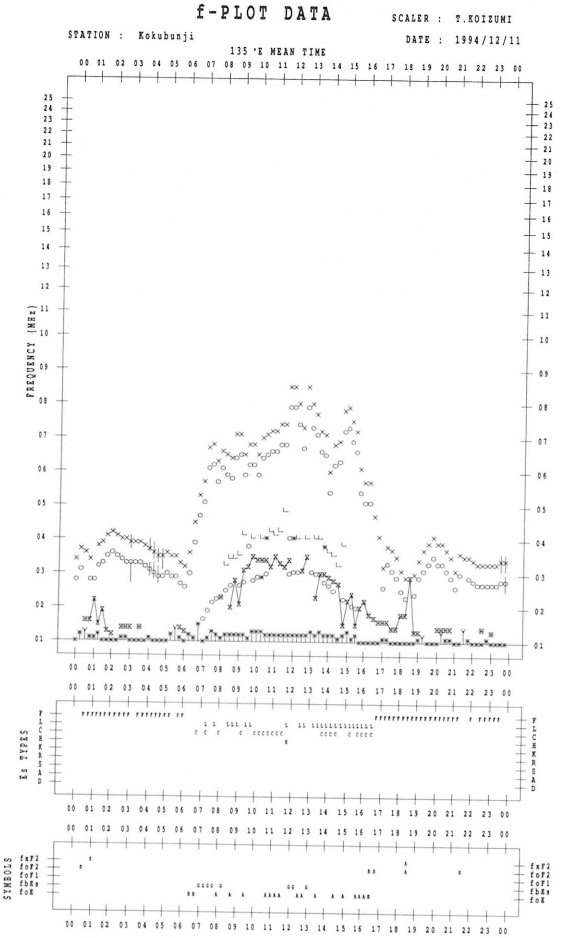

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/ 5
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

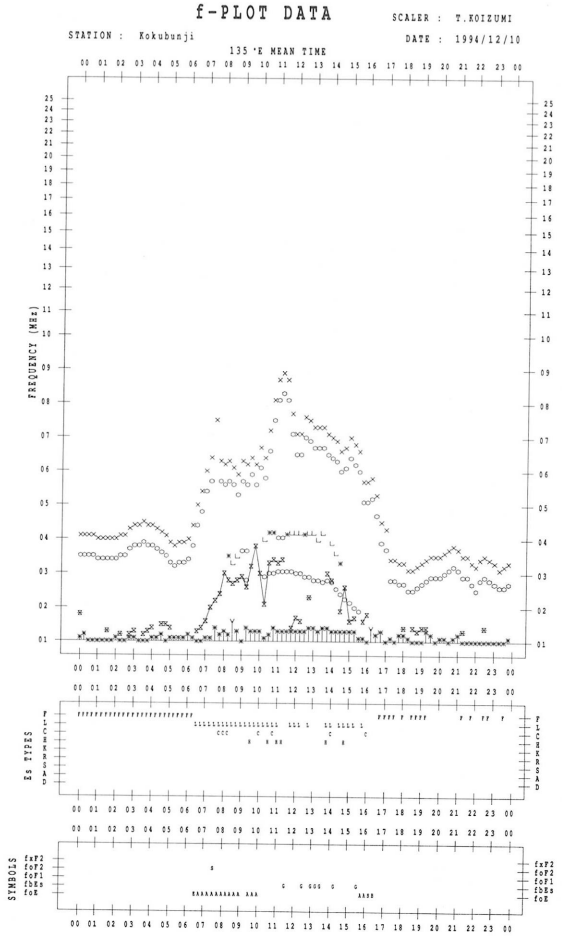

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/ 7
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

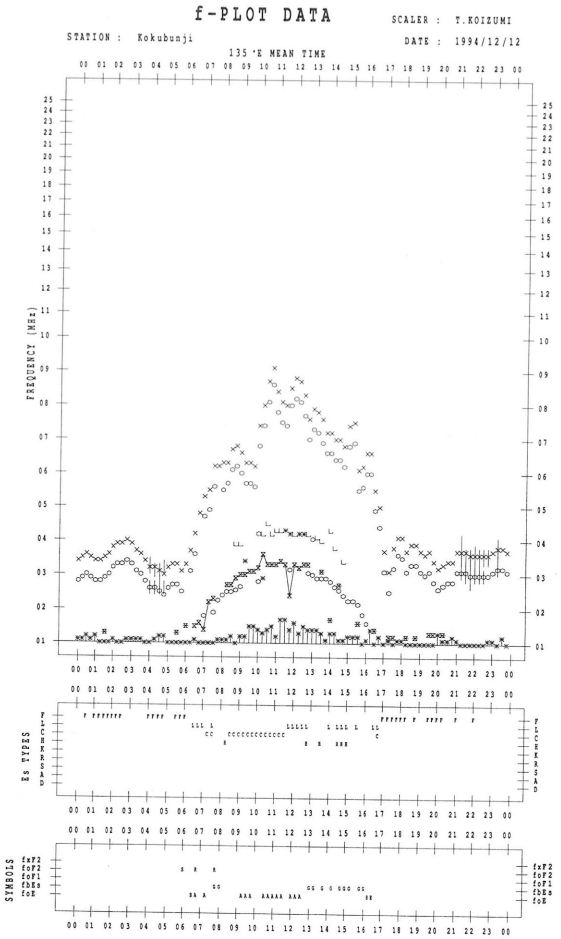

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/ 6
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

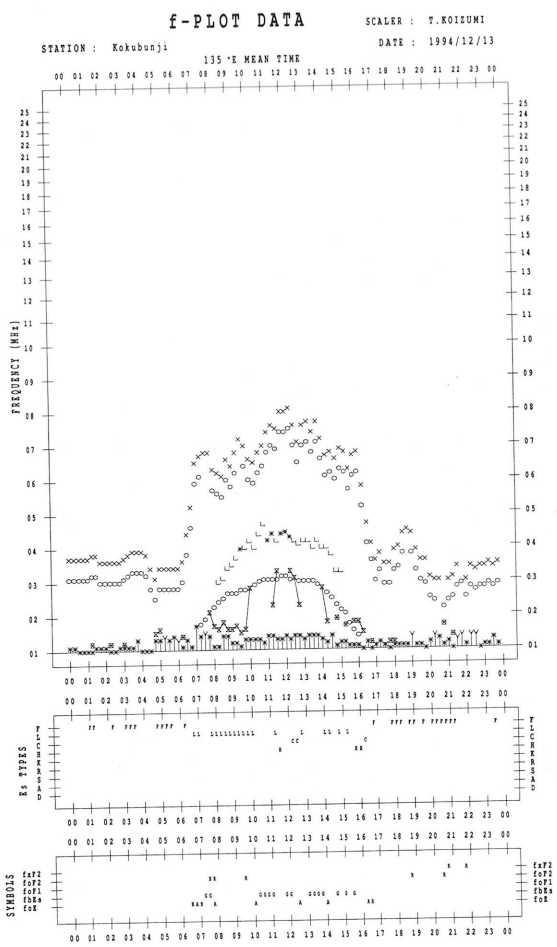

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/ 8
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

