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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

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

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5'N	141°41.2'E	35.3°N	206.5°	Vertical Sounding (I)
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

FEB. 1989

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	37	49	36	37	31	27	34	61	94	114	136	145	151	142	132	132	117	114	95	64	51	53	42	40
2		43	50	42	29		30	83	113	124	149	132	C	125	118	116	110	102	82	73	55			55
3		56	53	52	54	54	50	82	94	122		144	131	115	124	125	97	89	67	70	64	65	58	55
4	56	50	46	56	49	32	51	79	111	120	136	130	140	130	128	124	120	96	86	66	53	51	52	52
5	52	53	54	54	55	52	46	80	103	126	146	137	133	127	120	114	111	89	88	79	53	47	50	50
6	51	53	52	50	48	48	39	66	98	121	137	130	130	127	118	110	104	87	86	82	57	64	52	54
7	52	48	41		52	46	39	72	106	129	122	124	120	114	112	98	91	90	85	67	68	64	74	57
8	56		50	52	52	36	35	83	112	128	141	141	138	131	107	110	108	87	72		61	53	53	52
9	41	N	53	50	48	42		73	101	125	141	130	136	122	112	101	97	96	82	78	60	56	53	54
10	53	38	46	47	42	41	35	67	114	112	122	143	145	133	126	125	119	97	95	96	74	69	58	54
11	48	60	67	58	42	32	36	98	122	123	126	131	126	118	112	113	111	98	88	83	64	60	51	
12	52	48	56	43	34	35	35	87	124	135	135	138	126	127	129	123	120	110	95	81	64	59	53	54
13	53	44	48	39	36	44	49	88	117	136	142	146	143	138	138	125	121	116	109		73	74	64	58
14	67	66		53	56	59	65	94	108	124	142	143	135	127	127	120	119	114	98	86	62	61	60	57
15	57	44	44	48	52	44	49	88	108	130	136	136	127	121	118	120	113	98	90	82	74	61	57	56
16	51	51	48	42	42	42	47	90	117	137	142	142	134	127	135	132	123	113	102	96	90	80	73	63
17	57	53	50	64	58	43	52	90	109	130	141	140	137	126	126	120	122	105	96	82	68		62	63
18	53	62	56	61	61	54	62	90	130	140	142	137	132	125	120	115	113	98	95	89	73	73	62	64
19	62	65	58	60	62	61	68	110	128	144	146	N	138	130	131	122	117	116	100	85	83	64	62	62
20	60	52		45	50	51	58	92	135	153	151	144	140	131	126	128	124	117	98	91	92	92	78	66
21	58	56	61	58	55	51	62	106	132	144			138	127	124			112	100	88	84	78	62	
22	61	59	42	51		54	58	90	130	134	152	146	137	127	126	120	122	116	100	79	71	66		74
23	58	52	50	51	52	53	60	110	126	132	136	135	140	131	122	117	99	101	92	82	65	63	57	60
24	58	50	51	47	48	47	54	86	111	116	119	121	120	118	116	114	117	116	97	89	76	74	64	58
25		52		57	58	52	58	106	130	142	142	135	136	133	128	127	125		99	101	103	76	60	61
26		58	62	56	57	51	66	95	133	142	142	140	140	136	127	128	123	117	108	91	80	83	76	65
27	58	56	57	57	58	58	63	104	129	141	146	141	142	136	133	127	118	112	104	89	85	66	72	57
28		57	54	51	58	67	62	97	126	130	130	136	132	130	122	112		107	100	87	66	66	60	58
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	26	25	27	27	27	27	28	28	28	26	26	27	28	28	27	26	27	28	26	28	26	26	26
MED	56	52	51	51	52	48	51	89	116	130	141	138	136	127	125	120	117	105	95	82	68	64	60	57
U Q	58	57	56	57	57	54	62	96	128	138	142	143	140	131	128	125	121	114	100	89	78	74	64	62
L Q	52	49	47	47	42	42	39	81	108	123	136	132	131	125	118	114	110	96	87	79	61	60	53	54

HOURLY VALUES OF FES AT WAKKANAI

FEB. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	26	G	G	G	G	G	G	G	G	G	55	G	G	G	40	37	32	29	25	28	G	G
2	G	G	G	G	G	G	G	G	G	G	G	66	C	G	G	G	G	G	G	G	G			G
3		G	G	32	G	G	G	G	G	37	G	G	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	G	32
5	G	32	G	G	38	33	G	G	G	G	44	G	G	G	G	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	28	G	39	G	G	G	G	G	G	G	G	37	29	76	31	G	G	G
7	G	G	G		28	G	G	77	50	G	G	G	G	G	G	49	G	G	30	28	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	G	G	G		G	G	G	G
9	G	G	G	G	G	24		G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G
13	G	G	G	G	G	G	G	60	148	G	G	G	G	G	G	G	G	60	56	46	30	G	G	G
14	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	34	G	G	G	G	G	G	G	G	G	38	39	32	G	G	G	G
17	G	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G
18	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
19	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G		G	
20	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G			G	G	G			G	G	G	G	G	G	
22	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G
23	G	G	G	G	G	G	G	G		G	G	G	G	42	46	G	G	32	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	38	40	28	G	G	G	G
25		G		G	G	G	G	G	G	G	G	G	G	G	G	G	G		58	44	30	29	26	G
26	G	G	G	G	G	G	33	38	44	G	G	G	G	G	G	G	G	G	28	G	G	G	36	32
27	26	26	G	G	G	G	G	G	G	G	G	59	G	G	G	G	34	G	33	G	G	28	G	G
28		G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	28	26	27	27	28	27	27	27	28	27	27	27	28	28	27	27	27	28	27	28	25	26	26
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	28	G	14	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

FEB. 1989

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

HOURLY VALUES OF FOF2 AT AKITA

FEB. 1989

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	30	32	28	28	37	37	38	80	85	121	138	139	137	133	134	134		116	90	73	53	53	44	44
2	30	43	63		25	34	31	70	131	134	131	118	104	117	116	118	107	96	84	71	59	56	52	50
3	54	52	52	44	40	42		80	86		124	129	131	113	132	117	100	88	77	67	59	64	53	53
4	52	52	47	49	52	31	53	86	99	117	140	140	126	117	114	113	105	99	82	78	62	62	58	49
5	52	58	50	A	A	44	40	73	88	117	136	136		118	128	116	115	104	88	84	63	52	47	
6	48	47	44	42	39	43	40	66	88	120	131	131	120	116	100	107	98	90	84	68	64	61	52	51
7	58	39	46	44	49	46	46	80	107	137	135	117	112	108	102	95	88	86	88	84	64	54	64	63
8		53	52	49	52	43	48	78	110	134	131	138	121	116	111	108	102	91	84	74	66	58	63	52
9	52	51	50	48	45	46	47	90	97	91	114	117	114	108	102	94	82	86	81	80	66	57	62	52
10	61	50	43	46	47	46	37	80	103	120	116	124	116	114	112	110	107	92	87	78	69	64	52	55
11	52	60	63	64	37	35	40	85	114	121	118	128	124	126	114	111	107	103	86	80	66	62	53	46
12	52	54	58	52	43	34	44	84	121	124	131	136	126	122	117	120	116	109	100	84	74	63	58	52
13	51	52	49	43	37	38	40	85	120	138	141	138	140	136	129		114	107	109	85	79	74	79	68
14	78	80	51	54	49	50	66	100	114	125	139	137	136	121	118	119	116	111	110	84	66	68	52	61
15	53	49	47	52	52	50	44	87	117	117	130	135	130	116	111	113	104	98	90	86	71	66	60	54
16	53	49	52	46	30	47	54	86	127	141	141	N	134	123	129	128	120	107	85	92	88	81	78	63
17	63	58	54		52	46	52	88	129	133	140	138	132	128	120	116	110	108	97	84	80	68	68	67
18	54	70	57	51	51	47	60	106	116	130	132	135	134	116	116	108	105	104	96	90	74	66	66	63
19	65	62	58	51	52	54	70	108	130	136	138	138	138	133	126	122	116	113	103	86	83	79	66	64
20	64	N	49	51		54	62	103	127	134	138	138	134	123	122	117	114	93	91	88	91	82		61
21	52	49	54	57	49	53	65	104	131	137	C	138	137	131	120	120	116	107	102	89	88	80	77	C
22	66	57	52	43	49	51	64	90	124	138	111	135	134	123	118	117	115	106	100	85	75	53	73	73
23	66	50		52	48	48	55	88	120	130	137	136	138	136	133	124	117	109	88	84	72	52	62	62
24	58	53	52	54	45	44	54	88	106		113	121		114	119		117	111	100	84	74	72	67	53
25	53	52	56	60	54	47	60	102		133	129	132	136	126		121	115	108	99	104	103	77	63	60
26	60	62	52	57	57	58	66	108	135	136	133	138	136	122		120	118	110	103	88	84	85	80	68
27	65	63		64	58	58	71	105		138	140	138	138	138	130	120	116	112	90	86	86	81	72	63
28	66	67	60	56	59	64	73	102	117	129	137	132	134	135	129	115	110	106	98	87	78	66	62	53
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	26	25	26	28	27	28	26	26	27	27	26	28	26	26	27	28	28	28	28	28	27	26
MED	54	52	52	51	49	46	53	88	116	132	133	136	134	122	118	117	114	106	90	84	73	65	62	58
U Q	64	60	56	55	52	50	64	102	127	136	138	138	136	129	129	120	116	109	100	86	81	75	68	63
L Q	52	49	49	45	40	42	40	80	103	121	129	129	124	116	114	111	105	94	85	79	65	57	53	52

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

FEB. 1989

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	27	G	G	G	G	30	33	G	50	54	53	50	40	G		G	G	35	29	24	25	27
2	G	24	24	32	24	G	G	G	G	G	G	50	55	92	44	G	34	30	36	30	G	G	G	G
3	G	G	G	G	G	G	G	G	G		42	42	59	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	43	50	55	G	G	G	G	G	26	G	32	G	G
5	G	G	29	36	36	29	G	G	G	40	44	45	G	G	G	G	G	34	G	33	28	30	31	29
6	G	G	G	G	G	G	G	G	G	43	44	G	G	G	G	G	36	37	33	33	29	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25	G
8		28	G	G	G	G	G	G	36	G	51	G	G	G	G	46	G	G	G	G	G	32	G	G
9	G	G	G	G	G	G	G	G	41	G	G	G	G	G	53	46	42	34	32	G	G	G	G	G
10	G	G	24	G	G	G	G	G	G	G	43	G	G	G	G	46	G	34	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	37	47	45	G	G	G	41	46	43	31	26	40	37	32	32	G
12	G	G	G	G	G	G	G	G	G	60	G	43	G	G	G	45	38	G	G	G	G	G	G	G
13	G	G	G	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25	28	G	G	G
14	G	24	G	G	G	G	G	G	35	G	G	G	G	G	G	G	G	G	25	G	29	30	G	28
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	37	54	G	G	29	34
16	34	30	33	G	G	G	G	G	G	43	G	58	51	G	55	70	54	37	34	29	24	G	G	G
17	G	G	G	G	G	G	G	29	G	G	G	74	G	43	G	G	37	37	30	G	G	G	G	G
18	G	G	G	G	G	G	G	G	G	G	G	G	70	G	G	G	G	G	G	G	G	G	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	G	38	32	G	G	G	G
20	G	G	G	G		G	G	G	G	G	G	G	G	73	G	G	G	G	G	G	G	G		G
21	G	G	G	G	G	G	G	30	36	57	G	G	G	G	43	41	G	G	G	G	G	G	G	C
22	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	47	44	32	29	G	G	G	G	G
23	G	G		G	G	G	G	G	G	G	G	91	G	50	54	55	54	47	36	24	33	G	G	G
24	G	G	G	G	G	G	G	G	58		G	G		58	50		46	37	44	24	27	G	G	G
25	G	G	G	G	G	G	G	G		G	43	G	G	G		40	44	37	28	59	48	49	40	37
26	G	G	G	G	G	G	33	G	48	44	60	54	G	70		40	50	31	G	33	37	30	29	34
27	32	34		28	G	G	G	30		44	G	44	G	G	53	68	72	69	58	116	86	G	38	28
28	24	G	G	G	G	G	G	G	37	44	G	73	G	G	42	G	42	41	32	27	G	G	50	29
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	26	28	27	28	28	28	26	26	28	28	27	28	26	27	27	28	28	28	28	28	27	27
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	31	26	24	G	G	G	G
U Q	G	G	G	G	G	G	G	G	36	43	43	47	G	46	43	46	44	37	33	33	29	27	29	28
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

FEB. 1989

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

FEB. 1989

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		39		47	35	38		71	96	116	144	150		116	132	135		118	103		53	57	57	51
2	45	49	52	42		30		73	124	138	122	131			125	121	117	97	84	79	68	67	66	58
3		47	50	49	47	41	46	78	84	116		124	132	112		117	102	93		81	64		64	68
4	56	54	51		35			82	100	120	142	141	131		118	111	111	103	86	83	73	65	67	58
5	54	56	56			48	41	81	114	117	136	142		138	133	130		131	112	96	85	63	53	52
6	53	54	55	48		36	44	84	85	111		128	116	117	118	102	95	92	87	75	71	N	58	54
7	49		40	37	42		42	79	111	134	133	117	111	106	92	92	86	86	95	90	80	70	69	60
8	55	53		58	51		50	92	110	131	130	140	129	125	120	115	108	107	87	84	82	82	68	64
9	61	52	52			42		92	112	115	121	116	118	117	108	98	90	88	85	78	65	62	71	67
10		47	45	48	46	42	52	88	106	117		124	121	117	121	114	112		96	88	76	64	70	58
11	58	58	60	55	28	32	48	93		121	124	130	134	136	132	124	113	112	93	84		61	55	55
12	52		56	50		38	45	91	115	117	124	133	141	136	134	N	130	126	111	97	85	66	63	59
13	52	60	56					95	127	129	141	143	142	136	128	122	116	111		103	87	81		
14			52	50	44		70	94	120	128		144	140	134	128	122	118	112	111	96	78	80		70
15	54	51	49	54	52		46	90	121	131	132	130	127	118	112	110	108	103	98	94	77	77	68	
16	55	56	48		48	54			127	136	149	140	132	131		123	116	107		100	94	84	82	69
17	71		65	62	47	43			130	138	131	137	131	129	124			109	105	92				
18	71	62	57	48	44		54	96	122	132	138	144		125	115		104	107	86		79	72	73	72
19	67	62		48	57	56	73	103	132	138	142	147	147	145	133	132	131	124	114	91	90			71
20	73		56	48	55	53	68	104	130	126	136	139	138	134	127	122	120	110	100	92	97	92	81	73
21		53		60		56	57	102			142	142	139	132	124		112	114	105	94	95		78	
22	78	56	49	47	48		56	97	118	137	131	133	136	128	118	118	109	107		88	84	90	80	
23	66	54		48	48	44	52	101	122	134	140	140		143	144	141	136	136	123	98	94	77	63	
24	66	68	58		47	44	60	88	113	121	120		125	122	119	114	113	111	105	86	77	73	69	67
25	61	54		68	51	49	56	96			130	140	138	134	129	124	118	108	106	103	104	81		50
26	60	57	58	56		54	66	106	134	134	131	141	134	138	128	120	122			88	89	92	79	
27	62	59	61		41	57	72	106	123		142	145		139	132	120	113	112	104	97	85	85	79	67
28		57	59		58	62			126	131	136	142		136	133	123	114	106	100		79	68	70	59
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	23	22	20	20	20	20	25	25	25	24	27	21	26	26	24	25	26	23	25	26	23	23	21
MED	59	54	56	48	47	44	53	92	120	129	134	140	132	132	126	120	113	108	100	91	81	73	69	60
U Q	66	58	58	55	51	54	63	99	126	134	141	142	138	136	132	123	118	112	106	96	89	82	78	68
L Q	54	52	50	48	43	39	46	83	110	117	130	130	126	118	118	114	108	103	87	84	76	65	63	56

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

FEB. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G		38	42	47	49	58	54	48	42	35	37	42	28		26	G	G
2	G	24		34	38	29	25	30	37	41	G	51	52	49	58	40	G	31	35	32	27	24	G	G
3		G	G	G	G	G			G	G	43	53	46				34	G	G	G	G	G	G	G
4	G	G	G	G	G		G			43	42	44	62	62	84	44	G	G	26	G	29	30	G	G
5	G	G	G	G	G	G	G	34	37	39	44	48	58	52	G	G		96		62	52	41	G	G
6	G	G	G	G	G	G	G	G	G	G	G	45	G	G	G	G	G	34	45	33	27		G	G	G
7	G		G	G	G	25	G	30	G	G	G	43	G	58	53	44	G	G	26	G	G	G	G	G
8	G	G	G	G	G		G			40	43	44	G	G	G	45	36	G		G	G	27	G	G
9	G		26	24		G	G			G	G	G	G	48	G	G	37	G	28	G	G	G	33	G
10	G	G	G	G	G	G	G		G	G	G				G	G	G	G	24	24	G	G	G	G
11	G	G		G	G	G	G	29	50	G	43	47	47	G	50	G	G	G	32	34	G	28	28	24
12	G	G	G	G	G	G	G	G	40	G	G	G		G	43	45	G	32	31	G		G	G	G
13	G	G	G	G	G			34	G	40	G	G	G	G	G	G	G	G	27	G	26	31	30	
14		G	G	G		G	G	34	G	43		G	G		G	G	G	G	28	24	30	28	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	79		58	46	40	G	G
16	G	G	G		G	G	G		G		G	G	52	G		41	36	34	28	G	G	G	G	G
17	G		G	G	G	G	G	36	38	42	G	G	49	46	44	41	G	G	29	G	G	G		
18	G	G	G	G	G	G	G	G	G		G	G			46	42	G	G	G	G	G	G	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	G	46	44	45	45	43	36	G	G	G		G
20	G	G	G	G	G	G	G		G	G	G	G	G			G	G	35	34	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G		G	G
22	G	G	G	G	G	G	G	G	G	G			54	47	56	52	49	48	33	34	30	24	G	
23	G	G	G	24	G	G	G	G		G	G	G	G	G	G	46	54	61	63	40	G	G		G
24	G	G	G	G	G	G	G		39	G	G	G	G	G	G		60	44	60			G	G	G
25	G	G	G	G	G	G	G	30			45	49	G	G	G	51	52	49	44	60	65	58	31	58
26	30	29	28	26	G	G	G	46	G	G	G	G		G	G	42	44	G	G	G	36	30	32	
27	37	33	33	31		25	G	31	G		G	G		54	57	61	43	45	34	34		58	39	33
28	G	30	27	26	G	G	G		G	50	44	G	G	G	55	62	78	68	84	70	28	G	G	30
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	25	26	27	25	25	26	18	23	24	26	26	23	23	24	25	27	28	25	27	24	27	25	24
MED	G	G	G	G	G	G	G	30	G	G	G	G	G	G	22	42	G	32	31	G	G	G	G	G
U Q	G	G	G	G	G	G	G	34	37	40	43	45	52	49	51	45	44	44	39	34	29	30	14	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

