ISSN 0021-0382

F—505

IONOSPHERIC DATA IN JAPAN

FOR JANUARY 1991

VOL. 43 NO. 1

CONTENTS

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MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *Es*.

B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.

C Measurement influenced by, or impossible because of, any non-ionospheric reason.

D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.

E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.

F Measurement influenced by, or impossible because of, the presence of spread echoes.

G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.

H Measurement influenced by, or impossible because of, the presence of a stratification.

K Presence of particle *E* layer.

L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.

M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.

N Conditions are such that the measurement cannot be interpreted.

O Measurement refers to the ordinary component.

P Man-made perturbations of the observed parameter; or spur type spread *F* present.

Q Range spread present.

R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.

S Measurement influenced by, or impossible because of, interference or atmospherics.

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

V Forked trace which may influence the measurement.

W Measurement influenced or impossible because the echo lies outside the height range recorded.

X Measurement refers to the extraordinary component.

Y Lacuna phenomena, severe layer tilt.

Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.

D Greater than.

E Less than.

I Missing value has been replaced by an interpolated value.

J Ordinary component characteristic deduced from the extraordinary component.

M Mode interpretation uncertain.

O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

U Uncertain or doubtful numerical value.

Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

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

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.

l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.

c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)

h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)

q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.

r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.

a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

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

* Measurement impossible because of interference.

B Measurement impossible because of bursts.

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C	artificial accident,
S	propagational accident,
U	inaccurate.

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

N	normal,
U	unstable,
W	disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

Correspondence of solar optical flare, solar radio burst, and geomagnetic crochet 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. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	40	36	30	34	38	38	A	52	92	130	126	124	114	110	110	106	86	84	71	50	36	30	30	31
2	35	30	38	34	39	38	28	54	88	114	107	116	106	106	101	91	80	66	41	40	32	30	32	34
3	32	34	30	32	30	31	34	63	96	111	125	121	111	115	106	96	90	66	52	43	45	26	30	
4			25		46	A	35	84	86	98	112	117	105	101	N	91	84	61	54	53	44	40		40
5	38	40	38	36	35	66	29	58	104	90	112	111	100	100	91	89	80	63	41	47	44	40	41	40
6	38	42	37	43	40	40	38	67	90	90	109	118	111	90	97	90	80	66	41	40	37	34	26	36
7	37	37	38	43	34	34	30	64	90	98	110	120	101	101	92	96	73	52	41	45	31	30	31	36
8	N	32	38	40	38	34	31	85	90	121	115	100	104	108	110	103	78	66	52	48	37	34	30	34
9		35	34	34	32	35	31	63	100	104	102	121	102	102	89	92	88	66	55	28	59	30	A	A
10	32	A	A	50	A	31	25	52	91	105	118	110	101	101	90	90	90	73	60	38	34	38	A	40
11	38	34	A	28	36	32	32	51	86	102	129	122	107	100	96	86	84	88	A	40	30		A	35
12	34	40	37	37	A	28	32	64	80	N	122	118	101	106	108	90	86	74	73	A	A	A	35	36
13	40	37	A	41		32		58	84	100	114	120	93	101	102	91	76	74	63	37	37	42	A	A
14	43	32	42	42	37	36	34	61	80	110	120	A	69	101	103	85	78	88	66	A	A	A	42	44
15	44	42	47	48	42	A	38	57	86	98	122	115	91	95	100	88	81	64	A	38	30	35	49	40
16	37	40	38	40	42	38	31	61	97	105	122	124	116	112	112	91	80	72	54	A	31	28	35	36
17	34	32	35	34	40	40	31	52	86	100	141	134	121	112	116	103	90	86	64	48	48	37	35	40
18	45	42	35	A	37	38	A	84	107	140	128	136	130	126	113	112	86	73	70	51	38	A	A	A
19	37	33	41	40	44	34	A	62	86	103	122	137	122	107	115	121	95	79	65	44	34	25	37	30
20	43	38	37	41	40	38	42	62	44	137	131	135	125	110	115	107	85	74	66	52	40	38	37	37
21	38	37	38	37	37	38	37	71	86	112	120	127	113	110	98	86	88	78	58	41	31	25	38	40
22	40	39	40	40	40	38	37	66	110	128	110	122	110	113	98	91	86	72	63	54	42	38	43	42
23	44	40	A	41	42	40	38	85	108	126	124	132	130	137	128	101	95	90	64	50	38	46	38	38
24	44	38	40	41	42	42	40	64	100	113	120	121	121	119	117	108	101	86	66	62	52	54	53	52
25	54	49	47	47	44	46	42	78	112	122	136	133	135	130	123	110	104	89	85	66		54	53	52
26	51	42	45	41	50	40	39	86	117	128	136	141	136	140	133	135	125	122	101	81	72	66	66	63
27	59	59	60	59	66	62	46	102	107	141	148	137	118	118	112	110	103	103	87	80	66	63	52	40
28	37	38	40	42	41	43	44	74	120	130	138	135	120	122	110	98	100	92	84	64	54	40	42	46
29	43	42	46	42	38	38	42	89	107	140	137	131	118	111	106	94	90	86	81	73	64	62	58	52
30	53	44	49	48	28	40	39	72	125	121	121	120	111	107	105	103	90	87	86	64	55	51	47	51
31	53	42	43	41	40	42	43	77	120	136	141	138	129	115	119	111	103	96	86	66	72	64	63	63
	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	27	29	28	29	27	31	31	30	31	30	31	31	30	31	31	31	29	28	28	27	25	27
MED	40	38	38	41	40	38	37	64	92	112	122	122	111	110	107	96	86	74	64	49	39	38	38	40
U Q	44	42	43	42	42	40	40	78	107	128	131	134	121	115	115	107	95	88	77	63	53	51	50	46
L Q	37	34	37	36	37	34	31	58	86	102	114	118	102	101	98	90	80	66	54	40	34	30	33	36

HOURLY VALUES OF FES AT WAKKANAI

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	27	G	G	G	G	34	38	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
2	G	G	G	G	G	G	44	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
3	G	G	G	G	28	G	G	G	30	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G
4		G	G		G	29	29	44	49	G	G	G	G	G	G	G	G	G	34	49	G	G	31	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	39	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	40	G	40	G	G	G	G	G	G	G	G	G	G	G	G
8	G	G	G	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	41	G	G	G	G	G	G	G	32	90	42	85	G	46	38
10	38	50	41	59	59	42	58	45	31	G	G	G	G	G	G	G	G	G	G	G	G	58	58	58
11	32	29	42	G	G	G	G	28	92	53	G	59	G	G	G	G	29	38	66	G	G		31	G
12	G	G	G	G	40	35	38	G	G	G	G	G	G	G	G	G	G	G	26	61	60	30	26	G
13	G	G	38	G	G	G		G	G	G	G	G	G	G	G	G	G	34	G	G	G	58	70	58
14	38	44	37	30	28	G	G	G	G	G	72	113	69	55	G	G	G	36	40	95	60	36	26	28
15	G	G	G	G	58	59	35	G	G	G	G	G	G	G	54	54	41	88	69	G	40	45	34	28
16	G	G	G	G	28	26	G	G	48	G	G	G	G	39	51	41	58	68	G	34	G	28	28	G
17	28	G	G	G	G	G	28	G	30	G	G	G	G	G	G	G	G	G	G	59	58	G	30	G
18	29	32	G	34	31	27	29	36	41	48	G	G	G	47	G	G	G	28	G	54	G	69	32	32
19	28	28	27	G	G	29	59	68	81	85	64	G	G	G	42	G	G	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	59	36	46	43
22	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	G	29	27	31
23	29	28	33	G	G	G	G	G	G	G	G	G	G	G	G	48	G	G	G	34	G	32	36	29
24	25	36	29	G	G	35	G	G	34	G	G	G	G	G	39	G	G	37	34	39	31	28	27	G
25	G	G	G	G	G	G	31	G	G	G	G	G	G	66	72	50	58	33	40	32	G	G	G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	42	G	G	G	G	33	28	35	G	29	G	G
27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	27	G
28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
30	G	G	G	G	32	31	G	33	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
31	28	30	34	G	G	G	G	112	39	39	G	G	G	G	G	G	G	G	G	32	G	25	G	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G
U Q	28	28	27	G	28	27	29	29	31	G	G	G	G	G	G	G	G	33	28	35	G	30	31	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

HOURLY VALUES OF FMIN AT WAKKANAI

JAN. 1991

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	17	16	18	16	16	14	16	24	36	36	38	38	39	33	30	18	16	16	15	16	17	20	18
2	16	17	17	17	14	16	16	16	26	28	32	33	34	34	30	27	20	16	15	16	17	18	17	16
3	17	16	15	15	16	17	16	16	17	32	33	34	22	35	20	18	18	17	15	17	16	16	17	71
4		71	66		15	17	15	16	23	34	24	36	35	28	35	32	20	18	15	17	15	16	21	18
5	16	15	16	15	16	15	16	16	24	28	24	36	39	34	30	27	20	17	15	20	15	16	17	16
6	16	15	17	15	18	17	16	18	24	34	23	34	23	18	20	21	20	16	15	16	17	17	17	16
7	15	15	17	17	16	16	16	16	18	20	21	23	23	21	22	20	21	20	16	15	16	17	18	16
8	18	16	16	15	15	15	16	18	26	21	23	22	22	22	34	30	23	18	15	17	16	17	17	18
9	20	17	16	17	15	16	16	18	20	23	34	34	35	35	33	29	21	18	15	16	15	15	21	16
10	16	16	16	17	16	16	16	18	23	33	36	34	42	35	36	32	21	21	18	16	20	18	17	17
11	17	17	18	15	16	15	15	18	34	23	35	43	35	33	34	24	20	18	17	15	21		21	18
12	18	17	16	16	16	17	15	17	24	29	33	35	35	34	32	30	20	18	17	26	24	18	17	16
13	18	22	15	23	81	17		17	26	30	32	39	36	27	32	24	20	16	17	16	15	16	17	17
14	15	17	15	16	16	17	16	18	20	21	27	30	26	30	33	28	21	15	17	17	17	17	17	17
15	18	17	15	15	14	17	18	17	24	30	33	35	38	35	24	22	20	20	18	17	17	17	18	15
16	17	16	15	16	18	16	18	17	27	33	34	35	36	32	28	21	20	17	16	16	16	18	17	20
17	21	16	20	18	17	14	16	18	22	30	36	34	36	35	33	33	24	18	15	17	18	15	16	16
18	18	20	18	17	17	18	16	16	24	27	24	40	39	34	34	30	22	21	20	17	18	17	21	21
19	18	20	16	15	15	15	17	17	22	40	26	36	38	34	24	27	22	20	16	15	18	18	15	16
20	18	15	18	17	15	16	17	18	27	30	34	39	35	33	22	18	23	16	15	17	16	17	16	15
21	17	15	15	17	15	16	16	17	27	21	23	34	41	34	34	30	23	15	15	17	18	17	18	17
22	18	15	18	18	17	17	16	17	17	20	23	24	26	26	21	20	22	16	15	15	16	17	17	15
23	20	17	16	16	18	16	14	20	28	30	36	35	24	35	34	29	20	20	16	18	16	17	17	18
24	16	20	17	15	17	16	15	20	20	30	22	22	23	39	29	23	23	17	17	14	16	17	16	20
25	15	15	15	15	15	17	16	18	28	34	36	38	38	26	23	22	33	17	18	18	26	16	18	15
26	16	15	18	17	17	17	17	20	29	32	39	38	35	38	36	30	26	17	15	16	15	16	15	16
27	15	16	15	14	15	16	15	20	29	39	38	40	40	38	27	33	26	16	16	16	16	18	16	16
28	18	16	15	18	15	16	16	20	20	38	36	39	39	29	35	21	24	17	18	14	16	16	16	16
29	16	15	16	16	17	15	16	20	29	34	35	40	40	40	35	21	24	15	16	15	16	16	16	15
30	15	16	15	15	18	16	15	16	28	34	38	38	40	36	38	21	24	16	15	18	16	16	15	15
31	15	16	16	15	16	17	15	21	20	23	36	39	54	42	40	26	21	18	16	21	15	17	15	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31
MED	17	16	16	16	16	16	16	18	24	30	33	35	36	34	33	27	21	17	16	16	16	17	17	16
U Q	18	17	17	17	17	17	16	18	27	34	36	39	39	35	34	30	23	18	17	17	18	17	18	18
L Q	16	15	15	15	15	16	15	16	20	23	24	34	26	29	24	21	20	16	15	15	16	16	16	16

HOURLY VALUES OF FOF2 AT AKITA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	38	38	34	37	40	40	30	52	94	108	137	121	110	110	115	90	86	78	A	33	A	30	32	30
2	37	34	40	42	42	35	35	63	88	103	112	118	121	100	102	106	86	61	58	50	56	34	N	34
3	34	32	34	32	32	32	26	62	97	112	121	126	111	112	111	102	90	83	63	44	51	34	34	31
4	34	51	51	34	51	31	37	62	90	102	110	113	106	91	97	88	84	76	56	52	43	30	40	37
5	A	38	35	36	35	34	41	62	83	88	104	117	106	88	87	86	86	75	50	43	51	38	43	43
6	34	44	43	46	43	43		71	101	110	97	131	117	104	102	96	88	64	49	48	38	56	53	N
7	34	42	37	64	37	38	40	66	88	105	107	106	112	100		90	87	N	47	42	36	53	A	A
8	34	35	35	34	31	31	34	60	N	107	117	134	111	104	112	104	87	66	52	47	30		35	32
9	A	65	64		30	32	36	67	107	88	112	124	112	103	88	97	90	80	A	A	A	A	38	A
10	35	34	A	41	39	A	32	53	86	107	116	122	104	86	101	87	87	87	66	43	38	37	36	34
11	36	35	34	46	54	31	55	60	84	103	121	114	106	90	102	97	93	72	72	31	30	A	30	26
12	35	36	36	35	36	A	A	64	88	110	127	124	102		103	100	86	70	77	53	34	52	50	A
13	26	36	43	36	30	35	N	52	82	93	111	115	120	88	108	97	82	80	54	42	64	50	35	38
14	40	42	31	40	36	34	36	57	78	90	120	127	106	86	90	91	A	79	82	A	A	A	A	A
15	30	38	46	42	37	36	30	63	86	89	126	114	103	91	103	90	A	54	A	A	35	40	A	43
16	37	A	38	46	26	A	32	62	96	100	114	111	120	112	106	102	86	76	A	A	A	A	A	34
17	38	A	26	30	A	38	37	60	87	108	121	132	111	107	112	103	86	67	A	66	A	A	A	A
18	42	40	65	32	38	93	32	63	86	134	138		130	117	111	113	103	80	71	60	25	N	A	A
19	37	37	43	41	38	36	23	54	86	117	121	120	131	114	104	120	103	73	73	53	40	32	A	51
20	49	53	49	35	38	37	45	63	82	111	135	126	120	112	103	103	86	69	78	63	44	34	36	25
21	53	31	32	31	51	38	34	64	78	116	131	110	109	98	102	90	78	56	72	46	34	35	41	40
22	41	38	46	42	42	40	43	73	100	122	135	120	122	111	119	113	86	84	53	51	44	37	37	42
23	43	61	A	41	42	43	38	73	121	132	133	124	121	117	131	111	94	102	87	53	22	26	40	A
24	62	64	40	A	47	46	46	70	86	110	121	114	118		116	111	86	90	76	51	52	A	A	A
25	A	51	45	44	41	46	46	74	108	114	137	137	126	120	115	113	90	87	87	76	52	53	25	42
26	44	46	43	41	N	41	N	86	121	137	149	140	134	133	134	130	121	118	104	78	59	66	53	66
27	62	64	64	59	63	51	43	77	99	125	141	134	116	108	115	111	116	100	91	86	76	78	67	65
28	A	45	43	44	46	40	38	77	122	122	134	131	117	111	118	110	94	100		77	74	54	65	48
29	48	50	34	36	36	34	38	76	103	126	135	124	110	104	104	100	90	88	87	76	75	70	64	62
30	65	48	44	41	44	44	43	78	107	N	118	116	90	90	101	90	90	90	90	79	58	52	46	50
31	52	62	65	65	53	65	64	84	110	124	133	136		90			88	90	86	52	70	50	52	52
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	29	29	29	28	27	31	30	30	31	30	30	29	29	30	29	30	25	27	26	23	22	22
MED	38	42	43	41	39	38	37	63	89	110	121	123	112	104	104	101	87	80	72	52	44	40	40	41
U Q	48	51	46	44	45	43	43	73	103	122	135	131	120	112	115	111	91	88	86	66	58	53	52	50
L Q	34	36	34	35	36	34	32	60	86	103	114	115	106	90	102	90	86	70	55	44	35	34	35	34

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	32	50	51	49	33	G	G	G
2	G	G	G	G	G	G	G	G	50	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
3	G	G	G	G	G	28	28	29	G	36	G	G	G	G	G	G	34	29	26	G	G	G	G	24
4	G	28	G	G	G	G	G	G	33	37	40	G	G	40	44	38	34	33	28	G	26	43	25	G
5	30	G	G	G	G	G	G	G	G	G	54	G	G	G	G	40	31	G	G	G	G	G	30	26
6	G	G	G	G	29	G		26	G	G	39	40	43	41	38	G	30	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	31	38	41	42	47	G		G	G	G	G	G	G	G	27	30
8	G	G	G	G	G	G	G	G	32	38	39	41	43	41	G	G	G	29	G	25	G		G	45
9	32	G	G		G	G	G	G	G	38	G	42	44	G	G	41	G	44	94	114	55	54	33	30
10	G	G	33	40	31	32	37	36	56	61	50	42	42	44	G	48	33	37	32	G	G	G	29	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	G	33	G	27	G	G
12	G	G	G	G	24	28	58	33	G	55	G	G	G		G	G	G	34	31	35	26	24	31	52
13	30	G	51	G	G	G	G	G	G	G	43	G	G	G	G	G	G	G	37	40	G	G	G	G
14	G	G	G	G	G	G	G	G	G	41	60	45	G	G	G	59	69	36	57	46	66	33	32	41
15	34	G	28	G	28	32	30	50	54	58	65	57	G	G	G	66	56	110	60	102	32	G	32	43
16	29	40	26	28	39	52	26	G	G	51	G	G	G	G	46	54	70	83	69	44	32	54	33	33
17	31	30	27	48	39	32	29	29	33	G	G	G	61	42	G	40	58	32	76	49	45	44	45	48
18	33	28	G	G	G	G	G	27	33	41	G		43	83	G	46	34	28	G	G	G	40	29	66
19	32	32	28	25	G	G	26	27	G	40	G	G	G	G	41	G	G	G	28	G	G	28	29	G
20	G	G	G	G	G	G	G	G	32	38	45	60	G	G	G	36	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	36	G	G	G	G	G	G	G	G
22	G	G	G	G	G	32	G	G	34	43	41	43	G	G	G	G	32	G	G	G	G	30	G	26
23	28	32	33	32	29	G	25	G	G	G	G	52	49	45	40	G	30	26	G	G	28	32	G	29
24	26	34	31	32	G	G	G	G	37	57	46	47	G		G	40	33	G	25	25	32	38	49	34
25	30	G	G	G	25	G	G	40	35	46	44	46	G	92	48	37	G	36	40	29	G	G	29	26
26	25	25	G	G	G	G	G	G	G	39	40	G	G	41	G	42	51	29	27	26	49	58	33	28
27	27	G	G	G	G	G	G	G	52	G	G	G	G	G	G	G	G	31	40	38	34	26	26	G
28	34	28	G	G	G	G	G	G	G	40	46	G	G	G	43	G	G	G	49	G	G	24	G	G
29	G	G	G	28	31	G	28	G	34	40	G	42	G	G	42	37	G	G	G	G	G	G	G	30
30	G	32	G	G	G	G	G	G	G	37	48	G	G	G	G	45	36	36	37	G	25	30	G	G
31	G	G	G	G	G	G	G	G	G	G	40	G	G	G			37	32	G	24	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	30	31	31	31	31	30	31	29	29	30	31	31	31	31	31	30	31	31
MED	G	G	G	G	G	G	G	G	G	38	39	G	G	G	G	36	30	29	27	G	G	24	25	26
U Q	30	28	26	G	25	G	26	27	34	43	45	42	42	41	39	41	34	36	40	38	32	33	31	33
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 AKITA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	15	16	15	18	27	18	21	17	21	20	20	17	16	16	15	15	15	16	16	16
2	16	16	15	17	15	15	15	16	15	18	16	20	20	20	16	16	17	15	15	16	17	15	16	15
3	15	15	15	15	15	15	15	18	15	16	16	17	21	18	17	17	15	15	15	15	16	15	15	15
4	16	16	18	17	16	17	15	18	15	17	16	24	21	22	18	18	15	15	15	15	15	15	17	20
5	15	15	15	16	16	15	15	16	16	17	18	22	22	24	22	20	15	15	15	15	15	16	15	15
6	18	16	16	15	16	20		17	16	18	18	21	16	20	17	16	16	15	15	16	15	15	15	16
7	15	15	15	15	15	15	15	17	16	18	21	22	21	17		18	24	15	15	15	15	18	15	15
8	15	15	15	15	16	16	20	20	15	16	18	22	22	17	22	18	16	16	16	16	16		17	16
9	15	16	15		15	16	15	20	17	18	22	20	21	21	20	17	26	15	15	15	15	15	16	15
10	16	16	16	15	16	15	15	15	17	17	21	21	20	18	20	18	17	15	16	15	17	16	16	16
11	16	15	16	16	16	15	15	17	21	33	35	35	35	28	24	21	20	15	16	15	15	17	21	18
12	18	16	15	15	17	15	16	15	17	18	22	22	23		22	18	17	15	15	15	17	16	16	15
13	15	16	15	15	16	15	18	18	22	23	23	26	23	35	22	21	24	15	15	16	15	15	15	15
14	16	16	16	15	16	15	15	18	26	20	23	22	26	21	22	20	18	16	15	15	15	15	15	15
15	15	15	15	15	16	15	16	15	16	18	18	20	22	21	28	20	16	15	15	15	15	15	15	15
16	16	15	15	15	15	15	16	18	17	20	21	26	24	22	18	22	18	16	16	15	15	15	15	15
17	15	15	15	15	15	15	15	15	16	20	18	27	26	20	26	24	20	15	15	15	15	15	16	15
18	15	15	15	15	15	17	15	18	16	18	21		21	21	18	17	16	15	15	16	15	18	15	15
19	16	15	16	15	15	15	17	20	15	15	17	17	23	17	16	15	24	17	16	15	15	16	15	15
20	15	15	15	16	16	15	15	20	16	18	16	20	18	20	22	18	26	16	16	15	15	16	16	16
21	15	15	16	15	15	15	15	17	16	16	21	22	20	21	20	18	26	16	16	15	16	16	16	15
22	15	16	15	15	16	15	15	20	16	16	20	22	21	24	24	22	27	16	16	16	16	16	16	15
23	16	15	15	15	15	15	15	21	16	17	20	21	26	21	20	17	16	18	16	15	16	15	15	15
24	16	15	15	15	16	15	15	18	15	16	18	20	18		22	20	17	18	16	15	16	15	15	15
25	15	15	16	16	15	16	17	16	18	16	20	28	48	22	22	17	37	16	15	16	15	16	15	16
26	15	16	15	16	16	15	16	15	17	20	23	24	23	23	23	21	16	15	16	15	15	15	15	16
27	15	15	16	15	15	15	15	15	17	22	23	26	28	28	23	22	20	14	15	15	15	16	16	21
28	15	15	16	16	15	15	15	21	17	17	20	47	27	24	22	18	18	18	15	15	15	15	15	16
29	15	15	15	17	15	15	15	21	16	20	21	26	26	22	20	18	17	18	16	15	16	15	15	16
30	16	15	15	16	16	16	16	21	18	22	22	24	32	28	27	32	18	16	16	18	16	16	16	16
31	16	16	15	16	18	16	16	23	16	18	21	49	75	65			20	16	15	18	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	30	31	31	31	31	30	31	29	29	30	31	31	31	31	31	30	31	31
MED	15	15	15	15	16	15	15	18	16	18	21	22	22	21	22	18	18	15	15	15	15	16	15	15
U Q	16	16	16	16	16	16	16	20	17	20	22	26	26	24	22	21	24	16	16	16	16	16	16	16
L Q	15	15	15	15	15	15	15	16	16	17	18	20	21	20	19	17	16	15	15	15	15	15	15	15

HOURLY VALUES OF FOF2 AT KOKUBUNJI

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	38	42	40	41	38	38	32	68	102	120	138	117	106	106	107	112	101	84	66	55	37	A	34	37
2	37	37	38	41	41	31	37	72	97	102	126	123	125	110	101	102	101	86	55		38	38	32	34
3	32	31	35	38	34	32	40	74	102	116	134	136	140	131	131	115	114	97	64	48	44	38	42	40
4	36	30	34	36	31	32	38	75	88	115	116	118	102	104	96	98	90	80	70	58	40	36	38	38
5	44	30	34	34	32	35	43	67	85	88	96	118	114	97	87	90	86	76	63	45	51	48	43	44
6	37	40	41	41	37	38	45	74	96	124	120	127	138	126	104	111	107	71	52	44	52	40	38	38
7	31	36	36	31	31	30	32	68	104	110	116	115	106	107	93		86	70	59	42	48	43	42	38
8	40	38	38	31	31	29	30	72	104	112	135	145	137	126	120	122	104	91	52	49	46	37	A	A
9	43	38	35		31	32	38	74	116	108	108	124	124	113	105	106	101	96	52	52	42	37	38	A
10	35	34	35	A	38		32	72	92	36	126	137	116	103	101	110	96	92	77	53	46	45	44	41
11	43	43	38	37	32	31	31	61	94	111	128	106	116	104	97	114	96	77	74	N	A	A		A
12	38	A	40	35		31	38	A	91	124	135	124	112	110	106	108	94	77	73	66	38	42	A	37
13	A	38	46	26	24	30	31	54	90	104	112	120	120	108	104	101	90	80	66	52	43	44	A	38
14	40	45	46	38	34	31	32	60	88	95	115	121	112	106	A	101	86	77	54	52	A	A	A	34
15	32	37	47	35	A	31	37	66	91	97	102	126	126	101	105	102	71	64	52	53	48	44	38	34
16	32	40	41	45	40	29	34	65	112	90	97	120	134	127	113	120	107	78	54	A	A	A	A	A
17	36	38	40		32	A	36	71	92	98	117	117	113	112	111	108	87	74	67	68	44	A	38	34
18	50	34	36	31	34	34	31	66	101	130	145	143	138	131	131	127	113	102	67	67	52	35	36	38
19	38	36	38	45	31	35	30	58	96	111	130	127	132	132	118	118	120	85	70	77	54	38	36	37
20	37	32	31	34	35	38	38	64	86	101	132	132	123	116	110	110	96	76	71	73	49	36	38	37
21	32	34	34	32	34	34	34	62	81	108	132	122	104	101	105	102	81	74	72	55	35	37	46	37
22	37	41	40	41	38	35	44	78	100	121	137	138	131	125	128	124	110	94	83	67	54	47	47	44
23	45	46	42	40	39	43	41		116	137	141	128	117	118	128	123	101	94	97	70	53	54	48	38
24	38	38	37	40	41	43	46	82	95	111	127	121	124	116	122	113	100	101	86	72	A	A	53	54
25	48	54	47	45	40	44	50	71	100	127	122	144	131	120	119	118	105	108	104	97	77	66	74	55
26	52	52	45	42	40	39	38	88	111	136	146	137	135	133	133	136	127	122	110	87	77	80	80	66
27	54	52	52	52	55	42	45	82	97	127	144	140	122	108	120	115	118	114	107	104	103	102		74
28	66	67	52	47	46	48	38	84	120	130	137	140	128	121	130	124	114	108	102	102	100	88	74	67
29	54	58	41	37	32	32	43	81	106	116	137	130	118	102	108	104	97	91	96	90	90	86	82	73
30	66	55	47	43	42	45	41	84	102	124	131	120		111	109	108	104	104	97	96	80	63	58	55
31	52	52	42	42	37	35	45	91	110	122	138	129	125	116		104	95	90	83	82	90	78	73	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	30	30	31	28	29	29	31	29	31	31	31	31	30	31	29	30	31	31	31	28	27	25	24	27
MED	38	38	40	39	35	34	38	72	97	112	130	126	124	112	109	110	101	86	70	66	49	44	42	38
U Q	48	46	45	42	40	38	43	79	104	124	137	137	131	125	121	118	107	97	86	79	77	64	55	55
L Q	36	36	36	34	32	31	32	65	91	102	116	120	114	106	104	104	90	77	59	52	43	37	38	37

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

JAN. 1991

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

DD \ HH	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	44	G	G	G	G	43	G	G	44	55	32	50	37	32	29	26	G	G
2	G	G	G	G	G	G	G	G	57	G	G	42	G	G	G	G	32	G	G		G	34	G	G
3	G	G	G	G	G	27	G	G	33	37	G	G	G	G	G	G	47	25	51	G	G	G	G	G
4	G	G	G	G	G	G	G	55	G	G	44	G	G	G	40	G	34	G	37	30	G	G	G	G
5	28	G	G	G	G	G	G	G	49	38	40	G	43	G	41	41	33	59	43	58	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	44	46	50	45	56	40	40	27	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	33	44	46	46	43	44	40		30	G	G	24	32	27	G	G
8	G	25	32	G	G	G	G	G	37	49	45	45	44	44	44	G	30	30	35	26	24	28	46	35
9	32	27	G		G	G	G	G	34	39	G	G	G	G	46	43	56	80	60	43	50	33	G	37
10	44	24	24	54	G		34	G	G	G	59	G	G	49	48	39	55	55	28	28	26	28	33	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	G	48	57	59	66		30
12	G	43	32	G		G	G	131	44	56	G	G	G	G	57	G	32	31	32	25	G	24	26	26
13	44	30	G	40	G	G	G	28	G	40	55	G	G	G	G	52	50	31	G	30	G	34	57	G
14	G	G	G	G	G	G	G	G	48	G	48	92	94	50	122	65	68	58	124	70	52	56	37	G
15	G	24	G	25	40	52	26	G	G	59	50	52	49	50	44	55	61	55	49	48	56	60	G	G
16	G	30	28	25	G	25	G	G	G	G	44	56	51	G	47	52	49	71	76	114	57	62	43	41
17	25	24	28		31	34	G	28	34	41	57	54	58	50	58	50	50	59	59	44	30	36	28	24
18	G	G	G	G	G	G	G	G	35	44	43	G	43	G	40	37	33	34	32	24	G	G	G	G
19	G	38	G	30	25	G	G	28	G	40	G	G	G	42	G	37	33	31	G	25	G	G	G	G
20	G	G	G	G	G	G	G	G	34	38	43	G	44	47	41	37	G	G	G	32	34	23	G	G
21	G	G	G	G	G	G	G	27	G	G	43	55	43	42	44	37	G	29	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	34	38	49	43	45	G	43	42	32	38	36	40	G	G	27	G
23	G	G	G	G	28	32	28		33	G	50	50	51	42	44	48	44	G	G	G	G	25	G	G
24	G	G	G	G	G	G	G	26	37	48	57	54	61	G	43	49	43	37	33	37	59	51	25	25
25	25	30	28	G	G	G	G	29	37	38	44	65	44	46	45	42	G	28	37	32	26	28	26	G
26	G	G	G	G	G	G	G	G	34	43	54	43	46	G	43	48	G	31	27	G	G	G	23	41
27	36	28	26	G	G	G	G	G	40	51	41	50	50	48	41	G	56	32	34	40	30	40		G
28	G	27	28	G	G	G	G	G	G	G	48	44	48	48	46	58	G	G	26	39	G	G	G	G
29	G	G	G	G	G	G	G	G	34	G	46	48	54	51	47	43	37	34	27	24	G	G	G	G
30	G	G	G	G	G	G	G	G	G	G	47	44		44	45	G	G	G	G	G	25	G	G	G
31	G	G	G	G	G	G	G	G	G	G	G	G	G	G		64	34	G	G	26	G	G	24	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	29	30	30	31	30	31	31	31	31	30	31	30	30	31	31	31	30	31	31	29	31
MED	G	G	G	G	G	G	G	G	33	38	44	43	44	42	44	42	34	31	32	30	G	25	G	G
U Q	G	27	24	G	G	G	G	26	37	43	49	50	50	47	46	50	49	50	43	40	32	34	26	24
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	30	G	G	24	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	16	15	15	14	15	15	20	16	16	21	21	22	20	18	18	15	15	15	16	15	15	16	15
2	15	15	15	15	14	15	15	17	16	16	17	18	20	21	18	15	17	15	14		15	15	15	16
3	15	15	15	14	14	15	15	20	16	16	18	20	21	17	15	17	15	15	15	14	15	16	15	16
4	15	16	15	15	16	16	15	18	17	16	18	20	22	20	17	16	16	15	15	16	15	16	16	16
5	14	16	16	15	18	15	15	17	15	16	18	18	21	20	20	17	16	15	16	14	15	15	15	16
6	16	15	15	15	15	16	16	17	14	18	17	18	18	20	17	16	14	15	16	16	16	15	16	15
7	16	14	14	15	15	16	16	18	15	17	21	20	20	18	16		15	16	15	15	15	16	16	16
8	16	16	15	15	15	17	16	18	15	16	18	21	21	22	23	20	16	15	14	15	14	14	14	15
9	15	14	15		15	16	16	18	17	17	20	23	21	21	20	16	17	14	15	15	15	15	15	15
10	15	16	15	17	17		16	20	17	14	24	22	23	21	18	16	15	15	15	14	16	15	15	17
11	16	16	15	17	14	20	15	20	17	21	36	38	38	28	34	21	17	16	15	15	16	15		16
12	16	17	16	15		22	15	15	16	18	20	18	21	20	18	15	15	15	15	15	20	17	16	15
13	16	15	15	14		14	15	15	28	21	21	24	26	32	29	21	16	15	15	15	17	16	16	16
14	18	15	14	15	15	15	16	18	16	18	23	26	22	23	23	20	21	14	15	15	15	14	15	15
15	16	15	15	16	14	16	16	17	18	16	18	21	20	20	21	20	16	15	15	15	15	15	16	15
16	16	15	15	15	14	18	16	18	16	18	18	20	22	22	22	18	16	14	14	15	15	15	15	15
17	15	15	15		14	15	15	17	15	16	17	17	17	18	33	20	17	15	15	15	15	15	15	16
18	16	15	15	15	14	15	16	20	15	20	21	39	28	24	21	17	16	14	15	16	16	16	16	17
19	16	15	16	14	15	15	16	18	15	17	17	23	17	16	20	17	15	14	16	16	16	16	15	16
20	16	15	15	16	15	15	15	18	16	17	17	22	21	17	18	17	17	18	15	15	15	14	16	15
21	16	15	15	16	15	16	15	15	18	16	18	24	21	23	20	18	16	14	15	15	16	15	15	16
22	15	16	15	14	15	15	15	20	16	18	20	22	23	21	20	21	16	14	15	15	15	15	16	17
23	14	15	15	16	16	15	16		15	18	20	18	20	22	18	16	16	18	15	16	15	15	16	16
24	16	16	15	16	15	16	15	15	14	16	17	17	20	48	22	16	15	14	15	15	14	15	15	15
25	16	15	15	15	16	14	15	15	15	16	16	29	36	28	22	18	38	14	15	15	15	15	15	15
26	16	15	17	15	15	16	15	20	16	20	23	21	21	29	21	18	17	15	14	15	16	15	15	15
27	15	15	16	15	15	15	15	22	16	21	24	27	26	29	24	22	18	14	15	15	15	15		15
28	16	15	14	15	15	15	15	21	18	17	16	35	29	24	16	20	18	15	16	16	15	15	14	14
29	15	15	15	15	15	15	15	21	15	16	21	30	24	23	21	20	16	14	15	14	15	15	15	15
30	15	14	15	15	15	17	15	23	16	20	22	23		26	20	17	17	20	16	16	16	16	15	15
31	15	14	14	15	15	15	15	22	16	20	20	44	69	46		22	16	20	15	14	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	31	31	31	29	29	30	31	30	31	31	31	31	30	31	30	30	31	31	31	30	31	31	29	31
MED	16	15	15	15	15	15	15	18	16	17	20	22	21	22	20	18	16	15	15	15	15	15	15	15
U Q	16	16	15	15	15	16	16	20	17	18	21	26	24	26	22	20	17	15	15	16	16	16	16	16
L Q	15	15	15	15	14	15	15	17	15	16	17	20	20	20	18	16	15	14	15	15	15	15	15	15

HOURLY VALUES OF FOF2 AT YAMAGAWA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	46	71	42	38		27	46	50	93	120	122	124	122	116	116	110	110	114	88	67	64	59	35	36
2	56	29	43	44	46	70	28	48	105	114	120	124	131	134	117	118	108	112	99	63	51	58	51	34
3	66	38	62	65	69	71	34	53	107	121	130	125	144	145	141	137	142	131	94	74	72	62	52	71
4	32	38	49	36	40	54	43	52	105	108	121	126	126	120		108	101	104	98	73	53	52	52	53
5	58	43	65	36	28	51	50	53	82	102	105	118	112	111	100	96	91	88	90	73	60	66	46	65
6	52	46	37	37	65	31	30	40	88	122	144	120	126	143	139	125	120	120	84	54	67	72	66	56
7		29	30	45		46	26	43	90	111	120	112	116	128	124	108	114	104	104	78	73	78	62	58
8	71	71	70	35			26	53	90	122	138	146	160	165		152	146	139	107	86	84	72	59	57
9	50	49	30	30	51	56	37	48	86	120	127	121	142	153	146	N	124	132	126	87	79	76	62	49
10	31	32	32	34	41		31	49	96	113	127	148	160	151	144	142	139	142	128	110	88	79	52	61
11	54	52	50	51	34		30	41	86	116	131	125		132	126	124	130	107	81	A	66	51	53	42
12	42	36	47	38	66	46	36	48	90	106	135	132	121	142	135	122	120	111	101	103	86	58	34	71
13	40	46	47	31	A		51	71	84	96	96	112	122	132	112	108	115	97	82	66	64	53	67	41
14	31	49	52	40	34	24	30	42	81	101	111	107	114	108	110	90	110	103	82	76	74	59	63	32
15	66	71	53	A	A	29	30	50	88	105	122	111	146	138	108	105		84	72	64	71	54	68	
16	34	67	34	A	28		30	48	104	108	98	120	152	163					106	87	78	64	49	39
17	41	36	35	38	44	51	32	51	86	108	111	97	114	115	117	112	101	104	84	78	77	58	44	44
18	42	38	51	66	36	46	29		87	121	140	141	141	138	130	131	133	130	100	66	82	63	69	42
19	43	37	34	43	30	28	46	46	88	100	122	127	141	141	127	122	134	120	85	88	95	84	58	50
20	46	66	31	38	36	37	40	51	88	101	114	132	132	128	130	122	122	117	96	86	86	73	43	39
21	32	49	36	31	51	46	46	53	92	107	108	122	122	114	120	115	112	90	85	84	76	55	52	59
22	36	56	49		40	66	31	51	89	105	134	147	132	135	137	140	148	133	117	104	98	78	66	60
23	57	49	46	64	41	66	37	51	104	126	141	140	127	117	125	138	126	110	105	108	90	61	66	59
24	52	43	37	66	38	71	38	54	86	96	125	130	128	120	127	120	116	110	118	104	90	74	67	63
25	59	52	53	57	40	58	50	53	90	130	135	136	131	115	122	123	116	121	128	130	134	136	144	144
26	88	71	41	51	44	37	46	64	86	112	153	146	137		138	141	137	128	128					
27																								
28										130	137	148	140	141	145	146	147	144	144	160	182	183	170	146
29	114	86	62	48	42	46	38	70	105	122	127	140	130	122	124	124	122	123	120	127	146	143	108	104
30	79	76	54	48	49	71	44	62	106	108	133	136	131	128				118		111	119	108	86	
31	76	79	68	57	42	40	42	66	126	128	134	139	144	135	125	118	117	107	96	104	118	86	85	80
	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	29	26	24	24	29	28	29	30	30	30	29	29	26	27	27	29	29	28	29	29	29	27
MED	51	49	47	42	41	46	37	51	90	112	127	126	131	132	126	122	120	114	99	86	79	66	62	57
U Q	62	69	53	51	47	62	45	53	104	121	135	140	141	141	137	137	134	129	117	104	92	78	67	65
L Q	40	38	35	36	36	37	30	48	86	105	120	120	122	118	117	110	112	104	85	73	69	58	51	42

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G		G	G	G	G	G	40	42	G	G	G	G	G	G	24	G	24	G	G	G
2	G	G	G	G	G	G	G	24	G	36	40	G	G	42	G	G	39	31	24	G	G	G	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G	43	G	G	G	40	35	G	G	24	G	G	G
4	G	G	G	G	G	G	G	G	G	37	43	50	42	G		G	35	31	27	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	42	46	44	44	44	42	38	31	25	24	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	40	43	43	45	52	G	G	G	G	G	G	G	G	G
7	G	G	G	G		G	G	G	32	41	45	46	47	46	44	G	49	50	G	G	G	G	25	G
8	G	36	30	G			G	G	G	G	G	48	G	46		48	85	68	70	48	33	24	G	G
9	G	G	27	G	G	26	G	G	G	39	50	66	43	42	50	70	68	71	61	G	G	G	28	G
10	G	G	G	30	32		30	G	G	38	G	63	45	55	52	56	44	50	G	26	G	31	G	G
11	G	G	G	G	G		28	24	G	G	G	47		G	G	G	53	54	72	86	G	24	30	24
12	24	G	G	G	G	G	G	G	35	41	45	46	G	G	G	G	G	37	28	24	G	G	28	G
13	G	43	G	30	28		G	23	31	G	44	48	48	G	G	44	40	43	28	39	G	44	G	G
14	G	G	G	G	G	G	G	G	48	G	44	G	55	79	68	51	102	51	38	38	32	27	G	G
15	G	G	G	48	33	G	G	G	G	38	42	47	63	48	57	51		48	43	34	56	42	G	G
16	G	G	G	37	28		26	23	G	39	42	46	45	G					G	G	G	29	G	G
17	G	G	G	G	36	G	G	24	57	40	44	43	50	54	53	48	50	40	28	40	43	40	G	G
18	G	G	G	27	25	G	G		G	G	46	51	G	46	90	53	38	32	G	G	G	G	G	G
19	G	28	24	G	G	G	G	25	G	G	G	46	G	51	52	42	G	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	G	32	G	40	G	44	G	G	56	40	G	G	G	G	G	26	26
21	39	28	30	G	G	G	G	G	G	G	G	46	49	48	44	52	46	G	33	24	G	G	G	G
22	G	G	G		G	G	G	G	33	40	45	48	48	47	48	G	54	40	32	34	30	30	G	G
23	G	G	G	G	G	G	G	G	G	G	55	G	44	50	52	41	G	32	30	28	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	43	43	G	65	56	63	G	37	31	G	G	G	G
25	G	G	G	G	G	G	G	G	G	38	G	45	77	66	91	93	G	G	25	G	G	G	G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	44		G	42	39	32	28					
27																								
28										G	47	45	44	48	53	45	38	G	G	G	G	G	G	G
29	G	G	G	G	G	G	G	G	31	39	G	51	64	61	61	54	49	40	26	G	G	G	G	G
30	G	G	G	G	G	G	G	G	32	39	41	G	G	G				39		28	31	28	G	
31	G	32	G	G	G	G	G	24	G	39	G	G	G	G	G	G	40	G	G	29	39	33	G	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	28	26	24	29	28	29	30	30	30	29	29	26	28	27	29	29	29	29	29	29	28
MED	G	G	G	G	G	G	G	G	G	G	40	46	44	45	49	43	40	32	26	24	G	G	G	G
U Q	G	G	G	G	G	G	G	12	31	39	44	48	48	49	53	52	50	45	32	32	27	28	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	35	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