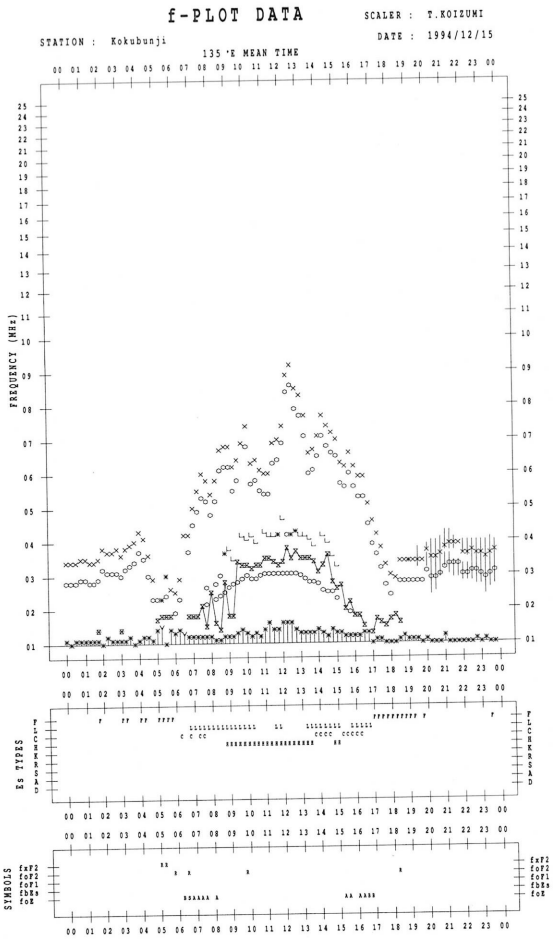

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

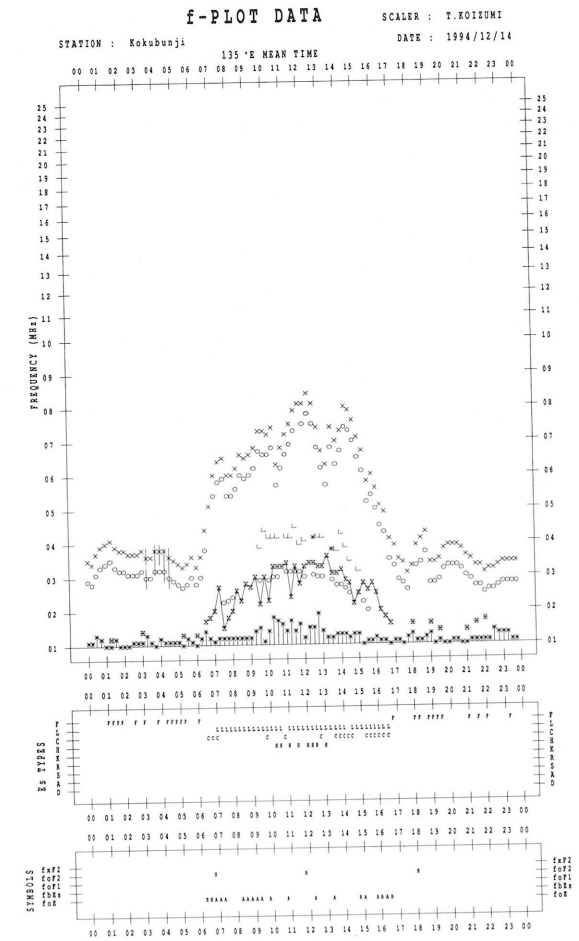

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

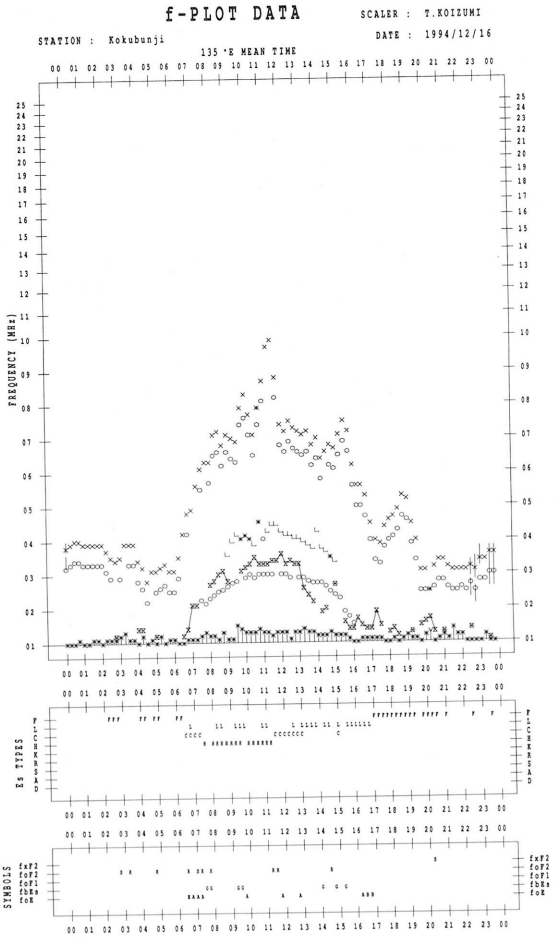

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

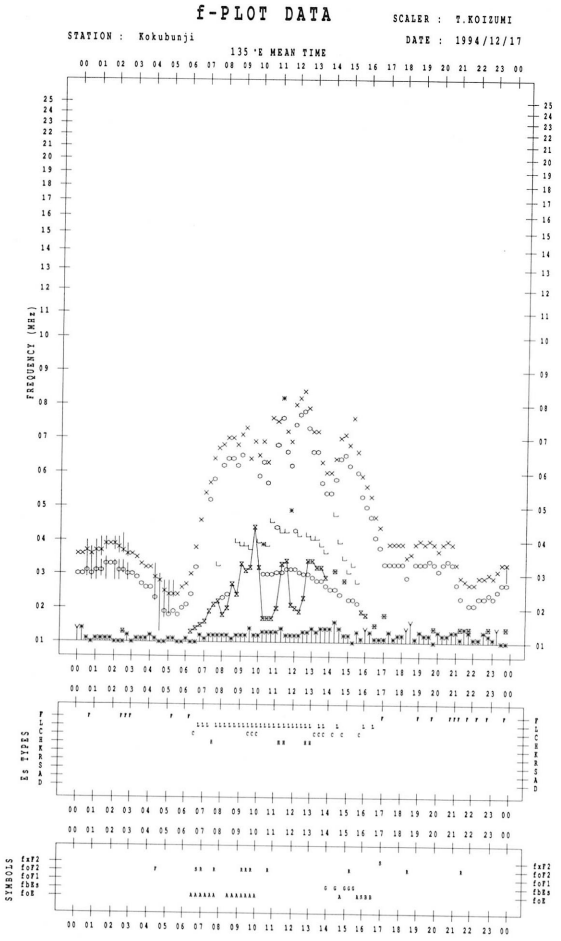

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

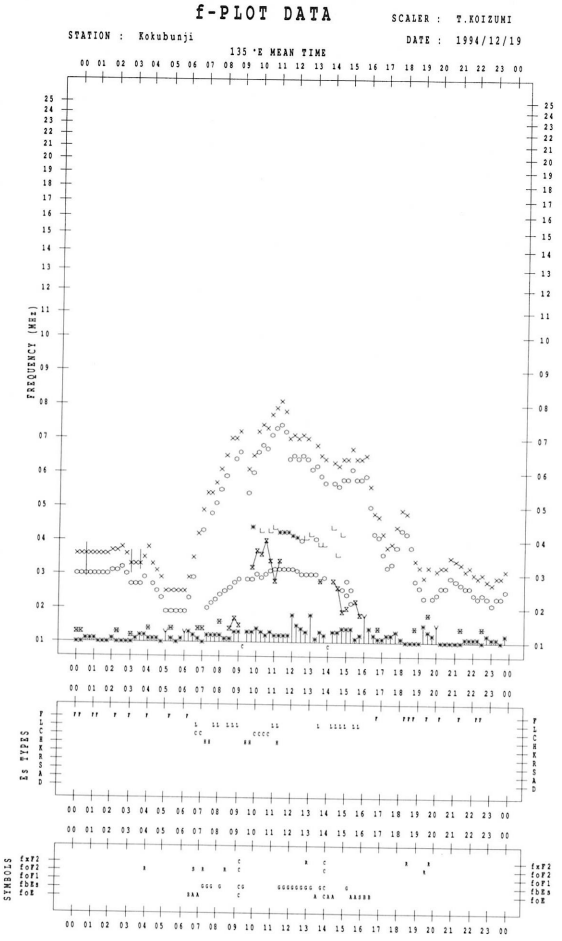

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/13
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

