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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

JAN. 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	34	34	34	37	30	30	52	79	88	97	97	86	80	86	72	62	49		A	A	26	31	29
2	34	34	34	30	30	A	A	A	91	74	94	90	82	80	78	70	57	A	28	25		34	35	34
3	38	29	26	29	A	26	29	32	89	87	89	90	78	84	82	77	53	69	34	A	A	A	31	29
4	34	34	34	37	34	34	34	A	64	69	74	87	97	91	66	67	60	54		28	30		28	30
5		28	30	30	31	30	82		68	77	78	83	75	89	70	63	52	48	35	35	30	30	29	A
6	34	34	31	35	35	34			66	80	81	85	90	77	66	67	54	53	36	42	34	36	34	34
7	35	30	31	32	31	36		51	66	85	90	86	71	78	66	66	56	64	34	26	28	30	32	30
8	32	A	34	31	34	34		50		89	86	89	90	89	76	62	61	51	32	31	30	31	30	34
9	34	34	34	29	37	31		42	76	90	78	85		79	78	70	52	51	38	29	29	30	A	A
10	34	35	35	32	34	34	38	49	48								63	A	A	40	28	28	A	A
11	34	34	35	37	37	43	34	53	66				74	73	66	64	64	53	34	32	34	32	A	36
12	35	42	38	37	31	29	A	A	62	67	90	111	90	84	85	68	84	51	48	34	37	42	42	40
13	50	53	52	59	53	30	A	A	74	84	74	110	77	82	89	66	50		34	30		31	28	36
14	30	34	32	A	30	31	A	A	A	72	88	97	78	77	73	77	58	38	34	31	34	29	34	42
15	42	48	48	47	37	N	85	52	75	86	88	80	84	78	82	78	70	N	29	30	29	34	36	32
16	38	38	31	32	35	26		70	84	80	88	58	91	89	86	80	66	54	32	22	26	45	50	54
17	54	53	48	50	47	52	29	56	62	78	84	91	87	88	82	72	63	53	42	35	34	34	43	32
18	38	37	34	30	31	31	A	40	72	78	90	89	81	81	66	66	61		42	45	30	34	34	36
19	37	31	35	34	35	A	A	A	54	73	92	84	84	76	71	68	71	53	37	30	31	A		34
20	35	35	37	35	31	28	A	43	64	86	85	80	83	71	66	70	64	53	40	31	30		34	34
21	A	34	34	34	34	29		35	62	82	78	79	78	66	68	77	57	A	26	29	29	34	35	30
22	A	40	34	34	40	37	34	52	64	68	73	75	79	89	74	67	62	A	52	26	41	47	51	54
23	53	52	50	52	52	54	A	54	65	75	71	80	79	89	80	64	54	54	48	50	43	46	52	52
24	51	52	52	54	54	51	34	53	78	87	68	52	68	74	70	67	54	54	41	35	31	A	38	38
25	43	43	42	42	42	37	70		61	87	83	73	76	67	66	65	59	51	46	44	34	42	43	41
26	43	38	42	38	A	38	34	50	67	88	90	86	87	78	77	65	62	53	51	63	52	50	52	44
27	40	43	38	43	42	20		71	83	97	115	90	91	80	74	78	84	51	42	40	35	30	34	35
28	35	37	30	35	34	34	79	48	86	89	107	114	117	84	74	77	73	36	37	42	A	26	A	34
29	34	A	34	34	31	30			67	77	87	88	90	84	71	72	72	A	A	A	A	34	34	34
30	37	38	36	38	36	34	71	53	89	96	92	84	88	65	78	71	58	46	43	40	26	31	35	30
31	37	36	34	35	35	35		53	74	66	76	82	95	72	77	71	57	50		35	31	35	34	40
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	31	30	29	28	14	21	29	29	29	29	29	30	30	30	31	23	26	28	25	26	26	28
MED	36	36	34	35	35	34	34	52	67	82	87	86	84	80	74	69	61	53	37	33	31	34	34	34
U Q	41	42	38	38	38	36	71	53	78	87	90	90	90	84	80	72	64	54	42	40	34	36	42	40
L Q	34	34	34	32	31	30	34	45	64	74	78	80	78	76	68	66	56	50	34	29	29	30	32	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT WAKKANAI

JAN. 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	G	G	G	G	G	G	34	32	33	G	35	38	37	52	45	G	35	51	126	84	59	36	33	32
2	23	G	G	24	36	90	94	32	59	63	G	G	G	G	G	31	34	34	26	29	G	26	28	G
3	G	G	24	25	44	40	30	G	G	G	G	G	G	G	G	G	G	G	54	70	40	34	G	28
4	G	25	28	G	G	35	33	32	28	58	G	G	G	G	G	G	G	G		G	G		G	G
5		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32
6	G	G	27	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
8	G	32	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	58	30	40	25
10	G	G	26	G	G	G	G	32	34								G	45	65	58	34	G	40	28
11	G	G	G	G	29	G	G	G	G				G	G	G	G	G	G	G	39	G	32	41	26
12	G	G	28	G	G	G	26	44	45	G	G	G	G	G	G	G	G	G	G	G	G	G	32	32
13	G	G	G	G	28	36	38	56	36	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G
14	G	G	G	48	51	33	34	61	92	57	G	G	G	G	G	G	G	G	G	G	G	G	33	24
15	G	G	G	G	G	23	G	26	G	G	36	G	G	G	G	G	G	G	G	G	G	G	28	G
16	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
17	G	G	G	G	G	G	G	G	37	60	G	G	G	G	G	G	G	G	G	G	G	30	30	G
18	32	G	24	30	G	28	30	26	32	52	36	G	G	G	G	36	50	G	G	G	G	G	G	G
19	G	G	35	G	G	31	41	34	G	G	G	G	G	G	G	G	G	G	G	G	27	40		33
20	G	G	G	G	24	24	26	43	39	G	G	G	G	G	36	33	G	G	25	39	G		G	26
21	32	29	G	26	G	28		G	G	G	G	G	G	G	G	G	G	84	39	33	26	32	32	40
22	34	G	G	G	28	32	G	G	G	G	G	39	G	G	G	G	58	58	59	34	G	G	G	G
23	G	G	G	G	33	G	50	50	G	G	G	G	G	G	G	G	G	G	32	40	32	29	28	G
24	G	39	G	G	G	G	40	G	G	G	G	G	G	G	G	G	32	G	G	G	33	40	30	29
25	29	33	26	G	G	G	G	G	42	G	G	G	G	G	G	G	G	G	G	58	38	36	36	31
26	32	32	41	26	54	29	32	28	32	G	G	G	G	G	G	G	G	G	26	36	38	37	40	G
27	G	G	30	26	G	35		G	G	52	40	G	G	G	G	58	G	30	G	G	25	G	G	G
28	G	G	G	G	G	G	26	27	G	G	G	G	G	G	35	G	G	G	G	G	39	G	34	33
29	31	27	G	G	G	G	G	32	30	G	G	G	G	G	G	G	G	40	59	54	71	30	30	24
30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G	29	28
31	27	G	G	G	24	24	G	34	G	G	G	G	G	38	40	G	G	G		G	32	26	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	30	31	31	31	31	31	27	31	31	29	29	29	30	30	30	30	31	31	29	31	31	29	30	31
MED	G	G	G	G	G	G	26	26	G	G	G	G	G	G	G	G	G	G	G	G	G	26	28	24
U Q	23	G	26	G	28	31	34	32	34	G	G	G	G	G	G	G	G	G	29	39	34	32	33	29
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

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

HOURLY VALUES OF FOF2 AT KOKUBUNJI

JAN. 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	34	43	40	34	35	35	35	58	82	100	115	102	85	81	82	80	82	52	54	A	A	A	40	46
2	40		A	A	A	26	A	54	88	116	97	87	85	88	91	77	68	51	A	A	34	A	A	A
3	A	A	A	A	A	N	N	68	81	114	122	91	85	88	80	78	66	56	47	A		A	A	A
4		31	A	A	A	35	36	52	88	98	90	88	86	96	97	70	55	58	48	30			A	32
5		30			28	29	31	57	66	82	93	82	78	77	74	63	61	44	38	38	29	32	30	30
6	31		34	31	29	51	37	59	76	93	104	87	76	75	76	76	68	56	42	42	41	35	40	43
7	32	30	30			40	25	56	77	86	97	97	75	80	82	74	67	46	A	A	A	A	35	41
8	32	47	38	28		26	31	60	80	98	93	84	82	84	81	71	56	64	44	45	35	A		
9			43	29		56	40	59	68	71	87	72	78		77	70	58	48	69	50	A	A	A	A
10	A	A	38		29	36	43	53	68	65	87	95	95	71	68	83	66	56	58	43	38	26	28	29
11			32	37	34	37	26	61	66	61	80	93	94	82	71	60	59	52	47	51				A
12			A	A		38	49	66	60	83	113	94	78	80	85	80	59	58	58	37	43	50	43	40
13	48	44	46	58	56	38	44	54	68	75	110	87	95	80	70	74	72	59		34	34		34	69
14	34	38	55	N		30	26	47	56	68	94	102	92	72	71	80	74	46	35	34	35		33	38
15	43	34	40	A	N	50		47	71	85	116	106	78	90	65	71	73	46	A	35	A	A	A	A
16	37		41	N		N	50	60	73	68	68	74	84	83	95	82	66	57	43		43	31	48	34
17	48	33	35		35	42	53	62	85	76	96	112	86	87	82	83	79	56	49	54	30	40	38	52
18	40	40	36	30	26	N	A	44	82	58	79	A	96	72	70	70	81	58	38	44	31	25	A	31
19	31	A		32	35	50		57	69	67	95	96	80	67	76	74	71	56	42	45	34		31	
20	41	36	40	34		N		52	70	67	71	94	92	80	62	62	69	56	46	41	37	A	A	A
21	36	32		30	29			45	58	68	78	95	92	79	70	76	67	58	30	35	40	28	30	32
22		38	37	35	40	37	33	52	73	67	82	82	85	67	61	73	73	56	37	54	46	N	46	39
23	47	40	43	47	44	41	42	60	66	66	88	81	82	73	72		66	57	51	50	44	44	43	46
24	47	44	44	45	44	38	36	66	62	70	84	78	75	70	78	77	70	50	40	40	42	28	38	41
25	A	42	A	45	39		56	84	67	66	84	84	80	75	74	63	63	57	40	47	49	43	42	53
26	A	43	48	48	41	32	51	56	76	73	101	107	77	72	76	80	66	66	67	54	46	41	44	37
27	50	54	57	48	51	37		61	73	81	101	96	91	78	81	66	78	75	52	41	43		37	38
28	40	40	50	37	37	48	40	69	68	97	106	120	113	102	78	80	67	64	41	37	56		40	
29	A	37	46	37	31	30	N	57	89	82	91	96	103	91	84	72	72	50	41	40	44	35	35	
30		46	35	50		37	46	57	80	92	95	94	83	79	72	66	66	52	35	46	35	24	34	37
31	31	38	49	41	34	56	51	58	66	83	91	82	91	81	70	73	67	56	A	38	46	32	34	51
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	22	23	20	19	25	22	31	31	31	31	30	31	30	31	30	31	31	26	26	24	15	22	21
MED	40	39	40	37	35	37	40	57	71	76	93	94	85	80	76	74	67	56	44	42	40	32	38	39
U Q	47	43	46	46	41	45	49	61	80	92	101	96	92	84	82	80	72	58	51	47	44	41	42	46
L Q	32	34	36	31	29	33	33	53	66	67	84	84	78	73	70	70	66	51	40	37	34	28	34	33

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

JAN. 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	26	G	G	G	G	24	38	G	44	60	45	G	G	51	44	55	G	59	132	111	112	72	59	G
2	G		26	36	55	57	57	49	54	54	53	48	53	61	56	42	50	56	50	45	31	43	52	61
3	60	58	35	31	27	G	G	29	56	60	40	44	48	G	G	G	34	G	44	58		53	27	30
4		G	36	33	33	G	G	52	G	G	G	52	G	G	G	G	G	G	G	G			26	25
5		G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	31	G
6	G		G	G	G	G	G	G	G	35	G	G	G	G	G	G	G	G	G	G	G	G	G	26
7	G	G	G			24	G	G	G	54	G	G	G	G	G	G	32	33	46	60	52	31	G	G
8	40	G	G	G		G	G	G	33	G	G	G	G	G	G	G	G	G	27	G	25	26		
9		G	G	G		G	G	G	G	G	G	G	G		G	G	G	28	40	30	36	34	32	25
10	31	28	25		G	G	G	33	G	40	G	G	G	50	50	G	G	G	G	G	G	G	G	G
11			G	G	G	G	G	G	32	49	G	G	G	G	G	G	G	52	G	G		G		38
12	G	G	28	28		G	G	G	34	40	G	G	G	G	G	G	33	36	26	G	G	G	G	G
13	G	38	28	G	G	G	23	29	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G
14	G	G	G	G		G	28	53	40	60	85	G	47	G	38	37	40	44	G	G	G		G	G
15	G	G	29	33	G	27		28	35	G	73	G	G	G	G	G	G	27	28	30	38	32	26	26
16	G	G	G	G		G	26	29	40	G	G	G	G	G	G	44	G	34	44		G	G	G	G
17	G	G	G		G	G	22	G	G	G	G	G	G	G	51	G	G	G	46	G	G	G	G	39
18	G	G	G	G	G	G	24	G	37	G	50	90	59	60	G	G	G	G	G	G	32	48	34	25
19	G	38		G	G	G	G	34	G	G	G	G	55	57	47	67	50	48	35	34	28		G	
20	G	G	G	G	G	G		G	35	G	G	54	51	60	50	G	55	27	G	G	37	52	50	59
21	G	34	G	G	G			G	33	G	46	41	G	G	G	G	36	32	31	29	25	G	G	G
22		G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G	G	48	G	G	60	41	G	G	G	G	G	G	G	G	40	G	G
24	G	G	G	28	35	G	G	26	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G
25	34	28	36	G	G	G	G	G	G	G	G	G	G	46	48	G	38	G	G	26	G	G	G	G
26	41	G	G	G	27	G	G	G	G	G	G	G	G	G	G	G	35	26	G	28	G	G	G	G
27	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G
28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	34	G	G	G	G	
29	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G
30		G	G	G	G	G	G	G	G	G	G	G	55	52	G	G	G	G	G	G	G	G	G	35
31	24	G	26	G	G	G	G	G	G	G	G	G	G	G	G	55	34	31	29	G	G	25	32	28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	28	30	27	25	30	27	31	31	31	31	31	31	30	31	31	31	31	31	30	28	26	29	28
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U 0	25	G	26	G	G	G	22	29	35	40	G	G	41	46	38	37	35	33	35	29	29	40	29	27
L 0	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

JAN. 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	14	15	15	17	21	15	14	20	15	15	21	36	38	32	28	18	15	15	14	15	14	14	15	14
2	15		18	14	14	14	14	15	15	20	24	23	24	22	17	17	14	14	14	16	14	14	15	15
3	14	14	14	15	14	15	15	16	32	18	18	21	16	35	33	28	17	15	15	15		14	15	14
4		14	15	15	14	17	16	14	16	16	20	20	40	36	34	27	15	16	15	15			16	15
5		15	17		20	17	16	17	16	18	18	17	39	24	33	29	28	15	16	14	14	15	14	16
6	15		14	15	15	15	15	17	15	15	20	21	34	35	36	28	26	15	15	17	15	16	15	15
7	15	18	14			14	15	17	16	20	24	33	29	22	17	14	14	15	15	15	15	15	15	14
8	14	15	17	16		17	15	18	14	18	21	39	34	33	23	18	24	15	16	15	15	14		
9		17	15	15		16	14	17	34	39	43	42	46		39	40	30	15	15	15	16	16	15	15
10	15	14	14		15	15	15	15	22	20	33	34	18	16	16	18	23	18	17	26	15	20	18	16
11			16	14	14	16	15	15	14	14	18	18	21	36	37	18	22	14	15	20		66		15
12	20	14	15	15		15	15	16	15	16	15	17	21	20	18	18	15	14	16	16	15	15	15	16
13	15	14	14	17	15	15	16	14	18	17	35	39	20	22	15	16	21	15	16	18	18		15	15
14	14	15	14	14		15	15	14	22	14	29	32	16	36	27	14	14	15	15	15	15		15	14
15	15	16	21	17	16	15		15	14	16	20	24	22	15	21	15	17	14	14	15	15	15	15	15
16	17		16	15		18	15	14	16	35	33	35	38	17	34	23	18	15	15		15	15	20	15
17	15	14	16		15	15	15	14	18	32	18	15	17	15	15	15	18	16	14	15	15	16	15	15
18	14	16	15	16	15	15	16	17	18	27	20	21	20	16	16	30	14	15	15	20	14	15	15	15
19	15	28		16	14	14	15	15	14	30	18	34	21	21	20	16	16	15	14	14	15		14	
20	16	14	14	15		15		18	14	29	35	27	28	21	29	15	15	15	18	15	28	15	15	15
21	15	14	23	18	15			18	15	22	26	26	20	18	18	18	14	14	15	15	16	17	15	16
22		16	14	15	16	15	15	17	27	15	22	35	35	35	35	16	24	16	17	15	15	20	16	15
23	15	15	15	14	14	15	15	20	15	33	36	23	23	23	20			18	15	14	15	15	15	15
24	15	15	15	14	14	17	15	16	18	18	39	39	35	39	34	28	17	15	15	16	15	17	18	14
25	14	14	14	14	14		15	16	27	32	35	38	36	43	32	32	22	18	15	14	15	17	15	15
26	17	15	15	14	15	15	15	20	26	33	36	42	34	40	35	32	15	17	16	15	15	14	15	16
27	16	15	15	15	14	15		20	29	21	38	38	35	36	23	20	27	22	16	15	16		17	17
28	16	16	15	15	15	15	16	26	18	38	32	37	35	41	35	29	18	18	16	15	22	18	17	
29	15	16	15	14	14	15	18	20	28	20	35	23	21	45	35	16	16	16	15	14	16	16	16	16
30		15	15	15	15	18	18	18	28	30	33	39	20	15	34	30	27	17	15	15	15	16	16	14
31	15	18	14	15	16	15	15	18	15	16	39	35	35	36	33	14	14	14	15	15	15	17	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	27	30	27	24	29	27	31	31	31	31	31	31	30	31	30	30	31	31	30	28	26	29	28
MED	15	15	15	15	15	15	15	17	16	20	26	33	28	28	29	18	17	15	15	15	15	16	15	15
U Q	15	16	16	16	15	16	16	18	26	30	35	38	35	36	34	28	23	16	16	16	15	17	16	15
L Q	14	14	14	14	14	15	15	15	15	16	20	21	20	20	18	16	15	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

JAN. 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		49	28	N	30				66	90	112	105	86	86	85	85	80	74	62	65	34	A	48	
2	42	A	58	A	28	A	A	A	74	108	111	105	100	93	105	97	77	62	54	A	A	33	43	44
3			30	A	A	A	A	31	66	105	132	101	94	91	91	87	77	66	54	A	A	A	A	
4		30		A	29			29	71	105	106	111	111	132	137	114	76	66	49	50	22	51		
5			25	30	39		25	49	66	71	91	94	90	78	79	82	77	64	43		A	A	A	32
6		51	33				30	43	62	78	114	96	76	75	74	81	82	68	52	44	57	A		A
7	31	39		28	34	N	28		72	72	85	94	106	107	101	108	87	72		34	42	A	A	
8				31	28		32		66	85	90	80	91	95	101	85	71	71	64	60	72	50		A
9		28			29	29	30	44	65	70	96	88	108	111	97	87	78	65	53	66		A	A	A
10				30	30					60	66	95	107	105	82	97	90	66	51	64		89		32
11	32	59	30			25	19	33	66	72	67	88	105	120	104	100	78	60	52	62	42		N	
12	34		31	30	30	N		36	52	72	104	90	87	82	93	86	75	66	49	52	60			
13			49	43	34	A	49	35	66	66	90	102	84	90	90	93	77	51	43		59			89
14					N	30	24		54	66	71	106	92	71	66	77	70	62	46	32	59	79		49
15	38	31	30	24				69	64	69	89	102	115	107	78	65	81	61		A		69	79	79
16	49		43	N				36	63	61	65	82	90	97	95	78	72	55	42	N	39	79		25
17	39	42	25		32	N	79	52	60	66	77	110	94	90	88	71	66	52	51	63				53
18		29		29	29		25	46	57	64	74								52	34	79	A	A	49
19	A	A	N	N	N	A	A	N	39	A	76	106	78	A	74	84	78	A	49	A	A	A	A	A
20	A	A	A	A	A	A	N	59	59				108	85	71	64	66	70	39					A
21	A	A	51	46	30				45	39	75	87	99	97	87	76	78	64	31	A	A	A		A
22	51	51		23	26		N	66	60	67	77	76	93	74	65	68	77	66	36	51	65	26		46
23		N	46		30	20	25	N		65	71	77	93	77	72	72	72	A	38	51	61		46	59
24		A	32	30	43	29	N	71	51	56	68	83	93	78	78	81	86	68	53			N	71	51
25			28	A	31		N			64	65	82	82	80	82	71	67	67	A	A				68
26			N	A	46	68	69	46	78	87	86	111	82	70	71	74	77	77	77	51		36	66	N
27		56		40	N	N		N	73	79	72	86	N	90	97	82	62	71	42	32	51	30	70	26
28	50	31		35	37	A	A	49	65	88	111	131	130	129	112	104	81	80	52			70		51
29	71	45	34	35	40			26	50	90	101	91	110	131	129	110	78	58	28	51	A	32		
30		31	46	N	32	30	28	24	82	76	92	104	93	87	76	74	67	66	52			53	34	
31			29	23	A	25	28	25	64	77	87	108	98	90	88	77	78	66	30	50	68	70	89	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	14	18	15	21		14	20	28	29	30	29	29	29	30	30	30	28	28	18	15	14		15
MED	40	40	32	30	30		28	44	64	72	86	95	93	90	88	82	77	66	50	51	59	52		49
U Q	50	51	46	35	35		32	50	66	86	101	105	106	106	97	93	78	69	52	62	65	70		59
L Q	34	31	29	28	29		25	32	58	65	72	86	88	79	76	74	72	62	42	44	42	33		32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

JAN. 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	49	59	130	62	46	60	49	G	27	G	29	32	71	G	
2	G	34	58	44	30	48	66	70	G	71	116	55	58	80	104	86	64	G	59	54	39	G	G	G
3			24	28	31	29	31	29	G	40	G	50	47	43	G	41	G	G	38	94	81	68	47	
4		G		29	24			G	60	60	64	G	G	G	G	G	G	G	33	33	26	25		
5	G	G	G	G	G	G	G	G	33	G	G	39	G	G	G	G	G	G	G		48	48	40	29
6		G	G				G	G	48	G	44	42	43	48	G	43	G	31	34	32	85	59	G	80
7	G	G		G	G	G	G	G	G	G	55	G	G	43	G	G	G	G		32	28	30	30	G
8				G	G	G	G	G	G	G	G	42	G	G	G	G	G	G	G	26	G	G		24
9	G	G			G	G	G	G	G	G	G	G	G	G	G	46	G	G	40	40	G	44	31	26
10			G	G	G	G				G	G	G	G	G	G	G	41	33	28	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	40	G	G	G	G	59	G	39	G	24	G	G	G	G	G
12	G	G	G	G	G	G	G	G	29	G	G	40	G	G	G	G	G	G	G	G	G		G	G
13	G		G	28	G	24	G	24	G	39	45	46	43	G	G	G	41	37	32		G	G	G	G
14	G	G	G		G	G	G	G	G	G	38	G	G	50	78	G	G	39	33	28	G	G		G
15	G	G	G	G	G	G	G	G	G	G	41	47	G	G	G	G	G	G	G	34	G	G	G	G
16	G		G	G	G	G	G	G	G	G	G	48	G	G	G	G	G	G	30	G	G	G	G	G
17	G	G	G		G	G	G	G	32	G	G	42	G	G	39	G	G	42	G	G	G			G
18	G	G	G	26	G		G	G	28	G	41	G	67	60	55	43	44							
19																								
20													G	G	G	G	G	40	39		G		G	36
21	33	32	25	30	G				36	G	G	41	54	G	G	G	G	G	28	39	33	29		30
22	G	G	G	G	G		G	G	G	G	G	G	G	G	44	38	G	G	30	G	G	G	G	G
23	G	G	G		G	G	G	G	G	G	G	G	G	G	56	G	G	44	G	G	G	G	G	G
24	G	30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
25	G	G	G	31	G		G	G	G	G	G	G	42	G	42	G	G	32	48	33		G	G	24
26	28	G	28	31	25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
27		G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
28	25	G	G	29	28	24	27	G	G	G	G	G	G	G	G	38	G	G	25	G	G	G		G
29	G	G	G	G	G			G	G	G	G	G	G	G	G	G	G	G	26	24	32	25	G	G
30	G	G	G	G	G	G	G	G	G	N	G	G	G	G	G	G	G	G	G	G	G	G	G	G
31		G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	33	G	G	28	24	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	21	24	25	24	28	21	24	27	28	28	29	29	30	30	30	30	30	29	28	26	28	26	23	26
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	12	G	G	G	G
U Q	G	G	G	28	G	G	G	G	14	G	41	42	42	G	42	38	G	31	33	33	30	29	G	24
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

JAN. 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	16		212	24	46	38	18	38	18	24	21	18	46	15	43	16	15	16	15	
2	15	15	16	15	15	15	40	15	43	42	18	22	23	40	17	29	15	42	15	15	15	16	15	16
3			15	15	15	15	15	15	43	16	34	44	16	24	15	15	18	15	15	15	15	15	15	
4		16		15	15			16	15	15	16	34	34	17	16	48	15	15	15	15	15	16		
5	17		16	15			15	15	18	16	16	27	26	43	20	42	32	22	27		15	15	15	15
6		15	15					15	23	16	20	17	22	27	16	15	39	15	15	15	15	16		42
7	16			15	15	15	15		15	44	24	38	44	18	43	16	16	26		15	15	16	16	
8				16	16	18	15		23	16	43	18	20	45	26	18	17	23		15	44	16		16
9		16			15	15	15	15	38	34	44	41	44	44	40	24	26	38	15	15		15	16	16
10			16	15	15					40	16	16	17	34	39	15	15	15	15	42		15		15
11	15	15	16	26		15	16	15	15	15	17	40	17	21	16	15	14	42	15	15	15		17	
12	15	15	16	15	15	16		24	15	16	16	16	44	45	16	42	44	21	15	32	15		16	16
13	18		15	15	16	15	18	16	40	15	16	16	20	18	26	16	15	15	15		16			
14	17		16		15	15	15		15	15	15	16	17	16	15	35	17	17	14	15	15	212		15
15	14	26	15				15	14	43	30	16	15	20	45	21	42	30	18		15		14	15	15
16	15		14					14	14	42	42	29	21	22	17	14	18	45	14	14		14		14
17		15	14		14	15		15	15	15	15	18	16	33	18	18	42	29	14	14				15
18		14		15	14		15	15	16	16	27	16	18	24	16	23	14	45	15	16	15	27	16	15
19	17	16	16	15	15	17	17	16	22	26	29	29	29	29	29	29	16	24	20	17	22	22	22	22
20	17	23	15	15	23	16	15	15	22				27	24	28	18	32	15	15		15			15
21	16	14	14	14	14				17	15	42	22	24	24	20	18	33	22	15	14	14	14		14
22	16	14	15	15	15		14	14	21	15	38	40	22	23	17	16	15	18	14	14	14	14	16	14
23	14	14	15		14	14	15	14	17	15	15	22	23	58	33	45	15	15	14	15	14	14	14	14
24		15	15	14	14	14	14	14	16	15	38	40	49	58	26	23	44	22	14	14	15	14	14	14
25	15	14	14	14	15		15	14	26	18	16	48	23	44	23	17	15	15	15	15		15	18	15
26	15	16	15	15	15	15	15	15	15	15	17	45	47	43	44	28	17	16	15	15	15	15	15	15
27		15	15	15	15			15	15	18	16	17	17	46	24	16	15	15	15	15	15	15	16	15
28	15	15	16	15	15	15	15	15	15	15	16	56	48	50	48	22	40	15	16	15	15	15		15
29	15	15	15	15	15			15	15	16	45	44	20	50	21	16	16	15	16	15	15	15	16	16
30	16	15	16	15	15		17	15	23	17	44	24	46	46	44	20	16	26	15	15	15	15	15	15
31		15	15	15	15	15	16	15	26	34	17	16	17	17	17	15	18	21	15	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	23	26	24	26	17	22	26	30	30	30	30	31	31	31	31	31	31	28	28	25	26	20	25
MED	15	15	15	15	15	15	15	15	18	16	18	26	22	33	21	18	17	18	15	15	15	15	16	15
U Q	17	16	16	15	15	15	16	15	26	30	38	40	34	45	29	29	32	26	15	15	15	16	16	16
L Q	15	15	15	15	15	15	15	15	15	15	16	17	18	23	17	16	15	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

JAN. 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	A	A	34	35	A	35	69	18	66	102	131	102	103	108	100	91	97	101	78	80	63	66	60	64
2	50	34	26	26	A	A	30	32	83	103	120	130	143	144	145	141	118	83	66	64	62	58	62	52
3		29	41	34	A	A		34	66	108	121	111	108	119	109	112	103	87	75	62	60	50	35	A
4	30										130	146	146	145	142	149	117	89	71	63	66	84		
5											98	100	111	91	96	110	94	87	56	42	64	61	47	36
6	26	N	31	30	30	29	28	34	78	76	101	104	86	84	87	88	86	87	76	58	66	72	66	54
7	43	32	28	28	31	25	29	32	85	86	86	100	120	161	158	145	136	118	87	64	62	63	53	53
8	52	A	33	42	30	A	A	70	75	88	87	94	120	142	155	121	118	121	107	87	85	89	67	56
9	42																							
10											68	87	115	170	167	164	142	122	85	54	70	73	52	40
11	69	31	32	31	41	26		68	66	90		104	130	154	155	144	128	110	63	70	67	58	51	35
12	38	36	N	N		28		34	60	78	88	97	96	108	103	108	93	87	66	52	66	32	34	34
13	32	28		31	32	A		30	64	76	98	100	90	108	122	130	110	76	58	54	35	52	34	A
14	26	26	30				N	71	61	87	81	86	102	84	85	87	95	75	60	38	44	45	35	A
15	46	43	29	26		N	79	87	66	100	91	91	128		132	100	108	88	64	42	51	42	32	
16	A	A	25	26	A	N		34	66	66	62	86	110	120	138			74	62	28	A	42	43	42
17	A	61	41	32	26	A	26	30	66	81	86	85	100	105	110	84	87	87	86	51	52		A	46
18	42		34	30		A		71	66	66	68	159	137	112	116	110	114	117		33	48	58	52	A
19	A		37	48	N	21	59	89		86	80	86	112	105		91	109	70	79	84	67			42
20	49	32	46	44	59			35	88	66	80		105	108	111	118	118	103	105	86	72	62	40	
21			A	44	45	A	71		54	66	83												38	
22											118													
23					63														63	66				
24		42									84	85			97	106	110	102	87	84	85	88	70	66
25	54	52	42	30	32	A	30	37	66	78	76	75	91	94	96	88	77	76	68	A	60	66	52	51
26	18	34	32	31		A		67	76	107	97	105	87	82	83	85	85	86	77	56	74	62	31	
27	30	32	40	40			N	26	86	85	87	91	137	137	109	106	103	82	86	64	66	80	62	60
28	54	54	44	48	42	34	71	A	79	101	121	131	146	145	145	135	108	112	92	74	62	60	54	50
29	51	52	52	37	71	23	N	31	66	90	111	128	141	161	153	146	120	112	75	63	60	77	66	38
30	41	43	23	45	26	A		34	78	82	82	117	103	119	127	118	112	98	77	63	62	62	A	34
31	28	29	26		32	25	A	37	62	86	105	135	127	118	118	N	107	101	86	63		53	43	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	20	18	21	21	14		10	22	23	24	28	26	26	25	26	25	26	27	27	27	25	25	24	18
MED	42	34	33	32	32		44	34	66	86	88	100	112	118	117	110	108	88	76	63	63	62	52	48
U Q	50	43	41	43	45		71	68	78	95	108	117	130	144	145	138	118	110	86	70	67	72	61	54
L Q	30	31	28	30	30		29	32	66	77	81	87	102	105	100	91	95	83	64	52	60	52	36	38

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

JAN. 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	65	36	34	34	40	27	25	23	32	45	60	58	60	56	96	71	38	G	29	32	G	G	G	G
2	G	22	G	G	39	41	58	33	33	58	70	44	G	G	60	70	67	36	30	G	G	26	24	22
3		29	G	G	34	29		G	G	42	60	61	56	61	60	52	55	31	83	83	78	56	36	39
4	G										G	68	45	48	44	58	60	51	59	34	33	28		
5											45	43	49	80	42	46	69	84	36	38	29	33	G	G
6	G	G	G	G	G	G	68	G	G	G	44	45	50	49	71	60	38	G	38	36	24	G	G	G
7	G	G	G	G	G	G	G	G	G	38	46	62	54	49	G	42	40	69	48	43	82	48	32	30
8	38	68	40	37	32	33	28	28	36	44	71	68	71	67	83	68	79	78	69	65	34	36	25	58
9	G																							
10											44	49	43	46	43	60	35	33	36	26	30	30	G	G
11	G	G	G	G	G	G		G	29	44		56	44	43	40	42	44	48	30	83	40	28	25	25
12	G	G	G	G		25		21	28	38	43	60	60	78	58	82	93	70	40	G	G	G	G	G
13	G	G	G	22	30	26	G	G	G	G	G	G	60	83	67	76	44	G	33	28	25	G	G	24
14	G	G	G				G	G	29	38	42	47	62	56	49	44	G	38	29	32	25	27	57	41
15	35	67	22	42	G	G	G	G	G	G	43	45	42	60	71	G	G	39	27	28	26	40	40	G
16	32	29	26	27	25	G		G	52	46	47	64	60	60	43			34	44	33	34	56	58	33
17	89	46	28	26	G	27	G	130	32	G	44	58	43	59	G	39	58	58	49	32	29	29	121	35
18	G		G	G	28	25		24	56	G	G	83	62	43	44	G	40	42	58	38	32	32	38	33
19	32	37	31	25	29	G	G	G	49	G	68	62	45	86	71	180	64	46	43	26	24	G		G
20	G	G	G	G	22			G	34	G	G	64	G	55	66	61	60	127	39	26	G	27	23	G
21	33	48	85	40	87	36	28	68	179	38	83						G						25	
22											56													
23					30							45							175	G				
24		27									G	46	46	65	49	41	60	37	33	24	G	23	G	G
25	G	G	G	G	32	33	26	G	33	40	44	47	90	44	G	46	70	34	46	41	38	30	G	G
26	24	25	27	30	27	32	24	G	G	35	39	G	45	43	42	68	G	G	G	29	G	G	30	G
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30	G	G	30	G	G	25		G	32	55	42	59	73	70	50	40	G	54	25	37	81	92	80	24
31	G	G	G	G	25	G	26	G	G	G	41	47	49	53	51	G	G	39	37	32	33	28	26	67
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	23	22	22	17	24	24	24	28	28	27	27	27	26	27	27	28	28	27	27	26	26
MED	G	G	G	G	26	25	24	G	32	38	44	50	49	55	49	46	44	39	38	32	26	28	25	G
U Q	32	32	27	27	32	29	28	23	34	43	57	61	60	65	66	68	60	54	48	37	34	33	36	33
L Q	G	G	G	G	G	G	G	G	G	G	41	45	44	46	42	41	35	32	30	25	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