FEB. 1989

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

FEB. 1989

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		52	43	35	N	36	38	52	71	108	144	148	114	113	128	120	118	112	104	87	76	74	67	60
2	42	46	66	35	27	N		52	107	116	124	134	132	143	157	146	143	128	123	122	112	91	83	75
3	63	58	57	58	53	66	26	66	89	88	112	141	145	120	121	114	104	102	112	88	76		67	72
4		54	56	51	35	N	31	62	80	110	135	148	136	130	126	129	129	130	124	106	88	83	79	63
5	53	52	42	39	40	29	34	62	101	110	132		144	146	146	147	146	150	146	138	127	107	85	82
6	84	67	60	54	43	38	40	56	101	109	127	135	128	126	133	122	117	116	124	108	90	86	67	71
7	53	54	32	42	40	43	37	63	108	116	119	136	118	116	113	106	102	101	105	107	88	84	71	50
8	59	57	59	58	43	43	40	60	112	122	131	142	138	133	118		120	120	116	128	127	108	86	66
9	67	66	67	62	32	31	37	61	105	116	128	127		136	130	127	N	101	104	86	83	84	85	84
10	67	38	35	41	35	32	34	66	102	110	116	117	122	126	127	123	121	111	111	110	88	88	79	75
11	62	67	60	48	32	30	34	64	103	117	126	129	142	146	151	144	138	136	131	111	87	86	74	65
12		51	53	45	38	34	42	66	88	108			141		137	142	146	146	133	120	111	86	78	66
13	56	63	60	63	54		38	77	108	124	128	139	143	131	130	122	116	120	112	111	90	86	87	86
14	84	81	59	48	49	52	64	66	102	128	151	149	146	151	145	142	140	137	138	128	123	108	103	85
15	69	68	51	66	54		43		111	130	132	127	129	123	122	113	112	109	111	99	87	86	79	66
16	65	68	60	49	46	38	42	74	116	126	139	148	146	146	142	138	132	132	121	122	109	107	88	85
17	86	85	83	62	40	31	26	66	110	126	126	137	139	138	138	132	125	120	120	111	120	107	107	90
18	84	102	78	54	36	34		67	116	133	145	146	150	146	138	127	120	115	108	91	87	88	83	84
19	89	77	76	54	52	53	53	79	113	147	148	162	166	171	167	168	156	150	144	143	149	152	152	134
20	139	114	86	68	62	63	68	82	120	128	134	146	153	150	152	144	132	123	119	111	109	110	105	84
21	75	71	52	58	43	47	50	78	111	135	144	147	145	144	146	136	131	122	122	111	107	104	86	78
22	73	66	64	52	41	40	42	65	111	142	145	142	146	142	126	130	116	110	111	106	89	84	86	84
23	73	54	50	53	43	32	34	66	110	141	143	145	152	172	186	182	168	159	149	140	126	120	89	81
24	80	73	66	70	66	30	38	65	102	120	138	140	145	142	144	141	130	126	126	111	108	108		110
25	86	84	84	86	66	46	43	74	112	125	134	148	153	160	157	144	129	122	118	111	105	90	77	63
26	64	63	56	52	51	52	54	85	122	130	138	145	151	154	166	157	145	135	128	110	108	106	87	82
27	65	62	58	52		48	40	82	112	130	141	145	146	146	144	141	129	126	124	111	109	111	110	102
28	83	81	64	66	58	54	52	86	116		132	143	141	143	143	140	137	120	111	A	102	85	84	79
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	28	28	28	26	24	26	27	28	27	27	26	27	27	28	27	27	28	28	27	28	27	27	28
MED	69	66	60	54	43	39	40	66	109	124	134	142	144	143	140	138	129	122	120	111	106	90	85	80
U Q	84	75	66	62	53	50	43	77	112	130	143	147	146	146	148	144	140	133	127	122	111	108	88	84
L Q	62	54	52	48	38	32	34	62	102	110	127	136	136	130	127	123	118	113	111	106	88	86	78	66

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

FEB. 1989

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	24	G	32	39	52	G	54	54	48	58	50	G	36	G	G	G	G	G
2	G	G	G	G	G	G		G	32	42	44	47	52	56	61	53	41	G	G	G	32	29	G	G
3	G	G	G	G	G	G	G	G	G	G	G	56	50	47	46	44	G	G	24	54	66	40	33	G
4	G	G	G	30	G	G	G	G	G	38	46	62	65	60	72	50	52	41	G	28	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	45	48	50	48	49	64	82	72	58	46	G	G	G	G
6	G	G	G	G	G	G	G	G	G	46	43	G	G	45	44	G	38	G	26	G	24	G	G	G
7	G	G	G	G	26	G	G	24	G	38	41	54	50	46	45	43	38	35	37	30	G	G	G	G
8	G	G	G	G	G	G	G	24	G	38	G	44	G	G	50	56	44	G	32	29	29	34	24	G
9	G	G	G	G	G	G	G	26	39	G	G	G	G	G	G	42	39	33	34	30	26	G	G	G
10	G	G	G	G	G	G	G	G	G	38	44	50	46	49	G	45	42	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	G	33	38	G	48	G	G	G	46	42	G	G	G	G	G	58	32
12	G	G	G	G	G	G	G	G	G	G	G	48	G	G	G	44	43	G	G	G	G	G	G	G
13	G	G	G	36	32	G	G	26	G	G	43	G	G	68	46	45	44	G	40	29	G	G	G	G
14	G	G	G	G	29	G	G	G	G	40	43	G	G	G	G	G	41	G	30	28	G	G	G	G
15	G	G	G	G	G		G	G	G	G	G	G	46	G	G	G	46	39	31	G	29	G	G	G
16	G	G	G	G	G	G	G	G	G	42	49	51	G	G	G	44	41	G	26	G	G	29	G	G
17	G	G	G	G	G	G	G	G	36	40	44	46	46	G	45	44	G	50	G	24	G	G	G	G
18	G	G	G	G	G	G	G	G	G	39	42	45	G	G	46	48	47	63	39	40	32	24	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	45	40	39	29	G	G	G	G	G
20	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	45	41	39	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	53	G	53	G	43	40	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	55	72	54	50	36	33	24	33	34
23	G	G	G	G	G	G	G	G	G	G	42	G	54	G	G	46	47	58	40	45	64	40	25	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	46	G	G	41	60	66	45	39	25	24	G
25	G	G	G	G	G	G	G	G	39	43	54	52	51	52	56	G	43	45	29	40	29	33	25	41
26	G	G	G	G	G	G	G	G	G	59	G	G	G	G	G	43	40	G	G	G	30	24	G	G
27	G	34	37	29		25	G	29	G	G	G	G	48	52	G	G	40	38	G	G	G	G	25	G
28	G	G	G	G	G	G	G	G	38	G	52	59	50	G	54	52	46	49	54	88	72	145	25	56
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	27	27	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	G	G	G	G	G	G	G	G	G	20	42	44	G	G	G	44	42	34	29	26	G	G	G	G
U Q	G	G	G	G	G	G	G	G	32	39	44	50	50	50	47	49	46	47	38	38	31	27	24	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	40	G	G	G	G	G	G	G

HOURLY VALUES OF FMIN AT YAMAGAWA

FEB. 1989

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

FEB. 1989

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	88	85	63	51	38	35	52	79	94	97	145	151	112	126	124		128	107	98	91	88	90	86	66
2		74	78	50	37			43	102	88	108	141	138	146	173	165	164	163	162		170	145	130	108
3		87	86	78	N	30		48	103		124	137	136	133	131	126	109	102	120	109	104	88	87	77
4	66	62	52	42	29	30	32	62	91	112	139	145	145	136	144	150	156	164	176	164	165	162	145	142
5	81	88	42	35	31	25	25	53	91	103	136	142	144	153	168	163	160	N	162	158		181	168	145
6	140	90	87	81	63	N	34	51	89	107	136	138	128	131	147	138	140	147	147	146	N	143	88	88
7	97	87	80	52	66	43	36	54	108	120	115	124		132		121	109	108	108	91	94	138	88	86
8	84	78	64	63	54	32	37	52	109	138	124	136	146	147	145	141	145	161	157	162	164	160	145	110
9	90	84	90	80	34	37	32	54	88	132	141	142	146	158	164	160	153	145	133	129	109	108	108	110
10	86	52	60	62	43	30	32	61	90		108	102	109	102	138	122	117	124	131		109	129	88	99
11	87	88	80	53	37	N		51	89	108	130	147	154	165	177	173	166	165	163	144	139	110	131	88
12	78	86	77	54	31		30	66	88	89	120	137	145	141		164	166	171	165	164	167	162	88	87
13	83	81	67	66	30			62	108	112	120	145	134	131	136	136	135	137	129		108	108	108	88
14	85	85	57	44	38	48	60	58	90	126	146	146	151	164	162	162	156	158	155	156	162	163	162	145
15	111	88	46	N	58	31	33	66	110	131	141	140	131	133	130	123	118	120	121	110	88	107	86	88
16	86	88	90	73	52	48	43	66	110	126	136	146	153	161	157	156	146	156	147	147	156	160	145	142
17	147	154	108	81	44	33	32	61	110	122	141	136	144	154	156	157	153	157	N	165	178	187	176	170
18	167	146	122	85	41	32	34	56	102	138	145	154	163	170	170	160	146	146	144	138	146	144	122	127
19	145	110	111	88	52	59	60	72	108	158	158	169	176	171	166	163	161	162	155	156	168	162	170	160
20	169	158	140	86	81	80	69	85	120	134	138	155	171		183	178	168	166	161	161	168	163	146	140
21	106	110	90	85	58	44	53	78	110	135	145	146	152	147	164	160	153	150	146	145	163	164		110
22	87	87	90	82	53	53	43	62	110	144	144	148	165	164	156	141	130	123	122	110	108	106	104	90
23	86	83	65	66	52	32	30	52	88	137	148	160	171	180	165	165	164	170	161	146	146	156	141	143
24	109	84	85	88	63	31	30	60	104	121		157	165	159	171	168	163	145	147	146	160	162	147	145
25	124	133	122	122	84	58	49	72	112	122	144	155	170	177	180		170	158	144	140	146	128	90	87
26	90	85	83	80	66	66	52	77	110	131	144	158	166	177	176	165	164	168	172	166	145	145	145	128
27	102	89	73	65	59	40	35	66	110	128	144	146	153	165	178	176	170	160	164	165	164	170	174	165
28	122	90	90	90	84	58	52	75	110	126	145	145	149	154	163	175	178	171	160	146	166	170	165	
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	28	28	27	27	23	24	28	28	26	27	28	27	27	26	26	28	27	27	25	26	28	27	27
MED	90	87	82	73	52	37	36	62	106	126	141	146	149	154	164	160	154	157	147	146	151	150	131	110
U Q	122	90	90	85	63	53	52	69	110	134	145	152	165	165	171	165	164	164	162	161	165	162	147	143
L Q	86	84	64	53	37	31	32	53	90	112	124	139	138	133	145	141	137	137	131	133	109	119	88	88

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

FEB. 1989

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	32	41	42	G	54	52	G	47	52	49	G	G	G	G	G	G
2	G	G	G	G	G		G	G	32	38	G	45	51	61	84	48	46	38	49	34	G	G	G	G
3	G	G	G	G	G	G	G	G	G	G	G	58	58	56	50	44	50	42	143	29	G	G	G	G
4	44	30	G	26	G	G	G	G	32	38	G	71	50	54	93	48	58	57	50	40	38	G	G	27
5	G	G	G	G	G	G	G	G	32	G	G	G	57	58	G	79	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	62	G	G	G	G	G	G	G	G	G	G
7	G	G	G	G	G	G	G	G	G	38	G	G	54	G	50	56	40	38	G	40	G	G	G	G
8	G	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	41	G	G	28	G	G	G	G
9	G	G	G	G	G	G	G	G	32	40	G	G	G	G	G	G	40	G	G	G	G	G	G	G
10	G	G	G	G	G	G	G	G	G	G	52	54	51	49	G	G	41	G	G	30	28	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	54	52	50	52	42	38	40	24	G	G	G	G
12	G	G	G	G	G		G	G	G	G	G	G	G	G	50	92	41	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	58	81	G	G	48	58	G	G	43	27	G	G	G	G
14	G	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	37	28	G	28	G	G
15	G	G	G	G	G	G	G	G	33	40	G	G	G	G	G	48	54	38	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	51	49	G	G	51	40	44	34	G	G	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	50	50	50	49	G	41	38	28	26	25	G	G	G
18	G	G	G	G	G	G	G	G	36	40	G	G	G	G	G	G	43	37	31	G	40	37	28	30
19	G	34	G	G	G	G	G	G	33	G	G	G	G	G	G	49	43	38	G	26	G	G	G	G
20	G	G	G	G	G	29	28	G	33	G	G	G	G	G	G	G	G	36	G	32	25	G	24	31
21	30	27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	32	G	G	G	G
22	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	55	46	40	22	G	G	G
23	G	G	G	G	G	G	G	G	G	G	47	55	57	G	G	G	41	38	33	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	42	46	63	56	36	24	G	G
25	G	G	G	G	G	G	G	G	39	48	56	56	G	G	G	G	43	39	G	G	G	G	32	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	G	G	48	26	G	G
27	G	G	G	24	32	33	G	G	36	G	58	62	G	G	G	G	G	39	32	G	G	G	G	G
28	G	G	G	G	G	G	G	G	G	G	G	50	G	47	G	G	G	38	57	26	G	G	30	G
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	26	28	28	28	28	27	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	38	30	26	G	G	G	G
U Q	G	G	G	G	G	G	G	G	32	38	G	52	51	51	48	48	43	39	41	31	23	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