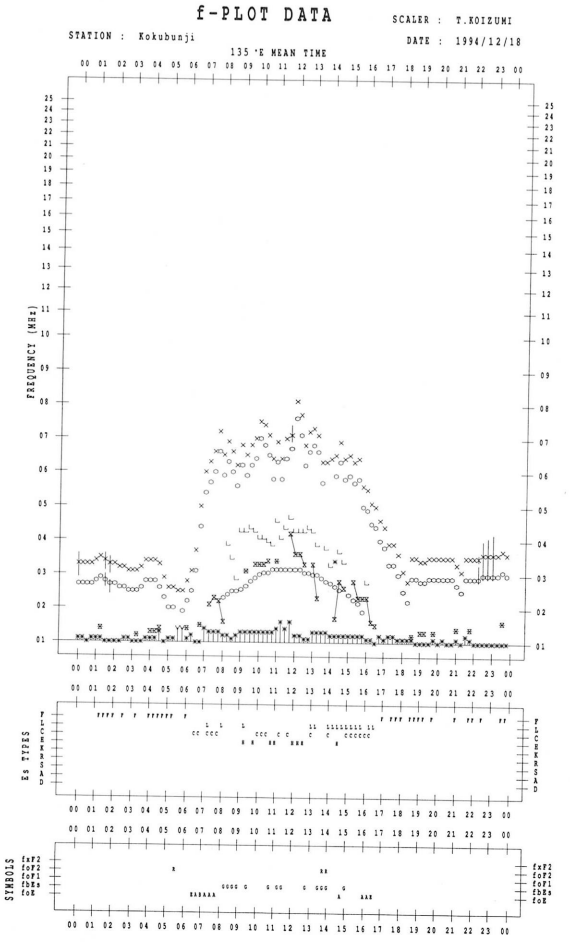

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/15
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

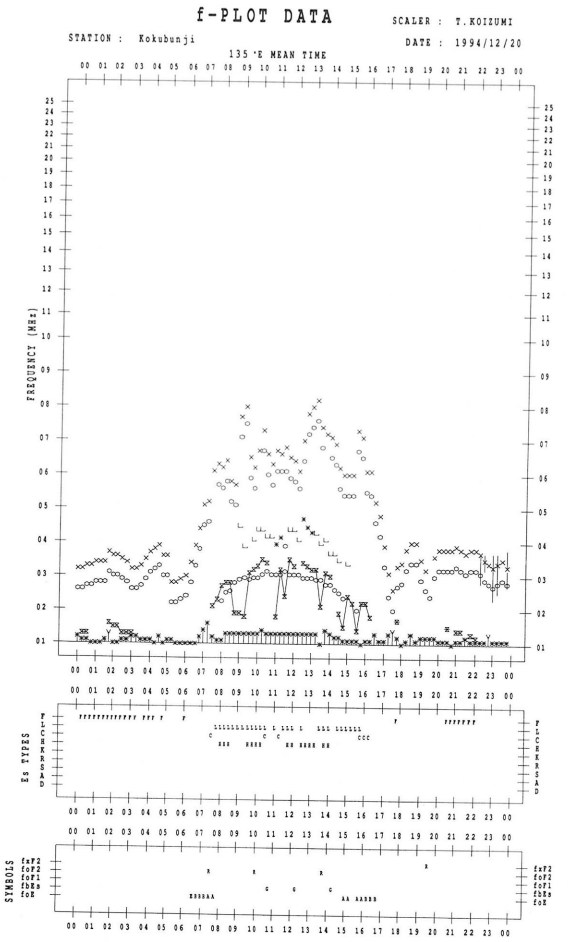

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/14
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

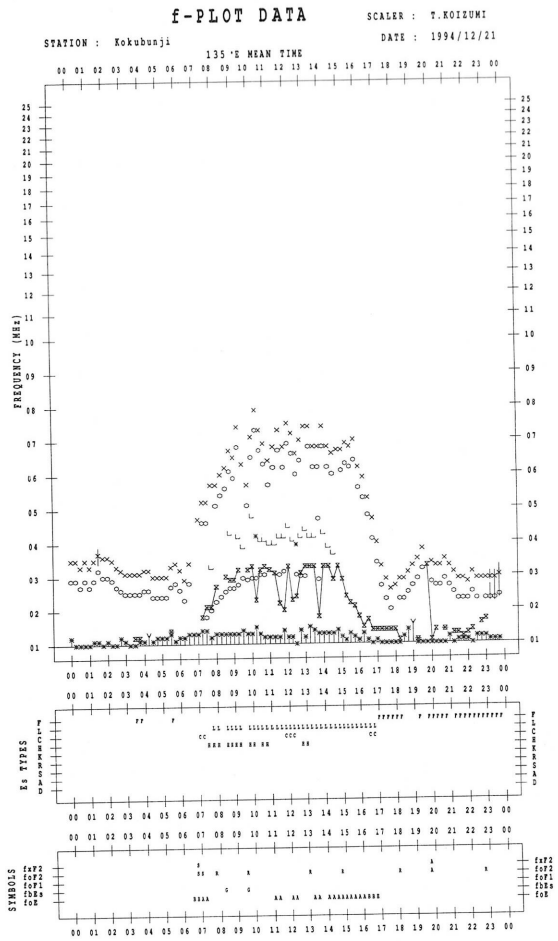

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/16
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