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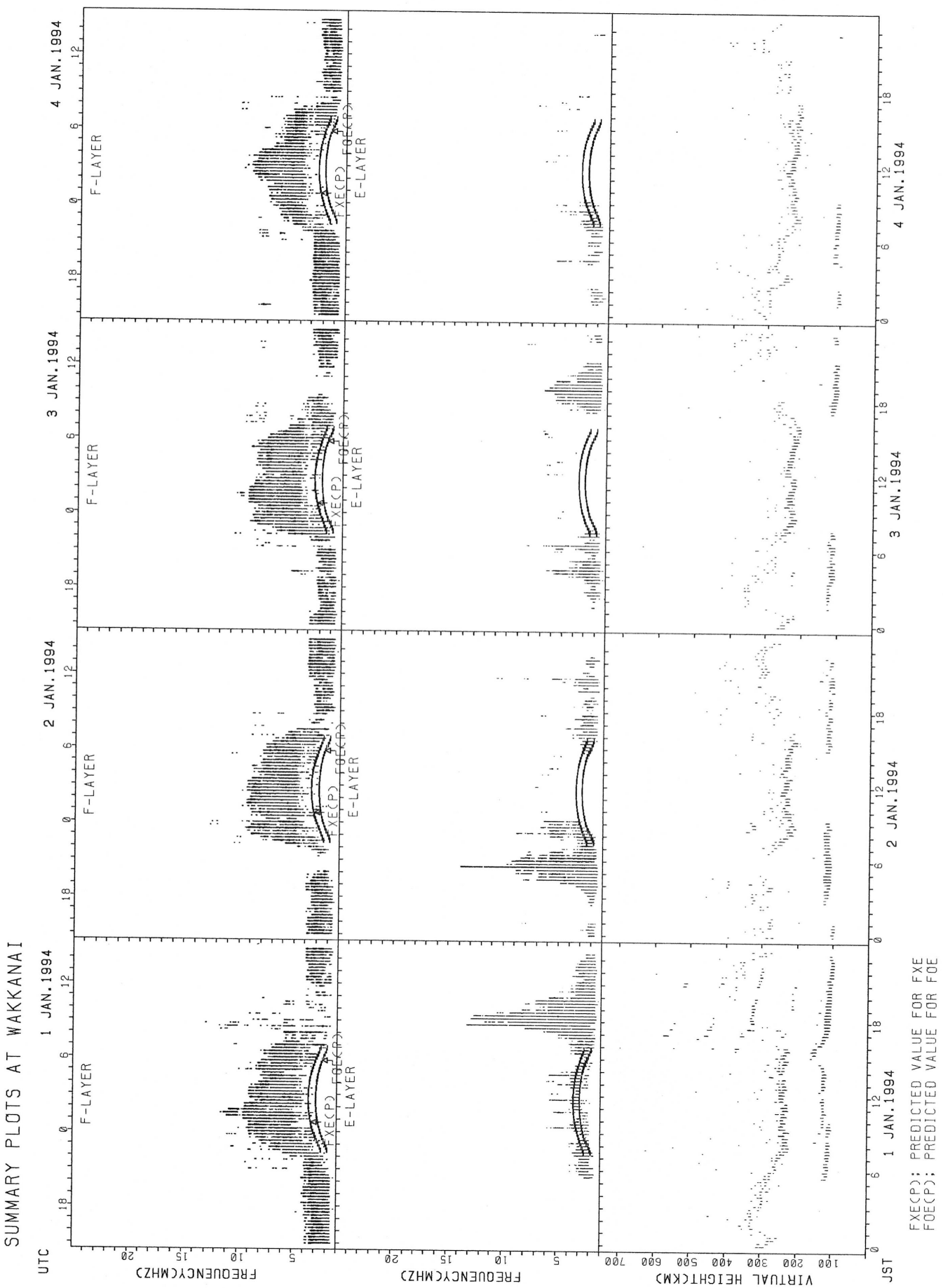
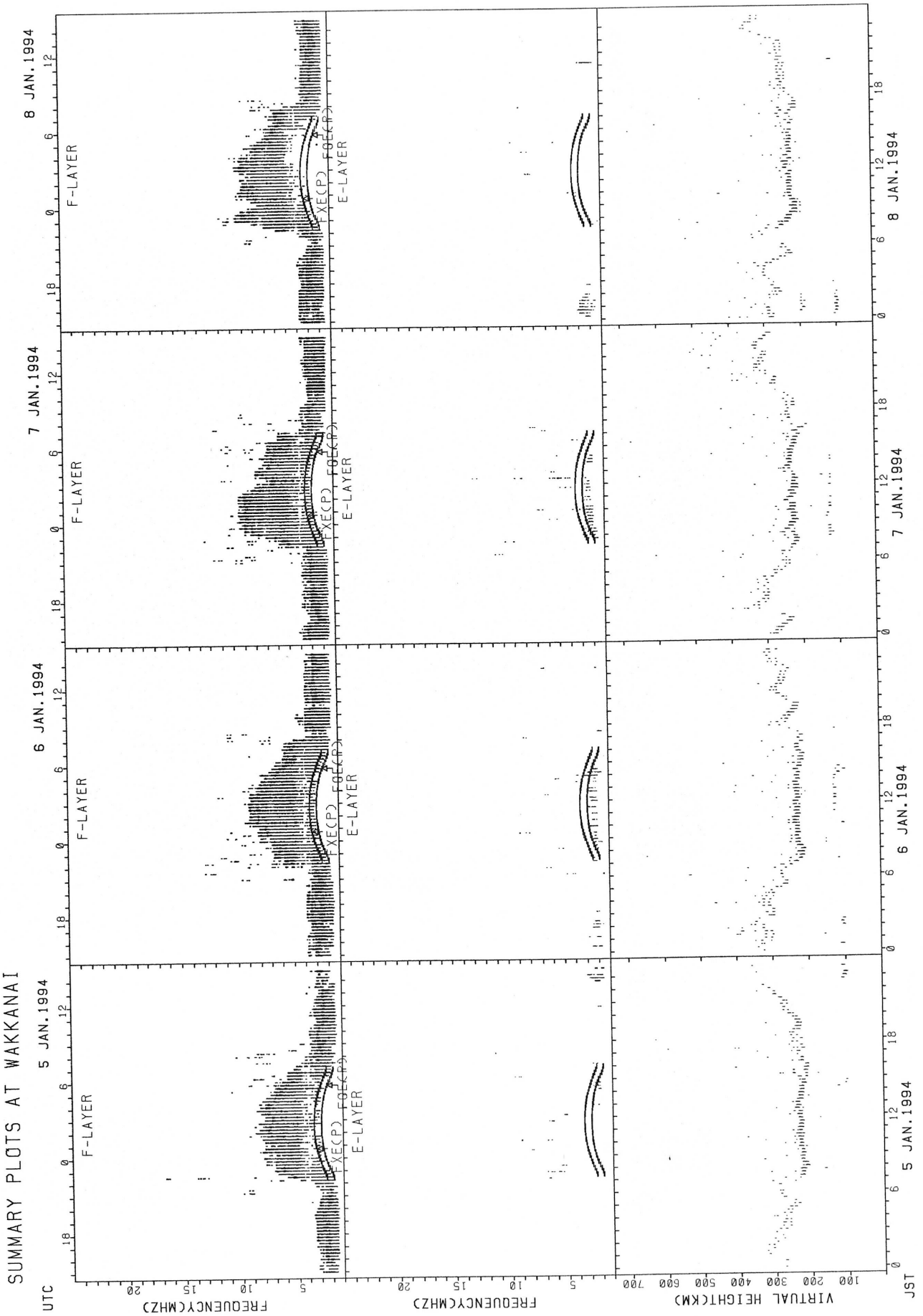
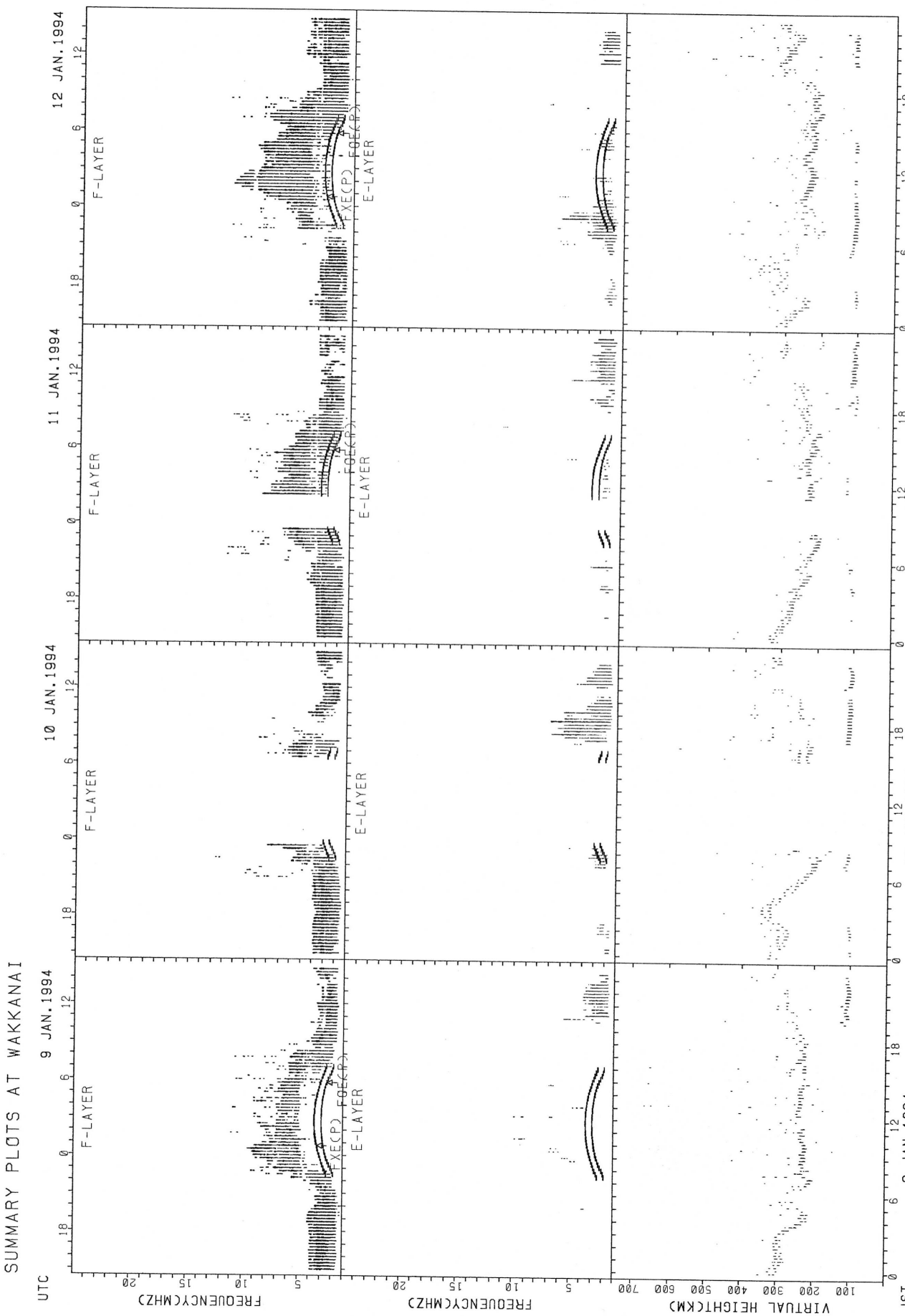
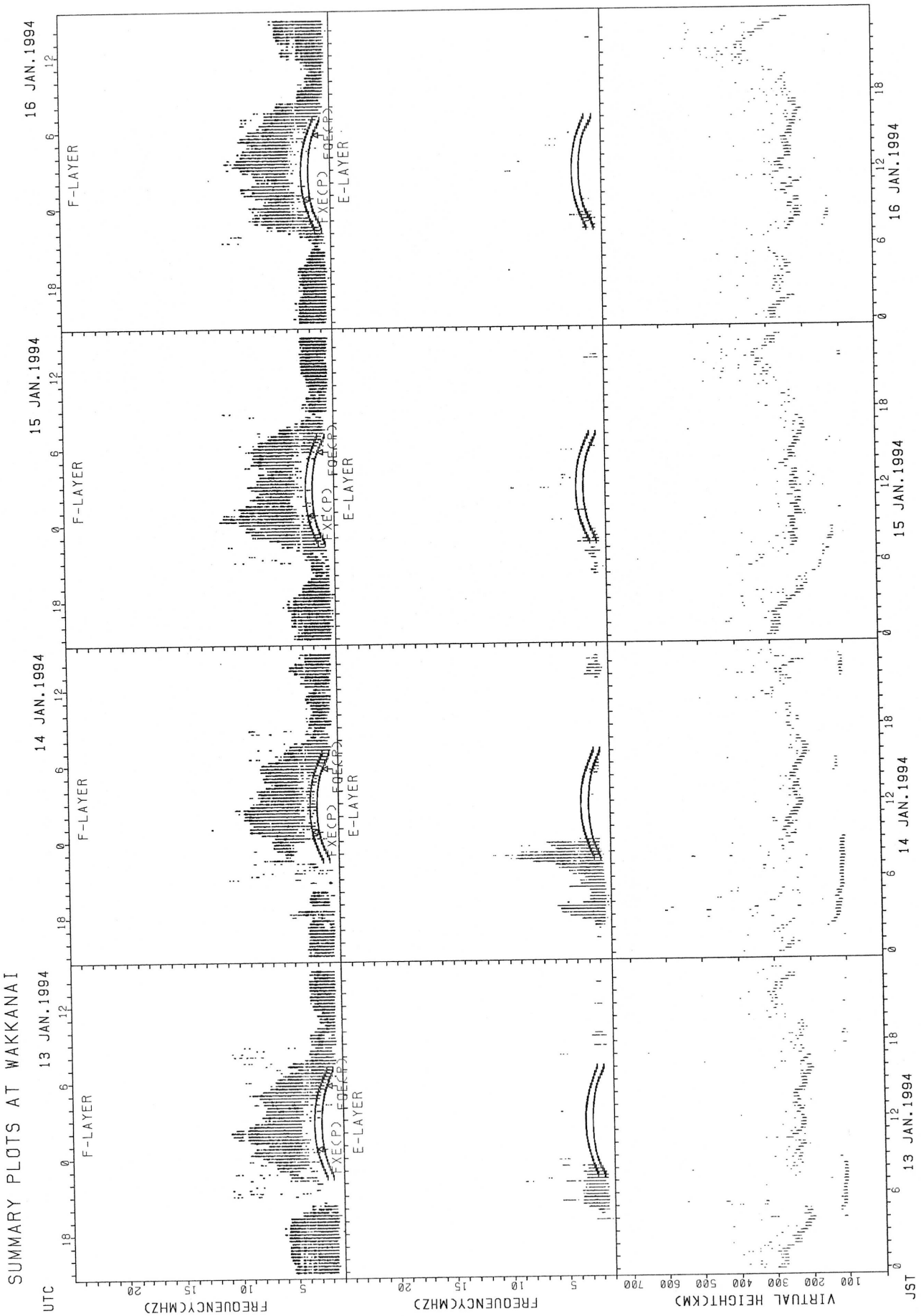
30	15	15	14	15	14	15		15	15	14	14	17	20	20	16	16	15	15	15	15	14	15	15	15
31	15	15	14	14	15	14	15	15	14	14	14	17	17	16	17	16	16	14	15	14	14	15	15	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	23	21	20	16	24	24	24	28	28	27	27	27	26	27	27	28	28	27	27	26	25
MED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

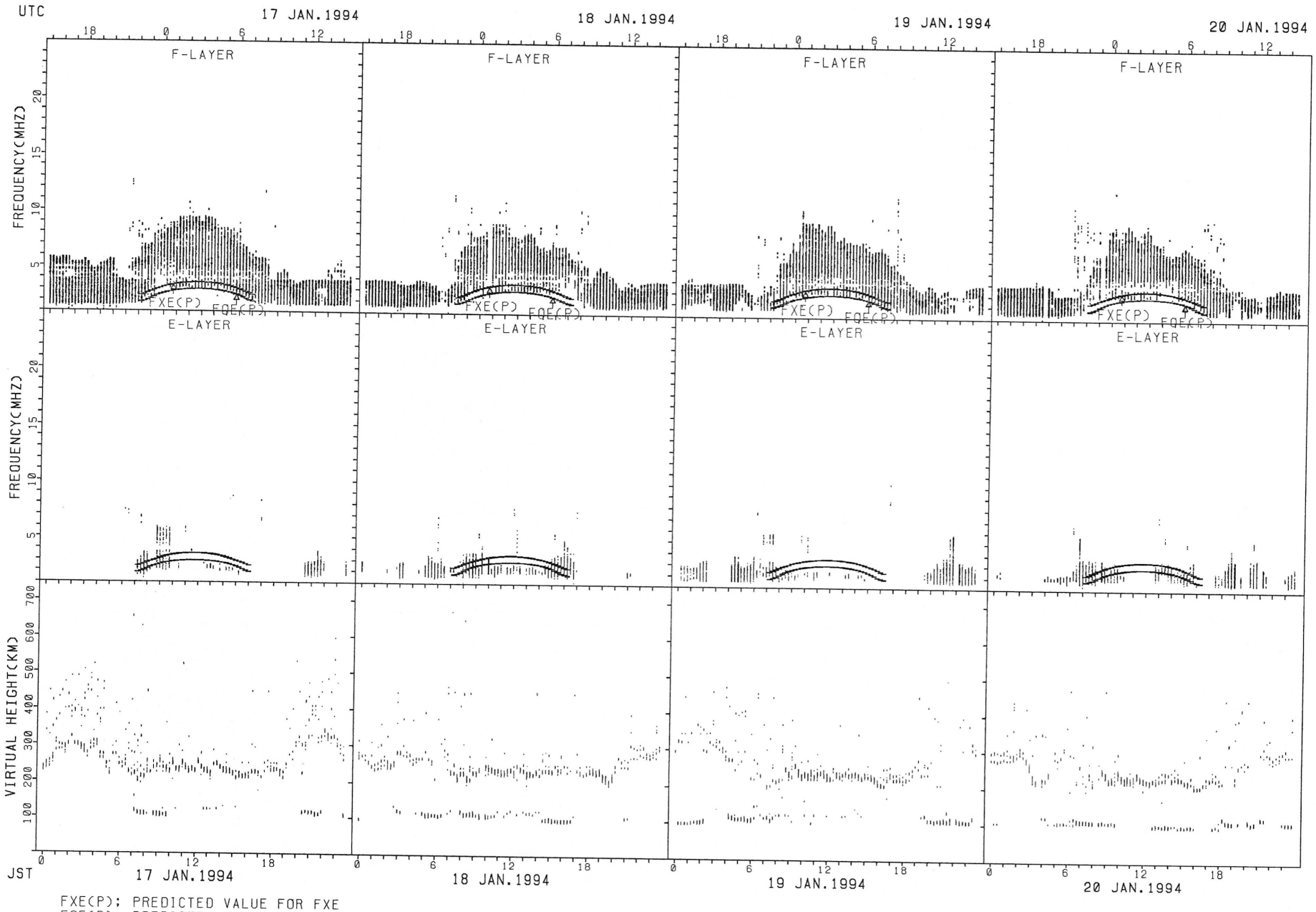

SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 JAN.1994
2 JAN.1994
3 JAN.1994
4 JAN.1994
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
JST
5 JAN.1994
6 JAN.1994
7 JAN.1994
8 JAN.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

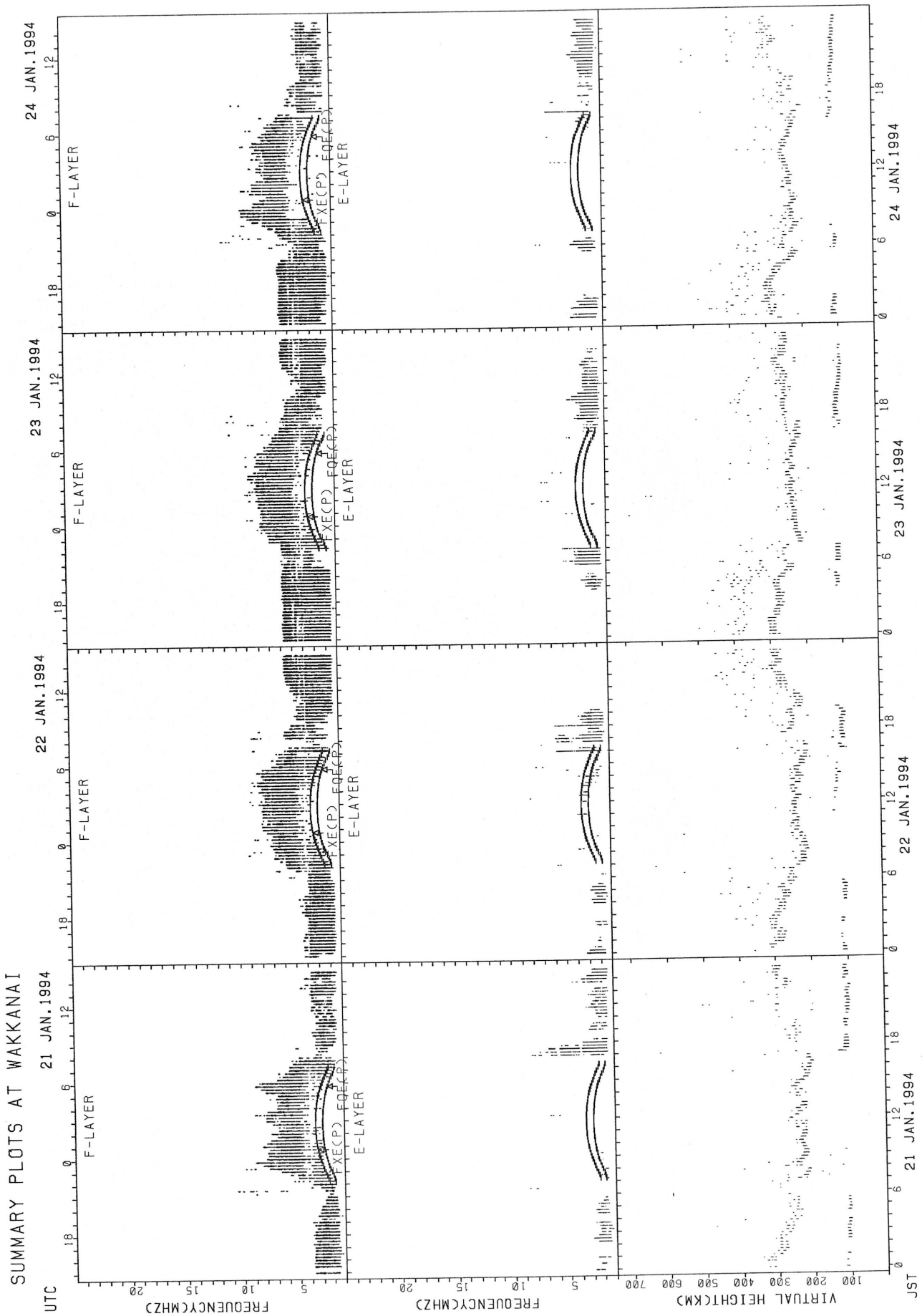

SUMMARY PLOTS AT WAKKANAI
UTC
9 JAN.1994
10 JAN.1994
11 JAN.1994
12 JAN.1994
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

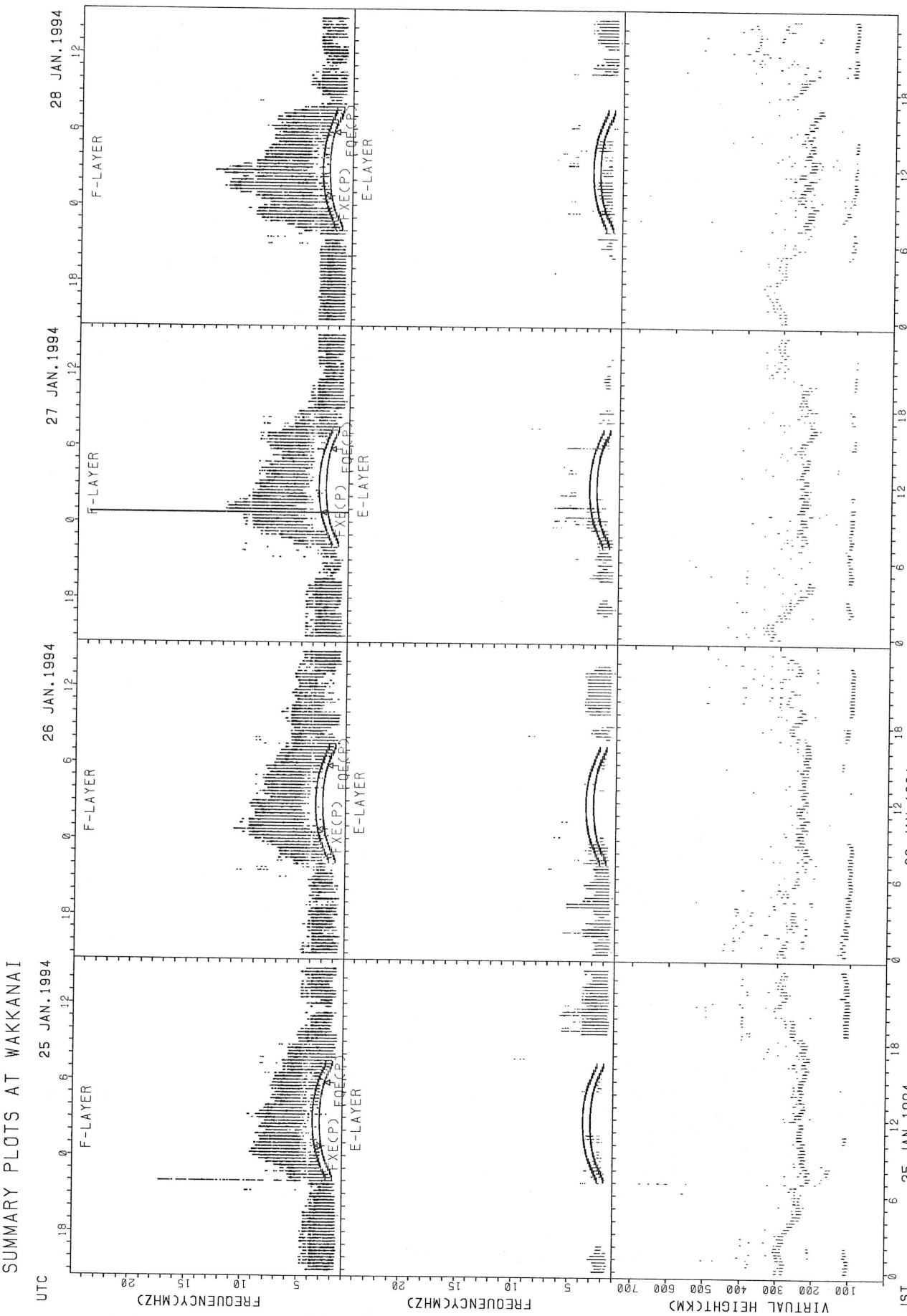

SUMMARY PLOTS AT WAKKANAI
UTC
13 JAN.1994
14 JAN.1994
15 JAN.1994
16 JAN.1994
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

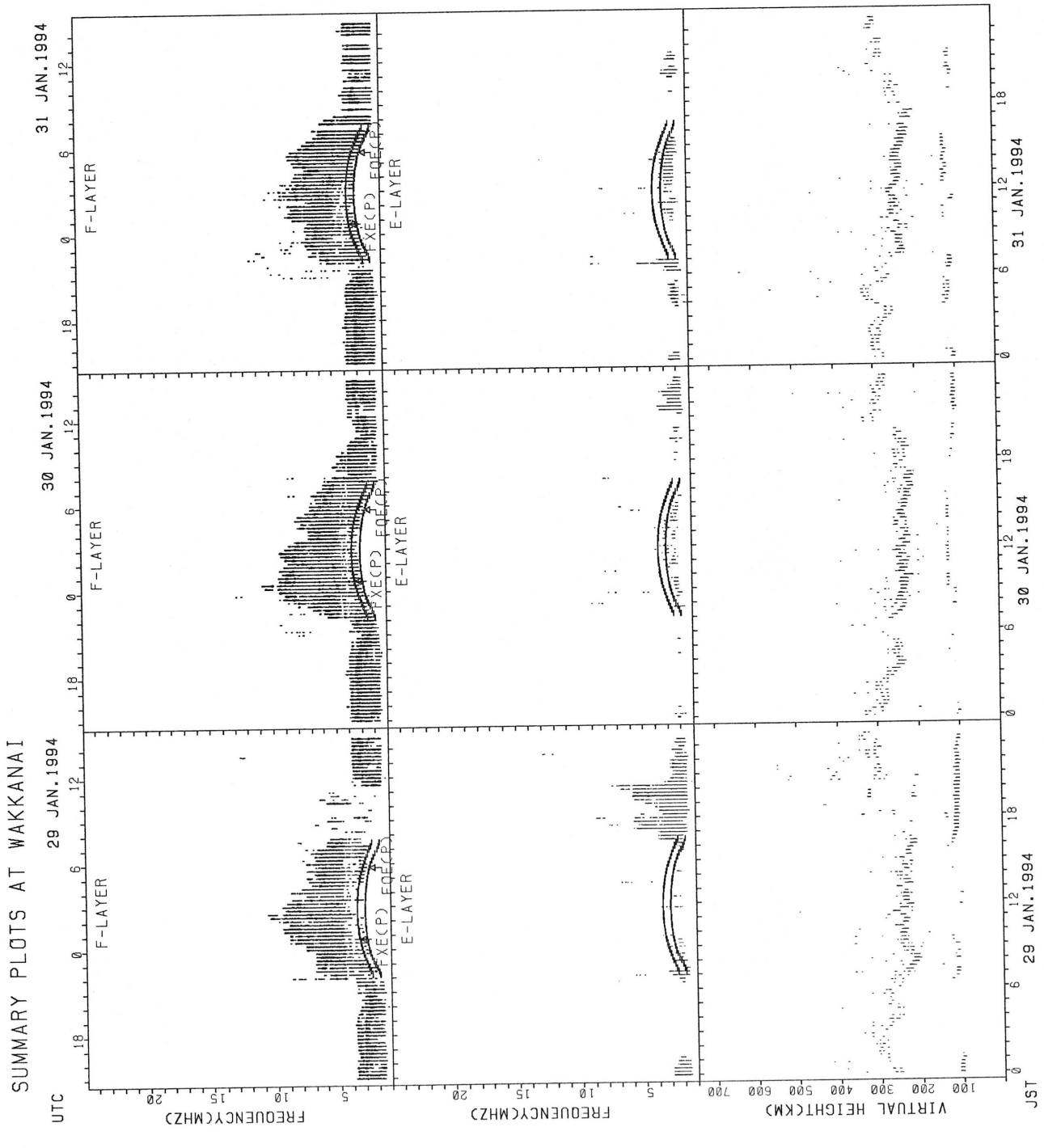
SUMMARY PLOTS AT WAKKANAI



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


SUMMARY PLOTS AT WAKKANAI
UTC
21 JAN.1994
22 JAN.1994
23 JAN.1994
24 JAN.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 WAKKANAI
UTC
25 JAN.1994
26 JAN.1994
27 JAN.1994
28 JAN.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 WAKKANAI
UTC
29 JAN.1994
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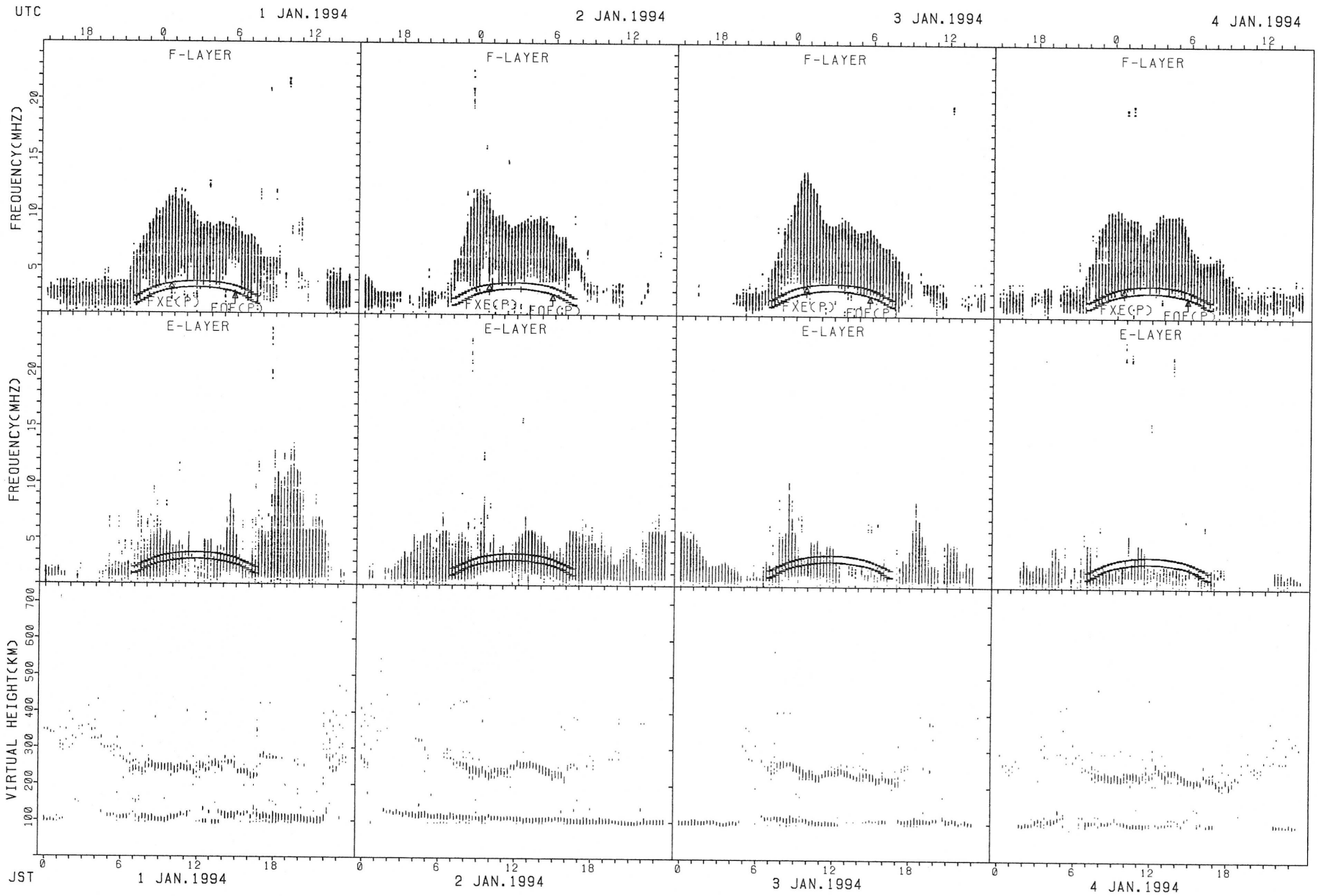
31 JAN.1994
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