JAN. 1991

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15		16	16	15	16	15	23	23	28	36	23	20	17	22	15	15	16	15	15	15
2	15	15	15	15	15	15	18	15	15	17	17	23	17	22	17	15	16	15	15	15	15	15	15	18
3	15	15	16	15	15	15	15	15	15	17	20	23	24	18	16	17	16	15	14	15	15	15	15	15
4	15	15	15	15	15	15	15	15	16	15	18	22	23	20		17	16	15	15	15	15	15	15	15
5	15	15	15	15	15	15	15	15	16	17	17	21	28	33	22	20	16	15	15	15	15	15	15	15
6	15	15	15	15	15	15	15	15	16	16	20	24	24	24	21	16	16	20	15	15	15	15	15	15
7	15	15	15	15		15	16	15	15	16	20	21	34	23	18	22	20	16	15	15	15	16	15	15
8	15	15	15	15			16	15	16	16	22	24	24	26		24	22	15	15	15	15	16	15	15
9	15	15	15	15	17	15	15	15	15	17	23	27	30	41	24	33	22	17	15	15	15	15	15	16
10	15	16	16	15	14		15	15	17	32	35	26	27	29	26	20	16	15	15	15	15	15	15	16
11	15	16	15	15	15		16	15	16	16	35	34		39	36	22	20	16	15	15	15	15	16	15
12	15	16	16	15	15	15	15	15	16	17	22	30	27	39	38	21	16	15	15	15	15	15	15	15
13	15	15	15	15	15		15	15	15	16	17	22	35	36	35	29	23	17	15	15	15	15	15	15
14	15	15	15	15	15	15	15	15	20	32	26	36	34	30	24	23	23	16	15	15	15	15	15	15
15	15	15	15	15	15	15	15	15	15	18	22	23	27	24	35	33		15	15	15	15	15	15	15
16	15	15	15	15	15		15	15	15	16	16	18	26	35					15	15	16	16	15	15
17	15	15	15	15	15	18	15	15	15	15	15	22	27	24	34	23	17	15	15	15	15	15	15	15
18	15	15	15	15	15	15	17		15	16	34	38	33	32	30	23	15	15	15	15	15	15	15	15
19	15	15	15	15	15	16	15	15	15	15	20	22	34	35	28	22	16	16	14	15	15	15	15	15
20	15	15	15	15	15	15	15	15	26	18	18	38	29	32	18	17	15	16	16	15	15	15	15	15
21	15	16	15	15	15	15	15	15	27	16	18	18	22	20	18	20	22	15	15	15	15	15	15	15
22	15	15	15		15	15	15	15	16	16	17	27	35	28	30	35	17	16	15	15	15	15	15	15
23	15	15	15	15	15	15	15	15	16	16	21	26	24	30	30	22	17	16	15	15	15	15	15	15
24	15	15	15	15	16	15	15	16	16	16	22	24	28	52	36	24	15	15	15	15	15	15	15	15
25	15	15	15	15	18	15	15	15	16	16	21	40	43	30	24	20	50	20	16	15	15	15	15	15
26	15	15	15	15	15	15	15	16	15	17	23	23	35		38	20	17	15	15					
27																								
28										21	24	36	34	32	27	23	21	20	17	15	15	15	15	15
29	15	15	15	15	15	15	15	17	16	21	38	42	33	34	34	33	23	15	16	15	15	15	15	15
30	15	15	15	15	15	15	15	17	16	16	21	36	24	24				16		15	15	15	15	
31	15	15	15	15	15	15	15	16	15	16	23	46	N	53	45	28	17	15	17	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	29	29	29	28	26	24	29	28	29	30	30	30	28	29	26	28	27	29	29	29	29	29	29	28
MED	15	15	15	15	15	15	15	15	16	16	21	24	28	30	28	22	17	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	15	16	17	23	36	34	35	35	24	22	16	15	15	15	15	15	15
L Q	15	15	15	15	15	15	15	15	15	16	18	22	24	24	22	20	16	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	52	58	58	52	44	N	N	43	90	131	134	120	126	127	133	108	108	120	110	86	77	80	78	38
2	49	64	72	80	66	38	26	37	97	121	142	137	145	158	161	146	131	136	121	87	76	78	66	
3	54	66	76	59	53	52	49	55	103	146	154	137	160	163	169	170	170	145	136	107	108	90	74	52
4	54	54	61	54	51	51	43	58	90	120	120	122	136	145	146	131	131	112	103	90	86	77	66	63
5	66	67	62	43	41	38	43	51	81	111	130	121	111	132	135	121	106	105	100	85	85	81	86	66
6	67	54	60	47	46	32	37		85	128	146	146	146	165	170	164	146	126	146	120	103	119	117	87
7	74	63	54	42	28	26	28	42	90	105	130	130	134	143	148	146	137	145	122	110	128	107	91	78
8	55	64	60	40	32			41	87	120	146	157	170	170	165		158	146	146	133	103	90	85	72
9	54	57	60	37	37	32	32	42	88	131	146	144	149	164	175	164	162	164	166	145	138	96	77	52
10	43	50	54	56	38	26	N	37	86	127	141	157	162	170	174	164	164	170	162	145	146	141	104	87
11	84	66	63	64	45	28		A	88	120	138	138	135	160	170	161	156	156	120	87	105	90	66	64
12	63	64	72	51	37	A	A	42	88	141		130	145	167	174	162	158	156	141	131	138	89	83	63
13	63	66	66	31	A	A	34	51	90	120	103	105	121	151	157	146	156	145	110	86	90	81	62	52
14	52	54	58	44	24	N	N	42	81	111	135	117	105	130	120	111	108	121	79	86	87	85	66	
15	43	43	66	62	N	A		37	87	107	138	140	164	170	146	130	120	107	90	54	80	78	54	37
16	37									111	120	138	162	155	171	164	162	166	146	121	124	110	86	66
17	58	52	52	46	32	A	25	42	88	111									104	86	90	87	58	52
18	57	42	26	A	30	32		32	88	122	138	142	145	146	147	146	146	146	119	92	87	103	88	80
19	66	62	44	48		N	28	38	90	111	108	121	145	145	146	146	146	161	159	141	162	146	88	77
20	50	32	38	35	32	36	31	43	90	111	119	120	136	150	165	170	167	171	158	135	145	140	103	77
21	62	43	40	41	41	38	42	62	108	127	107	120	132	145	139	137	142	128	108	87	96	87	86	
22	50	42	42	52	46	29	26	43	88	107	133	141	135	151	157	159	165	164	31	145	146	144	120	108
23	108	88	85	63	51	34	31	42	103	122	135	145	136	141	148	157	156	145	138		143	130	86	87
24	86	60	37	49	54	38	37	53	103	111	120	138	132	127	138	131	128	121	136	137	130	110	87	88
25	84	73	60	51	42	54	86	67	87	136	150	145	138	128	133	140	142	146	161	187	178	171	164	145
26	135	88	84	53	30	34	31	73	88		146	146	138	141	144	141	146	134	145	146	168	177	187	168
27	123	87	78	83	50	37	32	61	108	134	142	146		145	157	171	186	176	156	162	166	170	163	161
28	142	128	110			66	50	66	121	121	137	139	151	160	160	164	165	170	164	164	176	170	N	177
29	157	103	77	60		29	37	52	120	128	120	126	137	140	136	140	142	143	160	164	178	198	190	165
30	145	127	90	79	63	37	38	64	108	107	133	146	144	N	142	137	136	142	144	145	170	172	164	146
31	118	104	87	84	54	46	54	80	128	138	142	147	157	143	145	145	142	146	137	141	164	156	122	94
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	28	25	22	22	28	30	30	29	30	29	29	30	29	30	30	31	30	31	31	30	28
MED	63	64	60	52	42	36	36	43	90	120	135	138	138	146	148	146	146	145	137	126	128	107	86	78
U Q	86	73	76	61	51	38	43	59	103	128	142	145	150	161	165	164	162	161	156	145	162	146	117	101
L Q	52	54	54	43	32	32	31	42	88	111	120	122	134	141	142	137	136	128	110	87	90	87	74	63

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G	36	66	48	58	52	44	41	40	31	26	G	24	G	G	G
2	G	G	G	G	G	G	G	G	G	G	G	43	44	G	43	42	G	35	32	31	24	G	G	
3	G	G	G	G	G	G	G	G	G	37	41	46	G	G	G	G	42	37	32	24	28	23	G	G
4	G	G	G	G	G	G	G	G	34	36	40	45	G	G	101	42	42	34	37	42	40	G	G	G
5	G	G	G	G	G	G	G	G	G	38	45	52	48	68	47	44	41	39	G	25	G	G	G	G
6	G	G	G	G	G	G	G		G	38	45	G	G	45	43	44	50	32	26	G	G	G	G	G
7	G	G	G	G	G	G	G	G	32	40	54	59	51	77	58	60	40	42	36	41	71	33	26	G
8	G	G	G	31	23			G	G	38	40	48	64	116	73		68	78	28	25	35	25	24	G
9	G	G	G	G	G	G	G	G	G	40	45	135	116	93	51	43	52	39	44	32	25	G	G	G
10	G	G	G	G	G	G	G	G	G	G	42	43	54	50	67	47	61	32	30	G	G	G	25	G
11	27	G	G	G	G	G		28	G	G	G	48	50	44	44	56	44	50	78	66	44	29	35	G
12	G	G	G	G	30	38	40	29	34	42		46	45	G	G	G	40	41	37	26	G	28	G	G
13	G	G	32	30	23	28	25	G	34	39	44	G	48	62	51	51	45	34	32	28	G	32	24	24
14	G	G	G	G	G	G	G	G	31	G	45	46	58	50	46	47	50	55	84	59	G	G	G	
15	G	G	33	38	G	27		G	34	G	45	47	56	62	56	82	44	44	43	30	G	30	24	G
16	G									G	45	51	56	67	50	63	58	48	41	43	32	G	28	G
17	G	G	G	G	G	30	G	22	35	42									38	33	G	G	25	28
18	G	G	G	26	G	G		G	35	41	50	52	64	62	44	43	G	G	29	28	G	24	24	G
19	G	G	G	G		G	G	G	G	G	G	G	64	G	G	43	45	33	25	G	G	G	22	26	
20	G	24	G	G	G	G	G	G	G	G	G	49	66	48	46	43	39	G	G	G	33	33	25	26
21	G	G	G	G	24	29	24	G	G	38	42	50	50	51	48	61	G	40	47	30	32	32	G	
22	G	G	G	G	G	G	G	G	31	38	41	43	52	54	45	42	45	43	45	40	G	36	28	24
23	G	G	G	G	G	G	G	24	33	38	G	51	45	G	65	45	39	36	40		28	24	G	G
24	G	G	G	G	G	G	G	G	G	38	40	43	52	G	55	G	41	40	32	29	G	G	G	G
25	G	G	G	G	G	G	G	G	G	42	44	54	55	64	85	66	G	44	32	G	G	G	G	G
26	G	G	G	G	G	G	G	G	49		40	G	G	G	G	G	55	40	38	40	40	28	24	G
27	G	G	G	G	G	G	G	G	33	72	51	49	50	69	56	48	44	50	37	86	34	G	G	G
28	G	29	33			G	G	G	30	38	44	47	78	56	48	51	44	37	G	25	G	G	G	G
29	G	G	G	G		G	G	G	G	38	42	51	60	81	88	61	59	48	44	25	G	G	G	G
30	G	G	24	G	G	G	G	G	32	39	42	G	53	G	G	50	44	42	40	N	24	30	G	G
31	24	G	G	G	G	G	G	G	36	38	42	G	G	G	G	45	40	G	G	G	28	39	32	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	29	27	29	26	29	30	30	29	30	30	30	30	29	30	30	31	29	31	31	31	28
MED	G	G	G	G	G	G	G	G	16	38	42	47	52	50	48	45	44	40	36	28	24	G	G	G
U Q	G	G	G	G	G	G	G	G	34	39	45	51	58	64	56	53	50	44	41	40	32	30	25	G
L Q	G	G	G	G	G	G	G	G	G	G	40	43	45	G	43	42	40	34	28	12	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

JAN. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	66	15	15	17	17	22	23	26	23	16	15	15	14	15	15	15	15	15
2	15	14	15	15	15	15	15	15	15	15	16	16	23	22	22	16	14	14	15	15	15	15	15	
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7	15	15	15	15	15	15	15	15	15	16	16	20	22	22	20	17	15	15	15	14	14	14	15	15
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16	16									15	17	22	20	26	21	20	14	14	15	15	15	15	15	15
17	15	15	15	15	15	15	15	15	14	15									14	14	15	15	15	15
18	15	15	15	15	15	14		15	14	15	23	39	29	28	27	24	16	15	15	15	15	15	15	15
19	15	15	15	15		17	15	15	27	16	18	23	26	26	26	18	21	16	14	15	15	15	15	15
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28	15	15	14			15	15	15	15	18	18	38	27	28	26	23	20	16	21	16	15	15	15	15
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31	15	15	15	14	15	15	15	15	15	17	24	48	63	50	36	26	20	14	20	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	31	30	30	29	27	29	26	29	30	30	29	30	30	30	30	29	30	30	31	30	31	31	31	28
MED	15	15	15	15	15	15	15	15	15	16	20	23	24	26	25	22	20	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	15	16	17	21	26	27	28	27	25	21	16	15	15	15	15	15	15
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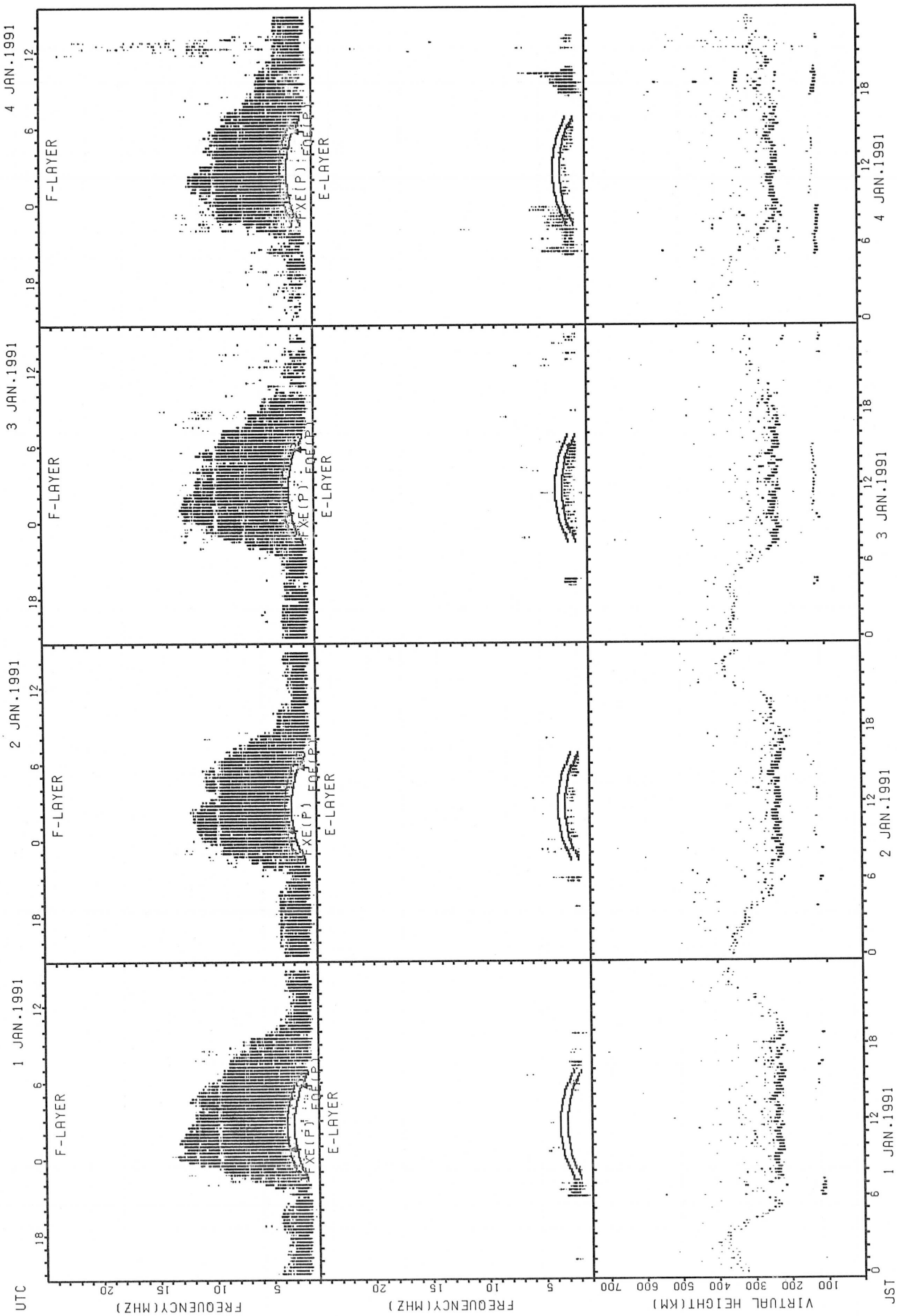
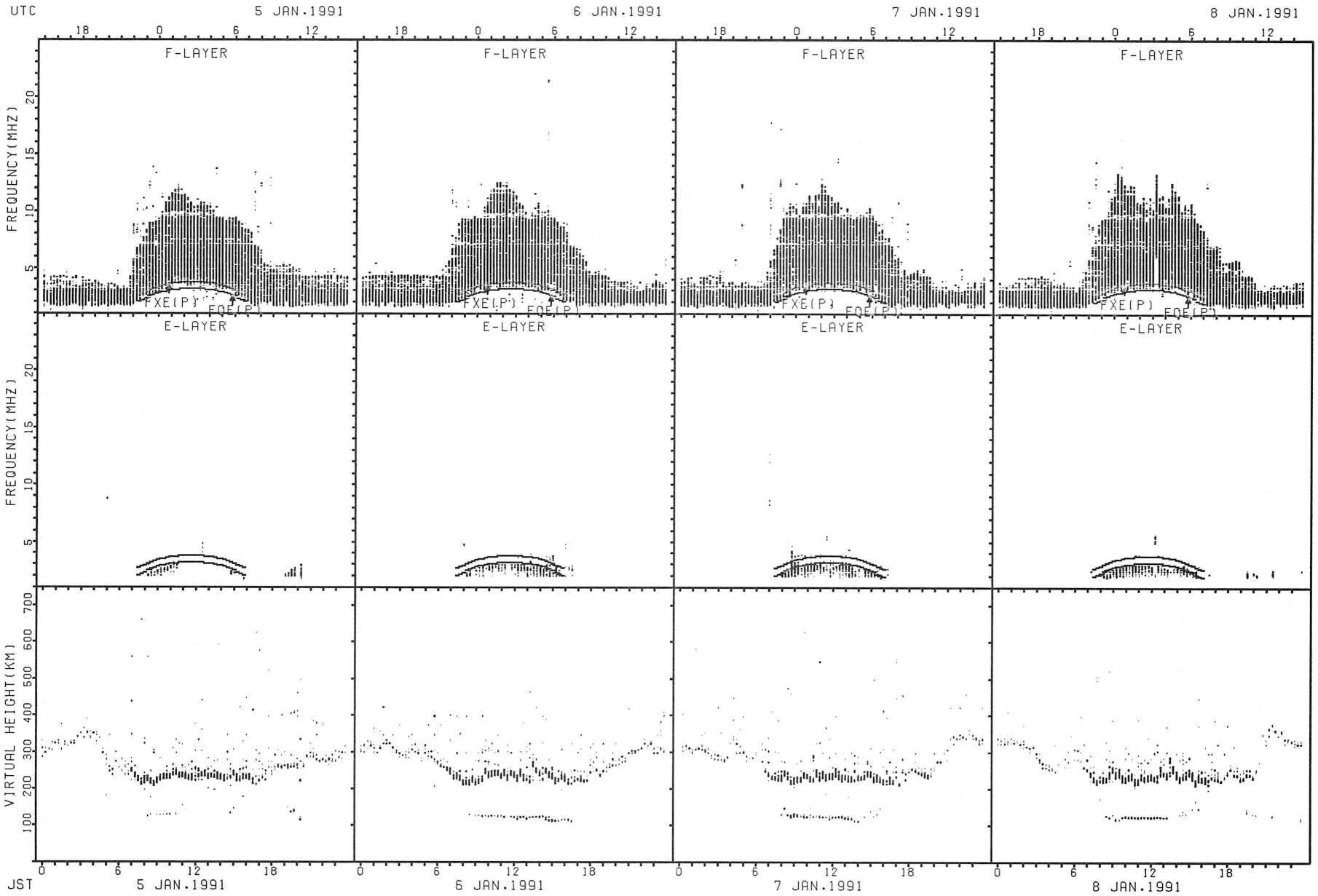
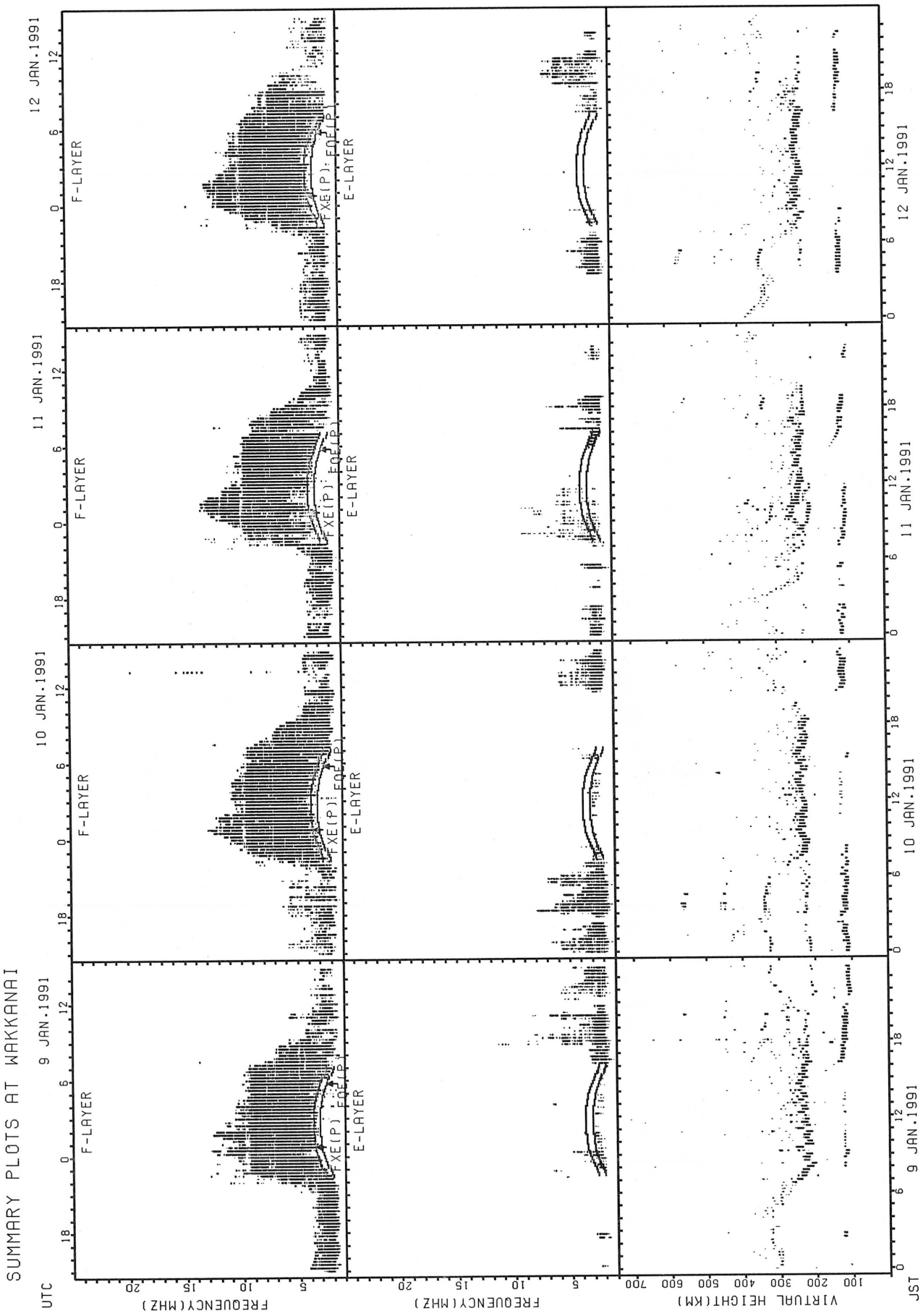
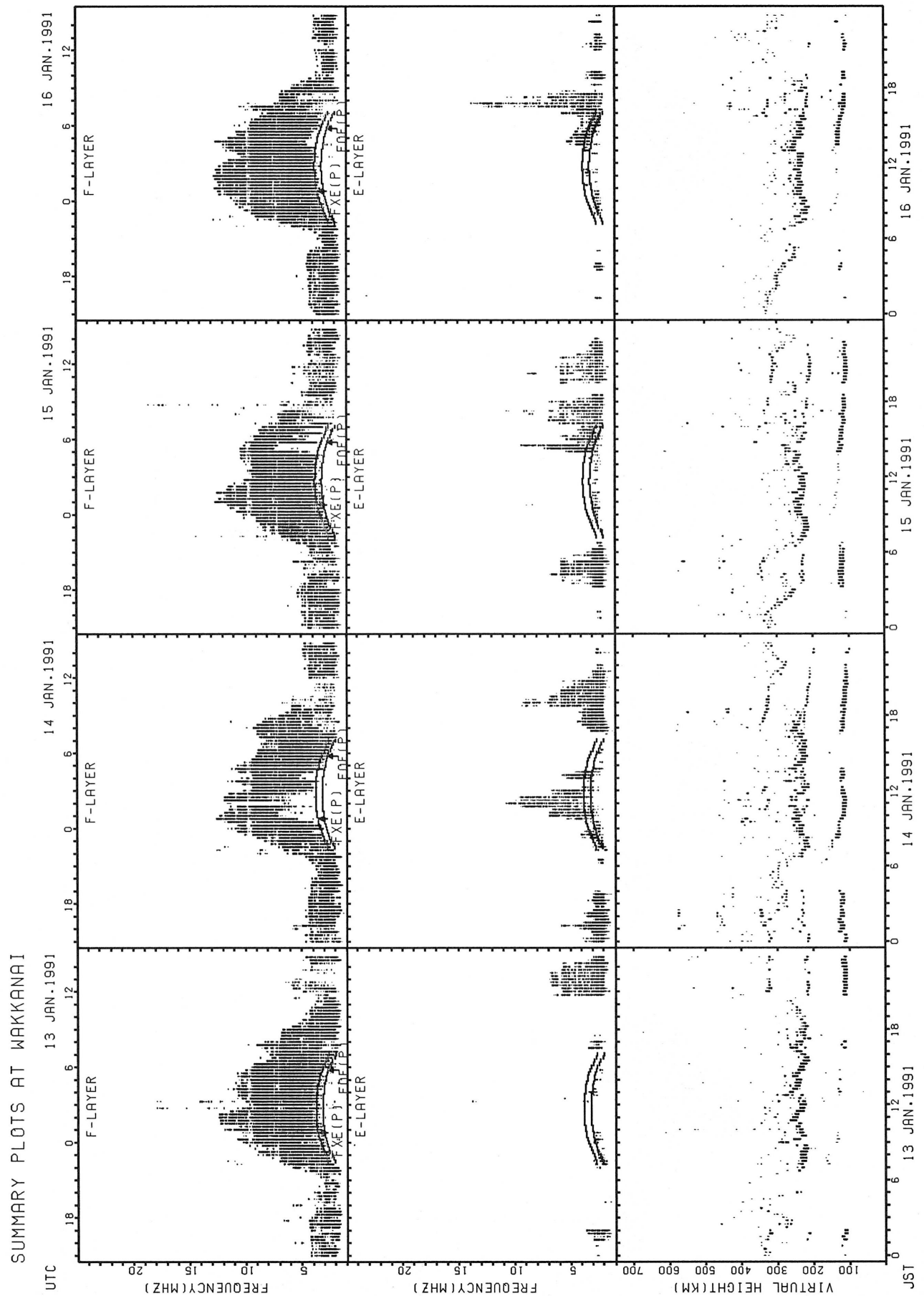

SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 JAN.1991
2 JAN.1991
3 JAN.1991
4 JAN.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI

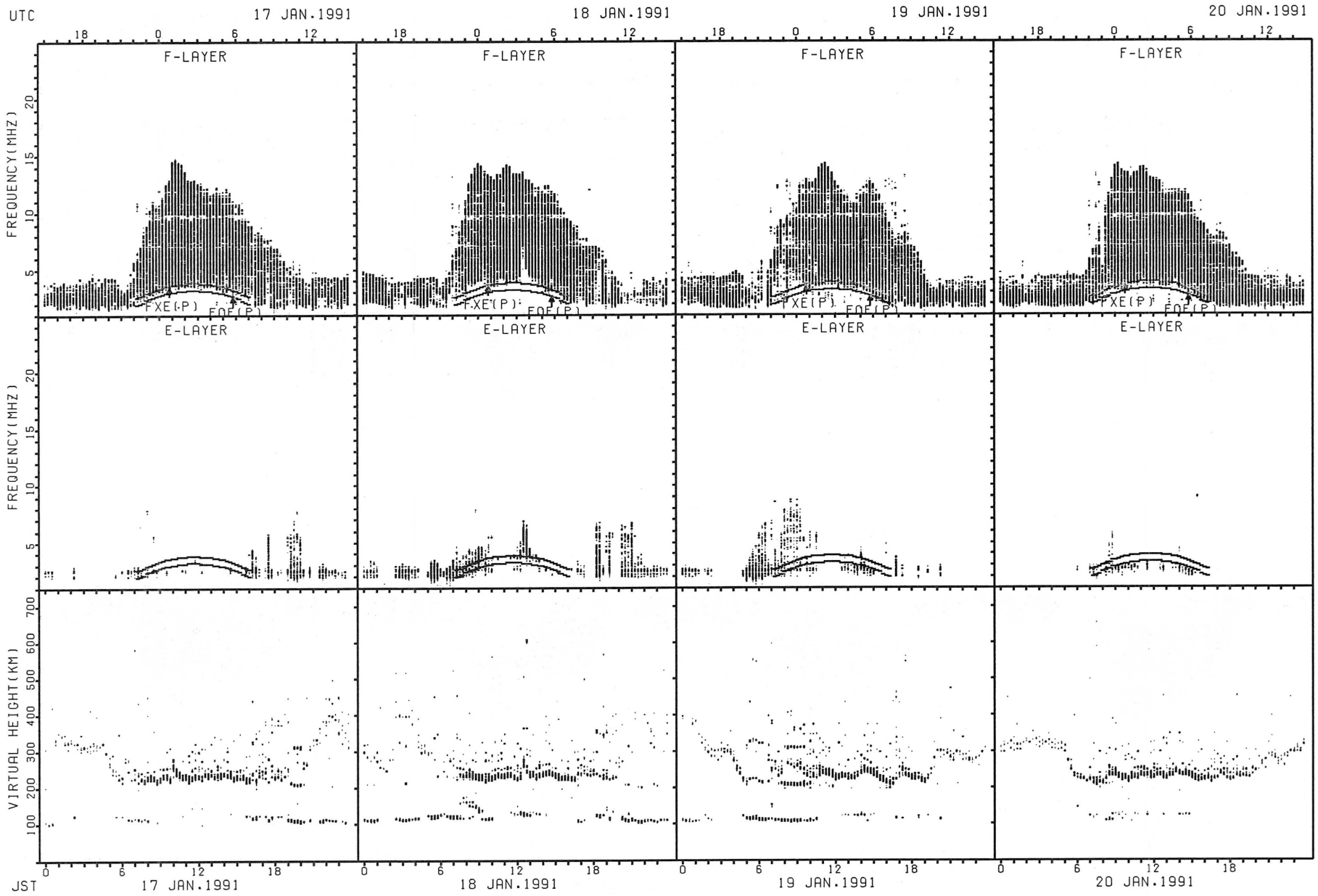


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

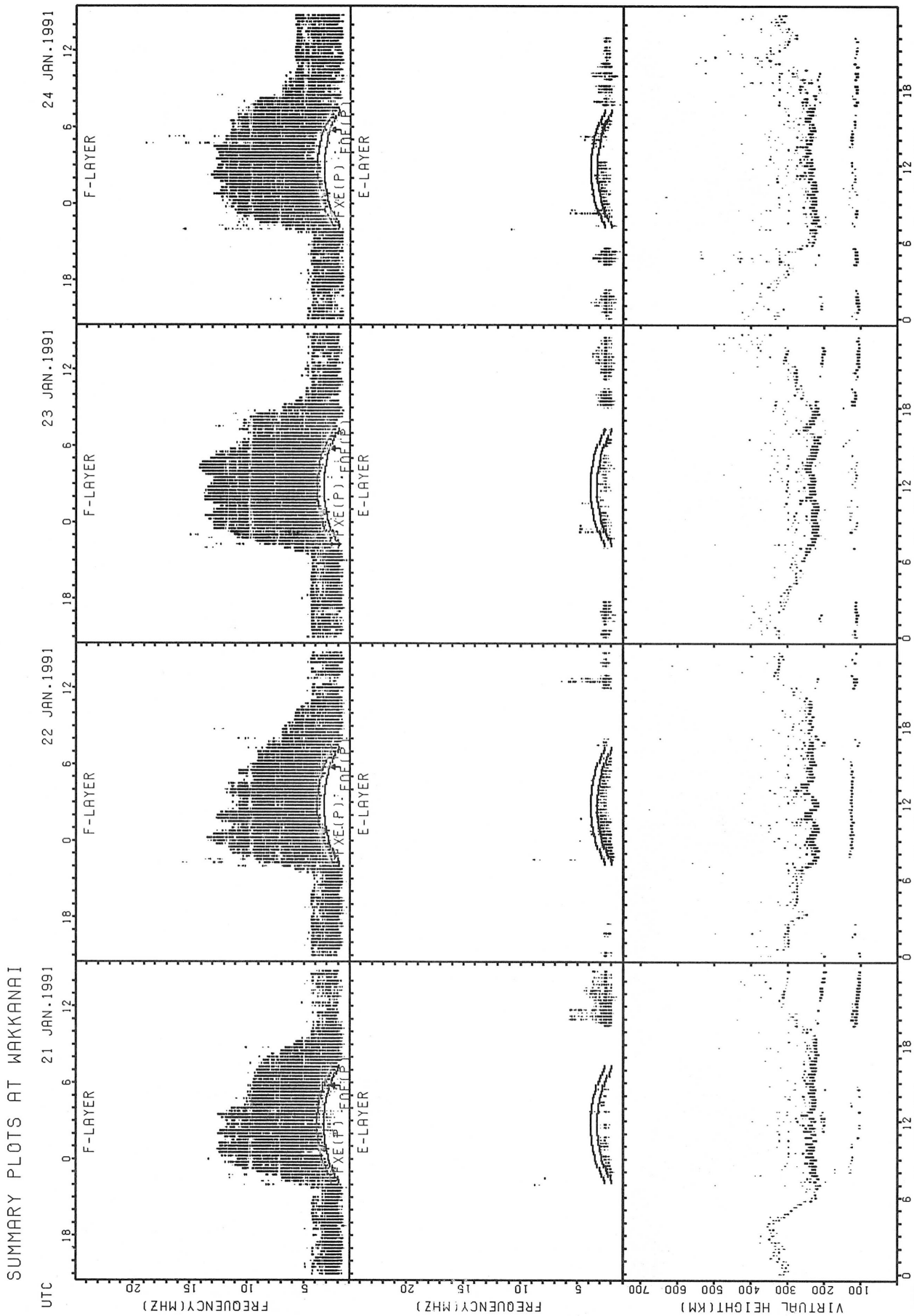

SUMMARY PLOTS AT WAKKANAI
9 JAN.1991
10 JAN.1991
11 JAN.1991
12 JAN.1991
UTC
JST
F-LAYER
E-LAYER
FXE(P); FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

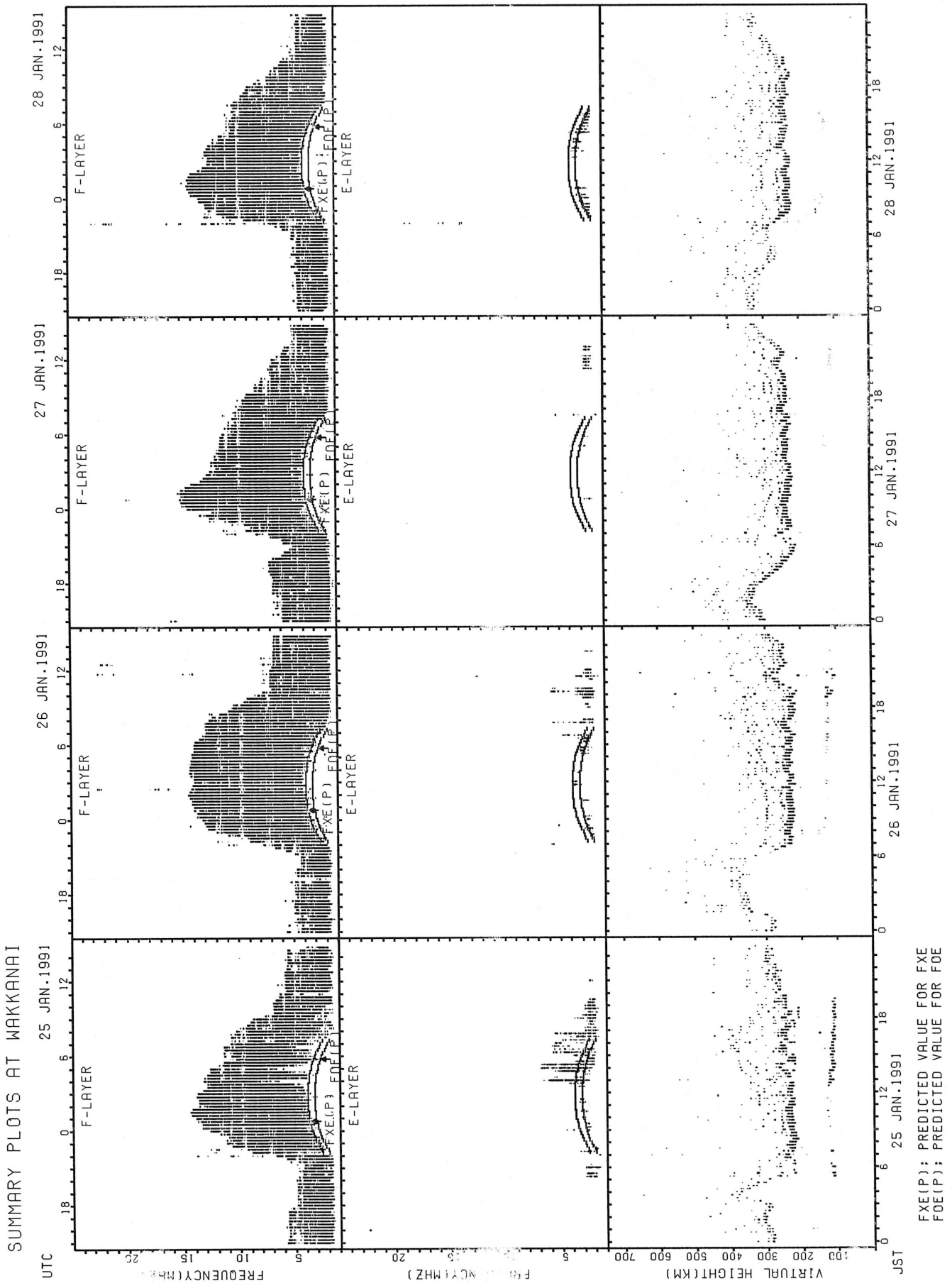

SUMMARY PLOTS AT WAKKANAI
UTC
JST
13 JAN.1991
14 JAN.1991
15 JAN.1991
16 JAN.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI

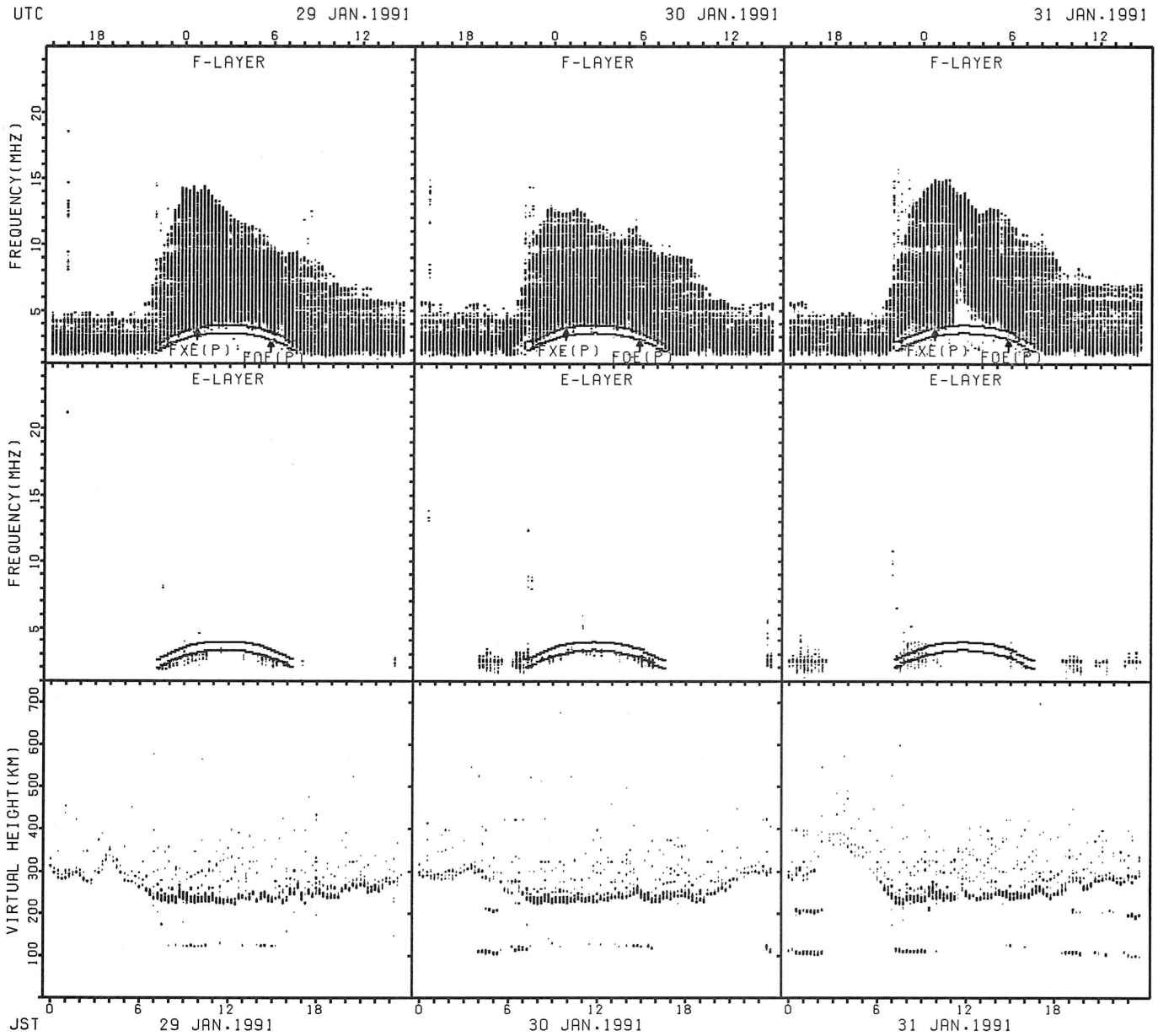


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

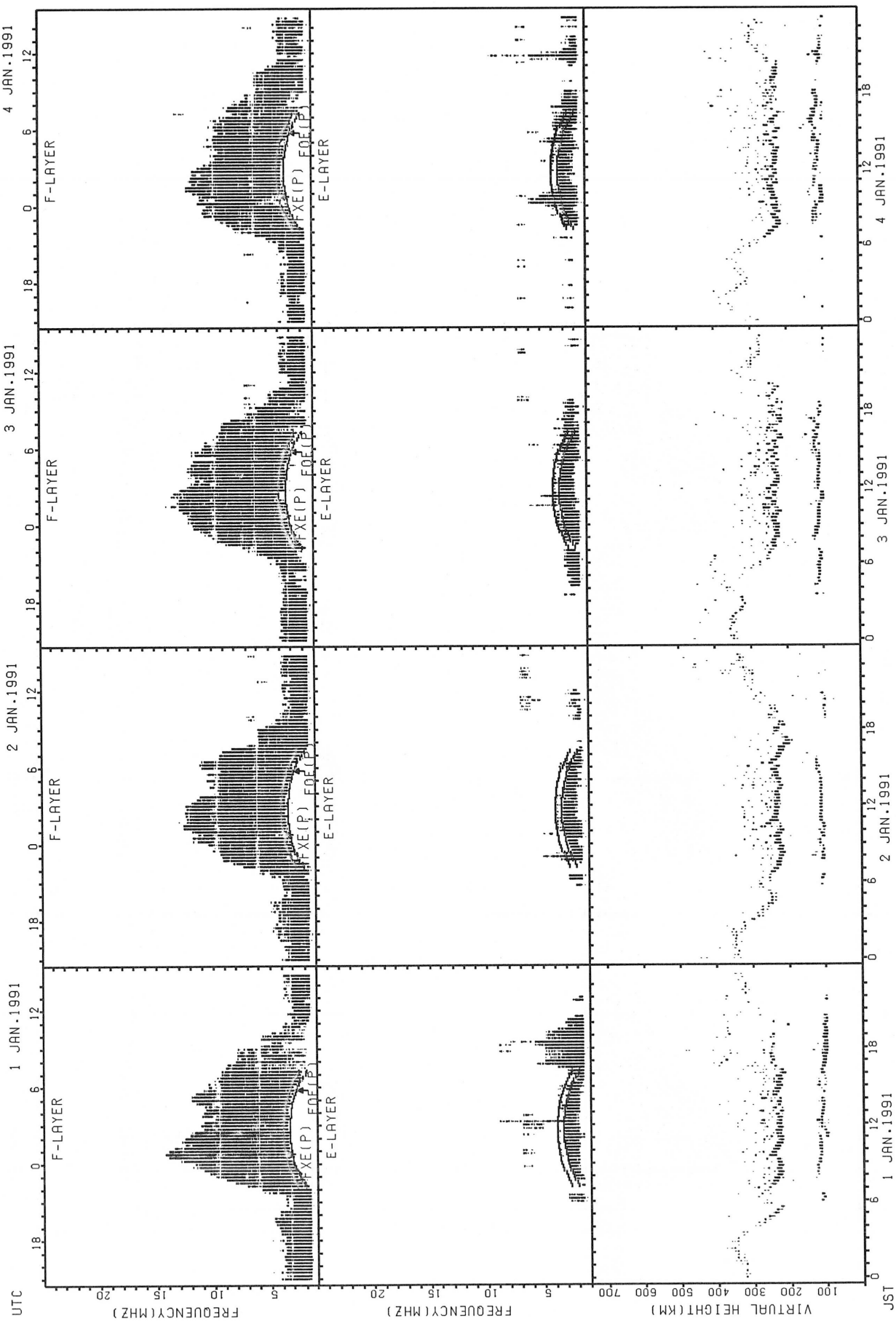

SUMMARY PLOTS AT WAKKANAI
UTC
21 JAN.1991
22 JAN.1991
23 JAN.1991
24 JAN.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