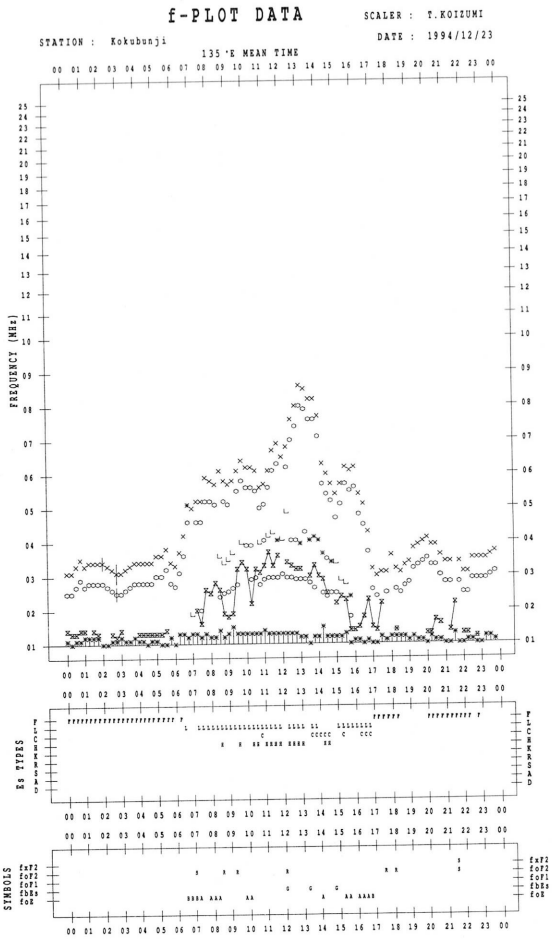

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

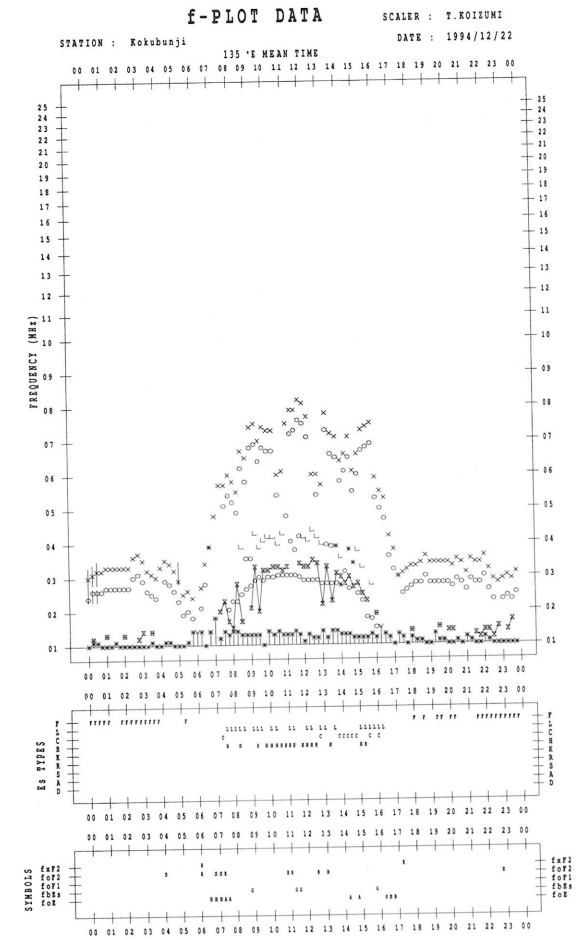

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

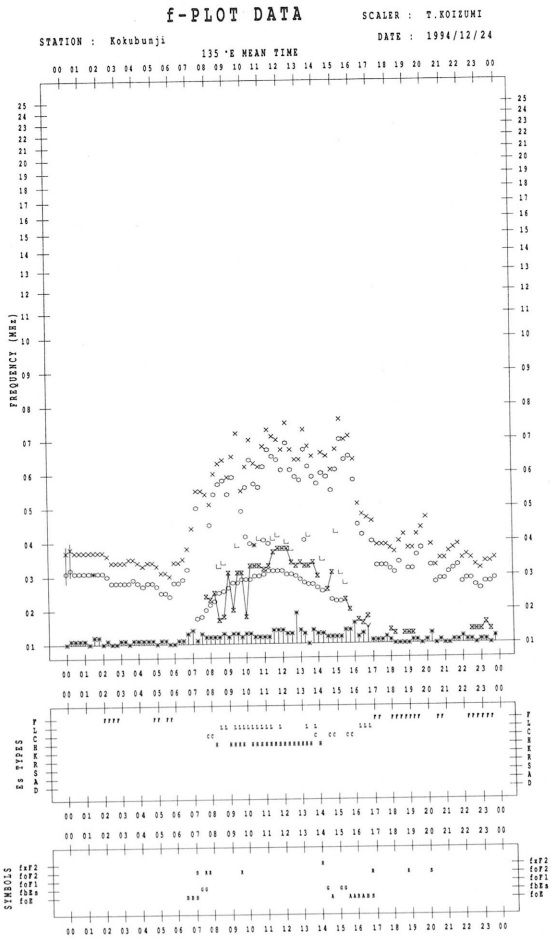

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

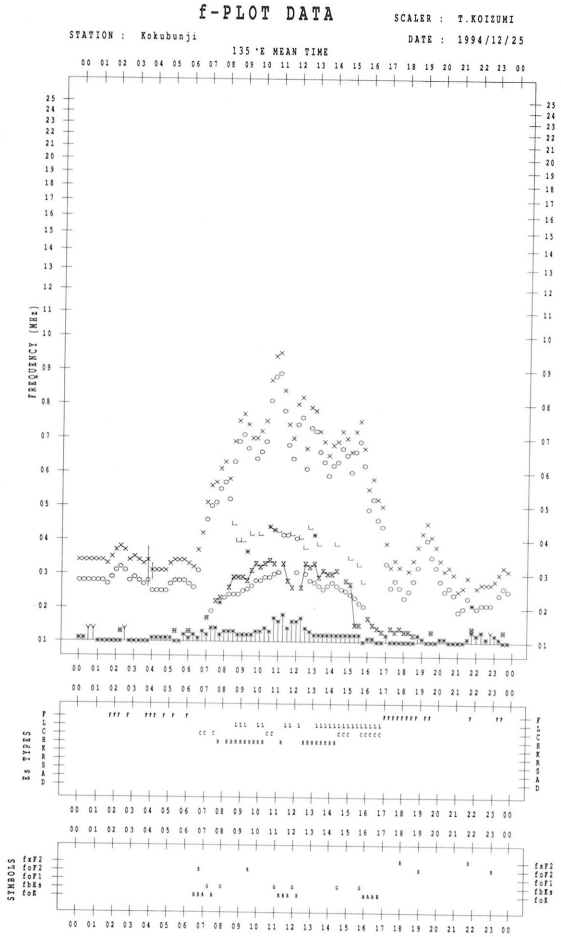

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

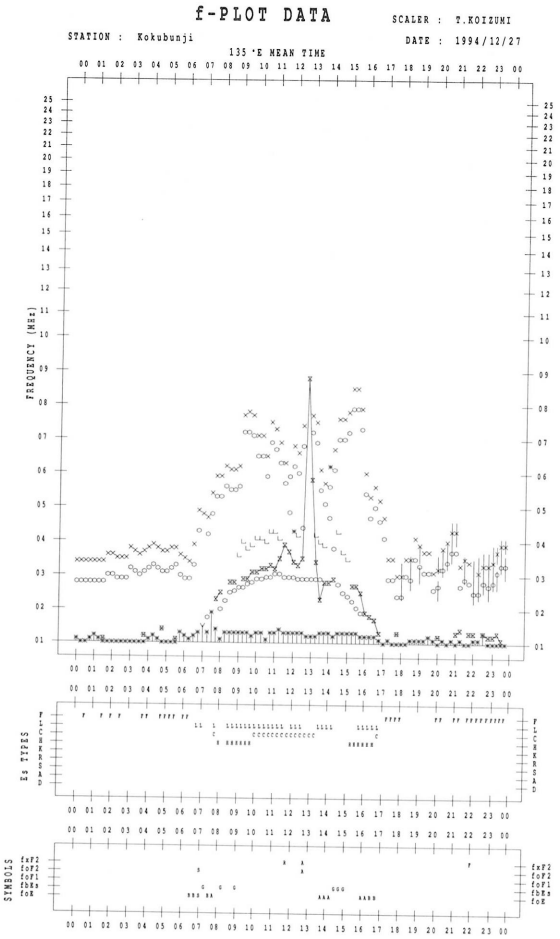

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/21
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