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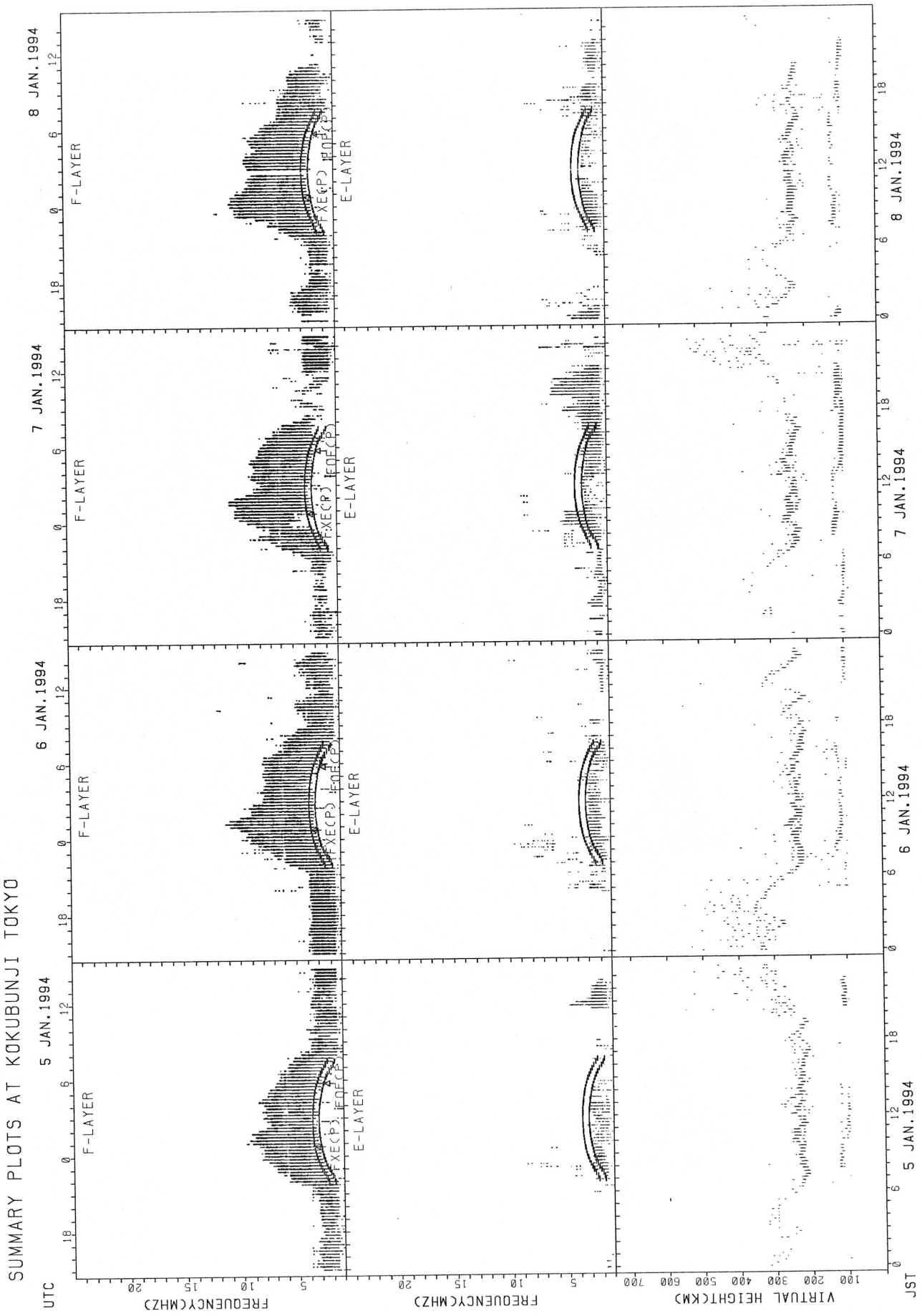
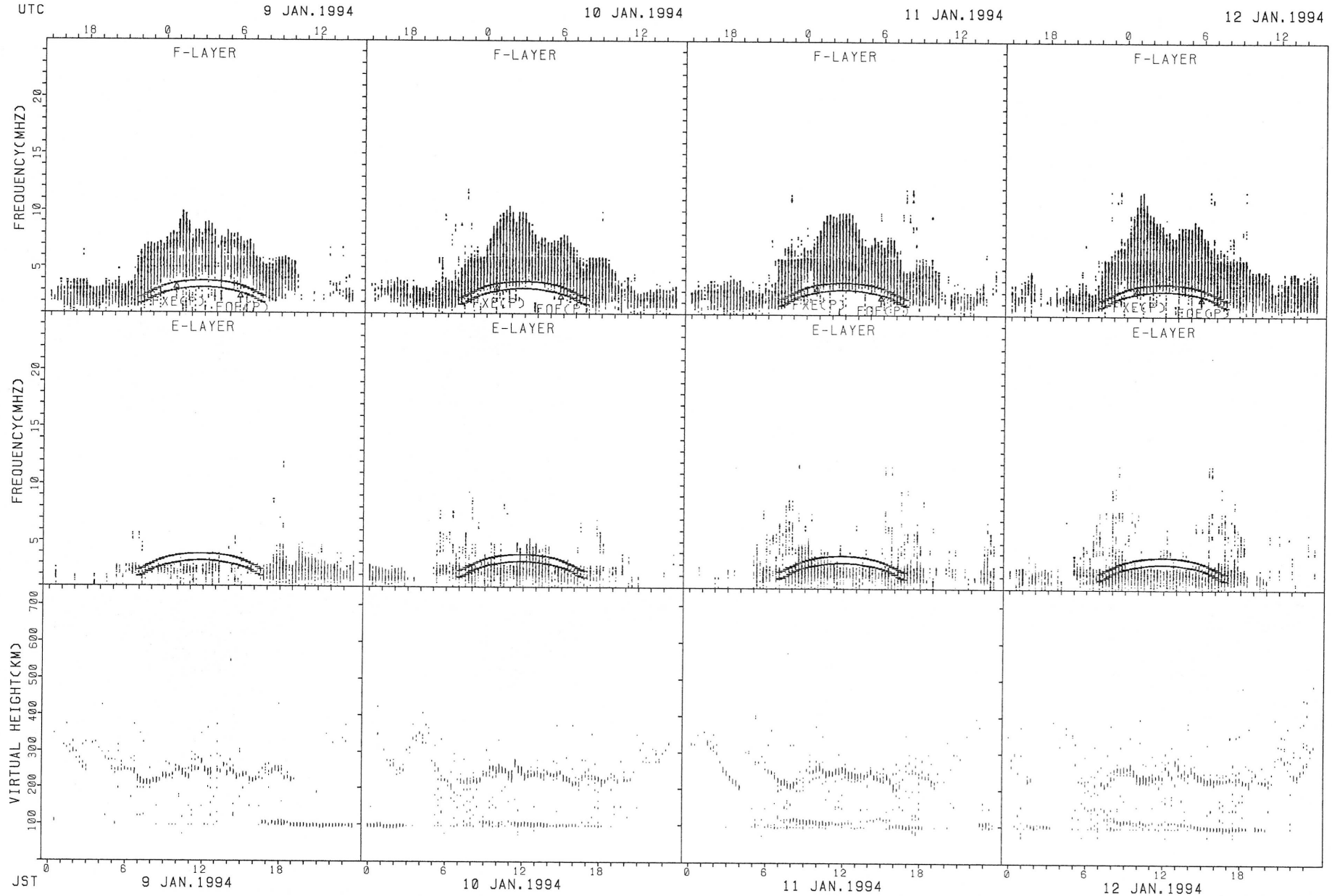
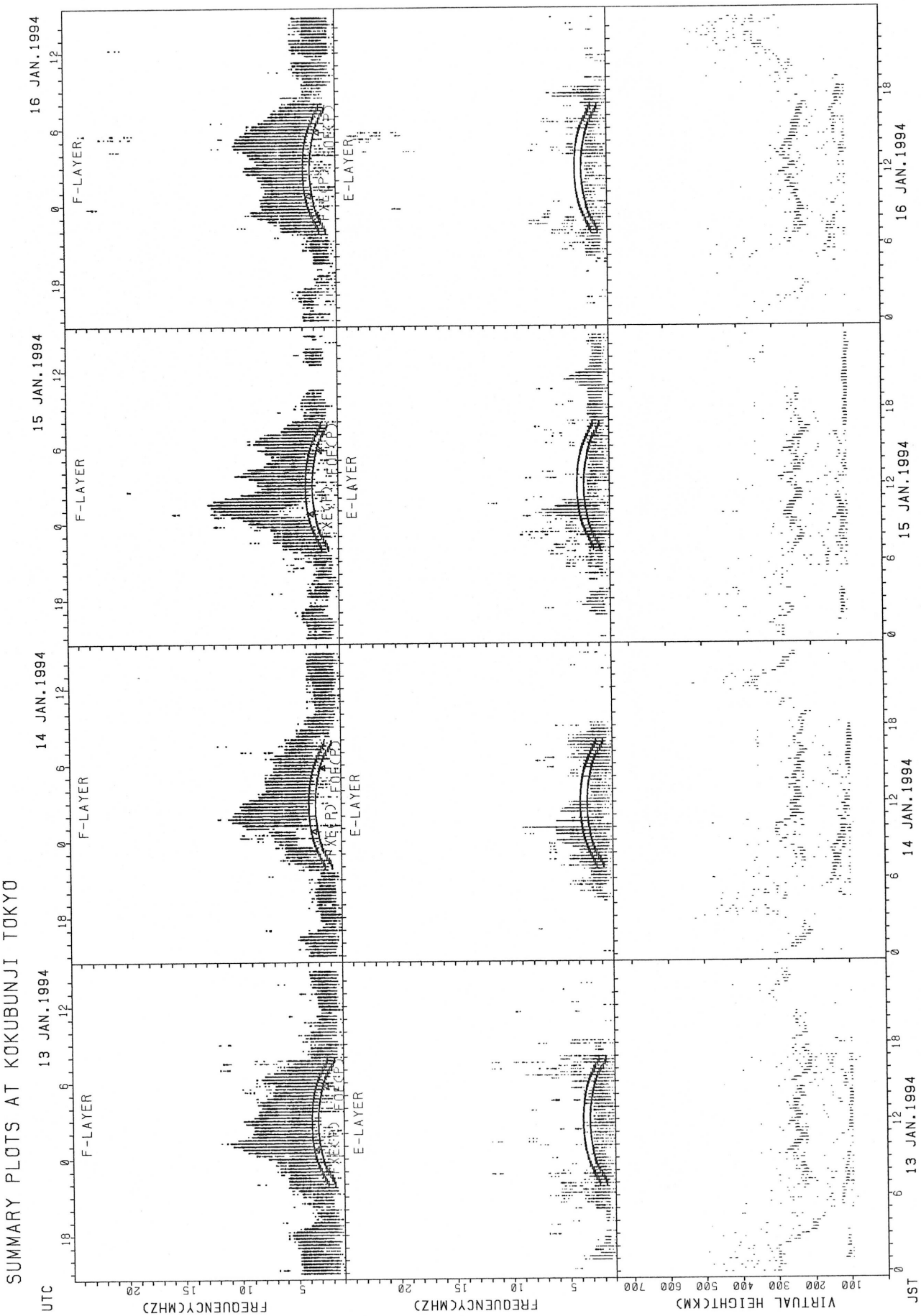
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
5 JAN.1994
6 JAN.1994
7 JAN.1994
8 JAN.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

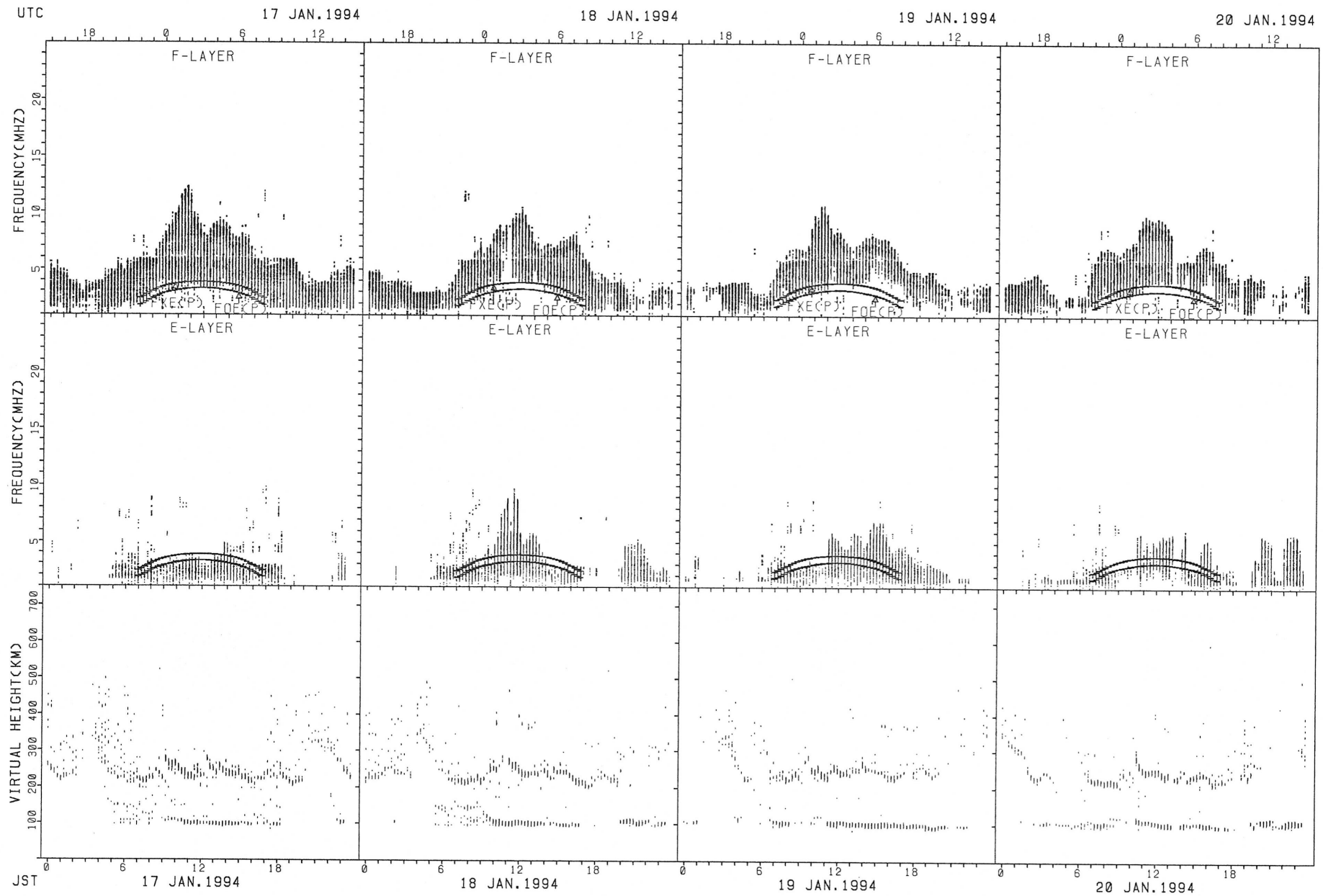
SUMMARY PLOTS AT KOKUBUNJI TOKYO



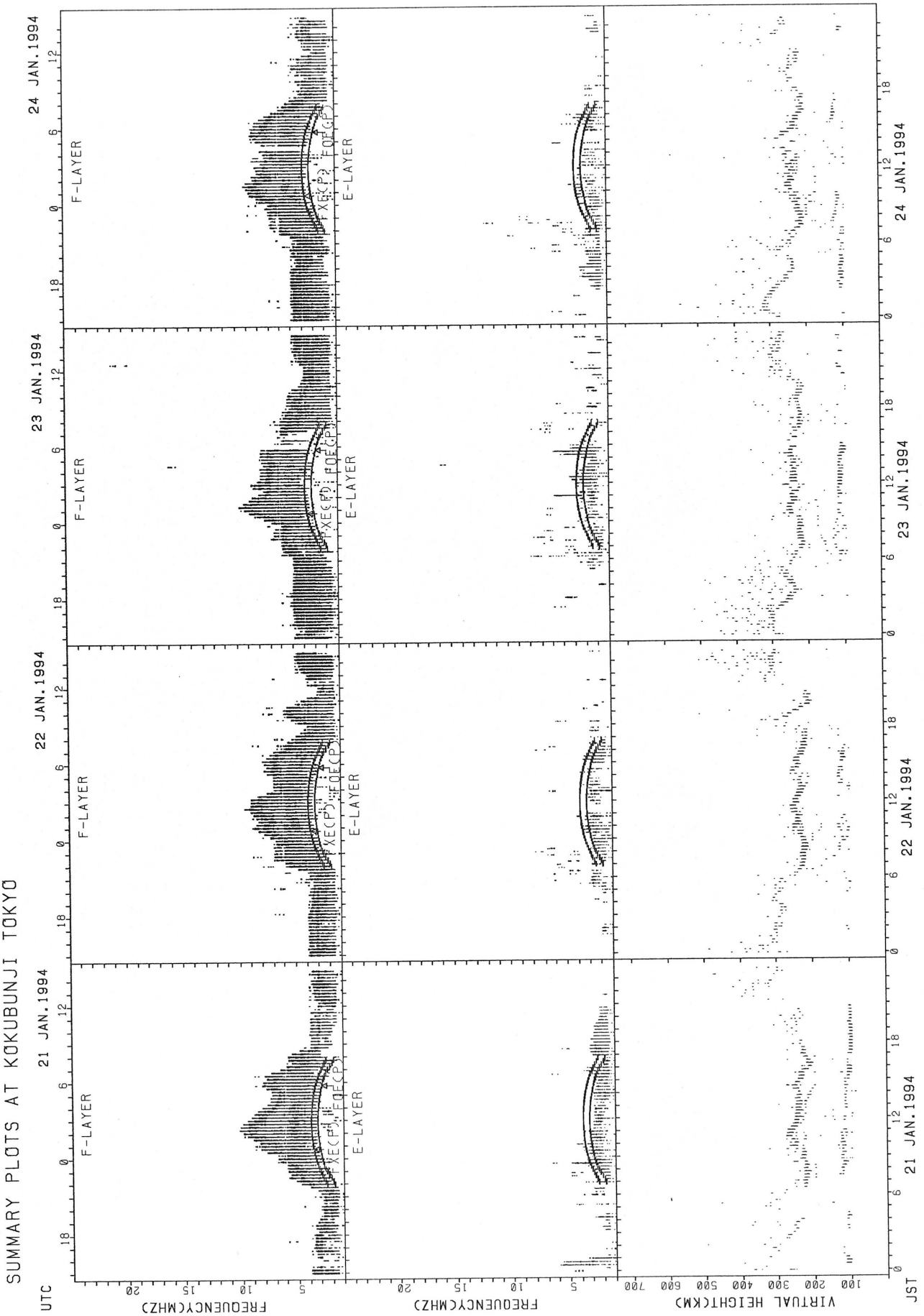
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

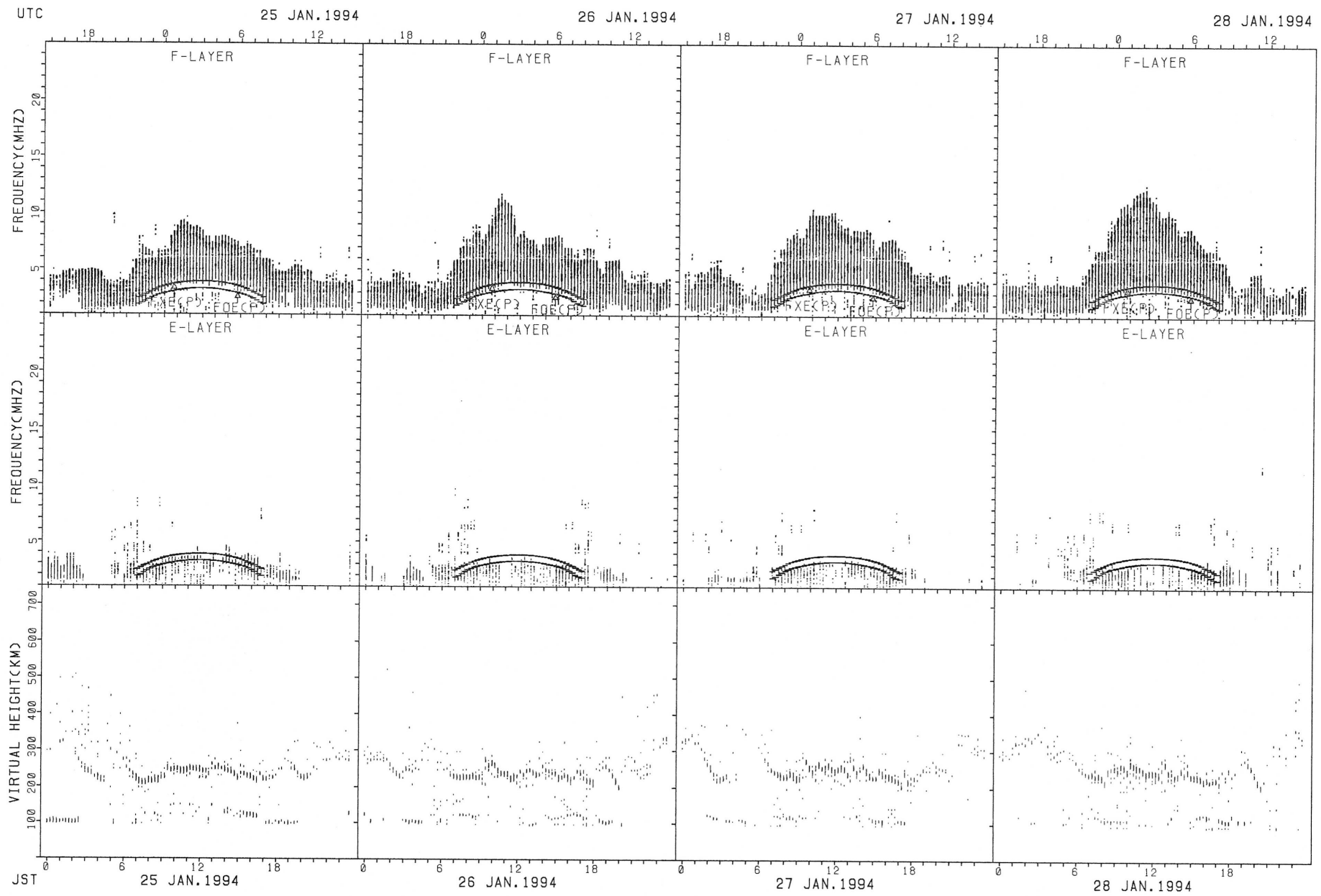

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
13 JAN.1994
14 JAN.1994
15 JAN.1994
16 JAN.1994
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



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


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
21 JAN.1994
22 JAN.1994
23 JAN.1994
24 JAN.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
UTC
25 JAN.1994
26 JAN.1994
27 JAN.1994
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F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
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FOE(P)
JST
FXE(P): PREDICTED VALUE FOR FXE
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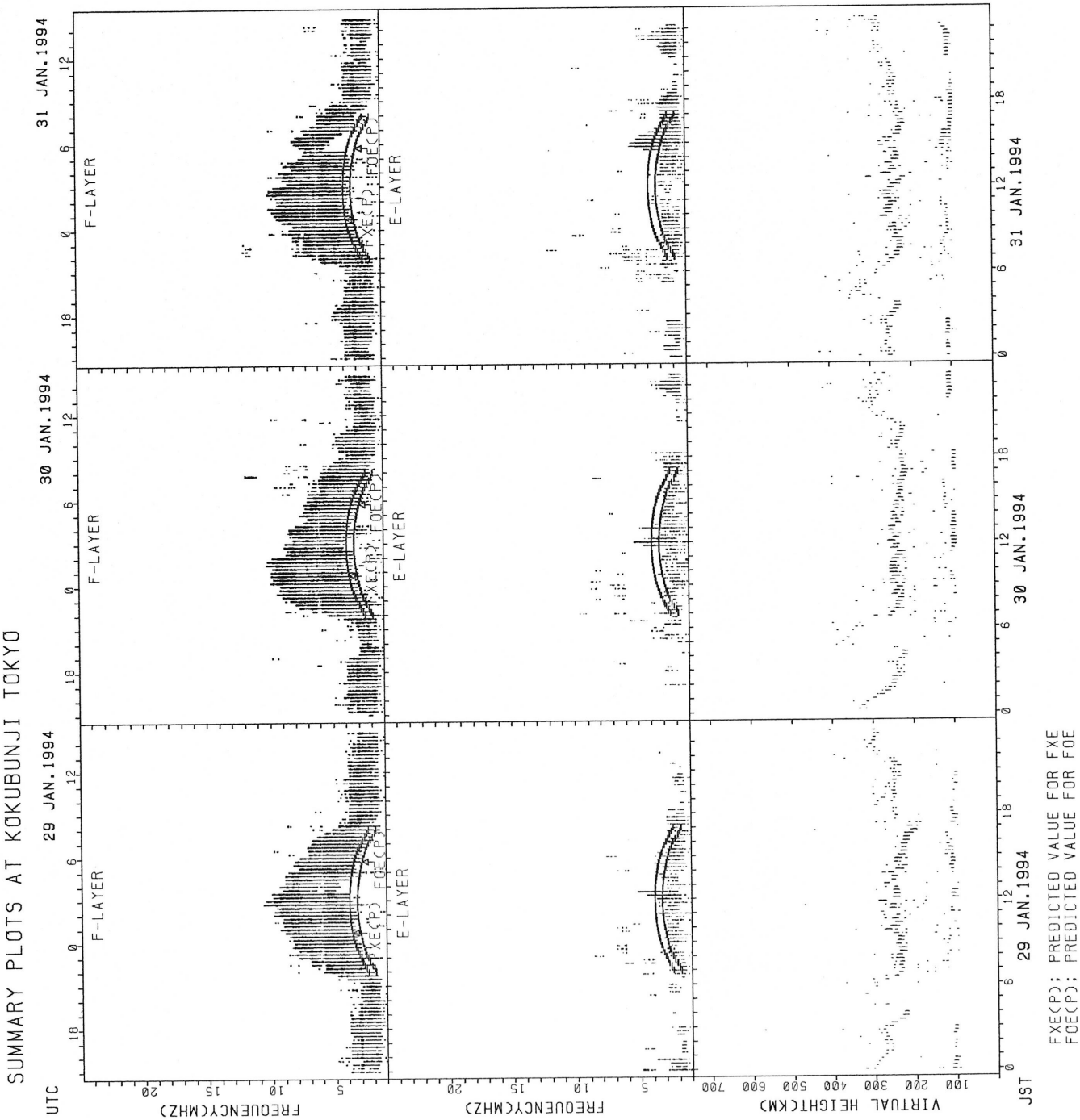
SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
29 JAN.1994
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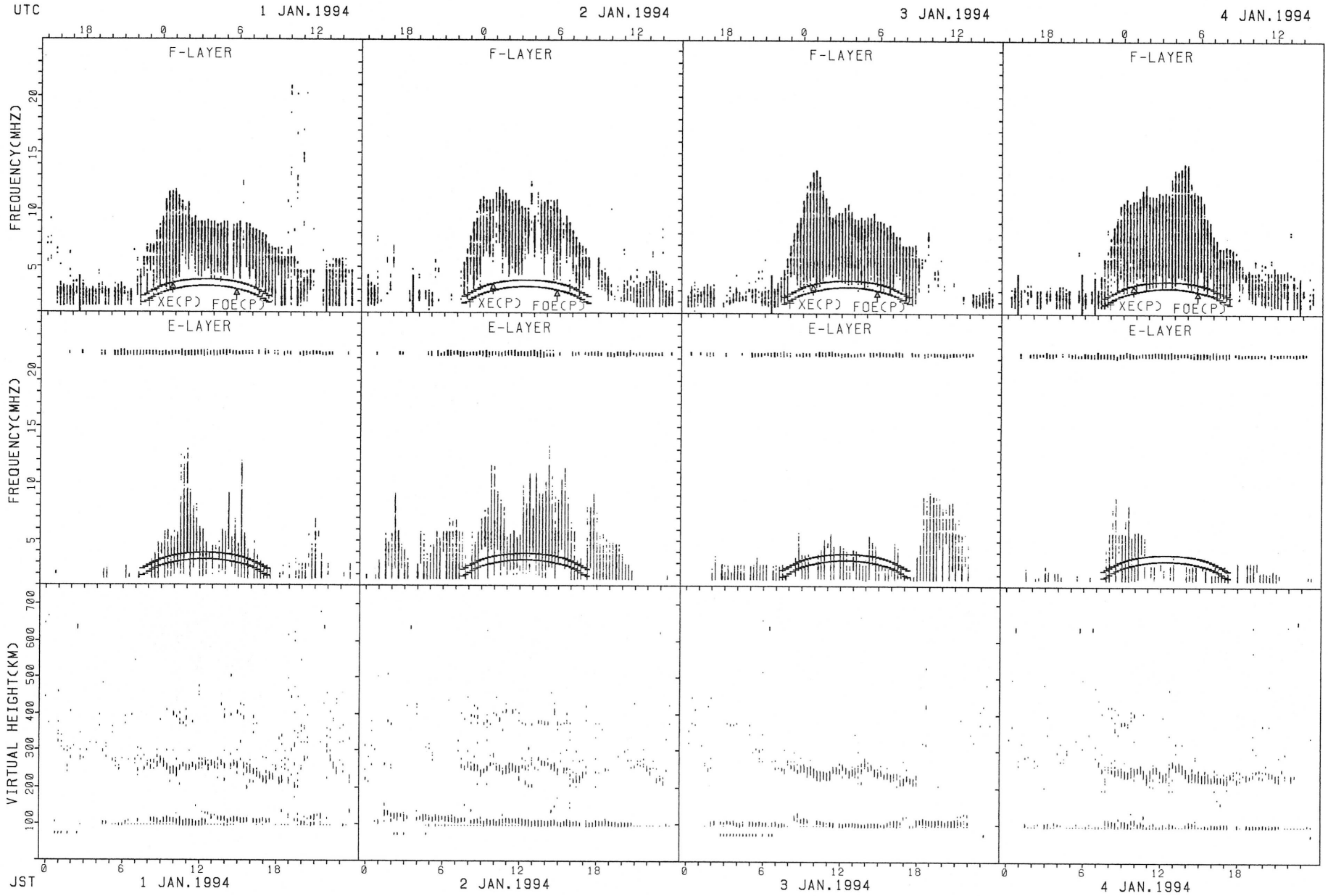
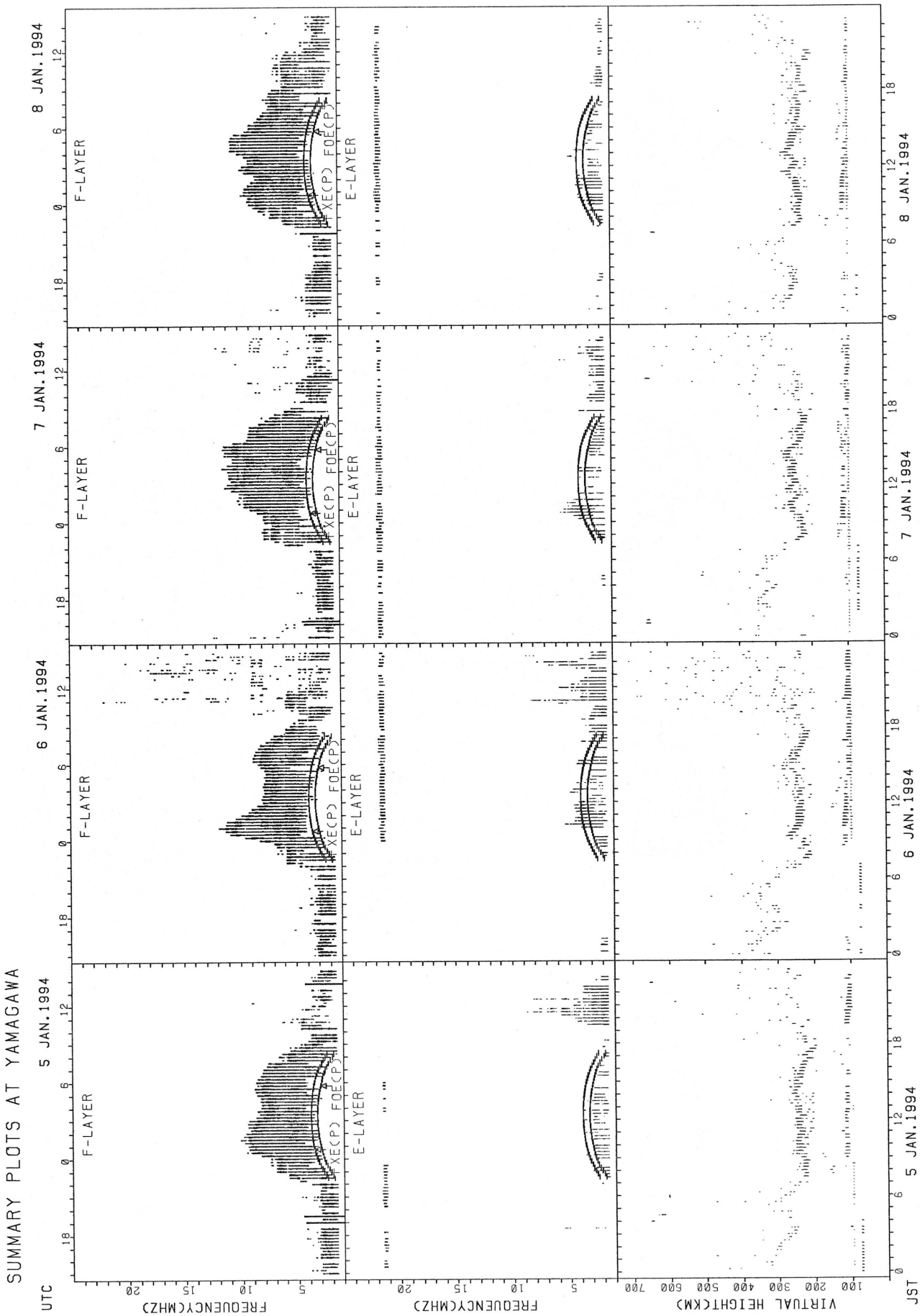
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