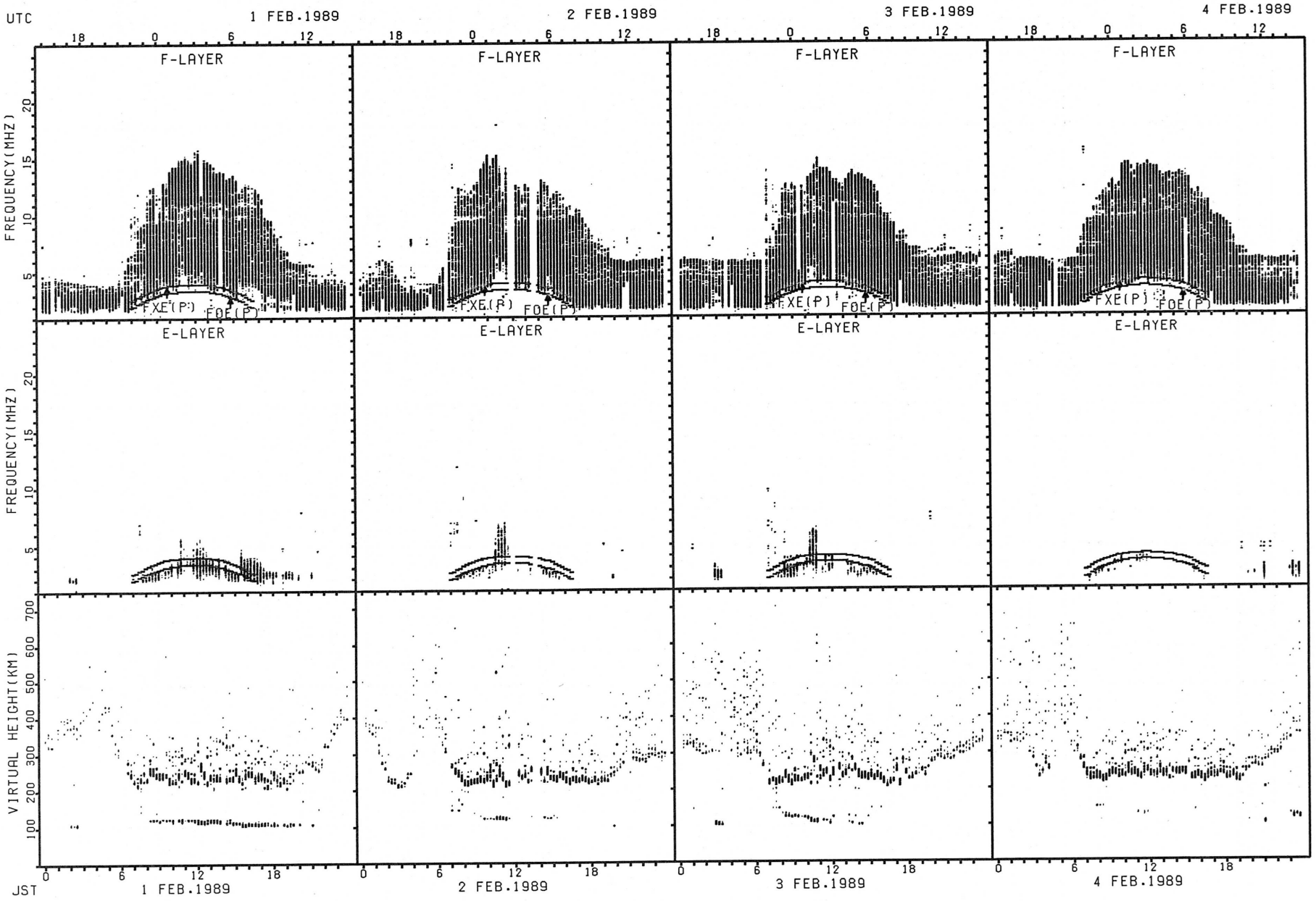
FEB. 1989

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

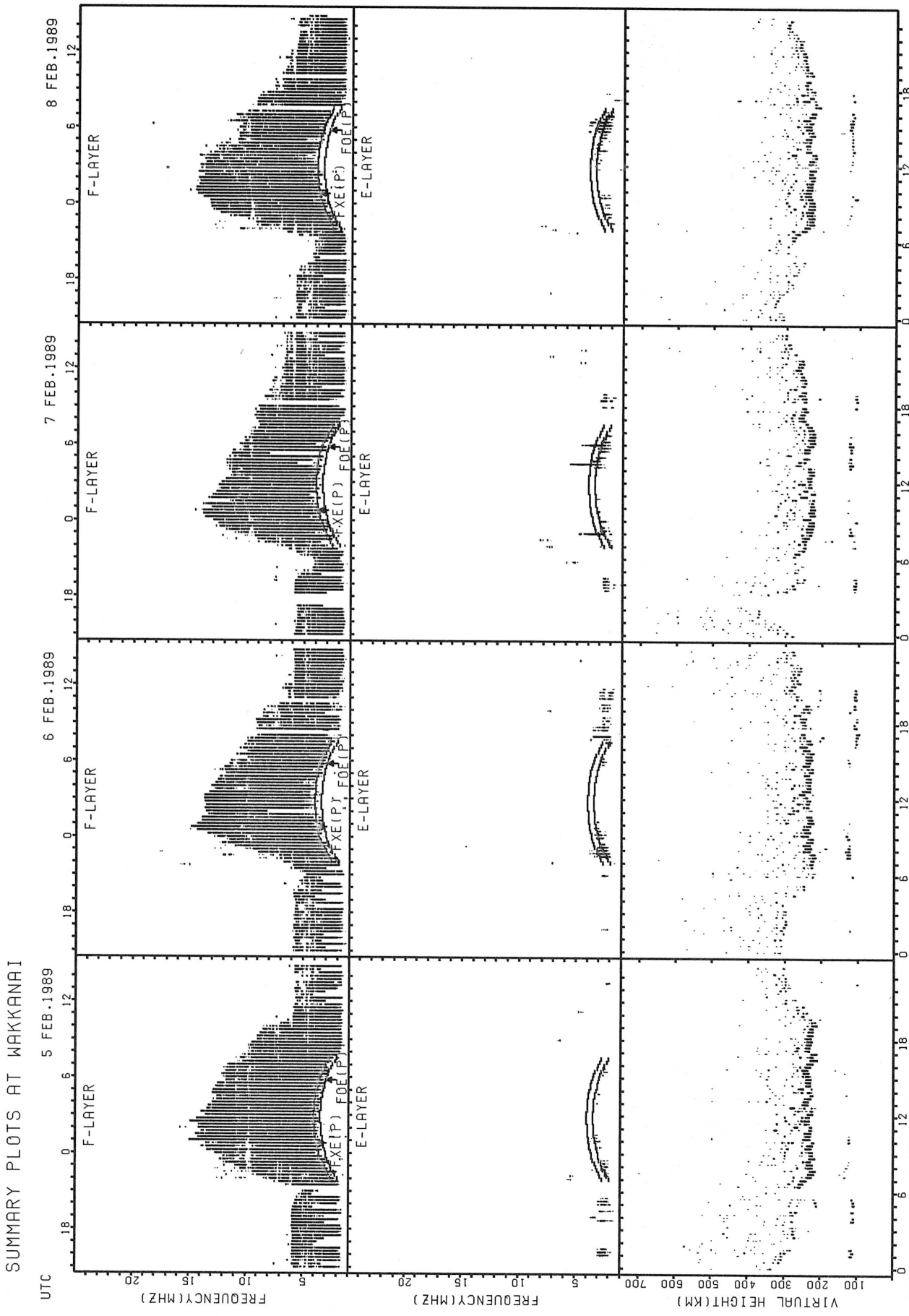
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	15	17	18	26	46	27	29	26	27	22	15	22	15	15	15	15	15
2	15	15	15	15	15			15	15	16	20	22	26	28	28	26	21	17	15	15	15	15	15	15
3	15	15	15	15	15	15		22	15	15	23	21	27	24	24	24	22	14	15	15	15	15	15	15
4	15	14	15	15	15	17		16	18	18	26	26	26	30	26	26	26	17	15	15	14	15	15	15
5	15	15	14	15	15	15	20	15	16	16	22	27	27	27	34	26	18	18	26	15	15	15	15	15
6	15	15	15	15	15	15	15	15	28	24	24	27	27	29	27	24	24	23	22	16	17	16	16	16
7	15	15	15	15	14	15	15	15	15	21	26	44	29	45	28	28	24	24	15	15	15	29	15	15
8	15	15	15	15	15	16	15	16	32	17	24	41	34	45	30	28	30	20	15	15	18	15	16	15
9	15	15	15	14	15	18	16	18	20	23	26	27	45	45	42	41	23	14	23	15	15	16	16	16
10	15	15	15	15	15	15	15	20	15	15	22	33	29	34	75	34	28	18	23	15	14	16	15	21
11	15	15	15	15	15		70	22	16	21	27	29	35	34	33	32	27	24	15	16	15	15	15	15
12	15	15	15	15	15		15	18	29	20	24	33	36	45	38	30	23	23	23	15	15	15	15	15
13	15	14	15	15	15		70	17	33	26	23	24	30	40	33	27	22	15	16	16	15	15	15	15
14	15	14	15	15	15	15	15	16	17	18	24	26	45	34	71	34	45	33	15	15	15	16	15	15
15	15	15	15	15	14	15	15	20	21	23	29	32	33	44	30	33	28	22	23	15	15	15	16	15
16	15	15	15	15	15	15	15	20	16	21	27	26	30	69	47	30	26	21	15	15	15	15	15	14
17	15	15	15	16	15	20	20	21	16	21	24	30	29	28	30	28	27	21	16	14	14	15	16	15
18	15	15	15	15	15	15	15	17	16	17	24	26	27	28	29	27	22	20	16	15	15	15	15	15
19	15	15	15	15	15	15	15	17	16	16	27	29	28	29	29	27	26	21	23	15	15	15	15	15
20	16	14	15	16	15	15	15	18	15	17	27	27	27	28	29	28	22	18	21	15	15	15	16	15
21	15	16	15	15	15	15	15	20	15	16	26	28	27	28	27	27	22	15	16	14	15	15	15	15
22	15	15	15	15	15	15	15	22	16	49	27	27	28	30	28	28	27	23	15	15	15	15	15	15
23	14	15	15	15	15	16	17	18	17	22	36	48	45	33	60	29	22	17	18	15	15	16	15	15
24	15	15	15	15	15	18	15	21	17	26		28	29	29	28	28	26	18	16	14	15	15	15	15
25	15	15	15	15	15	15	15	21	16	26	27	28	30	47	32	28	21	18	17	15	15	14	15	16
26	15	15	15	15	15	15	15	21	16	21	23	29	46	32	32	30	27	20	18	15	15	15	15	15
27	15	15	15	15	14	15	15	27	18	22	23	42	47	48	29	29	23	21	15	18	15	17	15	16
28	16	15	15	15	15	15	15	21	15	16	23	26	27	27	28	27	22	18	15	15	15	15	15	15
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	24	25	28	28	28	27	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	15	15	15	15	15	15	15	18	16	20	24	28	29	31	30	28	24	19	16	15	15	15	15	15
U Q	15	15	15	15	15	15	15	21	18	22	27	32	34	44	33	30	27	21	22	15	15	15	15	15
L Q	15	15	15	15	15	15	15	16	15	16	23	26	27	28	28	27	22	17	15	15	15	15	15	15

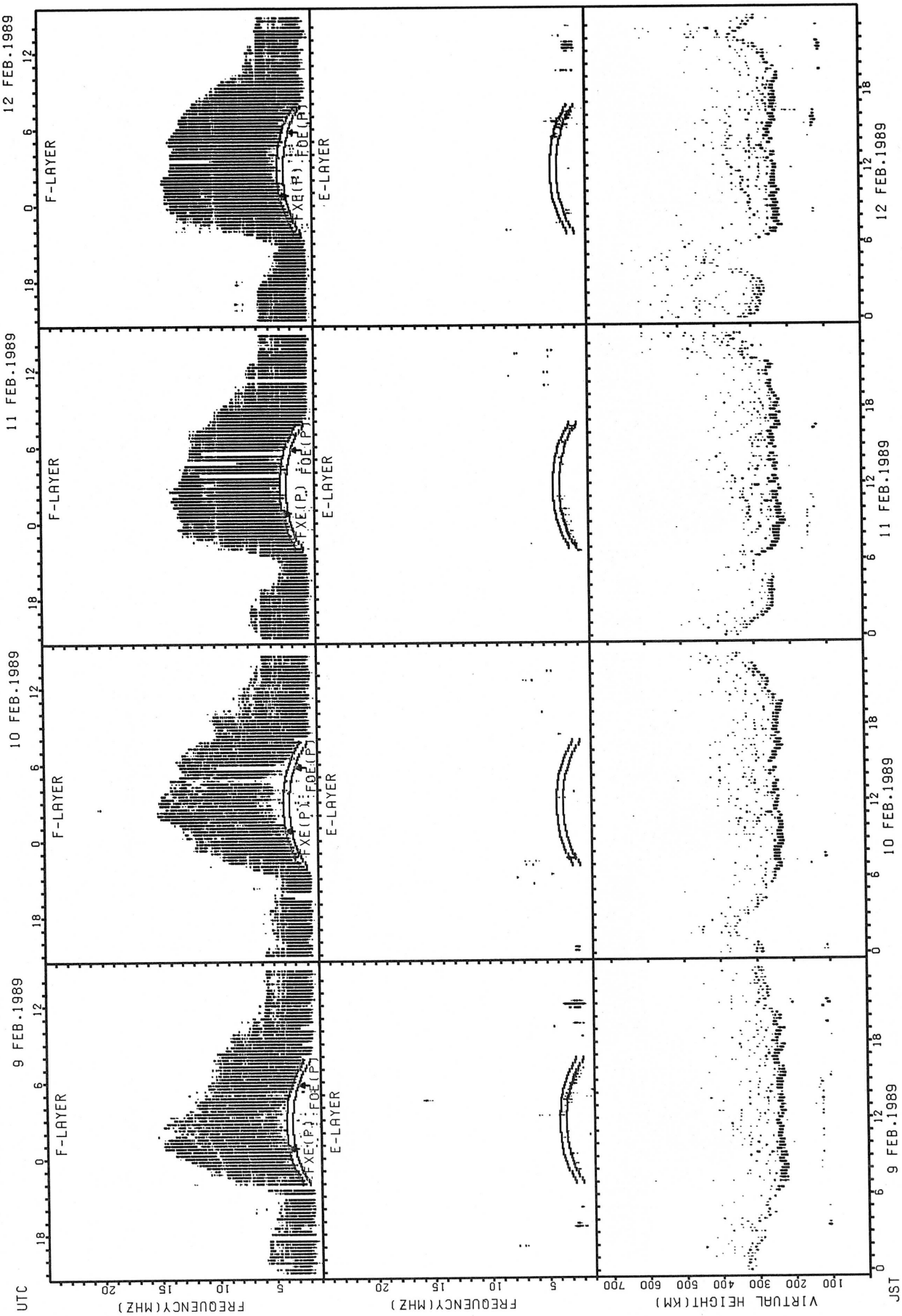
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

SUMMARY PLOTS AT WAKKANAI



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


SUMMARY PLOTS AT WAKKANAI
UTC
JST
5 FEB.1989
6 FEB.1989
7 FEB.1989
8 FEB.1989
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
9 FEB.1989
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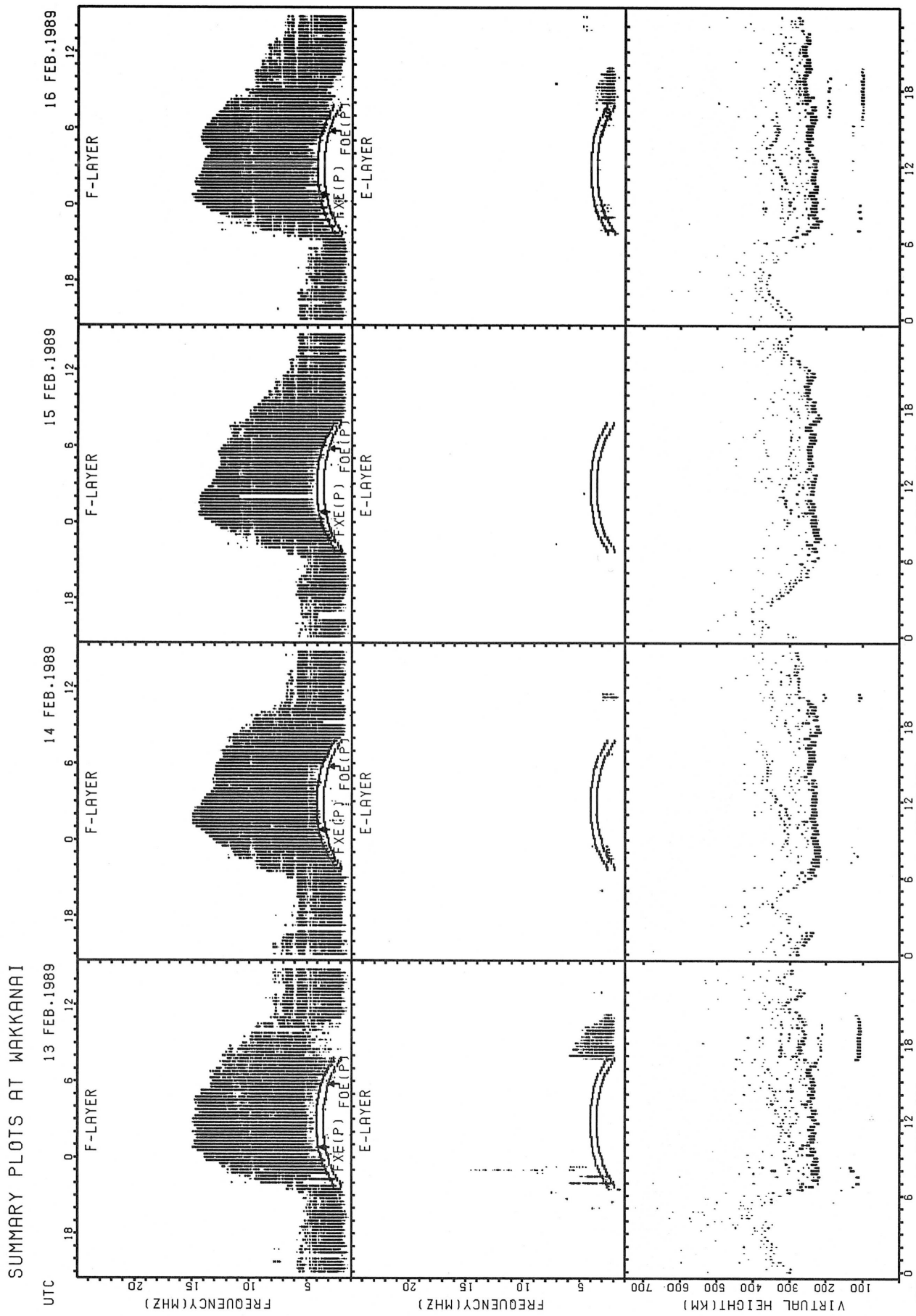
11 FEB.1989
12 FEB.1989
F-LAYER
E-LAYER
FXE(P); FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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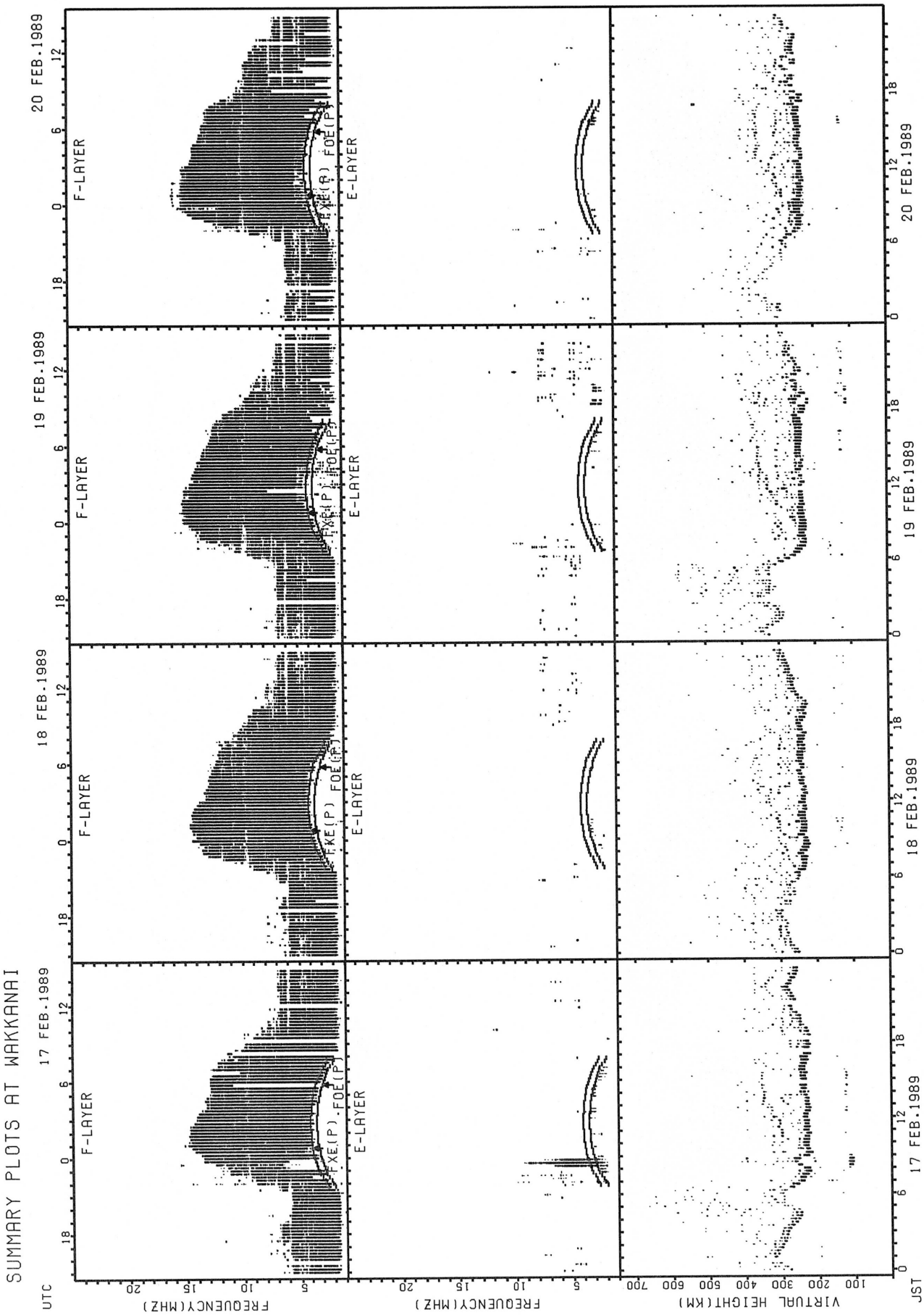
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
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17 FEB.1989
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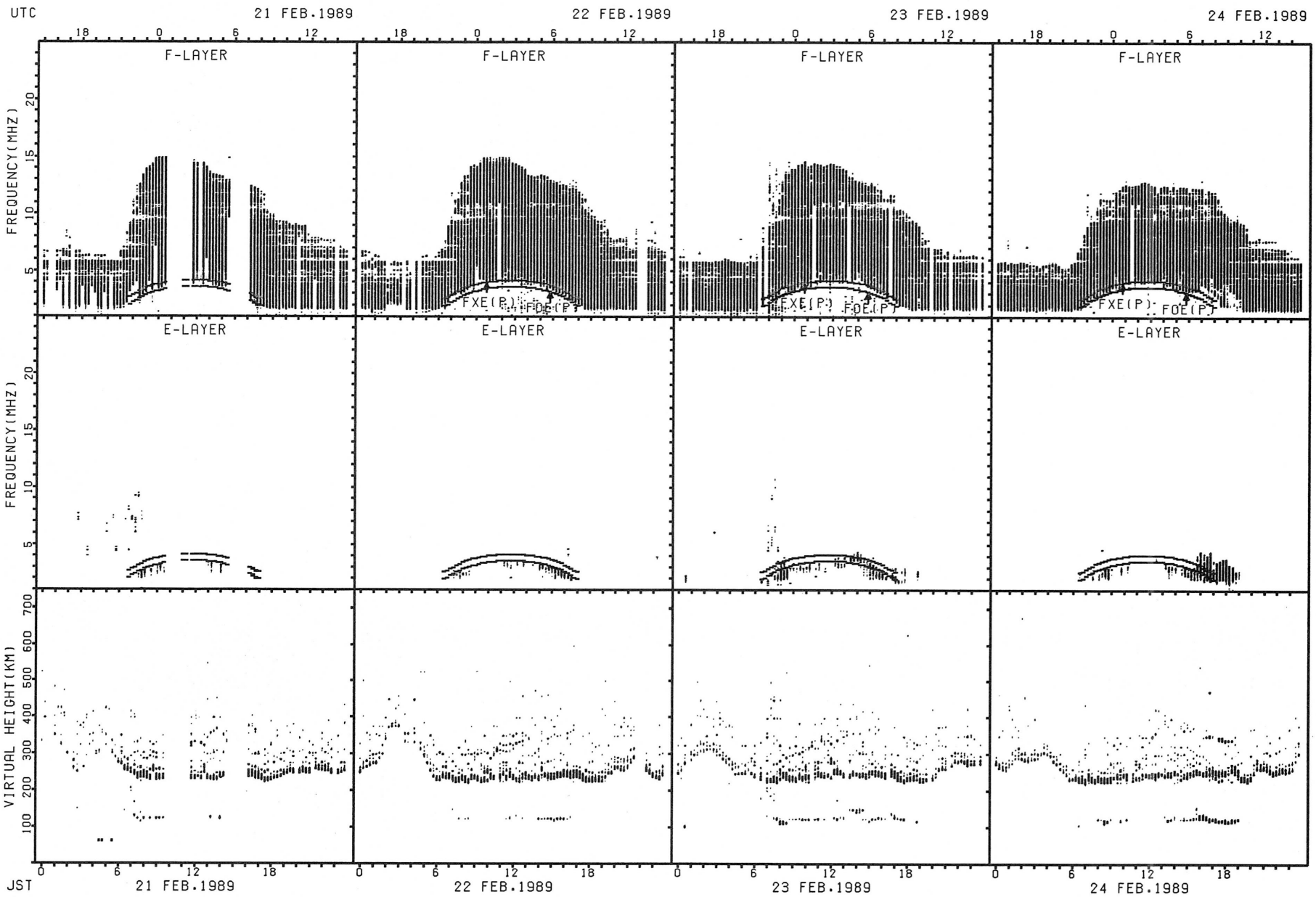
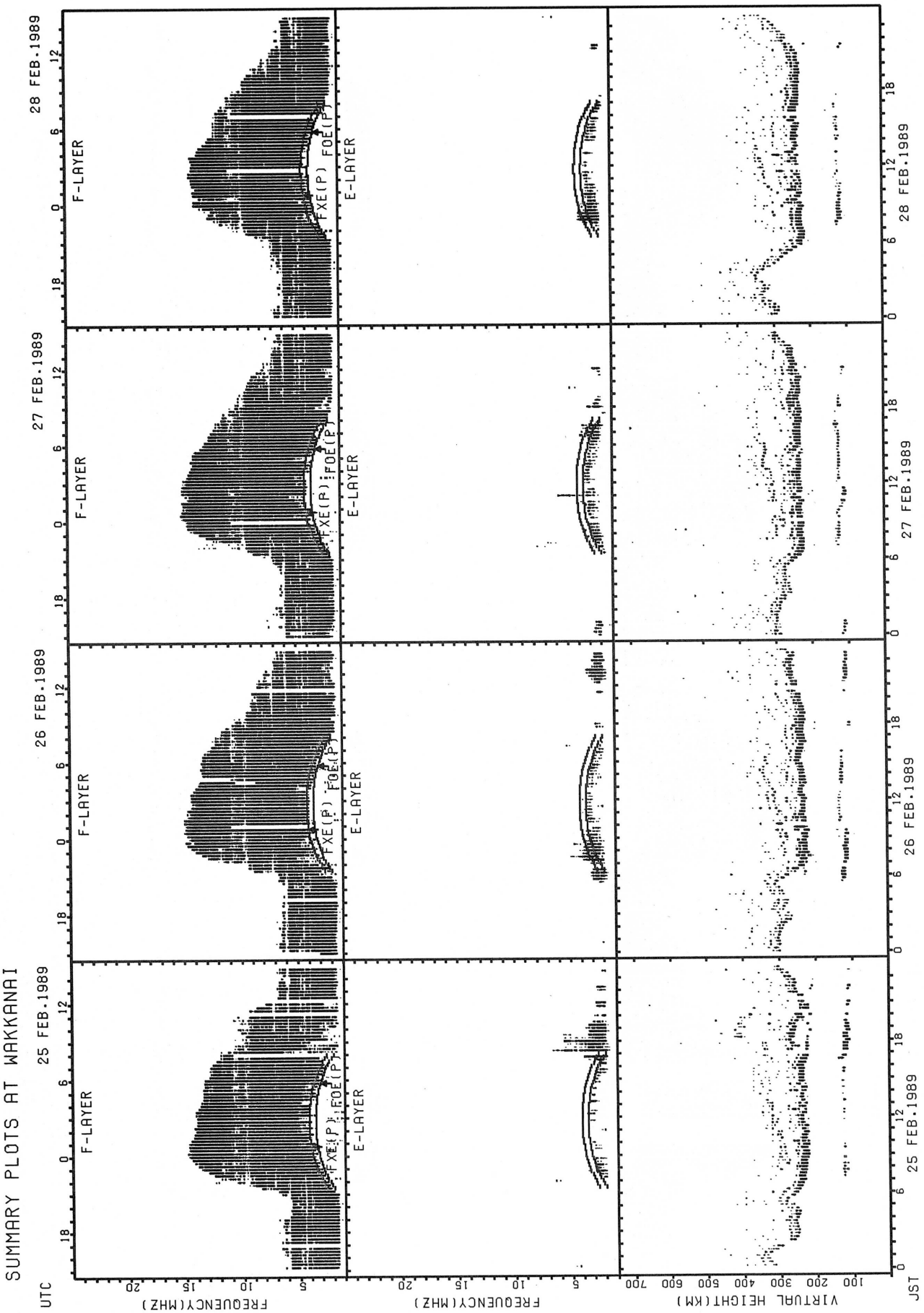
19 FEB.1989
20 FEB.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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