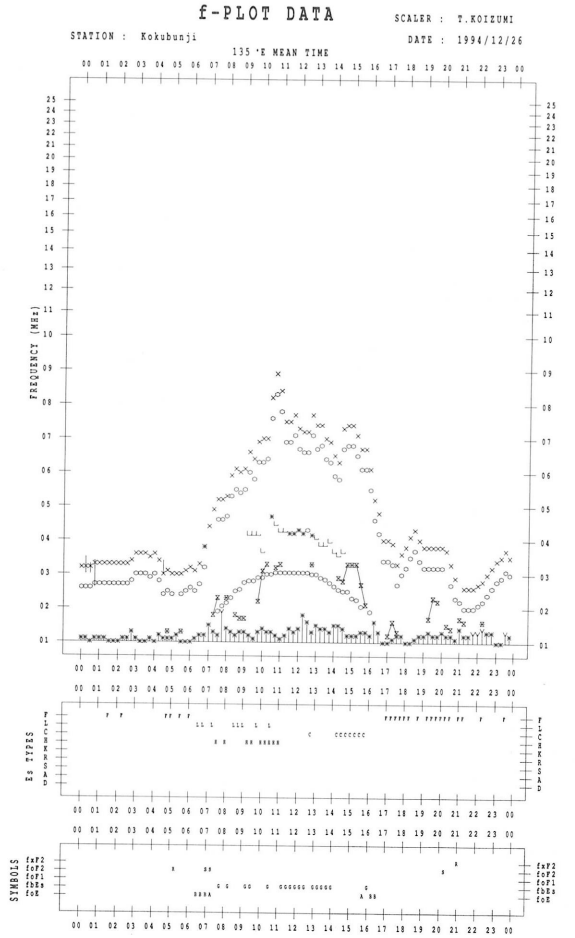

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/23
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

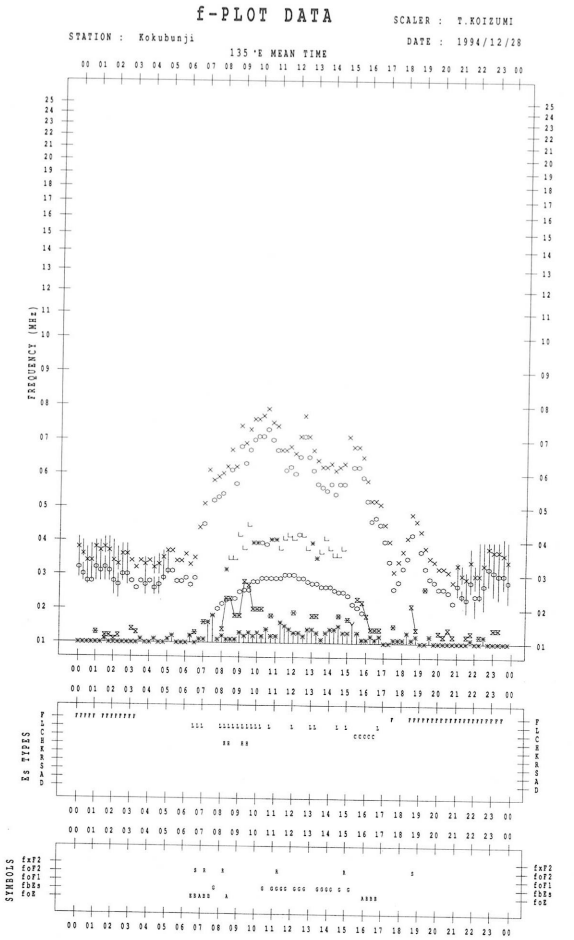

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/22
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

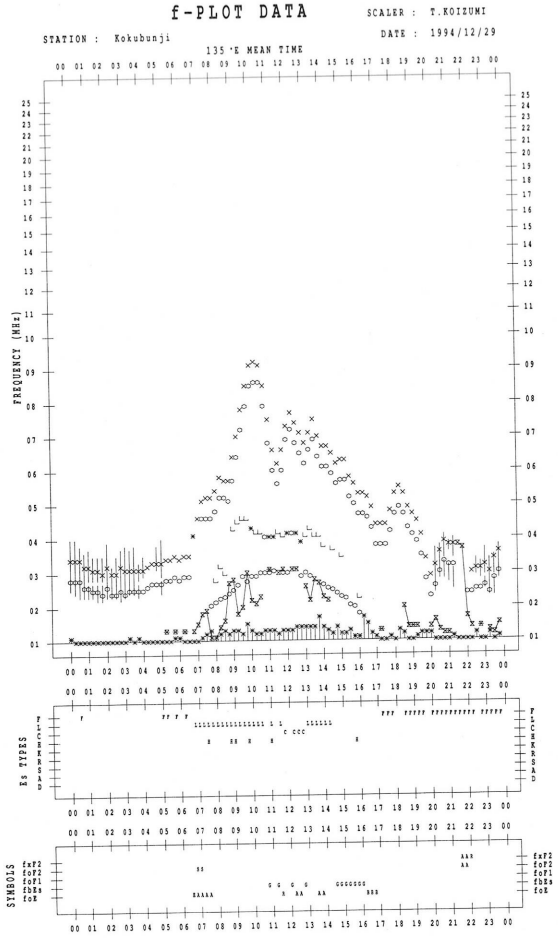

f-PLOT DATA
SCALER : T.KOIZUMI
DATE : 1994/12/24
STATION : Kokubunji
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

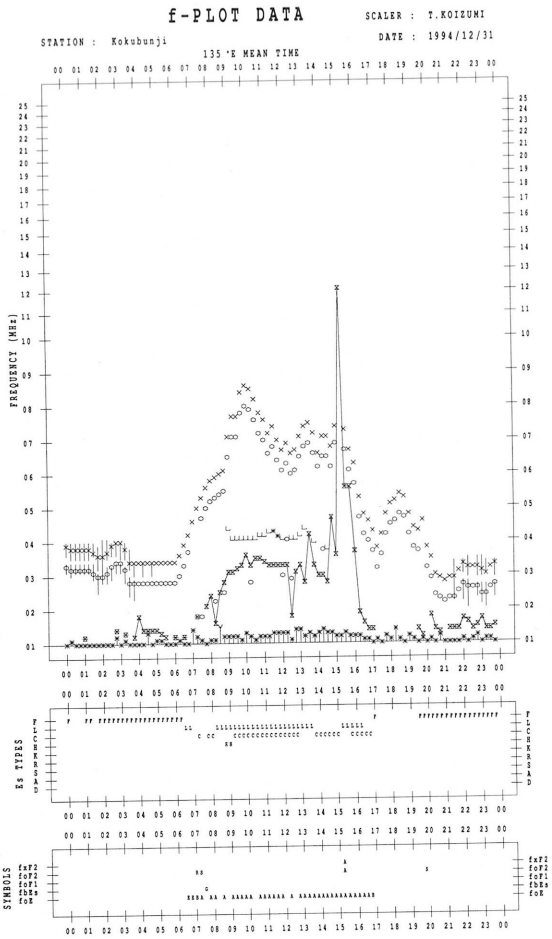

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/25
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