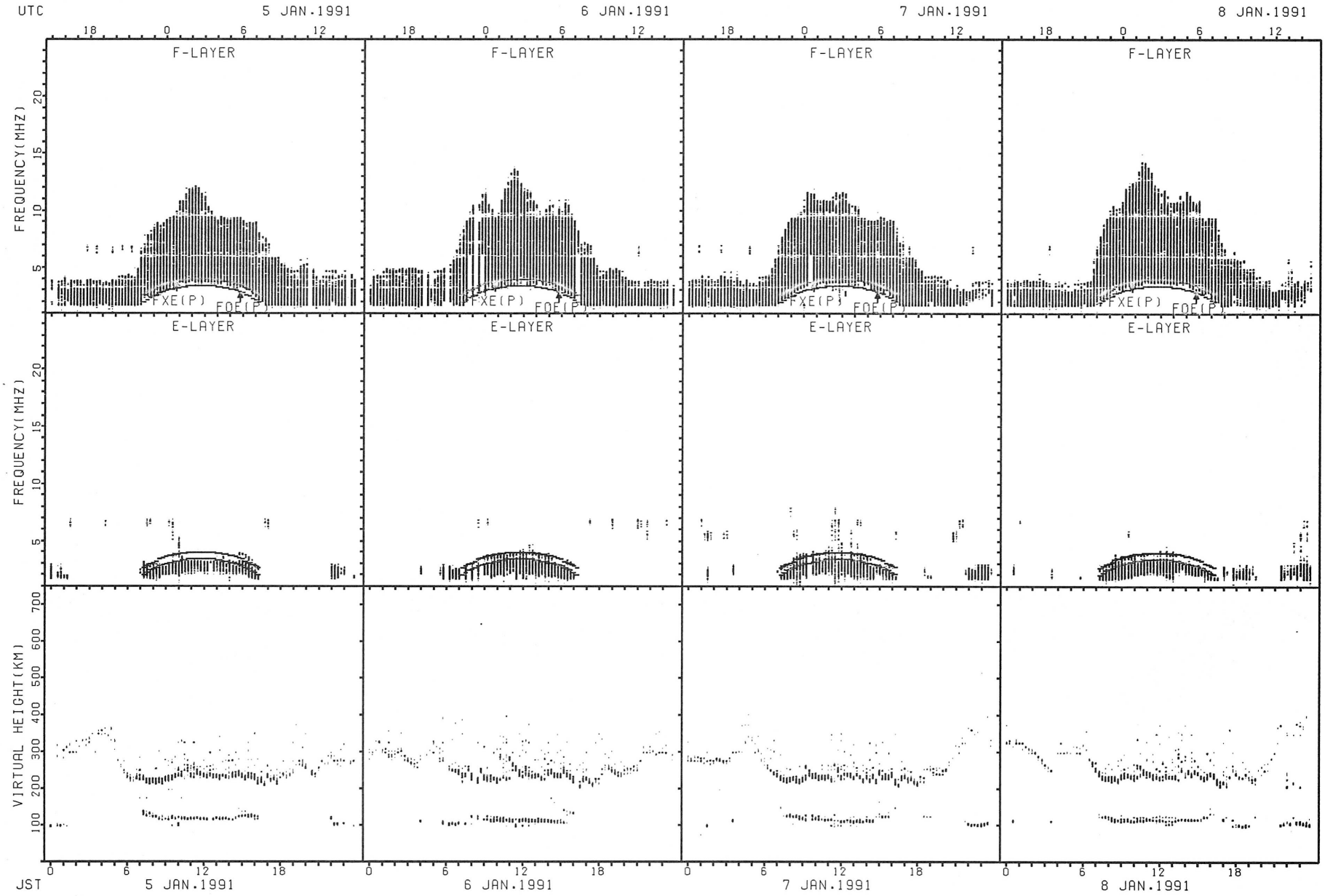
SUMMARY PLOTS AT WAKKANAI



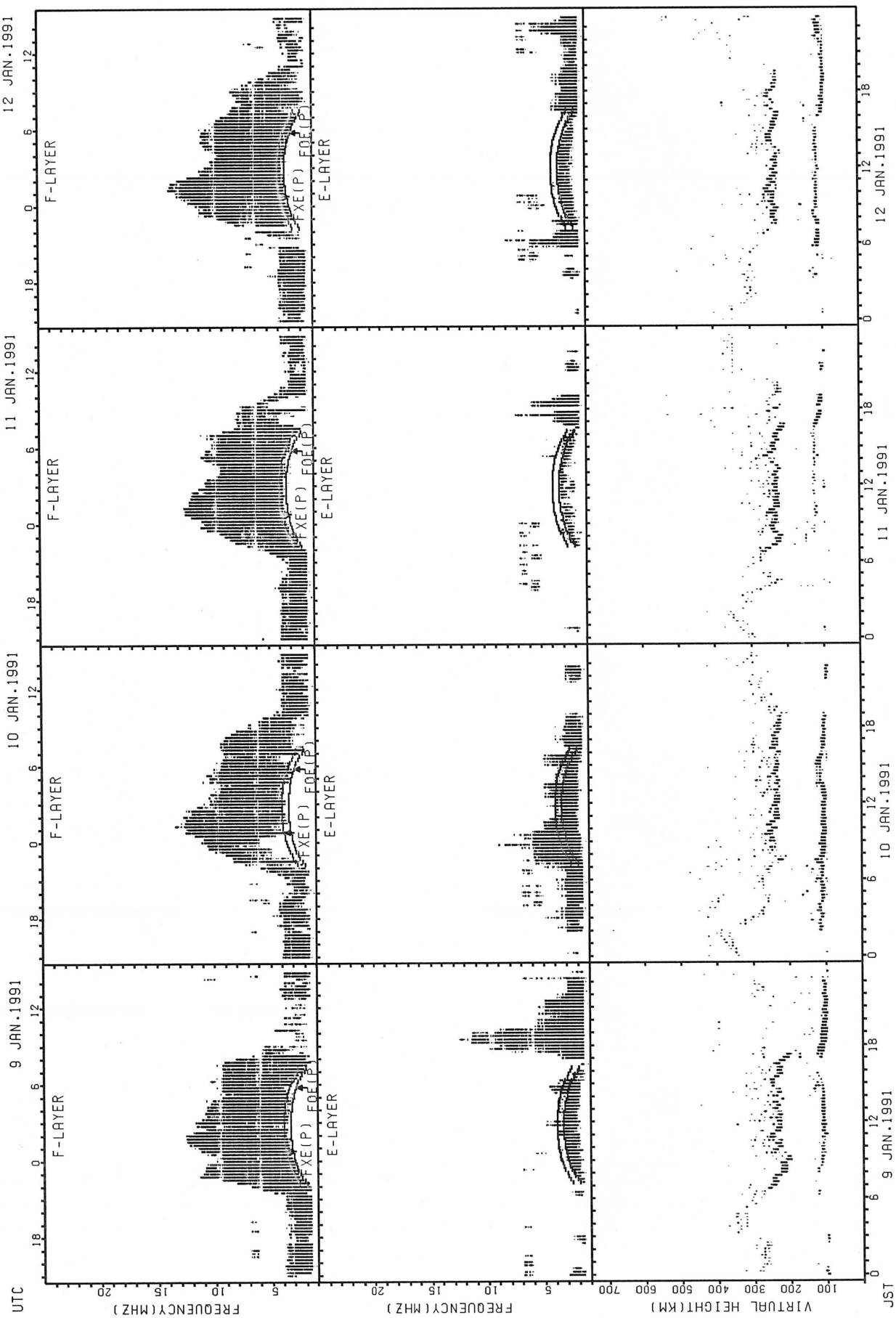
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

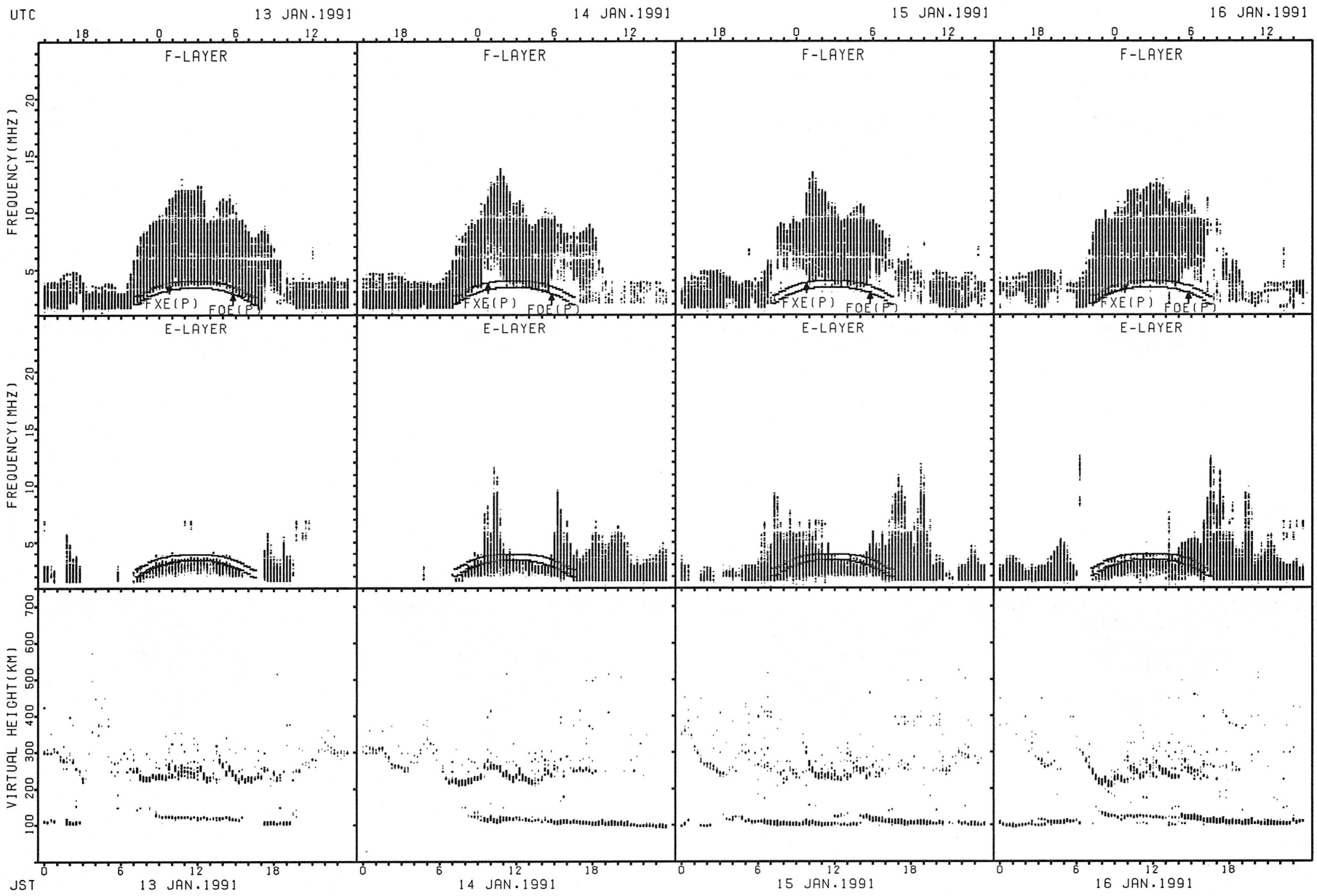

SUMMARY PLOTS AT AKITA
UTC
1 JAN.1991
2 JAN.1991
3 JAN.1991
4 JAN.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



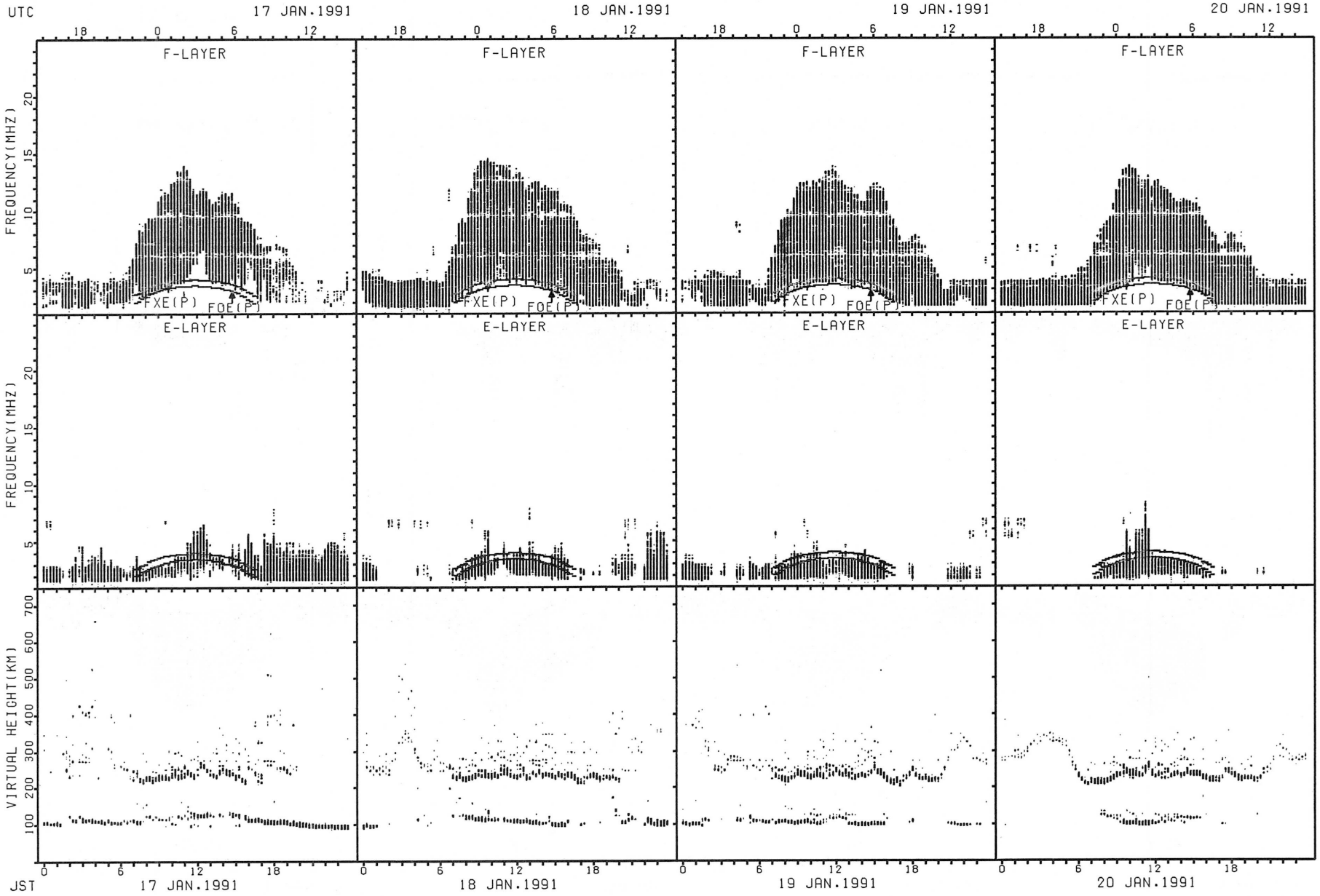
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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



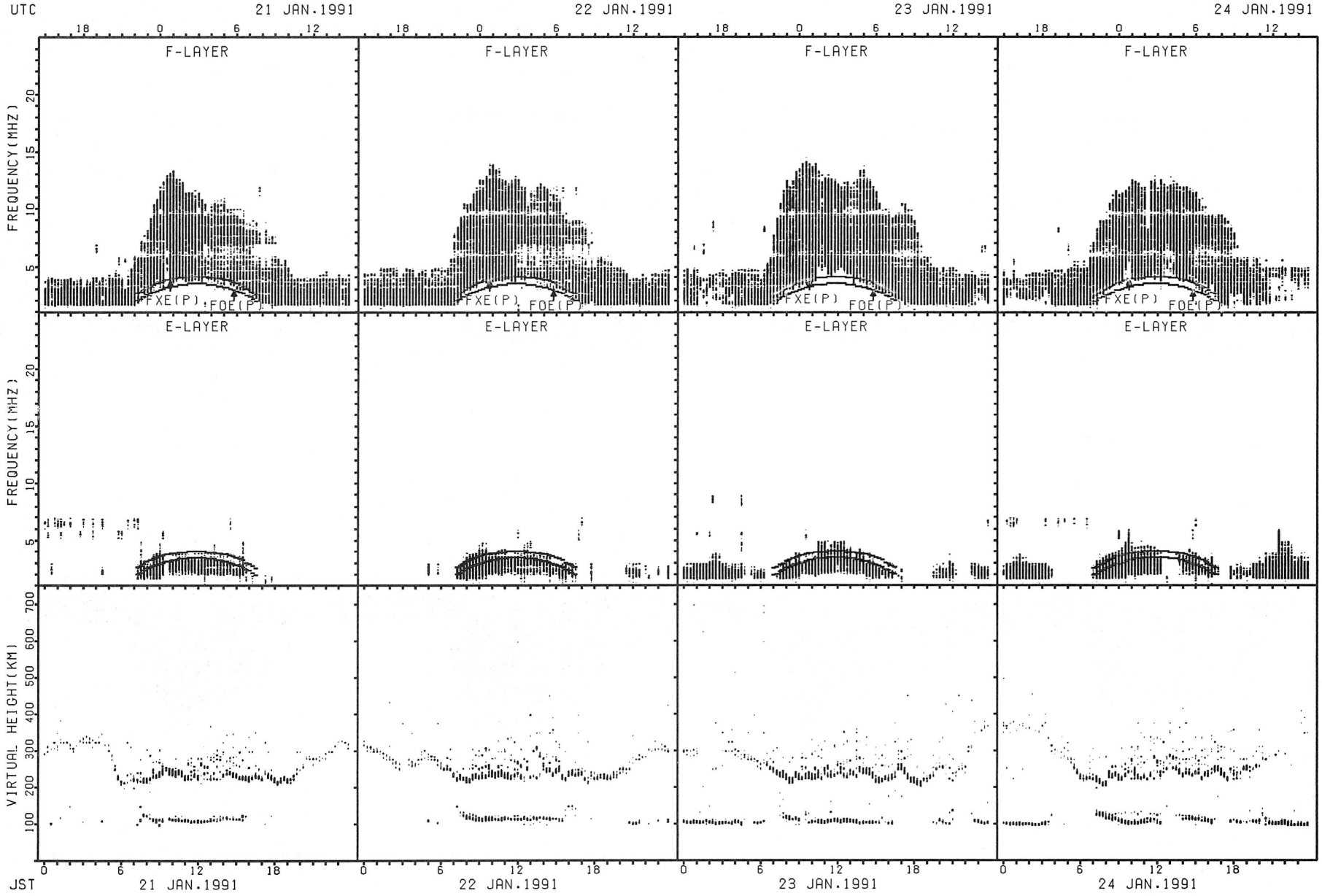
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

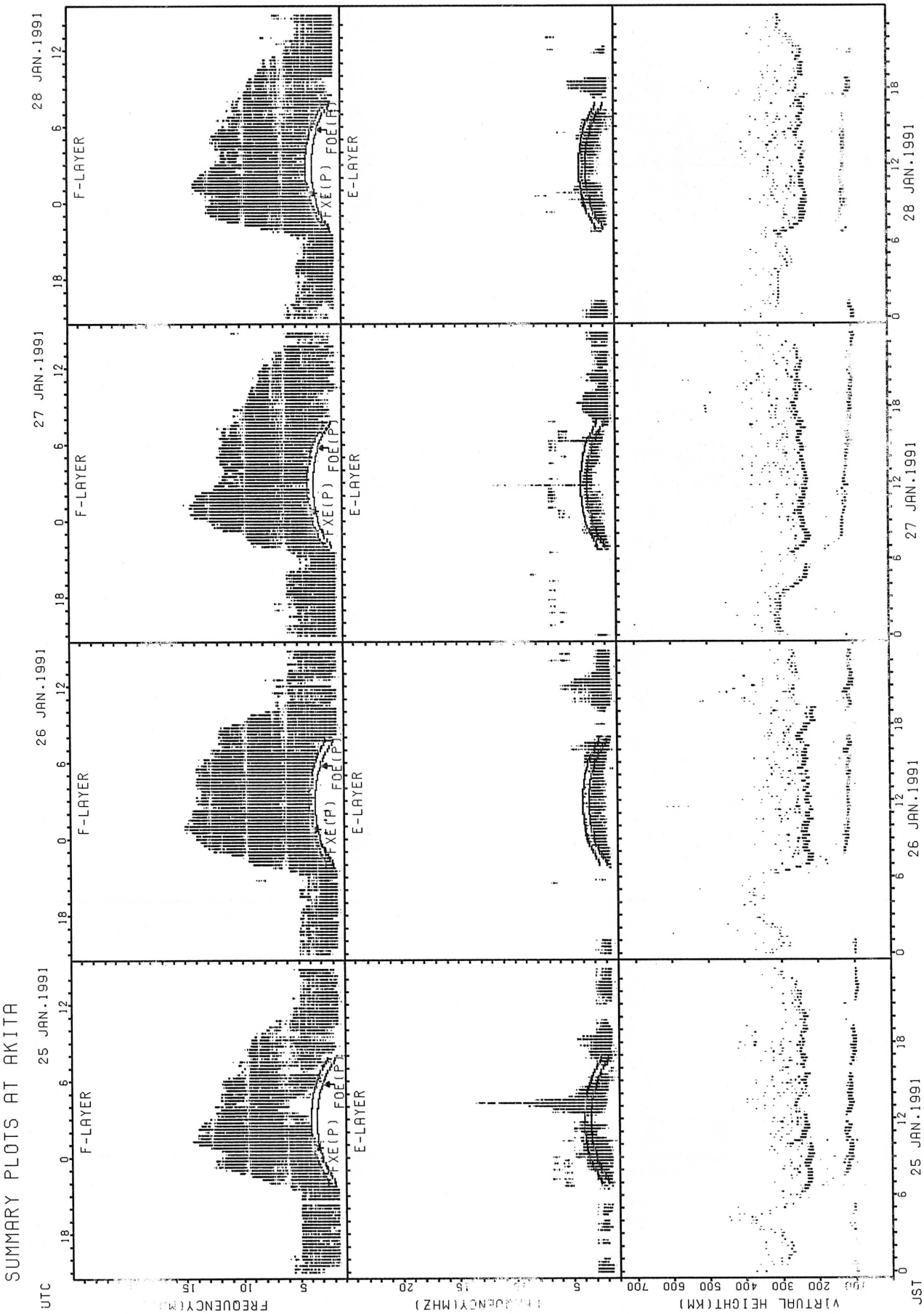


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

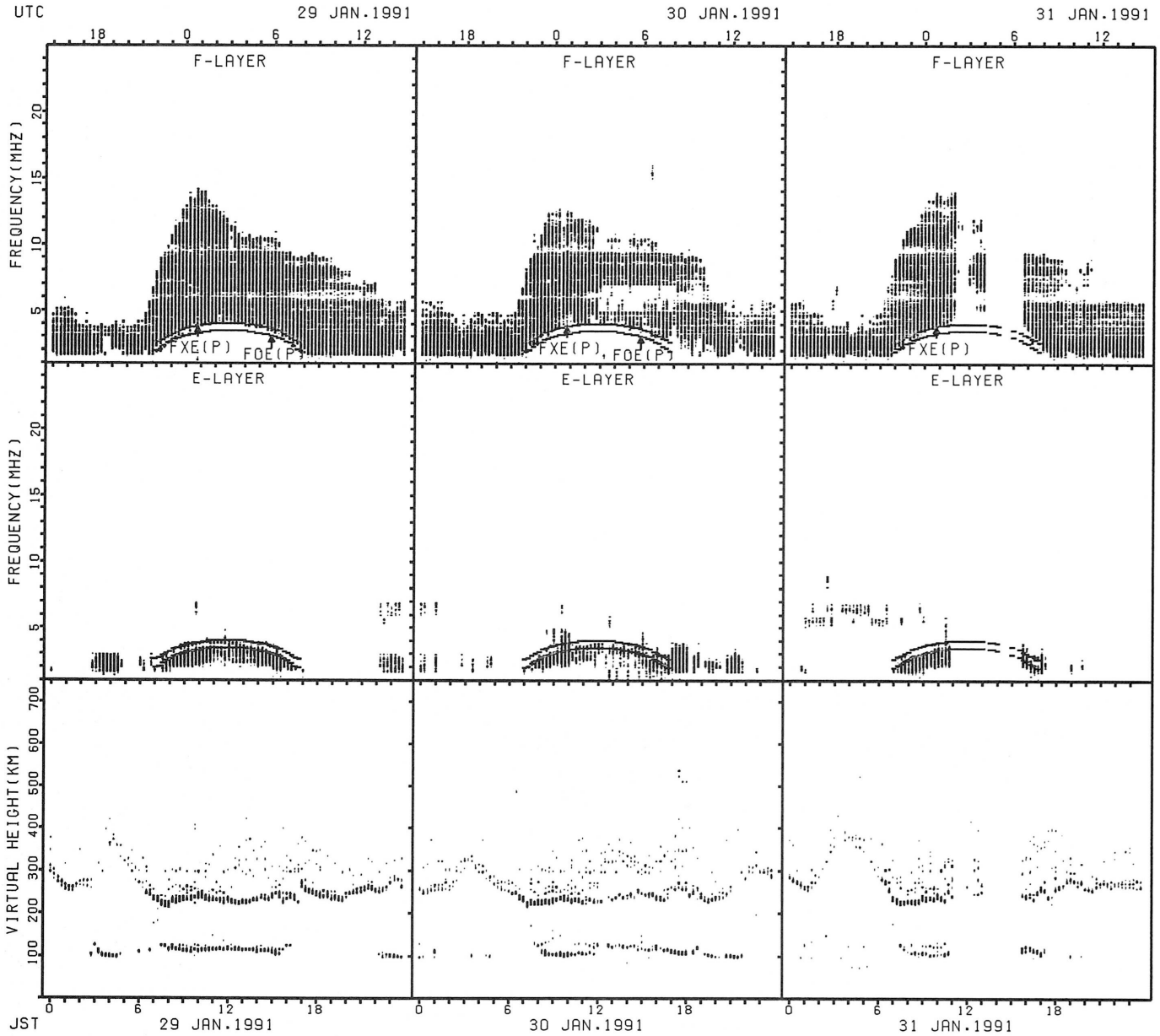
SUMMARY PLOTS AT AKITA



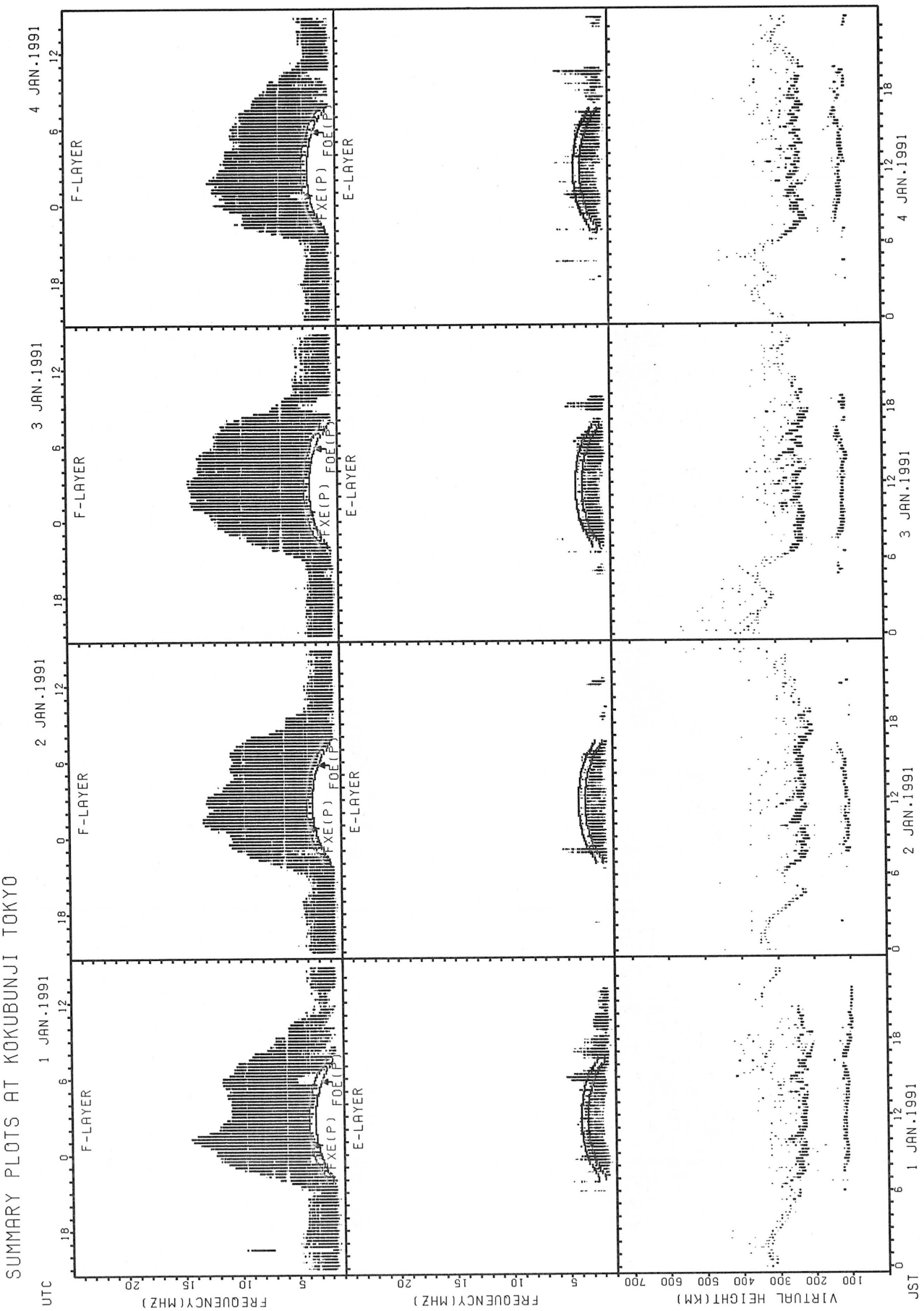
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

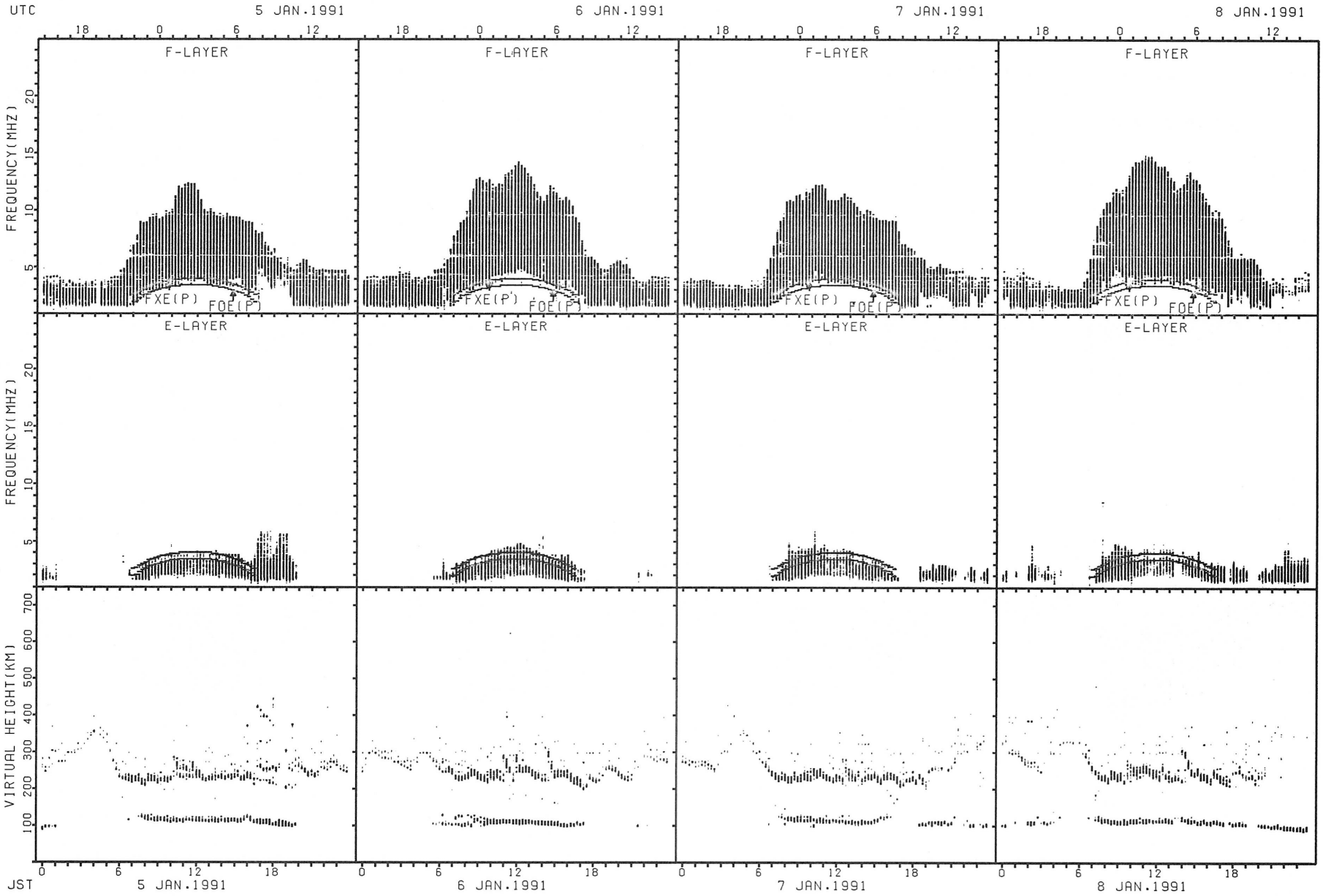
SUMMARY PLOTS AT AKITA



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

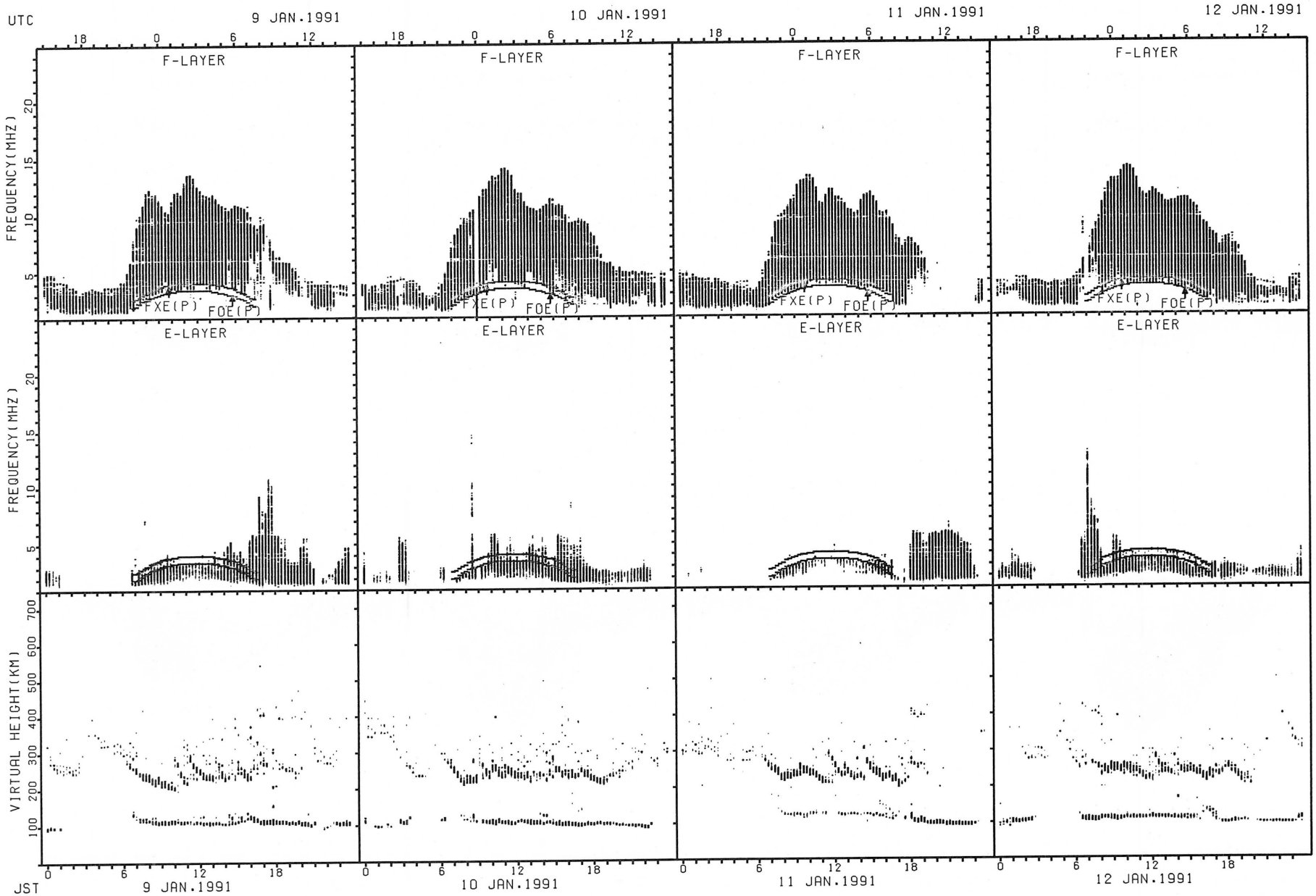

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 JAN.1991
2 JAN.1991
3 JAN.1991
4 JAN.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

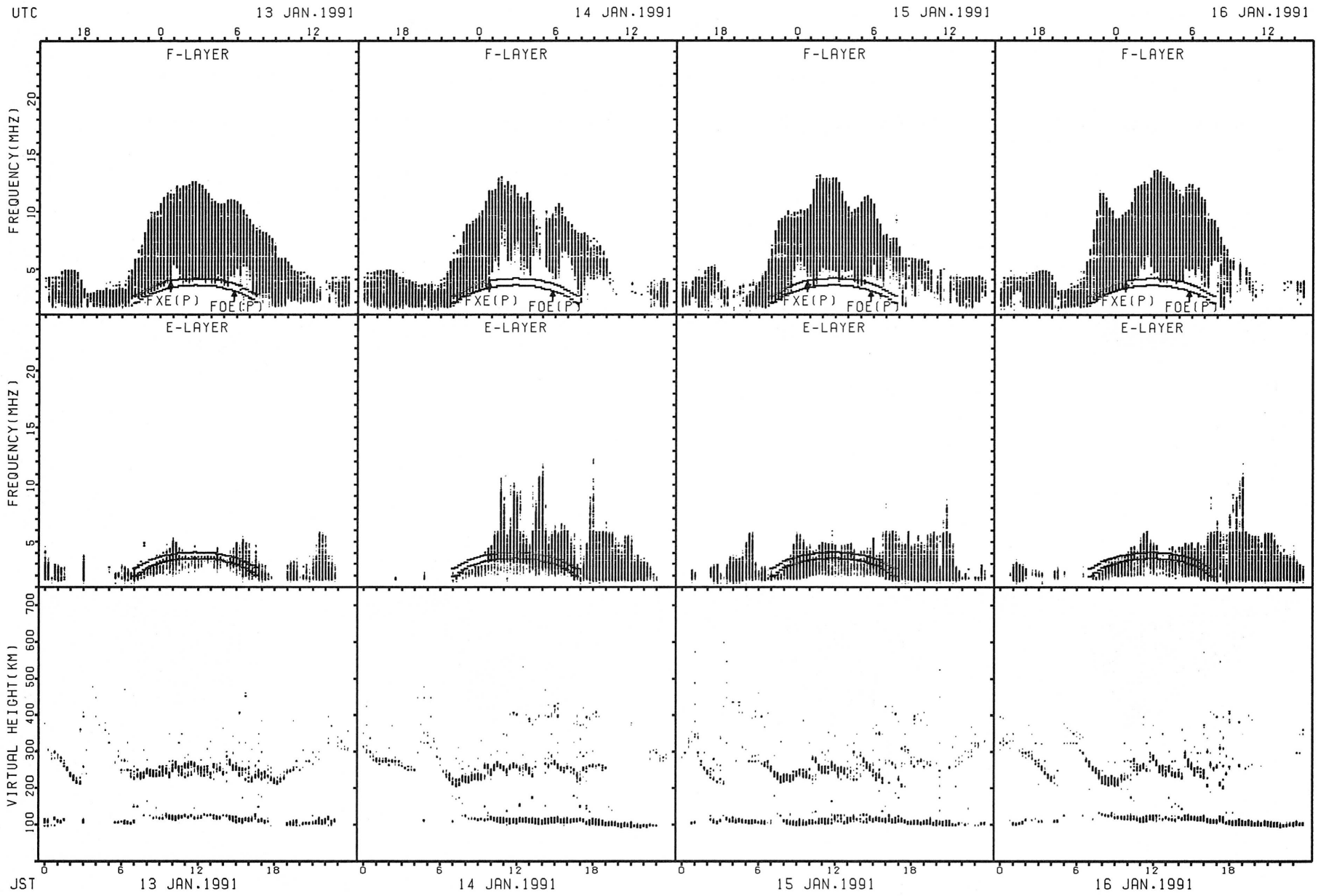


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

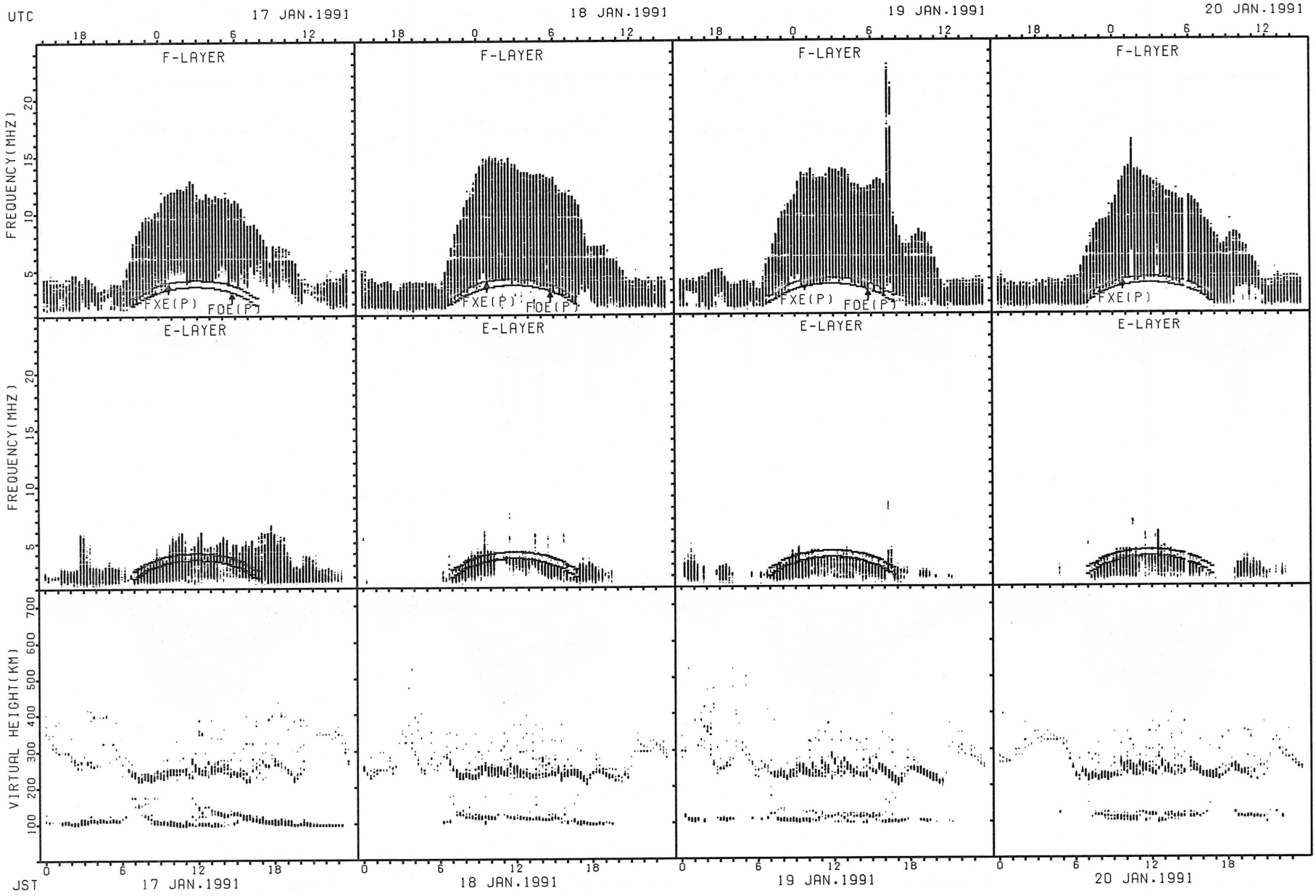
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