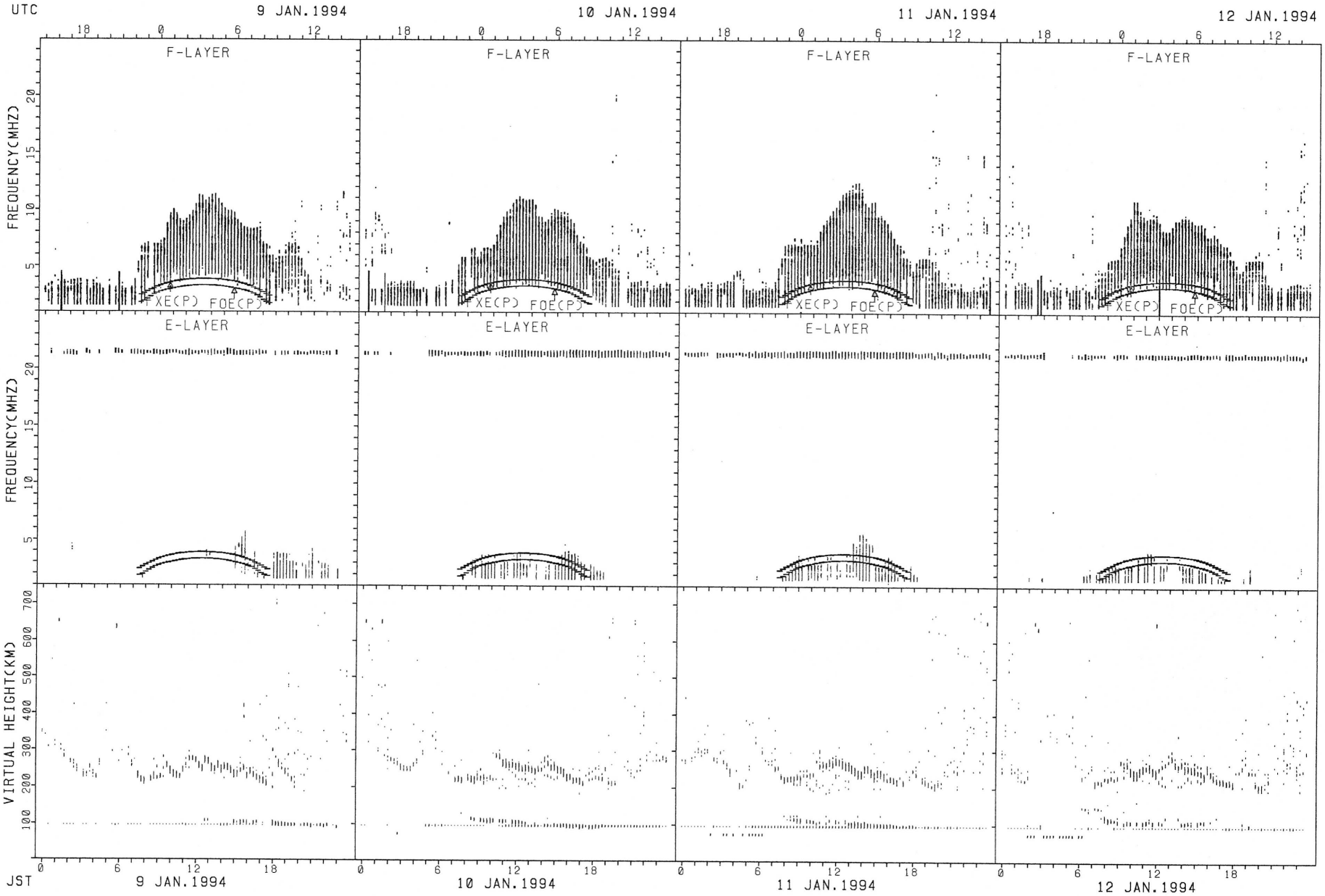
SUMMARY PLOTS AT YAMAGAWA



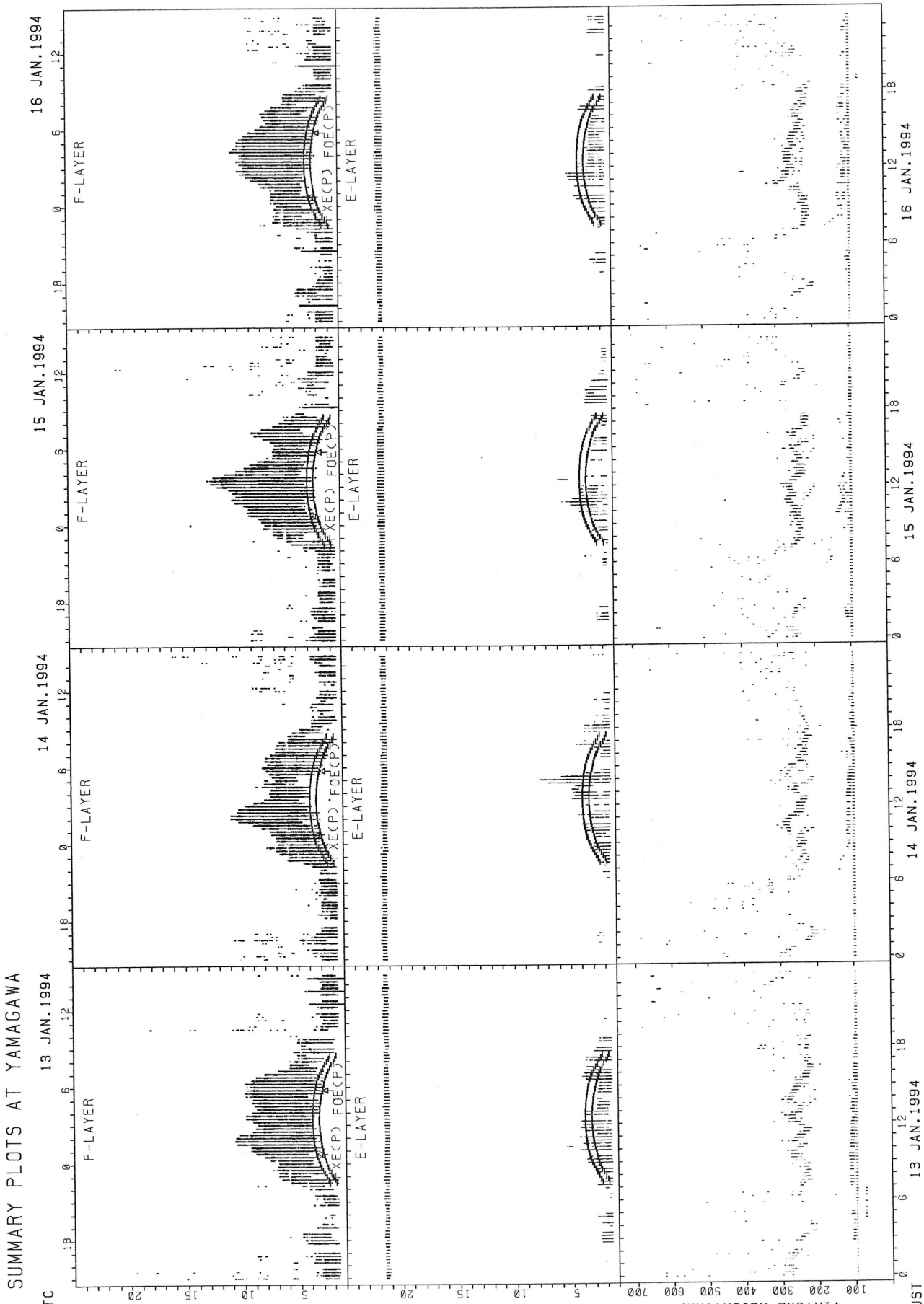
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
5 JAN.1994
6 JAN.1994
7 JAN.1994
8 JAN.1994
F-LAYER
E-LAYER
XE(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
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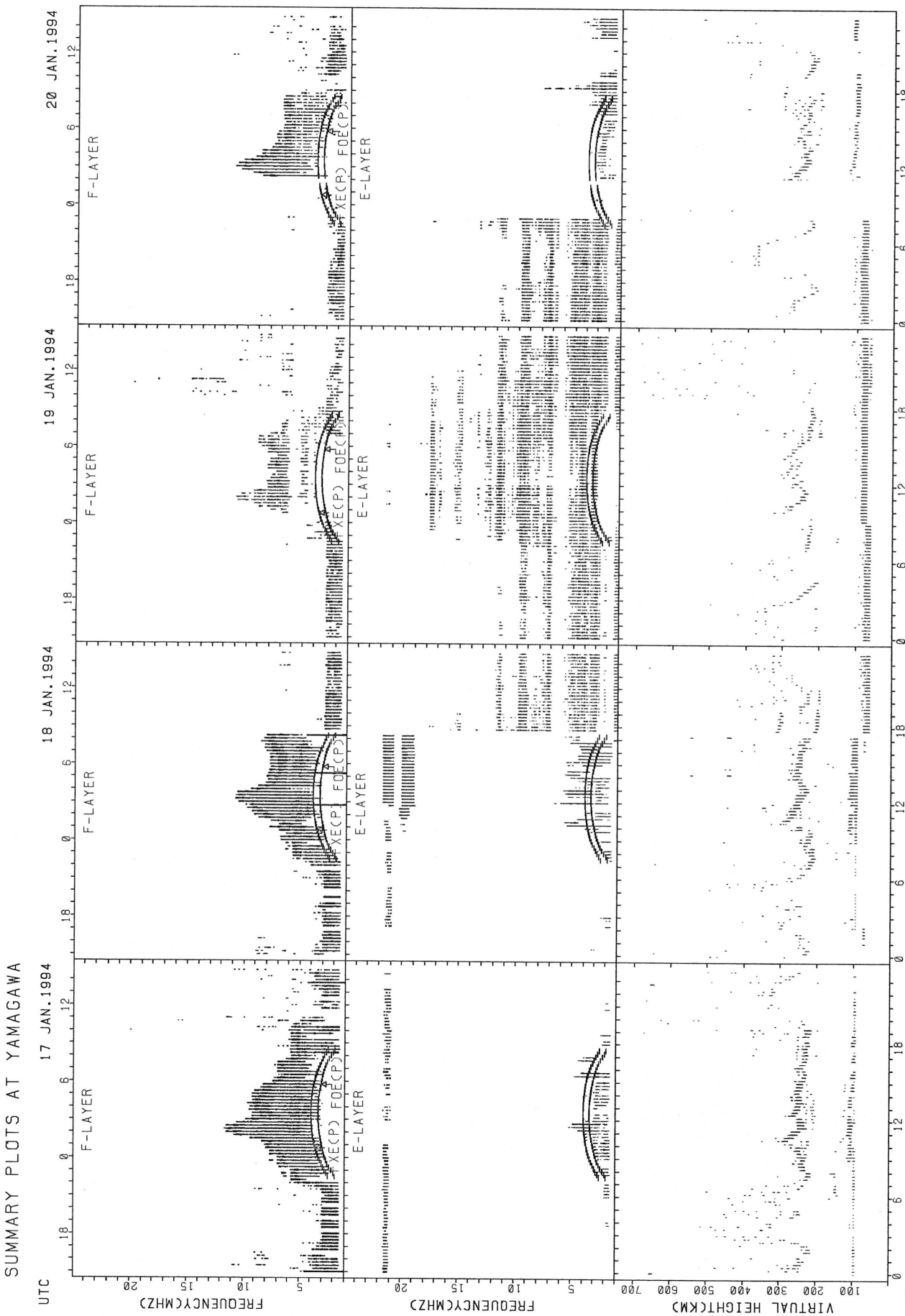
14 JAN.1994
15 JAN.1994
16 JAN.1994
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
17 JAN.1994
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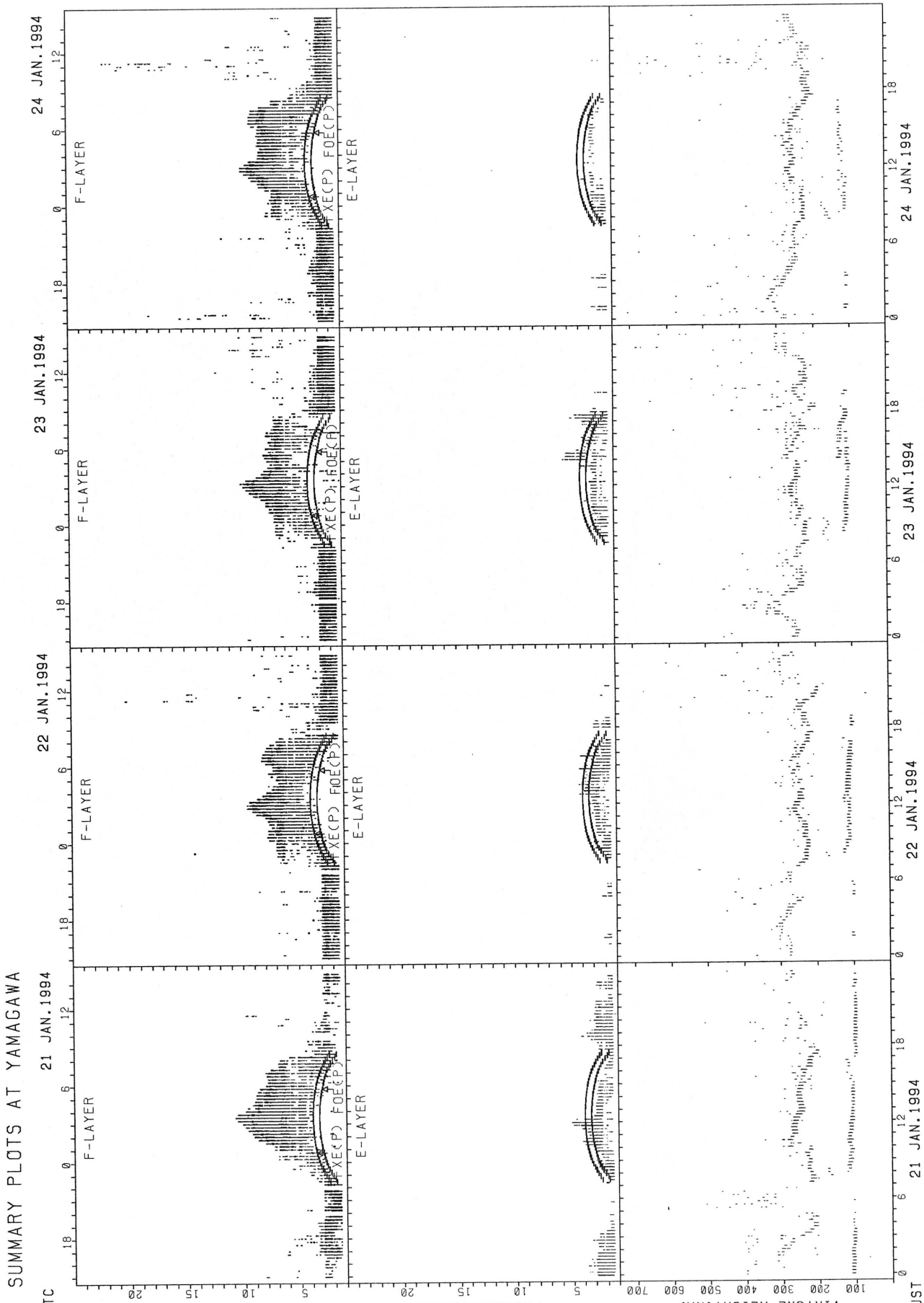
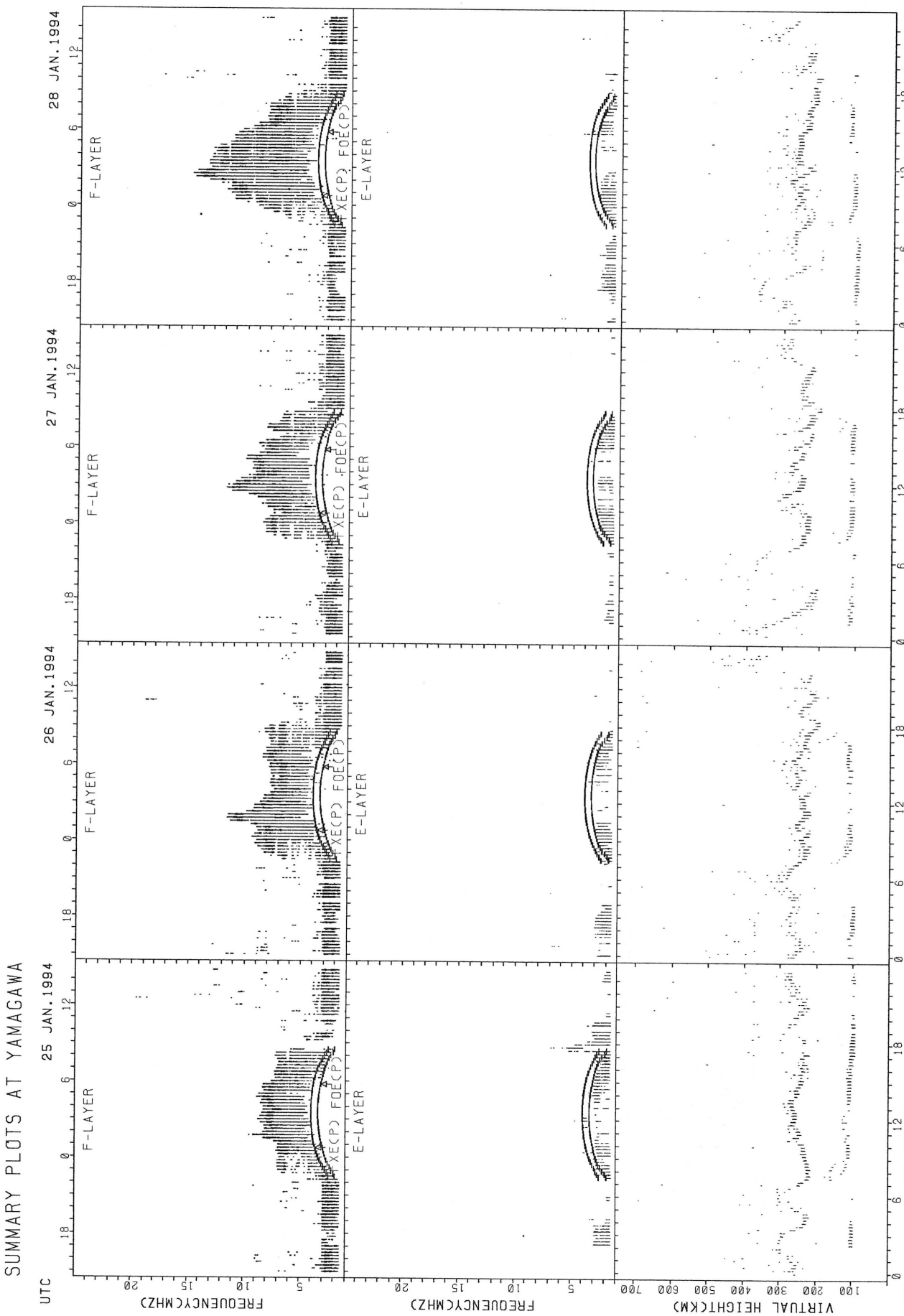
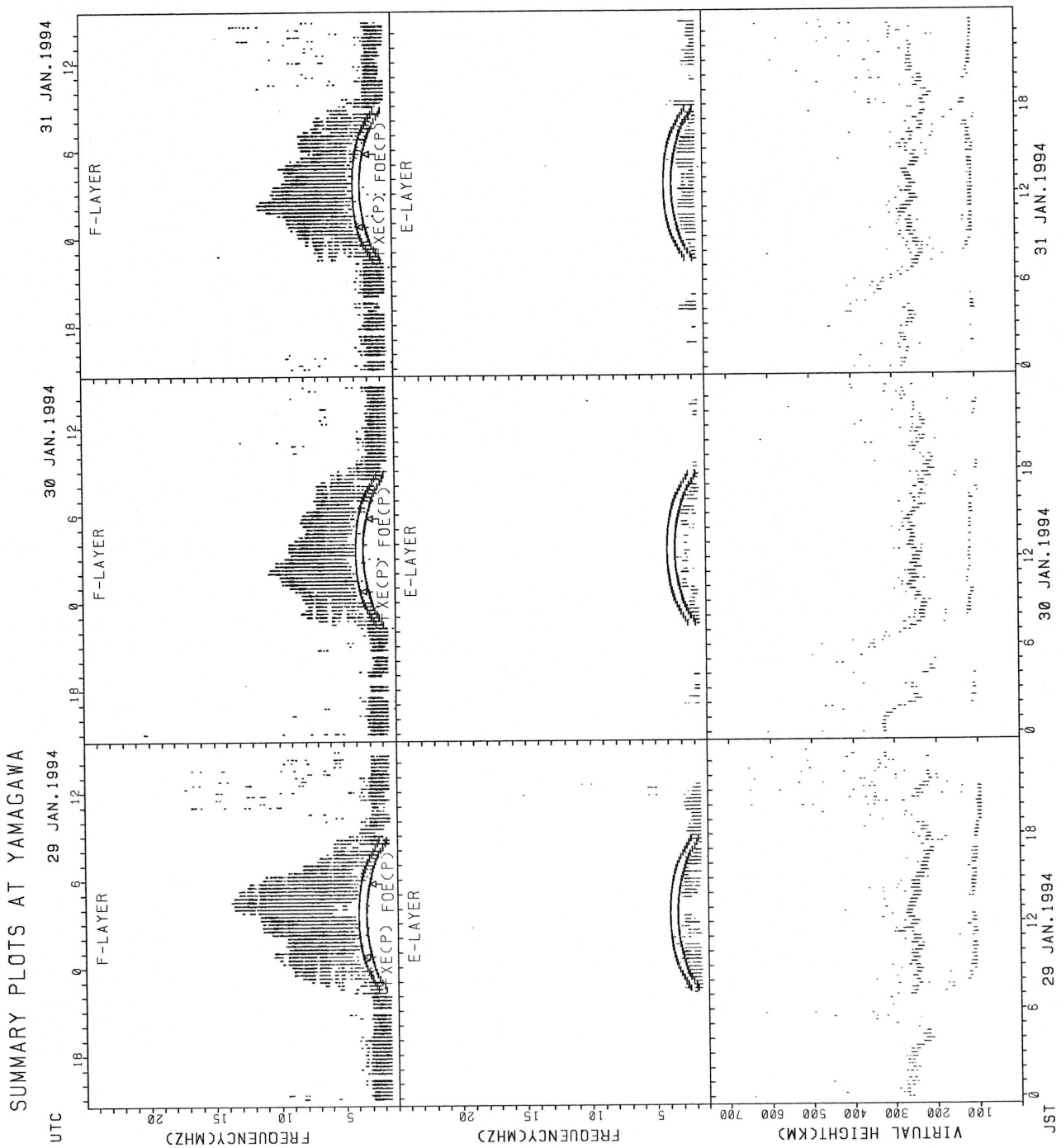
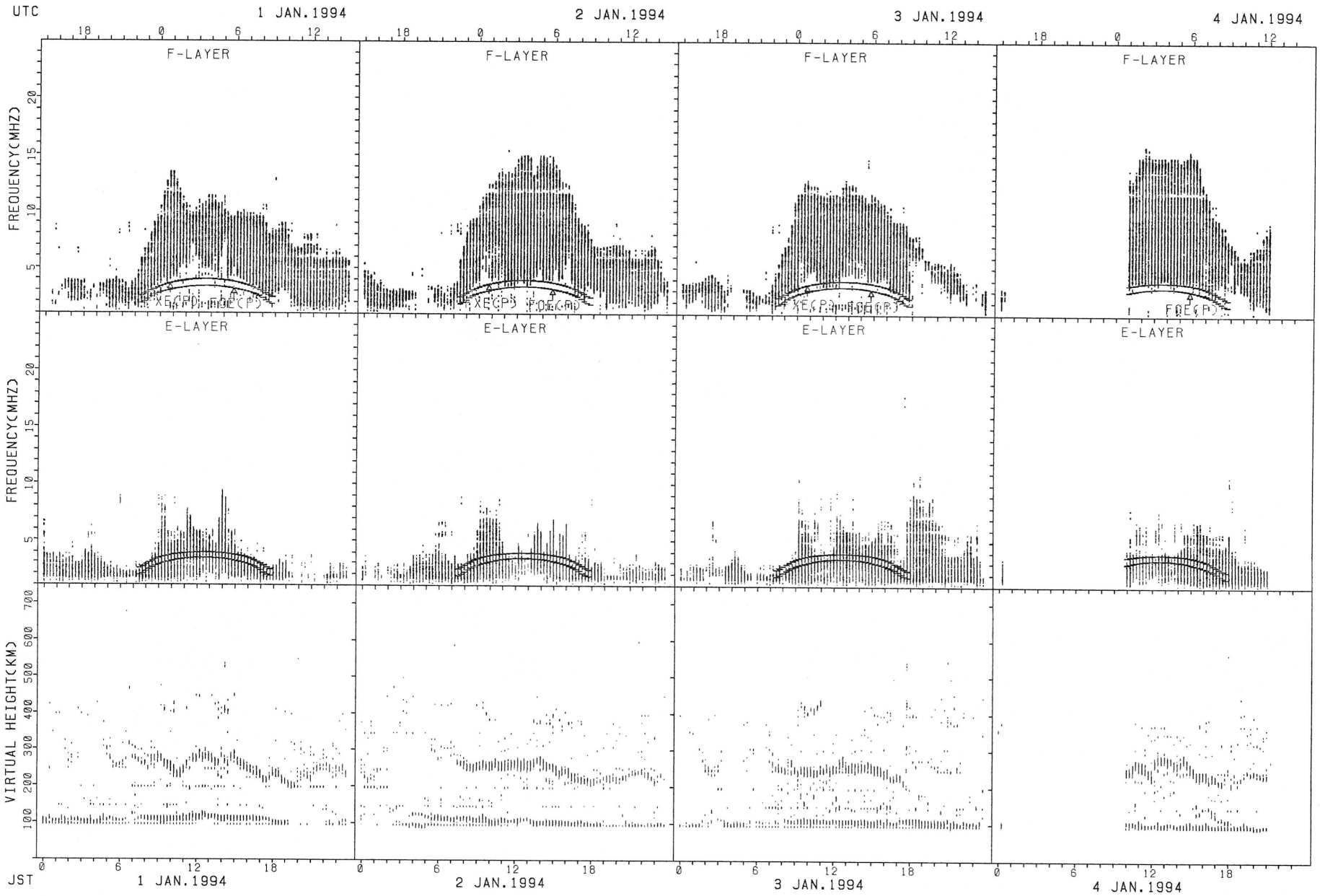
19 JAN.1994
20 JAN.1994
UTC
JST
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

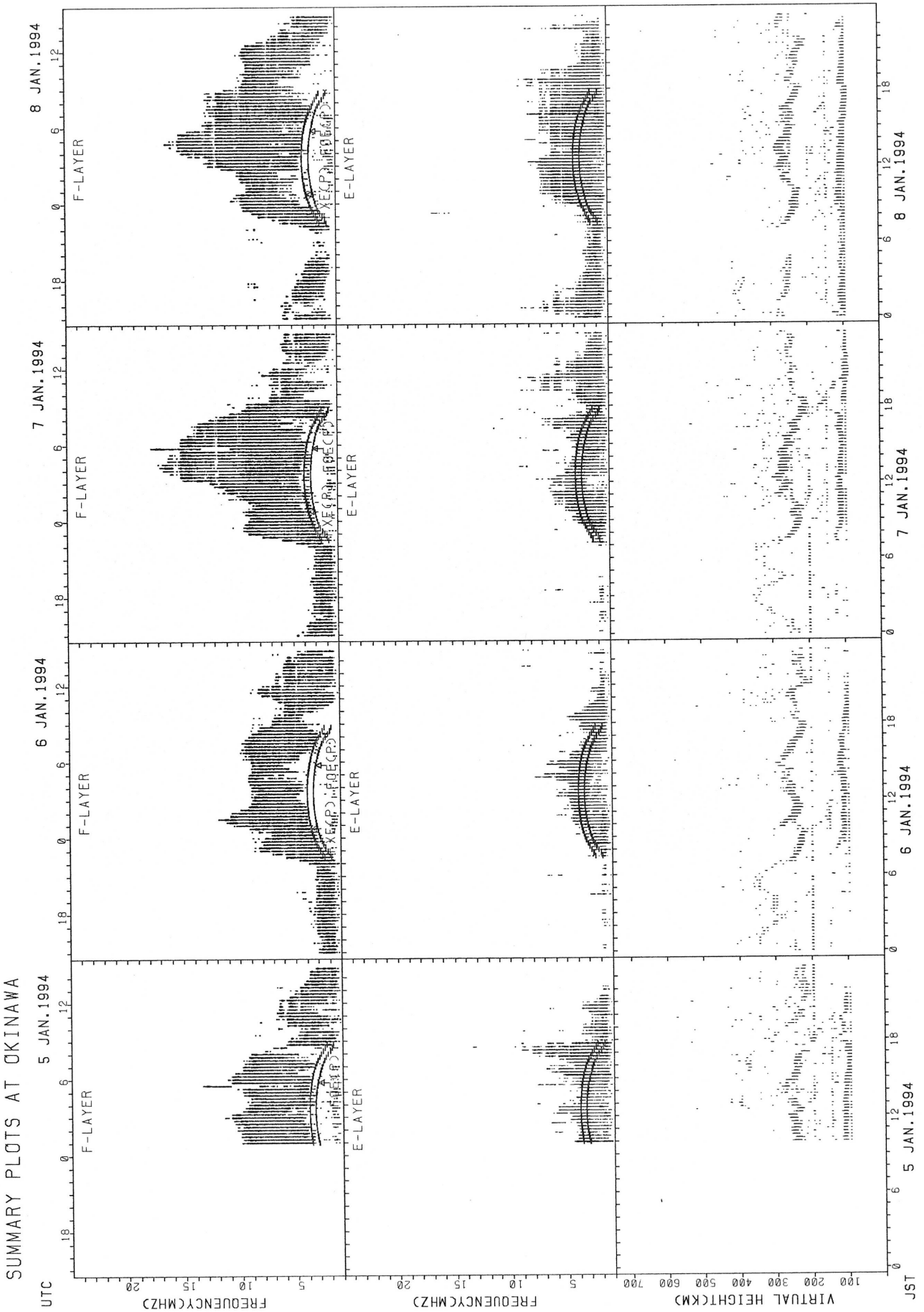

SUMMARY PLOTS AT YAMAGAWA
UTC
21 JAN.1994
22 JAN.1994
23 JAN.1994
24 JAN.1994
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 JAN.1994
26 JAN.1994
27 JAN.1994
28 JAN.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

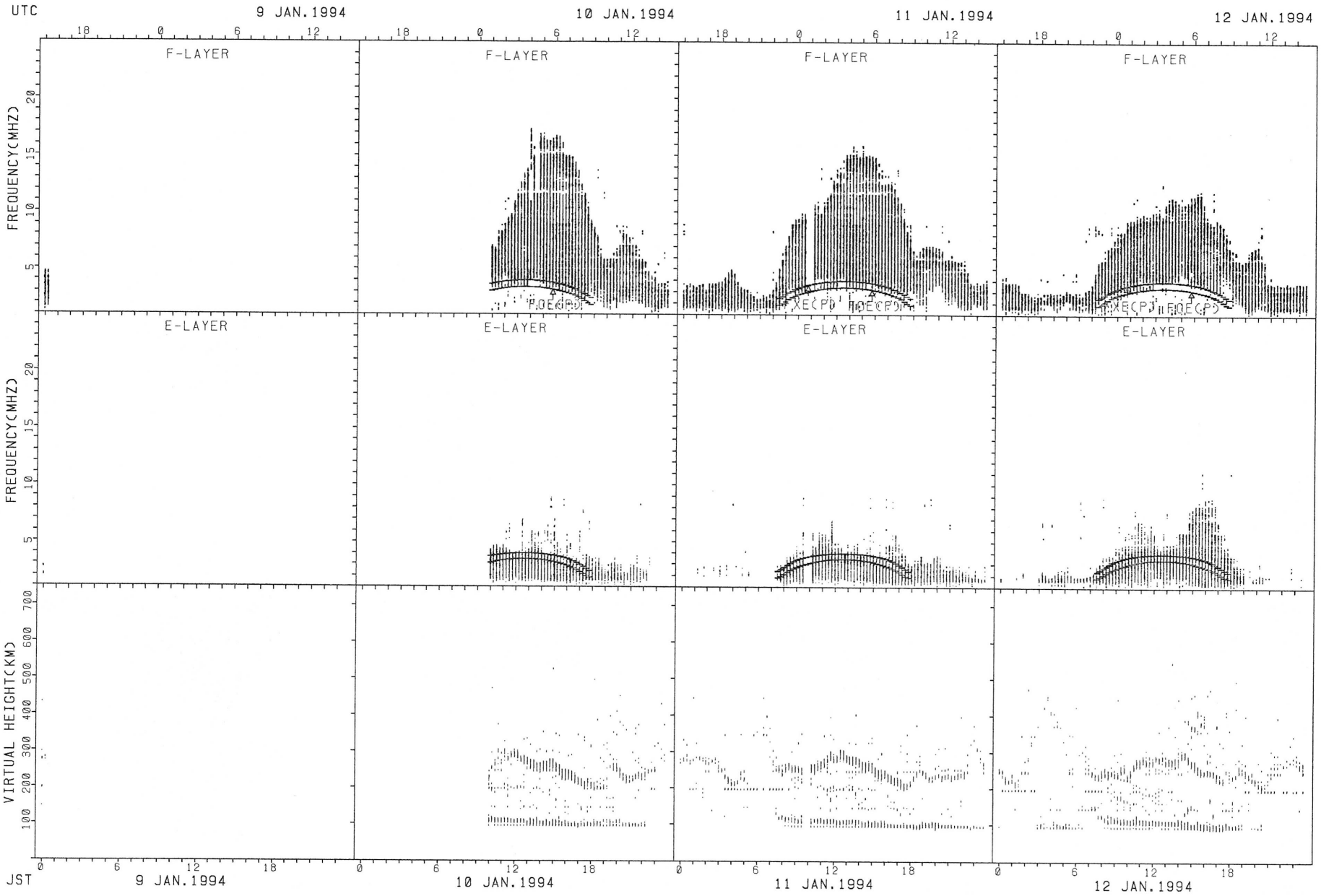

SUMMARY PLOTS AT YAMAGAWA
UTC
29 JAN.1994
30 JAN.1994
31 JAN.1994
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

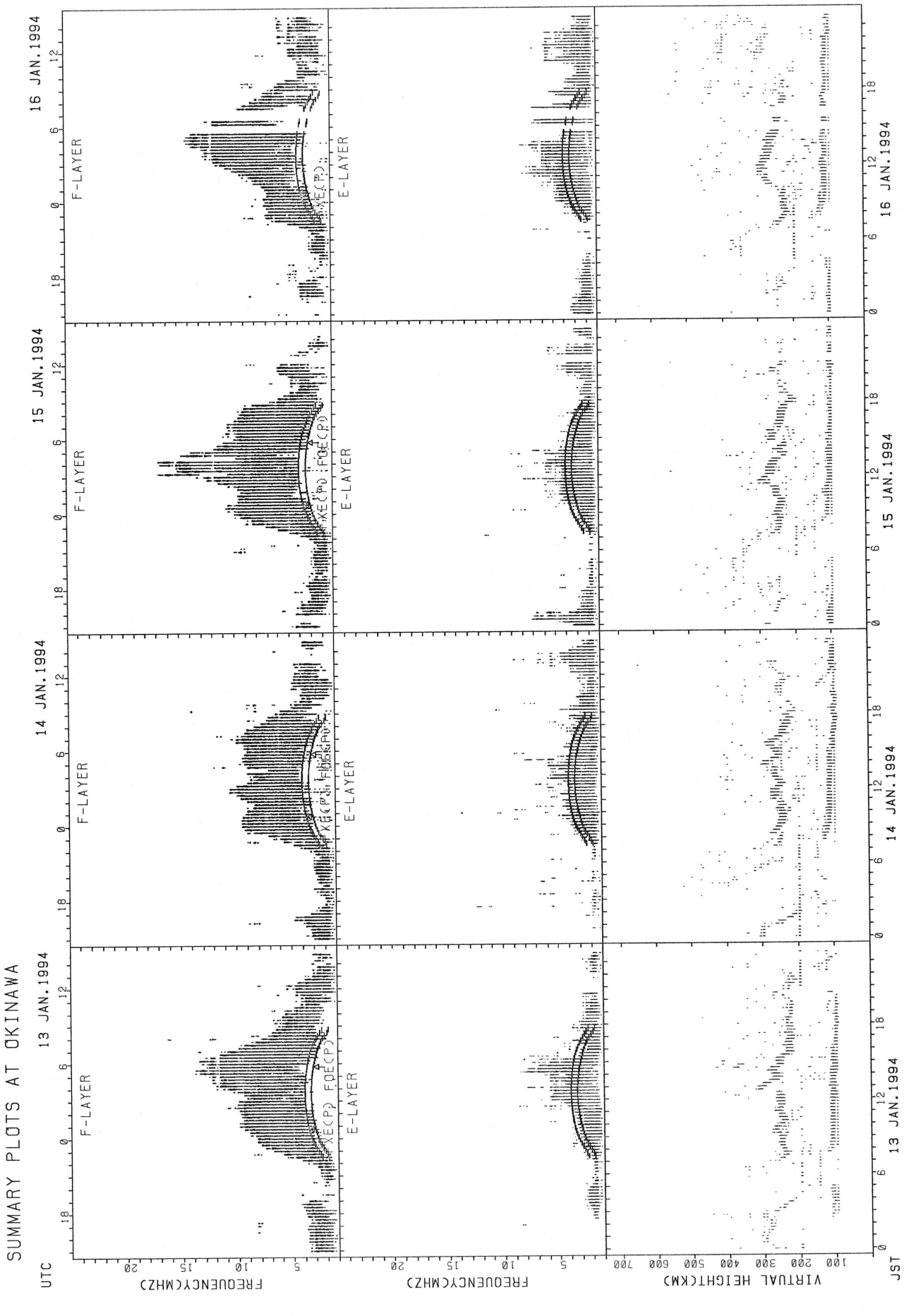


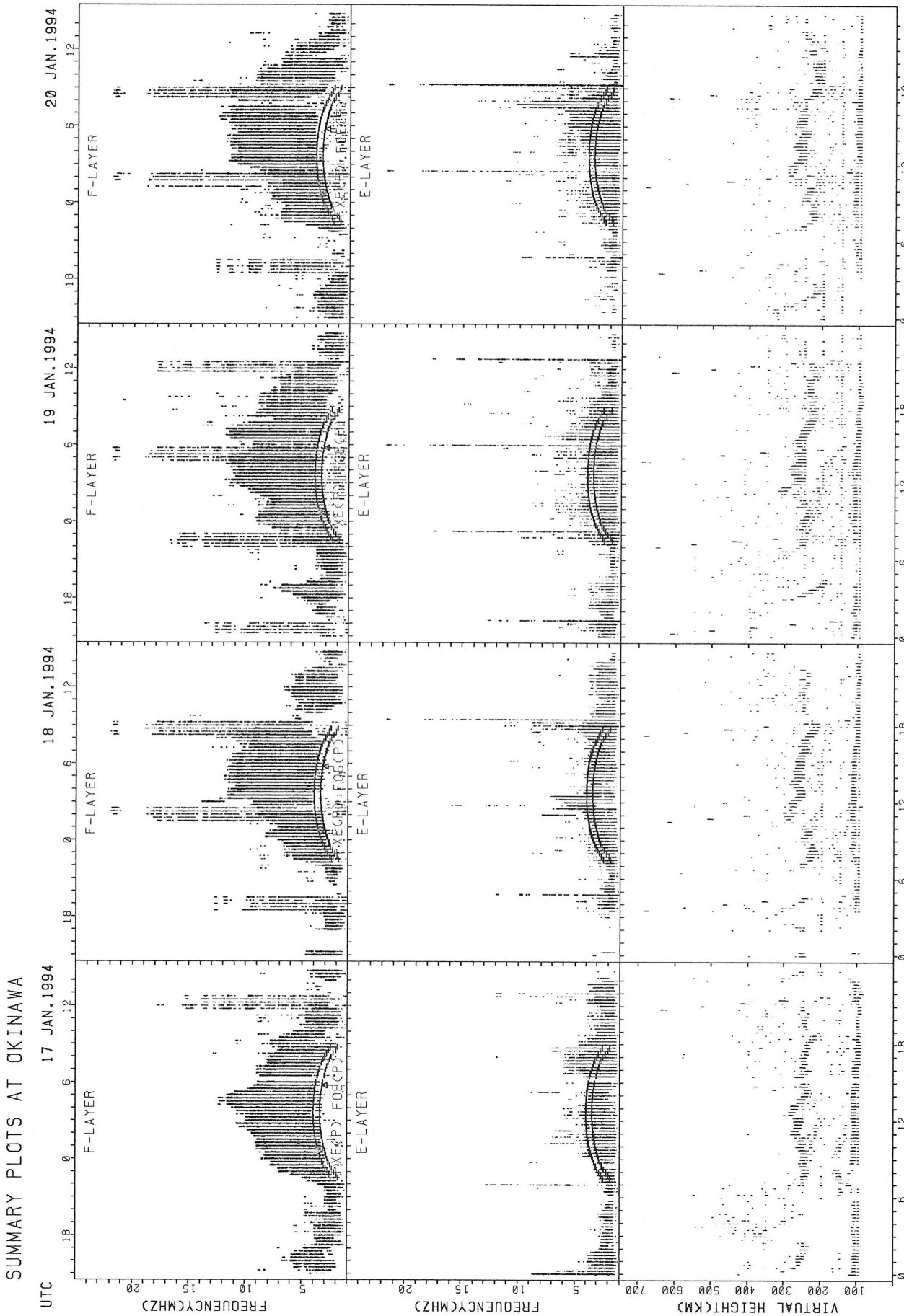

SUMMARY PLOTS AT OKINAWA
UTC
JST
5 JAN.1994
6 JAN.1994
7 JAN.1994
8 JAN.1994
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