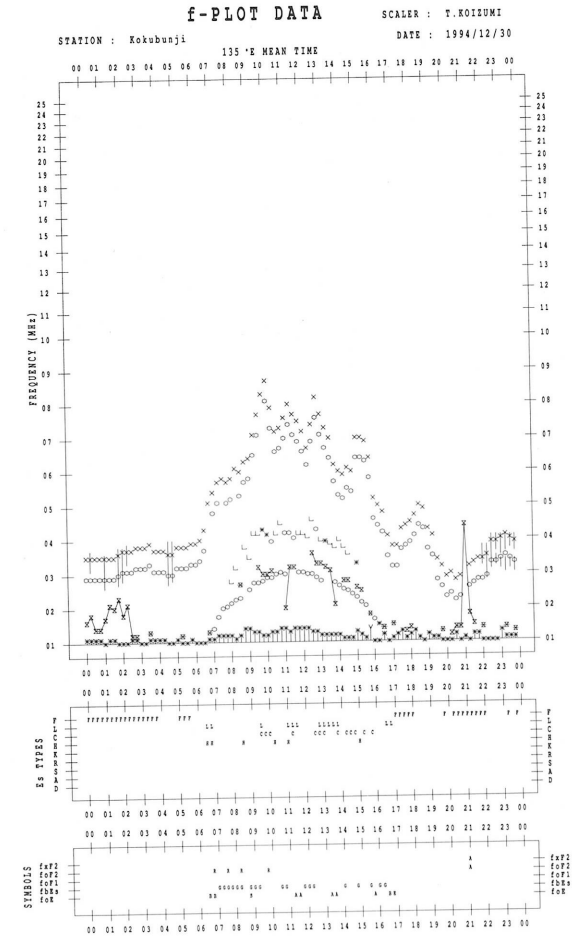

f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/27
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/26
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/28
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : T.KOIZUMI
STATION : Kokubunji
DATE : 1994/12/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Not available until system improvement is completed.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso December 1994

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} Wm^{-2}Hz^{-1}					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	30	29	(29)	30	30
2	30	30	(29)	30	30
3	30	30	(30)	31	30
4	31	30	(30)	31	31
5	31	31	(31)	31	31
6	31	31	(31)	-	31
7	-	(30)	(30)	31	(30)
8	31	30	(30)	31	31
9	31	31	(31)	33	31
10	33	32	(32)	33	33
11	33	33	(33)	32	33
12	33	35	(33)	33	33
13	34	34	(34)	35	34
14	35	34	(34)	33	35
15	33	32	(31)	35	32
16	36	34	(34)	35	35
17	33	31	(31)	48	33
18	40	32	(31)	34	38
19	34	34	(34)	32	34
20	33	31	(31)	31	32
21	31	30	(31)	32	31
22	32	31	(30)	34	31
23	32	30	(29)	33	31
24	32	32	(31)	33	32
25	31	30	(31)	31	31
26	31	30	(30)	29	31
27	30	29	(29)	29	29
28	29	29	(29)	31	29
29	31	30	(30)	31	30
30	31	30	(29)	29	30
31	29	29	(29)	30	29

Note: No observations during the following periods.

7th 2205 - 8th 0508

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso

December 1994

Single-frequency observations

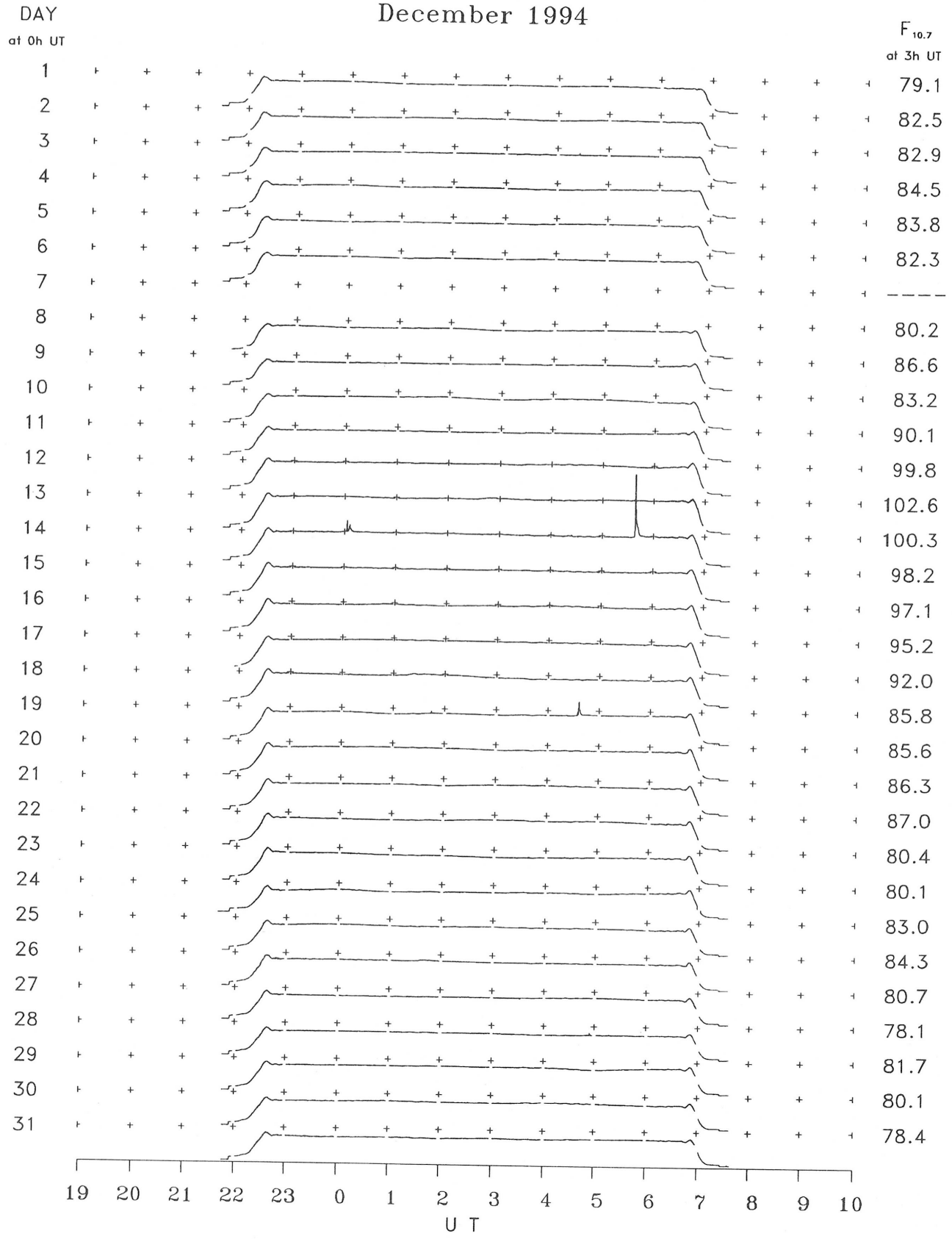
Normal observing period: 2200 - 0720 U.T. (sunrise to sunset)

DEC. 1994	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
12	500	8 S	0156.9	0157.2	0.4	60	-	O
	500	20 GRF	0240	0301.6	99	7	3	WR
	500	46 C	0252.7	0254.1	2.0	500	150	WL
14	2800	45 C	0002.0	0002.9	8.5	34	15	O
	500	6 S	0002.3	0002.9	1.0	6	4	O
	500	46 C	0004.9	0005.5	1.5	190	60	O
	2800	4 S/F	0537.9	0538.8	6.5	186	70	O
	500	46 C	0538.2	0538.8	9.5	107	40	O
19	500	45 C	0434.4	0436.9	4.0	80	50	O
	2800	46 C	0434.9	0436.9	5.0	42	28	WR
21	500	42 SER	0223.8	0230.6	7.5	2	-	O
	500	46 C	2325.1	2325.7	1.0	5	3	O
22	500	46 C	2234.1	2235.3	2.0	33	20	WL
	500	46 C	2241.3	2243.0	3.0	10	8	WL
	500	46 C	2309.8	2309.9	1.0	18	13	WL
23	500	46 C	0224.9	0225.8	1.0	30	20	WL
26	500	46 C	0134.5	0137.1	3.5	15	5	WR