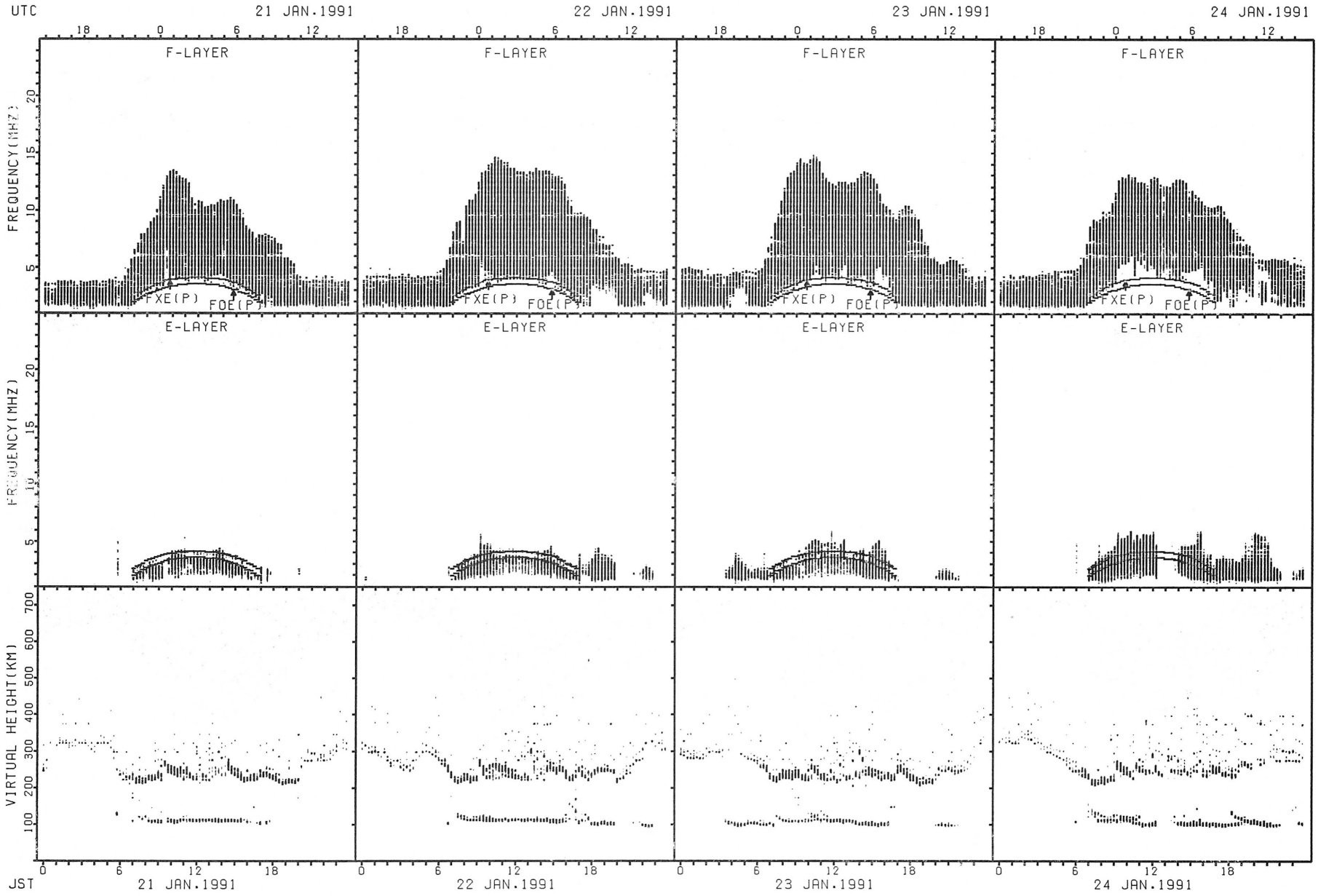

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
13 JAN.1991
14 JAN.1991
15 JAN.1991
16 JAN.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO

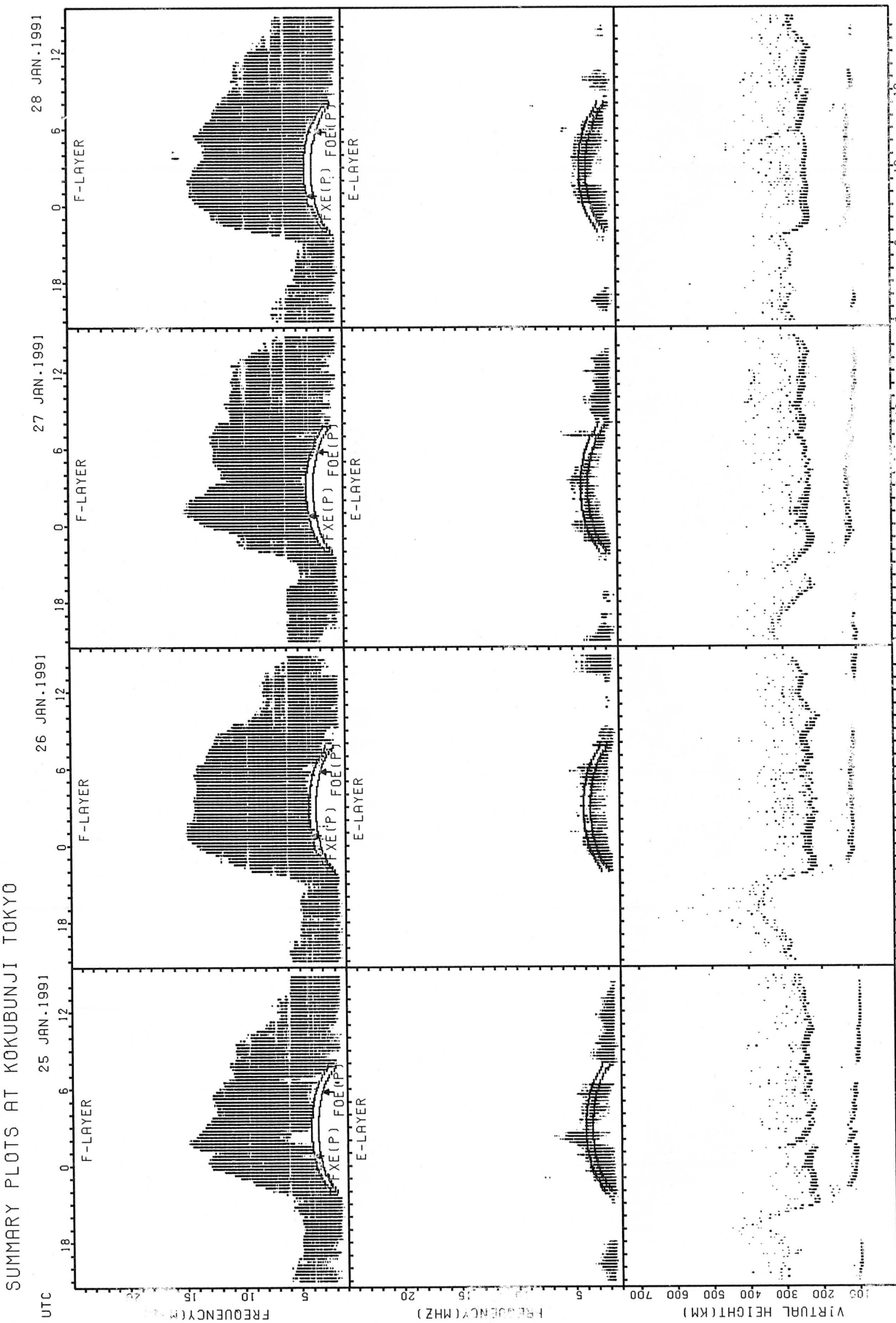


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

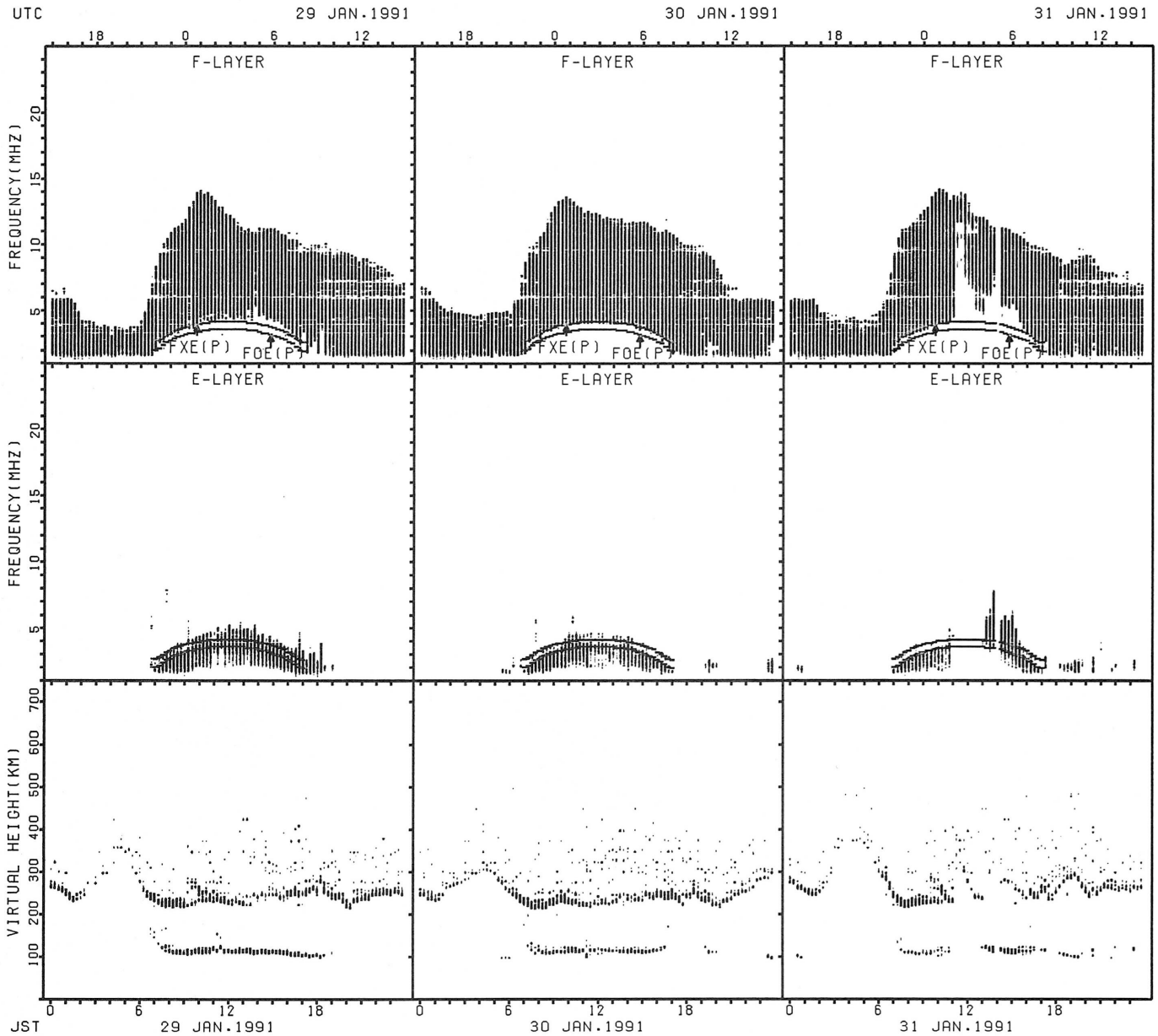
SUMMARY PLOTS AT KOKUBUNJI TOKYO



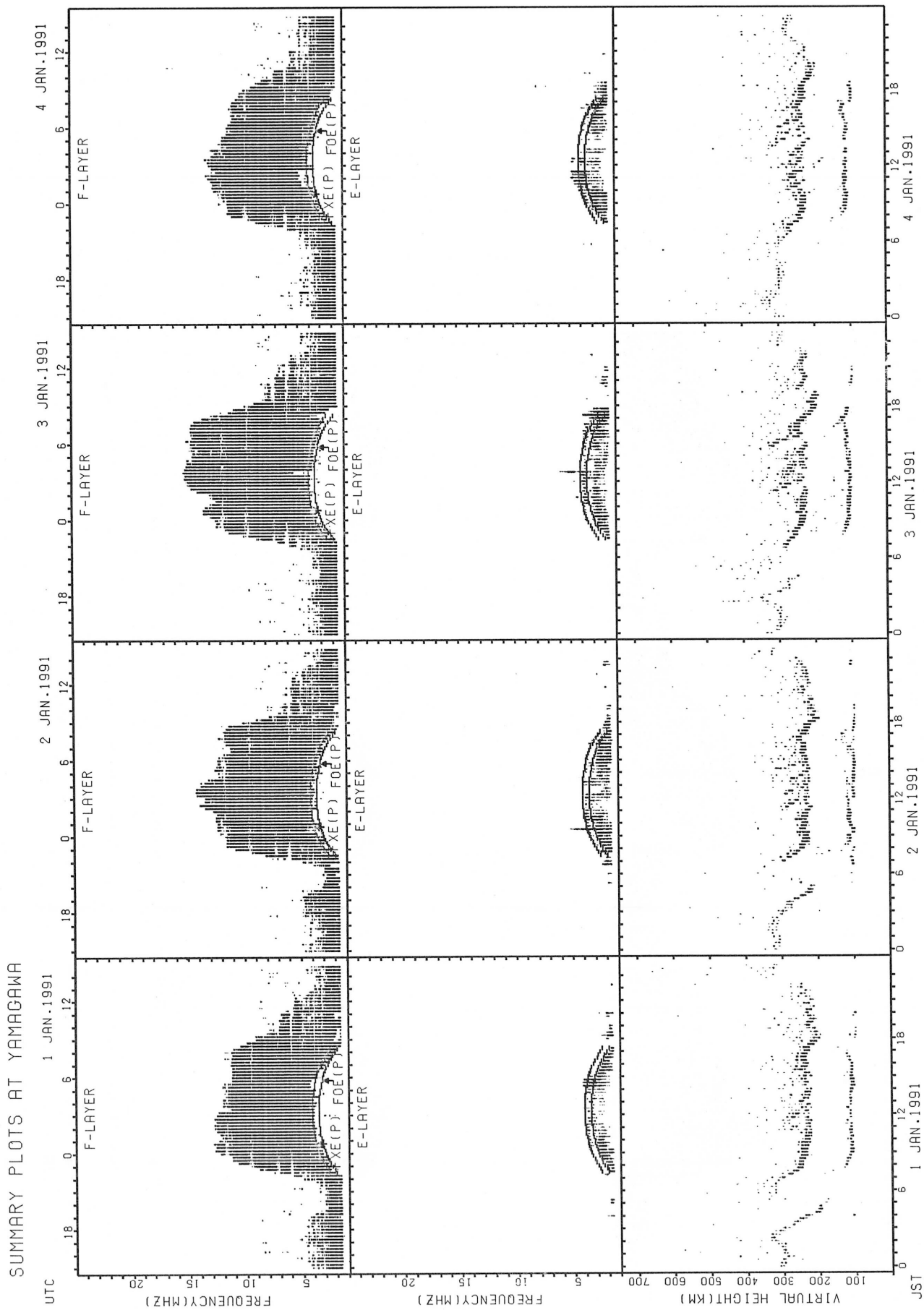
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

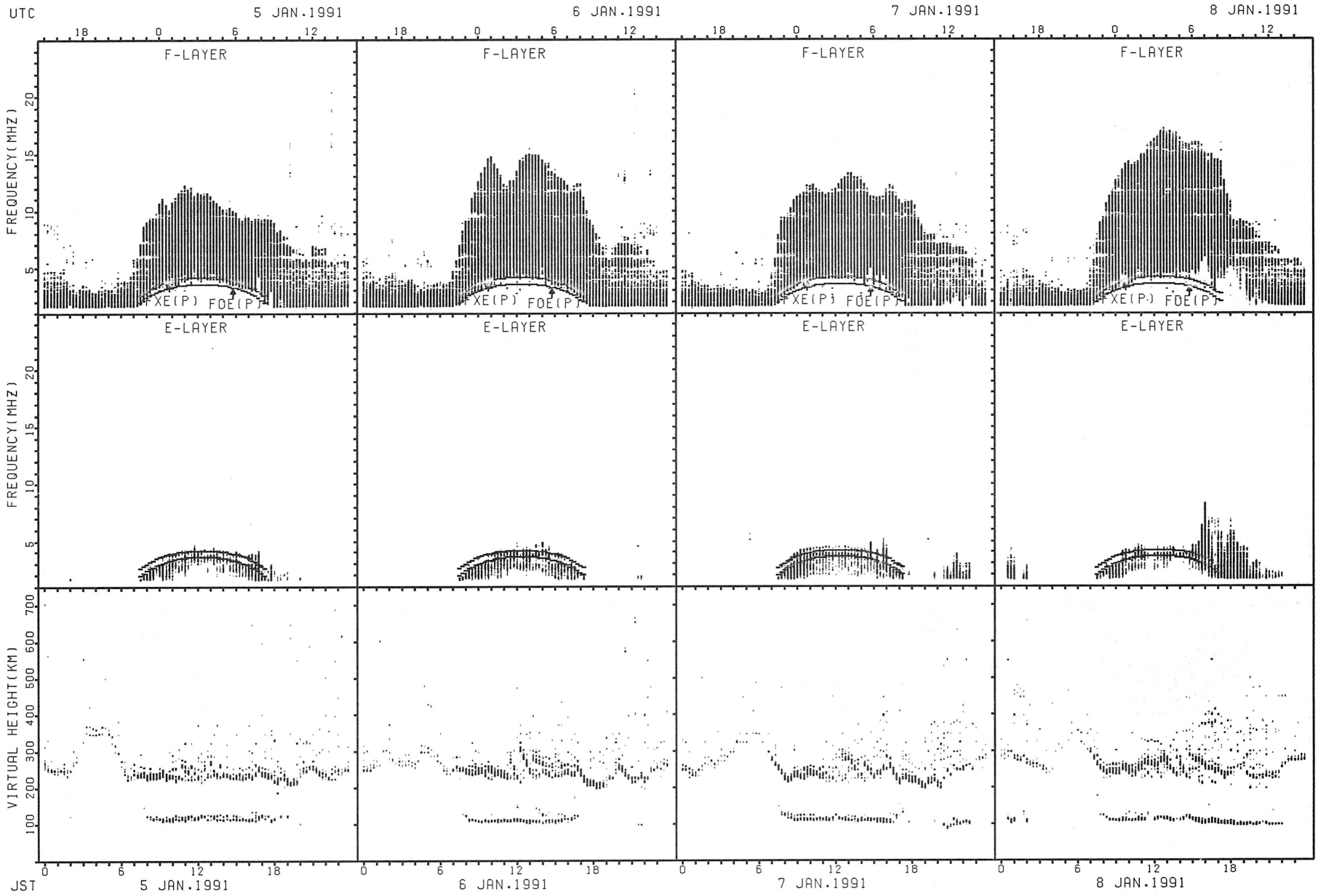
SUMMARY PLOTS AT KOKUBUNJI TOKYO



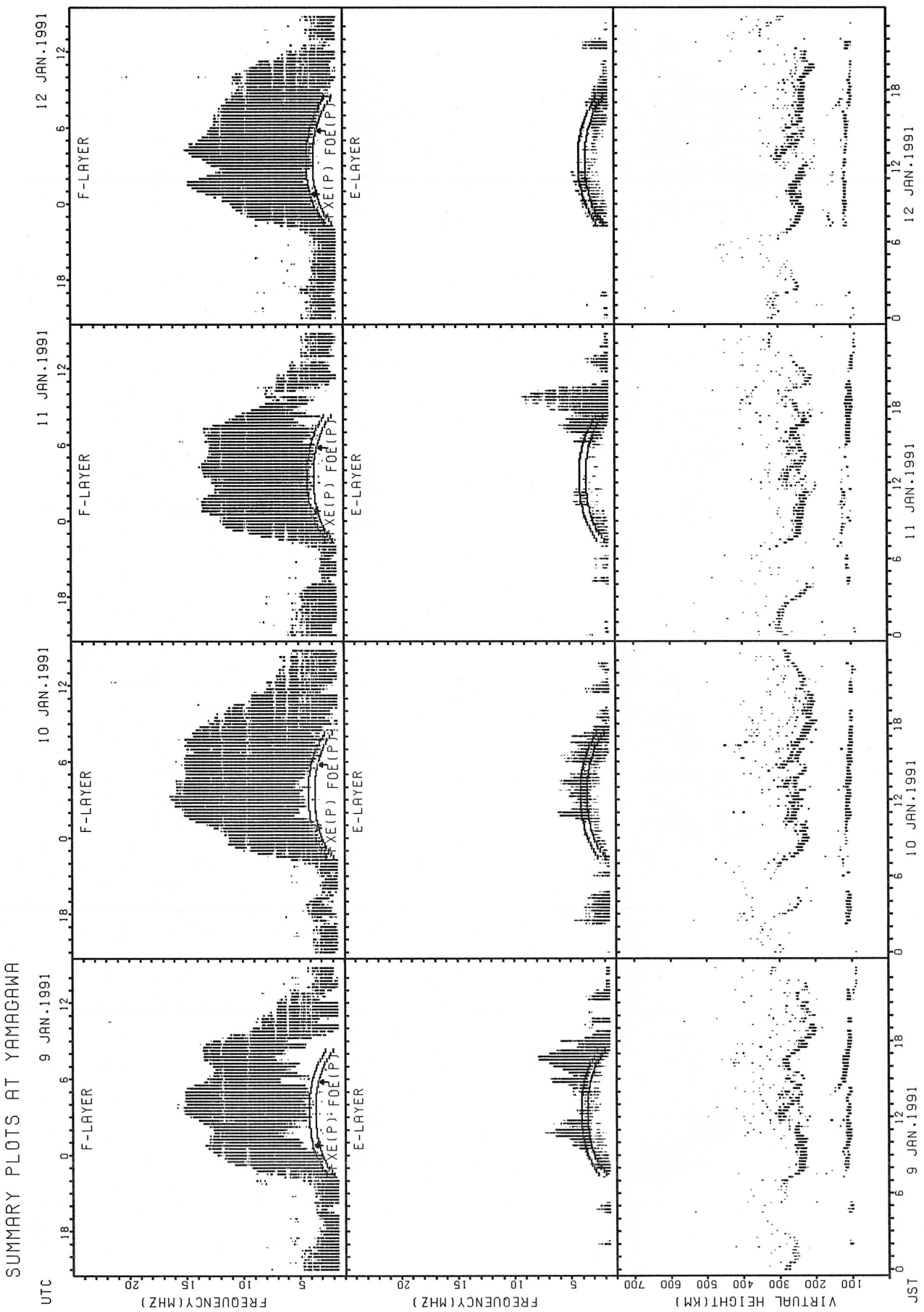
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

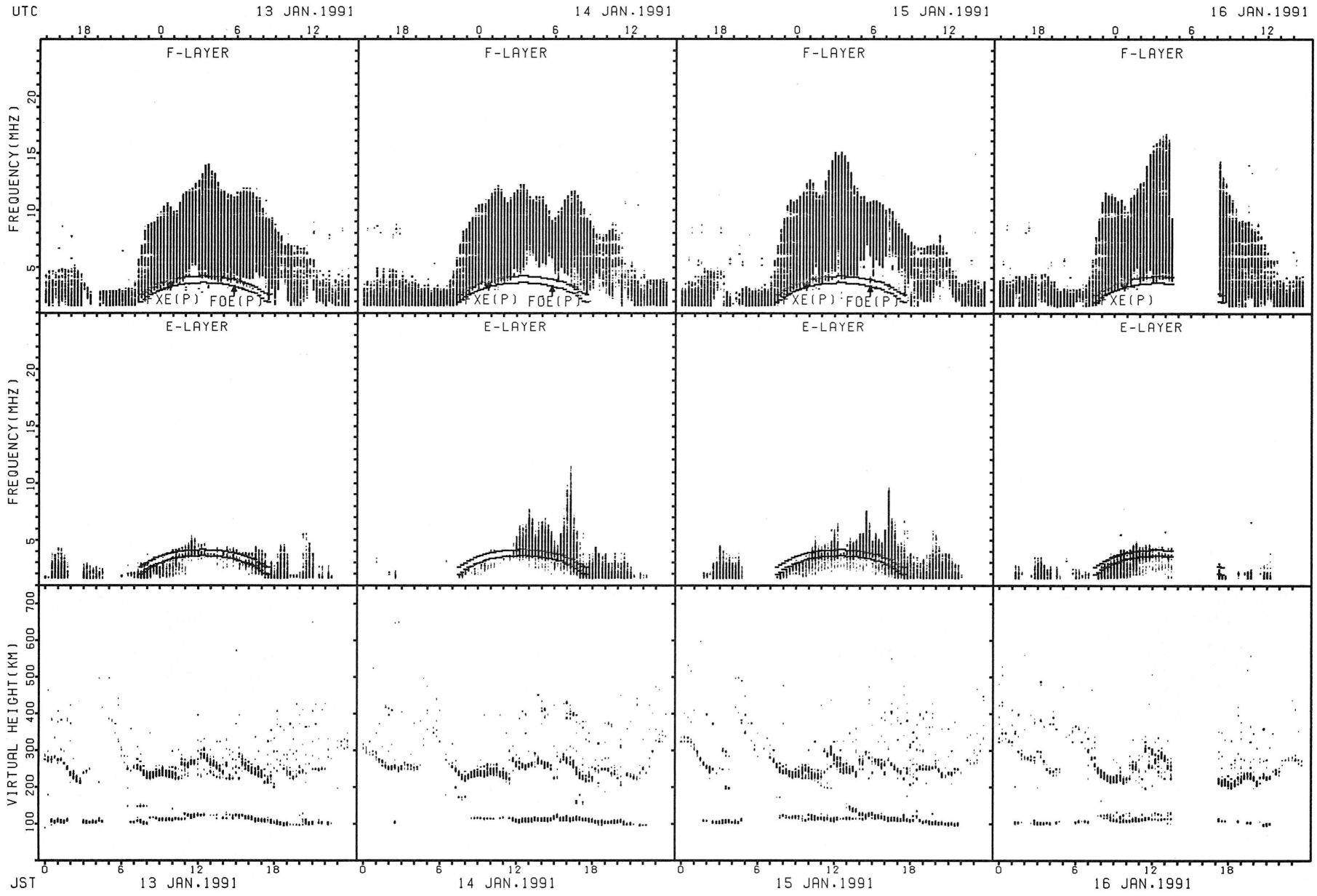

SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 JAN.1991
2 JAN.1991
3 JAN.1991
4 JAN.1991
F-LAYER
E-LAYER
XE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

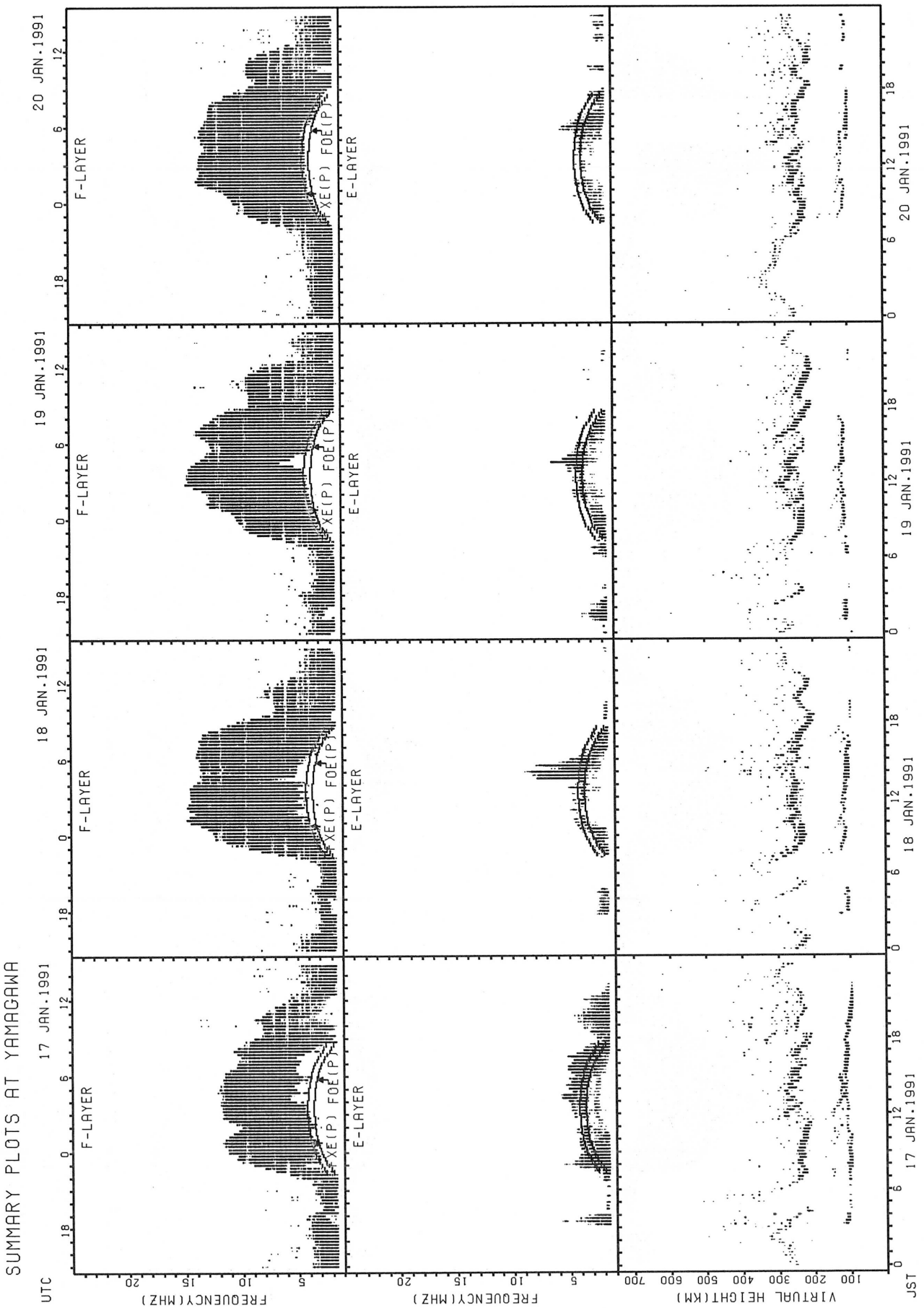
SUMMARY PLOTS AT YAMAGAWA

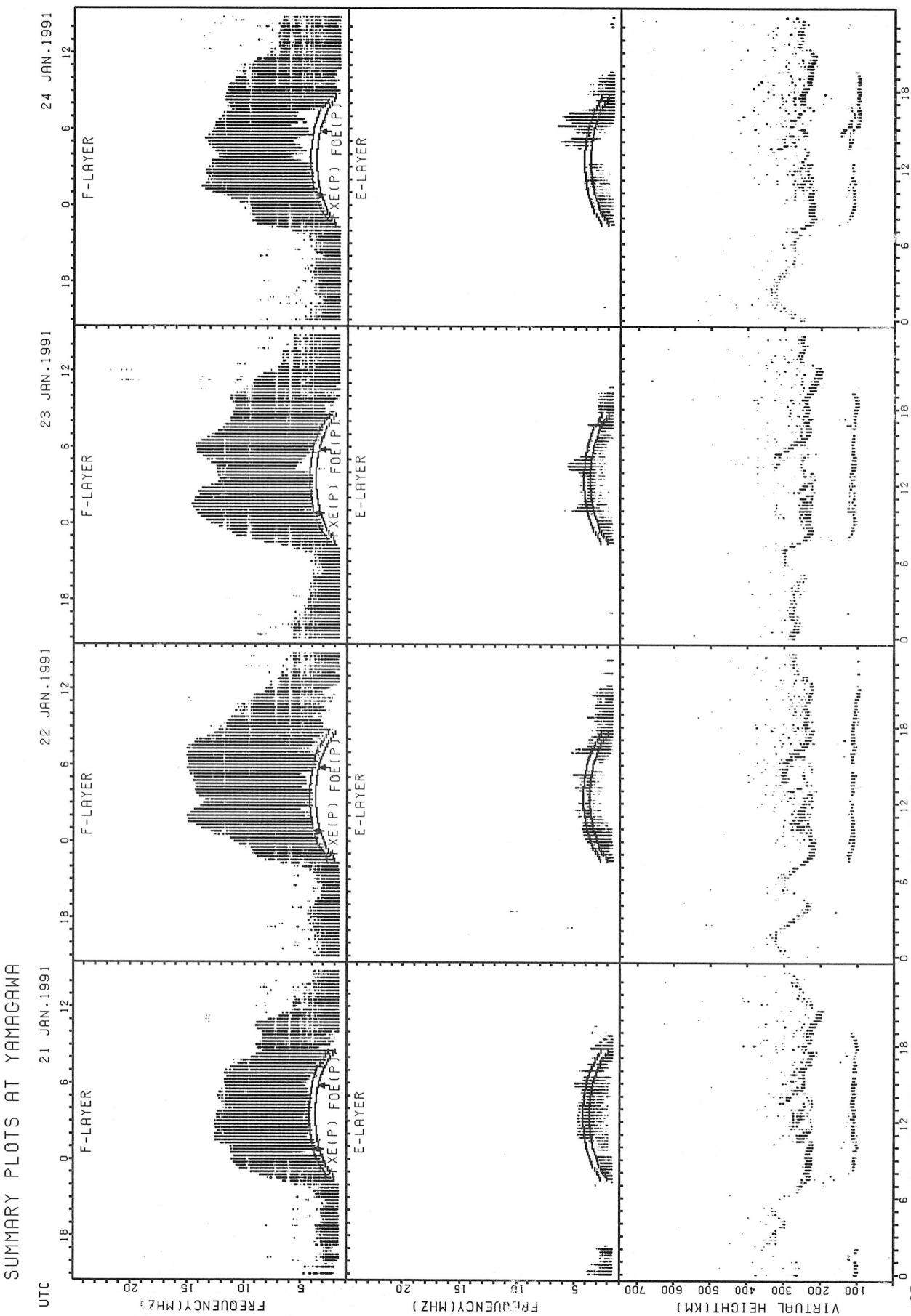


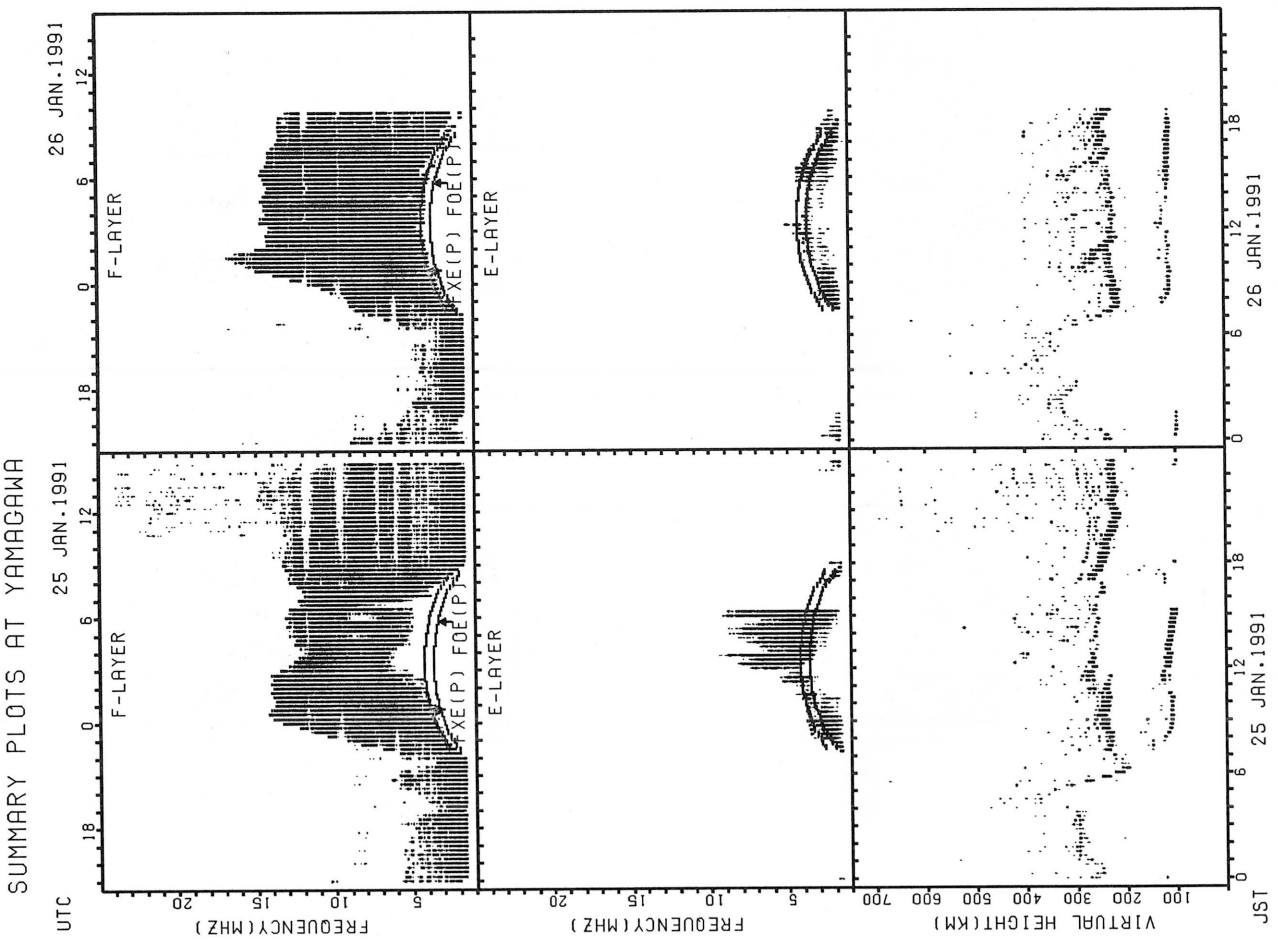
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

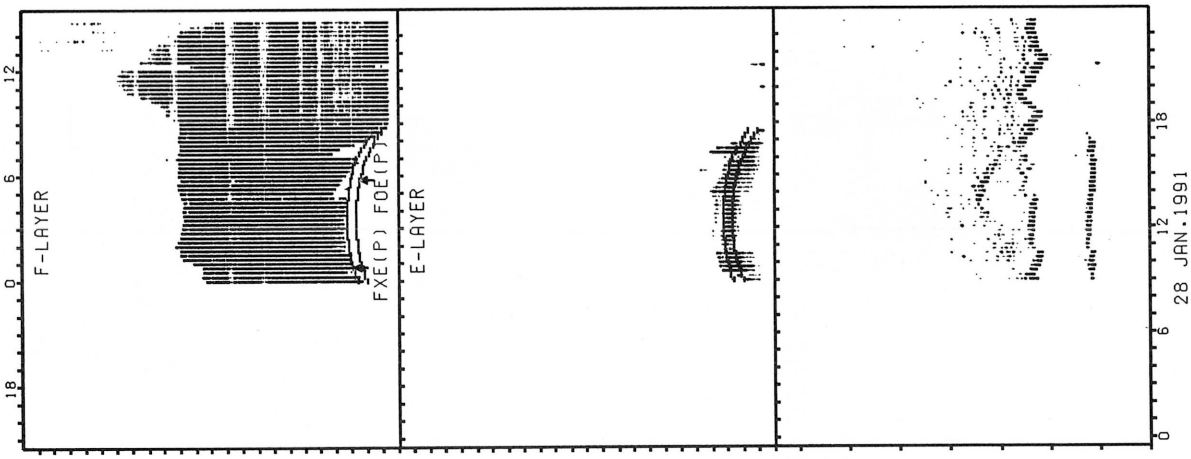

SUMMARY PLOTS AT YAMAGAWA
UTC
9 JAN.1991
10 JAN.1991
11 JAN.1991
12 JAN.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

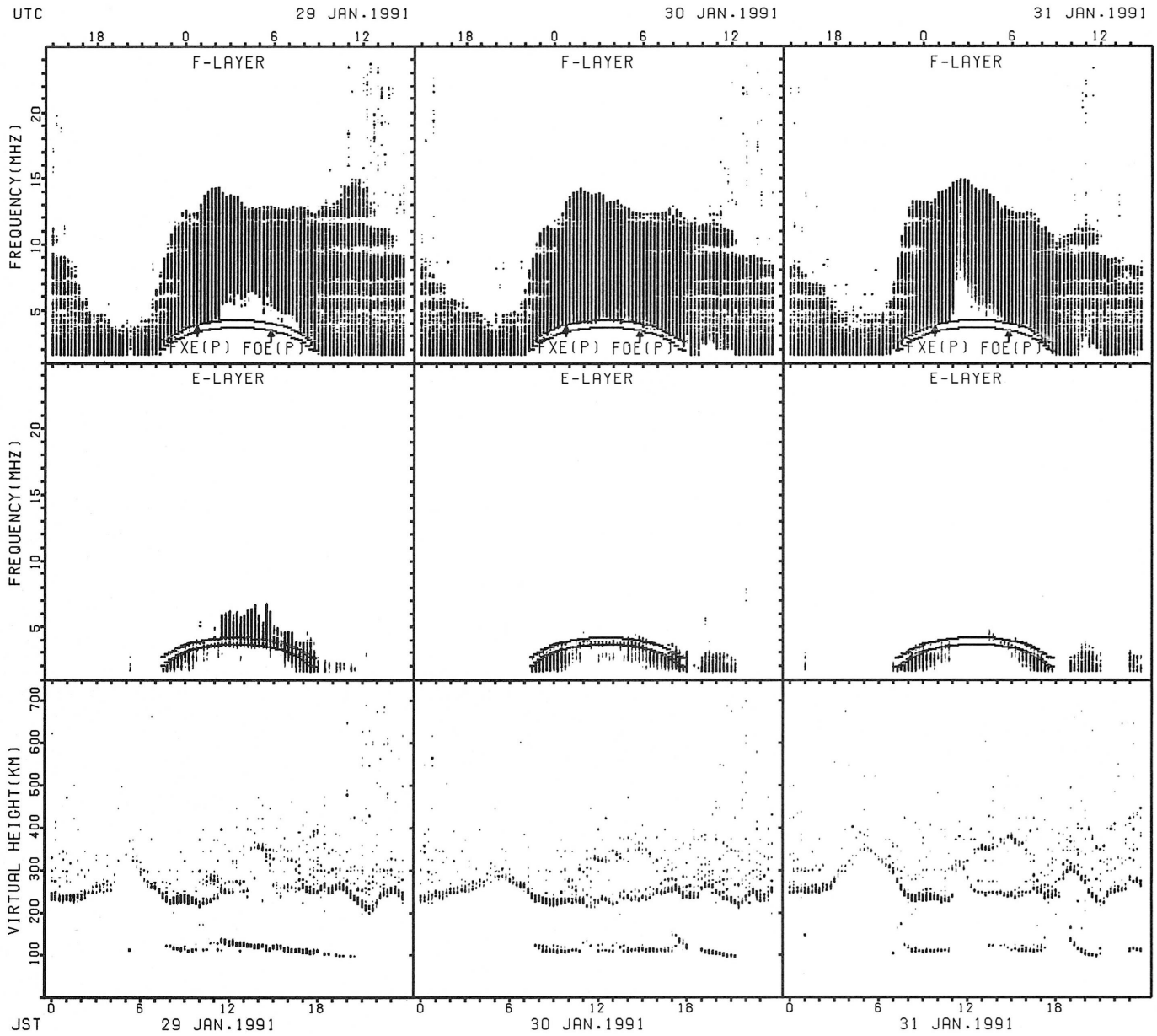

SUMMARY PLOTS AT YAMAGAWA
17 JAN.1991
18 JAN.1991
19 JAN.1991
20 JAN.1991
F-LAYER
E-LAYER
XE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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