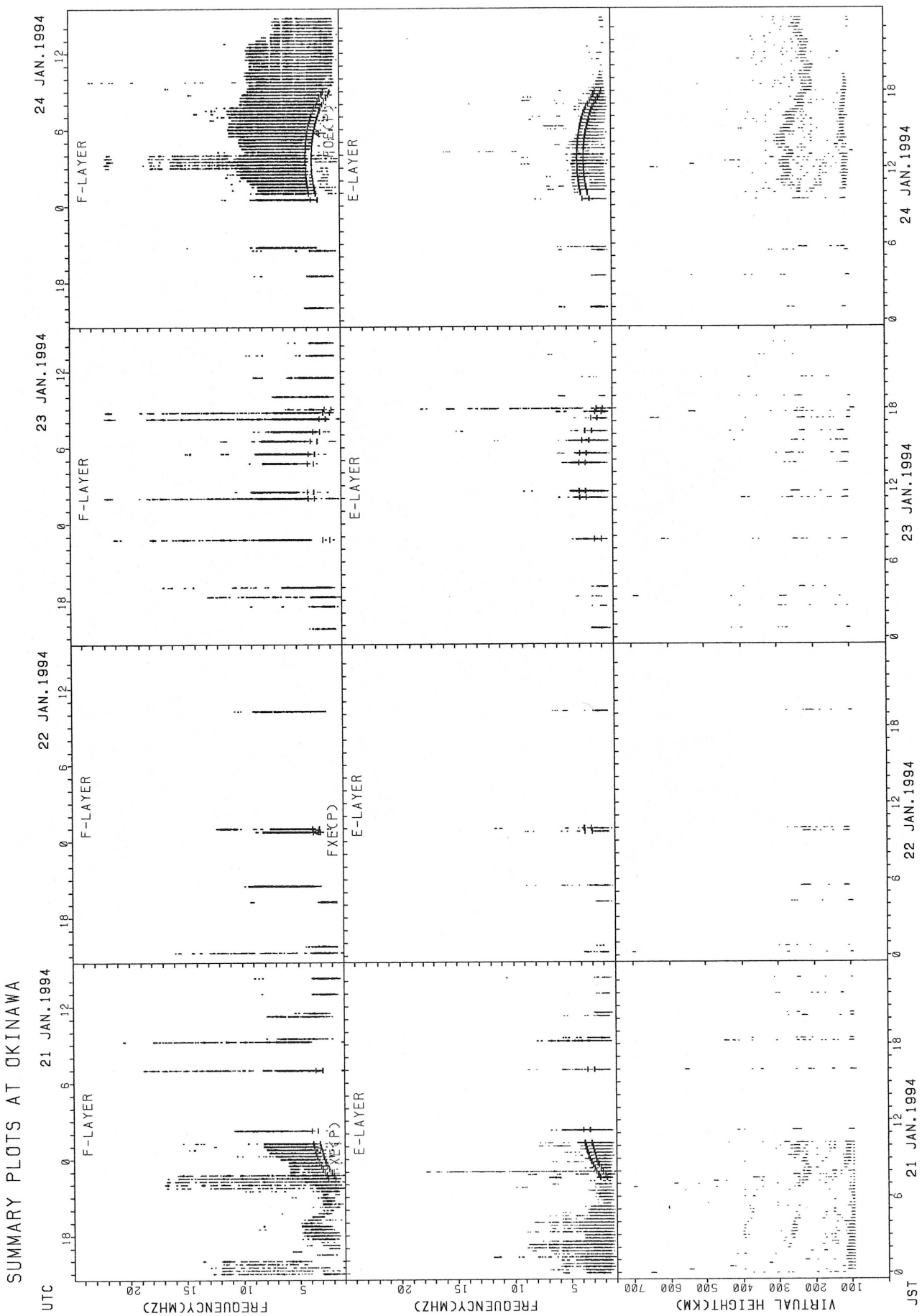
SUMMARY PLOTS AT OKINAWA



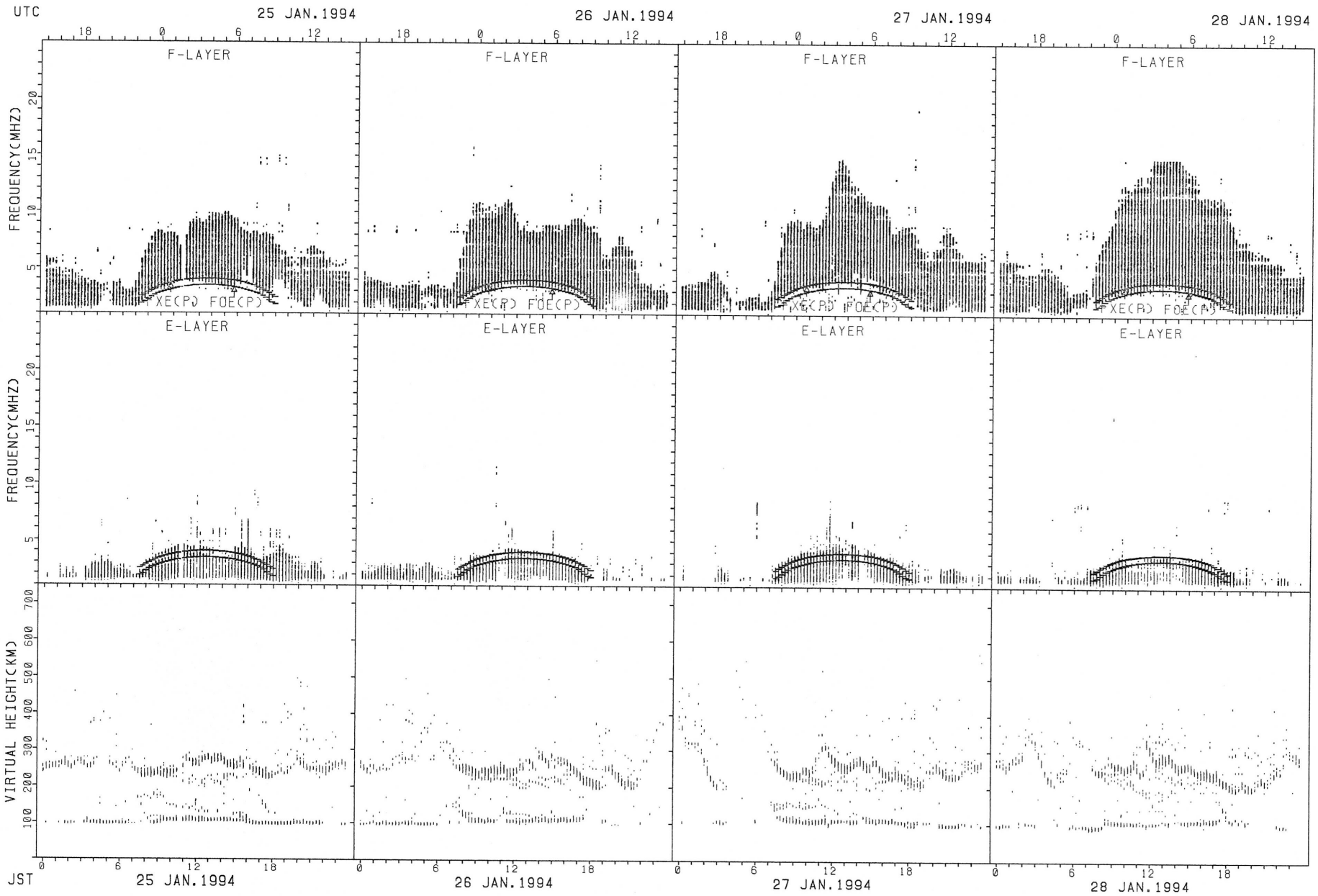
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
JST
13 JAN.1994
14 JAN.1994
15 JAN.1994
16 JAN.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

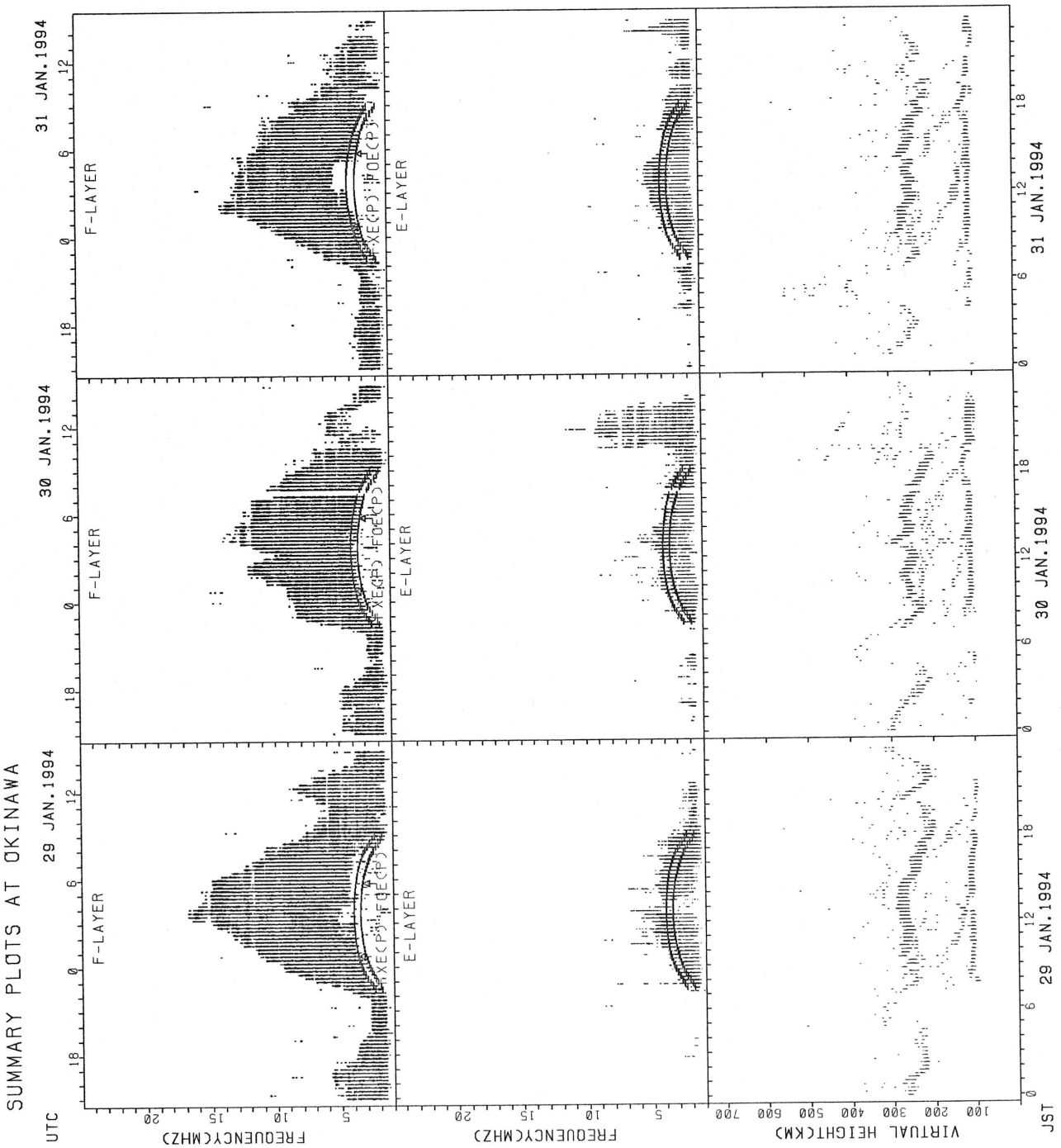

SUMMARY PLOTS AT OKINAWA
17 JAN.1994
18 JAN.1994
19 JAN.1994
20 JAN.1994
UTC
JST
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
JST
21 JAN.1994
22 JAN.1994
23 JAN.1994
24 JAN.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 JAN.1994
30 JAN.1994
31 JAN.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
JAN. 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									19	30	30	31	30	30	30	26								
MED									248	236	239	234	237	240	242	237								
U Q									262	242	246	242	242	246	254	252								
L Q									236	222	228	230	230	236	236	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			10		10	14	14	16	14										10	12	15	15	17	16
MED			109		113	113	112	113	111										114	113	109	109	107	111
U Q			113		117	117	113	117	119										121	114	113	111	110	111
L Q			105		109	109	111	111	109										111	109	107	107	105	109

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									23	24	29	26	21	23	29	25	17							
MED									240	249	246	235	246	250	258	250	240							
U Q									252	260	252	250	254	262	268	259	246							
L Q									230	235	238	230	240	238	245	244	234							

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								10	13								13	14	14	10	10	12	10	12
MED								112	117								105	101	104	102	103	107	107	104
U Q								135	131								121	107	109	111	109	109	115	107
L Q								105	113								102	99	101	99	99	100	101	100

MONTHLY MEDIANS OF H'F AND H'ES

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

H'F STATION YAMAGAWA LAT. 31.2N LON. 130.6E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									11	20	28	30	10	11	26	28	27	12						
MED									246	251	249	253	241	254	257	252	254	244						
U Q									266	262	262	262	252	264	268	263	264	257						
L Q									230	240	239	240	238	242	248	244	246	236						

H'ES

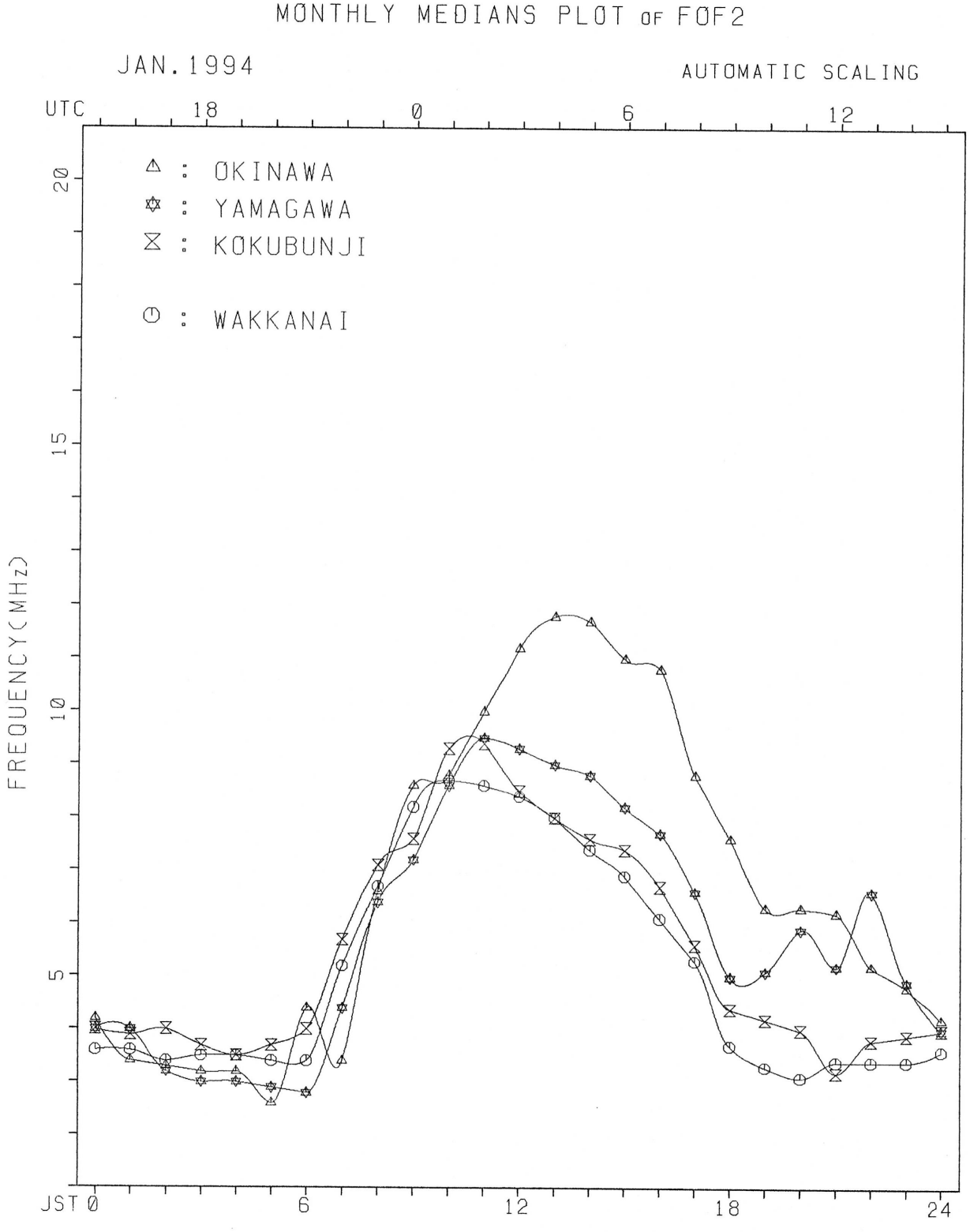
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												13							17	13		10		
MED												115							105	101		104		
U Q												117							107	103		109		
L Q												109							101	99		97		

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									16	24	28	24			15	26	27	28	19					
MED									251	248	243	256			262	254	240	231	234					
U Q									267	259	248	272			280	260	254	242	242					
L Q									236	238	235	245			252	248	234	225	220					

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		11		11	14	12			20	19	25	29	24	25	26	27	25	26	29	24	18	21	16	12
MED		107		105	101	99			149	119	125	121	117	119	114	113	113	118	107	102	101	99	99	103
U Q		111		109	107	105			168	228	150	148	128	131	119	135	124	149	120	110	111	110	106	111
L Q		99		101	99	99			116	113	113	113	110	108	109	105	106	101	99	99	97	97	97	99


MONTHLY MEDIANS PLOT OF FOF2
JAN. 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

JAN. 1994 FXI (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

D / H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 37	X 39	X 39	X 38	X 39	X 42	X 39												X 59	A	A	A	47	44
2	44	29	X 28	X 30	X 31	33	A												X 39	X 34	X 38	A	38	A
3	A	A	A	A	X 29	X 31	X 31												X 42	X 45	X 38	O X 33	X 30	X 32
4	X 36	X 36	A	X 34	X 38	X 36	X 36												X 50	X 33	X 36	X 34	X 36	X 35
5	X 34	X 37	X 34	X 31	X 32	X 34	X 36												X 41	X 43	X 37	39	36	35
6	36	38	40	37	X 37	X 37	X 38												X 44	X 46	X 43	X 37	X 43	X 48
7	X 31	X 33	X 34	X 33	X 34	X 35	X 36												X 34	A	X 34	X 37	39	39
8	40	X 42	X 45	X 33	X 31	X 32	X 35												X 52	X 50	X 39	X 28	O X 30	X 35
9	X 35	X 39	X 39	X 34	X 36	X 40	X 37												X 61	X 55	A	A	X 37	X 35
10	X 36	X 39	X 43	X 35	X 33	X 36	X 40												X 62	X 47	X 42	X 30	X 33	X 34
11	X 36	X 36	X 38	X 42	X 36	X 34	X 37												X 54	X 50	X 32	X 32	X 34	X 38
12	X 39	X 42	X 40	X 33	X 33	X 33	X 33												X 66	X 49	X 47	X 38	49	44
13	46	49	50	55	X 38	X 35	48												X 39	X 39	X 34	X 31	X 35	X 38
14	X 38	X 44	X 31	28	X 31	34	X 32												X 44	X 35	X 34	34	40	X 42
15	X 38	X 39	X 45	X 33	X 36	X 34	X 30												X 38	X 38	O X 36	O X 34	X 38	O X 34
16	X 39	X 43	X 45	X 27		31	33												X 40	X 34	X 47	42	47	41
17	53	45	38	37	40	51	53	62		82									X 54	X 62	X 37	X 39	45	X 49
18	49	X 41	43	36	32	32	X 30												X 44	X 42	38	34	34	X 36
19	X 36	X 36	X 36	X 38	39	X 33	X 27												X 49	X 49	X 37	X 32	X 36	X 36
20	X 38	X 40	X 44	X 38	X 27	X 28	X 30												X 45	47	44	X 36	37	43
21	44	X 34	X 37	X 37	X 34	X 28	X 27												X 40	X 40	X 40	X 33	X 36	X 37
22	X 37	X 39	X 40	X 40	X 37	X 38	X 37												X 44	X 62	X 44	X 31	42	46
23	50	47	49	54	52	49	49												X 53	X 53	X 41	42	47	48
24	51	50	50	X 50	X 48	47	44												X 44	X 43	X 47	X 32	X 41	X 42
25	X 40	48	47	49	47	X 37	X 39												X 48	X 51	X 54	X 43	X 43	X 46
26	X 46	X 44	X 48	X 43	X 38	X 37	X 41												X 59	X 61	X 50	X 46	X 42	X 41
27	X 48	X 50	X 54	X 49	X 40	X 36	X 34												X 50	X 48	X 47	X 40	X 40	X 44
28	X 44	X 44	X 43	X 41	X 43	X 41	X 42												X 44	X 39	X 51	X 31	X 36	O X 38
29	X 39	X 41	X 40	X 39	X 37	X 32	X 31												X 41	X 44	X 46	X 44	X 38	X 38
30	X 40	X 42	X 43	X 39	X 38	X 31	X 30												X 44	X 48	X 39	X 34	X 39	X 41
31	X 39	X 42	X 43	X 48	X 39	X 40	X 40												X 43	X 42	X 40	X 37	X 39	X 39
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	30	30	31	30	1		1									31	29	29	28	31	30
MED	X 39	X 41	X 43	X 38	X 37	X 35	X 36	62		82									X 44	X 46	X 40	X 34	X 38	X 39
U Q	44	44	45	X 42	X 39	X 38	40												X 53	X 50	X 46	X 39	42	44
L Q	X 36	X 38	X 38	X 33	X 33	X 32	X 31												X 41	X 40	X 37	X 32	X 36	X 36

IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 FOF2 (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	31	33	33	32	33	36	33	57	80	98	112	102	84	78	81	77	74	54	53	A	A	A	F 36	F 34
2	F 24	F 22	22	24	25	F 25	I A 24	51	88	114	97	86	84	87	90	76	67	49	33	28	32	I A 29	28	A
3	A	A	A	A	23	25	25	48	80	112	122	91	84	86	77	78	65	53	36	39	32	27	24	26
4	30	30	I A 27	28	32	30	30	50	85	96	90	87	84	95	96	66	57	57	44	27	30	28	30	29
5	28	31	J R 28	25	26	28	30	48	67	77	86	80	77	78	73	62	55	42	35	37	J R 31	29	F 28	F 26
6	29	F 29	F 32	F 30	31	31	32	49	70	90	103	87	74	74	74	74	60	51	39	40	37	31	37	42
7	25	27	28	27	28	29	30	53	74	85	96	96	73	78	V 80	73	62	42	28	I A 34	28	31	F 28	F 29
8	F 33	36	39	27	25	26	29	48	79	98	93	82	81	83	80	71	56	52	46	44	33	22	24	29
9	29	33	33	28	30	34	31	59	66	71	89	77	83	70	76	70	57	46	55	49	A	I A 28	31	29
10	J R 30	33	37	28	27	30	34	45	57	63	89	94	93	69	67	76	55	53	56	41	36	24	27	28
11	30	J R 30	32	36	30	28	31	54	R 62	62	80	91	94	78	H 70	64	61	43	48	44	26	26	28	32
12	33	36	J R 34	27	27	27	26	46	62	75	109	94	V 80	79	84	75	61	60	60	43	41	R 32	F 40	F 37
13	F 37	F 38	F 40	F 49	32	29	39	54	61	73	103	86	93	79	69	72	56	40	33	33	28	25	29	32
14	32	38	25	F 22	25	F 25	27	40	52	63	J R 81	101	92	71	70	62	55	47	38	30	28	27	F 32	36
15	32	33	39	27	30	28	24	49	61	84	115	105	76	88	62	72	67	44	32	32	30	28	32	28
16	33	37	39	21	B	F 20	F 25	50	71	V 72	67	73	84	82	93	79	63	46	34	27	41	F 33	F 35	F 31
17	F 38	F 38	F 31	28	F 27	F 40	40	52	60	Z 76	Z 103	112	76	88	81	76	58	47	48	V 55	31	33	F 38	43
18	F 40	J R 35	F 34	27	F 24	F 22	24	43	57	63	80	84	99	71	67	71	77	56	38	36	F 29	25	25	30
19	30	29	30	32	F 32	27	21	47	57	62	92	96	78	66	74	74	68	48	43	43	31	26	30	30
20	32	34	38	32	21	22	24	52	64	62	69	93	92	78	R 63	61	67	51	39	F 38	F 34	30	26	F 36
21	34	28	31	31	28	22	21	42	52	63	77	94	90	76	69	75	60	53	34	34	34	27	30	31
22	31	33	34	34	31	32	31	51	65	63	80	82	84	66	66	72	64	47	38	56	38	25	F 35	F 34
23	F 35	F 37	F 41	F 41	F 42	F 42	F 42	53	R 62	R 63	87	79	81	72	J R 71	U R 64	62	55	47	47	35	F 34	F 38	F 40
24	F 42	F 42	F 41	43	42	F 39	F 36	60	64	69	82	76	75	69	74	76	69	48	38	37	41	26	35	36
25	34	F 39	F 38	F 41	F 40	31	V 33	62	61	59	83	82	78	73	73	65	62	55	42	45	48	37	37	40
26	40	38	42	37	32	31	35	61	73	72	100	106	76	72	74	76	64	R 64	53	55	44	40	36	35
27	42	44	48	43	34	30	28	52	70	74	100	94	90	77	V 81	64	72	61	44	42	41	34	34	38
28	38	38	37	35	37	35	36	57	69	98	R 105	119	106	100	77	78	65	62	38	33	45	25	30	R 32
29	33	35	34	J R 33	31	26	25	53	74	79	89	95	R 102	91	82	72	63	48	35	38	40	38	32	32
30	J S 34	36	37	33	32	25	24	51	78	89	93	93	82	79	72	65	61	51	38	42	33	28	33	35
31	33	36	37	42	33	34	34	59	70	76	89	86	89	R 84	68	H 73	65	54	37	36	34	31	33	33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	29	30	31	30
MED	33	35	34	32	30	29	30	51	66	74	90	91	84	78	74	72	62	51	38	38	34	28	32	32
U Q	F 35	38	39	36	32	32	34	54	74	89	103	96	92	84	81	76	67	55	47	44	40	32	F 35	36
L Q	30	31	31	27	27	25	25	48	61	63	82	82	78	72	69	65	58	47	35	34	30	26	28	29

JAN. 1994 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 FOF1 (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	L	L	L	L								
2										L	U L 450	L	L	L	L	L								
3										L	U L 450	L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5										L	L	L	U L 420		L									
6										L	U L 460	U L 450	L	L		L								
7										L	L	U L 450	L	L	L									
8										L	L	U L 460	L	U L 460	L									
9											L	L	U L 460											
10											L	L	U L 450	L	L	L								
11									L 290	L		L	U L 420	U L 460	U L 440	U L 395	L							
12										L	L	U L 440	L	U L 490	L	L								
13										L	L	U L 420	U L 430	L	L	L								
14												U L 470	U L 440	U L 430	L	L								
15										L		U L 450	U L 480	L	L									
16										L		L	L	U L 450	L									
17										L	U L 460	U L 450	L 440	U L 460	U L 400	L	U L 250							
18										L			U L 450		L	L								
19											U L 420	U L 450	U L 450	L	U L 430									
20											L	U L 470	L 450	L										
21											L	U L 460	U L 460	U L 440	U L 420	L								
22									L 280	L 330	L	L	U L 460	L	L									
23									U L 280		L	U L 460	U L 460	L	L									
24											U L 440	L	U L 460	U L 420	U L 500	L								
25									L	L	L	U L 470	U L 480	L	L									
26										U L 360	U L 490	U L 450	L	U L 430	L	L								
27											L	L	U L 470	L	L									
28										L	L	U L 470	L	U L 500	L									
29										L	U L 460	L	U L 460	L	U L 420	L	L							
30									L	L	U L 470	U L 440	L	U L 440	U L 445	L								
31									L	L	U L 460	U L 450	U L 460	U L 460	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	2	10	18	19	12	7		1							
MED									L 280	L 345	U L 460	U L 450	U L 460	U L 445	U L 420		U L 250							
U Q									L 290		U L 460	U L 460	U L 460	U L 460	445									
L Q									L 280		U L 450	U L 450	U L 450	U L 435	U L 400									

JAN. 1994 FOF1 (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 FOE (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								150	240	A	A	A	R	A 320	U A 295	U A 265	220	B						
2								A	250	280	300	A	A	A	A	A	A	B						
3								A	B	A	A 300	A	A	U R 300	270	A	A	B						
4								A	230	285	A	A	R 310	300	285	245	200	B						
5								B	R 240	280	310	U R 320	R 305	320	295	250	B	B						
6								B	240	285	305	325	R 325	R	295	260	215	B						
7								B	245	A	A	310	A	310	285	275	A	B						
8								B	230	290	310	R 325	325	320	295	270	210	B						
9								155	B	B	B	B	B	B	B	B	B	B						
10								145	245	285	R	325	320	A	A	240	210	B						
11								B	A	270	305	A	R	R	300	260	H 210	B						
12							B	B	225	A	290	315	R	305	275	245	A	B						
13								A	220	275	R 305	R	320	B	A	R 260	H 210	B						
14								A	220	270	A	305	A	B	280	A	A	B						
15						J K 120		A	A	A	A	A	R 315	R 300	270	250	A	B						
16								A	230	A	A	R	B	R 310	300	265	215	B						
17								A	230	U R 275	305	A	R	305	A	R	R	B						
18								B	205	285	A	A	A	A	300	R 270	A	B						
19								A	230	295	320	330	A	A	A	A	A	B						
20								B	A	255	B	A	A	A	A	265	A	B						
21								160	235	270	A	305	R	315	285	260	A	B						
22								B	230	285	310	320	U R 325	320	A	A	210	B						
23								170	H 235	280	305	A 335	A	320	A	A	B	B						
24								160	250	270	U R 305	320	R	R 320	300	R	210	B						
25								150	230	R	315	335	340	325	305	R	220	B						
26								185	250	295	B	B	330	R 320	300	270	235	B						
27								B	R 235	285	R	340	R 335	B	A 300	A	205	B						
28								170	255	R 290	300	R 315	R	B	290	270	235	H 165						
29								175	260	290	B	330	340	B	305	285	225	B						
30								B	235	265	U R 310	320	A	A	310	270	235	B						
31								180	235	280	305	330	R	R 325	310	275	A	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1		11	26	23	17	18	12	17	22	20	16	1						
MED						J K 120		160	235	280	305	322	325	320	295	265	212	H 165						
U Q								175	245	285	310	330	332	R 320	300	270	222							
L Q								150	230	270	302	315	R 318	305	285	255	210							