SUMMARY PLOTS AT WAKKANAI
UTC
25 FEB.1989
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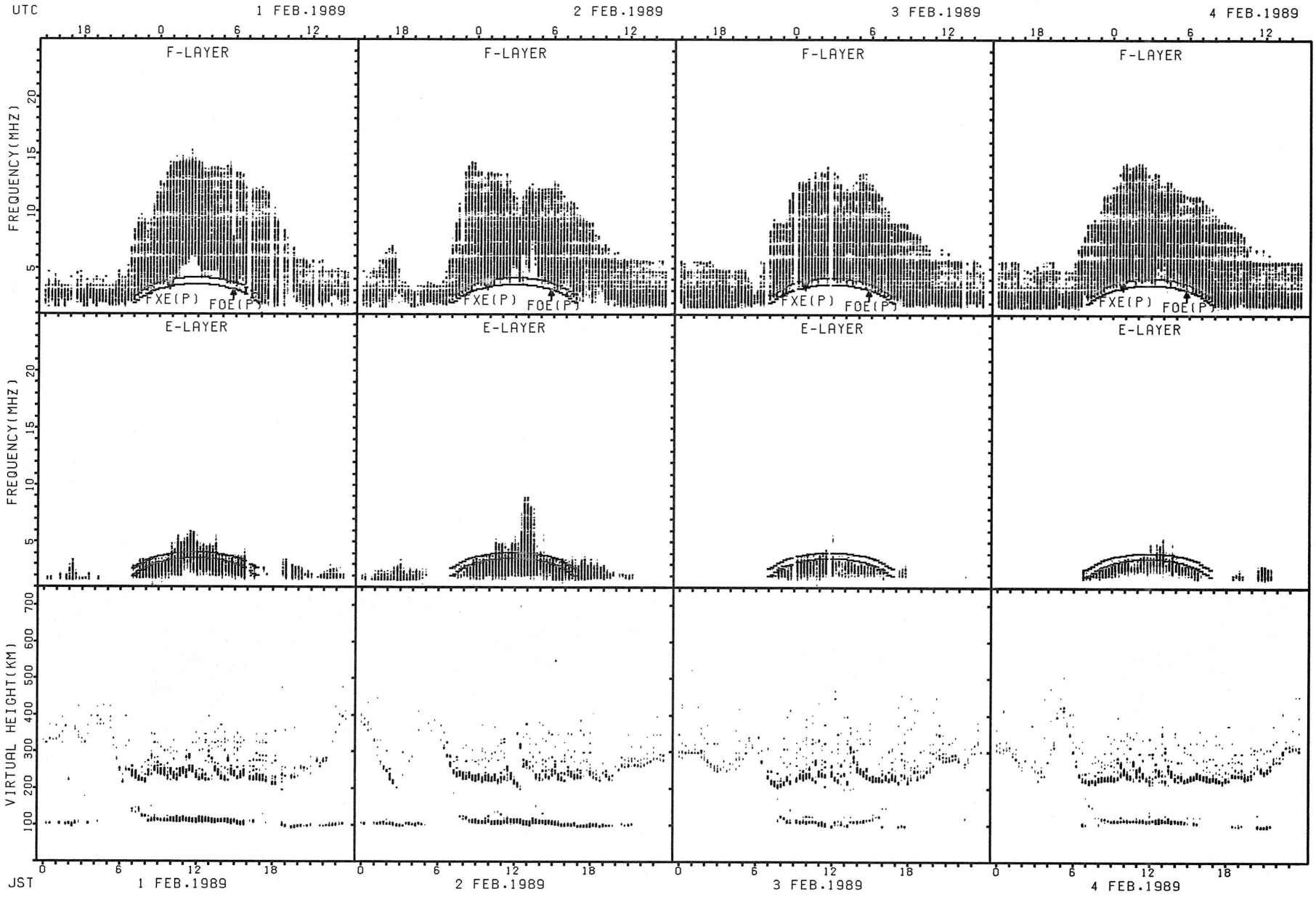
27 FEB.1989
28 FEB.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