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

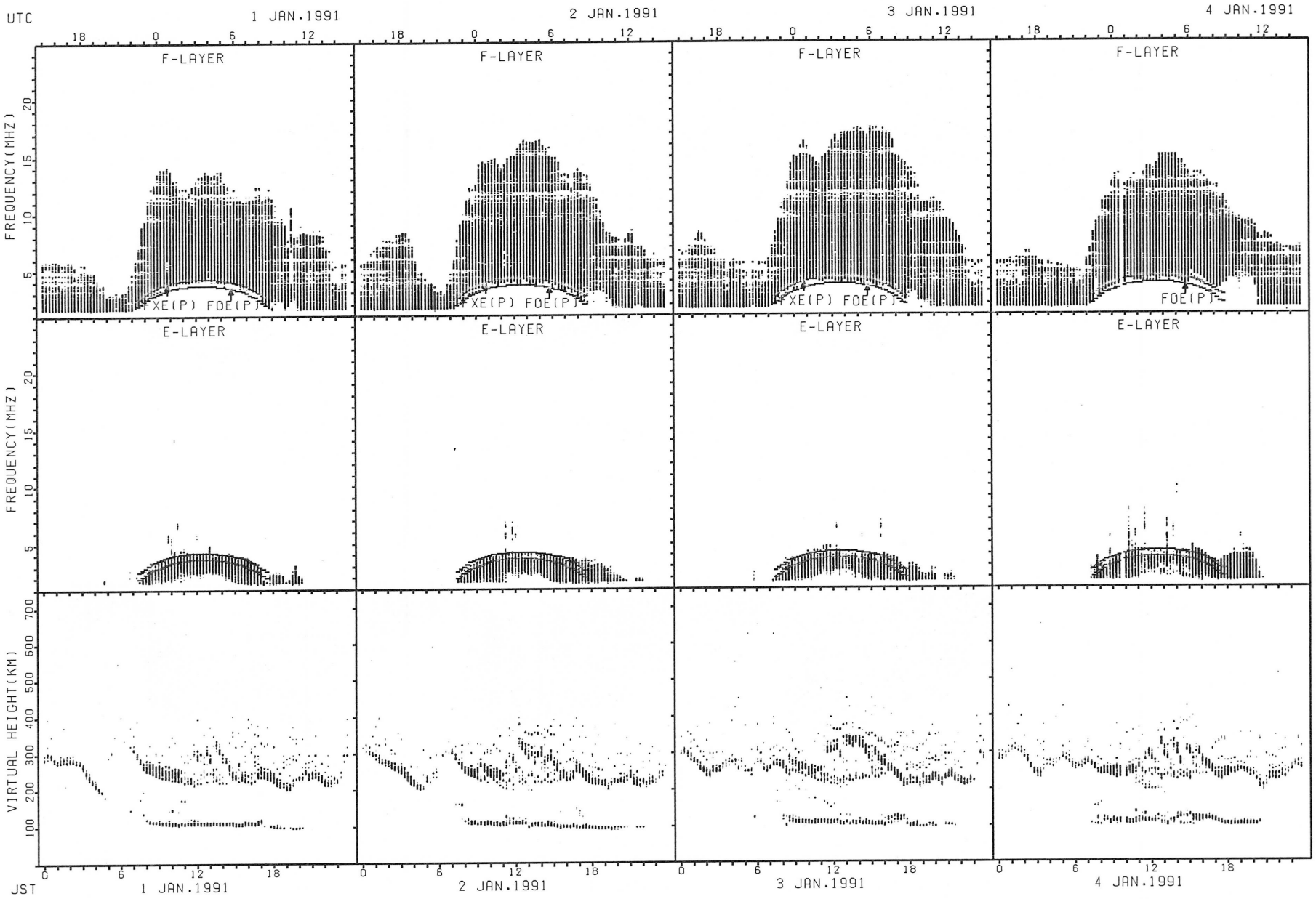

28 JAN.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)

SUMMARY PLOTS AT YAMAGAWA

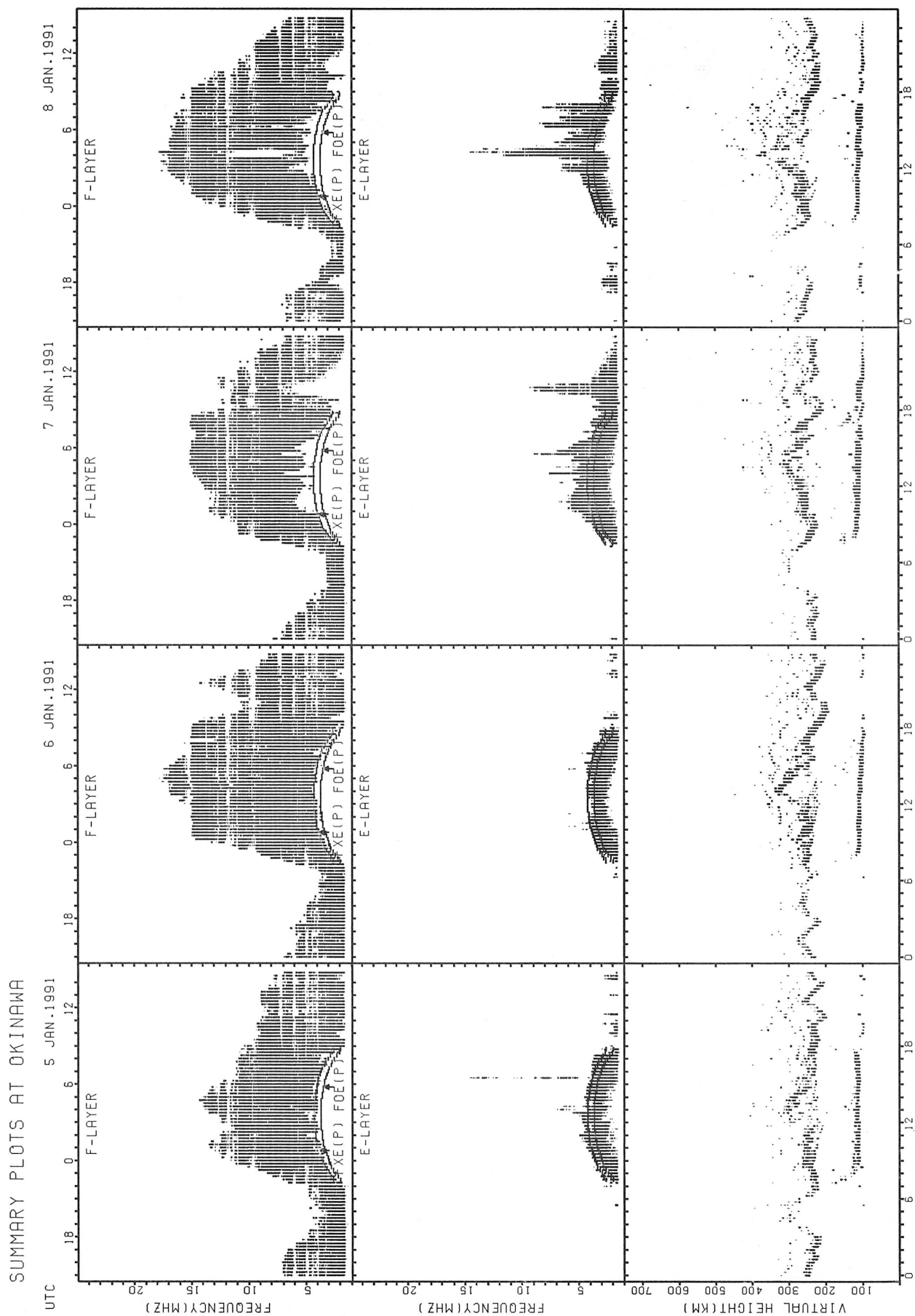


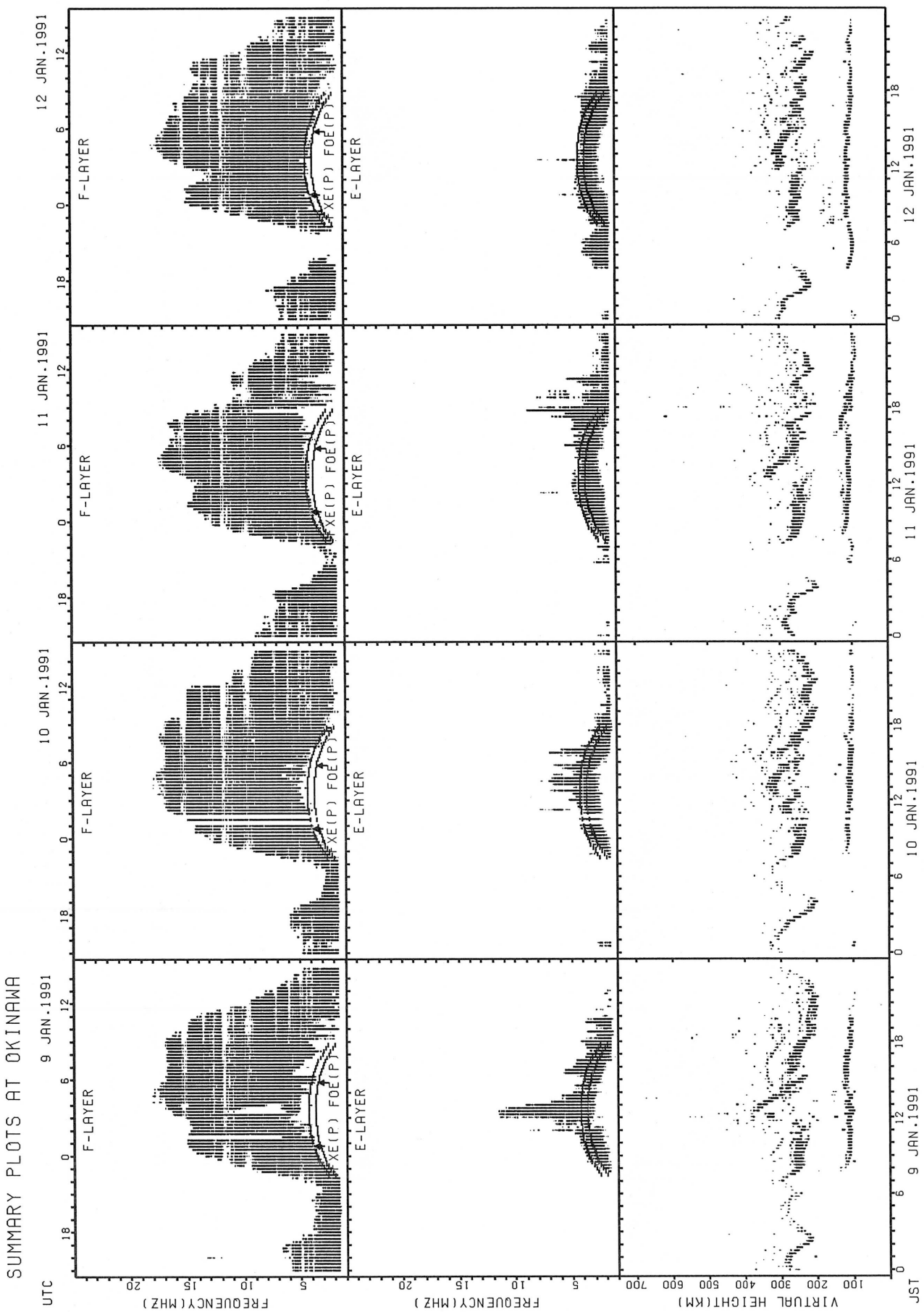
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

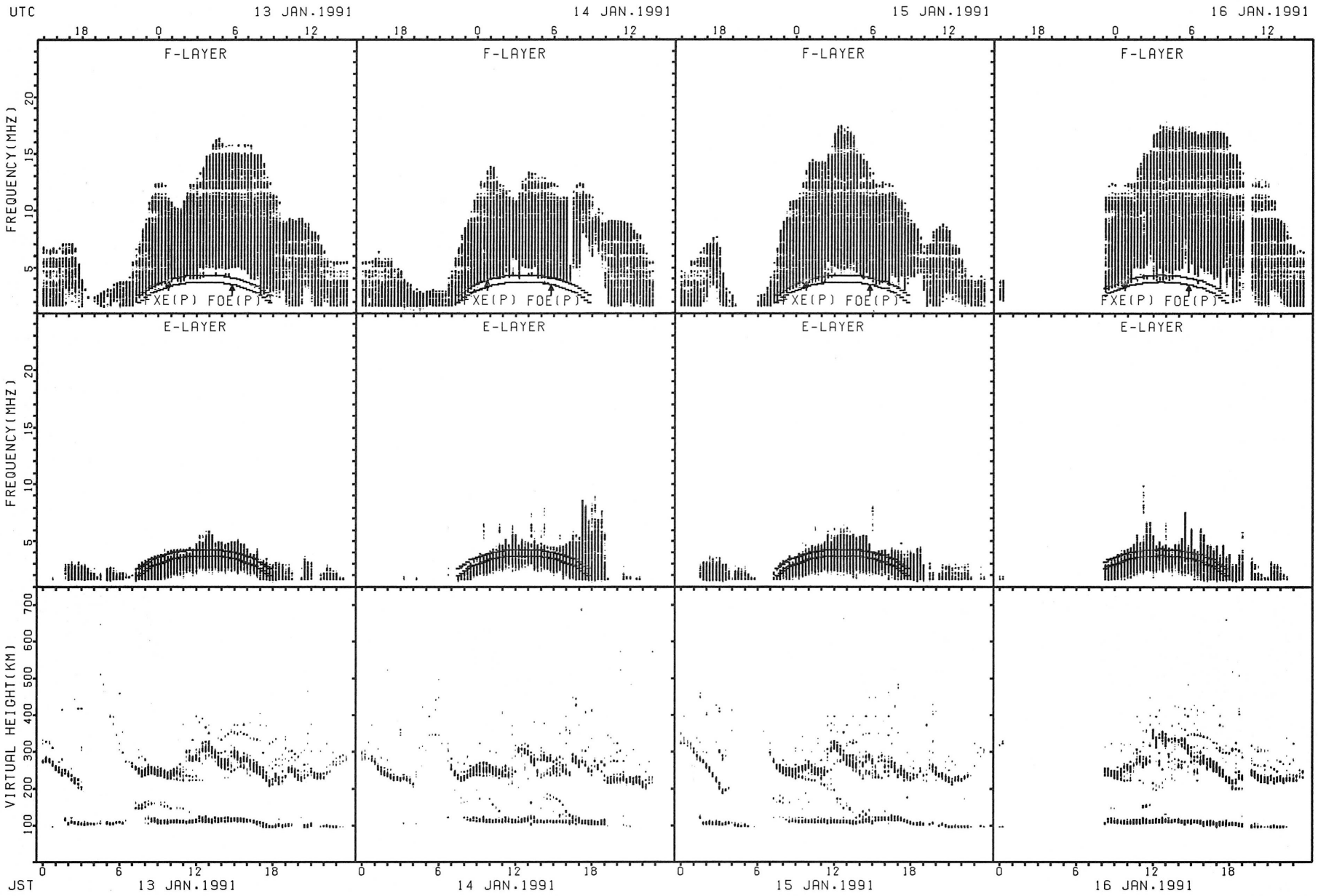


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

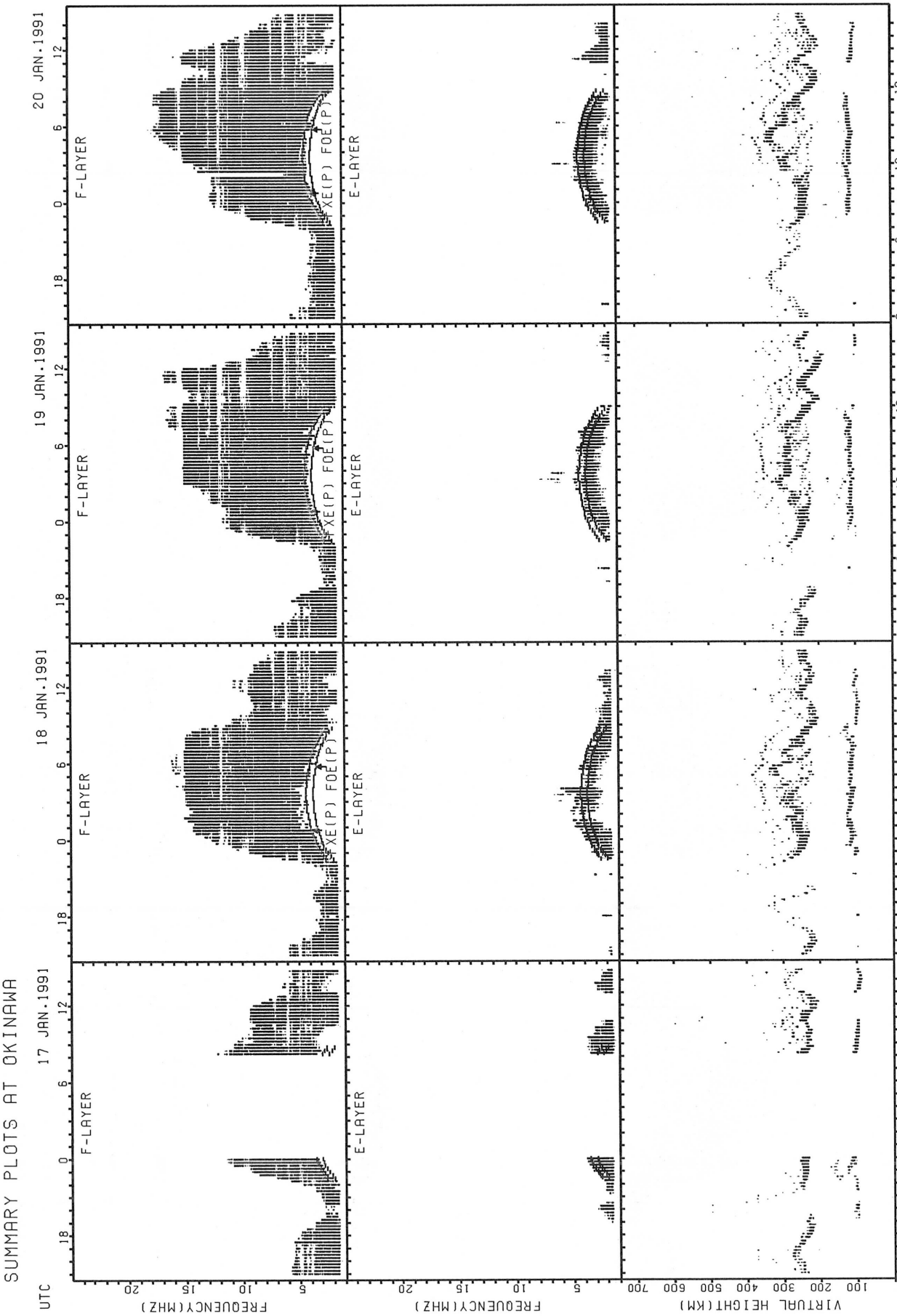

SUMMARY PLOTS AT OKINAWA
UTC
JST
5 JAN.1991
6 JAN.1991
7 JAN.1991
8 JAN.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

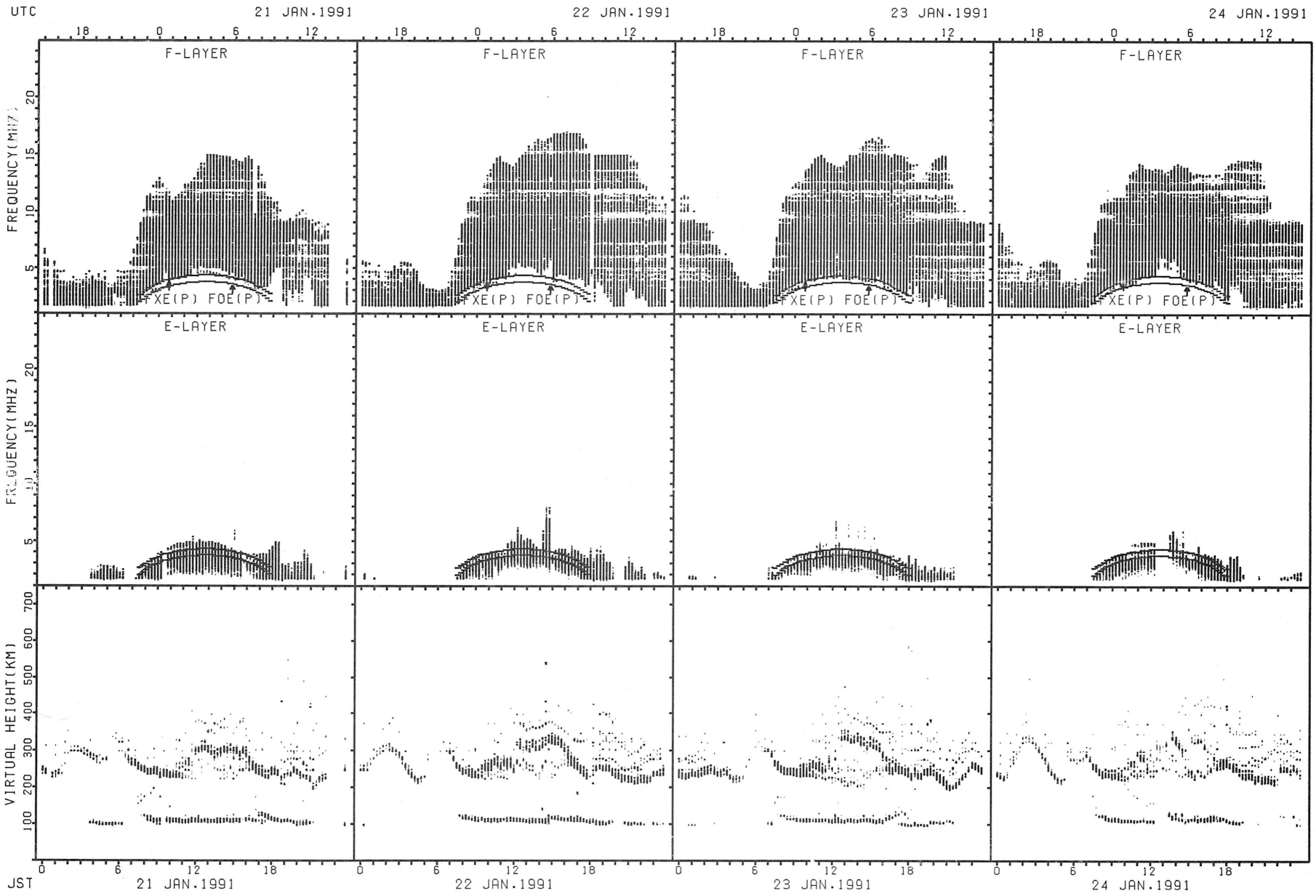
SUMMARY PLOTS AT OKINAWA



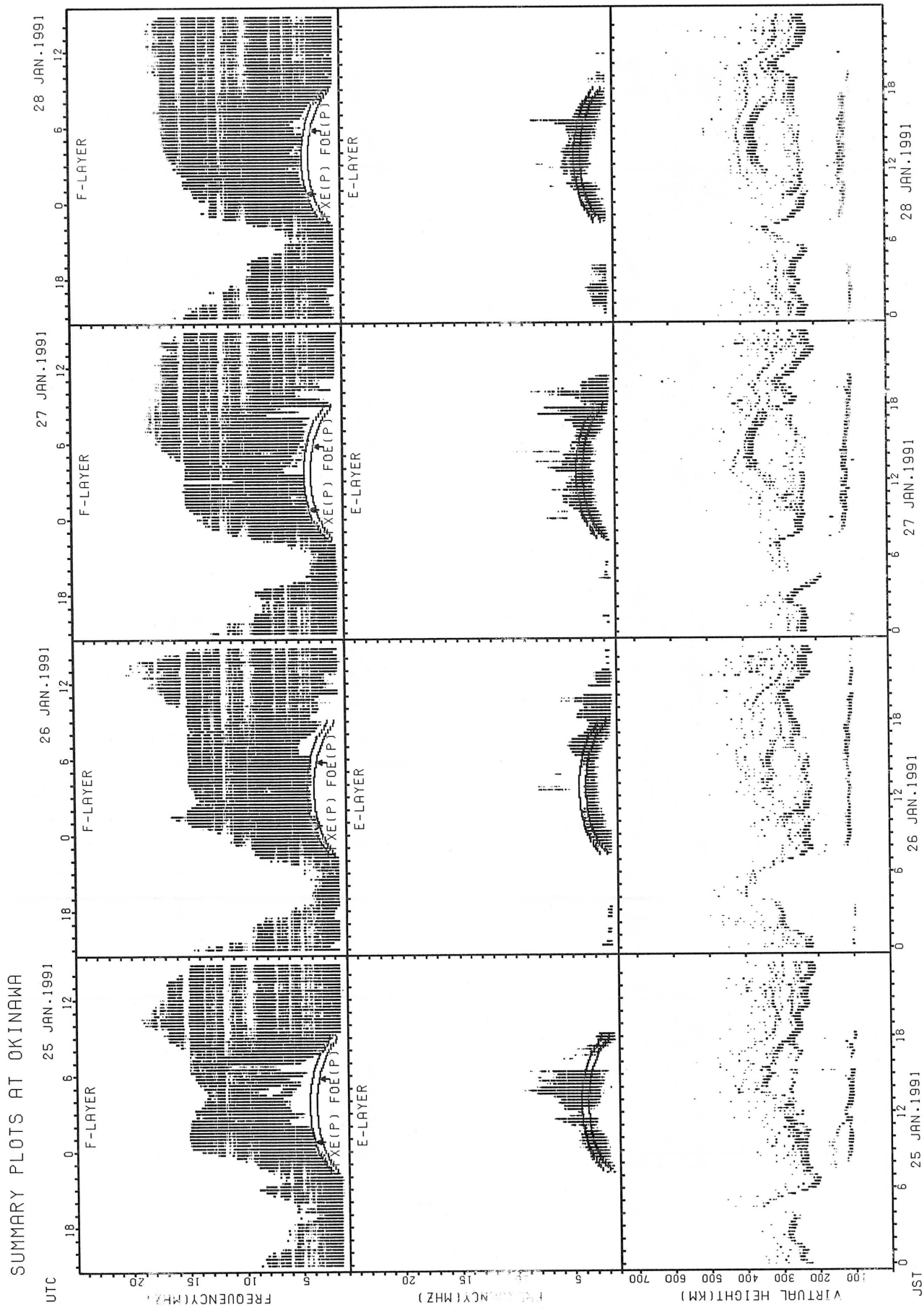
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

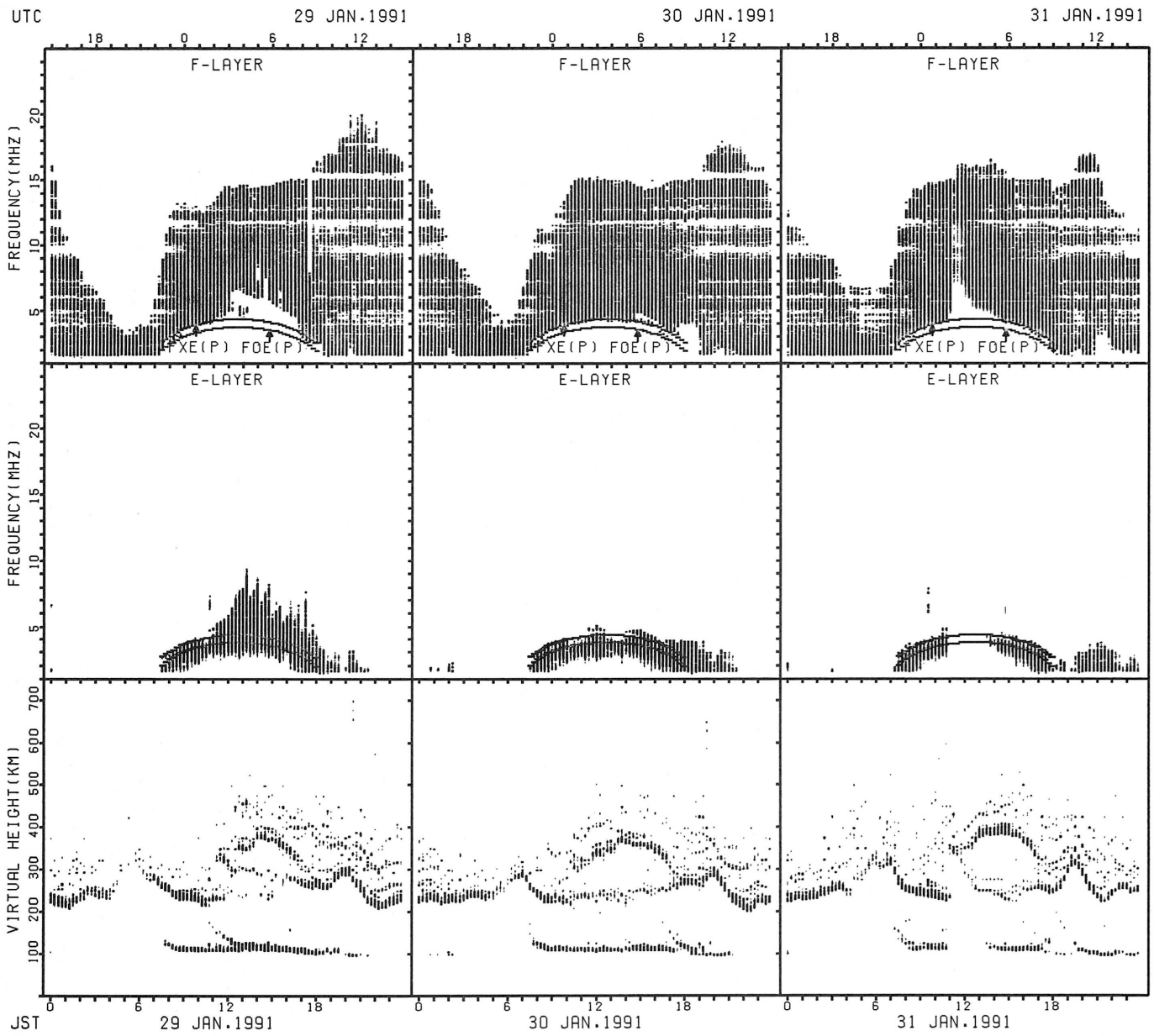

SUMMARY PLOTS AT OKINAWA
UTC
17 JAN.1991
18 JAN.1991
19 JAN.1991
20 JAN.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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


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



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

MONTHLY MEDIANS OF H'F AND H'ES
JAN.1991 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								11	29	31	31	30	31	31	31	31	31	19	13					
MED								286	238	234	234	237	236	250	246	242	260	278	286					
U Q								310	246	242	238	240	244	268	262	252	268	296	300					
L Q								272	232	224	226	232	232	242	238	240	250	262	266					

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		10									11		13		14	16	10
MED	113						117		115									117		117		113	112	110
U Q	115						127		165									123		125		117	118	119
L Q	113						115		113									115		113		111	110	105

H'F STATION AKITA LAT. 39.7N LON. 140.1E

	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	30	30	28	29	30	26	16						
MED									242	242	244	244	249	254	264	259	257	294						
U Q									250	250	258	250	258	272	281	276	280	314						
L Q									230	238	236	236	238	242	257	250	248	284						

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	14	10							14	22	17	14		11		16	17	19	18	15	13	16	16	17
MED	103	102							120	117	119	116		119		118	115	111	107	105	105	104	103	107
U Q	107	105							125	121	120	121		153		126	124	117	115	109	108	109	105	113
L Q	97	99							117	115	105	107		113		115	111	105	105	103	101	102	98	101

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								15	31	30	31	31	31	30	28	29	31	27	13					
MED								258	238	239	246	252	248	255	276	258	256	270	292					
U Q								266	242	248	260	258	256	274	300	283	268	292	304					
L Q								244	230	234	238	240	240	244	262	249	244	260	265					

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		12							18	17	23	19	20	16	26	23	25	22	21	24	15	18	12	
MED		105							119	115	117	117	119	117	115	113	115	108	107	105	105	100	98	
U Q		110							129	119	119	121	121	121	119	119	127	117	112	108	109	109	106	
L Q		101							119	109	113	113	115	112	111	111	110	105	105	104	101	99	97	

MONTHLY MEDIANS OF H'F AND H'ES

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									31	31	31	31	30	31	30	30	31	31	30	20	19			
MED									240	234	242	248	259	260	268	271	258	244	259	268	262			
U Q									250	242	250	256	272	272	284	294	270	258	270	295	280			
L Q									232	230	232	236	246	248	246	252	250	236	244	253	240			

H'ES

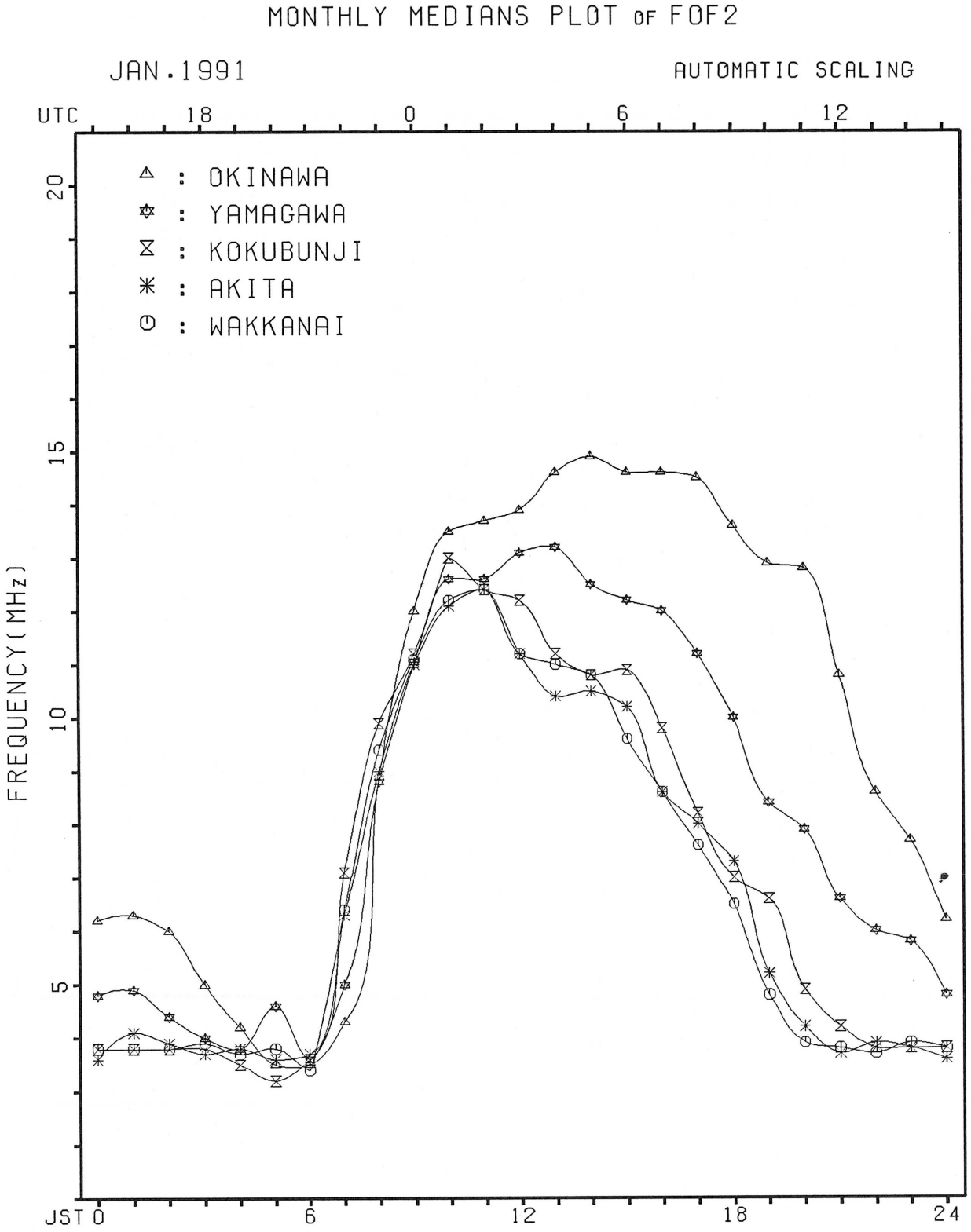
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									11	15	20	23	23	20	22	21	24	22	21	17	11	13		
MED									165	119	118	117	119	118	118	117	115	113	109	107	105	101		
U Q									173	131	122	121	129	126	129	127	131	137	113	120	107	107		
L Q									121	113	114	117	115	115	113	110	111	109	105	103	103	99		

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10								30	31	31	31	31	29	31	30	31	31	30	30	28	27	22	15
MED	263								263	246	246	252	290	314	312	290	290	256	258	266	274	258	273	274
U Q	294								280	256	256	268	314	336	360	330	330	300	270	294	300	272	296	300
L Q	258								250	236	240	244	262	290	292	262	272	250	240	242	256	244	256	256

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									16	23	26	25	26	21	25	27	27	28	27	23	16	15	14	
MED									152	125	125	125	119	117	117	115	115	115	107	105	101	103	102	
U Q									170	143	137	149	129	121	123	119	131	123	113	111	108	105	105	
L Q									125	115	113	117	113	110	112	109	111	112	103	99	99	101	99	


MONTHLY MEDIANS PLOT OF FOF2
JAN.1991
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
✳ : AKITA
⏀ : WAKKANAI
FREQUENCY(MHz)
5
10
15
20
JST 0
6
12
18
24

IONOSPHERIC DATA

JAN. 1991 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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 46	X 48	X 47	X 45	X 43	X 44	X 38											X 90	X 75	X 60	X 44	X 37	X 39	X 44
2	X 43	X 43	X 43	X 46	X 46	X 39	X 43											X 90	X 60	X 45	X 42	X 42	X 39	X 38
3	39	40	X 40	X 40	X 38	X 38	X 44											X 102	X 71	X 54	X 49	X 45	X 46	X 45
4	X 42	X 38	X 40	X 42	X 38	X 38	X 43											X 86	X 76	X 63	X 46	X 42	X 44	X 46
5	X 47	X 42	X 41	X 40	X 40	X 40	X 48											X 81	X 67	X 52	X 55	X 52	X 49	X 48
6	X 45	X 46	X 46	X 47	X 44	X 45	X 51										X 112	X 75	X 58	X 50	X 57	X 45	X 42	X 43
7	X 43	X 42	X 42	X 38	X 37	X 36	X 40											X 75	X 67	X 51	X 53	X 47	X 47	X 43
8	X 45	X 46	X 45	X 35	X 37	X 36	X 37												X 64	X 61	X 51	X 43	X 43	X 46
9	X 48	X 47	X 42	X 36	X 39	X 40	X 43												X 70	X 62	X 49	X 41	X 42	X 41
10	41	X 41	X 42	X 45	X 43	X 35	X 37												X 39	X 61	X 53	X 50	X 49	X 46
11	X 48	X 47	X 43	X 42	X 39	X 36	X 36												X 79	X 67	A	A	A	X 40
12	X 43	X 42	X 46	X 41	X 38	X 39	X 43	A											X 78	X 69	X 43	X 38	X 38	X 43
13	X 45	X 47	X 52	X 37	X 33	X 35	X 35					232							X 74	X 57	X 49	X 46	X 42	X 45
14	X 47	X 50	X 51	X 43	X 39	X 38	X 38												X 78	X 61	X 44	X 39	X 40	X 42
15	X 41	X 43	X 52	X 39	X 35	X 37	X 39												X 63	X 57	X 53	X 50	X 44	X 44
16	X 42	X 45	X 45	X 49	X 46	X 36	X 38												X 69	X 62	X 40	A	A	X 42
17	X 42	X 43	X 45	X 46	X 38	39	X 41												X 74	X 69	X 48	X 41	X 42	X 43
18	X 52	X 41	X 41	X 36	X 40	X 38	X 36												X 71	X 74	X 57	X 42	X 42	X 44
19	X 42	X 42	44	X 49	X 35	X 40	X 35												X 75	X 83	X 60	X 39	X 41	X 42
20	X 41	X 38	X 38	X 39	X 41	X 41	X 44												X 77	X 80	X 60	X 41	X 43	X 45
21	X 40	X 40	X 39	X 39	X 40	X 41	X 41												X 77	X 61	X 40	X 44	X 45	X 42
22	X 44	X 45	X 46	X 45	X 43	X 45	X 48												X 89	X 75	X 61	X 52	X 49	X 48
23	X 51	X 49	X 46	X 46	X 47	X 48	X 49												X 102	X 75	X 57	X 57	X 53	X 43
24	X 44	X 45	X 44	X 46	X 46	X 48	X 51												X 91	X 76	X 64	X 60	X 59	X 56
25	X 55	X 56	X 53	X 51	X 49	X 51	X 54												X 109	X 102	X 82	X 75	X 71	X 63
26	X 60	X 57	X 51	X 48	X 48	X 49	X 46												X 116	X 92	X 83	X 84	X 83	X 71
27	X 61	X 60	X 58	X 64	X 61	X 48	X 50												X 114	X 110	X 109	X 107	X 101	X 79
28	X 74	X 74	X 64	X 54	X 52	X 49	X 47												X 107	X 107	X 106	X 97	X 80	X 75
29	X 67	X 66	X 47	X 41	X 39	X 41	X 44												X 101	X 99	X 96	X 91	X 86	X 77
30	X 70	X 60	X 52	X 48	X 47	X 49	X 51												X 102	X 101	X 85	X 70	X 64	X 62
31	X 64	X 65	X 51	X 44	X 46	X 46	X 50												X 92	X 90	X 95	X 84	X 78	X 74
	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					1					1	7	31	31	30	29	29	31
MED	X 45	X 45	X 45	X 44	X 40	X 40	X 43					232					X 112	X 86	X 77	X 67	X 54	X 46	X 45	X 45
UQ	X 52	X 50	X 51	X 46	X 46	X 46	X 48											X 90	X 92	X 82	X 64	X 60	X 59	X 52
LQ	X 42	X 42	X 42	X 40	X 38	X 38	X 38											X 78	X 70	X 60	X 48	X 42	X 42	X 43

JAN. 1991 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1991 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	40	42	41	39	37	38	32	62	101	118	140	118	105	105	108	113	101	84	69	54	38	31	33	38
2	37	37	37	40	40	33	37	71	96	101	127	122	125	109	100	101	100	84	54	39	36	36	33	32
3	F 30	33	34	34	32	32	38	78	101	116	133	136	142	131	130	116	113	96	65	47	43	39	39	39
4	36	32	34	36	32	32	37	74	89	R 113	115	118	104	104	95	98	92	80	69	57	40	36	38	40
5	41	36	35	34	34	34	42	66	84	88	96	118	113	95	93	91	86	75	61	46	49	46	43	42
6	39	40	40	41	38	39	45	73	95	124	118	128	138	126	105	111	106	69	52	44	51	39	36	37
7	37	36	36	32	31	30	34	65	102	109	115	114	107	107	95	92	85	69	61	45	R 47	41	41	37
8	39	39	39	29	31	30	31	68	103	112	135	146	135	125	120	123	103	91	58	55	45	37	37	40
9	42	41	36	30	33	34	37	72	116	R 113	109	126	122	115	105	106	100	95	64	56	43	35	36	35
10	F 33	35	36	39	37	29	31	68	93	106	126	136	124	101	100	106	95	92	83	55	46	44	43	40
11	42	41	37	36	33	30	30	61	95	110	128	107	116	104	97	113	96	S 75	73	61	A	A	A	34
12	37	36	40	35	32	33	37	A	94	124	134	124	112	108	105	107	92	77	72	63	37	32	32	37
13	39	41	46	31	27	29	29	53	90	103	111	119	121	107	103	105	89	77	68	51	43	40	36	39
14	41	44	V 45	37	33	32	32	59	84	95	115	121	112	106	86	101	86	77	72	55	38	33	34	36
15	35	V 36	46	V 33	29	31	33	65	92	95	104	126	126	100	104	H 101	76	68	57	51	47	44	38	38
16	36	39	39	43	40	30	32	65	112	90	97	120	133	127	R 112	118	107	81	S 63	S 56	34	A	A	36
17	36	37	39	40	32	32	35	70	93	98	117	117	112	111	111	108	86	79	68	63	42	35	36	37
18	46	35	35	30	34	32	30	65	99	131	148	143	139	130	129	126	112	101	65	68	51	36	36	38
19	36	36	F 38	43	29	34	29	57	95	111	129	127	132	132	113	118	118	82	69	77	54	33	35	36
20	35	32	32	33	35	35	38	62	86	101	134	133	122	115	109	108	95	75	71	74	54	35	37	39
21	34	34	33	33	34	35	35	60	79	109	132	123	105	101	105	100	80	74	71	55	34	38	39	36
22	38	39	40	39	37	39	42	77	100	120	139	138	130	128	130	125	109	92	83	69	55	46	43	42
23	45	43	40	40	41	42	43	72	116	138	140	130	V 119	118	128	122	99	94	96	69	51	51	47	37
24	S 38	39	38	40	40	42	45	31	95	114	127	120	126	117	122	113	99	100	35	70	58	54	53	50
25	49	50	47	45	43	45	48	71	99	126	122	144	131	119	124	118	107	109	102	96	76	69	65	57
26	54	51	45	42	42	43	40	87	110	136	R 154	143	138	136	137	137	127	121	110	86	77	77	77	65
27	55	54	52	58	55	42	44	81	97	127	148	140	122	112	118	119	121	114	108	104	103	R 100	95	73
28	68	68	58	48	46	43	41	84	119	129	138	141	132	126	130	129	118	112	101	R 101	98	91	74	69
29	61	60	41	35	33	35	38	79	106	116	137	129	118	109	109	107	99	93	95	93	90	85	80	71
30	64	54	46	42	41	43	45	83	101	125	131	120	119	116	114	113	108	105	96	95	79	64	58	56
31	58	59	45	38	40	40	44	89	109	121	138	R 133	128	117	111	105	98	94	86	84	89	78	72	68
	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	30	31	31	31	31	31	31	31	31	31	31	31	31	30	29	29	31
MED	39	39	39	38	34	34	37	70	97	113	129	126	122	115	109	111	99	84	71	61	48	40	39	39
UQ	46	44	45	40	40	40	42	77	102	124	138	136	132	126	121	118	108	96	86	76	53	54	53	46
LQ	36	36	36	34	32	32	32	65	93	104	116	120	114	106	104	105	92	77	64	54	42	36	36	37

JAN. 1991 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1991 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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													
2										L	L	L	L			L								
3											L	L	L	L	L	L								
4										L	L	L	L		L	L								
5										L		L	L	L										
6											L	L	U L 570	L										
7											L	L	L	L										
8											L	L	L	L	U L 610									
9											U L 620	L	L			L								
10											L	L	L											
11											L	L	L	L										
12								A		L	L	L		L	L									
13											L	L	L	L										
14											L	L			A									
15											L	L	L		L									
16												L	U L 550											
17											L	L		L										
18										L	L		L		L									
19										L		L	U L 470	L										
20										L	L	L	L			L								
21										L	L	L	L	L	L									
22										L	L	L												
23									L	L	L	L	L	L	L									
24												L	U L 580	L	L									
25												L			L									
26													L	L	L		L							
27											L	L	L	L	L	L								
28												L		L	U L 710									
29											L			L	U L 630	L								
30											L		L	L	U L 690	L								
31											L	L	B	L	U L 690									
	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		4		5									
MED											U L 620		U L 560		U L 690									
UQ													U L 575		U L 690									
LQ													U L 510		U L 630									