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IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 FOES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A 19	20	E B 14	E B 13	E B 14	J A 18	J A 20	G	J A 33	J A 54	J A 39	39	G	J A 45	37	J A 49	G	J A 52	J A 125	J A 106	J A 122	J A 67	J A 52	E B 13
2	E B 12	E B 15	J A 19	J A 31	J A 48	J A 50	J A 51	J A 36	J A 42	J A 47	J A 47	J A 43	J A 46	J A 54	J A 51	J A 36	J A 43	J A 47	J A 44	J A 34	J A 23	J A 36	22	62
3	59	J A 51	34	30	J A 20	17	20	J A 23	J A 49	J A 53	38	39	J A 41	G	G	27	27	E B 14	J A 35	J A 50	J A 28	J A 47	26	J A 23
4	21	E B 13	34	J A 26	J A 26	21	E B 14	J A 47	G	G	32	J A 44	G 23	G	G	G	G 20	19	E B 13	E B 15	E B 14	E B 13	24	23
5	E B 14	E B 13	E B 14	E B 13	E B 15	E B 14	E B 14	E B 15	G 23	G 26	G 19	G 25	G 20	G 18	G 18	G 18	E B 25	E B 15	E B 14	E B 13	E B 13	J A 34	28	E B 13
6	E B 12	E B 14	E B 14	E B 13	E B 14	E B 14	E B 13	E B 15	G	G 28	G	G	G	G	34	G	G	E B 14	E B 14	E B 14	E B 15	17	19	J A 20
7	21	E B 13	E B 14	J A 20	18	21	18	E B 15	G	J A 46	33	G	34	G	31	G 26	J A 28	J A 27	J A 42	J A 54	J A 47	J A 24	E B 16	E B 11
8	J A 34	20	E B 12	E B 13	E B 14	E B 15	E B 13	E B 16	J A 27	G	G	G	G	G	G	G	G	16	J A 20	19	J A 19	J A 20	19	E B 13
9	E B 21	18	E B 13	E B 13	E B 15	E B 13	E B 13	G	E. B 31	E B 33	E B 36	E B 38	E B 40	E B 45	E B 40	E B 39	E B 30	J A 22	J A 29	J A 23	34	33	30	24
10	30	J A 21	23	18	E B 14	E B 15	E B 14	G	G	J A 33	G 25	G	G 29	J A 44	J A 42	G 21	G 21	23	E B 13	E B 18	E B 13	E B 14	E B 15	E B 14
11	E B 12	E B 17	E B 13	E B 11	17	E B 13	18	E B 15	25	J A 42	G 28	35	34	G	G	G	G 18	33	J A 22	E B 15	E B 20	E B 13	E B 15	J A 33
12	E B 12	E B 13	27	J A 21	E B 13	E B 12	J A 14	E B 16	J A 28	J A 33	G 26	G	G 26	G	G 22	G 22	31	J A 24	J A 21	E B 13	19	E B 13	E B 14	E B 13
13	E B 13	J A 33	J A 23	20	E B 14	15	22	29	G 19	G 24	G	G	G 25	E B 31	J A 31	G	G	E B 14	E B 14	E B 14	E B 13	E B 13	E B 13	E B 12
14	E B 14	E B 14	E B 14	E B 13	E B 12	E B 12	J A 22	J A 32	J A 32	J A 55	88	G 26	J A 42	E B 34	37	J A 29	34	J A 38	19	E B 13	E B 13	E B 13	E B 13	E B 14
15	E B 11	22	28	31	E B 13	K J A 12	J A 14	21	29	27	J A 66	31	G	G 23	G 20	G 20	26	21	27	28	J A 31	J A 24	J A 22	24
16	19	E C 27	E B 12	E B 11	B	E B 14	J A 21	J A 22	G	31	31	G 30	E B 35	G 26	G	38	24	J A 27	32	J A 23	E B 12	E B 12	E B 15	E B 13
17	E B 14	E B 14	19	18	E B 14	J A 14	21	19	G	G	G 25	35	G 24	35	J A 43	G 21	G 20	E B 15	22	E B 14	E B 14	E B 13	14	J A 31
18	E B 11	E B 13	E B 13	E B 13	E B 13	18	J A 17	E B 16	29	33	J A 43	89	J A 52	58	35	G 23	22	E B 13	E B 15	E B 13	J A 28	J A 44	J A 28	J A 19
19	22	J A 32	E B 21	E B 12	19	E B 12	20	J A 22	J G 23	G	34	G 30	J A 49	J A 52	J A 42	J A 60	42	J A 42	J A 28	J A 27	27	E B 15	20	E B 14
20	E B 13	E B 13	21	22	17	21	20	E B 16	J A 28	G 26	E B 31	J A 49	J A 44	J A 53	J A 42	G 22	J A 49	J A 20	20	E B 13	J A 33	J A 47	J A 46	J A 51
21	E B 13	J A 29	J A 16	E B 11	20	17	E B 13	G	26	G	J A 38	34	G	G	31	G	J A 29	J A 27	J A 23	J A 22	22	E B 14	E B 12	E B 14
22	E B 14	E B 12	19	E B 14	J A 18	E B 12	E B 14	E B 17	G	32	34	36	G	G 22	32	30	G	E B 15	E B 14	E B 13	E B 12	E B 15	E B 14	E B 12
23	E B 13	E B 13	E B 12	E B 14	E B 13	E B 13	E B 13	G	G	32	33	J A 53	J A 36	35	35	45	E B 45	E B 16	E B 15	E B 11	E B 12	J A 33	E B 15	E B 14
24	E B 15	E B 13	E B 14	J A 21	J A 29	E B 15	19	22	G	36	G	37	G	G	33	G	30	22	E B 13	E B 14	E B 13	E B 11	E B 13	20
25	J A 29	J A 22	J A 28	E B 12	E B 14	E B 14	15	G	26	G	37	37	37	39	40	32	J A 32	E B 16	E B 13	24	E B 15	E B 13	15	E B 13
26	J A 34	E B 14	E B 14	19	25	E B 13	20	24	G	G	E B 34	E B 40	36	G 31	G	G	27	19	E B 14	J A 22	19	E B 11	E B 11	E B 13
27	E B 15	E B 15	19	20	20	21	E B 14	E B 17	G	G	35	G	G	E B 35	33	28	G 18	18	E B 14	E B 12	E B 14	E B 12	E B 12	E B 14
28	E B 13	E B 14	E B 13	E B 14	E B 14	E B 11	E B 16	G	G	G	36	G	G 21	E B 33	G	G	G	G	J A 27	E B 13	E B 18	E B 15	E B 14	E B 15
29	21	E B 14	18	J A 16	E B 13	E B 12	E B 13	G	G	G	E B 34	37	37	E B 41	33	G 22	G	E B 14	J A 16	E B 13	20	E B 15	E B 15	E B 13
30	E B 17	E B 14	E B 14	E B 14	E B 14	E B 14	E B 13	E B 17	G	G 20	34	G	J A 48	J A 43	G 22	G	G	20	20	E B 13	E B 13	E B 13	20	J A 30
31	22	19	J A 18	E B 13	E B 15	E B 12	E B 13	G	G 22	G 20	G 21	37	G	G	G	J A 48	27	J A 24	J A 22	19	E B 13	23	J A 25	J A 22
	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	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 15	E B 14	E B 16	E B 14	E B 14	E B 14	14	G	G	G	34	33	G	G	32	G	24	20	20	E B 15	E B 18	E B 15	15	E B 14
U Q	21	J A 21	21	J A 20	19	17	20	J A 22	J A 28	J A 33	J A 37	39	J A 40	J A 43	J A 37	32	30	J A 27	J A 27	J A 23	J A 27	J A 33	24	J A 23
L Q	E B 13	E B 13	E B 14	E B 13	E B 14	E B 12	E B 13	E B 16	G	G	G	G	G	G	G	G 23	G	E B 15	E B 14	E B 13	E B 13	E B 13	E B 14	E B 13

JAN. 1994 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 FBES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 12	15	E B 14	E B 13	E B 14	E B 13	E B 13	G	G 21	35	34	37	G	41	36	38	G	34	28	A A 106	A A 122	A A 67	19	E B 13
2	E B E B 12	E B 15	E B 14	20	19	16	A A 51	18	G 22	G 26	G 26	35	36	44	36	30	24	27	26	21	20	A A 36	18	A A 62
3	A A 59	A A 51	A A 34	A A 30	16	E B 13	15	17	31	33	G 27	36	34	G	G	26	24	E B 14	26	26	E B 13	25	17	20
4	21	E B 13	A A 34	23	21	E B 14	E B 14	25	G	G	32	34	G 22	G	G	G	G 16	16	E B 13	E B 15	E B 14	E B 13	20	E B 13
5	E B E B 14	E B 13	E B 14	E B 13	E B 15	E B 14	E B 14	E B 15	G 23	G 25	G 18	G 25	G 20	G 18	U G 18	G 17	E B 25	E B 15	E B 14	E B 13	E B 13	16	17	E B 13
6	E B E B 12	E B 14	E B 14	E B 13	E B 14	E B 14	E B 13	E B 15	G	G 23	G	G	G	G	34	G	G	E B 14	E B 14	E B 14	E B 15	E B 12	E B 14	E B 13
7	E B E B 13	E B 13	E B 14	18	14	16	E B 13	E B 15	G	29	33	G	34	G	31	G 25	21	18	17	A A 54	19	15	E B 16	E B 11
8	E B E B 13	E B 14	E B 12	E B 13	E B 14	E B 15	E B 13	E B 16	G 17	G	G	G	G	G	G	G	G	15	18	E B 12	E B 13	17	18	E B 13
9	E B 21	16	E B 13	E B 13	E B 15	E B 13	E B 13	G	E B 31	E B 33	E B 36	E B 38	E B 40	E B 45	E B 40	E B 39	E B 30	20	20	17	A A 34	A A 33	24	E B 13
10	25	20	21	E B 14	E B 14	E B 15	E B 14	G	G	G 26	U G 25	G	G 27	35	32	G 21	G 20	21	E B 13	E B 18	E B 13	E B 14	E B 15	E B 14
11	E B E B 12	E B 17	E B 13	E B 11	E B 15	E B 13	E B 15	E B 15	25	G 22	G 26	33	33	G	G	G	G 15	23	20	E B 15	E B 20	E B 13	E B 15	18
12	E B E B 12	E B 13	23	20	E B 13	E B 12	E B 12	E B 16	27	29	G 25	G	G 25	G	G 21	G 20	24	23	E B 13	E B 13	15	E B 13	E B 14	E B 13
13	E B E B 13	E B 13	E B 13	E B 13	E B 14	14	19	27	G 19	G 21	G	G	G 24	E B 31	28	G	G	E B 14	E B 14	E B 14	E B 13	E B 13	E B 13	E B 12
14	E B E B 14	E B 14	E B 14	E B 13	E B 12	E B 12	17	27	32	40	84	G 22	32	E B 34	34	27	27	32	14	E B 13	E B 13	E B 13	E B 13	E B 14
15	E B E B 11	E B 13	23	24	E B 13	K E B 12	E B 13	19	27	26	54	31	G	G 22	G 19	G 20	25	19	20	20	23	18	17	20
16	17	E C 27	E B 12	E B 11	B	E B 14	E B 14	22	G	28	31	G 30	E B 35	G 25	G	35	G 17	23	26	22	E B 12	E B 12	E B 15	E B 13
17	E B E B 14	E B 14	16	E B 13	E B 14	E B 13	E B 13	16	G	G	G 23	32	U G 24	G 26	32	U G 21	G 19	E B 15	E B 14	E B 14	E B 14	E B 13	13	21
18	E B E B 11	E B 13	E B 13	E B 13	E B 13	E B 12	E B 14	E B 16	28	30	40	73	38	48	34	G 23	U Y 21	E B 13	E B 15	E B 13	E B 12	E B 14	15	E B 12
19	16	27	E B 21	E B 12	E B 12	E B 12	E B 14	18	G 21	G	34	G 30	38	34	35	50	32	24	17	23	17	E B 15	19	E B 14
20	E B E B 13	E B 13	E B 13	E B 14	E B 13	E B 12	17	E B 16	23	G E B 22	31	34	35	41	40	G 21	40	18	E B 15	E B 13	30	22	17	28
21	E B 13	17	E B 13	E B 11	E B 12	14	E B 13	G	25	G	34	G 28	G	G	30	G	22	16	20	19	E B 13	E B 14	E B 12	E B 14
22	E B E B 14	E B 12	E B 13	E B 14	15	E B 12	E B 14	E B 17	G	31	34	35	G	G 22	32	30	G	E B 15	E B 14	E B 13	E B 12	E B 15	E B 14	E B 12
23	E B E B 13	E B 13	E B 12	E B 14	E B 13	E B 13	E B 13	G	G	32	33	G 34	35	35	35	U Y 44	E B 45	E B 16	E B 15	E B 11	E B 12	16	E B 15	E B 14
24	E B E B 15	E B 13	E B 14	17	17	E B 15	E B 14	G 16	G	36	G	36	G	G	32	G	30	19	E B 13	E B 14	E B 13	E B 11	E B 13	E B 14
25	15	19	19	E B 12	E B 14	E B 14	14	G	26	G	36	36	36	37	39	32	30	E B 16	E B 13	U Y 24	E B 15	E B 13	E B 15	E B 13
26	E B E B 13	E B 14	E B 14	E B 14	16	E B 13	E B 13	G	G	G E B 34	E B 40	35	G 23	G	G	27	16	E B 14	18	E B 12	E B 11	E B 11	E B 13
27	E B E B 15	E B 15	E B 15	E B 14	E B 14	E B 13	E B 14	E B 17	G	G	34	G	G E B 35	33	U Y 27	G 16	15	E B 14	E B 12	E B 14	E B 12	E B 12	E B 14
28	E B E B 13	E B 14	E B 13	E B 14	E B 14	E B 11	E B 16	G	G	G	33	G	G 20	E B 33	G	G	G	G	27	E B 13	E B 18	E B 15	E B 14	E B 15
29	E B E B 14	E B 14	14	14	E B 13	E B 12	E B 13	G	G	G E B 34	36	36	E B 41	32	G 22	G	E B 14	15	E B 13	E B 14	E B 15	E B 15	E B 13
30	E B E B 17	E B 14	E B 14	E B 14	E B 14	E B 14	E B 13	E B 17	G	G 20	33	G	44	G 35	G 21	G	G	19	E B 14	E B 13	E B 13	E B 13	E B 13	18
31	E B 14	18	16	E B 13	E B 15	E B 12	E B 13	G	G 21	G 20	G 21	36	G	G	G	41	26	21	20	17	E B 13	E B 15	17	E B 13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 14	E B 14	E B 14	E B 14	E B 14	E B 13	E B 14	G	G	G	32	G	G	G	32	G	E G 21	16	E B 15	E B 14	E B 14	E B 14	E B 15	E B 13
U Q	15	17	16	14	15	14	14	17	25	30	34	36	35	35	34	30	27	21	20	20	18	16	17	15
L Q	E B 13	E B 13	E B 13	E B 13	E B 13	E B 12	E B 13	E B 16	G	G 26	G 27	G 33	G	G	G	G 23	G	E B 15	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13

JAN. 1994 FBES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 FMIN (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

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

JAN. 1994 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	285	295	285	275	280	285	310	340	335	325	335	330	330	335	335	345	350	350	335	A	A	A	F 315	F 340
2	F 300	F 275	295	255	290	F 275	A	330	315	360	360	350	330	335	345	350	365	365	335	305	305	A	290	A
3	A	A	A	A	285	315	315	325	325	330	355	355	335	340	340	360	345	360	335	350	365	A 350	305	270
4	295	330	A	300	320	295	315	330	345	345	345	360	315	330	345	355	315	345	375	350	335	320	310	310
5	310	315	J R 295	300	295	295	340	360	365	350	345	375	355	315	350	360	360	350	330	350	J R 330	335	F 320	F 300
6	280	F 310	F 335	F 265	290	305	330	350	340	355	355	350	350	350	330	350	355	350	335	310	360	295	305	340
7	345	290	305	280	285	300	315	350	375	340	350	365	340	330	V 350	345	355	360	325	A	360	290	F 290	F 295
8	F 310	315	340	305	295	295	340	340	335	350	370	360	340	355	340	350	340	330	335	350	385	285	305	280
9	295	280	305	320	295	315	325	365	370	350	320	345	345	355	350	335	360	330	340	370	A	A	300	300
10	J R 290	300	340	300	285	315	350	350	365	335	330	350	355	355	345	355	365	325	355	335	345	295	295	300
11	285	J R 290	295	330	370	310	320	355	R 380	360	325	345	330	355	H 320	345	375	320	330	365	335	315	265	290
12	310	315	J R 360	265	295	280	380	325	335	320	340	340	V 315	315	320	345	345	330	335	315	345	R 315	F 315	F 315
13	F 290	F 310	F 290	F 350	350	325	305	350	345	320	345	330	355	335	330	335	365	340	300	350	340	285	290	310
14	305	340	365	F 280	310	F 280	345	355	355	335	A	340	350	345	350	350	370	340	335	360	320	265	F 300	325
15	310	305	320	320	300	340	320	340	355	330	350	365	345	370	340	330	355	355	305	365	320	280	295	310
16	280	320	355	385	B	F 275	F 345	360	370	V 345	365	345	360	325	345	345	370	330	345	360	315	F 295	F 295	F 280
17	F 325	F 345	F 340	330	F 310	F 325	325	355	350	Z 300	Z 330	360	345	325	350	355	360	315	325	V 355	365	270	F 285	315
18	F 325	J R 355	F 315	320	F 275	F 310	355	355	370	365	340	A 330	355	340	350	345	350	355	320	355	F 335	320	325	315
19	290	A 295	280	280	F 320	365	300	345	370	345	350	360	350	325	335	340	345	340	345	355	310	295	295	280
20	285	290	325	335	395	280	325	360	375	345	340	350	350	365	R 350	345	350	335	315	F 315	F 355	310	275	F 300
21	335	305	310	325	365	290	315	350	365	350	335	340	355	360	345	355	375	345	350	335	345	315	275	295
22	315	295	310	295	285	295	330	340	370	355	355	340	355	360	335	345	355	335	270	340	340	310	F 295	F 285
23	F 280	F 300	F 290	F 330	F 315	F 300	F 320	370	370	R 340	350	360	360	335	J R 340	U R 355	355	345	330	340	340	F 325	F 300	F 290
24	F 300	F 275	F 300	330	335	F 310	F 330	370	360	350	345	340	360	320	330	345	375	340	325	325	330	355	305	320
25	305	F 295	F 305	F 330	F 345	275	V 320	365	380	360	340	350	350	340	350	325	360	355	320	325	335	310	300	295
26	295	295	310	330	320	300	320	355	360	365	330	350	345	335	335	350	370	R 330	360	305	390	300	330	270
27	275	275	310	340	305	285	290	335	340	350	345	335	335	335	V 325	350	340	355	335	325	320	330	295	280
28	290	285	270	275	290	285	300	345	340	320	R 315	320	325	335	320	345	345	345	570	295	355	315	295	R 325
29	290	310	315	J R 335	340	300	290	335	355	350	350	320	R 340	335	350	370	370	360	315	315	320	330	300	300
30	J S 305	300	330	330	365	275	295	340	350	330	345	350	365	345	345	350	350	355	335	335	355	295	295	310
31	315	320	315	335	295	285	295	340	345	360	345	345	365	R 365	340	H 325	355	350	330	320	325	310	300	310
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	30	30	31	30	31	31	31	30	31	31	31	31	31	31	31	31	29	29	28	31	30
MED	298	300	310	320	302	295	320	350	355	345	345	350	350	335	340	345	355	345	335	340	340	310	300	300
U Q	310	315	332	330	335	310	330	355	370	355	350	360	355	355	350	355	365	355	340	355	355	320	305	315
L Q	290	290	295	280	290	285	310	340	340	330	335	340	335	330	335	345	350	330	325	318	322	295	295	290

JAN. 1994 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	L	L	L	L								
2										L	U L 380	L	L	L	L	L								
3										L	L	L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5										L	L	L	U L 395		L									
6										L	U L 380	U L 390	L	L		L								
7										L	L	U L 380	L	L	L									
8										L	L	U L 360	L	L	L									
9											L	L	U L 390											
10											L	L	U L 360	L	L	L								
11									L 400	L	L	U L 405	U L 370	U L 360	U L 395	L								
12										L	L	U L 390	L	U L 360	L	L								
13										L	L	U L 390	U L 365	L	L	L								
14										A	A	L	U L 360	U L 390	L	L								
15										L	A	U L 375	U L 350	L	L									
16										L		L	L	U L 365	L									
17										L	U L 360	U L 375	L 390	U L 380	L	L	U L 420							
18										L	A	A	A	A	L	L								
19											U L 375	L	U L 375	L	U L 365	A								
20											L	L	L 370	L										
21												L U L 350	U L 375	U L 385	U L 385	L								
22									L 415	L 425	L	L	U L 360	L	L									
23									U L 390		L	L	U L 370	L	L	Y								
24											U L 385	L	U L 375	U L 395	U L 355	L								
25									L	L	L	U L 370	U L 370	L	L									
26										U L 405	U L 355	B	L	U L 390	L	L								
27											L	L	U L 375	L	L									
28										L	L	U L 380	L	U L 350	L									
29										L	L	L	U L 360	L	L	L	L							
30									L	L	L	U L 380	L	U L 380	375	L								
31									L	L	U L 355	U L 380	L	U L 375	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	2	7	13	17	11	5		1							
MED									L 400	L 415	U L 375	U L 380	U L 370	U L 380	U L 375		U L 420							
U Q									L 415		U L 380	U L 390	U L 375	U L 390	U L 390									
L Q									U L 390		U L 355	U L 372	U L 360	U L 360	U L 360									

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

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									250	250	240	240	250	245	240	250								
2										235	220	235	250	250	245	220								
3										255	225	220	240	235	230	220								
4									240	225	230	230	240	240	255	220								
5										230	250	225	250		235									
6										240	250	230	230	235		250								
7										250	240	230	230	250	240									
8										230	225	240	250	240	250									
9											265	230	270											
10											250	240	240	240	250	250								
11									215	225	260	245	255	240	245	230								
12										265	235	235	240	285	255	235								
13										270 L	250	245	250	255	240	260								
14										260	A	240	250	245	250	230								
15										250	250	230	260	230	235									
16										220		255	240	260	250									
17										230	265	230	235	255	235	240	215							
18										215	255	A	250	235	250	250								
19											250	235	250	240	270	255 A								
20											260	255	250	230										
21											250	260	245	240	245	240								
22									220	220	245	250	245	230	255									
23									220		255	240	235	250	250	255 Y								
24											250	240	250	255	285	235								
25									215	220	250	240	245	265	250									
26										230	265	235	230	255	260	245								
27											250	255	245	240	255									
28										260	250	255	245	270	240 H									
29										240	255	275	250	275	235	230	220							
30									235	240	245	230	250	250	250	235								
31									225	240	250	255	240	240	235									
	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									8	23	29	30	31	29	28	19	2							
MED									222	240	250	240	245	245	250	240	218							
U Q									238	250	255	250	250	255	252	250								
L Q									218	225	242	230	240	240	240	230								

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	305	310	300	335	325	280	280	240	230	240	220	240	220	A	A 240	A 235	230	A 245	A 240	A	A	A	305	235
2	260	315	325	A	A 365	300	A	245	240	H 210	220	225	240	A	A 245	A	215	220	E A 265	E A 310	290	A	A 300	A
3	A	A	A	A	A 340	290	270	250	255	A 250	235	225	220	205	230	240	225	210	A 260	245	220	A	A 300	A 385
4	A 335	245	A	E A 365	A 290	280	265	260	230	230	220	225	210	245	235	225	220	220	220	220	250	255	A 300	285
5	285	270	275	240	290	285	245	220	225	230	230	230	215	225	210	220	220	210	235	225	250	250	270	300
6	320	290	265	335	325	305	255	H 210	225	235	230	220	220	230	240	230	225	220	220	255	210	290	285	235
7	225	315	290	340	330	305	275	230	220	225	220	220	220	235	250	235	225	210	255	A	260	305	320	325
8	310	275	230	250	270	310	250	240	225	235	220	210	220	225	215	230	215	240	230	230	210	E A 335	A 325	315
9	E B 365	320	290	245	310	255	260	225	215	235	220	210	220	235	240	235	225	235	250	220	A	A	A 330	290
10	A	315	260	275	330	280	225	220	220	230	230	230	H 210	225	225	225	210	240	230	230	225	310	280	280
11	325	330	310	240	210	280	265	230	A 220	215	225	200	215	210	215	230	210	A 260	240	220	E B 275	265	355	335
12	260	270	240	E A 390	330	335	215	H 235	235	240	245	220	215	220	230	240	225	230	230	230	220	295	255	260
13	310	290	295	225	195	255	250	230	230	235	220	210	225	225	230	H 210	215	215	240	225	235	310	305	275
14	280	235	220	E B 340	290	310	250	230	230	A	A	230	205	215	250	230	220	E A 250	220	210	260	340	320	270
15	265	290	255	E A 315	260	265	275	240	220	225	A	225	205	205	215	230	215	220	270	225	E A 310	A 330	320	E A 345
16	345	E C 295	215	215	B	380	255	225	220	235	230	235	B 240	215	230	230	220	210	E A 260	A 250	245	290	355	365
17	260	225	240	290	290	240	220	230	225	225	235	H 220	205	210	245	235	200	215	240	220	210	335	315	270
18	215	230	255	275	320	300	250	215	210	225	A	A	A	A	235	235	240	215	220	220	235	280	275	280
19	305	A	E B 365	310	265	225	290	230	220	235	250	240	235	A 235	A 235	A	225	225	235	250	250	285	320	315
20	335	315	255	220	210	315	285	230	220	220	220	245	225	A	240	240	230	220	235	255	265	300	A 355	E A 360
21	260	310	300	255	225	310	280	225	220	230	235	225	230	220	210	235	215	225	230	245	235	255	330	310
22	275	300	290	290	290	285	260	230	220	205	230	230	210	220	210	240	220	220	240	240	205	280	290	310
23	280	300	280	250	240	260	240	220	A 230	220	H 190	235	210	235	225	Y	B 235	220	230	220	220	260	295	270
24	270	310	290	255	235	250	245	225	210	230	185	240	225	205	210	220	215	215	225	235	235	210	290	260
25	270	310	300	240	220	280	270	220	220	205	235	230	220	220	A	220	225	215	215	260	230	230	270	275
26	270	275	260	230	255	310	260	230	225	205	235	E B 245	215	185	H 200	H 215	220	240	215	255	200	250	220	310
27	310	325	260	220	220	310	315	250	225	220	225	H 210	220	230	225	230	235	220	215	250	240	230	305	305
28	290	300	320	335	290	280	280	235	230	210	215	H 215	H 215	200	210	235	220	225	A 250	275	230	250	305	275
29	315	270	270	270	220	290	300	235	240	230	240	215	240	B 255	240	230	225	H 205	230	255	250	240	280	300
30	330	290	255	235	215	340	320	250	225	220	220	H 205	A	230	230	220	230	215	215	235	215	265	280	280
31	260	255	250	240	260	310	280	235	225	H 210	205	230	230	240	225	A 250	220	220	220	240	245	265	275	275
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	30	31	30	31	31	30	28	30	29	27	30	28	31	31	31	29	29	27	31	30
MED	282	295	268	250	280	290	262	230	225	228	225	225	220	225	230	230	220	220	230	235	235	272	300	284
U Q	318	312	298	325	320	310	280	240	230	235	235	230	225	235	240	235	225	230	A 240	252	250	305	320	315
L Q	262	270	255	240	225	280	250	225	220	220	220	215	212	210	215	225	215	215	220	222	220	250	280	275

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	E A 145	A	A	A	110	120	120	120	120	B						
2								A	A	A 130	A 130	A	A	A	A	A	A	B						
3								A	B	A	A	A	A	B 135	120	A	A	B						
4								A	120	115	A	A	115	110	110	120	130	B						
5								B	A	E A 140	120	A 120	A 120	115	120	120	B	B						
6								B	120	A 130	115	115	115	115	120	115	120	B						
7								B	120	A	A	B 125	A	120	A 130	E A 135	A	B						
8								B	A	115	120	120	120	120	120	120	120	B						
9								150	B	B	B	B	B	B	B	B	B	B						
10								B	125	A	A	115	A 125	A	A	A 125	A	B						
11								B	A	A 130	A 130	A	A	120	120	125	120	B						
12							B	B	125	A	120	120	120	120	A 120	A 120	A	B						
13								A	A 130	A 130	E B 130	E B 150	120	B	A	115	125	B						
14								A	125	115	A	A 130	A	B	120	A	A	B						
15							B	A	A	A	A	A	120	120	120	120	A	B						
16								A	130	A	A	A	B	A 130	125	125	A 130	B						
17								A	120	120	A 130	A	A	E A 135	A	A	A	B						
18								B	115	120	A	A	A	A	A 130	E A 130	A	B						
19								A	A	120	A 125	A	A	A	A	A	A	B						
20								B	A	A	B	A	A	A	A	A 125	A	B						
21								B 175	125	120	A	A	120	120	115	115	A	B						
22								B	125	120	120	120	120	A 125	120	A	120	B						
23								155	120	120	120	A	A	A	A	A	B	B						
24								E A 160	120	120	125	E B 150	E B 130	B 130	B 125	120	130	B						
25								B 160	115	120	120	B 135	B 130	130	B 130	120	120	B						
26								B 155	125	115	B	B	130	B 150	120	120	120	B						
27								B	115	115	115	120	B 130	B	120	A	A 120	B						
28								B	120	115	110	115	120	B	120	120	120	B						
29								E B 160	120	120	B	A 130	A 130	B	A 125	120	120	B						
30								B	120	A 125	125	120	A	A	A 125	120	125	B						
31								E B 180	E A 135	120	120	120	120	120	115	120	A	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								8	22	22	17	16	18	18	23	22	15							
MED								B 159	120	120	120	120	120	120	120	120	120							
U Q								B 168	125	A 125	A 128	B 130	B 130	B 130	A 125	A 125	125							
L Q								155	120	115	120	120	120	120	120	120	120							

JAN. 1994 H'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JAN. 1994 H'ES (KM) 135°E MEAN TIME (G.M.T. + 9H)

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

D/H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	105	105	B	B	B	120	110	G	110	105	115	115	G	125	125	115	G	110	110	110	105	105	115	B
2	B	B	130	125	120	120	115	115	115	125	120	115	110	105	105	110	110	105	105	105	105	100	105	100
3	105	105	105	105	105	110	110	115	115	110	110	105	105	G	G	110	110	B	110	110	115	110	105	105
4	110	B	100	115	115	120	B	105	G	G	110	100	105	G	G	G	110	105	B	B	B	B	100	100
5	B	B	B	B	B	B	B	B	120	120	105	105	105	100	105	105	B	B	B	B	B	110	110	B
6	B	B	B	B	B	B	B	B	G	115	G	G	G	G	155	G	G	B	B	B	B	105	105	105
7	100	B	B	100	100	95	100	B	G	115	115	G	120	G	160	105	105	100	120	110	110	110	B	B
8	115	120	B	B	B	B	B	B	115	G	G	G	G	G	G	G	G	110	110	110	100	95	100	B
9	B	110	B	B	B	B	B	G	B	B	B	B	B	B	B	B	B	110	105	105	100	100	100	100
10	100	100	100	100	B	B	B	G	G	110	110	G	105	105	105	105	105	110	B	B	B	B	B	B
11	B	B	B	B	110	B	115	B	120	115	115	110	110	G	G	G	110	100	105	B	B	B	B	110
12	B	B	105	105	B	B	155	B	135	120	120	G	115	G	110	105	105	100	110	B	100	B	B	B
13	B	115	110	115	B	160	120	115	115	110	G	G	105	B	100	G	G	B	B	B	B	B	B	B
14	B	B	B	B	B	B	135	140	145	120	120	110	110	B	135	110	100	95	105	B	B	B	B	B
15	B	120	115	110	B	B	145	150	120	110	115	125	G	105	105	115	130	105	100	100	100	105	100	100
16	110	C	B	B	B	B	140	140	G	120	125	120	B	110	G	125	125	120	115	120	B	B	B	B
17	B	B	115	120	B	160	110	145	G	G	120	105	105	100	100	100	100	B	100	B	B	B	100	105
18	B	B	B	B	B	155	140	B	140	140	110	105	105	100	180	105	100	B	B	B	110	110	110	110
19	110	110	B	B	120	B	165	110	110	G	170	120	105	120	110	100	105	105	100	100	100	B	100	B
20	B	B	115	110	110	110	110	B	110	120	B	115	110	105	105	110	105	105	120	B	120	115	120	115
21	B	115	115	B	115	120	B	G	E G 185	G	125	120	G	G	E G 165	G	110	105	100	105	105	B	B	B
22	B	B	110	B	110	B	B	B	G	E G 195	170	165	G	105	120	120	G	B	B	B	B	B	B	B
23	B	B	B	B	B	B	B	G	G	170	165	110	115	185	110	110	B	B	B	B	B	110	B	B
24	B	B	B	105	105	B	110	105	G	185	G	170	G	G	150	G	120	120	B	B	B	B	B	110
25	105	105	100	B	B	B	115	G	E G 190	G	150	140	135	150	130	130	120	B	B	100	B	B	125	B
26	120	B	B	110	105	B	105	E G 195	G	G	B	B	145	120	G	G	135	120	B	105	110	B	B	B
27	B	B	120	115	110	110	B	B	G	G	170	G	G	B	125	115	110	110	B	B	B	B	B	B
28	B	B	B	B	B	B	B	G	G	G	140	G	110	B	G	G	G	G	115	B	B	B	B	B
29	110	B	110	110	B	B	B	G	G	G	B	190	175	B	135	110	G	B	110	B	105	B	B	B
30	B	B	B	B	B	B	B	B	G	110	E G 190	G	95	100	100	G	G	170	100	B	B	B	115	110
31	110	110	110	B	B	B	B	G	120	110	110	E G 185	G	G	G	120	115	100	95	100	B	110	110	120
	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	11	15	14	12	11	17	11	16	20	23	20	20	15	22	20	20	20	19	13	14	13	16	13
MED	110	110	110	110	110	120	115	115	118	116	120	115	110	105	112	110	110	105	105	105	105	110	105	105
U Q	110	115	115	115	115	155	140	145	138	122	150	132	115	120	135	115	118	110	110	110	110	110	112	110
L Q	105	105	105	105	105	110	110	110	115	110	110	108	105	100	105	105	105	102	100	100	100	102	100	100

JAN. 1994 H'ES (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

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

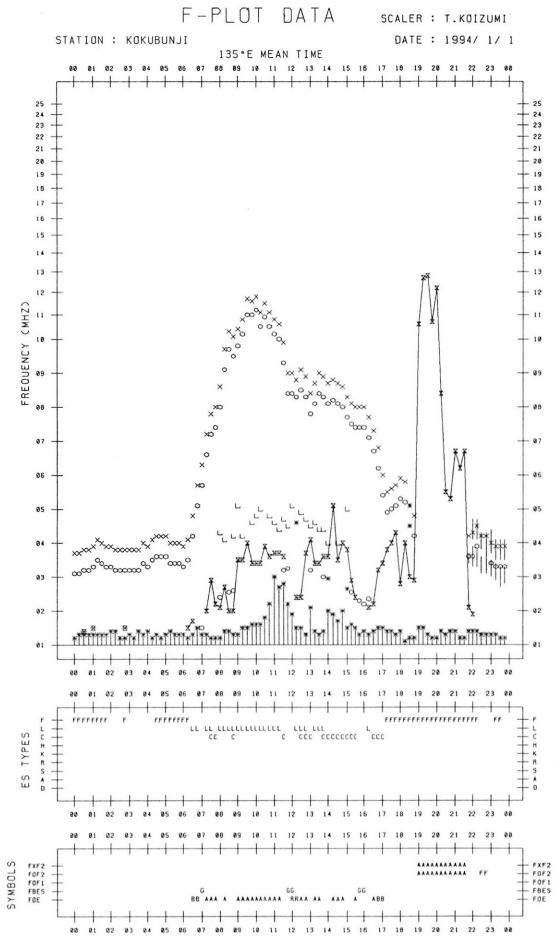
LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