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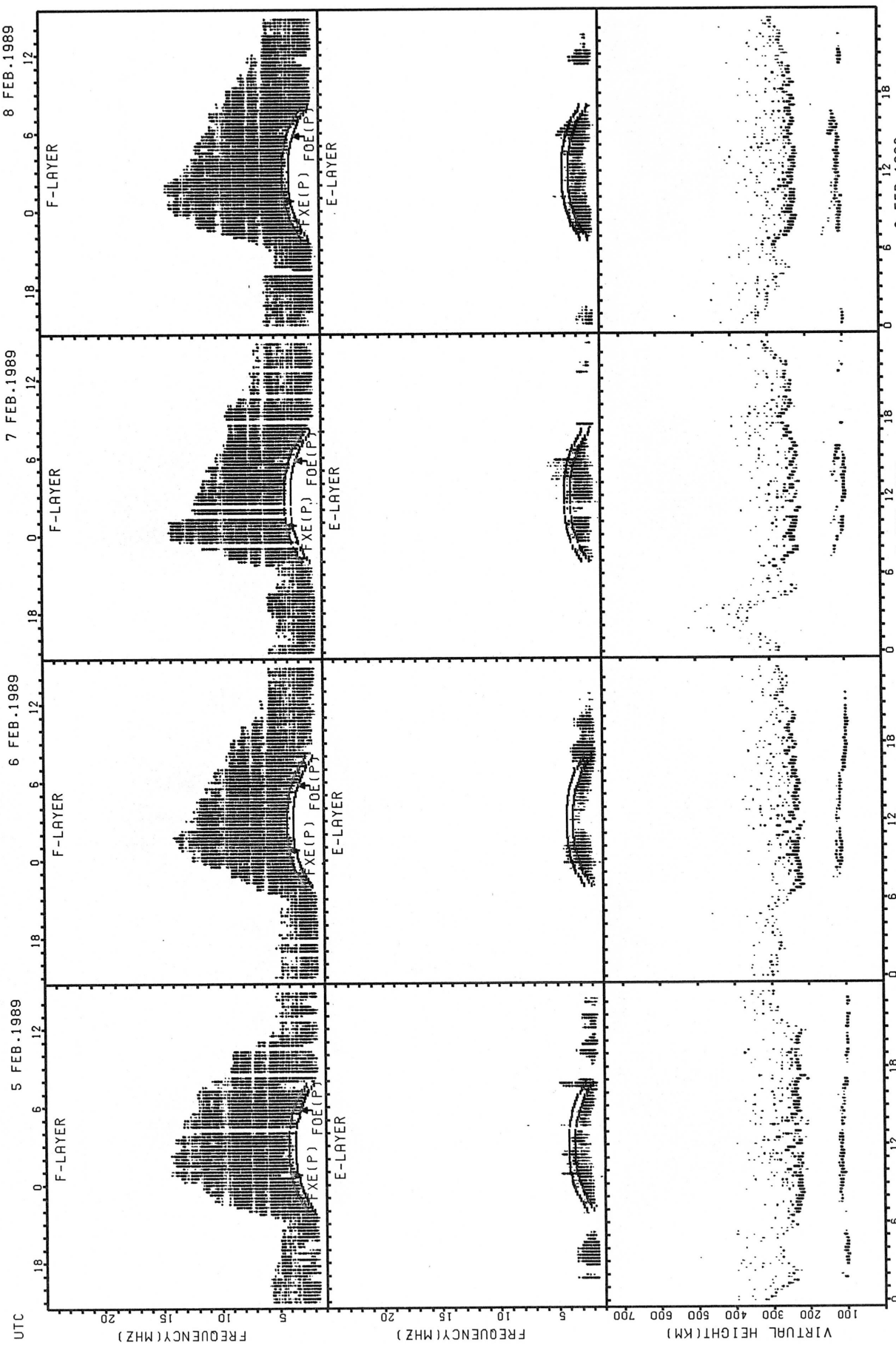
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
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F-LAYER
E-LAYER
FXE(P) FOE(P)
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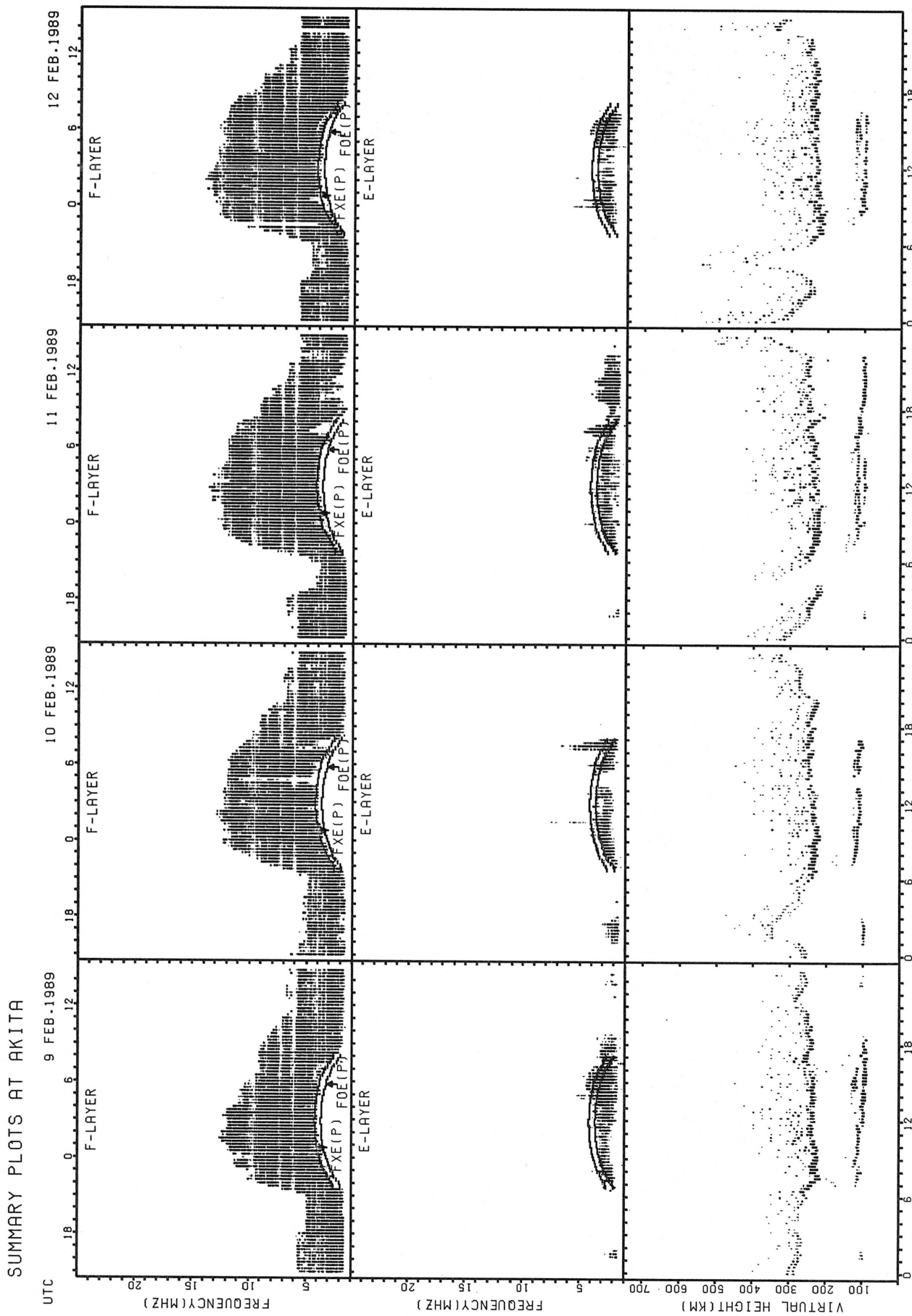
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
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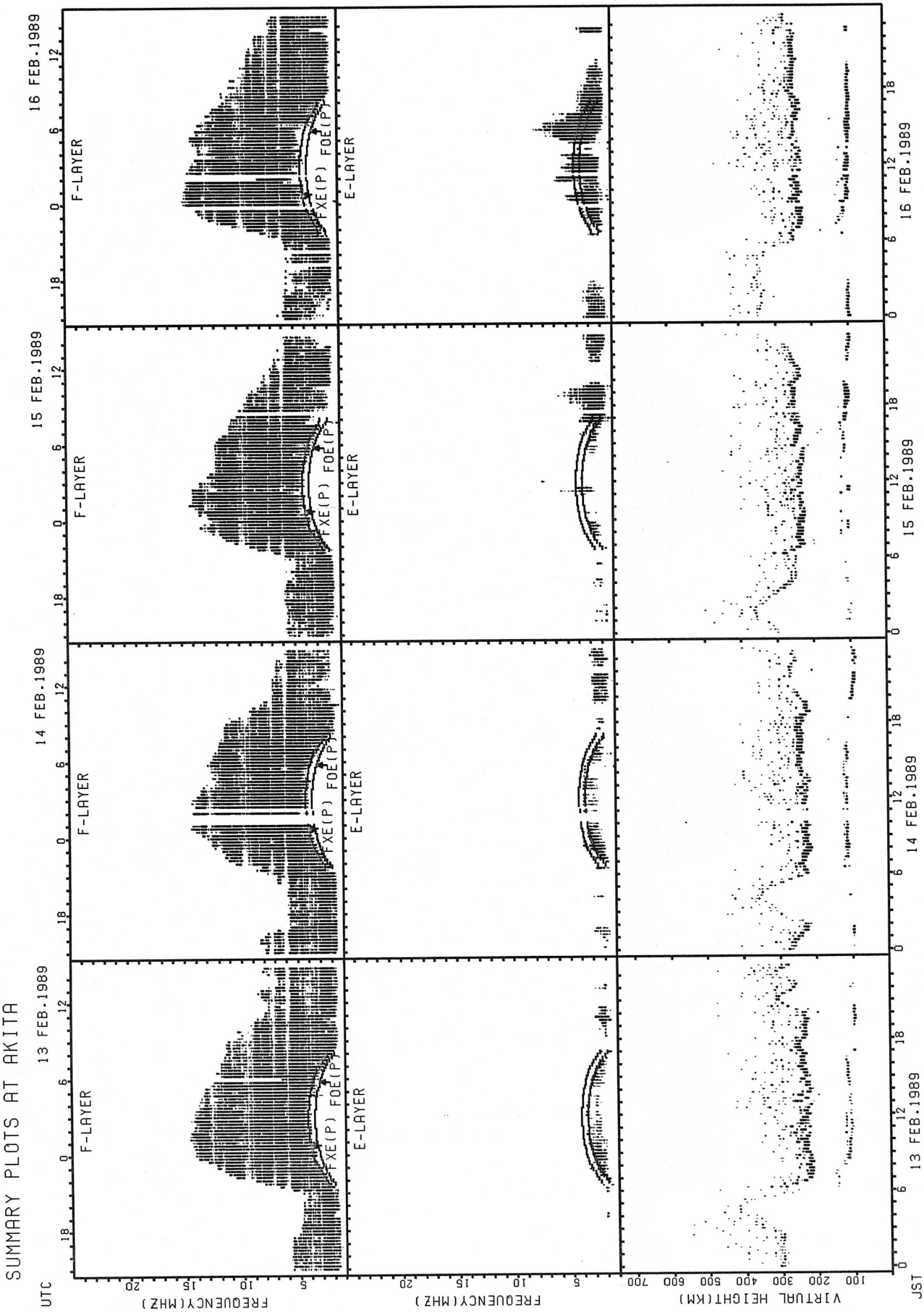
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
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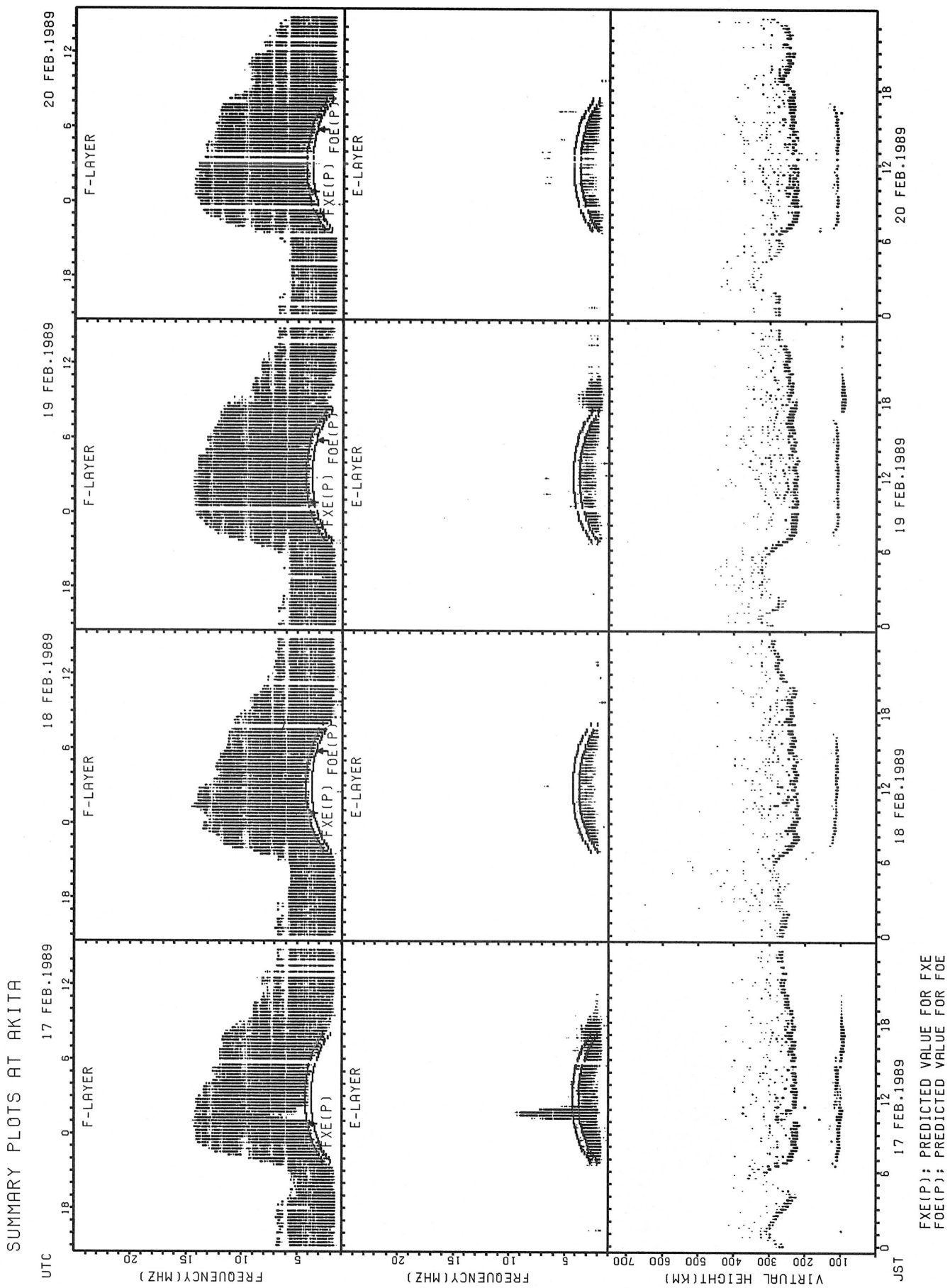
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
17 FEB.1989
18 FEB.1989
19 FEB.1989
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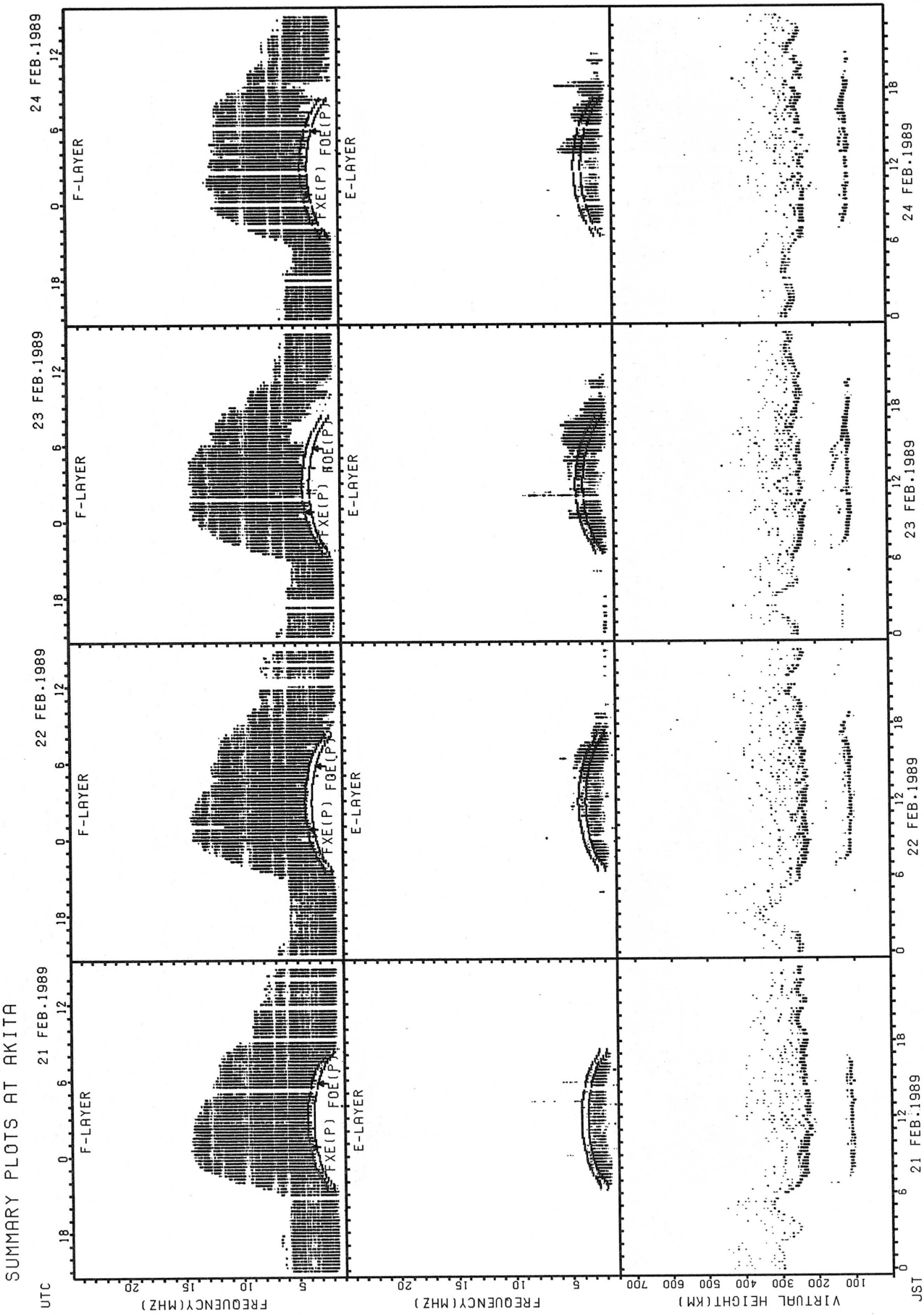
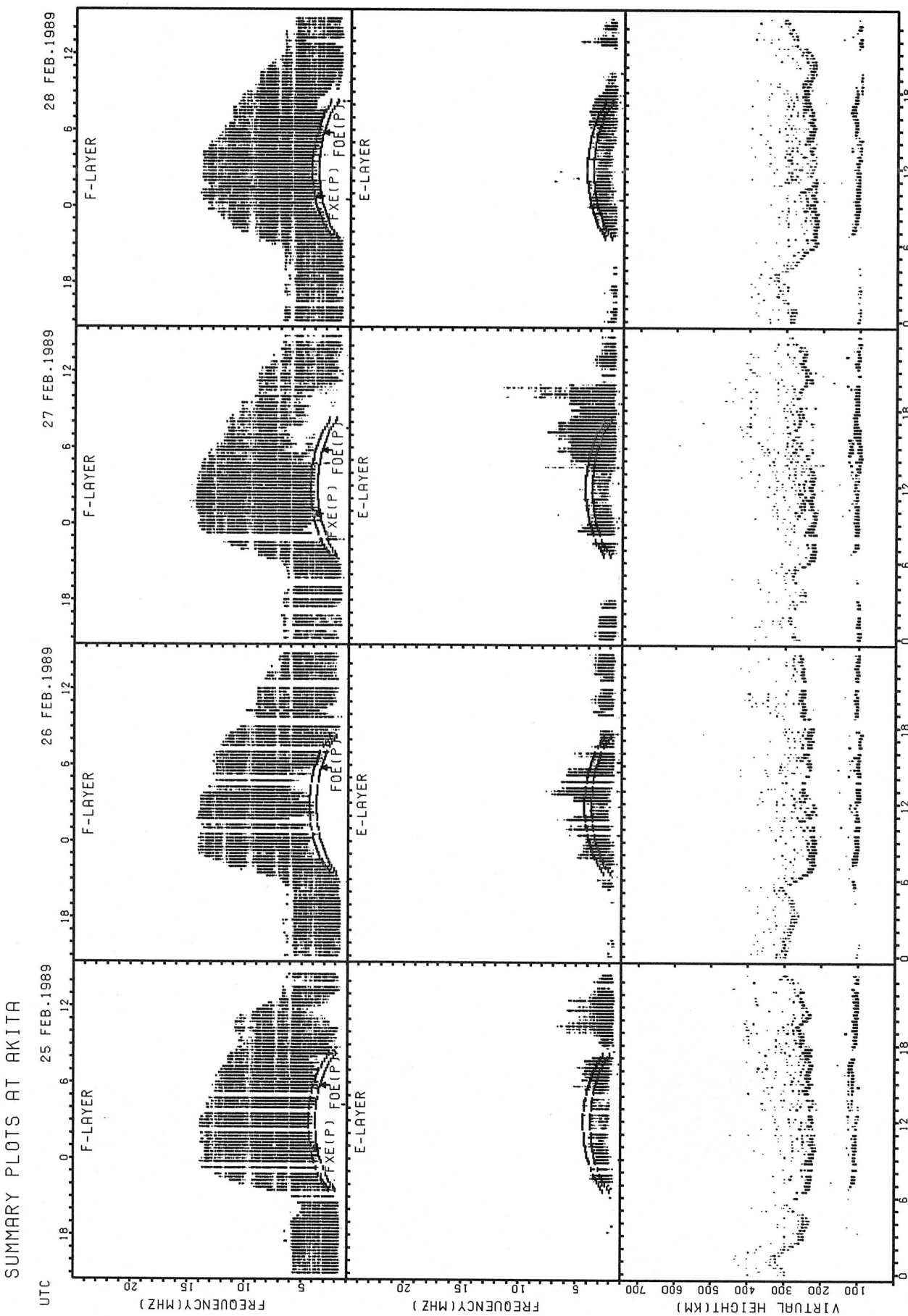
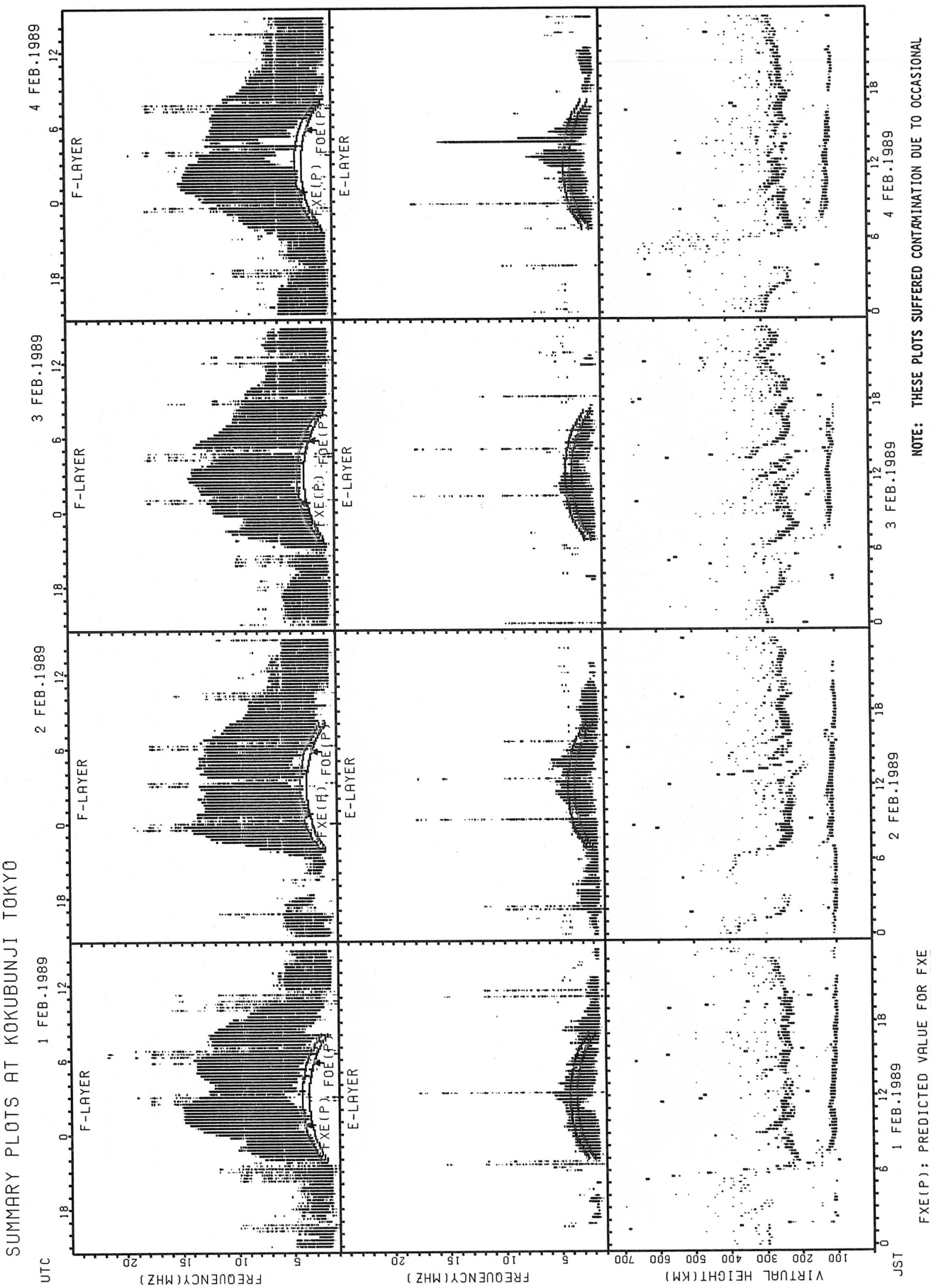
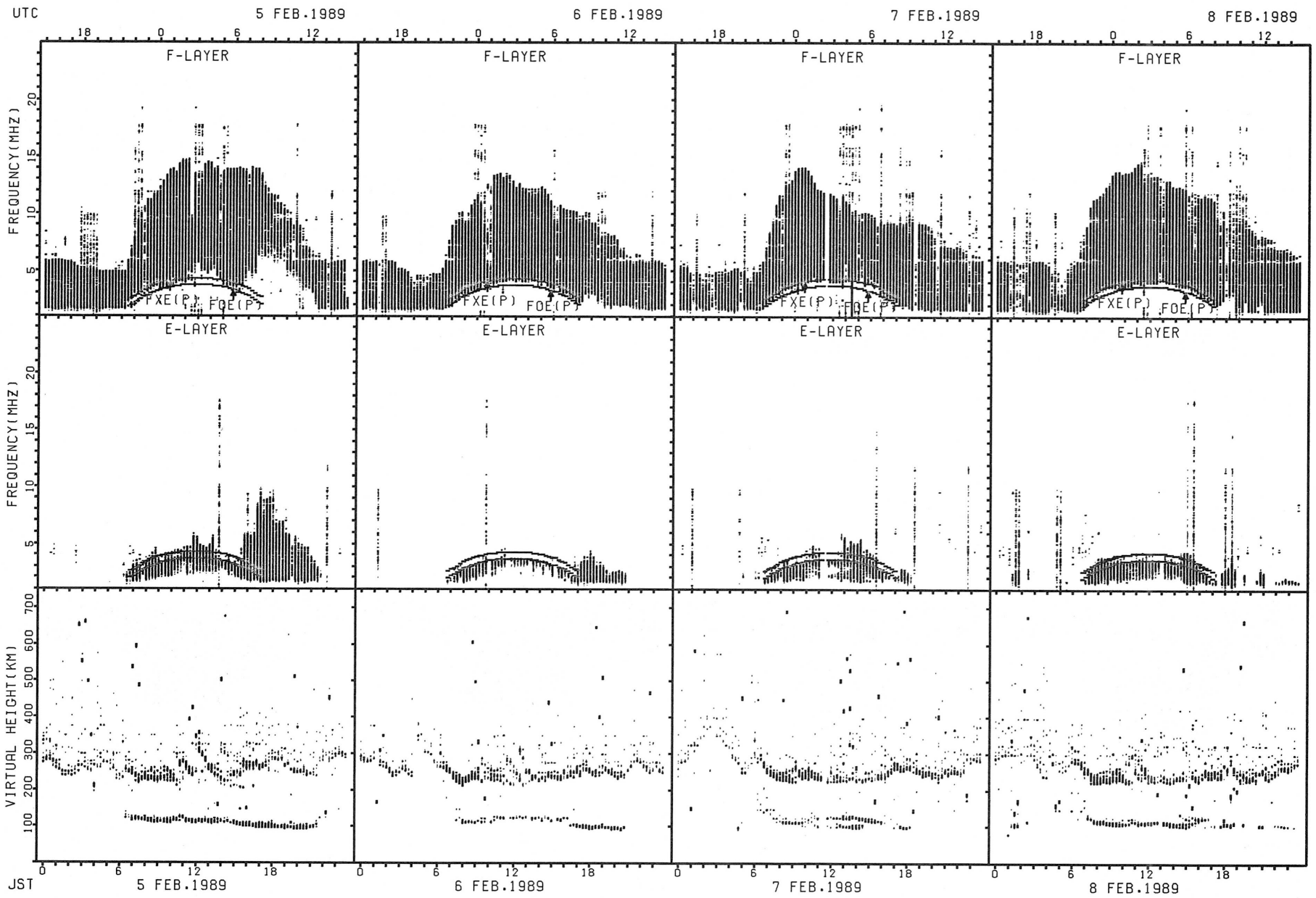
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
21 FEB.1989
22 FEB.1989
23 FEB.1989
24 FEB.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
25 FEB.1989
26 FEB.1989
27 FEB.1989
28 FEB.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