JAN. 1991 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1991 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	250	310	340	355	360	350	320	275	205							
2								150	A	300	340	350	340	330	315	285	205							
3								B	A	310	330	350	350	340	315	285	205							
4								U B 140	255	305	A	350	360	340	A	280	220							
5								B	255	A	330	350	355	340	A	A	A							
6								B	255	315	A	A	A	A	330	280	A							
7								160	255	A	A	350	355	345	325	290	220							
8								160	260	A	A	355	A	A 345	A	A	245	B						
9								B	265	A	340	355	365	345	340	300	230	B						
10								165	250	310	A	350	355	A	335	A	235	B						
11								B	265	315	345	360	360	345	325	310	A 235	B						
12								A	245	300	330	345	345	340	320	270	205	B						
13								150	245	295	325	335	350	340	315	A	220	B						
14								B	240	285	320	A	A	A	A	A	A	B						
15								150	230	A	320	A 335	335	330	310	270	A	B						
16								B	245	305	335	A	A 350	340	330	285	A	B						
17								H 195	H 270	H 310	A	A 350	345	340	330	295	230	B						
18								B	265	A	A	360	360	355	335	295	245	B						
19								B	250	A	340	360	360	355	340	295	230	B						
20								B	265	310	A	360	375	360	340	300	235	B						
21								195	H 270	305	A	A	365	350	A	310	235	B						
22								165	265	325	A	365	A	360	340	A	245	155						
23								A	260	325	350	375	375	365	A	A	A	155						
24								170	270	330	355	370	375	B	A 345	290	A	B						
25							J K 155	150	270	320	350	U A 380	A	U A 360	A	A	B	175						
26								175	270	A	350	370	365	A	A	A	265	B						
27								185	290	A	375	390	390	A	A	325	A	A						
28								S 180	280	330	365	A 390	A	U A 395	A	340	265	B						
29								185	280	340	A	400	400	390	A	A	A	A						
30								185	280	340	A 365	385	390	390	365	340	270	160						
31								190	280	335	365	415	B	410	395	340	270	190						
	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	18	29	22	20	27	24	25	20	21	21	5						
MED							J K 155	168	265	310	340	360	360	345	330	295	235	160						
UQ								185	270	325	352	372	370	360	340	310	245	175						
LQ								150	250	305	330	350	350	340	320	285	220	155						

JAN. 1991 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1991 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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 15	E B 15	E B 13	E B 14	E B 14	E B 14	J A 37	E B 15	G	34	36	G	39	38	38	J A 48	25	J A 42	J A 30	J A 26	J A 22	26	21	E B 14
2	E B 13	E B 13	E B 13	E B 14	E B 13	E B 13	E B 13	G	J A 51	G 28	G 23	G 23	G	G	33	32	25	E B 13	E B 14	E B 14	E B 14	J A 27	E B 14	E B 15
3	E B 13	E B 13	E B 14	E B 13	E B 13	J A 21	J A 14	E B 15	J A 27	G	35	38	G	G	38	35	27	J A 20	J A 45	E B 13	E B 16	E B 16	E B 15	E B 15
4	E B 14	E B 14	J A 16	J A 20	E B 13	J A 21	E B 13	G	G	G	J A 40	G	G	G	34	33	28	J A 18	J A 28	24	E B 13	E B 13	E B 15	J A 17
5	J A 20	21	E B 14	E B 13	E B 14	E B 15	E B 15	E B 15	G	33	G 33	G 33	G	G	35	34	26	J A 53	42	J A 52	E B 13	E B 13	E B 13	E B 14
6	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	20	J A 18	G 24	G	36	39	J A 44	39	37	33	J A 35	J A 21	E B 14	E B 15	E B 16	E B 14	J A 17	E B 14
7	E B 14	E B 13	E B 13	E B 13	E B 13	E B 15	E B 14	G	29	J A 40	40	40	40	39	G	G 23	G	E B 13	E B 13	23	J A 26	J A 21	20	E B 14
8	J A 16	J A 18	J A 26	J A 17	E B 14	E B 13	E B 14	G	J A 30	J A 42	J A 39	J A 39	36	39	36	32	G 24	J A 24	J A 28	J A 21	J A 17	J A 21	J A 37	J A 29
9	J A 26	J A 21	J A 16	E B 14	E B 13	E B 14	E B 14	19	27	33	G 33	G	G	G 30	39	36	J A 50	J A 74	J A 55	J A 38	J A 44	J A 26	20	J A 30
10	J A 37	J A 18	23	J A 47	E B 16	E B 16	J A 30	G	G 21	G 31	J A 53	36	G	J A 43	42	J A 33	J A 49	J A 43	J A 24	J A 21	J A 19	J A 22	J A 25	E B 17
11	E B 14	E B 16	E B 15	E B 14	E B 13	E B 16	E B 13	E B 15	G	G	G 32	37	G	G	G 24	34	31	19	J A 48	J A 51	J A 53	J A 61	J A 49	28
12	24	J A 36	J A 24	J A 19	E B 15	E B 13	E B 14	J A 125	J A 36	J A 48	G	G	G	G	G	29	25	J A 24	J A 26	J A 21	J A 16	J A 20	J A 20	J A 20
13	J A 42	J A 23	E B 14	J A 35	E B 14	E B 13	J A 16	J A 19	27	34	J A 48	39	39	39	35	J A 45	J A 45	J A 23	E B 14	24	21	J A 35	J A 50	E B 15
14	E B 16	E B 13	E B 13	E B 14	E B 13	E B 13	E B 14	J A 26	27	G	43	J A 87	J A 89	J A 43	J A 117	J A 59	60	J A 21	J A 120	J A 64	J A 46	J A 48	J A 33	20
15	E B 13	J A 17	J A 17	J A 19	33	J A 46	J A 21	J A 18	J A 28	J A 52	J A 42	J A 44	42	43	35	J A 48	J A 54	J A 51	J A 44	J A 42	J A 49	J A 53	20	20
16	J A 17	J A 25	J A 21	J A 20	J A 16	J A 18	E B 14	E B 18	G	34	39	J A 50	J A 45	37	40	J A 45	J A 42	J A 65	J A 69	J A 107	J A 50	J A 54	43	J A 33
17	J A 19	J A 17	J A 21	J A 52	J A 26	J A 27	J A 19	G	G	J A 35	J A 53	J A 48	J A 51	42	J A 51	44	J A 44	J A 53	J A 52	J A 37	J A 21	J A 29	J A 21	J A 21
18	E B 15	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14	E B 15	30	J A 39	J A 39	G	G	G	G 30	G	G 24	J A 26	J A 27	J A 18	E B 14	E B 14	E B 14	E B 14
19	E B 14	J A 32	J A 19	J A 22	J A 20	E B 13	J A 15	J A 21	G 24	40	J G 33	G	38	G	G	G	26	J A 22	E B 13	J A 18	20	20	E B 14	E B 14
20	E B 15	E B 13	E B 13	E B 16	E B 14	E B 13	E B 13	E B 17	31	J A 32	39	G 24	G	40	G 20	G	G	E B 13	E B 13	J A 25	J A 27	J A 18	J A 16	E B 14
21	E B 14	E B 14	E B 14	E B 13	E B 13	E B 15	E B 14	J A 21	G	G	J A 37	J A 39	G	36	37	G 30	G 23	J A 21	E B 13	E B 14	E B 13	E B 13	E B 15	E B 14
22	E B 13	E B 14	E B 13	E B 14	E B 13	E B 14	E B 14	G	G	G	J A 42	38	38	G 35	G 34	34	27	J A 33	J A 29	J A 32	J A 21	J A 16	J A 20	E B 16
23	E B 13	E B 14	E B 14	E B 15	27	J A 26	J A 23	J A 19	G	35	42	42	J A 45	G 35	J A 38	J A 41	J A 38	G	E B 15	E B 15	20	J A 20	E B 13	E B 14
24	E B 15	E B 13	E B 13	E B 15	E B 13	E B 14	E B 14	G	32	40	50	J A 48	J A 55	E B 41	J A 38	J A 42	J A 35	J A 30	J A 26	J A 31	J A 53	J A 44	22	J A 19
25	J A 19	J A 22	J A 22	J A 19	E B 14	E B 13	K 16	G	30	J A 36	39	J A 59	44	40	38	J A 39	E B 33	J A 23	J A 27	J A 26	J A 20	J A 21	J A 20	19
26	E B 14	E B 14	E B 15	E B 13	E B 14	E B 14	E B 13	G	G	J A 37	39	40	G	37	38	J A 41	G 25	24	J A 20	E B 14	20	E B 13	J A 16	J A 36
27	J A 29	J A 22	J A 19	J A 15	E B 13	E B 13	E B 14	G	J A 36	J A 45	41	43	43	42	38	G	J A 51	21	J A 28	J A 23	J A 24	J A 32	J A 27	E B 14
28	E B 15	J A 20	J A 21	E B 14	E B 13	E B 14	E B 14	G	G	G	J A 41	43	42	J A 41	39	G 33	31	20	J A 21	J A 32	E B 14	E B 14	E B 13	E B 13
29	E B 14	E B 13	E B 13	E B 14	E B 14	E B 14	E B 14	G	G	G	39	43	46	45	40	36	J A 30	J A 29	J A 20	J A 18	E B 14	E B 14	E B 13	E B 14
30	E B 13	E B 13	E B 14	E B 13	E B 15	E B 16	18	G	G	G	J A 44	G	G	G	G	36	G	G	E B 14	E B 14	J A 18	E B 14	E B 13	E B 13
31	J A 17	18	E B 13	E B 13	E B 14	E B 14	E B 14	G	30	35	G 21	45	E B 66	G	48	J A 58	G 18	G 19	E B 14	21	E B 13	21	23	E B 15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 15	E B 15	E B 14	E B 14	E B 14	E B 14	E B 14	E G 15	G 24	34	39	39	38	37	37	34	28	J A 23	J A 26	J A 24	J A 20	J A 21	20	E B 15
UQ	J A 18	J A 20	J A 19	J A 19	E B 14	E B 16	16	18	30	J A 38	J A 42	43	44	40	38	J A 42	J A 40	J A 32	J A 36	J A 32	J A 25	J A 28	J A 22	20
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	36	G 24	G	G	34	32	25	20	E B 14	18	E B 15	E B 14	E B 14	E B 14

JAN. 1991 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1991 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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 15	E B 15	E B 13	E B 14	E B 14	E B 14	E B 14	E B 15	G	G	35	G	38	37	36	39	23	E B 14	E B 14	E B 15	E B 13	17	17	E B 14
2	E B 13	E B 13	E B 13	E B 14	E B 13	E B 13	E B 13	G	33	G 27	G 22	G 22	G	G	33	31	24	E B 13	E B 14	E B 14	E B 14	E B 13	E B 14	E B 15
3	E B 13	E B 13	E B 14	E B 13	E B 13	E B 13	E B 15	E B 15	26	G	34	37	G	G	37	33	25	E B 14	21	E B 13	E B 16	E B 16	E B 15	E B 15
4	E B 14	E B 14	E B 13	E B 14	E B 13	E B 15	E B 13	G	G	G	35	G	G	G	33	31	G	15	E B 12	E B 14	E B 13	E B 13	E B 15	E B 14
5	16	18	E B 14	E B 13	E B 14	E B 15	E B 15	E B 15	G	31	G 30	G 30	G	G	34	29	25	37	25	41	E B 13	E B 13	E B 13	E B 14
6	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	E B 14	E B 14	G 17	G	35	39	40	37	35	32	31	19	E B 14	E B 15	E B 16	E B 14	E B 14	E B 14
7	E B 14	E B 13	E B 13	E B 13	E B 13	E B 15	E B 14	G	28	32	37	37	38	37	G	G	G	E B 13	E B 13	14	17	E B 14	E B 15	E B 14
8	16	E B 13	16	E B 13	E B 14	E B 13	E B 14	G	G 22	33	34	G 31	36	37	35	32	G 20	E B 13	27	E B 14	E B 14	17	27	24
9	20	18	E B 14	E B 14	E B 13	E B 14	E B 14	E B 15	G 21	32	G 30	G	G	G 29	37	34	39	41	20	23	24	17	E B 13	23
10	16	E B 14	E B 14	27	E B 16	E B 16	E B 13	G	G 21	G 29	39	G 28	G	36	36	30	G 19	17	20	16	18	17	18	E B 17
11	E B 14	16	E B 15	E B 14	E B 13	E B 16	E B 13	E B 15	G	G	G 30	G 36	G	G	G 23	32	30	16	18	19	A A 53	A A 61	A A 49	20
12	20	25	19	E B 14	E B 15	E B 13	E B 14	A A 125	G 21	G 28	G	G	G	G	G	28	24	17	19	E B 14	E B 17	E B 14	15	E B 14
13	22	17	E B 14	15	E B 14	E B 13	E B 14	G 13	27	33	41	37	37	37	34	43	G 19	16	E B 14	22	E B 15	19	20	E B 15
14	E B 16	E B 13	E B 13	E B 14	E B 13	E B 13	E B 14	G	26	G	39	40	41	39	73	37	45	E B 14	25	28	25	20	24	19
15	E B 13	E B 13	E B 13	E B 13	20	16	E B 14	G	G 17	34	G 27	39	38	40	34	38	26	15	27	24	25	16	E B 14	E B 14
16	E B 14	15	14	15	E B 13	E B 13	E B 14	E B 18	G	G	37	38	42	37	39	41	27	44	20	34	23	A A 54	A A 43	23
17	E B 14	E B 13	E B 15	22	19	16	E B 14	G	G	G 23	35	G 35	40	39	39	38	35	27	29	24	17	19	20	17
18	E B 15	E B 13	E B 14	E B 13	E B 13	E B 13	E B 14	E B 15	G 27	32	36	G	G	G	G 23	G	G 24	16	20	E B 15	E B 14	E B 14	E B 14	E B 14
19	E B 14	17	16	17	14	E B 13	E B 14	16	G 20	34	G 27	G	38	G	G	G	25	16	E B 13	E B 15	E B 14	E B 13	E B 14	E B 14
20	E B 15	E B 13	E B 13	E B 16	E B 14	E B 13	E B 13	E B 17	G	G 25	35	G 22	G	38	G 19	G	G	E B 13	E B 13	23	23	E B 13	E B 13	E B 14
21	E B 14	E B 14	E B 14	E B 13	E B 13	E B 15	E B 14	G	G	G	36	36	G	G 34	34	G 28	G 22	17	E B 13	E B 14	E B 13	E B 13	E B 15	E B 14
22	E B 13	E B 14	E B 13	E B 14	E B 13	E B 14	E B 14	G	G	G	35	G 32	37	G 34	G 30	32	27	G 14	24	17	E B 13	E B 14	E B 15	E B 16
23	E B 13	E B 14	E B 14	E B 15	E B 14	17	15	17	G	34	40	40	39	G 33	35	34	34	G	E B 15	E B 15	E B 14	E B 13	E B 13	E B 14
24	E B 15	E B 13	E B 13	E B 15	E B 13	E B 14	E B 14	G	G	35	42	42	G 31	E B 41	G 35	39	27	20	E B 14	19	40	35	E B 13	E B 15
25	E B 13	E B 14	17	E B 14	E B 14	E B 13	K 16	G	G	34	38	41	40	39	37	32	E B 33	G 16	16	16	17	18	16	E B 13
26	E B 14	E B 14	E B 15	E B 13	E B 14	E B 14	E B 13	G	G	34	G	39	G	36	35	34	G 23	21	16	E B 14	E B 15	E B 13	E B 13	20
27	22	16	17	E B 13	E B 13	E B 13	E B 14	G	G 21	35	40	41	42	40	37	G	27	19	27	17	17	28	20	E B 14
28	E B 15	E B 14	18	E B 14	E B 13	E B 14	E B 14	G	G	G	39	42	41	G 31	38	G 32	29	18	E B 14	17	E B 14	E B 14	E B 13	E B 13
29	E B 14	E B 13	E B 13	E B 14	E B 14	E B 14	E B 14	G	G	G	38	G	44	43	39	35	27	28	17	E B 13	E B 14	E B 14	E B 13	E B 14
30	E B 13	E B 13	E B 14	E B 13	E B 15	E B 16	E B 13	G	G	G	38	G	G	G	G	35	G	G	E B 14	E B 14	16	E B 14	E B 13	E B 13
31	E B 14	E B 14	E B 13	E B 13	E B 14	E B 14	E B 14	G	30	35	G 21	44	E B 66	G	46	55	G 17	G 18	E B 14	E B 13	E B 13	E B 15	16	E B 15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	E B 14	G	G	G 28	35	G 36	36	35	35	32	25	16	16	15	E B 16	E B 14	E B 15	E B 14
UQ	E B 16	E B 15	E B 15	E B 14	E B 14	E B 15	E B 14	E B 15	G 22	34	38	39	40	38	37	36	28	19	20	20	18	18	18	E B 16
LQ	E B 14	E B 13	E B 13	E B 13	E B 13	E B 13	E B 14	G	G	G	G 30	E G 22	G	G	G 32	30	G 21	14	E B 14	E B 14	E B 14	E B 14	E B 13	E B 14

JAN. 1991 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1991 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	13	14	14	14	14	15	15	16	20	20	21	20	19	18	14	14	14	15	13	15	14	14
2	13	13	13	14	13	13	13	13	16	17	17	17	17	18	19	15	16	13	14	14	14	13	14	15
3	13	13	14	13	13	13	15	15	16	15	17	18	18	17	16	16	14	14	15	13	16	16	15	15
4	14	14	13	14	13	15	13	14	16	17	18	18	20	18	17	16	15	14	12	14	13	13	15	14
5	13	13	14	13	14	15	15	15	14	17	18	18	19	18	18	17	16	13	14	13	13	13	13	14
6	13	13	13	13	13	14	14	14	13	16	16	17	18	20	18	16	15	14	14	15	16	14	14	14
7	14	13	13	13	13	15	14	14	15	18	20	18	18	17	17	16	15	13	13	13	13	14	15	14
8	13	13	14	13	14	13	14	13	14	16	20	20	20	22	19	18	16	13	13	14	14	13	13	14
9	13	14	14	14	13	14	14	15	16	17	18	20	20	21	18	17	16	12	14	14	14	14	13	14
10	14	14	14	17	16	16	13	12	15	18	23	21	21	18	19	16	14	14	14	12	14	14	15	17
11	14	16	15	14	13	16	13	15	17	19	23	27	32	26	21	21	16	14	14	14	16	14	16	15
12	15	17	15	14	15	13	14	13	16	18	18	18	21	20	17	15	14	13	14	14	17	14	15	14
13	16	14	14	13	14	13	14	12	17	20	19	24	22	27	26	20	16	14	14	15	15	15	15	15
14	16	13	13	14	13	13	14	15	16	18	21	22	21	22	22	18	21	14	13	13	14	13	14	13
15	13	13	13	13	13	14	14	14	15	16	18	20	18	20	18	20	13	14	14	14	13	13	14	14
16	14	13	13	13	13	13	14	18	16	17	17	18	20	20	18	17	16	14	13	13	14	13	14	13
17	14	13	15	13	13	13	14	13	14	16	17	17	16	19	18	19	17	15	14	14	13	13	14	15
18	15	13	14	13	13	13	14	15	15	18	18	32	29	21	21	17	14	13	14	15	14	14	14	14
19	14	13	13	12	13	13	14	15	15	18	17	19	17	16	18	17	14	13	13	15	14	13	14	14
20	15	13	13	16	14	13	13	17	14	17	18	20	20	16	16	17	16	13	13	14	14	13	13	14
21	14	14	14	13	13	15	14	15	15	15	17	26	21	21	18	18	15	13	13	14	13	13	15	14
22	13	14	13	14	13	14	14	14	15	18	20	21	21	18	20	20	17	12	13	13	13	14	15	16
23	13	14	14	15	14	14	14	16	15	19	17	18	20	22	18	17	16	12	15	15	14	13	13	14
24	15	13	13	15	13	14	14	15	13	14	17	17	20	41	22	17	13	13	14	14	13	14	13	15
25	13	14	14	14	14	13	13	13	14	16	17	27	34	20	21	17	33	12	14	13	13	13	13	13
26	14	14	15	13	14	14	13	13	14	16	20	20	22	28	20	18	17	14	13	14	15	13	13	15
27	14	13	14	13	13	13	14	E S 15	16	19	22	24	24	27	24	20	17	13	14	13	14	14	14	14
28	15	14	14	14	13	14	14	16	17	17	17	30	27	23	15	20	16	15	14	14	14	14	13	13
29	14	13	13	14	14	14	14	15	14	16	21	24	22	21	21	18	16	13	12	13	14	14	13	14
30	13	13	14	13	15	16	13	15	15	19	21	21	22	23	17	17	17	13	14	14	13	14	13	13
31	14	14	13	13	14	14	14	14	17	17	17	40	66	36	30	20	16	13	14	13	13	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	14	13	14	13	13	14	14	15	15	17	18	20	21	20	18	17	16	13	14	14	14	14	14	14
UQ	14	14	14	14	14	14	14	15	16	18	20	24	22	22	21	18	16	14	14	14	14	14	15	15
LQ	13	13	13	13	13	13	14	14	14	16	17	18	20	18	18	17	14	13	13	13	13	13	13	14

JAN. 1991 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1991 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270	265	260	270	285	300	310	305	320	320	315	305	300	295	285	315	310	310	320	320	320	280	275	275
2	270	260	265	290	315	275	290	335	325	330	315	305	305	300	290	305	315	315	310	310	310	315	295	305
3	F 285	265	270	280	265	270	300	335	330	320	305	295	295	290	290	285	315	320	325	325	305	290	275	310
4	285	275	265	280	280	270	290	335	330	335	330	320	305	295	295	315	315	305	315	340	335	305	275	290
5	300	295	290	275	260	280	325	355	340	335	305	310	320	315	300	310	315	325	335	305	295	315	300	305
6	285	275	280	300	285	285	305	335	325	330	325	295	310	305	280	300	320	330	330	310	320	305	285	295
7	300	300	310	280	270	280	300	335	350	340	325	325	305	320	305	320	320	310	350	335	R 290	275	270	280
8	280	290	310	310	285	280	290	320	340	335	310	305	305	290	280	300	300	325	310	310	305	275	265	280
9	295	305	310	260	280	285	285	320	345	R 350	305	295	310	285	295	300	310	320	315	315	325	300	300	300
10	F 270	260	260	305	315	295	295	320	345	300	310	315	310	300	290	320	320	315	325	315	310	300	290	300
11	285	285	270	285	300	305	300	315	340	320	320	315	315	320	290	325	315	S 305	325	340	A	A	A	265
12	275	280	305	295	270	265	305	A	315	335	330	330	300	305	305	315	330	310	310	340	300	275	255	270
13	285	300	340	340	245	275	340	315	330	320	310	310	305	300	295	310	320	310	320	320	300	300	280	270
14	280	300	V 300	305	275	275	310	350	345	335	325	320	320	335	305	315	330	315	315	350	295	300	290	295
15	280	V 280	335	V 360	275	295	310	335	355	340	290	310	310	295	295	H 315	330	335	320	315	305	315	280	280
16	280	275	290	315	350	260	285	310	355	340	305	305	305	300	R 295	315	325	325	S 325	S 275	315	A	A	295
17	275	280	300	310	320	265	300	345	355	330	330	315	320	310	305	305	320	315	310	345	335	285	285	260
18	330	320	325	265	290	300	295	315	325	320	320	305	310	300	295	300	305	330	305	325	330	260	285	280
19	295	270	F 290	340	290	290	345	330	345	315	315	310	310	310	295	295	320	320	305	345	360	275	295	300
20	295	295	285	275	265	280	355	350	360	320	315	320	305	305	300	305	325	320	305	330	340	285	295	305
21	315	280	285	270	280	270	320	340	340	315	325	320	305	300	300	320	310	310	330	335	290	295	295	290
22	270	285	300	305	285	290	300	340	330	300	305	305	290	285	285	285	305	305	305	315	325	295	280	270
23	285	290	280	270	270	290	310	340	325	320	310	320	V 285	290	290	300	300	300	320	330	295	300	295	275
24	S 265	275	260	260	280	295	325	345	345	300	310	305	295	280	285	285	290	290	300	295	280	265	275	280
25	270	290	285	270	240	265	345	325	320	320	290	310	290	280	275	290	285	295	300	320	290	290	295	280
26	270	280	275	255	245	245	255	330	315	305	R 305	295	280	280	275	280	285	285	295	290	280	285	305	295
27	280	270	275	285	320	270	305	325	330	310	305	305	295	270	275	270	285	285	285	300	290	R 295	305	280
28	285	270	280	260	275	295	280	305	325	310	300	290	280	265	265	275	275	280	275	R 290	290	290	280	270
29	295	305	300	280	260	260	290	335	325	300	305	300	285	265	265	270	285	275	290	295	295	290	290	285
30	300	300	295	280	270	290	310	335	325	300	295	280	275	270	265	270	280	280	275	295	295	275	275	270
31	290	305	295	245	240	250	280	325	325	305	300	R 280	275	260	260	260	275	275	265	260	280	270	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	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	30	29	29	31
MED	285	280	290	280	280	280	300	335	330	320	310	305	305	295	290	300	315	310	310	315	302	290	285	280
UQ	295	298	300	305	288	290	310	340	345	335	320	315	310	305	295	315	320	320	322	332	320	300	295	295
LQ	275	275	275	270	268	270	290	320	325	310	305	302	292	282	280	285	295	298	302	302	290	275	275	275

JAN. 1991 | M(3000)F2 (0.01)

IONOSPHERIC DATA

JAN. 1991 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35°42.4'N, Long. 139°29.3'E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

Hour / Day	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													
2										L	L	L	L			L								
3											L	L	L	L	L	L								
4										L	L	L	L		L	L								
5										L		L	L	L										
6											L	L	U L 350	L										
7											L	L	L	L										
8											L	L	L	L	U L 345									
9											U L 365	L	L			L								
10											L	L	L											
11											L	L	L	L										
12								A		L	L	L		L	L									
13											L	L	L	L										
14											L	L			A									
15											L	L	L		L									
16												L	U L 345											
17											L	L		L										
18										L	L		L		L									
19										L		L	U L 370	L										
20										L	L	L	L			L								
21										L	L	L	L	L	L									
22										L	L	L												
23									L	L	L	L	L	L	L									
24												L	U L 365	L	L									
25												L			L									
26													L	L	L		L							
27											L	L	L	L	L	L								
28												L		L	U L 310									
29											L			L	U L 330	L								
30											L		L	L	U L 325	L								
31											L	L	B	L	U L 315									
	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		4		5									
MED											U L 365		U L 358		U L 325									
UQ													U L 368		U L 330									
LQ													U L 348		U L 315									

JAN. 1991 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JAN. 1991 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											270													
2										255	260	255	260			255								
3											280	305	280	290	285	275								
4										235	255	255	H 245		L 300	260								
5										225		260	250	L 275										
6											240	290	280	255										
7											255	240	250	255										
8											270	265	245	235	310									
9											300	315	250			275								
10											255	260	240											
11											240	215	260	240										
12								A		245	250	235		255	260									
13											255	265	260	245										
14											240	235			A									
15											230	250	260		300									
16												260	285											
17											250	240		255										
18										255	255		250		275									
19										260		265	260	260										
20										260	260	255	250			L 265								
21										260	255	255	305	310	285									
22										255	260	255												
23									255	250	255	235	235	L 280	305									
24												260	290	L 305	275									
25												260			L 305									
26													L 305	260	L 330		L 300							
27											265	255	285	L 330	310	L 305								
28												290		L 350	335									
29											260			L 355	L 340	U L 315								
30											255		L 350	L 355	340	L 325								
31											270	270	B 280	360	360									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	10	24	26	23	19	16	8	1							
MED									255	255	255	258	260	275	305	275	L 300							
UQ										260	262	265	282	L 320	332	L 310								
LQ										245	252	250	250	255	285	262								

JAN. 1991 | H'F2 (KM)

IONOSPHERIC DATA

JAN. 1991 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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	320	325	320	305	285	265	250	255	H 220	230	230	230	230	235	240	A 250	235	215	230	240	220	315	325	310
2	310	335	330	300	255	245	290	240	225	H 205	H 225	225	H 215	225	235	235	235	210	220	210	260	255	280	270
3	340	355	330	310	335	345	285	240	235	225	220	230	230	215	235	230	240	215	230	225	240	280	280	260
4	270	320	340	295	310	355	285	240	210	235	235	205	235	225	225	240	240	225	230	220	225	260	300	275
5	265	285	295	310	345	330	235	220	210	220	H 205	235	235	230	235	235	235	A 255	250	A	265	240	260	270
6	250	300	285	270	265	300	260	250	230	235	230	A 230	230	240	H 225	235	240	210	225	260	240	230	290	280
7	275	265	260	275	305	330	285	245	230	225	230	235	225	225	H 220	235	230	210	230	205	230	260	310	310
8	310	300	270	250	290	305	310	260	230	230	225	235	235	225	225	240	225	220	A 240	215	215	A 305	E A 375	A 330
9	300	255	250	300	320	310	300	255	230	215	205	H 210	245	230	230	250	235	E A 255	215	240	A 235	295	265	A 320
10	330	365	350	A 305	240	260	295	250	220	H 215	230	235	230	H 225	H 240	245	230	240	220	210	235	260	280	265
11	295	305	320	280	255	270	285	255	225	235	240	220	H 220	240	230	240	225	205	255	225	A	A	A	A 380
12	340	A 365	285	285	275	345	270	A	230	240	240	240	H 215	240	230	240	225	230	255	210	230	285	385	330
13	320	280	235	230	380	320	240	230	240	235	240	230	240	230	240	250	220	230	220	240	250	265	320	315
14	310	275	265	260	240	325	270	215	220	225	A 245	A 240	245	240	A	A 260	240	225	A 245	230	E A 290	A 275	E A 340	A 290
15	290	325	240	215	E A 370	285	280	250	220	230	210	230	245	230	230	230	A 230	220	A 270	A 250	A 270	250	275	305
16	310	310	290	265	225	320	320	265	220	210	225	230	240	240	235	A 250	235	A 240	240	A	A 280	A	A	310
17	330	300	280	280	260	350	260	235	225	230	230	220	245	240	250	235	220	230	A 265	230	225	290	340	350
18	250	240	260	325	295	265	255	250	235	H 215	235	235	230	225	230	240	235	225	235	230	220	260	290	315
19	285	330	310	235	270	290	230	240	225	220	230	220	230	245	H 230	240	230	205	245	230	215	280	305	280
20	265	285	305	325	325	310	225	215	220	225	230	230	230	240	230	240	225	220	240	225	230	240	300	265
21	245	320	310	320	300	325	240	230	220	H 230	245	225	230	220	230	240	225	235	230	220	220	270	280	300
22	310	295	275	260	255	300	280	240	225	225	235	235	230	H 225	H 230	245	235	235	230	235	220	250	280	315
23	295	285	290	295	315	285	270	230	230	235	225	230	225	H 220	235	235	230	245	225	215	225	255	245	285
24	330	320	335	315	295	280	250	235	220	225	A 240	235	220	B 240	245	A 245	235	245	225	250	A	A	270	275
25	295	300	270	290	380	325	215	225	225	235	225	240	230	H 230	225	235	235	245	245	235	225	250	250	260
26	275	285	305	335	375	355	335	225	215	230	230	225	H 215	215	225	240	225	240	220	205	235	260	250	255
27	295	310	305	265	225	230	265	235	215	235	235	230	220	225	225	235	255	240	A 255	240	230	A 240	230	235
28	265	285	270	285	280	270	290	260	225	230	230	235	235	230	235	250	240	235	215	235	230	225	240	270
29	265	250	245	270	310	350	280	235	225	225	235	235	230	230	225	235	240	235	255	245	220	240	250	255
30	250	235	270	285	305	295	255	235	220	225	230	225	H 230	230	240	235	250	245	245	235	225	240	255	285
31	275	260	255	335	365	375	335	245	225	230	230	235	B	240	235	E A 270	245	255	255	290	260	260	265	260
	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	30	31	31	31	31	30	31	30	31	31	31	31	29	29	28	29	31
MED	295	300	285	285	295	310	270	240	225	230	230	230	230	230	230	240	235	230	235	230	230	260	280	285
UQ	310	320	310	308	320	330	288	250	230	232	235	235	235	240	235	245	240	240	248	240	240	278	302	312
LQ	268	282	268	268	262	282	252	230	220	225	225	225	225	225	225	235	228	220	225	220	225	245	260	268

JAN. 1991 | H'F (KM)

IONOSPHERIC DATA

JAN. 1991 | H'E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	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 120	120	120	120	120	115	115	115		A 135							
2								B 140	A 130	A 130	120	115	115	115	115	115	130							
3								B 125	A 120	120	115	115	115	115	A 120	115	120							
4								B 125	120	115	120	115	110	A 120		130								
5								B 125	A 140	E A 135	A 135	115	120	115	A 125									
6								B 125	A 115	A 110	110	A 150	E A 140	A										
7								B 160	120	115	120	120	110	110	110	120	120							
8								E B 170	A 135	A	A	E A 135	A	120	120	A	E A 140	B						
9								B	A 125	115	A 130	115	110	A 125	110	115	125	B						
10								E B 170	A 125	A 135	A	A 130	115	A	A 120	A	E A 135	B						
11								B	125	120	A 135	130	E B 140	125	A 125	125	A	B						
12								A	A 135	A	115	115	120	115	115	110	120	B						
13								E A 140	125	120	120	125	120	120	120	A	A 130	B						
14								B	120	115	120	115	115	A	A	A	A	B						
15								E B 165	A 125	A	A 130	A 125	120	120	120	120	A	B						
16								B	130	120	120	115	120	115	120	120	A	B						
17								B 150	120	A 120	A	A	120	A	115	E A 135	B 125	B						
18								B	120	120	A	125	120	120	A 125	120	E A 135	B						
19								B	A 130	A	A 130	115	120	110	120	115	A 130	B						
20								B	120	A 125	115	115	120	120	120	115	120	B						
21								E B 170	120	110	115	A	115	A	A	A 130	A 135	B						
22								E B 170	120	120	120	120	120	A 130	A 135	A	A 130	A 130						
23								A	115	110	110	115	110	A 125	A	A	A	E B 160						
24								B 135	115	115	115	A 120	E A 125	B	A	A 125	A	B						
25							B	B 150	115	115	110	120	B 125	115	115	A	B	A						
26								B 170	120	120	120	115	115	A	A	A	A 135	B						
27								E S 150	A 135	A	120	120	120	120	A	120	A	A						
28								E B 160	120	110	110	120	A	120	A	E A 135	115	B						
29								145	115	110	115	A 135	115	115	120	A	A	A						
30								B 165	115	115	120	120	120	115	115	115	115	B 155						
31								B 150	110	110	115	B 145	B	B 120	125	115	115	A 135						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								17	29	25	26	29	28	24	23	21	21	4						
MED								U B 148	120	120	120	120	118	120	120	118	128	138						
UQ								E B 170	A 125	120	120	125	120	120	120	122	A 132	B 156						
LQ								B 145	120	115	115	115	115	115	115	115	120	A 132						

JAN. 1991 | H'E (KM)

IONOSPHERIC DATA

JAN. 1991 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	B	B	B	120	B	G	120	E G 180	G	150	140	130	115	160	115	105	105	110	100	105	B
2	B	B	B	B	B	B	B	G	105	110	105	105	G	G	E G 200	E G 165	135	B	B	B	B	120	B	B
3	B	B	B	B	B	115	120	B	115	G	E G 190	E G 170	G	G	E G 190	140	130	110	110	B	B	B	B	B
4	B	B	105	105	B	115	B	G	G	G	120	G	G	G	115	145	140	130	130	105	B	B	B	105
5	95	100	B	B	B	B	B	B	G	120	115	115	G	G	120	120	125	110	110	110	B	B	B	B
6	B	B	B	B	B	B	110	110	110	G	115	115	110	115	E G 165	155	105	105	B	B	B	B	110	B
7	B	B	B	B	B	B	B	G	155	125	120	125	130	120	G	115	G	B	B	110	110	110	110	B
8	105	115	115	110	B	B	B	G	120	115	115	120	120	120	120	115	110	110	105	105	105	100	100	95
9	95	100	110	B	B	B	B	120	120	120	115	G	G	110	135	135	120	110	110	110	105	110	95	105
10	115	100	105	110	B	B	120	G	115	115	120	110	G	110	125	105	105	100	105	110	105	100	100	B
11	B	B	B	B	B	B	B	B	G	G	125	E G 155	G	G	115	160	140	130	120	105	100	100	100	100
12	95	105	110	120	B	B	B	110	110	115	G	G	G	G	G	E G 190	145	120	105	115	105	105	105	100
13	110	110	B	110	B	B	115	110	E G 165	130	120	125	130	130	120	110	115	115	B	105	100	120	110	B
14	B	B	B	B	B	B	B	110	E G 185	G	120	110	110	110	110	110	110	115	105	105	100	105	95	100
15	B	110	120	115	115	110	110	110	110	105	110	115	120	120	130	110	110	115	110	110	105	110	110	105
16	110	105	120	115	120	125	B	B	G	150	E G 180	115	120	E G 190	145	120	120	110	110	105	105	105	100	105
17	115	115	110	110	115	115	120	G	G	110	105	110	140	130	125	130	120	110	110	110	105	95	100	100
18	B	B	B	B	B	B	B	B	145	120	120	G	G	G	115	G	105	100	100	110	B	B	B	B
19	B	110	120	110	115	B	115	115	110	110	105	G	E G 200	G	G	G	155	105	B	110	105	105	B	B
20	B	B	B	B	B	B	B	B	150	120	120	105	G	140	110	G	G	B	B	115	110	115	120	B
21	B	B	B	B	B	B	B	110	G	G	115	120	G	120	110	110	110	105	B	B	B	B	B	B
22	B	B	B	B	B	B	B	G	G	G	120	120	115	115	115	110	E G 175	110	105	105	115	110	100	B
23	B	B	B	B	105	100	105	105	G	E G 175	130	130	120	110	100	100	100	G	B	B	105	105	B	B
24	B	B	B	B	B	B	B	G	160	125	120	120	100	B	105	115	120	105	100	115	110	100	105	135
25	105	100	100	100	B	B	B	G	120	125	E G 170	120	130	125	120	110	B	105	105	105	105	100	100	100
26	B	B	B	B	B	B	B	G	G	120	150	E G 155	G	125	115	110	115	110	110	B	110	B	110	105
27	105	110	110	100	B	B	B	G	115	120	140	130	120	125	120	G	110	110	105	105	100	95	100	B
28	B	105	100	B	B	B	B	G	G	G	125	125	125	120	120	120	E G 160	140	110	105	B	B	B	B
29	B	B	B	B	B	B	B	G	G	G	120	120	140	135	110	115	110	110	105	110	B	B	B	B
30	B	B	B	B	B	B	100	G	G	G	120	G	G	G	G	160	G	G	B	B	115	B	B	B
31	105	105	B	B	B	B	B	G	E G 205	E G 175	105	155	B	G	120	110	110	115	B	105	B	100	125	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	11	14	12	11	5	6	10	9	18	21	30	24	17	20	27	27	27	26	21	24	21	21	20	12
MED	105	105	110	110	115	115	115	110	118	120	120	119	120	120	118	115	118	110	105	108	105	105	102	102
UQ	110	110	118	112	115	115	120	110	U 138	122	122	125	130	129	124	132	133	115	110	110	110	110	110	105
LQ	100	100	105	108	115	110	110	110	110	115	115	115	120	115	115	110	110	105	105	105	105	100	100	100

JAN. 1991 | H'ES (KM)

IONOSPHERIC DATA

JAN. 1991 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

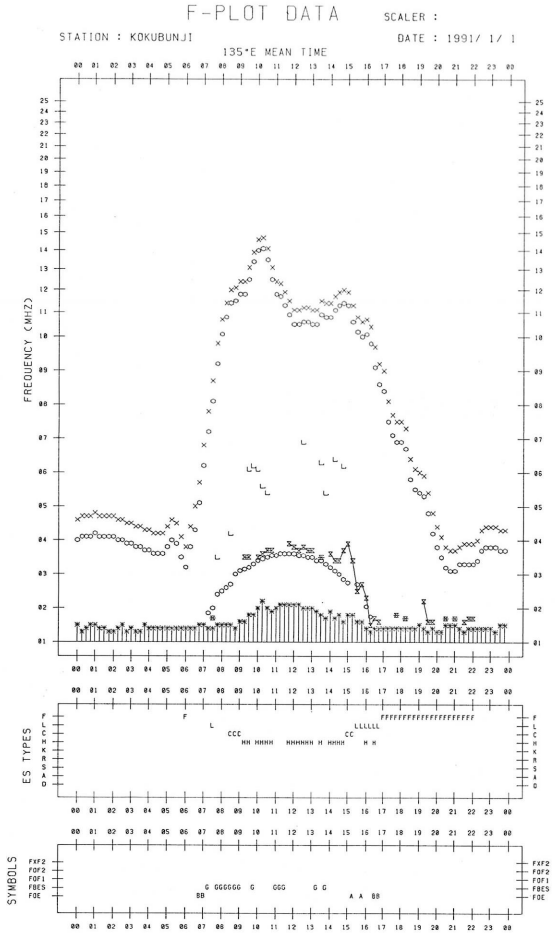
Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

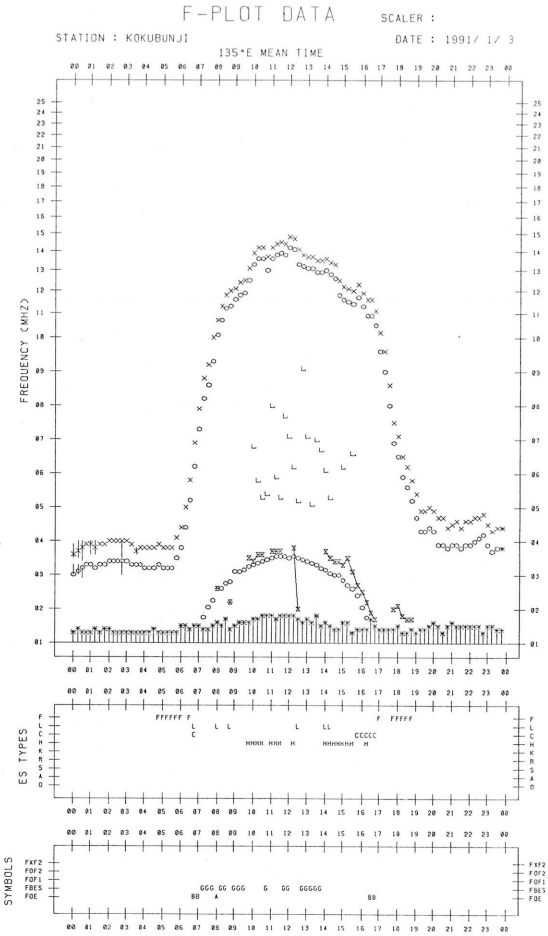
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							F 1			C 1	H 1		H 1	H 1	H 2	C 3	HL 11	F 1	F 3	F 2	F 2	F 2	F 1	
2									L 3	L 2	L 1	L 1			H 1	H 1	H 2					F 2		
3						F 2	F 1		L 2		H 1	H 1			HL 12	H 2	C 3	F 1	F 2					
4			F 1	F 1		F 1					C 2				L 1	HL 12	H 2	F 1	FF 11	F 1				F 1
5	F 2	F 1								C 1	L 1	L 1			C 1	C 1	C 2	F 3	F 4	F 4				
6							F 2	L 1	L 2		L 1	L 2	L 2	L 2	HL 12	HL 12	L 3	F 2					F 1	
7									HL 11	C 1	C 1	C 1	C 2	C 1		L 1				F 1	F 1	F 1	F 1	
8	F 1	F 1	F 3	F 1					L 2	C 2	L 2	L 1	L 1	C 1	C 1	L 2	L 2	L 1	F 3	F 1	F 1	F 3	F 4	F 4
9	F 2	F 1	F 1					L 1	L 1	C 2	L 1			L 1	H 1	H 2	H 2	C 3	F 2	F 2	F 3	F 2	F 1	F 3
10	F 1	F 1	F 1	F 2			F 1		L 1	L 1	CL 12	L 1		LH 21	CL 12	L 3	L 1	L 2	F 1	F 1	F 2	F 1	F 2	
11											L 1	H 1			L 1	H 1	HL 21	L 1	FF 21	F 3	F 4	F 4	F 3	F 1
12	F 1	F 1	F 1	F 1				L 4	LH 21	LH 21						HL 11	H 2	CL 11	F 2	FF 11	F 1	F 1	F 1	F 1
13	F 2	F 2		F 2			F 1	L 1	H 1	H 1	C 2	C 1	C 1	C 1	C 1	C 2	L 1	C 1		F 2	F 1	FF 12	F 2	
14								L 1	H 1		C 2	C 2	C 2	L 2	L 3	L 2	L 3	L 2	F 3	F 3	F 4	FF 23	F 2	F 1
15		F 2	F 1	F 1	F 7	F 2	F 1	L 1	L 1	L 2	LH 11	CL 11	CL 11	CL 21	CL 11	C 2	C 2	C 2	F 4	F 4	F 4	FF 23	F 1	F 1
16	F 1	F 2	F 1	F 2	F 1	FF 11				H 1	HC 11	C 2	C 1	H 1	H 2	C 2	C 2	C 3	F 4	F 4	F 4	F 3	F 3	F 2
17	F 1	F 1	F 1	F 3	F 2	F 2	F 1			L 2	L 2	LL 22	HL 11	HL 12	HL 11	CL 21	C 3	C 4	F 4	F 2	F 2	F 2	F 2	F 2
18									H 1	C 1	C 1				L 2		L 2	L 2	F 3	F 1				
19		F 2	F 2	F 2	F 1		F 1	L 1	L 3	L 3	L 2		HL 11				HL 12	L 1		F 1	F 1	F 1		
20									H 1	LL 11	CL 11	L 1		HL 11	L 1					F 3	F 2	FF 11	F 1	
21								L 1			C 1	C 1		L 2	L 2	L 2	L 2	L 2						
22											C 1	L 1	C 1	L 1	L 1	L 2	HL 12	L 1	F 3	F 2	F 1	F 1	F 2	
23					F 2	F 2	F 2	L 1		H 1	H 1	C 1	C 1	L 1	L 2	L 3	L 3				F 1	FF 12		
24									H 1	C 1	C 2	CL 22	L 2		LH 21	CL 22	CL 21	L 2	F 2	FF 32	F 3	F 4	F 2	F 1
25	F 1	FF 11	F 1	F 1			K 1		R 1	CH 11	HC 11	C 1	C 1	C 1	C 1	L 1		L 1	F 2	F 2	F 2	F 2	F 2	F 1
26										C 1	H 1	H 1		C 1	L 1	L 2	L 2	L 3	F 1		F 1		F 2	F 2
27	F 3	F 1	F 1	F 1					L 2	L 1	H 1	H 1	C 2	C 1	C 2		L 1	L 2	F 2	F 3	F 3	F 4	F 2	
28		F 1	F 1								C 1	C 1	C 1	L 1	CL 11	L 1	H 1	H 1	F 1	F 1				
29											C 1	CH 11	H 1	HL 11	C 2	L 2	L 2	L 3	F 2	F 1				
30							F 1				C 1					H 1					F 1			
31	F 1	F 1							H 1	H 1	L 1	H 1			C 1	C 3	L 1	L 1		F 2		F 1	F 1	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