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

JAN. 1994 TYPES OF ES COMMUNICATIONS RESEARCH LABORATORY, JAPAN

f-PLOTS OF IONOSPHERIC DATA

KEY OF F-PLOT	
I	SPREAD
⬡	FOF2, FOF1, FOE
X	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
L	ESTIMATED FOF1
*, Y	FMIN
∧	GREATER THAN
∨	LESS THAN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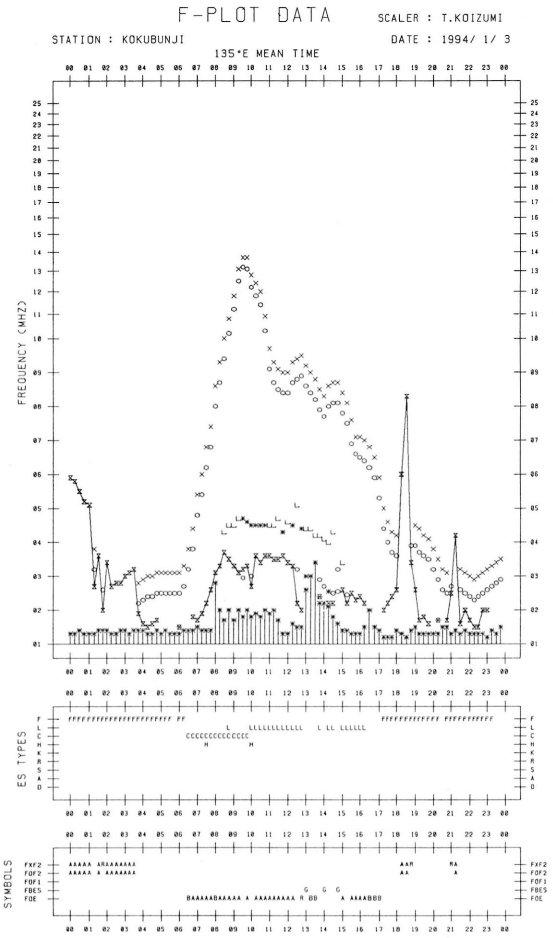
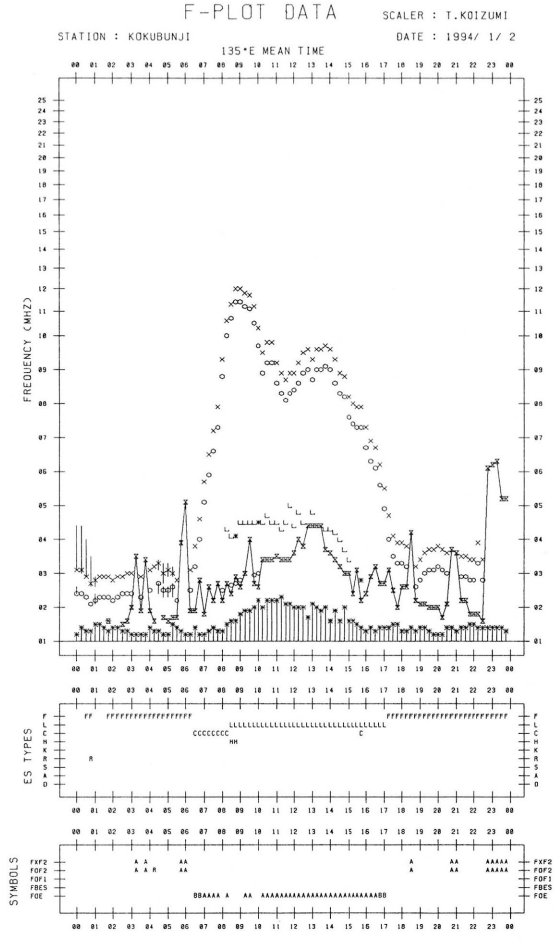
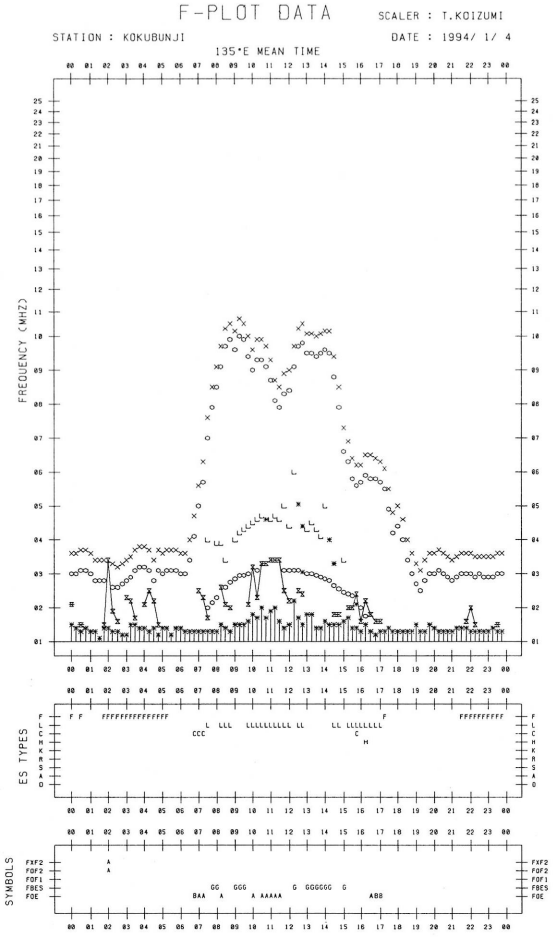
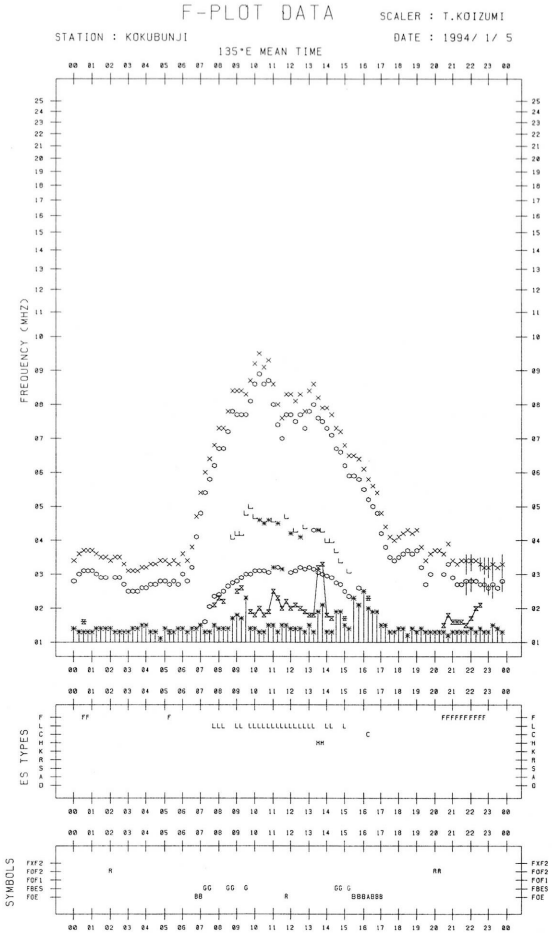
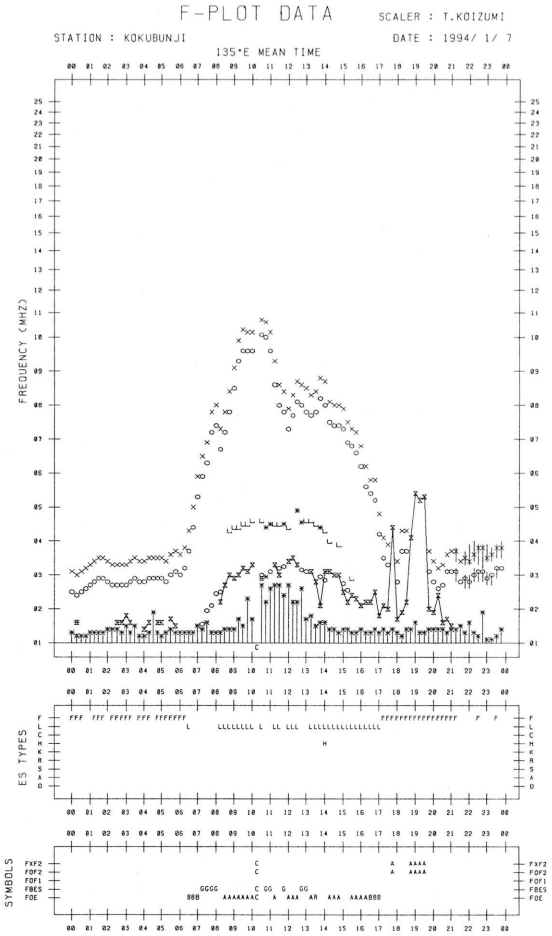
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

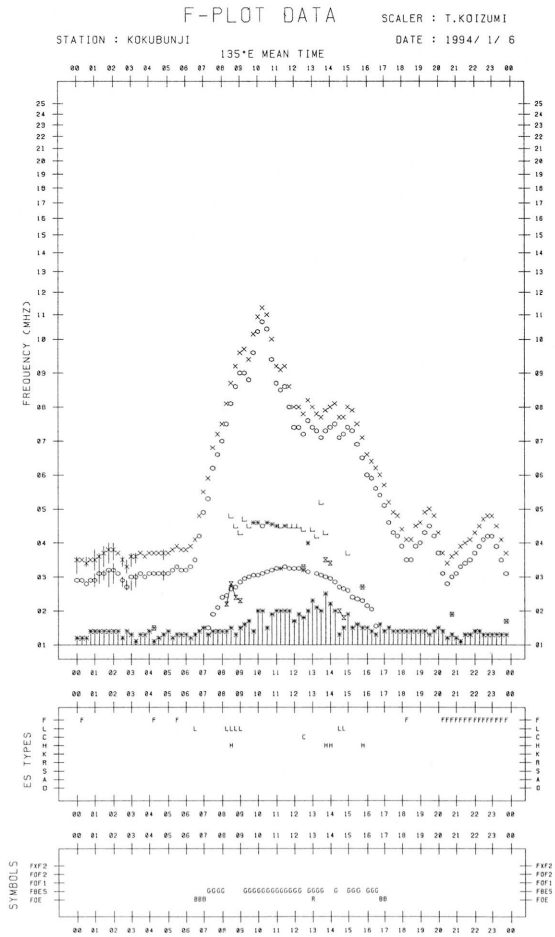

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

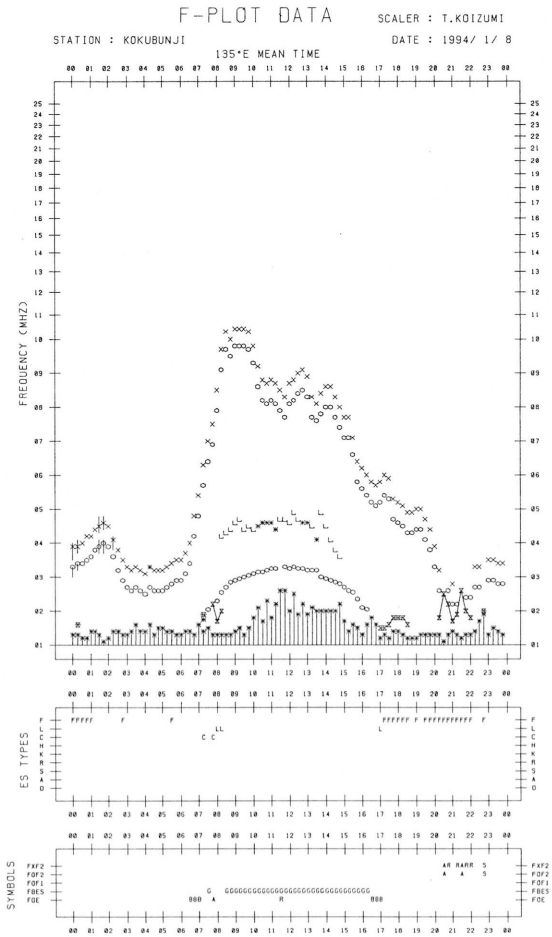

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

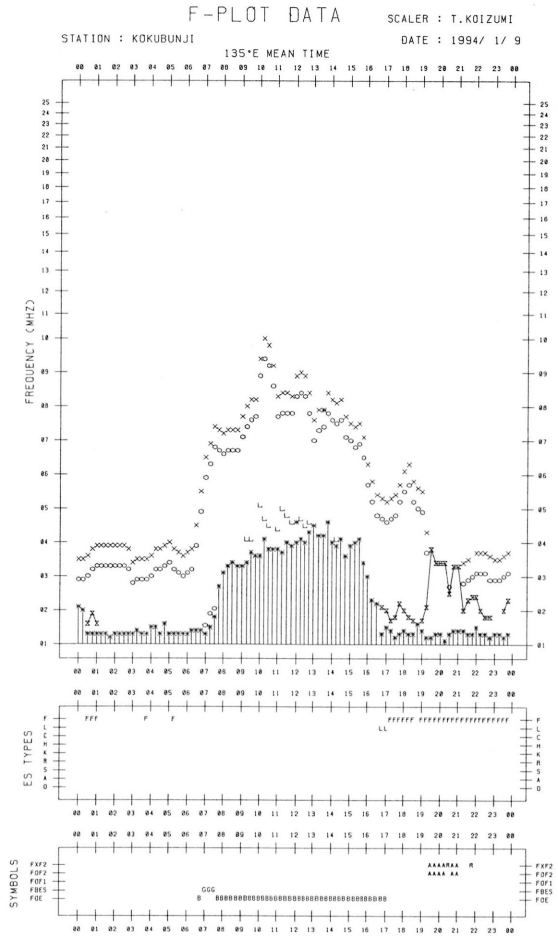

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
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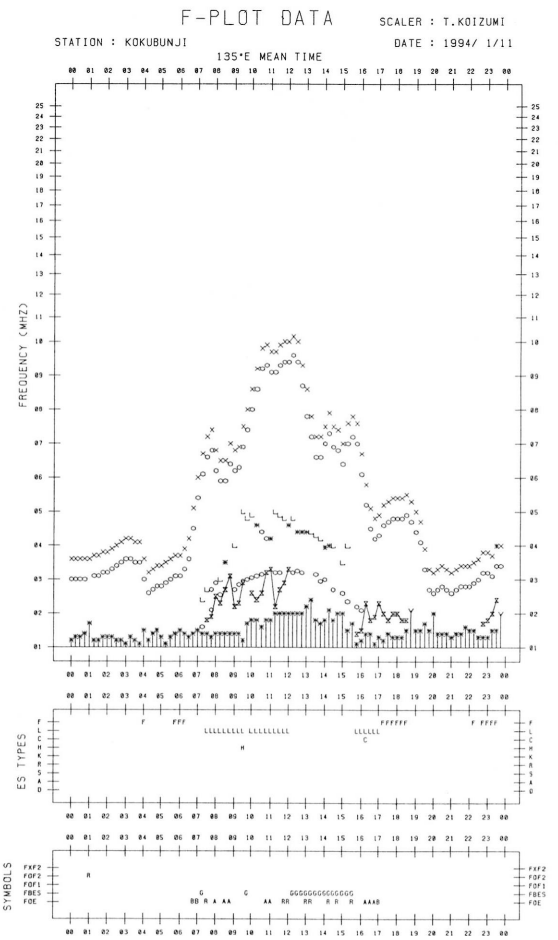
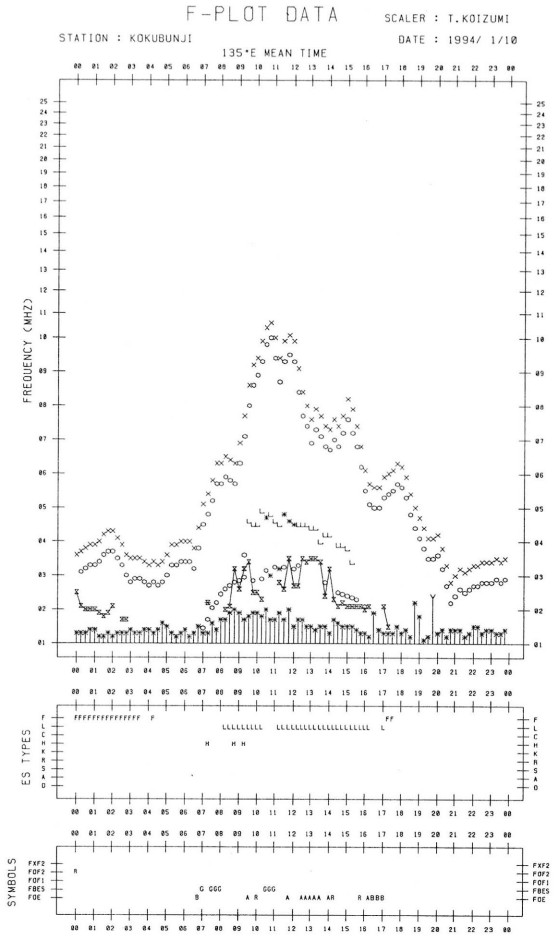
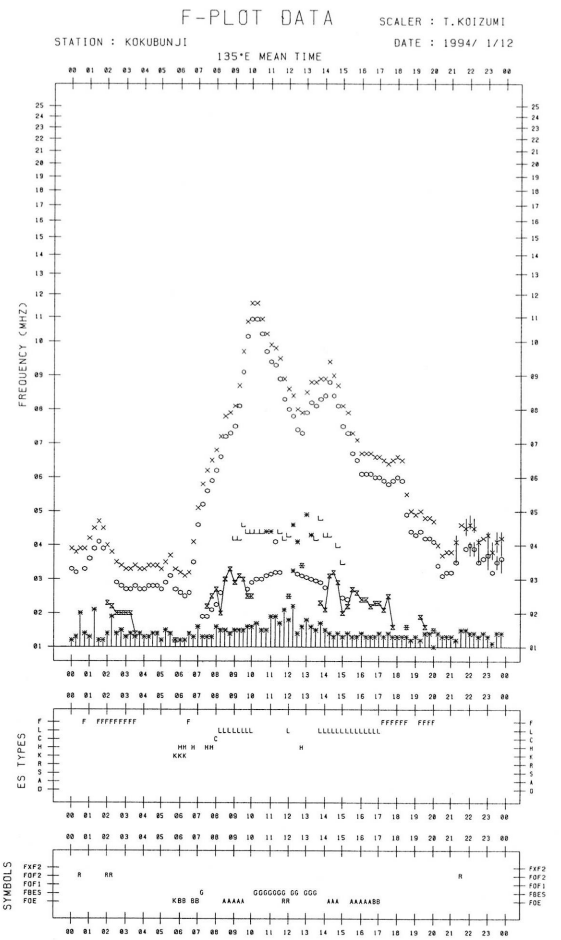
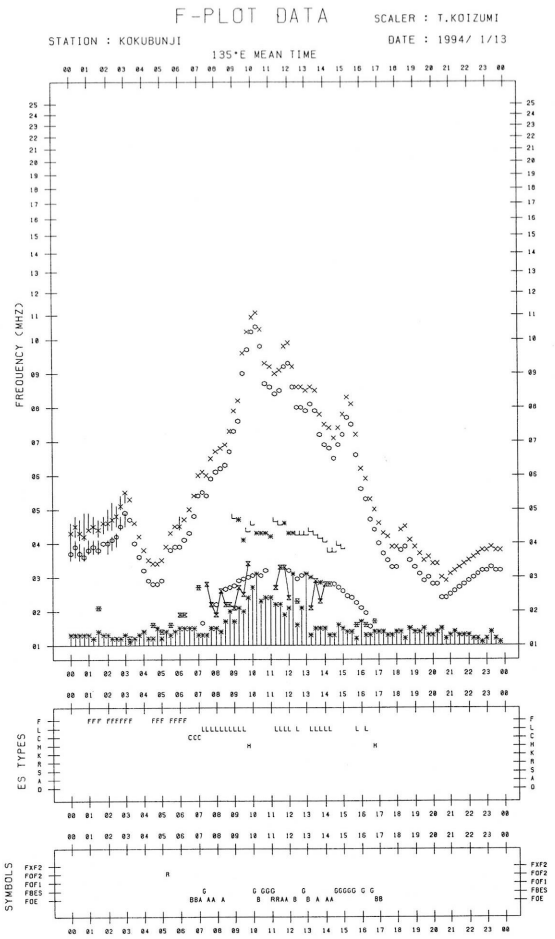
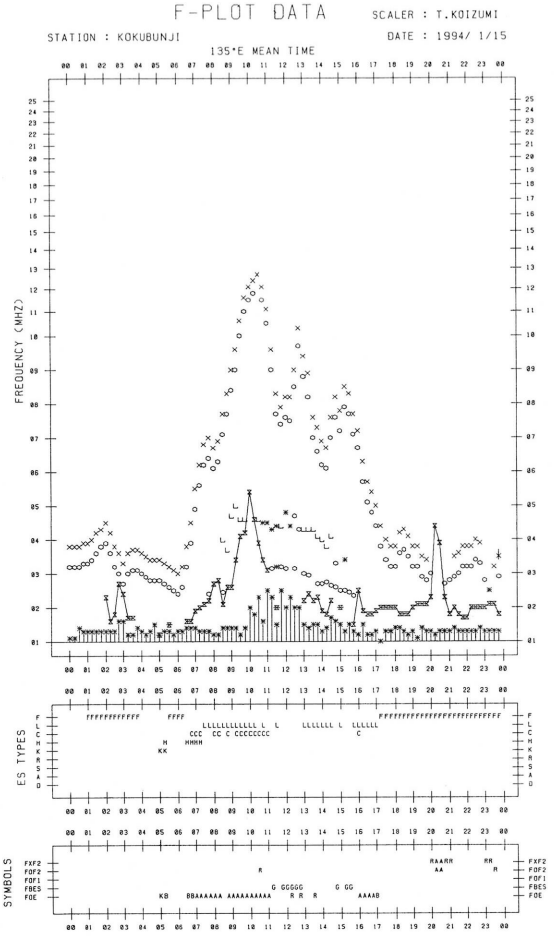
STATION : KOKUBUNJI
DATE : 1994/ 1/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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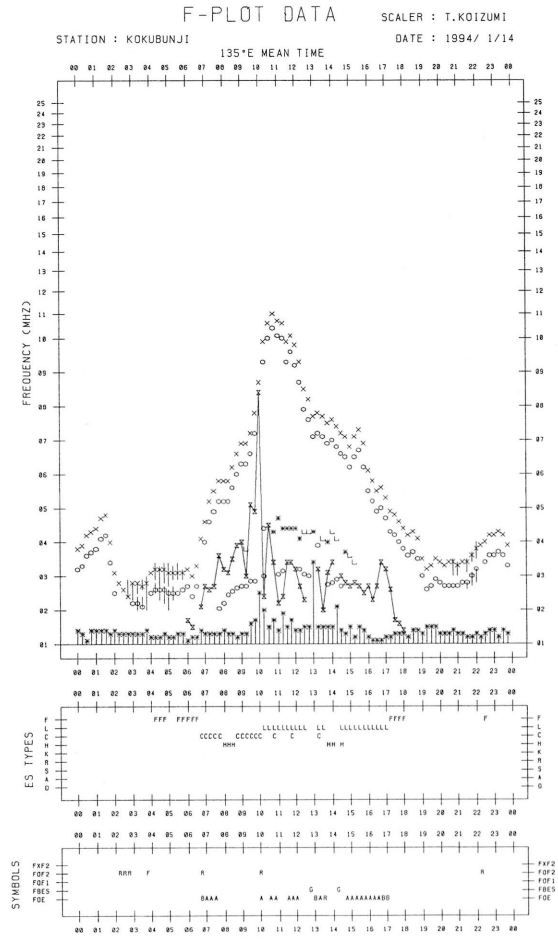
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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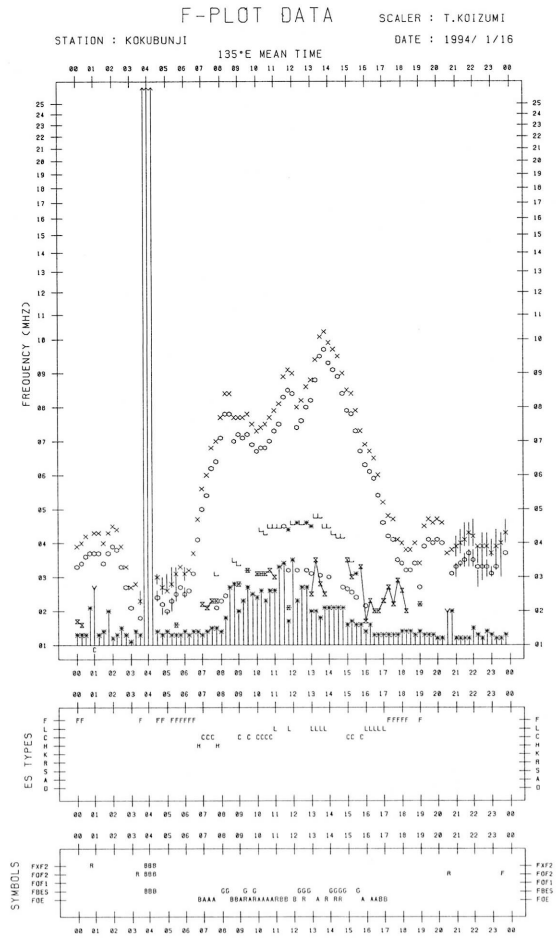
STATION : KOKUBUNJI
DATE : 1994/ 1/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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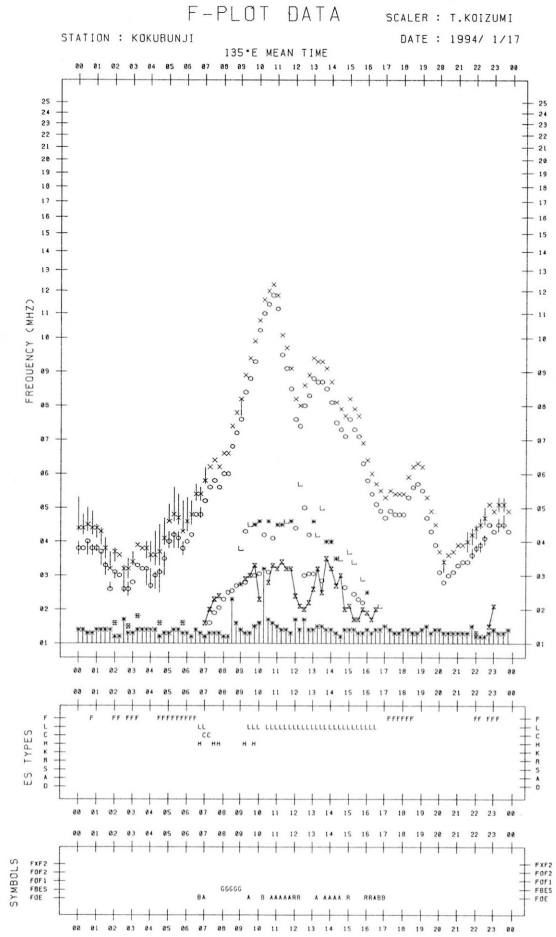
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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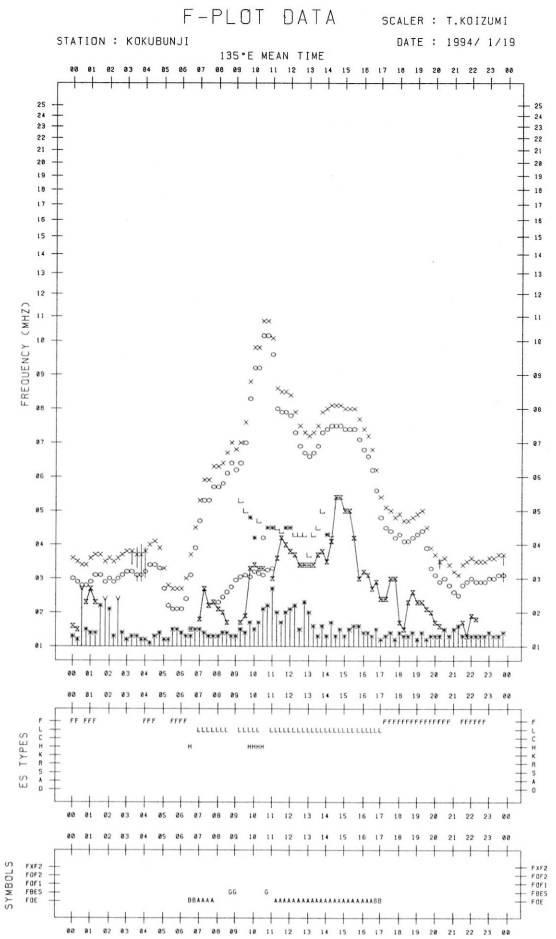
STATION : KOKUBUNJI
DATE : 1994/ 1/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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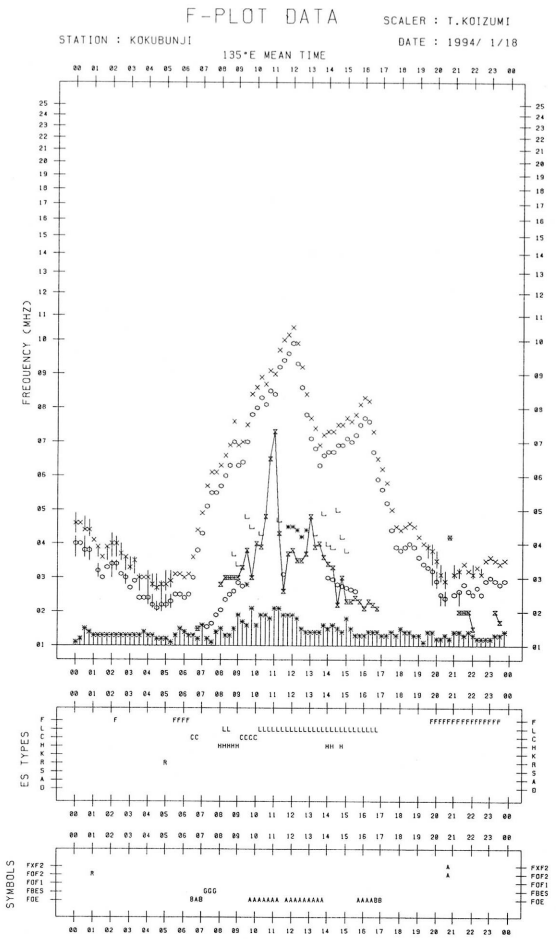
STATION : KOKUBUNJI
DATE : 1994/ 1/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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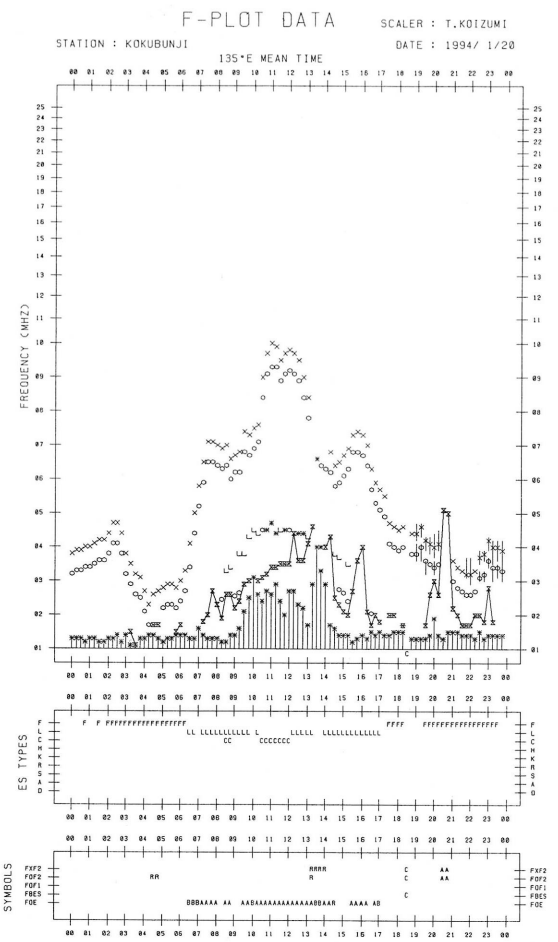
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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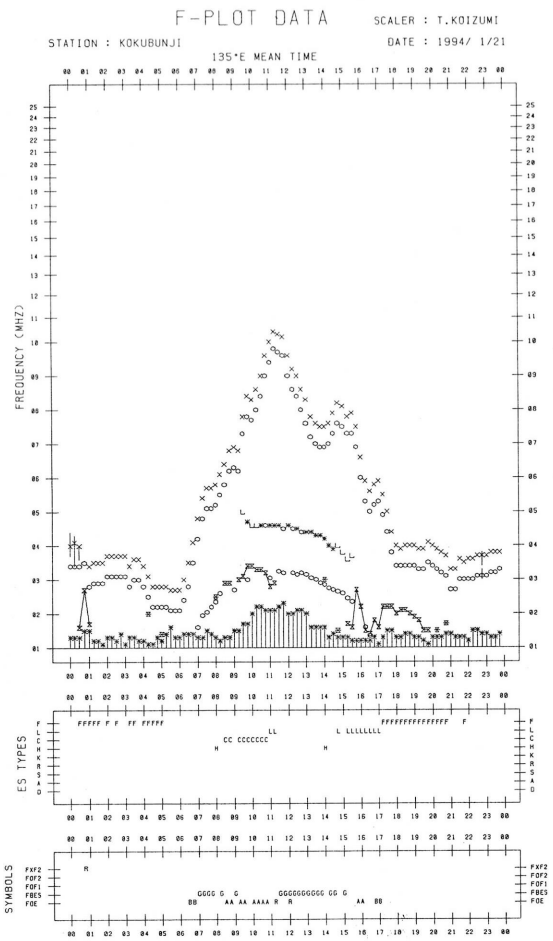
STATION : KOKUBUNJI
DATE : 1994/ 1/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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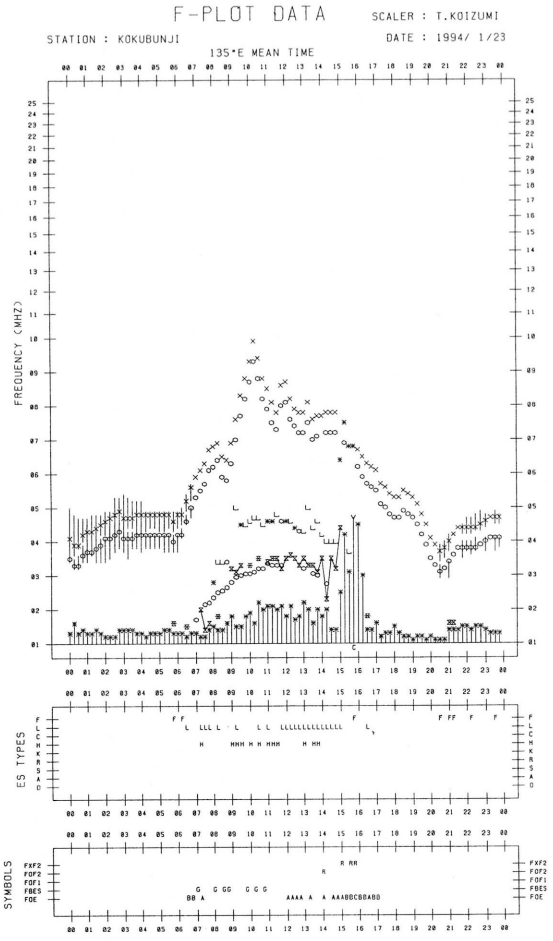
STATION : KOKUBUNJI
DATE : 1994/ 1/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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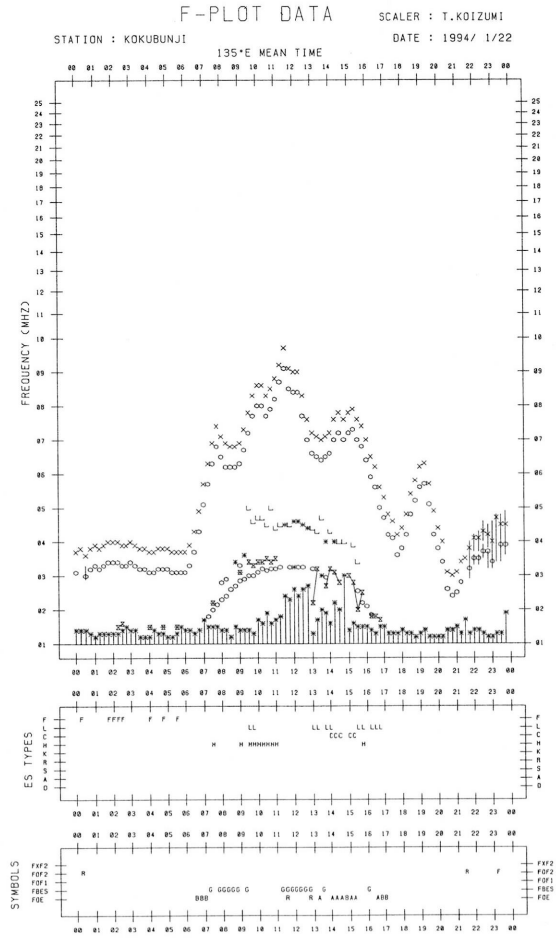
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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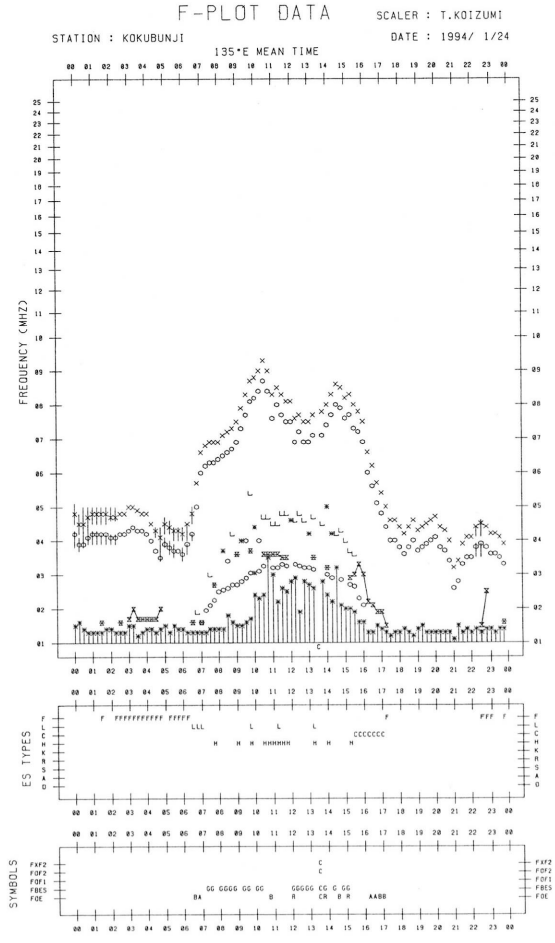
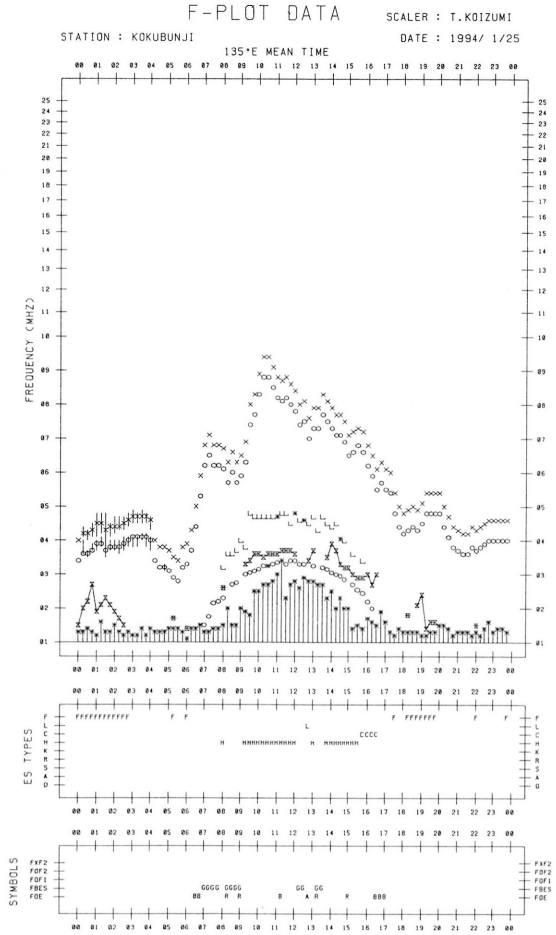
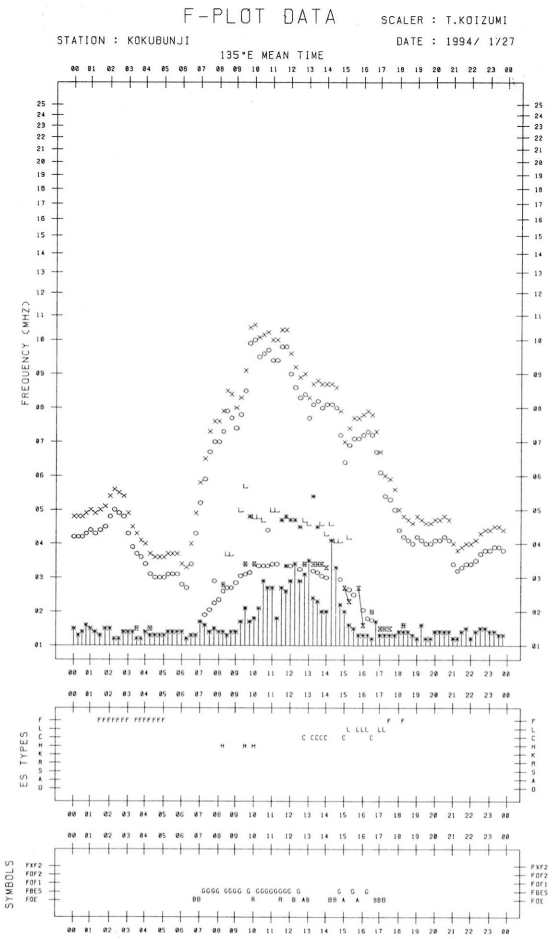
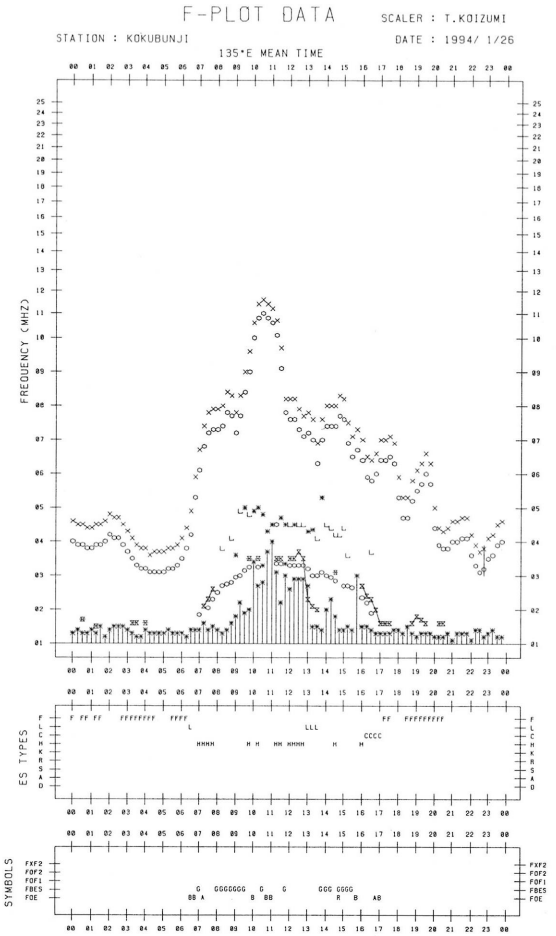
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE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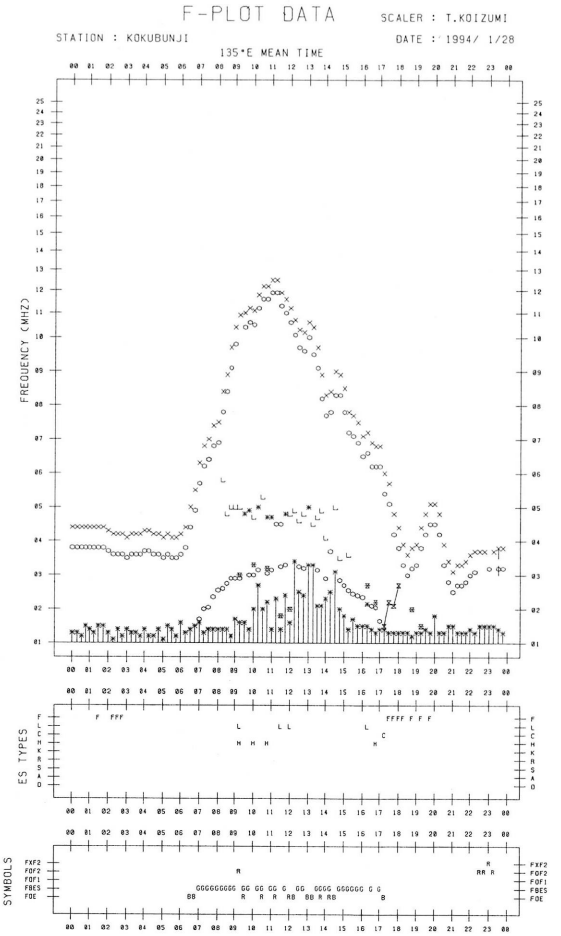
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE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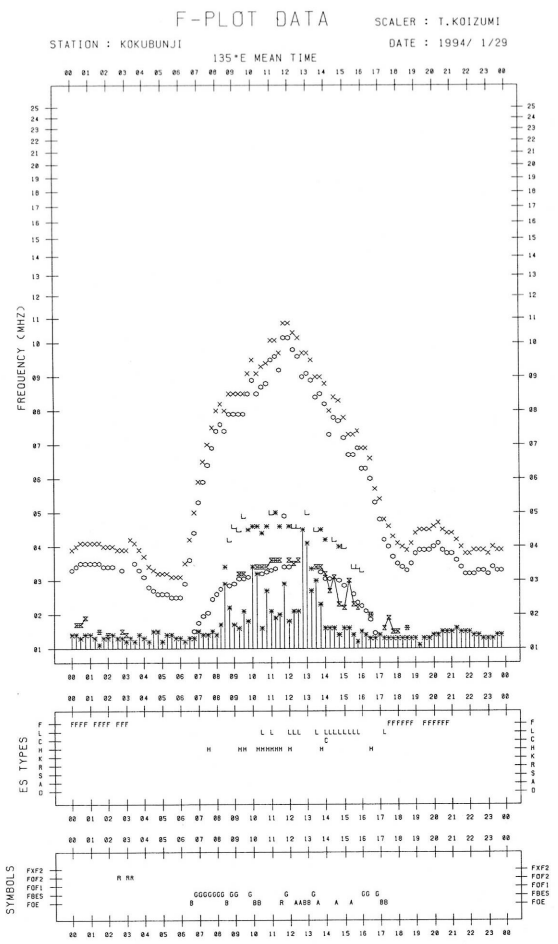
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE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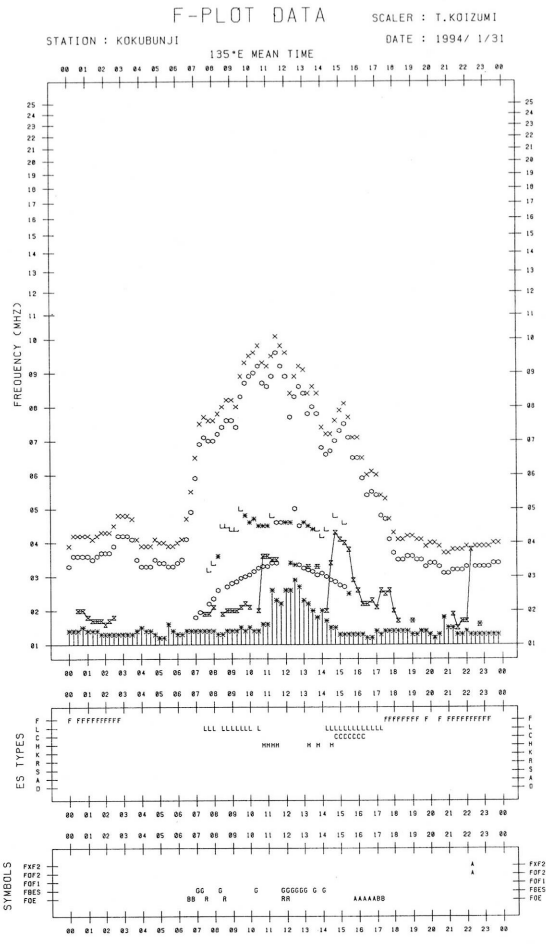
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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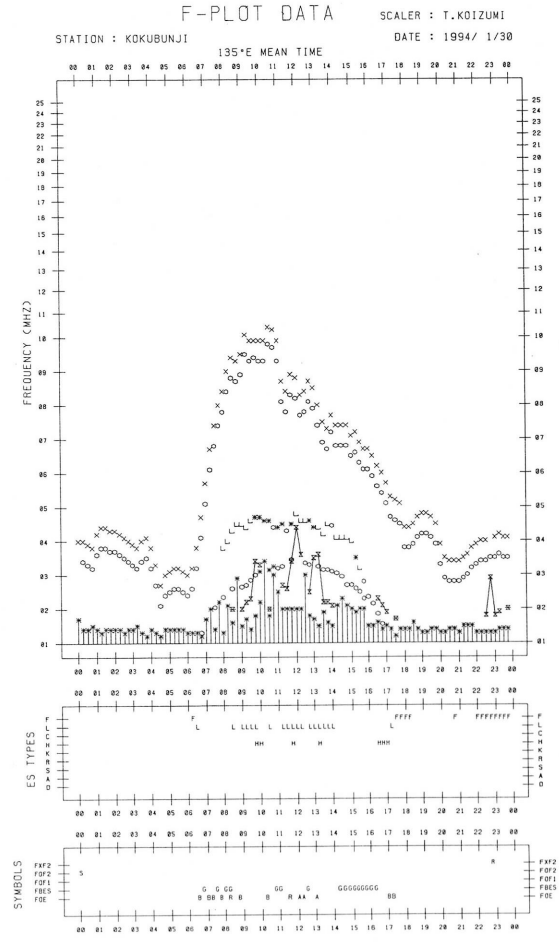
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1994/ 1/30
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 January 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	39	39	(39)	41	40
2	41	41	(39)	41	41
3	40	40	(39)	38	40
4	38	38	(38)	39	38
5	39	39	(38)	38	39
6	39	38	(38)	39	38
7	39	38	(38)	38	39
8	40	40	(40)	38	40
9	38	38	(38)	38	38
10	39	38	(37)	34	38
11	34	35	(34)	34	34
12	36	36	(34)	33	35
13	35	34	(34)	34	34
14	34	33	(34)	34	34
15	34	34	(33)	35	34
16	34	34	(34)	35	34
17	35	34	(34)	34	35
18	35	34	(34)	34	34
19	35	34	(34)	35	34
20	36	35	(35)	35	35
21	35	36	(36)	37	36
22	37	36	(36)	37	37
23	37	37	(37)	38	37
24	38	38	(37)	39	38
25	40	39	(39)	39	39
26	39	38	(38)	39	39
27	38	38	(38)	38	38
28	39	38	(38)	39	38
29	39	38	(38)	39	39
30	38	38	(37)	38	38
31	38	37	(36)	37	38