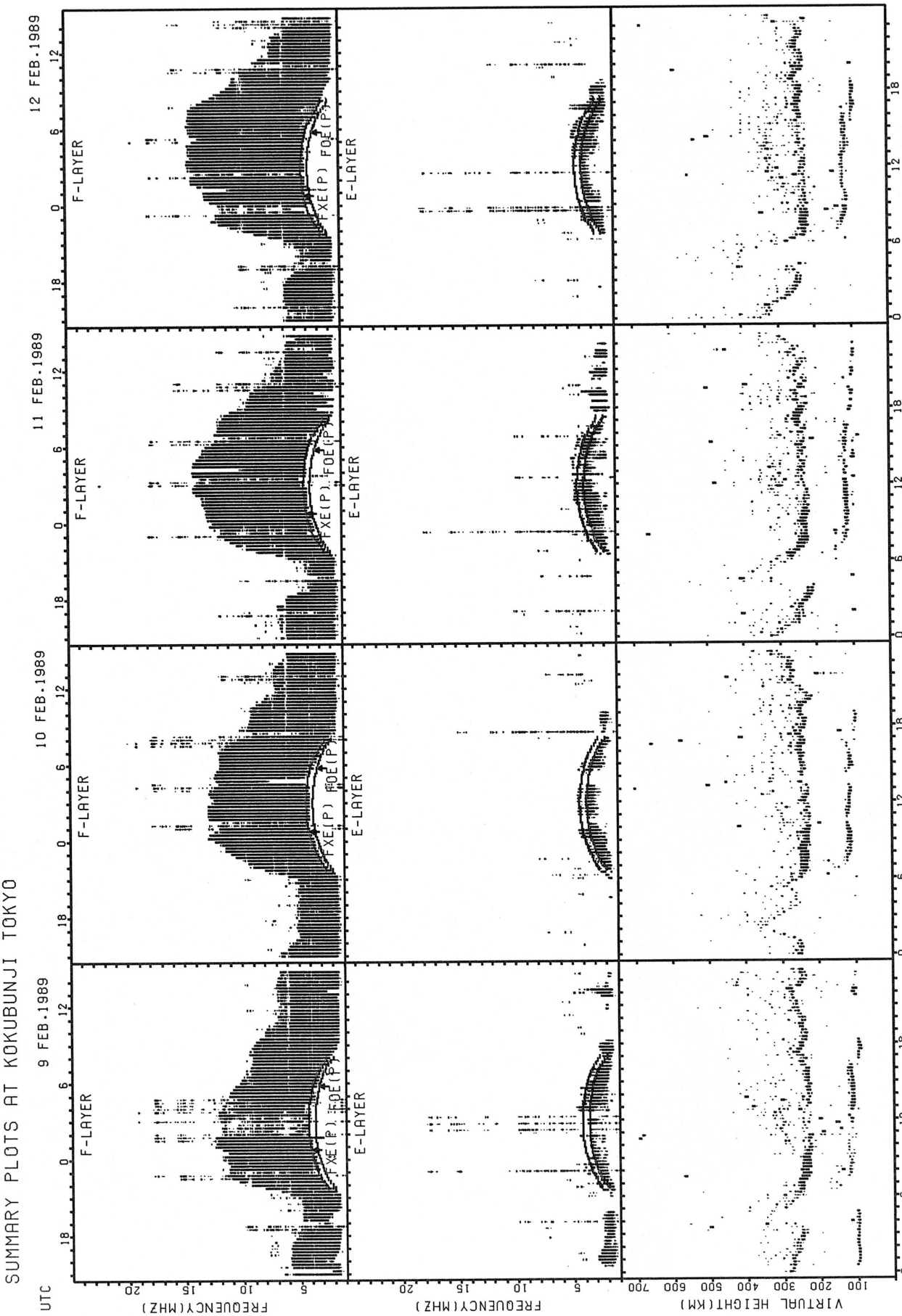

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
1 FEB.1989
2 FEB.1989
3 FEB.1989
4 FEB.1989
F-LAYER
E-LAYER
FXE(P), FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT KOKUBUNJI TOKYO

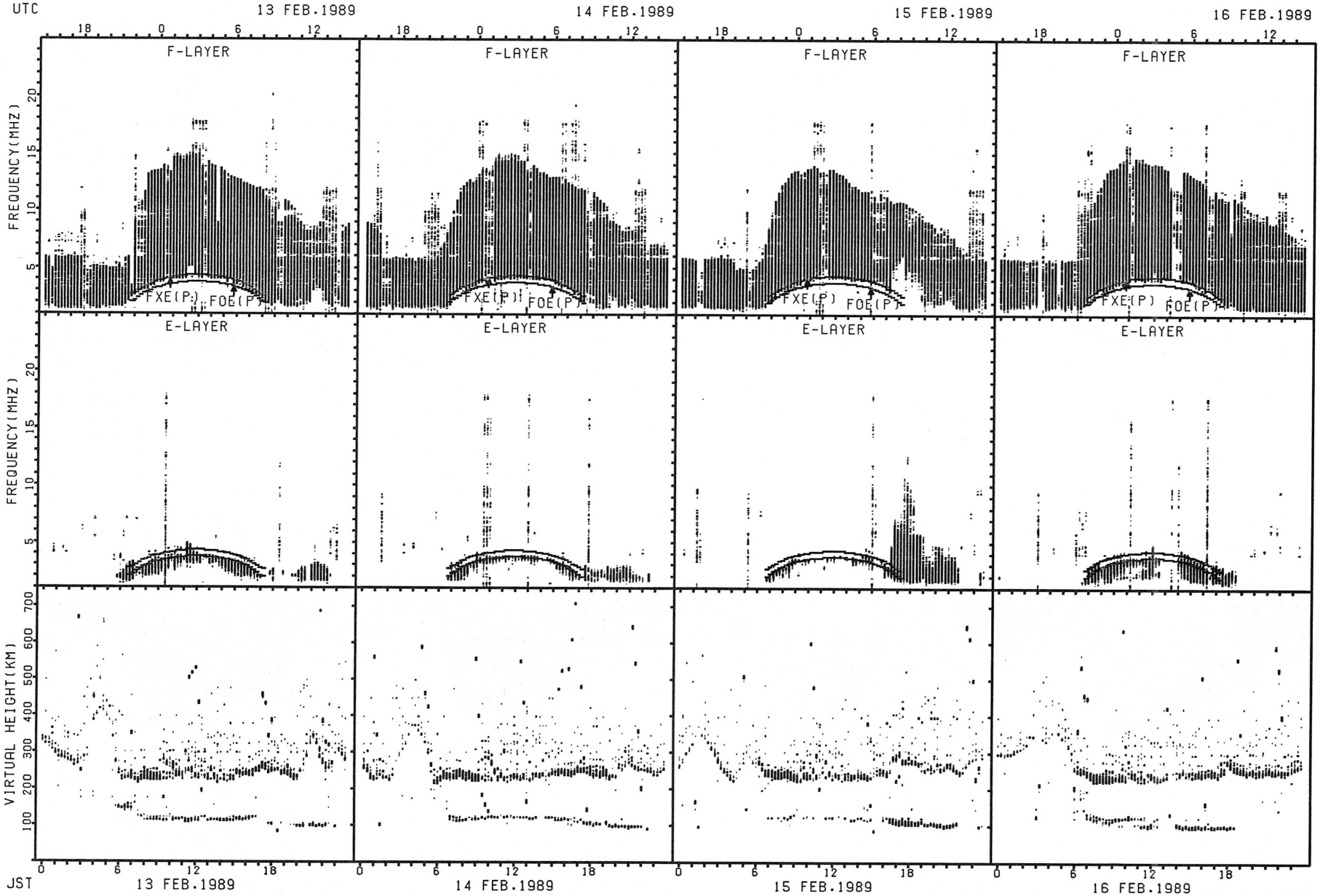


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

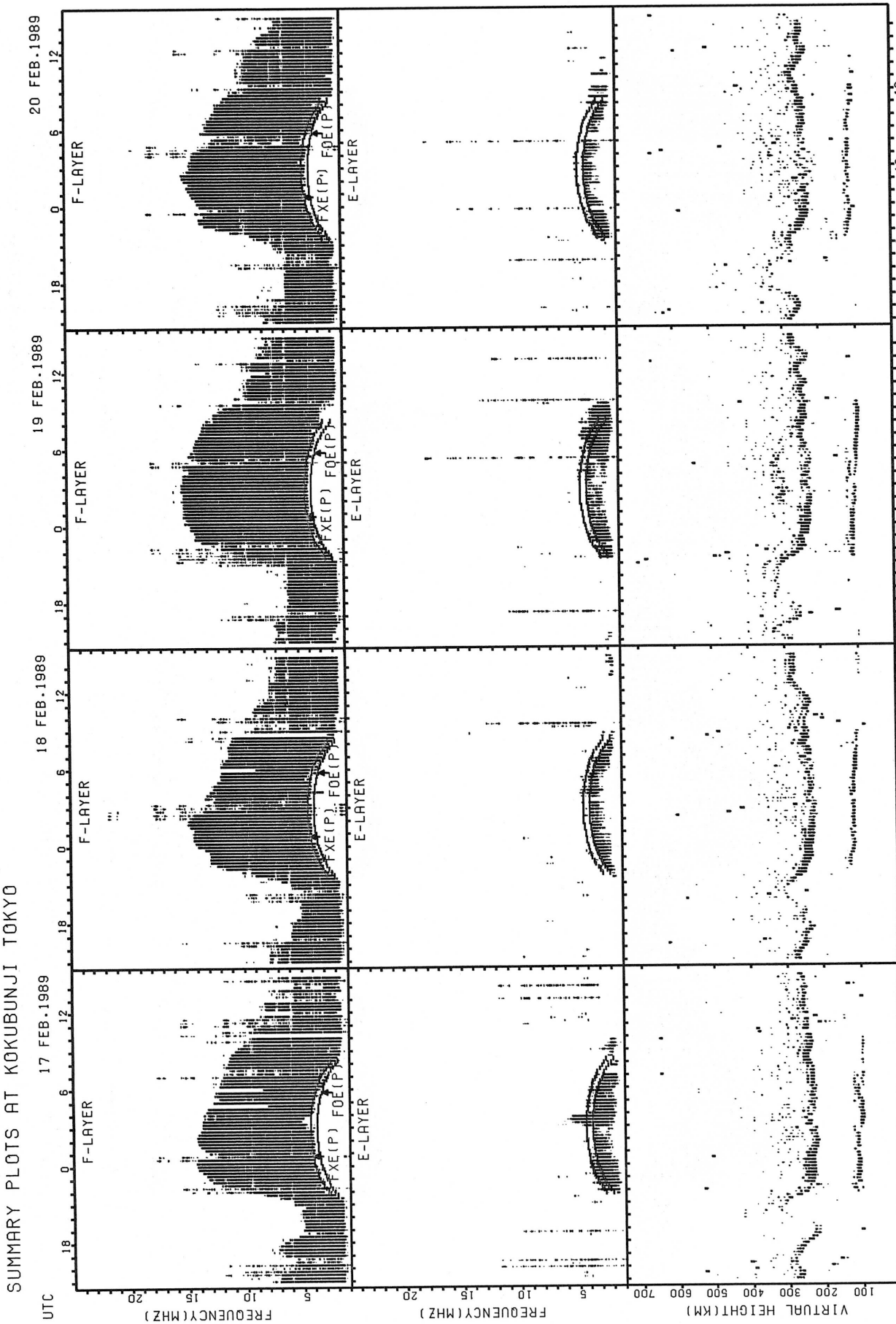

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
JST
9 FEB.1989
10 FEB.1989
11 FEB.1989
12 FEB.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT KOKUBUNJI TOKYO