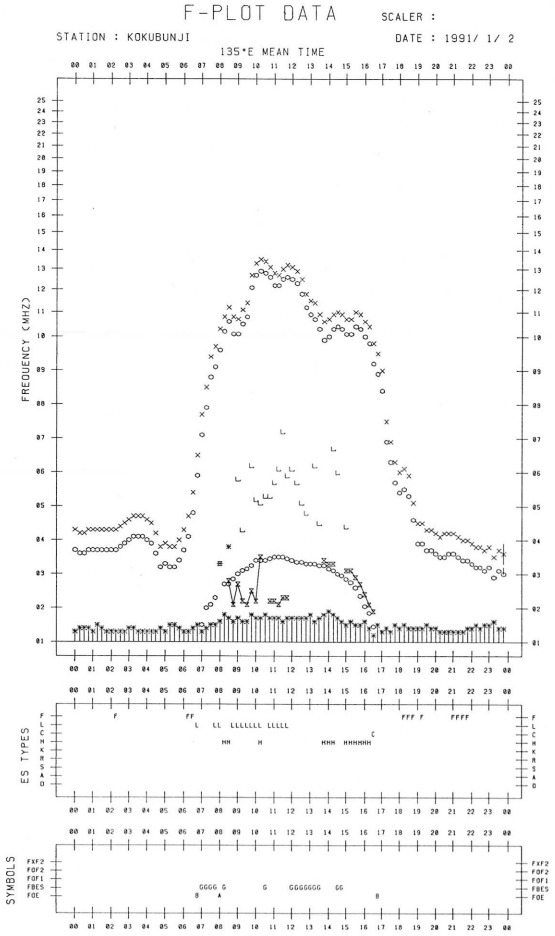
JAN. 1991 | TYPES OF ES

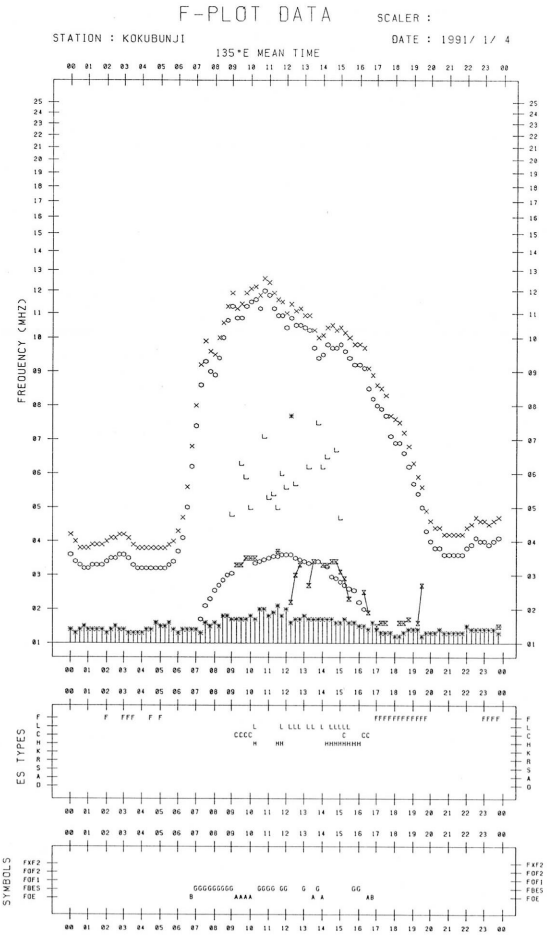
f-PLOTS OF IONOSPHERIC DATA

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


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


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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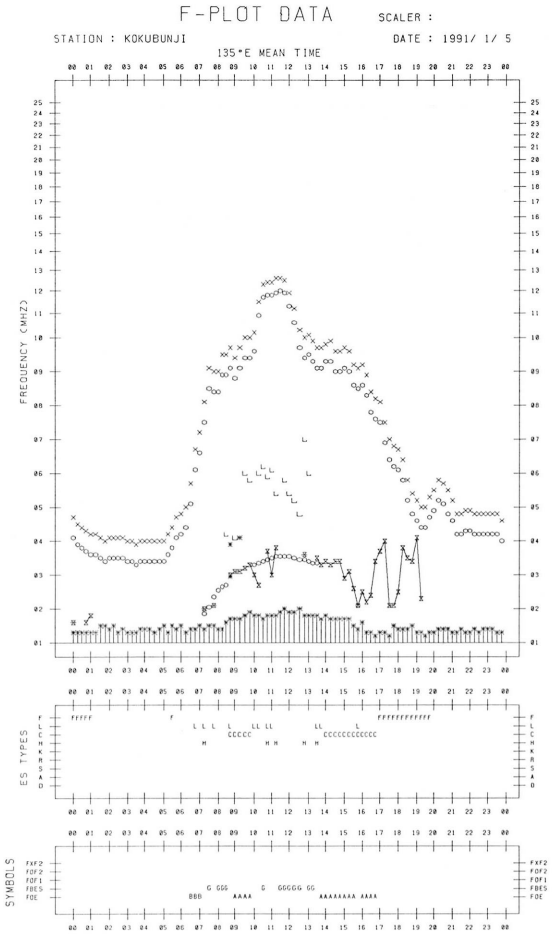
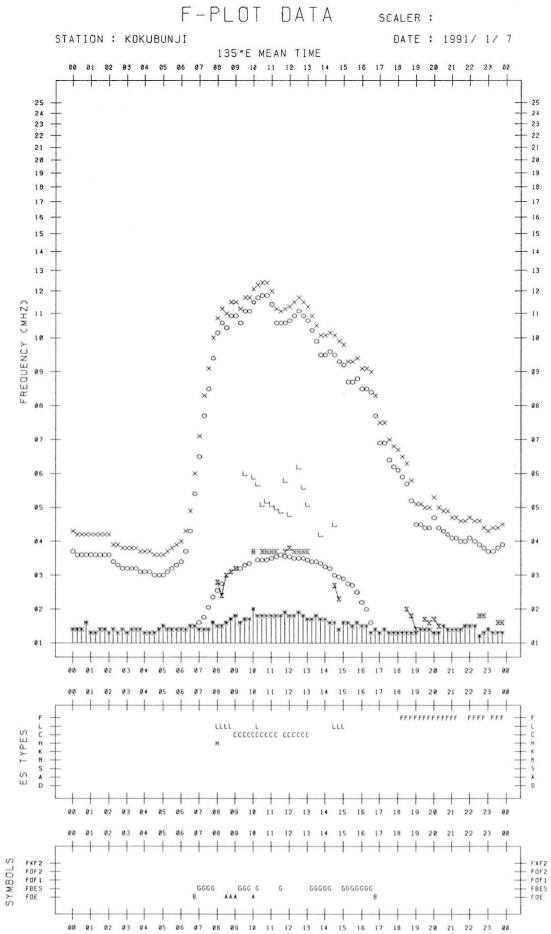
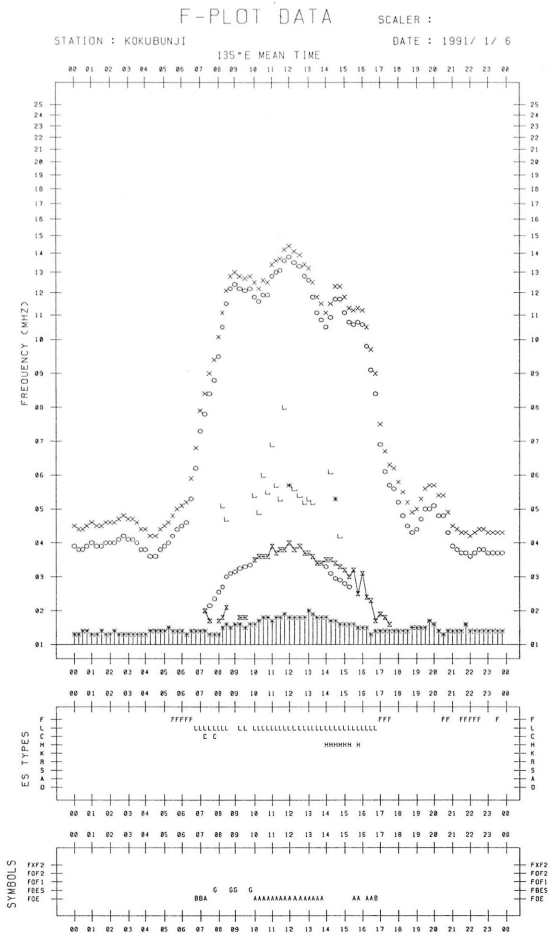
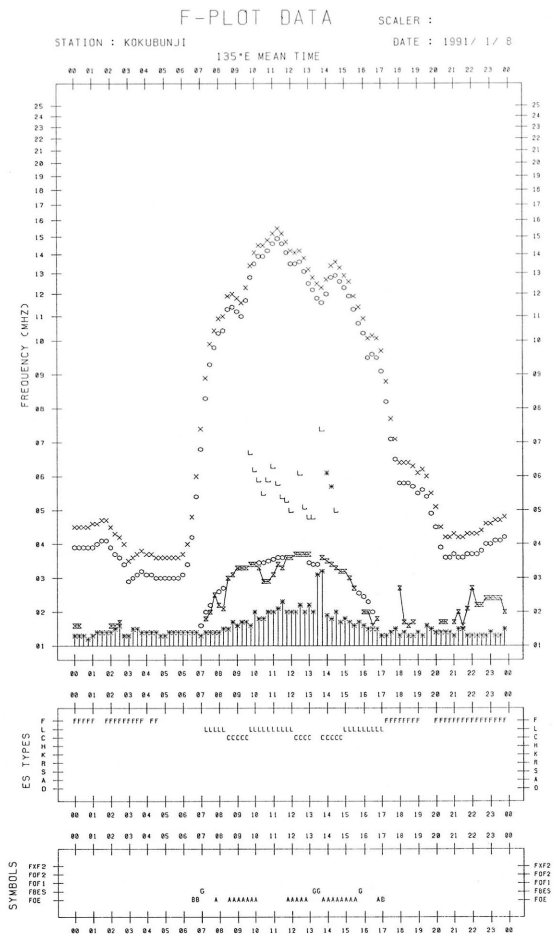
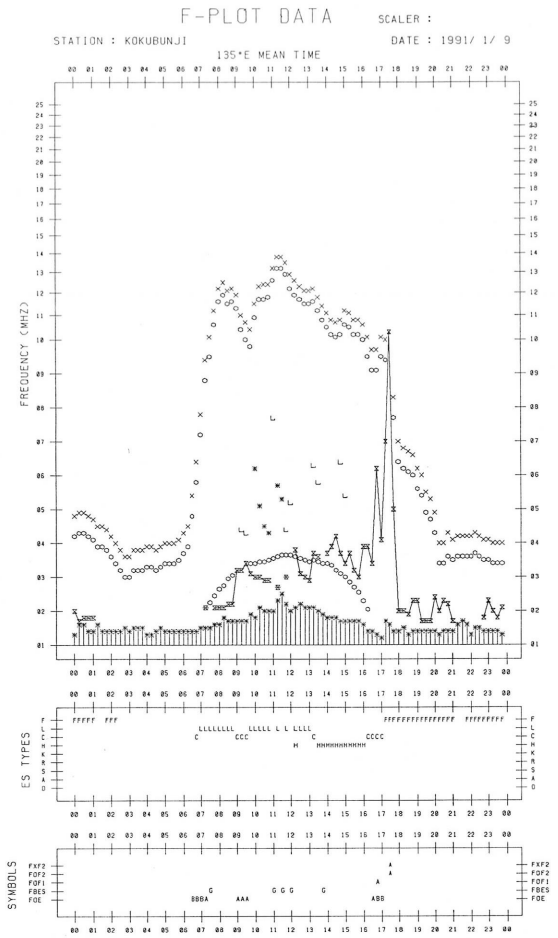
STATION : KOKUBUNJI
DATE : 1991/ 1/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

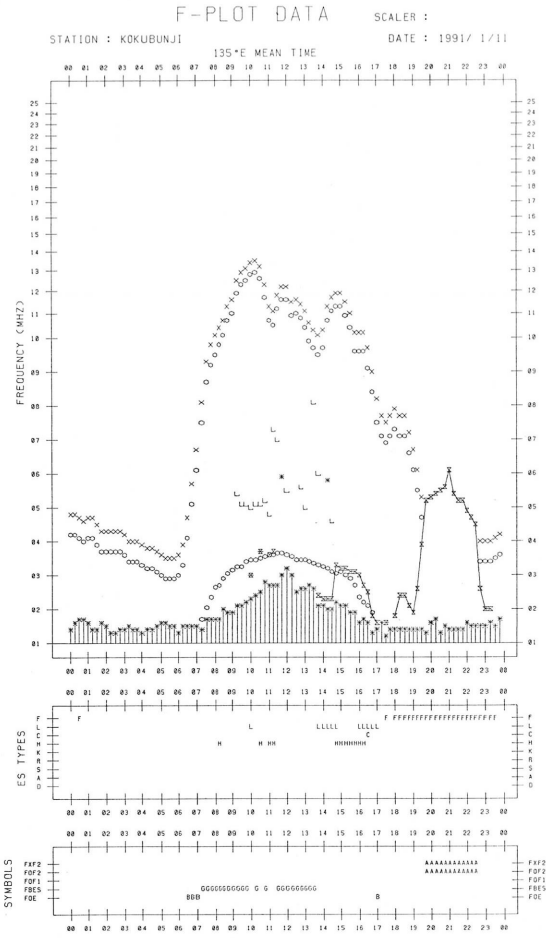

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

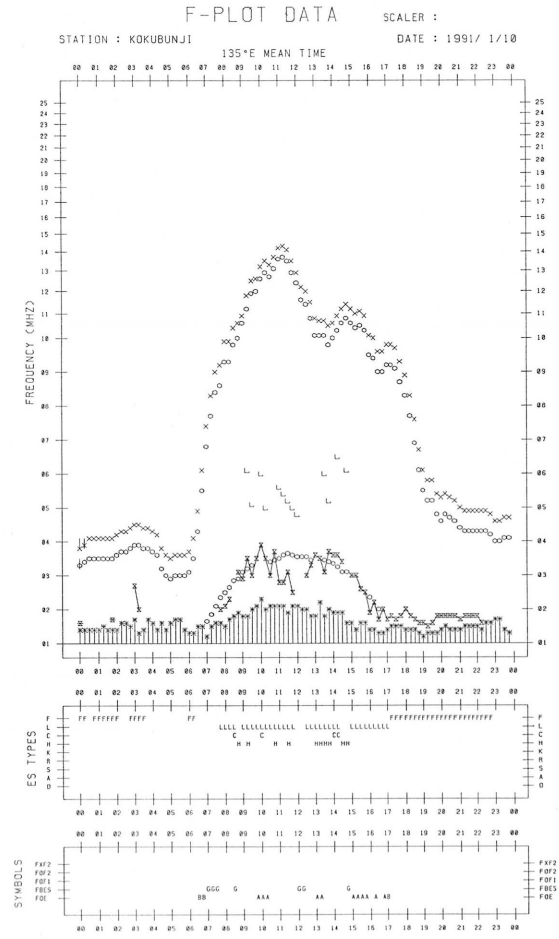

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

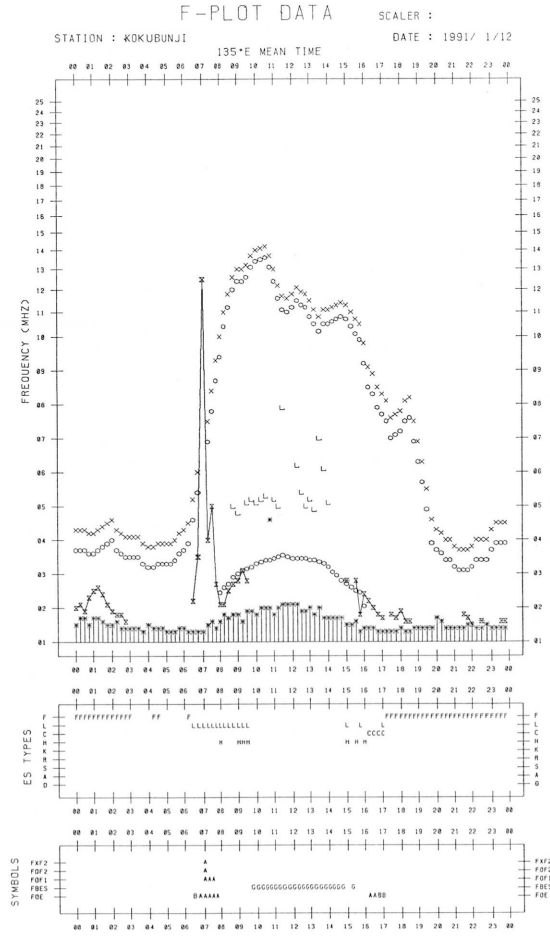

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

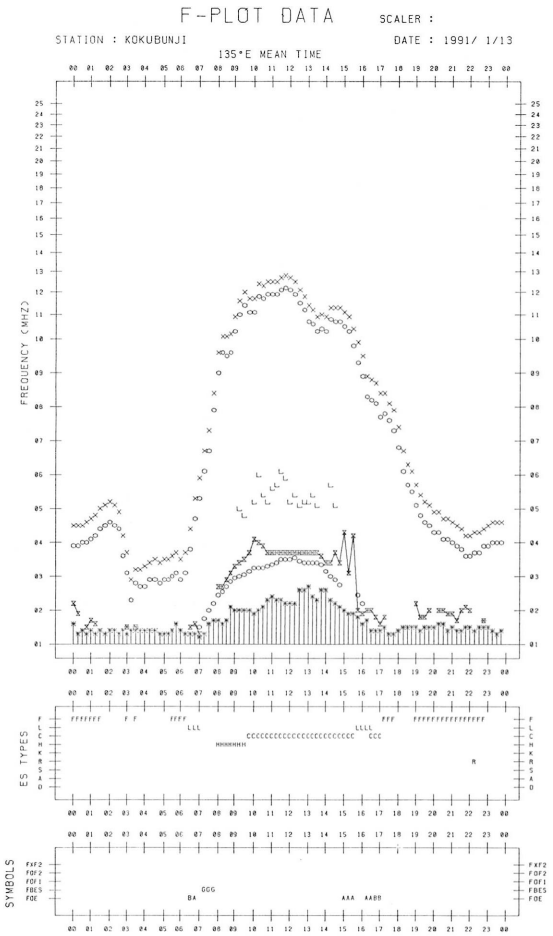

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

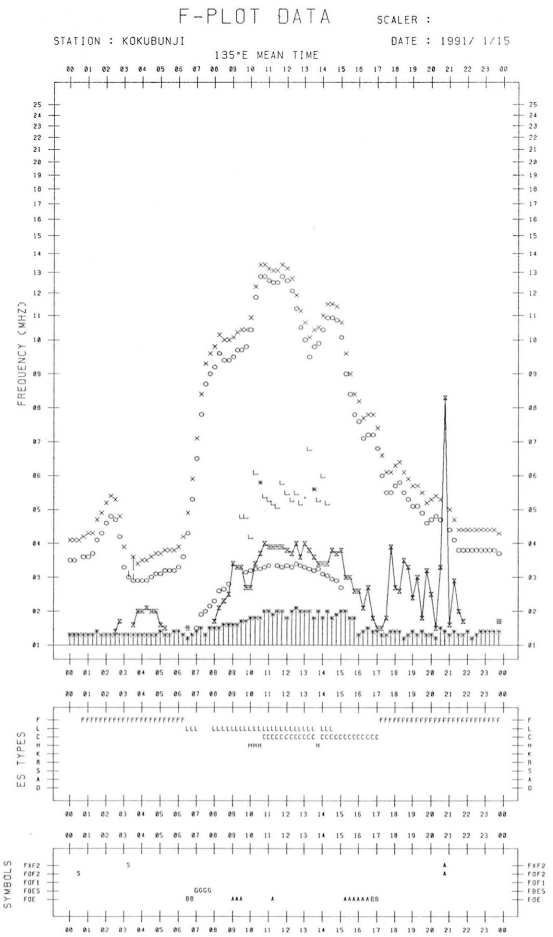

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

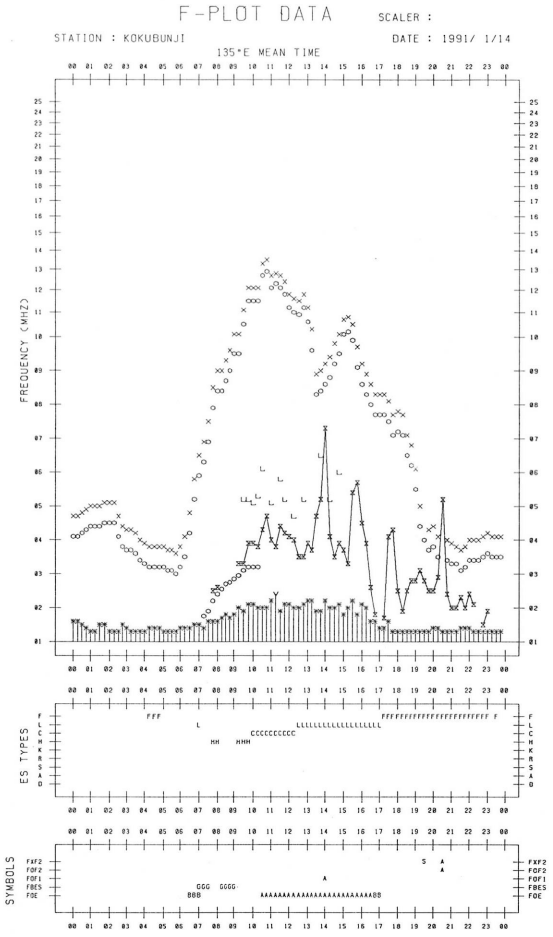

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

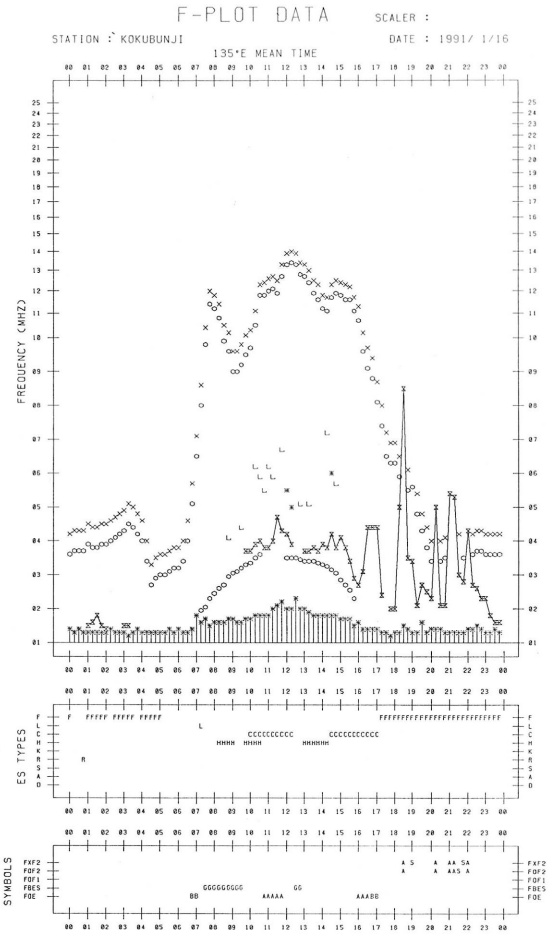

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

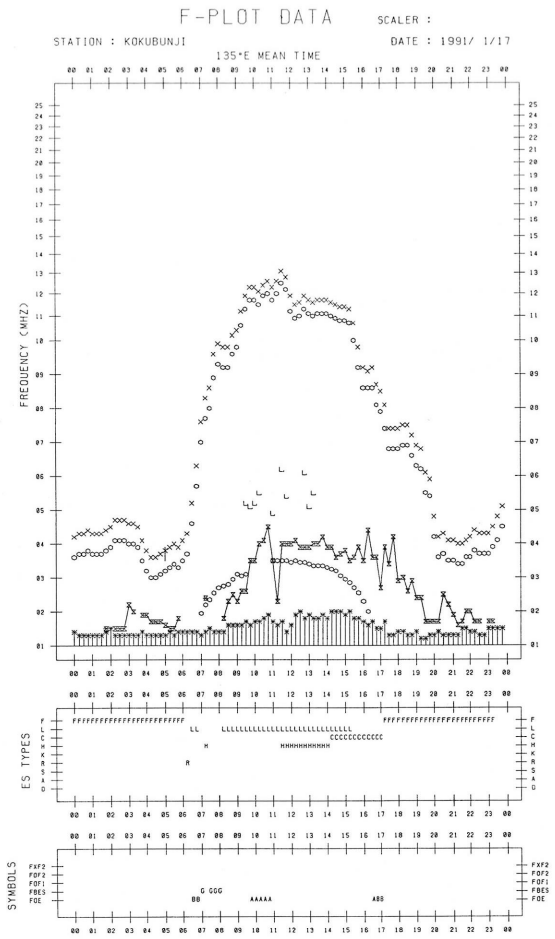

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

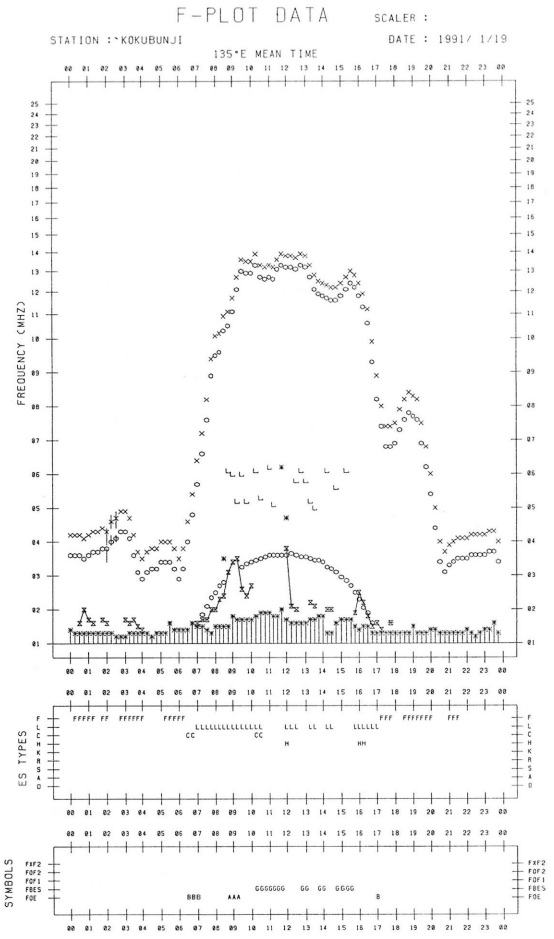

F-PLOT DATA SCALER :
STATION : KOKUBUNJI DATE : 1991/ 1/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

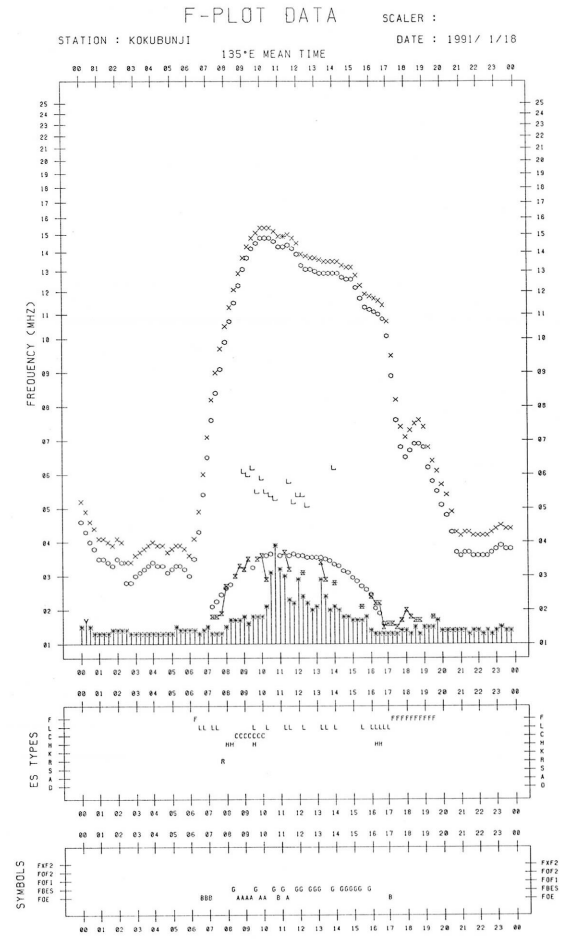

F-PLOT DATA SCALER :
STATION : KOKUBUNJI DATE : 1991/ 1/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

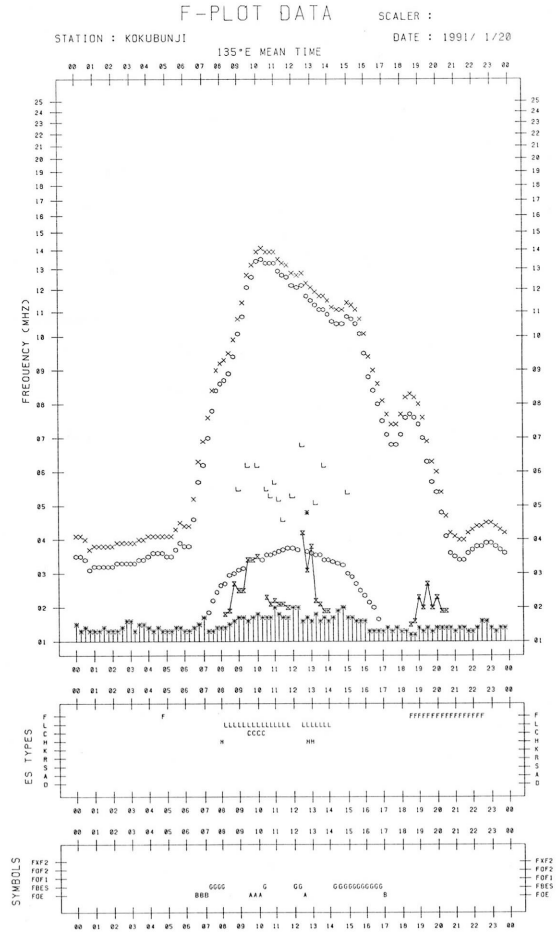

F-PLOT DATA SCALER :
STATION : KOKUBUNJI DATE : 1991/ 1/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

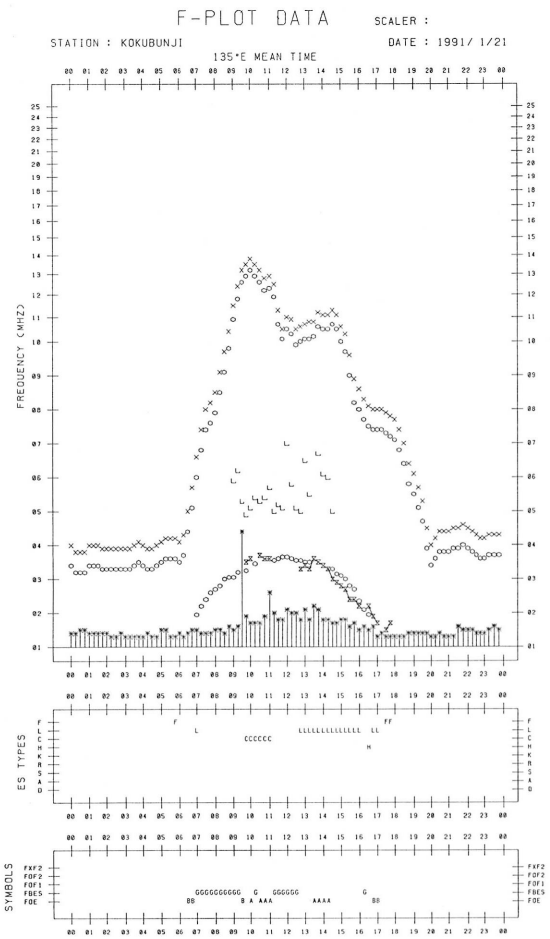

F-PLOT DATA SCALER :
STATION : KOKUBUNJI DATE : 1991/ 1/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

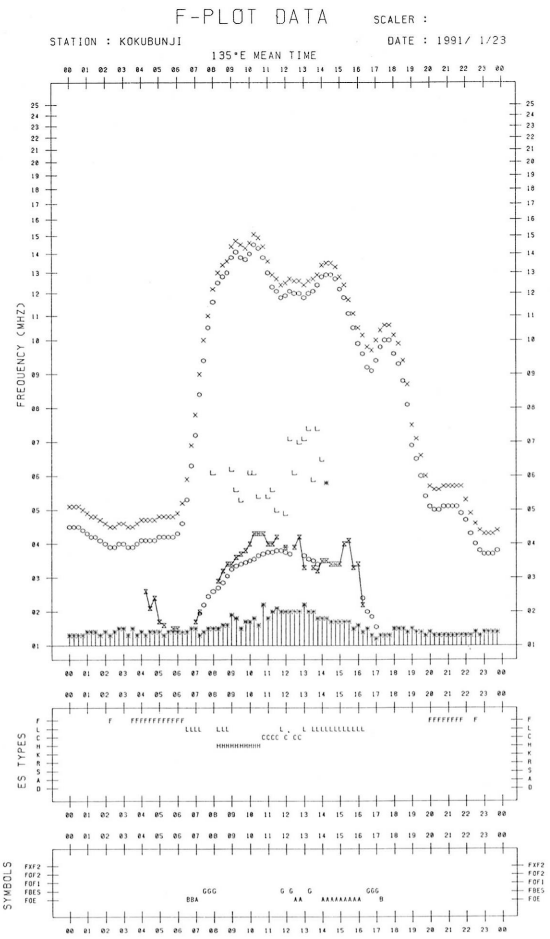

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

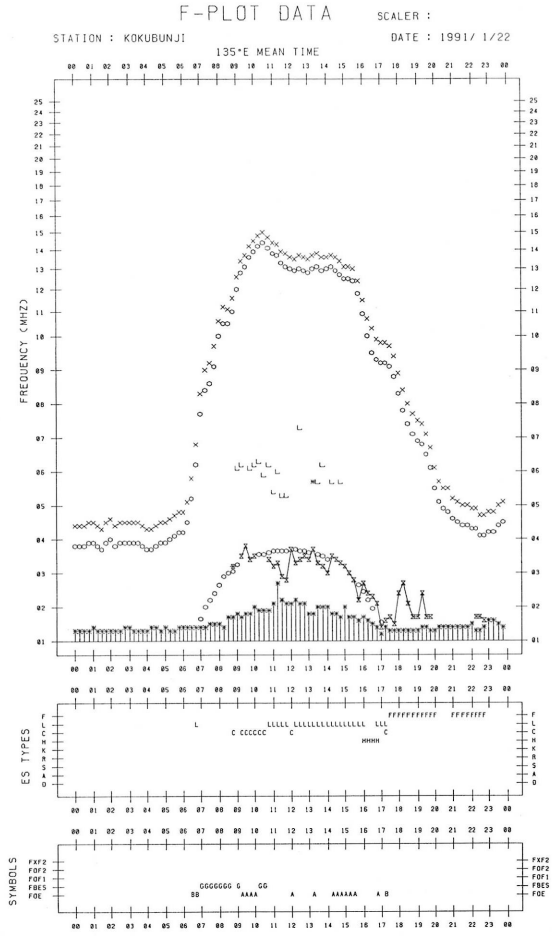

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

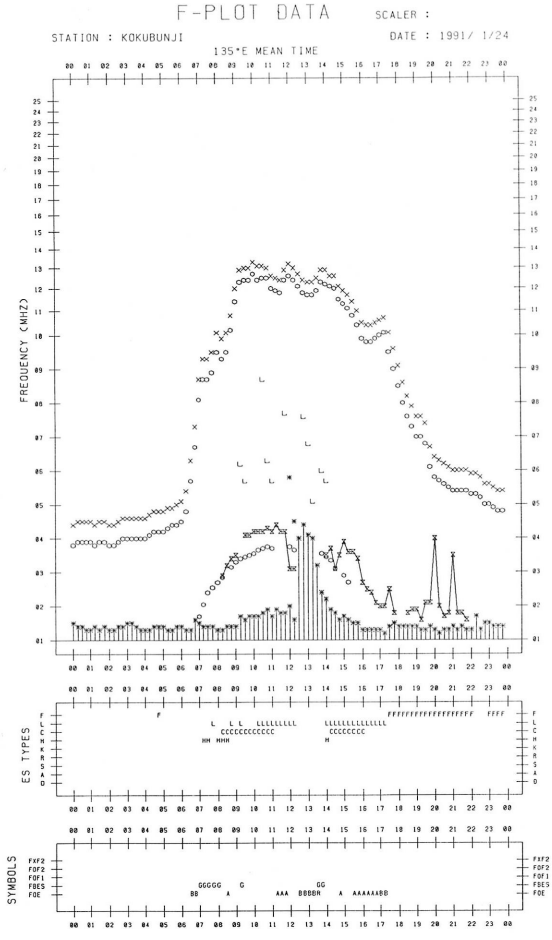

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

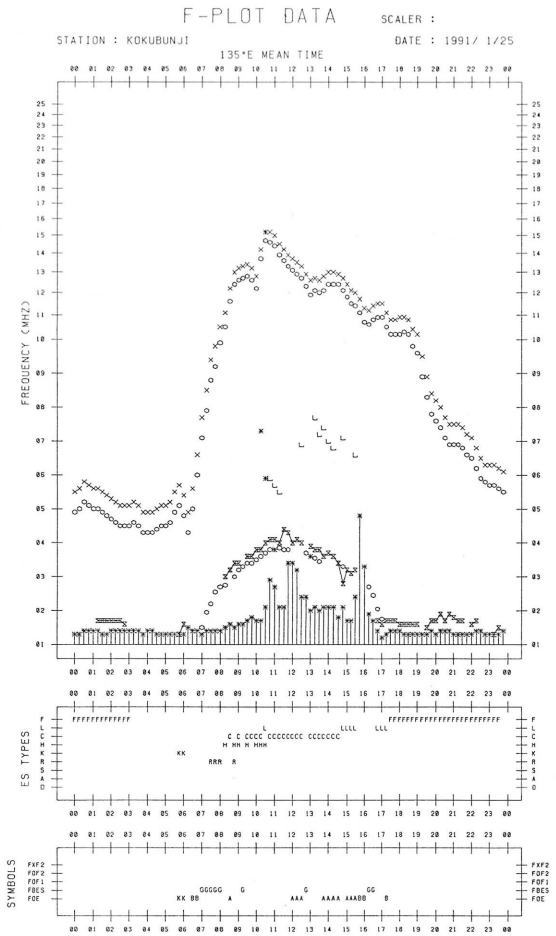

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

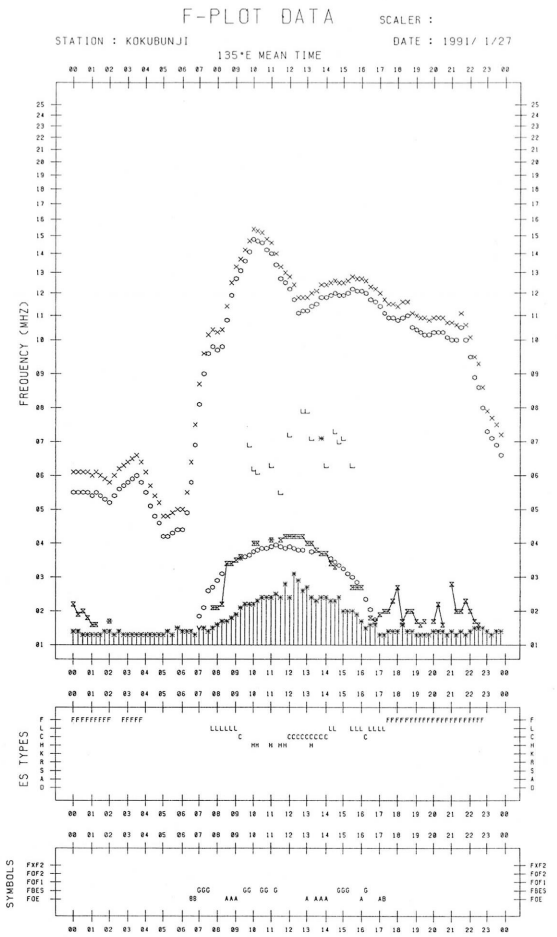

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

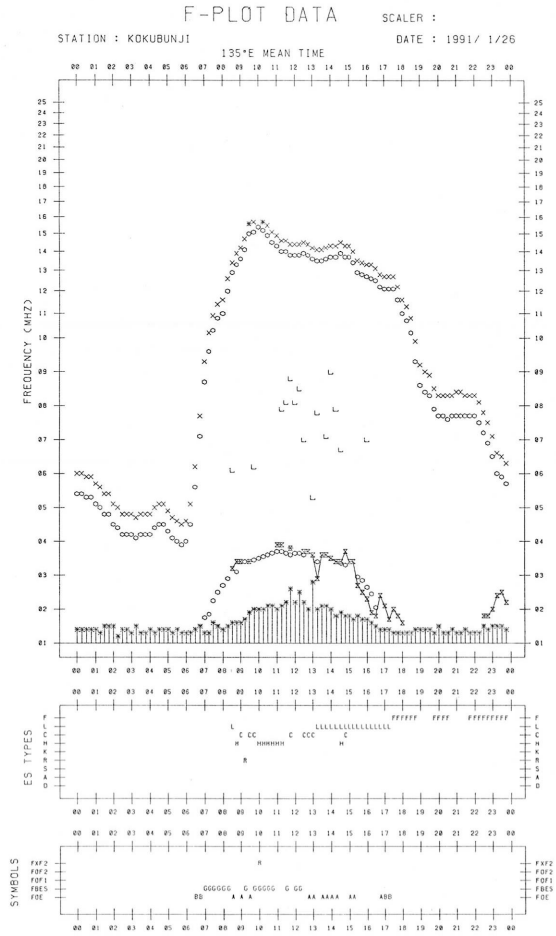

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

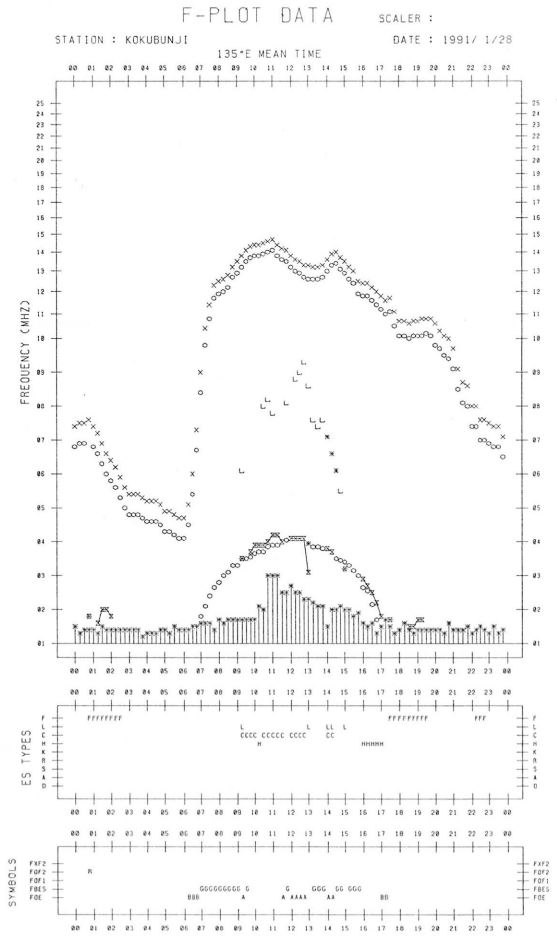

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

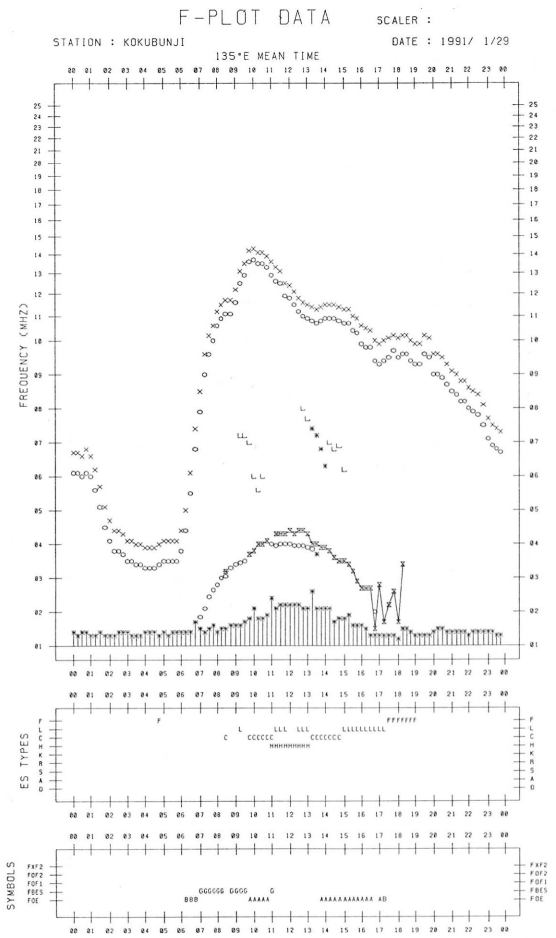

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

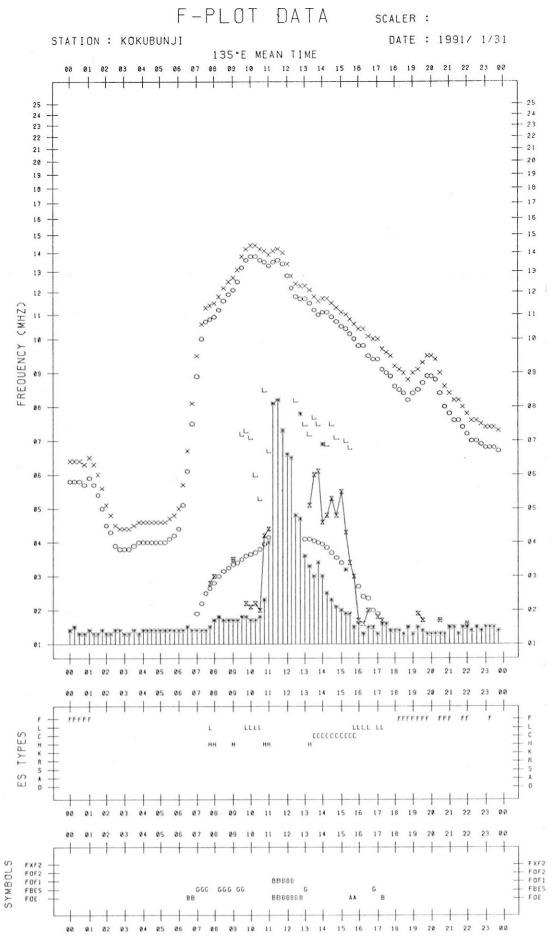

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/25
135*E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