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso

January 1994

Single-frequency observations

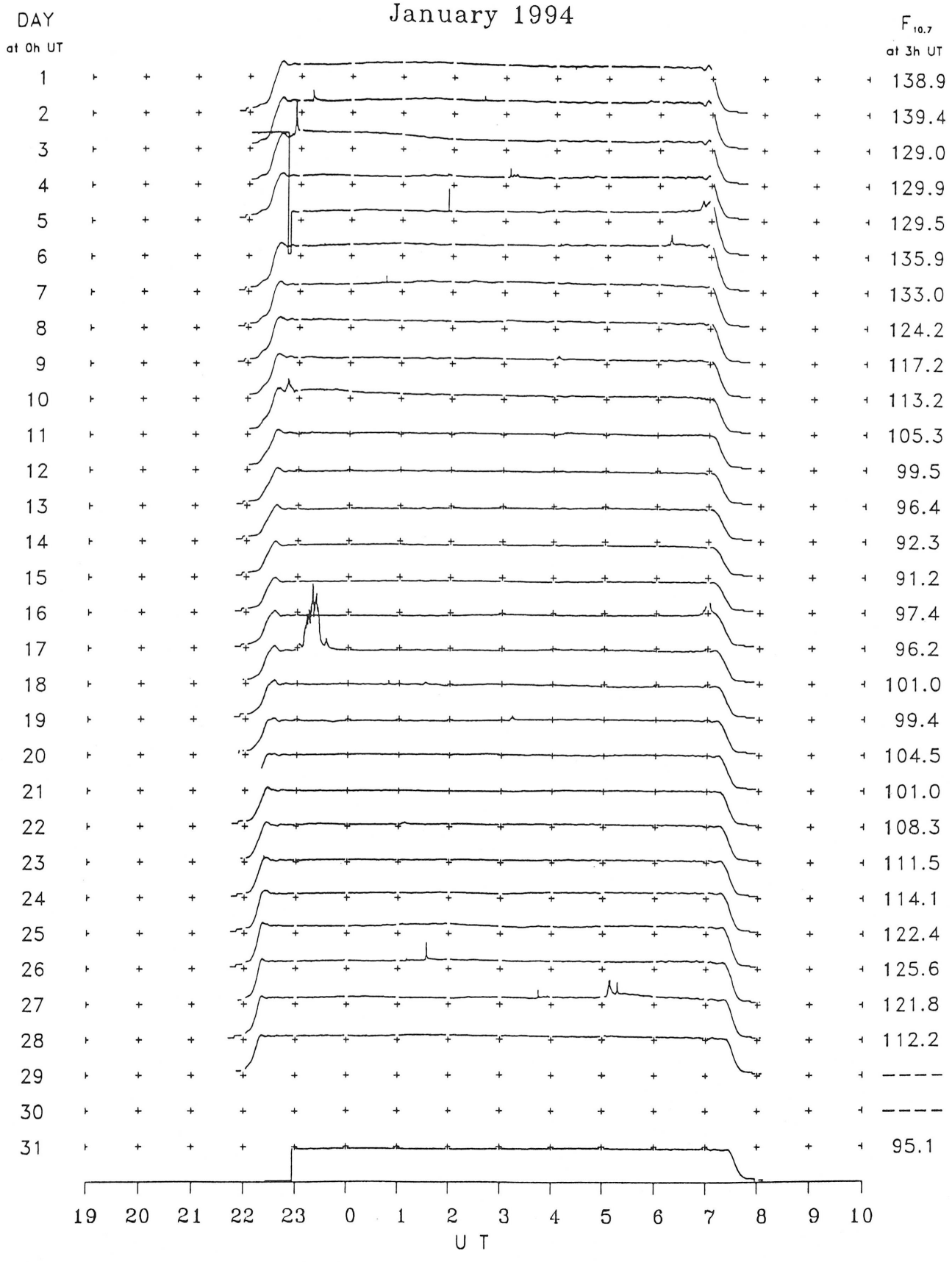
Normal observing period: 2150 - 0755 U.T. (sunrise to sunset)

JAN. 1994	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	MEAN	POLARIZATION REMARKS
1	500	8 S	0157.2	0157.5	0.5	53	-	0
	500	42 SER	2312.8	2313.1	6.0	10	-	0
	2800	3 S	2312.8	2313.4	3.0	43	24	WR
2	2800	1 S	0235.0	0235.3	2.0	12	5	WR
	500	42 SER	0235.1	0236.1	1.0	5	-	0
	2800	45 C	2253.3	2253.8	3.0	87	50	0
	500	42 SER	2254.3	2255.2	1.3	14	-	0
4	2800	20 GRF	0153.0	0153.2	20	7	5	0
	2800	41 F	0304.8	0305.7	10.5	23	-	0
	500	1 S	0305.0	0305.5	1.5	3	2	0
5	500	8 S	0153.9	0154.0	0.2	33	-	0
	2800	8 S	0154.2	0154.2	0.3	100	-	ML
	500	8 S	0355.9	0356.0	0.4	86	-	0
	500	42 SER	0600.8	0601.0	6.5	72	-	WL
	2800	3 S	0646.7	0649.9	6.0	30	14	0
	500	45 C	0647.5	0650.1	9.0	29	15	WL
	500	42 SER	2318.0	2319.5	11.0	38	-	WL
6	2800	1 S	0405.2	0405.4	1.0	12	7	WR
	2800	29 PBI		0411.5	10.5	7	3	WR
	2800	4 S/F	0612.6	0614.2	3.8	22	10	0
	500	46 C	0612.6	0614.6	3.7	19	6	0
7	2800	8 S	0042.1	0042.2	0.5	19	-	0
	500	45 C	0258.5	0259.0	1.0	6	3	WL
	2800	1 S	0538.3	0539.5	1.8	9	4	0
8	500	42 SER	0547.3	0549.1	3.0	16	-	0
9	2800	45 C	0402.8	0404.8	6.0	9	4	0
	2800	46 C	2244.6	2247.3	9.5	32	13	0
16	500	42 SER	0648.9	0648.8	1.5	370	-	0
	2800	45 C	0649.6	0700.9	15	29	20	0
	2800	47 GB	2301.0	2317.6	45	177	78	0
	500	46 C	2302.0	2322.6	36	29	6	0
17	500	1 S	0519.5	0519.6	1.0	2	-	0
	500	42 SER	0719.8	0720.0	1.6	700	-	0
18	2800	20 GRF	0112.5	0130.7	40	8	4	0
	500	8 S	0157.8	0157.9	0.3	1	-	0
	500	8 S	2344.3	2344.6	0.3	26	-	WR
19	2800	45 C	0309.5	0312.6	5.0	16	8	0
22	500	46 C	0103.4	0103.5	5.0	18	5	WR
	2800	20 GRF	0103.6	0104.5	9.5	10	6	0
	500	8 S	0633.8	0633.9	0.3	164	-	WR
24	500	42 SER	0430.6	0432.3	2.0	110	-	0
	500	46 C	2305.8	2306.0	1.5	128	20	0
25	500	46 C	0121.0	0121.4	2.5	24	7	0
	500	46 C	0152.8	0155.5	5.0	27	7	WL
	500	42 SER	0335.0	0335.7	3.7	7	-	0
	500	42 SER	0342.6	0350.1	10.0	10	-	0
	500	42 SER	0433.5	0435.1	3.0	12	-	0
	500	42 SER	0444.9	0445.1	10.0	6	-	0
	500	8 S	0512.7	0512.7	0.7	5	-	0
	500	42 SER	0528.1	0531.5	6.5	6	-	0
	500	42 SER	0541.5	0550.1	10.0	32	-	0
26	500	42 SER	0109.6	0109.7	5.0	71	-	0
	2800	1 S	0110.2	0110.7	1.5	9	4	WR
	500	42 SER	0131.5	0134.0	4.0	110	-	0
	2800	3 S	0133.0	0134.0	3.0	68	40	WR
	500	8 S	0623.4	0623.5	0.3	83	-	0
	500	42 SER	2236.3	2236.8	4.0	173	-	0
	500	46 C	2305.4	2305.7	1.5	18	8	0
27	500	42 SER	0342.1	0344.5	16.0	38	-	0
	2800	4 S/F	0504.2	0507.4	9.0	44	28	0
	500	42 SER	0504.5	0506.5	3.5	6	-	0
	2800	3 S	0515.8	0517.4	3.0	39	28	0

B. Solar Radio Emission

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

January 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)

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

C. RADIO PROPAGATION

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

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

C. Radio Propagation

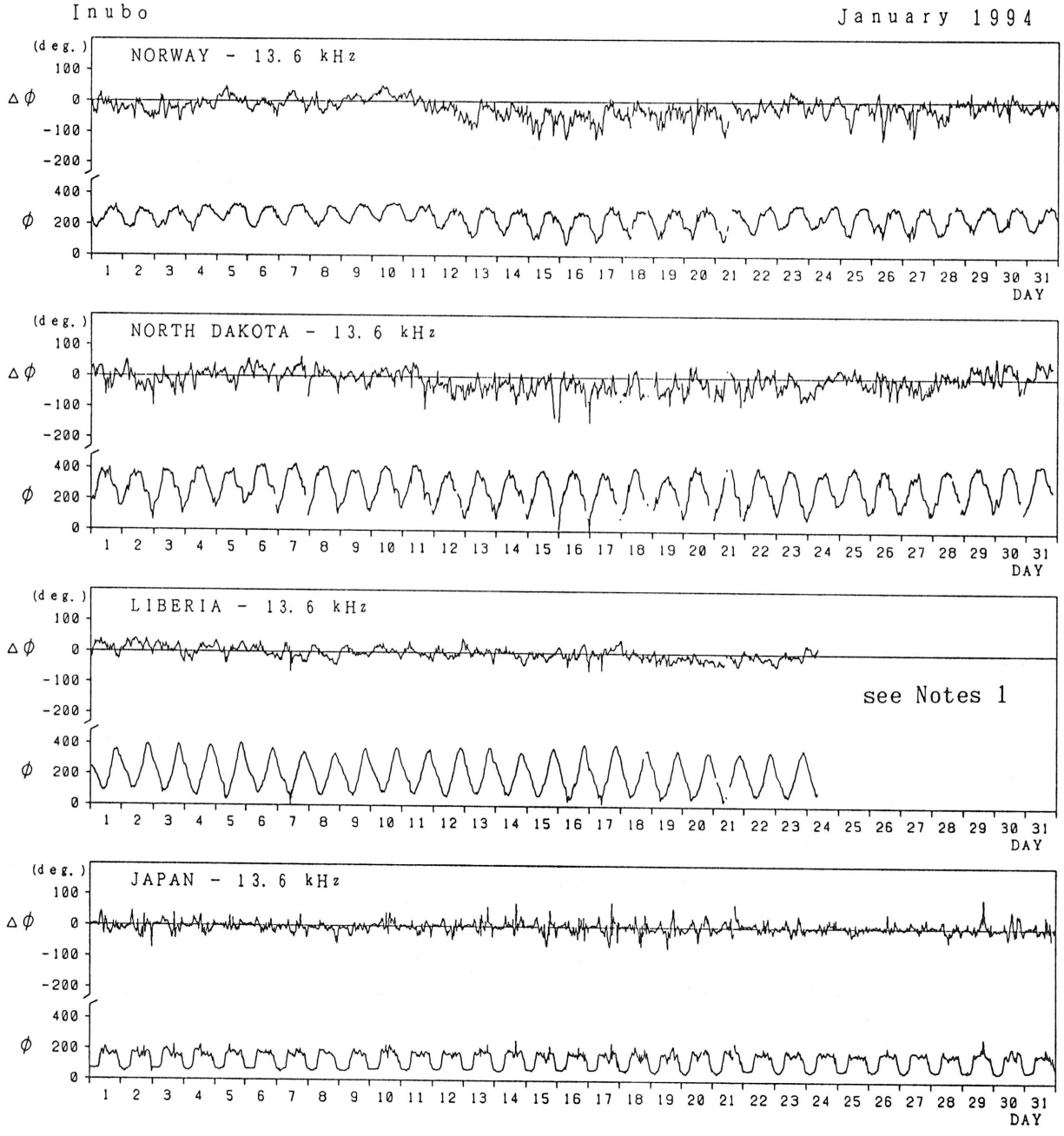
C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso — Time in U.T.

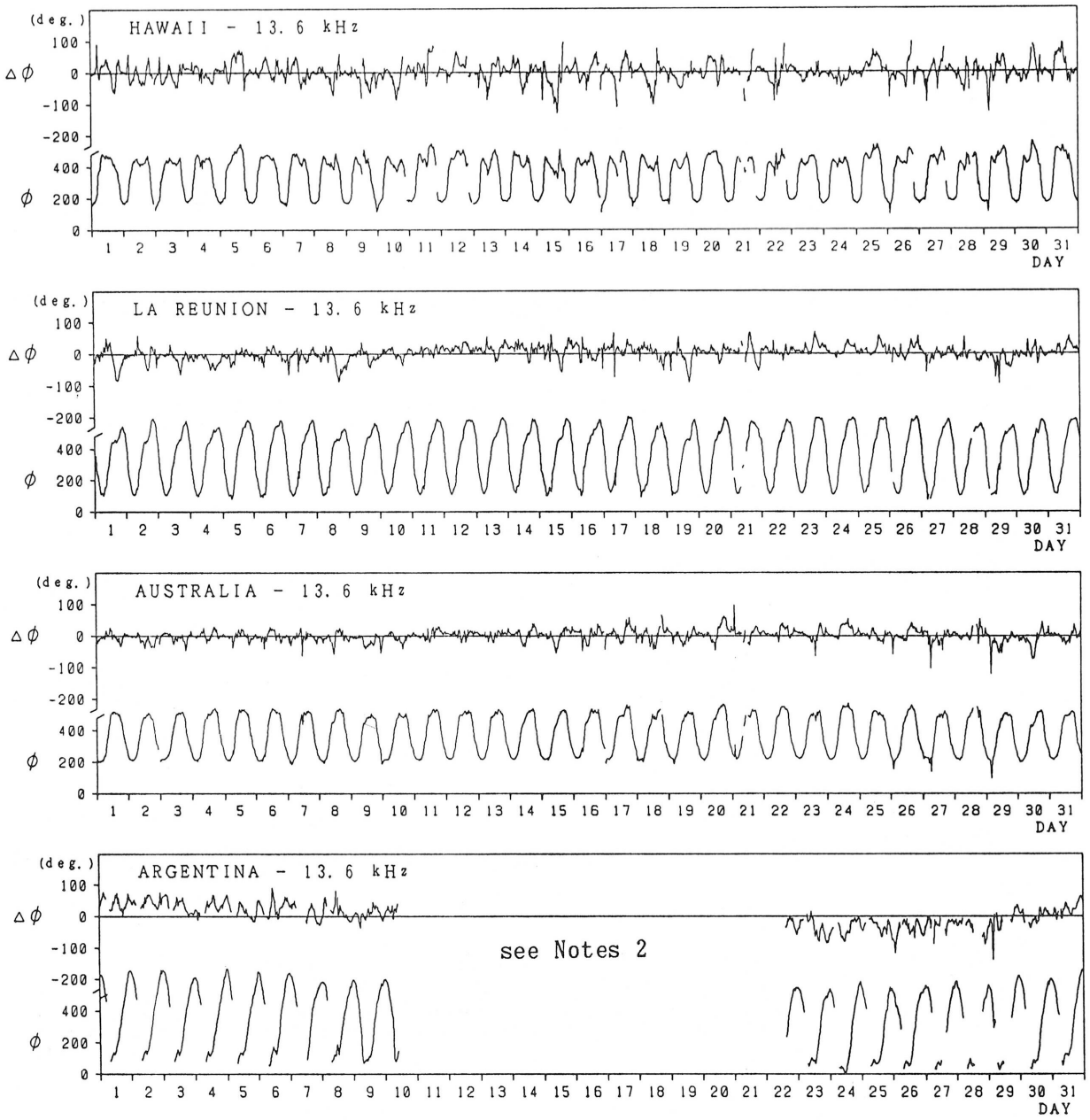
JAN. 1994	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Condition 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	5- U	5U - - 4U	5 5U 5U 5	N N N N	None		
2	4+ U	3U - - 4U	4 5U 5U 5	N N N N			
3	4+ U	3U - - 4U	5 5U - 5	N N N N			
4	5- U	5U 5U - 4U	5 5U - 4	N N N N			
5	5- U	5U - - 5U	5 4U - 4	N N N N			
6	4+ U	5U - C C	4 4U C C	N N N N			
7	4+ U	5U - - 5U	4 4U - 4	N N N N			
8	4+ U	5U - - 4U	4 4U - 4	N N N N			
9	3+ U	3U - - 4U	3 4U - 3	N N N N			
10	4- U	3U - - 4U	3 4U - 5	N N N N			
11	3+ U	3U - - 4U	4 2U - 4	N N N N			
12	4o U	4U - - 4U	4 4U - 4	N N N N			
13	4- U	4U - C C	4 3U C C	N N N N			
14	4- U	4U - - 3U	4 3U - 4	N N N N			
15	4o U	4U 5U - 4U	4 4U - 3	N N N N			
16	3+ U	4U - - 4U	3 2U - 4	N N N N			
17	4- U	3U - - 4U	4 3U - 4	N N N N			
18	3+ U	5U - - 4U	3 2U - 3	N N N N			
19	4o U	5U - - 4U	3 4U - 4	N N N N			
20	4- U	4U - - 4U	4 3U - 3	N N N N			
21	4- U	4U - - 4U	4 3U - 4	N N N N			
22	4- U	4U - - 4U	4 3U - 4	N N N N			
23	3+ U	4U - - 3U	3 4U - 3	N N N N			
24	3o U	3U - - 3U	3 3U - 3	N N N N			
25	3+ U	3U - - 4U	3 3U - 4	N N N N			
26	4+ U	4U - - 5U	4 4U - 5	N N N N			
27	4o U	4U - - 3U	4 4U - 5	N N N N			
28	4+ U	4U C C C	5 C C C	N N N N			
29	C	C C C C	C C C C	N N N N			
30	C	C C C C	C C C C	N N N N			
31	4- U	4U C C C	4 3U - 4	N N N N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo



Inubo January 1994



Notes 1: As for LIBERIA-13.6kHz, no record during 24 January 0820 UT - 2 March 1500 UT, due to the maintenance of transmitter.

Notes 2: As for ARGENTINA-13.6kHz, no record during 10 January 1000 UT - 22 January 1500 UT, due to the maintenance of transmitter.

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

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso

Time in U.T.

Jan. 1994	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	AUS	MOS	BBC						
2		>36	>21			2246	46	2 SL	3+	x	C
5		X	6			0655	25	2 SL	1-	x	C
6			8			0359	18	2 SL	1-	x	C
16		47	42			2309	45	2 SL	3-	x	C
17			7			2345	14	2 SL	1-	x	C
19			13			0309	17	1 S	1	x	C
26			20			0129	19	2 SL	2-	x	C
27		>44	32			0507	23	1 S	3-	x	C
29			35			0337	45	1 S	3-	x	C

NOTE CO:Colorade(WWV) HA:Hawaii(WWVH) AUS:Australia MOS:Moscow BBC:London

* Optical and X-ray Flares

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jan. 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
1	–			26	21		0015	0129	0040
1	15		10	5	9		0318	0358	0334
1			31	16	18		0336E	0438	0348
1			18	10			0551	0634	0601
1			8				0751	0808	0755
2			15	9	9		0229	0253	0236
2			5				0625	0645	0631
2	31	16	54	197	147	91	2250	0112	2259
4			40	19	17		0306	0339	0316
4			7				0632	0655	0637
5			16	6			0351	0441	0408
5		62	51	56			0650	0800	0715
5		22	30				0827E	0901D	0835
5		21	19				0858E	0921	0906
5			8				1025	1042	1030
6				8	7		0051	0120	0058
6			48	32	24	19	0405	0509	0413
6		22	37	31			0611	0712D	0624
6			12				0712E	0748D	0719
6		25	41				0748E	0857	0805
6		39	8				1239	1312	1248
6		16					1432	1501	1443
7				10	11		0037	0113D	0046
7			12	19	18		0115E	0155	0129
7			65*	36*	29*		0220	0347	0232
7		95	122				0943	1050	0948
7		61	32				1127	1211	1136
7		27					1228	1313	1246
7			13				1440	1512	1451
8			8	5	5		0243	0304	0251
8			23	13	8		0307	0354	0323
9	7		17	70	53		2246	0120	2322
10					11		2314	2336	2322
11			22	13			0411	0456	0421
11	22		7			63	0627	0752	0647
11		23	36				0814	0909	0820
11			8				1044	1055	1048
11		17					1558	1633	1617
12			7				1424	1452	1433
13			18				0751	0825	0800

Inubo

Jan. 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
14		22					1049	1110	1052
14		15					1606	1624	1615
15				7	5		0112	0129	0117
15	29		34	18*			0412	0500D	0430
15	14		24	12			0500E	0554	0514
15		–	10				0555	0617	0604
15	–	–	28	13			0735	0814D	0751
15	–	–	35				0814E	0840	0822
15	–		10				0928	0943	0931
16				8	8		0101	0132	0112
16		–	80	80			0652	0858	0710
16	47	34	73	210	191	–	2309	0035D	2326
17				22	26		0035E	0159	0039
17			7				0433	0500	0440
17			11				0522	0552	0536
17			22				0600	0636	0614
17		64	137				0914	1030	0922
17		29					1306	1346	1316
17			10	36	47	–	2350	0046D	2359
18				14	22	–	0046E	0112D	0104
18				22	25		0112E	0227	0124
18			10	11			0241	0313	0247
18	–		54	32	44		0420	0513	0428
19	32	20	90	63	50	54*	0308	0406	0319
19			11			15	0452	0510	0456
19		20	14				1146	1215	1152
19	25	34					1334	1442D	1355
19	18	20					1442E	1504	1446
20			9	7	6		0237	0305	0245
22	14			14	14		0100	0128	0107
25		–		10	9		0101	0130D	0108
25		–	13	6	10		0342	0407	0348
25		–			29		2042	2054	2046
26		–		5	5	–	0024	0041	0030
26	9	–	12	22	22		0110	0132D	0120
26	42*	–	206	111	110	59	0132E	0153D	0141
26		–	123	74	77	33	0153E	0300	0205
26		–	10	9			0540	0608	0549
26	–	–	10				0647	0708	0653
26	–	–	17			73*	0710	0824	0744

Inubo

Jan. 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
26	–	–	20				1137	1221	1145
26		–		8	11		2236	2307	2240
27		–		19	17		0019	0059	0030
27		–		5	5		0208	0241	0216
27	–	–	71	53	37		0344	0458D	0403
27	79	–	212	149	124	29	0458E	0737	0513
28	–	–	14	8	7		0321	0338D	0332
28	–	–	22	13	7		0338E	0410	0348
28	–	–	32	25	25		0450	0615	0508
29		–	14	6	6		0318	0335D	0329
29	54	–	227	152*	95	59	0335E	0411D	0345
29	47	–	187		91	34	0411E	0636	0415
29	–	–	41*	22*			0722	0827D	0742
29	–	–	87*				0827E	0940	0905
29		–	8				1056	1110	1101
29		–	66				1123	1226	1130
29		–	8				1300	1339	1309
30	7	–	23	29	27		0104	0138D	0114
30		–		11	9		0138E	0213	0140
30		–	8	7	6		0249	0306	0254

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