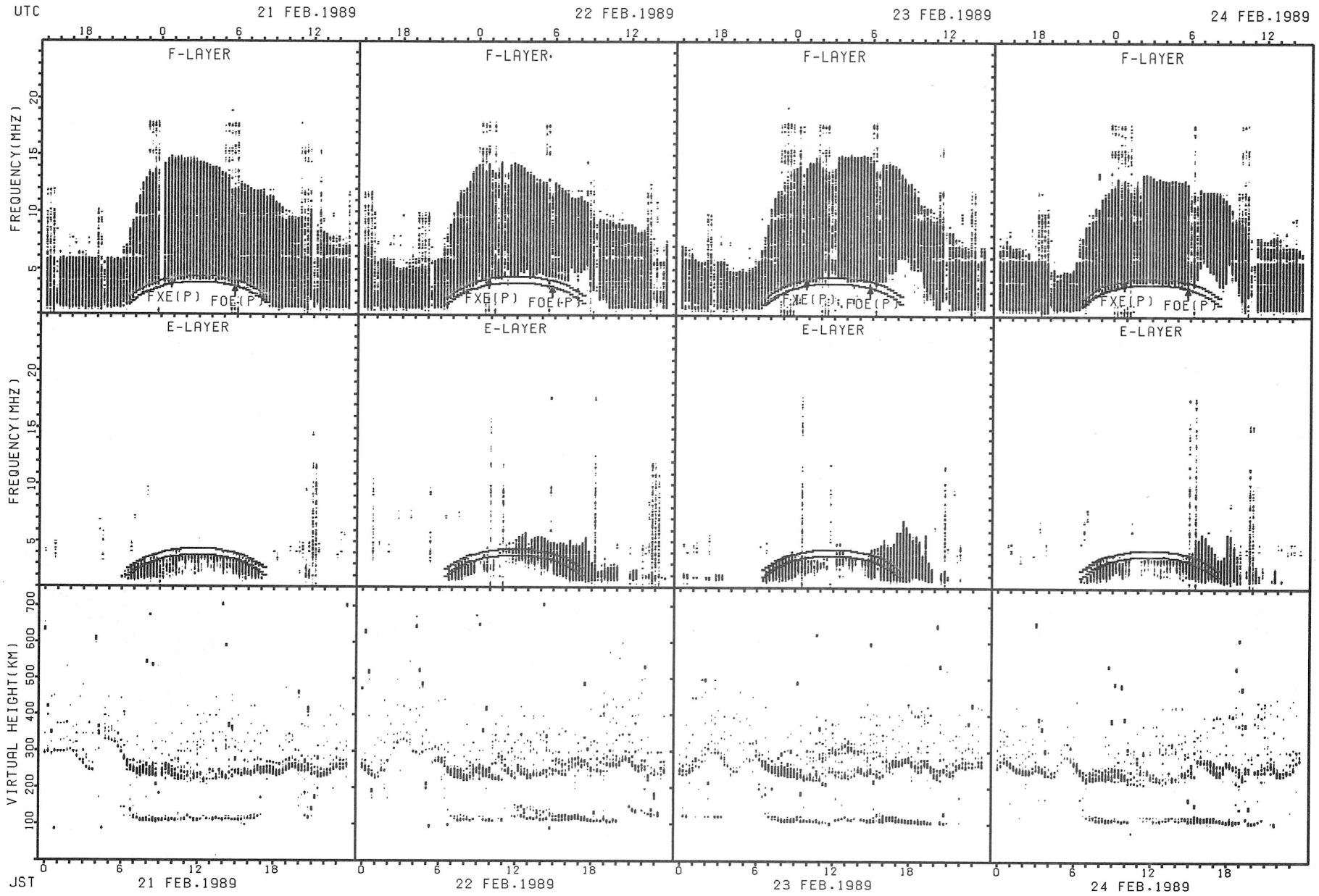


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

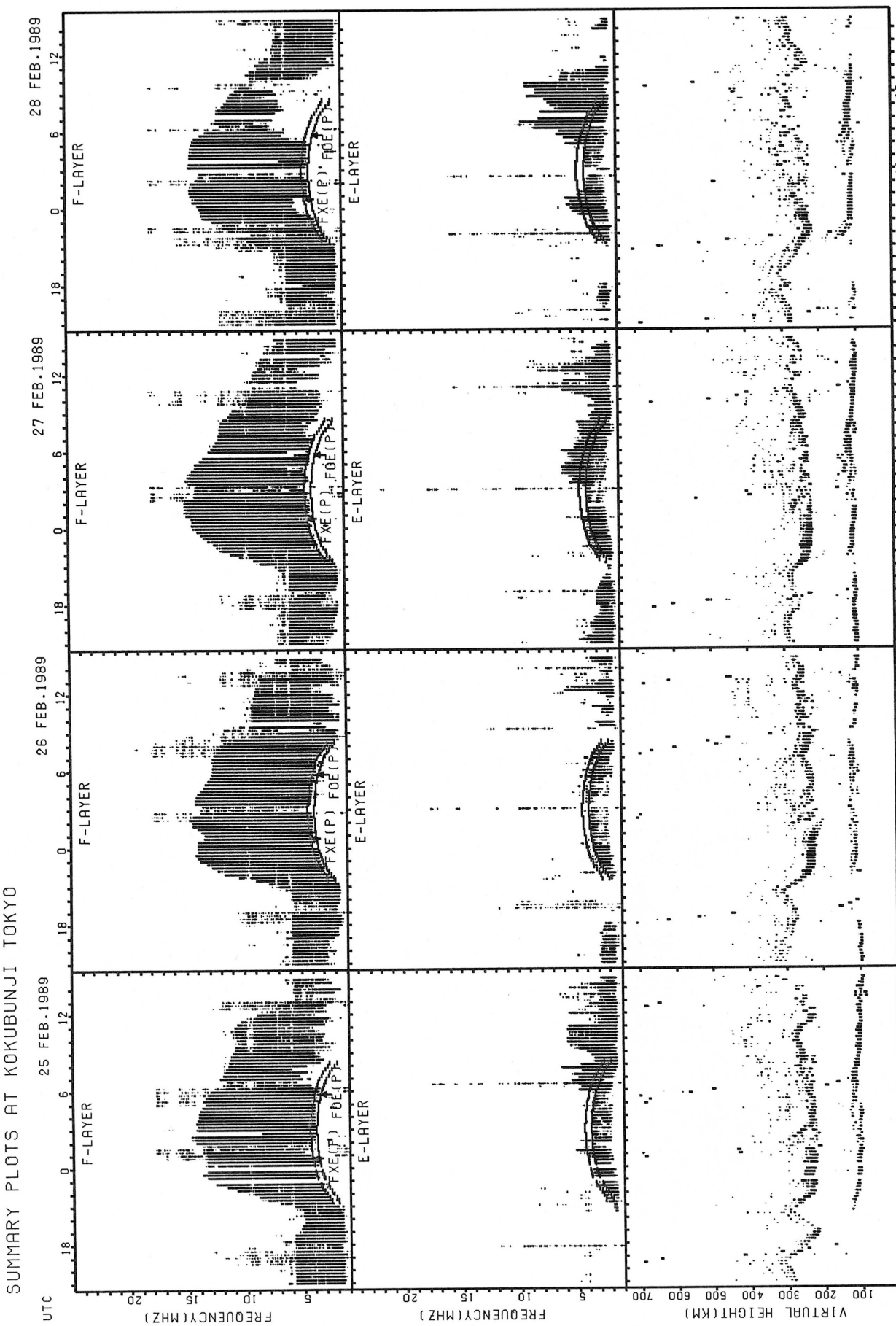

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
17 FEB.1989
18 FEB.1989
19 FEB.1989
20 FEB.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 FEB.1989
26 FEB.1989
27 FEB.1989
28 FEB.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
25 FEB.1989
26 FEB.1989
27 FEB.1989
28 FEB.1989
FXE(P): PREDICTED VALUE FOR FXE
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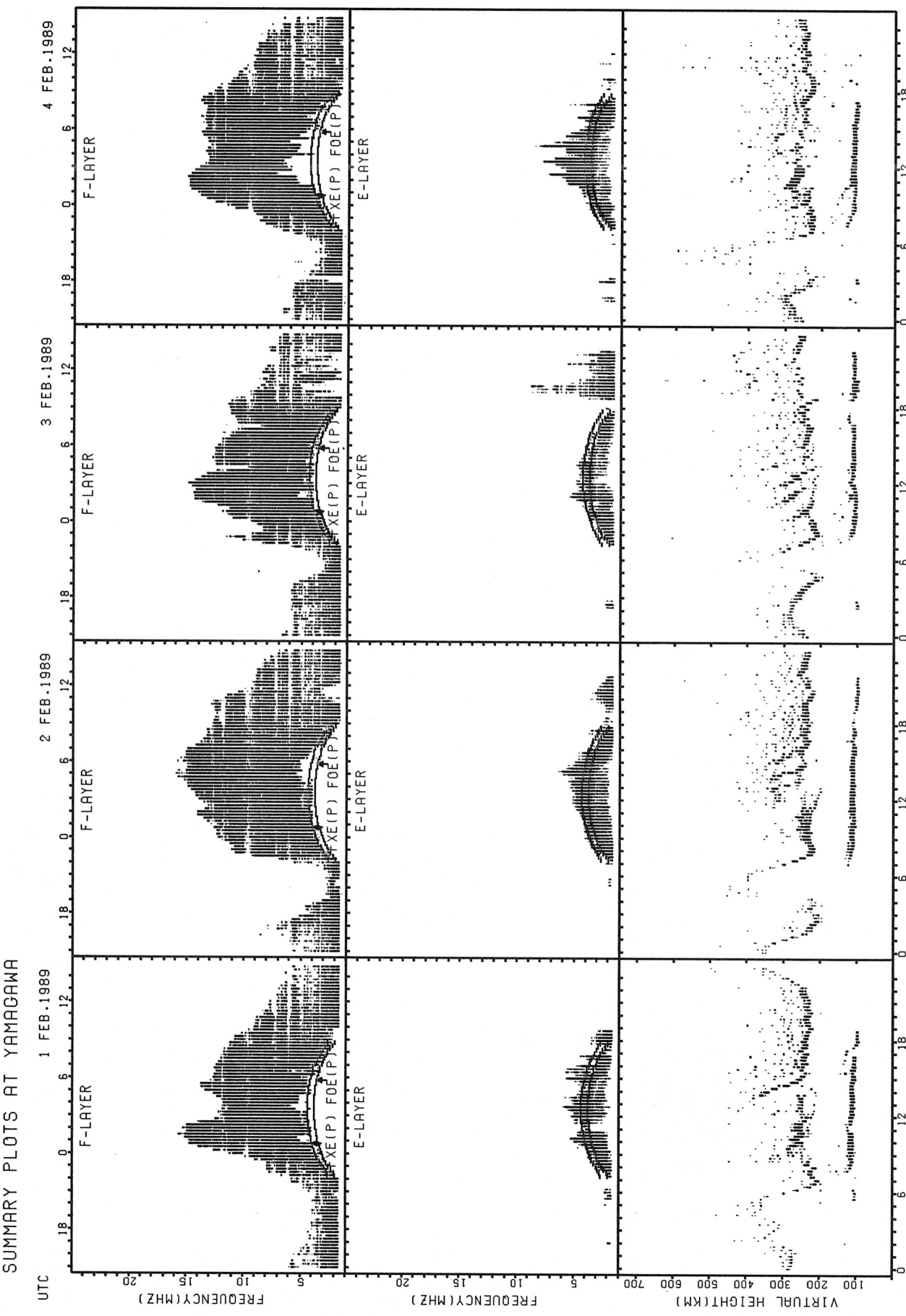
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.


SUMMARY PLOTS AT YAMAGAWA
UTC
JST
1 FEB.1989
2 FEB.1989
3 FEB.1989
4 FEB.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
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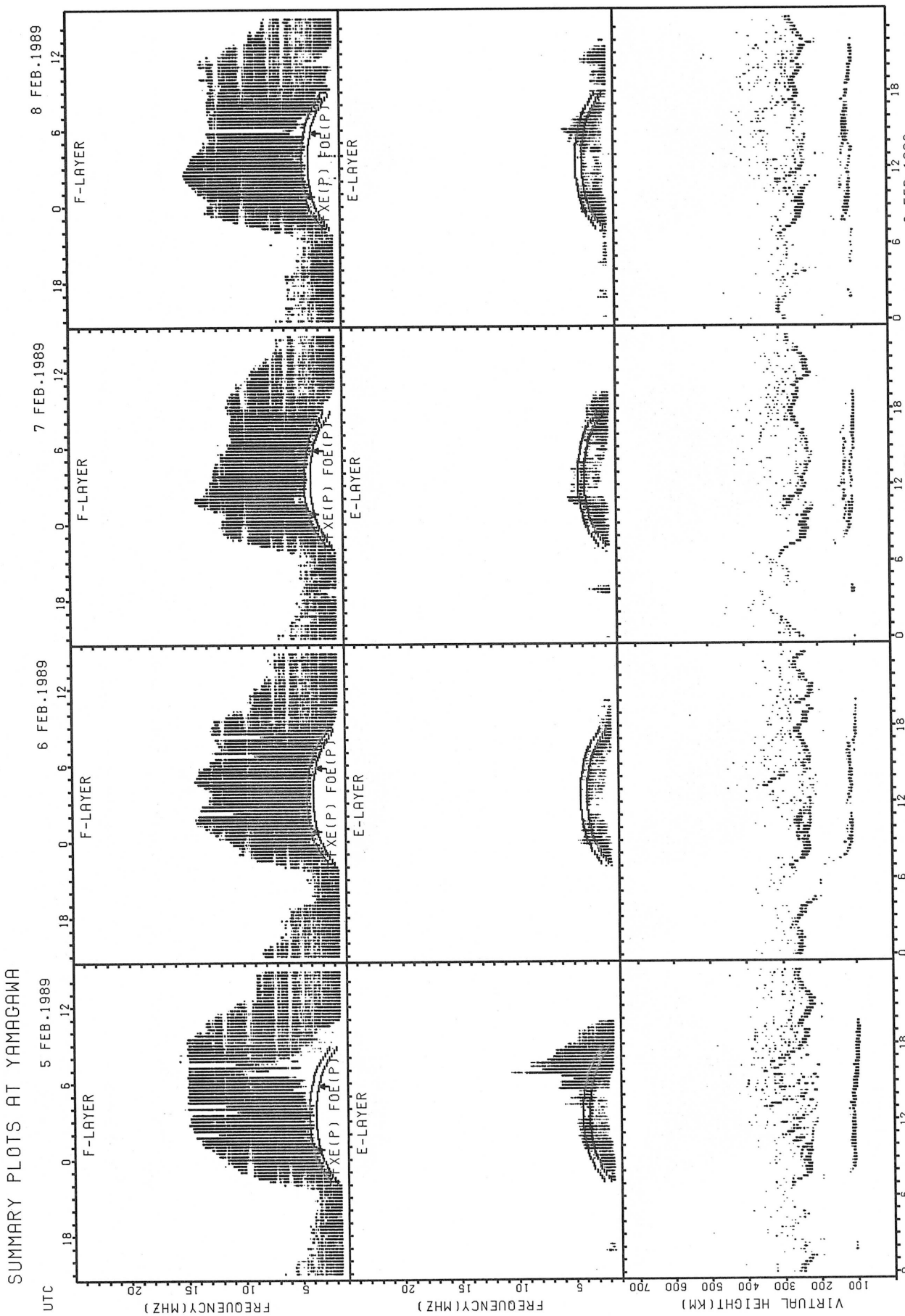
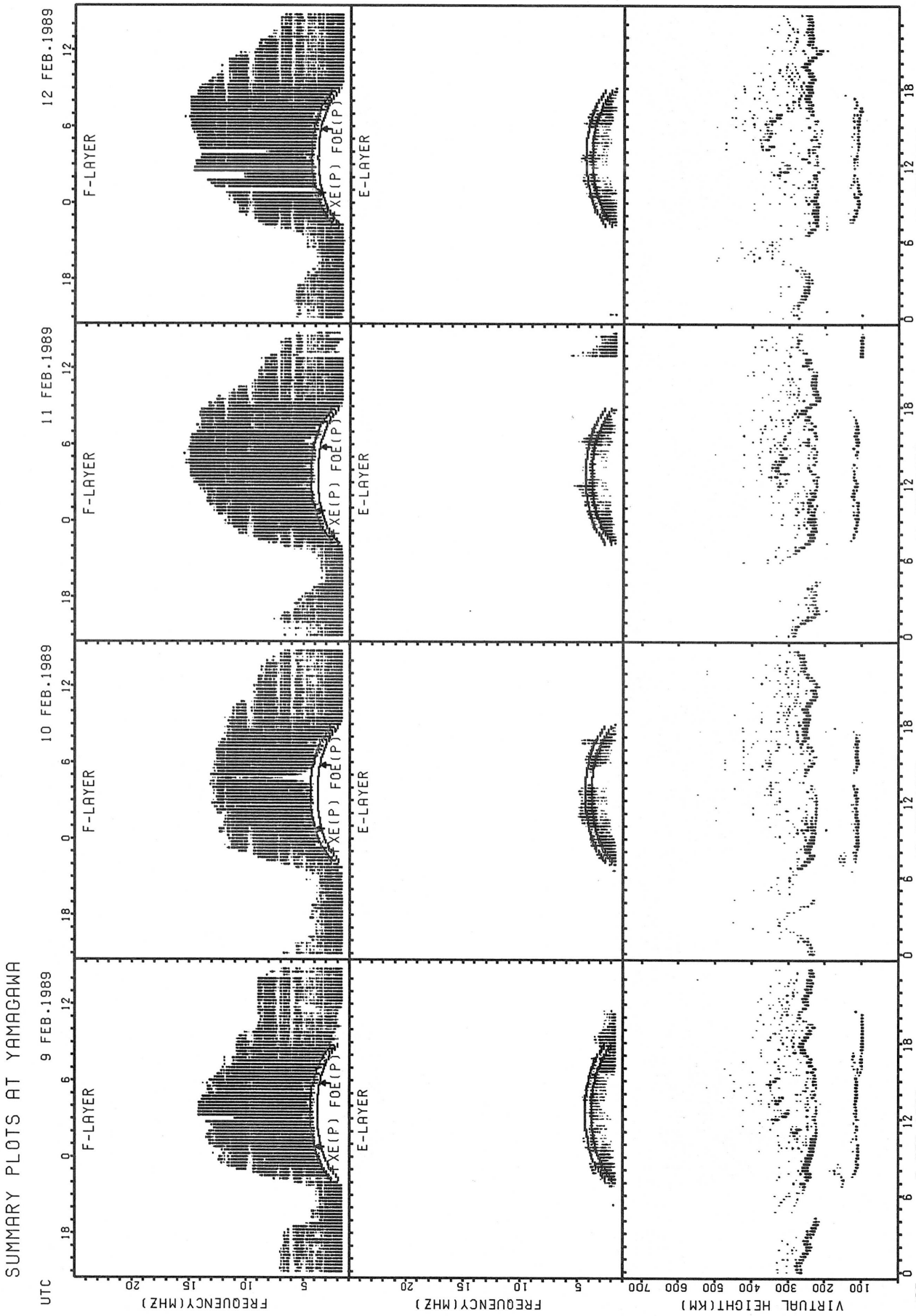
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
5 FEB.1989
6 FEB.1989
7 FEB.1989
8 FEB.1989
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
9 FEB.1989
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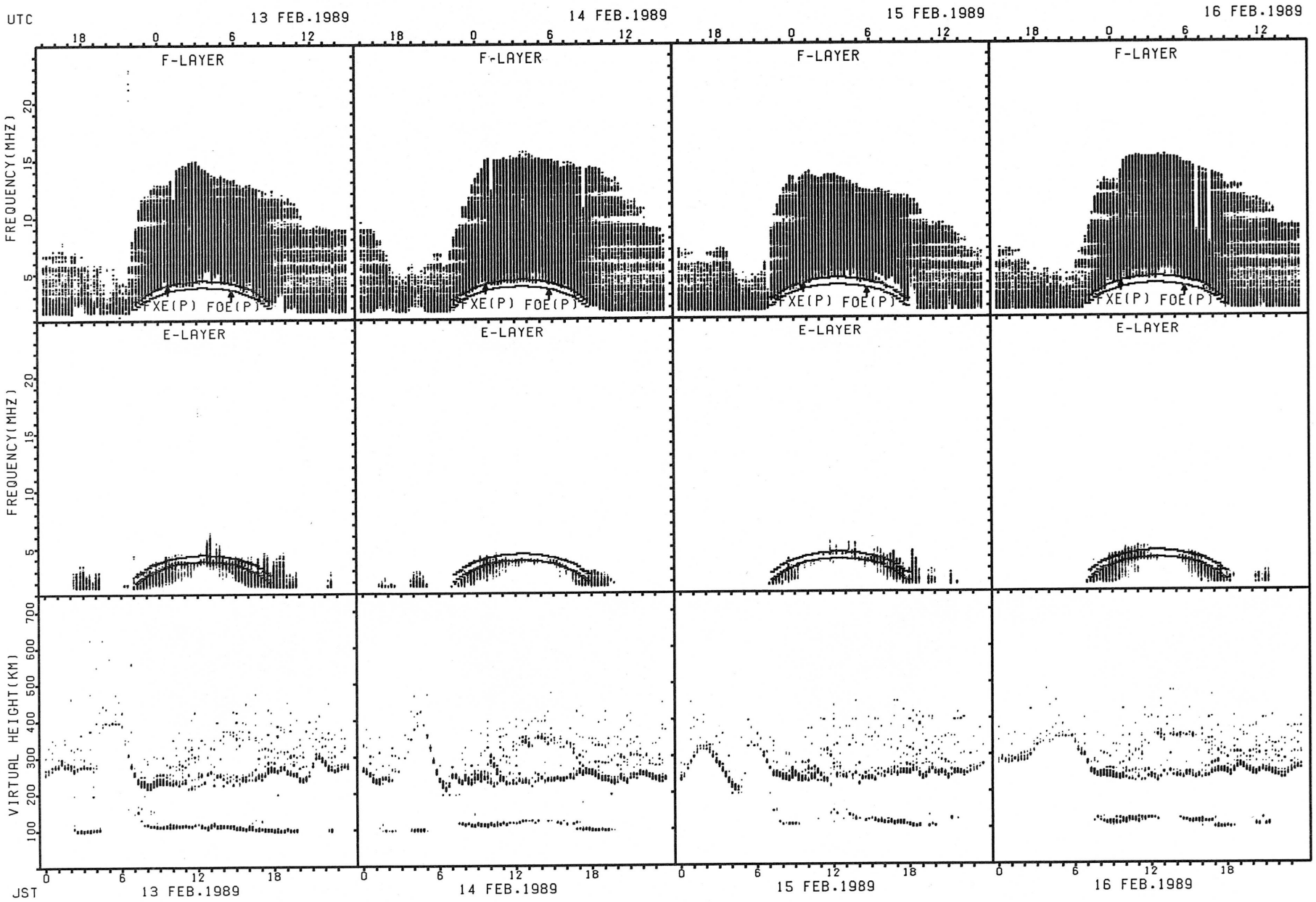
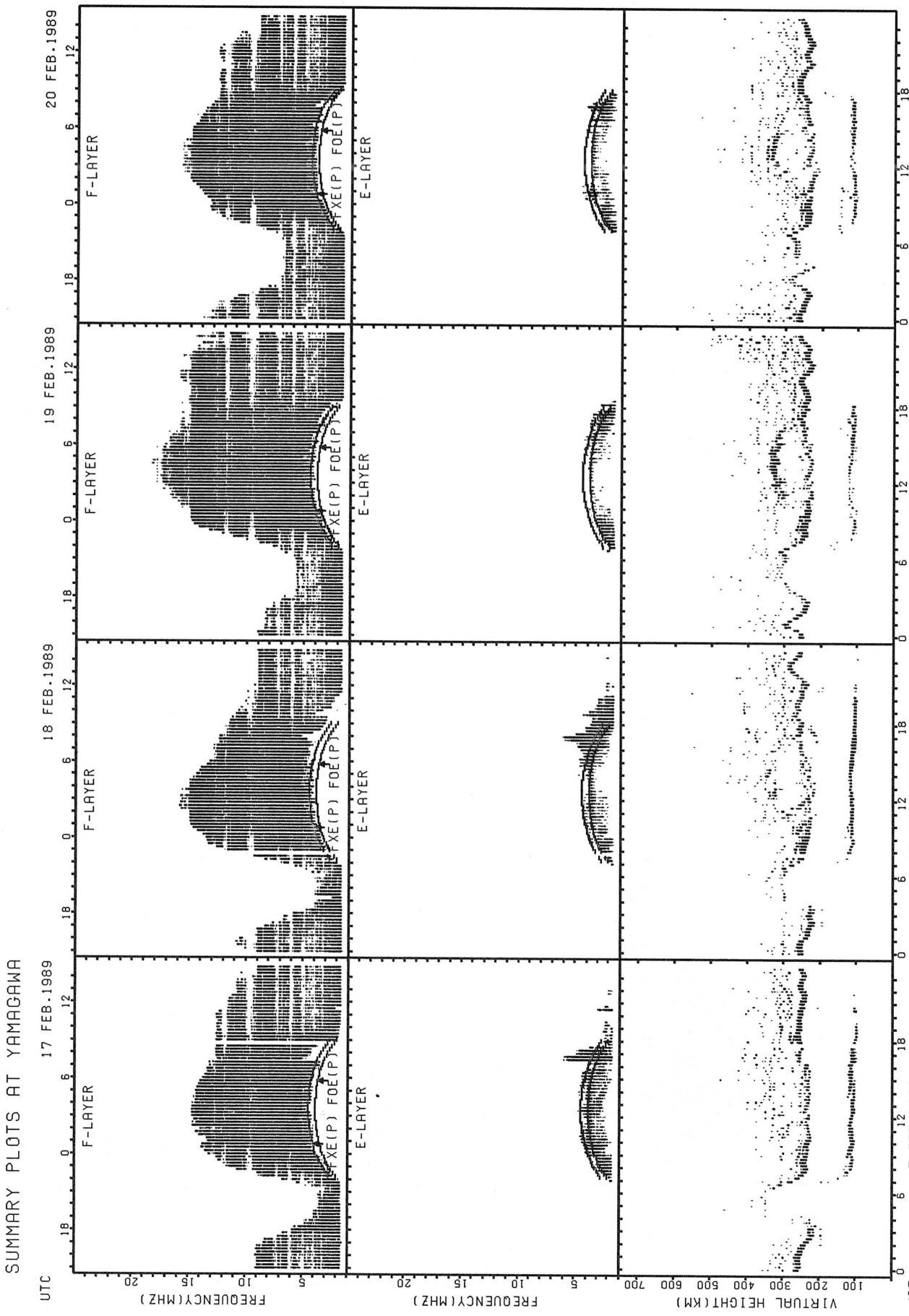
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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