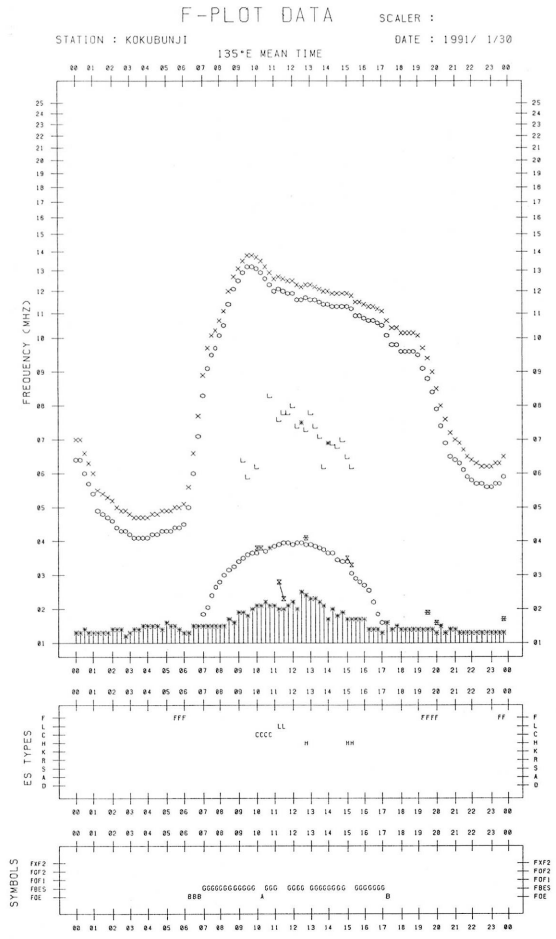

F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/27
135*E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/26
135*E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/28
135*E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 1/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER :
STATION : KOKUBUNJI
DATE : 1991/ 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

Hiraiso January 1991

Single-frequency total flux observations at 200 MHz										
FLUX DENSITY: 10^{-22} $Wm^{-2}Hz^{-1}$						VARIABILITY: 0 TO 3				
UT	00-03	03-06	06-09	21-24	DAY	00-03	03-06	06-09	21-24	DAY
DATE										
1	10	10	(10)	9	10	*	0	(0)	0	0
2	9	9	(10)	10	9	0	0	(0)	0	0
3	9	9	(9)	11	9	0	*	(*)	0	0
4	10	11	(B)	11	12	0	*	(3)	0	*
5	10	10	(10)	10	10	0	0	(0)	*	0
6	10	11	(11)	11	10	0	1	(1)	*	*
7	10	11	(12)	B	11	0	1	(1)	1	1
8	B	B	(B)	B	B	2	2	(2)	2	2
9	B	B	(B)	B	B	3	3	(3)	3	3
10	B	B	(B)	*	B	3	3	(1)	*	2
11	10	10	(10)	11	10	0	0	(0)	0	0
12	10	10	(10)	11	10	0	0	(0)	*	0
13	10	11	(B)	B	11	*	1	(2)	1	2
14	B	B	(B)	B	B	1	1	(0)	3	1
15	B	B	(B)	B	B	3	3	(3)	3	3
16	B	B	(B)	*	B	3	2	(3)	*	3
17	B	B	(B)	B	B	3	3	(*)	3	3
18	B	B	(B)	B	B	3	3	(3)	3	3
19	B	B	(B)	B	B	2	2	(2)	2	2
20	B	B	(B)	B	B	3	3	(1)	2	2
21	B	10	10	*	12	3	*	0	*	2
22	9	10	9	11	9	*	0	0	1	*
23	11	11	10	12	11	0	0	*	*	0
24	11	11	11	11	11	0	*	*	0	*
25	11	11	B	11	B	*	0	0	0	0
26	11	11	B	B	11	0	2	2	3	1
27	B	B	B	*	B	3	2	3	*	3
28	B	B	B	(B)	B	2	2	3	(1)	2
29	13	12	11	B	13	0	1	*	*	*
30	B	B	B	B	B	3	2	*	1	2
31	B	B	B	B	B	3	3	3	3	3

Notes: No observations during the following period.

none.

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso January 1991

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	*	*	(*)	(50)	*
2	(50)	*	(*)	(48)	*
3	49	51	(51)	(-)	50
4	56	53	(53)	(55)	54
5	55	54	(53)	(58)	54
6	56	55	(54)	(59)	56
7	59	58	(B)	(60)	B
8	65	B	(65)	(-)	B
9	65	65	(64)	(B)	65
10	B	B	(B)	(57)	B
11	57	56	(55)	(54)	56
12	57	55	(53)	(54)	55
13	55	53	(56)	(54)	55
14	56	55	(49)	(-)	54
15	58	59	(52)	(54)	56
16	B	57	(56)	(52)	B
17	54	55	54	(-)	54
18	B	56	56	(53)	B
19	53	54	54	(54)	54
20	54	56	55	(-)	55
21	62	56	58	(54)	59
22	57	57	56	(57)	56
23	57	57	56	(55)	57
24	56	B	57	(-)	B
25	58	59	B	(59)	B
26	59	60	59	62	59
27	62	63	62	-	62
28	B	B	B	63	B
29	63	64	65	-	64
30	B	B	B	70	B
31	73	B	70	B	B

Note: No observations during the following periods.

3rd 2148 - 2345. 8th 2150 - 2335. 14th 2150 - 15th 0015.
17th 2145 - 2350. 20th 2145 - 2350. 24th 2144 - 2355.
27th 2145 - 2350. 29th 2140 - 2350.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso — January 1991

Single-frequency observations

Normal observing period: 2150 - 0750 U.T. (sunrise to sunset)

JAN 1991	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
2	200	46 C	0547.5	0548.8	2.8	67	-	0
4	200	41 F	0618.0	0625.0	55.0	260	-	SR
6	200	42 SER	0618.7	0619.1	4.8	105	-	0
7	200	41 F	0433.7	0436.7	7.2	52	-	0
	500	27 RF	0540.0	0623.0	72.5	9	5	0
	200	41 F	0641.9	0643.8	3.7	39	-	0
	200	24 R	2150E	-	400D	-	4	0
	200	42 SER	2352.8	0005.3	33.7	205	-	0
8	200	42 SER	0120.5	0146.8	42.2	185	-	0
	500	8 S	0213.8	0214.0	0.6	245	-	0
	200	42 SER	0233.0	0243.9	85.8	91	-	0
	500	27 RF	0337.5	0407.5	40.0	10	4	0
	500	46 C	0419.0	0429.5	62.5	253	34	0
				0439.0		113		0
	100	27 RF	0426.0	0538.0	178	97	18	-
	200	46 C	0427.7	0429.1	118.8	192	51	0
				0438.3		53		0
				0509.9		62		0
				0551.4		38		MR
	200	43 NS	2230	0200	545D	17	8	0
	200	41 F	2248.0	2249.5	4.0	185	-	0
9	200	42 SER	0117.2	0221.5	69.0	260	-	0
	200	42 SER	0456.8	0523.7	49.5	42	-	0
	100	44 NS	2150E	2216	160D	32	14	-
	200	44 NS	2150E	2307	580D	95	38	0
	500	24 R	2150E	2326	580D	35	9	0
	200	41 F	2229.7	2233.6	4.6	410	-	0
	200	8 S	2250.8	2250.8	0.8	450	-	0
	200	41 F	2318.5	2320.7	7.9	170	-	0
10	200	46 C	2252.1	2253.4	2.8	140	-	0
11	500	4 S/F	0012.2	0016.3	7.8	11	-	WR
	200	8 S	0719.1	0719.1	0.8	2700	-	0
12	500	4 S/F	0128.0	0131.2	4.0	12	-	WR
	200	42 SER	0129.7	0139.6	15.8	84	-	0
	200	42 SER	0223.6	0224.1	5.9	140	-	0
	500	42 SER	0305.5	0306.7	6.5	75	-	MR
	100	42 SER	0312.5	0321.7	67.0	240	-	-
	200	42 SER	0413.2	0523.1	82.5	105	-	0
	100	42 SER	0504.0	0522.4	33.0	730	-	-
	500	42 SER	0702.3	0708.2	16.0	200U	-	ML SUNSET
	200	42 SER	0703.1	0707.9	15.8	150	-	0
13	500	42 SER	0023.8	0039.2	17.0	96	-	ML
	500	46 C	0402.0	0403.0	3.0	27	-	WL
	100	46 C	0402.5	0403.3	2.0	750	-	WL
	200	8 S	0402.6	0403.3	0.8	130	-	0
	200	42 SER	0640.9	0645.9	39.6	220	-	SR
	100	45 C	0720.1	0721.1	4.0	3000	-	0
	200	24 R	2150E	0300	580D	7	3	WL
	100	44 NS	2150E	0606	580D	34	12	-
	100	41 F	2306.6	2307.0	2.8	370	-	-
	500	41 F	2306.7	2307.5	3.4	106	-	WR
14	500	46 C	0039.3	0040.8	14.0	17	6	WR
	500	46 C	0125.3	0127.0	14.5	45	7	WR
	200	41 F	0235.6	0236.3	2.6	2800	-	0
	500	22 GRF	0250.0	0309.0	75	13	-	WR
	100	42 SER	0317.6	0318.2	41.0	1000	-	0
	200	42 SER	0317.7	0318.0	5.9	135	-	0
	100	42 SER	0433.0	0446.5	15.2	1600	-	-
	500	22 GRF	0433.0	0458.0	53.0	14	-	WR
	200	42 SER	0437.3	0437.6	46.8	240	-	WR
	200	44 NS	2150E	0443	580D	106	49	SR
15	100	8 S	0051.5	0051.5	0.5	517	-	-
	500	8 S	0051.5	0051.5	0.6	104	-	ML
	500	42 SER	0109.0	0157.0	87.5	181	-	SL
	100	42 SER	0135.6	0136.6	22.4	7100	-	ML
	500	23 GRF	0251	0300	78	9	-	WR
	500	46 C	0527.5	0545.0	28.0	21	7	WR
	500	46 C	0630.0	0630.5	30.0	150	8	MR
				0635.0		16		WR
	100	42 SER	0707.6	0721.1	15.2	1000	-	-
	200	44 NS	2149E	0221	580D	47	14	SR
	500	20 GRF	2323	0026	210	15	6	WR
16	100	41 F	0621.1	0621.8	3.3	1000D	-	-
	200	42 SER	0621.1	0624.0	21.1	85	-	ML
	200	42 SER	0702.6	0725.9	24.4	120U	-	ML SUNSET
	500	4 S/F	2240.8	2241.5	2.9	42	-	ML
	500	42 SER	2333.2	2334.5	38.8	35	-	WL

JAN 1991	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} $Wm^{-2}Hz^{-1}$) PEAK	FLUX DENSITY (10^{-22} $Wm^{-2}Hz^{-1}$) MEAN	POLARIZATION REMARKS
17	200	43 NS	0046	0200	380	13	6	ML
	500	42 SER	0046.5	0102.7	18.0	48	-	ML
	500	41 F	0300.8	0301.0	4.4	45	-	WL
	200	44 NS	2147E	0053	580D	190	45	SL
	100	43 NS	2342	0100	380D	340	80	-
18	500	42 SER	0032.4	0033.2	8.3	144	-	WL
	500	21 GRF	0119	0155	63	5	2	WL
	500	42 SER	0134.3	0142.4	11.2	14	-	WL
	100	42 SER	0140.3	0142.2	10.6	620	-	-
	100	42 SER	0427.7	0452.8	73.3	530	-	-
	200	44 NS	2147E	2336	600D	11	4	WL
19	500	41 F	0129.0	0129.4	1.1	22	-	0
	500	41 F	0231.0	0232.5	2.6	56	-	0
	100	46 C	0407.3	0407.6	1.5	624	-	-
	200	44 NS	2146E	0430	600D	19	9	0
20	200	42 SER	0215.2	0247.5	49.5	135	-	0
	200	42 SER	0326.4	0332.3	73.0	105	-	0
	100	42 SER	0506.0	0604.3	76.0	860	-	0
	200	42 SER	2207.3	2215.1	79.0	185	-	0
21	500	46 C	0015.8	0018.2	4.7	47	-	0
	200	42 SER	0100.0	0117.8	68.0	2900	-	0
	500	27 RF	0600.0	0636.5	63.5	27	8	0
23	200	41 F	0515.0	0519.8	5.0	29	-	0
	100	46 C	0524.0	0526.0	2.4	190	-	WL
	100	46 C	0202.4	2203.1	1.3	780	-	ML
24	500	8 S	0114.4	0114.5	0.9	84	-	0
	500	46 C	0320.4	0408.2	90.0	183	35	0
				0331.5		33		0
				0340.0		27		0
				0439.0		63		0
	200	48 C	0320.9	0323.1	21.1	9100	370	0
				0325.0		1400		0
				0340.9		65		0
	100	48 C	0321.5	0335.0	29.0	1000D	153D	0
	100	42 SER	2203.6	-	7.9	1000D	-	-
	200	42 SER	2207.4	2209.4	3.3	890	-	0
25	500	41 F	0304.4	0304.6	1.8	46	-	0
	100	42 SER	0354.1	0358.1	7.3	1000	-	-
	200	8 S	0357.4	0357.7	0.9	130	-	0
	500	41 F	0358.4	0359.4	1.2	16	-	0
	500	41 F	0454.5	0456.0	3.0	151	-	0
	200	48 C	0630.8	0631.6	90.0	48000	510	0
				0633.3		290		0
				0634.0		1300		0
		29 PBI		0656.0	70D	38	15	0 SUNSET
	500	48 C	0631.0	0632.7	37.6	43000	790	0
				0631.3		12000		0
				0652.8		70		0
				0704.6		30		0
	100	48 C	0631.0	-	67.0	1000D	215D	-
26	200	46 C	0218.0	0218.2	1.0	97	-	ML
	100	46 C	0218.2	0218.8	1.1	560	-	-
	200	43 NS	0446	0600	185D	3	2	0
	200	44 NS	2143E	0620	610D	15	7	0
	200	42 SER	2204.0	2238.0	69.0	85	-	0
27	200	42 SER	0016.0	0024.4	124.0	145	-	0
	200	42 SER	0248.8	0249.5	19.0	90	-	0
	200	42 SER	0546.0	0646.2	76.0	140	-	0
	200	44 NS	2142E	0621	610D	21	9	0
28	500	24 R	0127	0308	390D	11	7	0
29	200	8 S	0111.0	0111.6	0.9	540	-	0
	200	44 NS	2142E	0028	615D	32	11	WL
	200	42 SER	2148.0	2244.2	55.0	450	-	0
	500	24 R	2350E	0026	490D	25	9	WL
30	500	46 C	0252.9	0254.5	3.2	180	-	0
	200	46 C	0446.9	0448.0	2.0	145	-	0
	200	41 F	0521.8	0537.6	31.0	65	-	0
	200	46 C	2215.2	2216.7	3.3	1050	-	0
	500	46 C	2215.3	2217.0	5.0	52	-	WR
	100	8 S	2216.9	2217.0	1.1	640	-	-
	200	43 NS	2300	0417	540D	17	10	WR
31	200	42 SER	0104.9	0105.1	31.0	410	-	ML
	200	46 C	0155.6	0208.9	79.0	240	33	WL
				0247.2		80		MR
	100	46 C	0156.1	0208.6	106.0	1000D	115D	-
				0227.1		460		-
	500	46 C	0156.5	0204.0	162.0	930	41	SL
				0224.5		57		WR
				0250.0		327		MR
				0306.0		157		MR
				0325.5		67		MR
	200	44 NS	2140E	0516	620D	50	29	0

C. RADIO PROPAGATION

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

JAN 1991 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 17M	01H 17M	02H 17M	03H 17M	04H 17M	05H 17M	06H 17M	07H 17M	08H 17M	09H 17M	10H 17M	11H 17M	12H 17M	13H 17M	14H 17M	15H 17M	16H 17M	17H 17M	18H 17M	19H 17M	20H 17M	21H 17M	22H 17M	23H 17M
1	-10	-4	-4	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	-37	-25	-21
2	3	8	8	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	9	3
3	4	7	4	9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-5	7	5
4	8	14	8	14	ES -24	ES -24	ES -24	ES -24	ES -24	-3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-1	6	3
5	3	9	13	0	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-6	3	6
6	3	12	10	16	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	7	4
7	3	12	11	8	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	4	3
8	6	11	11	12	ES -24	ES -24	ES -24	ES -24	-2	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	3
9	7	8	9	11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	-9	6	6
10	7	8	9	11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	-9	6	6
11	2	3	7	6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-7	-3	1	4
12	2	3	12	11	5	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	-3	3
13	3	7	5	7	14	19	3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-1	2
14	2	0	9	5	2	ES -24	ES -24	-7	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	4	ES -24	ES -24	ES -24	-12	-1	-1
15	3	4	9	-9	ES -24	ES -24	-12	-1	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	-11	-11
16	1	2	8	6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	3
17	5	7	12	ES -24	ES -24	ES -24	ES -24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	C	2	4
19	2	0	3	6	ES -24	2	ES -24	ES -24	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	11	7
20	1	8	8	13	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	7	12
	ES				ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES		
21	-24	7	11	15	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	9	9
22	11	10	7	14	-3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	9	3
23	2	11	12	16	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	8	7
24	9	6	10	17	8	2	20	3	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	1	ES -24	ES -24	ES -24	ES -24	ES -24	-9	2	5
25	-1	-1	6	6	13	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	9	ES -24	ES -24	ES -24	ES -24	ES -25	ES -25	ES -25	ES -25
26	ES -24	-3	1	18	15	11	7	ES -24	1	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-4	-9	4	-9	ES -24	-12	ES -24
27	-9	-12	1	1	ES -24	ES -24	ES -24	ES -24	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -24	-12	2	2
28	-5	2	1	1	9	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	0	0
29	9	9	6	12	9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	2	-1	ES -24	ES -24	ES -24	ES -24	ES -24	0	0
30	ES -25	-10	-7	1	11	-2	ES -25	ES -25	-12	ES -25	-8	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -24	ES -24	-7	3
31	ES -25	ES -25	ES -25	ES -25	-4	7	12	12	-5	ES -24	-11	ES -24	ES -24	ES -24	ES -24	-1	-6	ES -24	-3	ES -24	ES -24	ES -24	ES -24	-12
CNT	30	30	30	30	30	30	30	29	29	29	29	29	30	30	30	30	30	30	30	30	30	29	30	30
MED	2	7	8	8	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	2	3
UD	9	12	12	16	13	7	7	-1	-5	ES -24	ES -23	ES -24	ES -24	ES -24	ES -24	1	ES -24	ES -24	ES -24	ES -24	-9	-5	9	7
LD	ES -24	-10	-4	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -25	ES -24	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -24	-21

C. RADIO PROPAGATION

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

JAN 1991 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M
1	4	9	13	20	26	25	27	19	21	4	-11	ES -23	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	ES -48	-7	-13	-11	-24
2	9	14	14	13	22	20	20	22	19	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-3	19	12	3
3	18	8	7	14	24	27	18	28	27	11	4	-9	2	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	15	15	7
4	6	7	21	24	24	24	26	23	16	23	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	18	9	12
5	18	14	15	19	22	28	23	5	19	13	9	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	4	15	12	8
6	8	10	14	24	26	23	28	20	26	13	-9	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	14	13	8
7	12	13	14	20	25	15	18	17	21	18	8	-9	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	15	12	18	12
8	11	9	12	16	20	24	22	18	23	10	-9	-9	-12	ES -24	-9	ES -24	ES -24	ES -24	ES -24	ES -24	3	11	10	9
9	4	12	16	13	18	25	25	20	9	ES -24	ES -24	-12	-6	ES -24	ES -24	ES -24	ES -24	ES -24	10	9	14	12	11	8
10	4	12	16	13	18	25	25	20	9	ES -24	ES -24	-12	-6	ES -24	ES -24	ES -24	ES -24	ES -24	10	9	14	12	11	8
11	2	3	8	15	21	22	29	19	13	17	7	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	8	12	14	11
12	7	12	13	18	20	22	23	12	-6	15	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	10	15	7	12
13	12	14	15	19	22	25	23	23	23	-9	ES -24	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-5	ES -24	13	17	12	9
14	-1	13	12	18	18	24	20	18	6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	6	13	14	3
15	8	14	14	23	23	23	16	-9	ES -24	-6	3	3	11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-12	11	15	14	12
16	12	8	16	20	21	26	23	18	17	-9	-12	-12	-12	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	4	19	9	13
17	12	18	12	15	21	22	27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	13	19	14	12
19	11	10	13	21	23	19	22	34	27	17	-2	-9	-12	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	21	18	16	4
20	8	14	14	18	22	23	23	28	26	15	1	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	14	17	14	14
											ES	ES	ES	ES	ES	ES	ES	ES	ES	ES				
21	-12	9	13	16	23	26	29	28	35	12	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	12	17	14	12
22	12	11	17	20	26	28	34	34	30	24	12	2	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	10	23	18	12
23	7	13	18	24	27	26	29	32	34	24	12	23	16	-9	ES -24	ES -24	ES -24	ES -24	ES -24	2	12	13	14	12
24	13	10	14	ES -24	17	27	32	29	24	27	7	2	-6	-1	8	-12	ES -24	ES -24	ES -24	-3	3	14	12	10
25	11	ES -24	-9	13	25	31	18	29	41	26	31	13	2	0	12	ES -24	ES -24	ES -24	ES -24	ES -24	5	3	9	6
26	6	8	12	18	26	26	32	29	28	17	12	1	2	ES -24	ES -24	ES -24	ES -24	27	18	13	2	12	2	-9
27	4	2	3	16	22	26	27	34	17	19	21	14	-1	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	17	7	12	7	2
28	1	ES -25	1	20	24	24	32	26	34	26	19	13	9	6	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	13	15	9	3
29	9	7	10	14	24	24	27	34	26	23	25	27	20	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	8	9	3	6
30	-2	-1	11	11	19	24	28	28	22	26	29	21	16	-10	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	4	17	2	2
31	-4	4	ES -25	ES -25	6	26	23	26	24	22	18	20	11	-11	-11	-9	ES -24	ES -24	ES -24	ES -24	-11	4	12	-10
CNT	30	30	30	30	30	30	30	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	8	10	13	18	22	24	25	23	23	15	3	-9	-12	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	8	14	12	8
UD	13	14	17	24	26	28	32	34	34	26	25	21	16	-1	-9	ES -24	ES -24	ES -24	10	9	14	19	16	12
LD	-2	-1	1	11	18	20	18	12	6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-3	4	2	-9

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

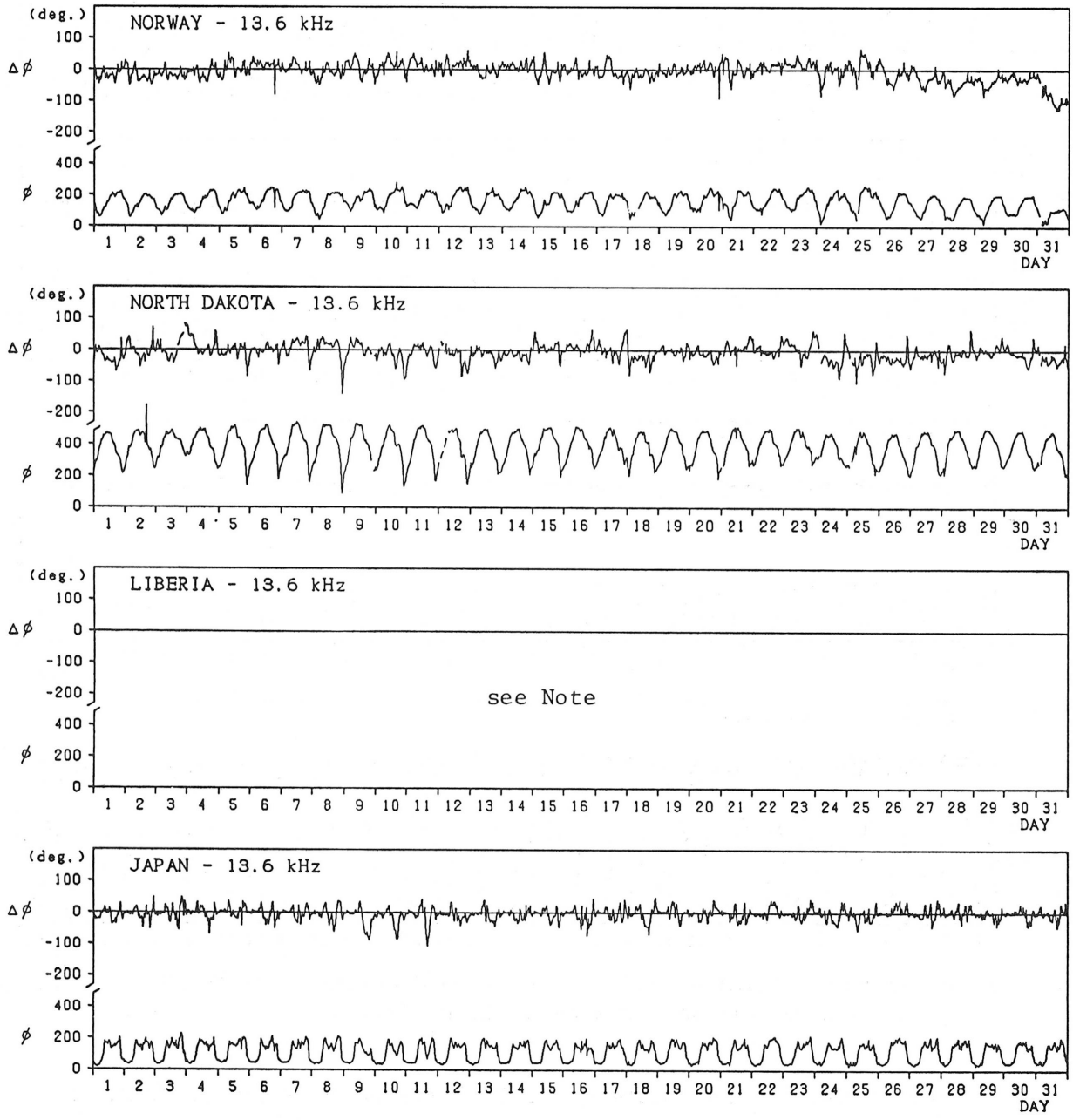
Hiraiso — Time in U.T.

Jan. 1991	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	Conditions 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start	End	Range
1	4-	3U S S 4	4 3 S 4	N N N N			
2	4-	4U S S 4	4 3U S 4	N N N N			
3	4o	4 S S 4	4 4 S 4	N N N N			
4	4+	5 S S 4	4 4 S 4	N N N N			
5	4o	4 S S 4	4 4 S 4	N N N N			
6	4o	4 S S 4	4 4 S 4	N N N N			
7	4o	4 S S 4	4 4 S 4	N N N N			
8	4o	4 S S 4	4 4 4U 4	N N N N			
9	4o	4 S S 4	4 3 5U 4	N N N N			
10	4-	4 S S 4	4 3 S 3	N N N N	None		
11	4o	4 S S 4	4 3 S 4	N N N N			
12	4o	4 S S 4	4 3 S 4	N N N N			
13	4o	4 S S 4U	4 3 4U 4	N N N N			
14	4-	4 S S 4	4 2U S 4	N N N N			
15	4o	4 5U S 3	4 3 S 4	N N N N			
16	4o	4 S S 4U	4 3 4U 4	N N N N			
17	C	3U C C C	4 C C C	N N N N			
18	C	C C S 4	C C S 4	N N N N			
19	4o	4 S S 4	4 4 4U 4	N N N N			
20	4o	4 S S 4	4 4 S 4	N N N N			
21	3+	3U S S 3U	4 3 S 4	N N N N			
22	4+	5 S S 4	4 5 S 4	N N N N			
23	4+	4 S S 4	4 5 5U 4	N N N N			
24	5-	5 5U S 4	4 5 5U 4	N N N N			
25	4+	4 S S 2U	3 5 5U 3U	N N N N			
26	4+	4U 5U 5U 3U	4 5 5U 4	N N N N			
27	4-	3 S S 4	4 4 S 4	N N N N			
28	4o	4 S S 3U	3 5 5U 4	N N N N			
29	4+	4 S 5U 4U	4 5 S 4	N N N N			
30	4o	3U 5U S 3U	4 5 5U 4	N N N N			
31	4-	3U 5U 5U 2U	3 5 5U 2U	N N N N			

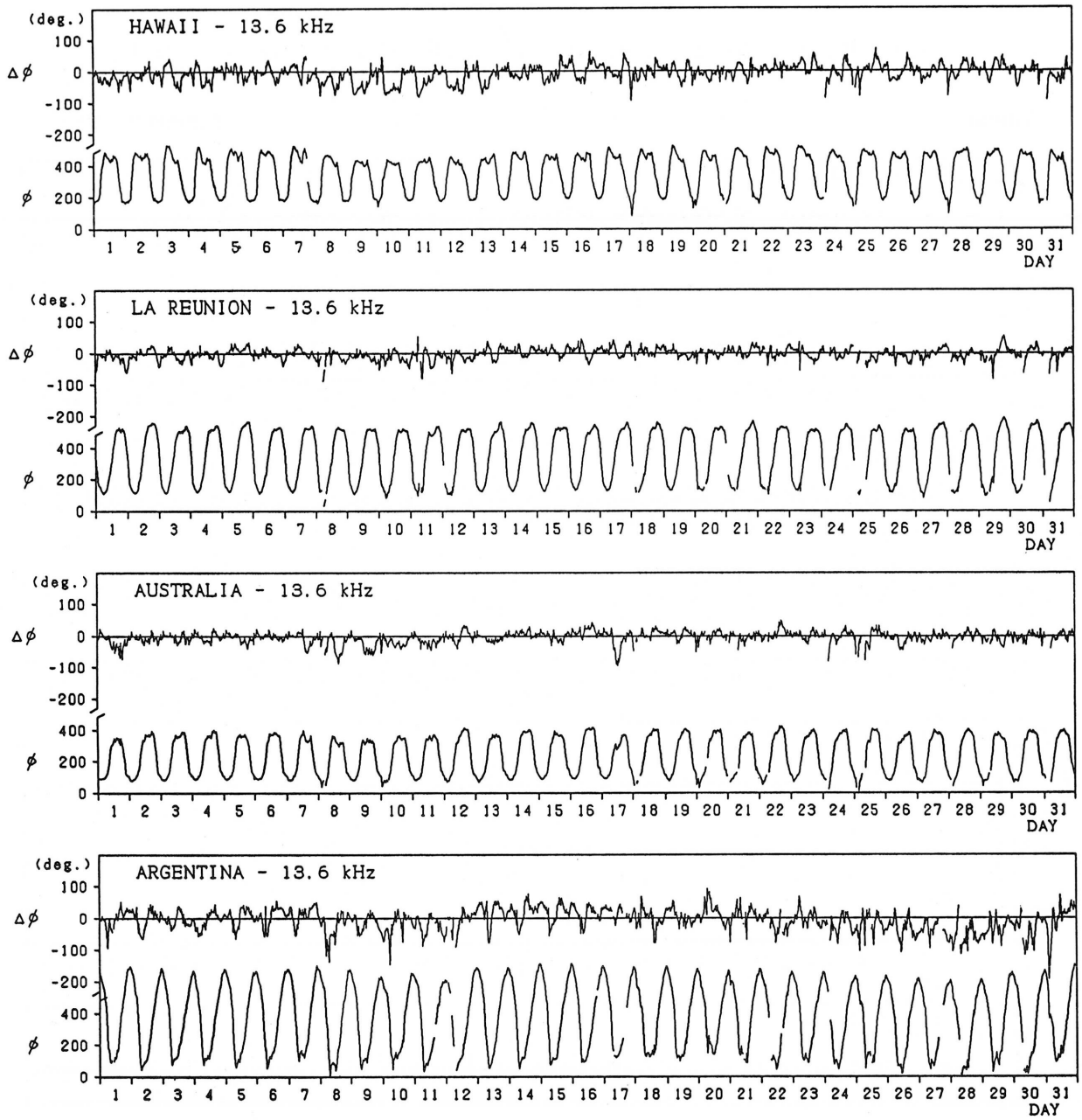
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo January 1991



Inubo January 1991



Note: As for LIBERIA - 13.6 kHz, no record during July 09 1990 - January 31, due to the maintenance of transmitter.

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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Jan.26/0200	Jan.31/0600D	Jan.28/0928	86.4
Jan.31/0600E	Feb.06/0822	Jan.31/1453	136.8

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso

Time in U.T.

Jan. 1991	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
8			8			0217	8	2	1-		
8			20		x	0416	63	3	2-	x	x
10			9			0444	10	2	1-	x	
10			14			0508	24	2	1	x	x
13			9			0210	28	2	1-	x	
18	C	C	26	x		0100	101	3	2	x	x
18	C	C	20			0350	40	3	2-	x	
20			10			0719	25	2	1-		
21	34	42	40			0016	22	2	3	x	x
21			15		6	0631	24	2	1		
22			9			0210	17	1	1-	x	
22			23			0547	15	1	2-		
23	11	16	13			0124	21	2	1	x	x
24	45	46	39	x	x	0320	156	3	3	x	x
25	25	37	20	x		0124	33	3	2-		
25	34	34	20	x		0232	49	2	2-		x
25	x	59	45	30	7	0627	86	1	3+	x	x
28	24	27	26			0130	62	3	2		x
29			17			0146	33	2	1+		x
29			14			0652	17	1	1		x
30		10	11			0112	24	3	1-		
30			11			0410	15	2	1-		
30			18			0852	70	2	1+		
31		27	40	x		0152	121	2	3		x

NOTES CO: Colorado(WWV) HA: Hawaii(WWVH) 1): Australia 2): Moscow 3): London

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jan. 1991	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
4		—	12	—			0431	0522	0446
4		—	42	—			0704	0743	0710
6		—	9	8			0420	0445D	0429
6		—	12	8			0445E	0514	0452
6		—	8	6			0604	0621	0608
7		—		—	4		0115	0148	0124
8		—		10	7		0009	0049	0020
8	11	—	42	47	24	15	0215	0324D	0225
8		—	4	6	4		0324E	0336	0327
8	39	—	165	98	34	24	0413	0651D	0439
8		—	89	31			0651E	0800	0702
8		—	50				1119	1305	1130
9		—		5	3		0240	0256	0244
9	15	—	19	11			0632	0710	0639
9		—	10	14			0808	0826	0815
9		—	17				1132	1230	1139
10	14	—		52	36	18	0039	0200	0058
10		—	17	20	8		0312	0410	0332
10	8	—	44	34	15		0445	0509D	0451
10	30	—	120	75	27	19	0509E	0632	0520

Inubo

Jan.	S			P			A		
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
10		—	14	6			0700	0734	0705
10		—	6				0330	0853	0834
10		—	10				0933	0948D	0941
10		—	16				0948E	1024	0957
11	8	—	24*	16*			0505	0549	0521
11		—	76	45			0650	0749D	0659
11		—	31	33			0749E	0821	0755
11		—	108	56			0853	1005	0905
11		—			11		2021	2044	2027
11		—		—	6		2321	2349	2328
12		—		—	9		0009	0055	0023
12		—	9	—	7		0213	0234	0218
12		—	11	—			0524	0603	0539
12		—	47	—		—	0708	0811D	0721
12		—	73	—			0811E	0922	0818
12		—		—	28		2212	2242	2217
13		—		—	4		0043	0102	0050
13		—	20	—	11		0215	0247	0221
13		—	15	—			0717	0748	0723
14		—	10				0702	0723	0708
14		—	10				0800	0828	0807
14		—		—	6		2220	2246	2224
15		—	11	10			0537	0558	0542
15		—	9*	6			0750	0818D	0802
15		—	12	6			0818E	0848	0824
15		—	4				1011	1028	1013
15	12	—		—	12		2209	2229	2213
16		—		3	4		0047	0108	0053
16		—		—	9	15*	2241	2254	2245
16		—		5	9		2346	0022	0002
17		—			6		2305	2327	2312
18		—		24	40	75	0008	0055D	0044
18	57	—	183	64	131	132	0107	0356D	0150
18	31	—	131	41	78	41	0356E	0606	0414
18		—	8				0838	0913	0847
18		—	18				0950	1045	0955
18		—	10				1303	1326	1307
19		—		9	5		0112	0143	0117
19	10	—	33	42	23	16	0232	0336	0236
19		—	7	6			0523	0558	0537
19		—	4				1038	1059	1043
19		—	30				1130	1217	1139
19		—			14		2033	2048	2039
19		—			22		2144	2210	2152
19		—	24	64	58	34	2341	0034	2356
20	5	—	25	13	12		0129	0148D	0140
20	15	—	73	71	47	24	0148E	0306D	0214
20	6	—	19	34	18		0306E	0413	0314
20	31	—	156	105			0713	0903	0727
20		—	48				0920	1039	0930

Inubo

Jan. 1991	S			P		A			
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
20		—			52		2044	2207	2100
20		—		14	25	14	2248	2322	2253
21	61	—	140	175	151	124	0015	0226	0030
21		—	17	44			0553	0627D	0611
21	57	—	229	135	21	23	0627E	0823D	0647
21		—	30	—			0823E	0847	0827
21		—	15	—			0915	0946	0919
21		—	16	—			1155	1223	1159
21		—	6	—			1231	1249D	1237
21		—	14	—			1249E	1324	1254
21		—		—	11		2017	2034	2023
21		—		—	34		2113	2202	2119
22	8	—	13	18	14	9	0151	0211D	0156
22	21	—	69	66	48	33	0209E	0252	0215
22		—	17	16	15	13	0311	0338D	0318
22		—	18	11	10		0338E	0400	0346
22	54	—	201	124		37	0543	0728	0553
22		—	79	36			0740	0841	0754
22		—	19				1038	1110D	1052
22		—	22				1110E	1151	1115
22		—	21				1315	1352	1319
22		—			62	25	1946	2038	1957
23	12	—	43	52	35	21	0127	0211D	0139
23		—	8	18	9		0211E	0242	0214
23		—	17	12			0611	0655	0618
23		—	83	37			0812	0903	0823
24		—		6	3		0111	0125	0114
24		—	6	7	5		0219	0249	0232
24	87	—	291	185	162	87	0317	0758	0341
25		—		14	16		0007	0049	0014
25	33	—	121	112	93	55	0120	0229D	0153
25	37	—	179	118	107	53	0229E	0358D	0252
25		—	36	22			0358E	0454D	0403
25	17	—	40	24	28		0454E	0607	0501
25	129	—	531	295	94	83	0620	1106D	0636
25		—	52				1106E	1206	1117
25		—	10				1227	1304	1230
25		—	14				1316	1400	1330
26		—			4	13	0024	0100	0036
26		—		6	3		0230	0251	0239
26		—	22	6	11		0400	0500	0420
26		—	8	6			0551	0615D	0600
26		—	27	10			0615E	0722	0635
26		—	15	10			0807	0844D	0815
26		—	57	27			0844E	0956	0850
26		—	12				1038	1114	1041
26		—			45		2111	2206	2122
26		—		26	22		2340	0038	2352
27		—	15	19	14		0130	0213	0138
27		—	14	15	12		0259	0324D	0307

Inubo

Jan.	S			P		A			
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
27		—	36	39	31		0324E	0353D	0334
27		—	17	26	20		0353E	0433	0358
27	8	—	58	40	14		0521	0702	0541
27		—	11	9			0812	0838	0820
27		—	7	6			0853	0906	0857
27		—	6				0916	0937	0920
27		—	6				1003	1037	1008
27		—	8				1053	1116	1102
27		—		13	13	11	2322	2351D	2327
27		—		6	6		2351E	0013	2357
28	28	—	121	116	100	65	0130	0312D	0155
28		—	24	38	32		0312E	0351	0322
28		—	10	10			0521	0541	0526
28		—	16	10			0643	0732	0650
28		—	44	22			0752	0835	0758
28		—	8				1122	1144	1130
28		—	8				1243	1323	1251
28		—			49	9	1950	2024	1958
28		—			61		2056	2139D	2102
28		—			22		2139E	2209	2145
29		—		10	6		0058	0134	0105
29	15	—	47	55	35	29	0150	0242	0158
29		—	16	17			0406	0440D	0424
29		—	17*	14*			0440E	0511D	0458
29		—	16	13			0511E	0541	0515
29		—	10	8			0604	0638	0613
29	23	—	123	88	12	8	0651	0741D	0658
29		—	50	47			0741E	0820	0749
29		—	9				0944	1008D	0955
29		—	87				1008E	1151	1019
29		—	6				1215	1230	1218
29		—	6				1309	1320	1315
30	6	—		40	27	10	0049	0224	0111
30		—	10	8			0349	0412D	0356
30	9	—	27	25	12		0412E	0454	0421
30		—	6				0707	0727	0713
30		—	12	9			0801	0826	0808
30		—	300	120			0848	1205	0907
30		—	4				1244	1301	1247
30		—		15	50	25	2214	2251D	2223
30		—		18	27	10	2251E	2333	2302
31		—		8	4		0005	0020	0010
31		—		4	2		0052	0103	0056
31	87	—	298	214	178	131	0154	0443D	0227
31	38	—	116	94		9	0443E	0716	0453
31		—	19				0956	1102	1008
31		—	59				1147	1300	1159
31		—			9		2125	2139	2132
31		—		12	14	13	2316	2330D	2323
31		—		17	18	25	2330E	2351	2339
31		—		89	33	31	2346E	0030D	0004

IONOSPHERIC DATA IN JAPAN FOR JANUARY 1991

F-505 Vol.43 No.1 (Not for Sale)

電離層月報 (1991年1月)

第43巻 第1号 (非売品)

1991年6月15日 印刷

1991年6月20日 発行

編集兼 郵政省通信総合研究所

発行所 〒184 東京都小金井市貫井北町4丁目2—1

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