B. Solar Radio Emission

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

December 1994



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)

DEC 1994 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	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-18	-5	ES -27
2	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-7	-7	-2	-4
3	5	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-7	-2	-2
4	-13	-6	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-11	-6	-4	-6
5	ES -28	ES -28	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-10	-2	-2
6	-2	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-6	-2	-2
7	C	C	C	C	C	C	C	C	C	C	C	C	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-19	-13	-7	-7
8	-7	-7	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-13	-7
9	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-19	-19
10	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-10	-7
11	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-4	ES -28	ES -28	ES -28	-7	-4
12	-4	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-19	-4	-8	6	-4
13	0	ES -7	ES -4	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-7	-3	-7
14	-7	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-19	1	6
15	-2	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-2	-7
16	0	-13	7	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-10	-2	-3
17	-19	ES -28	ES -28	ES -28	ES -28	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-7	-3	-7
18	0	ES -28	ES -28	ES -28	ES -28	ES -27	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-13	-24
19	-7	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28
20	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-13	-2	-4
21	2	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-13	-4
22	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-5	-2
23	-4	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-9	-10	-4
24	-4	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	0	-2
25	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-12	-6	-18
26	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-18	-18	-12
27	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-18	-12	-12
28	ES -27	-18	-18	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -18	ES -18
29	ES -27	-12	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -6	ES -27
30	-18	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-18	-3	-3
31	-6	-6	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-18
CNT	30	30	30	30	30	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-18	-5	-7
UD	0	-7	ES -13	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-11	-7	0	-2
LD	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -19	ES -27

C. RADIO PROPAGATION

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

DEC 1994 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	6	3	7	7	5	ES -27	ES -27	ES -27	-5	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-2	6	14	5
2	-5	6	8	0	3	-10	ES -28	ES -28	ES -28	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	11	4	8	9
3	7	8	3	3	8	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	8	10	6	8
4	8	9	10	10	5	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	5	3	6	6	5
5	8	7	6	6	13	-4	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	6	9	6	3
6	13	9	6	6	10	ES -28	-4	ES -28	ES -28	-11	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	10	3	6	11
7	C	C	C	C	C	C	C	C	C	C	C	C	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	8	4	8	6
8	3	3	5	5	9	5	6	-4	-7	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	6	-2	-2
9	-2	3	0	3	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	6	-2	-2
10	8	8	14	6	0	-7	-7	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	8	13	3
11	3	6	11	13	6	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	16	6	3	13
12	3	10	7	8	6	16	-7	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	9	3	6
13	9	10	11	6	13	-19	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	7	9	6
14	6	6	6	16	3	-14	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	1	9	9
15	11	6	3	6	-2	-19	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-3	-2	8	8
16	1	8	5	6	-19	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-8	6	4	6
17	8	2	13	18	6	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	2	2	6	10
18	8	8	7	7	8	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-2	-4	3	8
19	5	3	11	6	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-2	-2	-2	8
20	8	2	7	4	-4	2	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	8	9	-2
21	2	12	6	6	-2	-24	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-2	5	-2	3
22	8	3	7	6	-1	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	13	-4	6	6
23	2	6	6	3	3	-13	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-4	-2	-19	7
24	2	7	13	11	11	-24	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-2	13	13	
25	7	9	9	6	9	-3	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	3	7	4	
26	3	11	14	11	4	-12	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-12	-6	1	-6	0	13
27	8	9	4	11	7	3	-18	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	1	14	4	
28	7	13	13	9	9	-6	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	1	2	3	
29	7	14	4	4	11	-6	ES -27	ES -27	-3	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-1	12	9	7
30	4	7	7	9	9	4	-1	-3	-3	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	9	9	10	7
31	-3	9	7	10	10	7	-6	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-3	3	2	3	9
CNT	30	30	30	30	30	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	6	8	7	6	6	-14	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	3	4	6	6
UD	9	12	13	13	11	5	-4	ES -27	-5	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	ES -27	-6	11	9	13	13
LD	-2	3	3	3	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -27	-4	-2	-2	

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

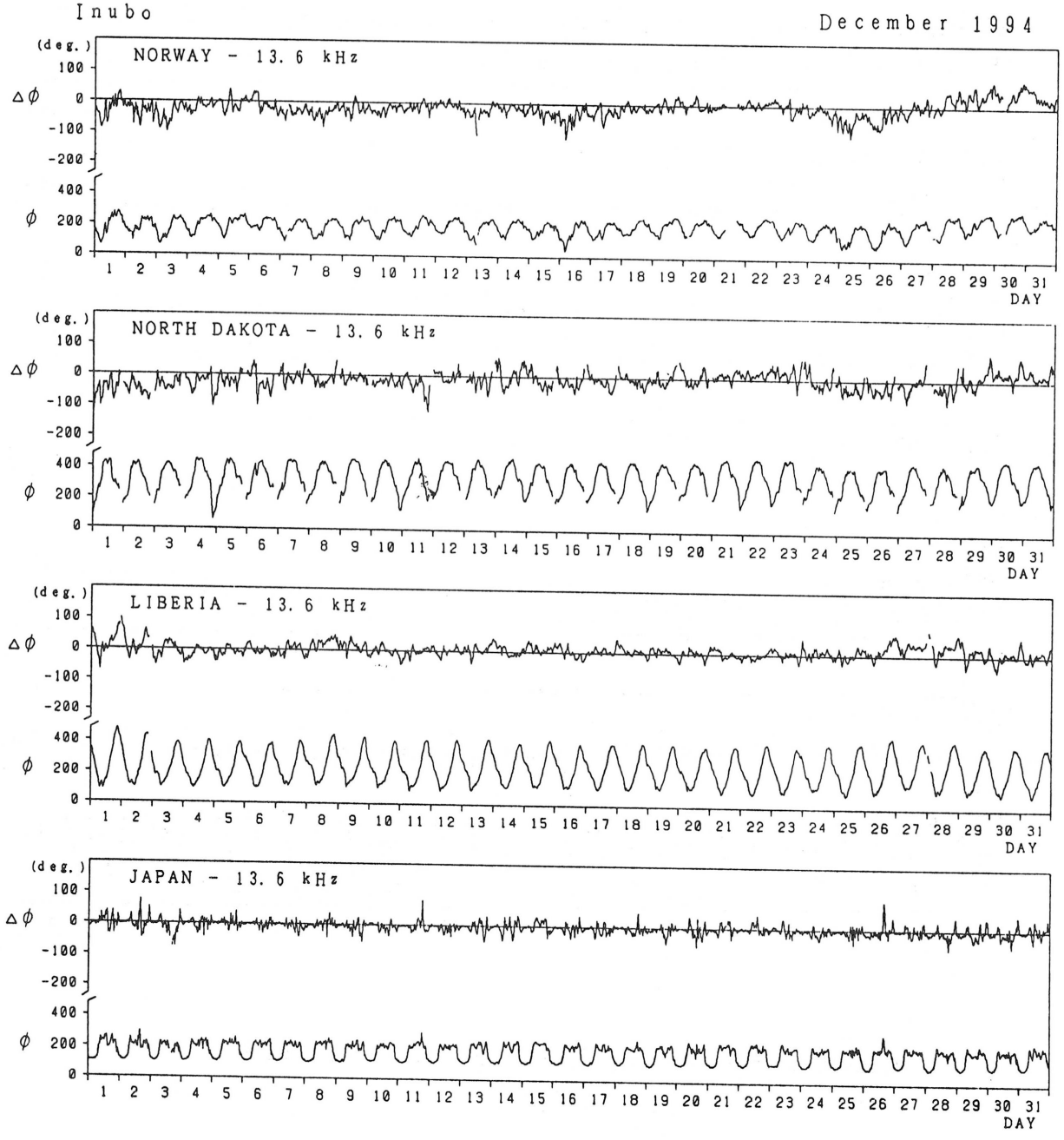
Hiraiso

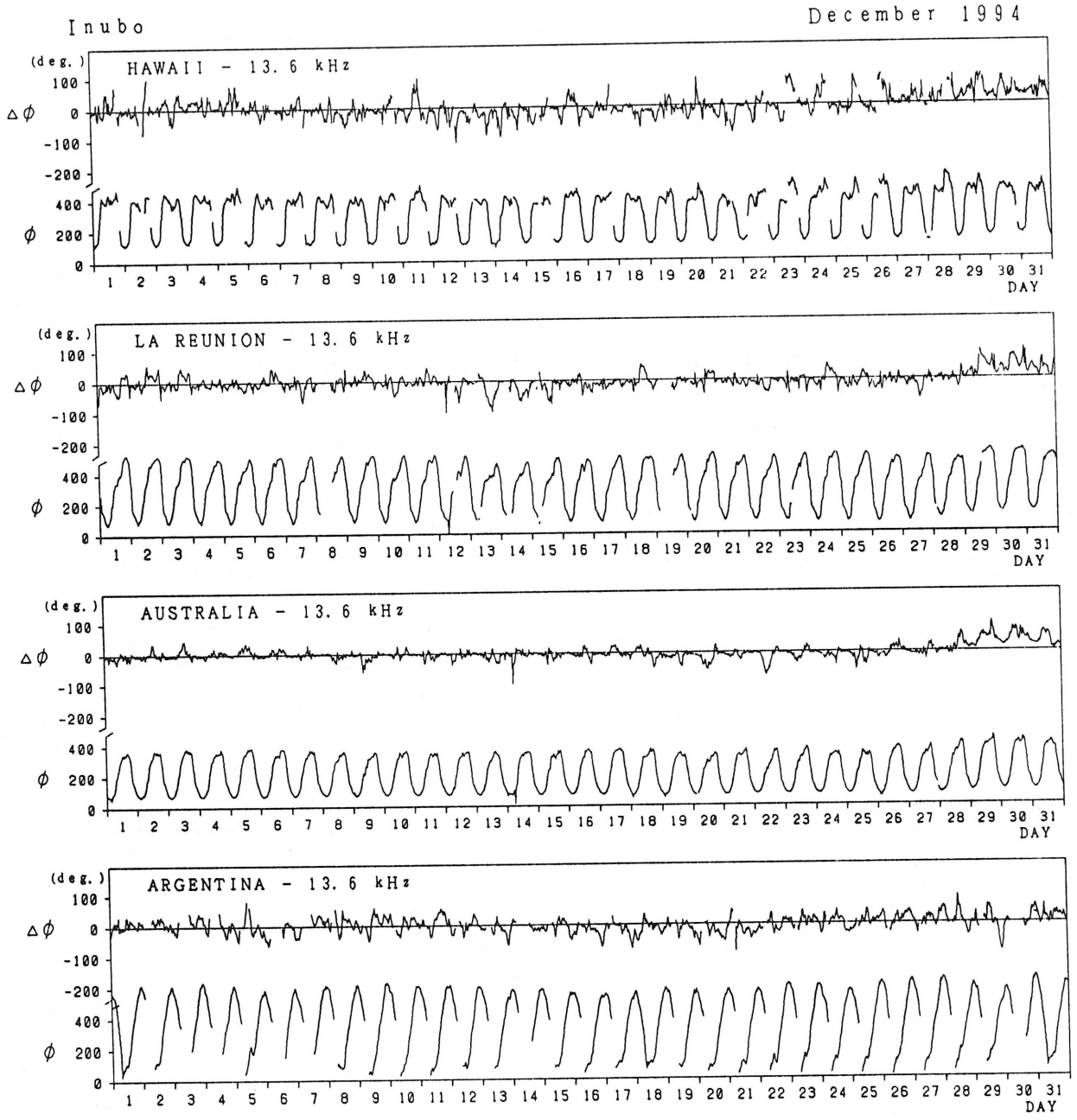
Time in U.T.

DEC. 1994	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	- - - 3U	4 - - 4	N N N N	None
2	4+ U	- - - 5	4 - - 4	N N N N	
3	4o U	- - - 4	4 - - 4	N N N N	
4	4o U	4U - - 4U	4 - - 4	N N N N	
5	4- U	3U - - 4	4 - - 4	N N N N	
6	4+ U	- - - 4	4 5U - 4	N N N N	
7	C	C C - 4	C C - 4	N N N N	
8	4o U	5U - - 3U	4 5U - 3	N N N N	
9	3+ U	- - - 3U	3 - - 4	N N N N	
10	4- U	- - - 3U	4 - - 4	N N N N	
11	4o U	- - - 4U	4 - - 4	N N N N	
12	4+ U	- - - 5	4 - - 4	N N N N	
13	4o U	- - - 4	4 - - 4	N N N N	
14	4+ U	- - - 5	4 - - 4	N N N N	
15	4- U	- - - 4	4 - - 3	N N N N	
16	4o U	5U - - 4	3 - - 4	N N N N	
17	4o U	4U - - 4	4 - - 4	N N N N	
18	4- U	- - - 3U	4 - - 4	N N N N	
19	3- U	- - - 2U	3 - - 3	N N N N	
20	4o U	- - - 4	4 - - 4	N N N N	
21	4- U	- - - 3U	4 - - 4	N N N N	
22	4- U	- - - 4U	3 - - 4	N N N N	
23	4- U	- - - 4	4 - - 3	N N N N	
24	4- U	- - - 3	4 - - 4	N N N N	
25	4- U	- - - 4U	4 - - 3	N N N N	
26	4- U	- - - 3	4 - - 4	N N N N	
27	4- U	- - - 3U	4 - - 4	N N N N	
28	4- U	5U - - 3U	4 - - 3	N N N N	
29	4- U	4U - - 3U	4 - - 4	N N N N	
30	4+ U	4U - - 4	4 5U - 4	N N N N	
31	4o U	5U - - 3U	4 - - 4	N N N N	

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo





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.

DEC. 1994	S W F						Correspondence	
	Drop-out Intensities(dB)				Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS BBC						
14			9		0008	9	S	1-	x	
14			17		0537	18	S	1+	x	

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

Dec. 1994	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
4			36	11			0610	0652	0624
9				11			0210	0236	0214
11			11	7			0330	0350	0337
12			94	42			0639	0744	0651
13				21	16		2059	2157	2106
14	12	13	15	54	41	18	0003	0116	0010
14	47	65	–	124	14	27	0538	0800	0544
18		15		27	17		0118	0230	0145
19			–	25			0438	0520	0443

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