SUMMARY PLOTS AT YAMAGAWA
UTC
17 FEB.1989
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F-LAYER
E-LAYER
FXE(P) FOE(P)
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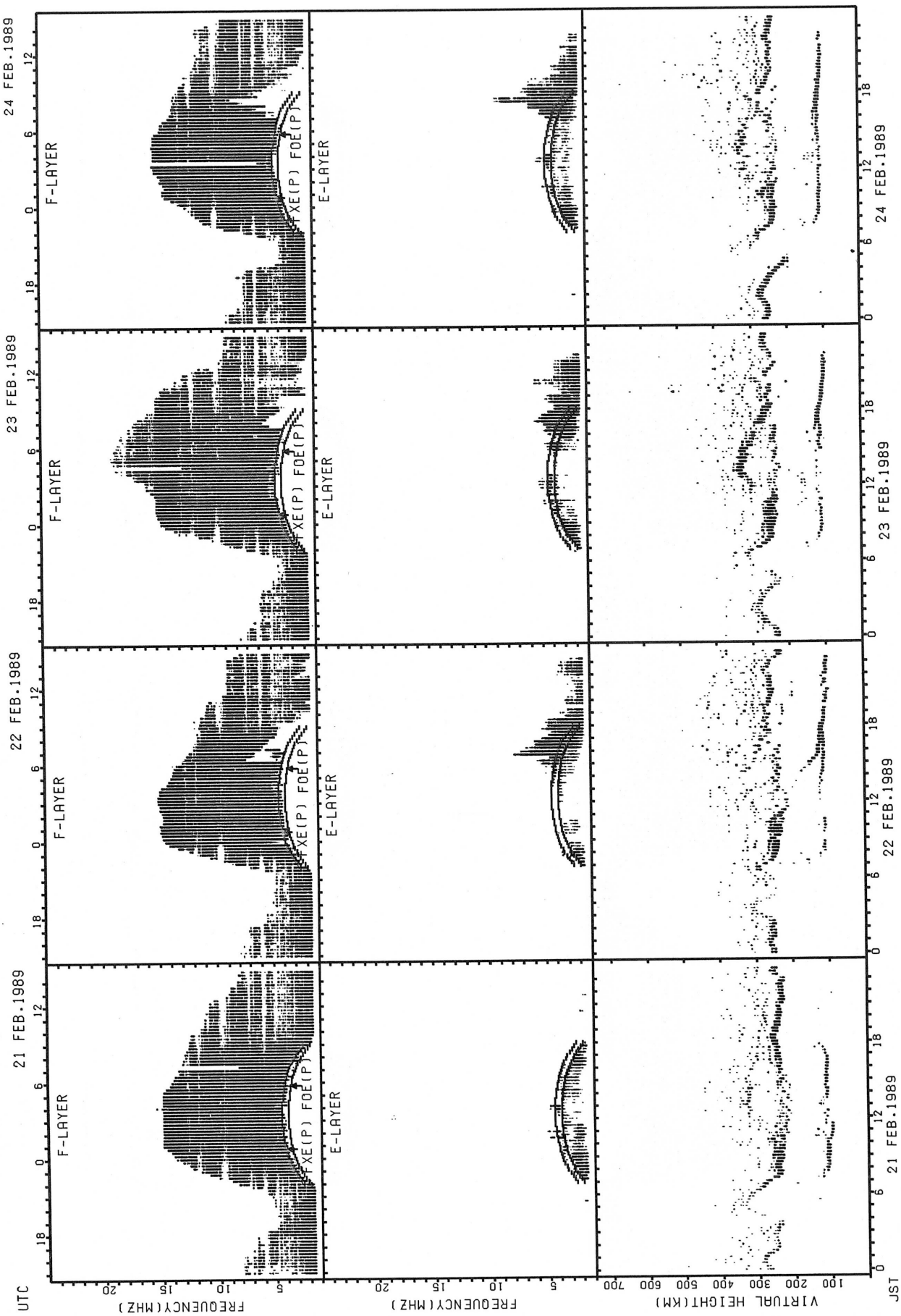
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
21 FEB.1989
22 FEB.1989
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24 FEB.1989
F-LAYER
E-LAYER
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VIRTUAL HEIGHT(KM)
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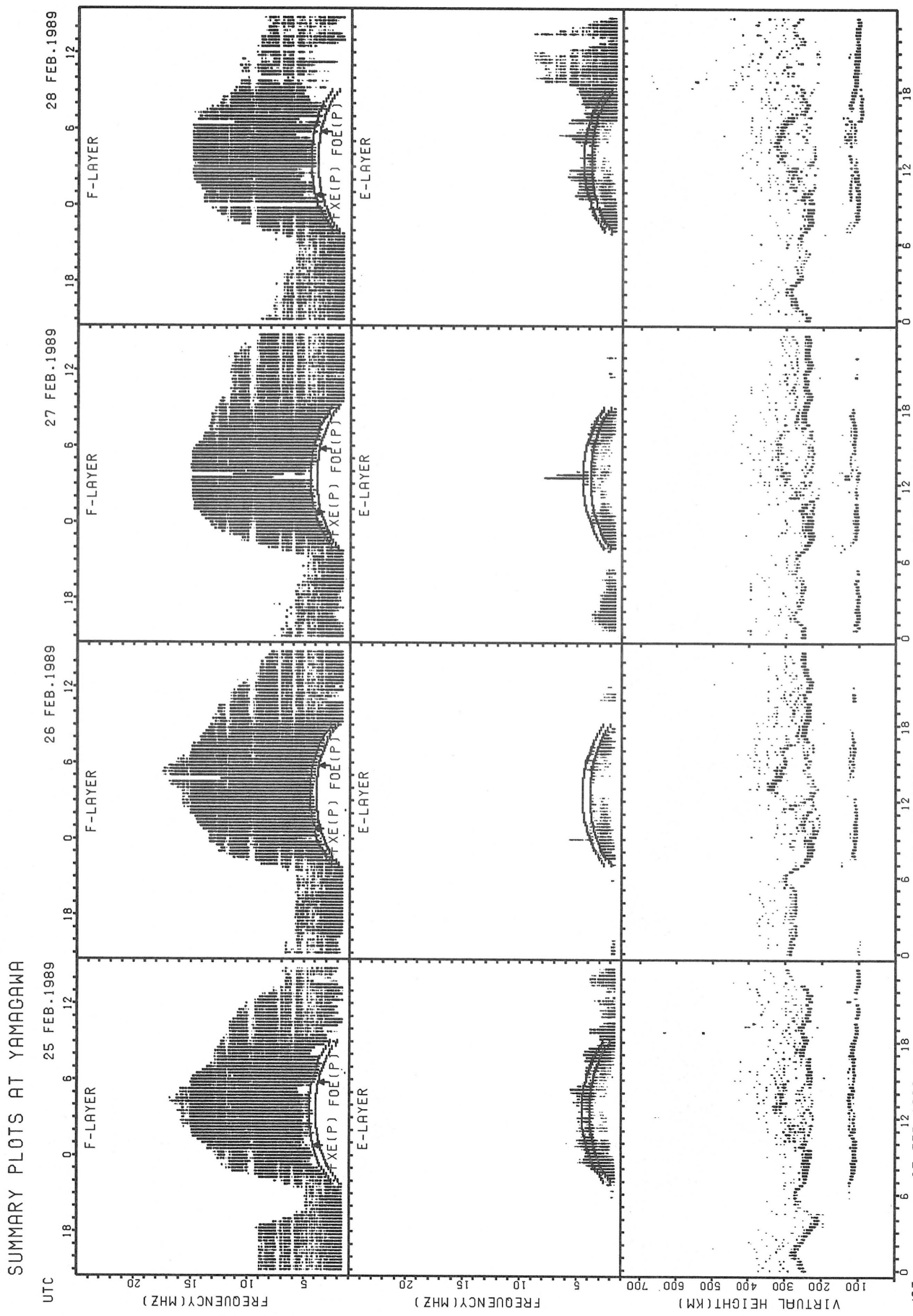
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
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FXE(P) FOE(P)
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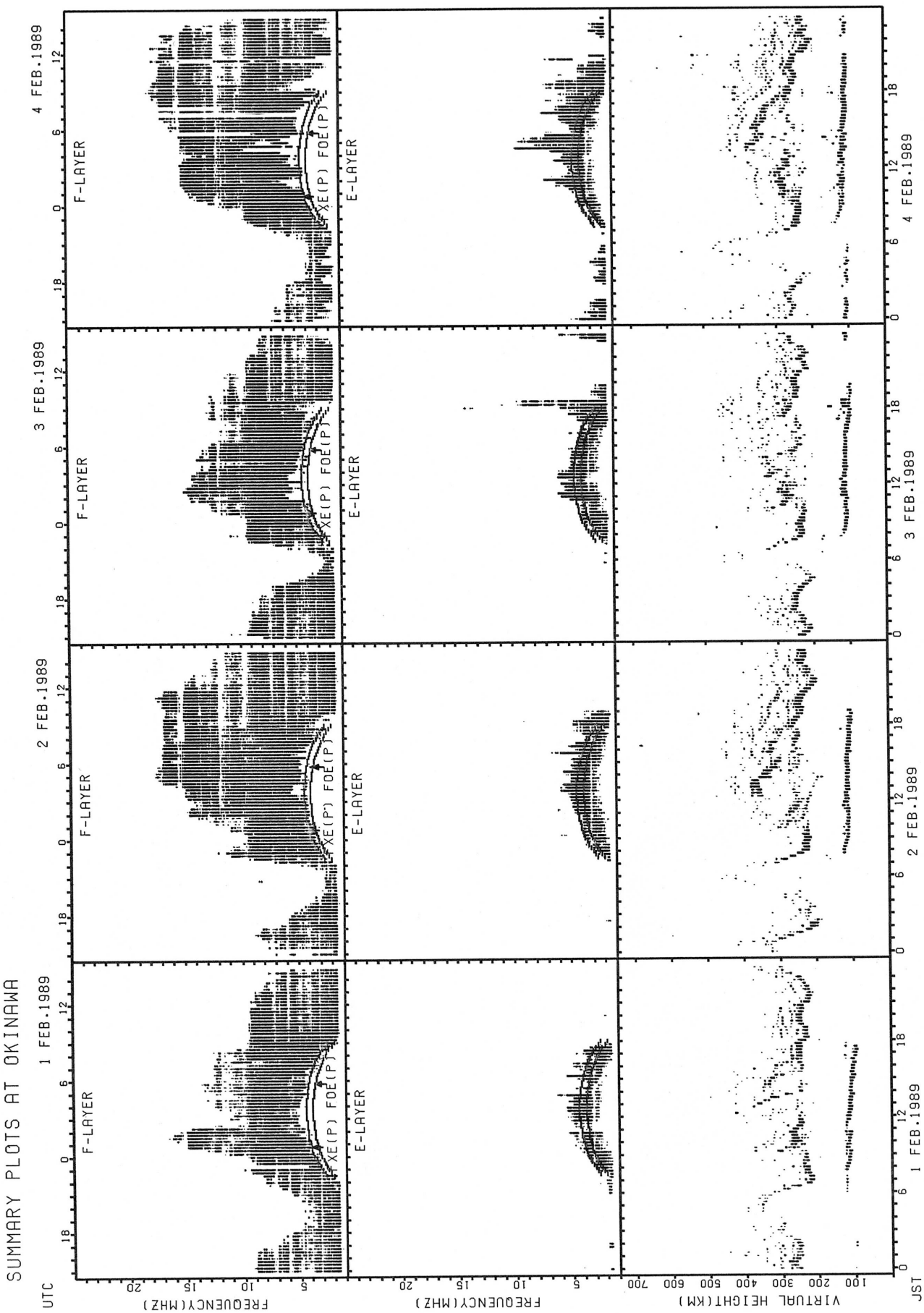
SUMMARY PLOTS AT OKINAWA
UTC
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2 FEB.1989
3 FEB.1989
4 FEB.1989
F-LAYER
E-LAYER
XE(P) FOE(P)
FREQUENCY(MHZ)
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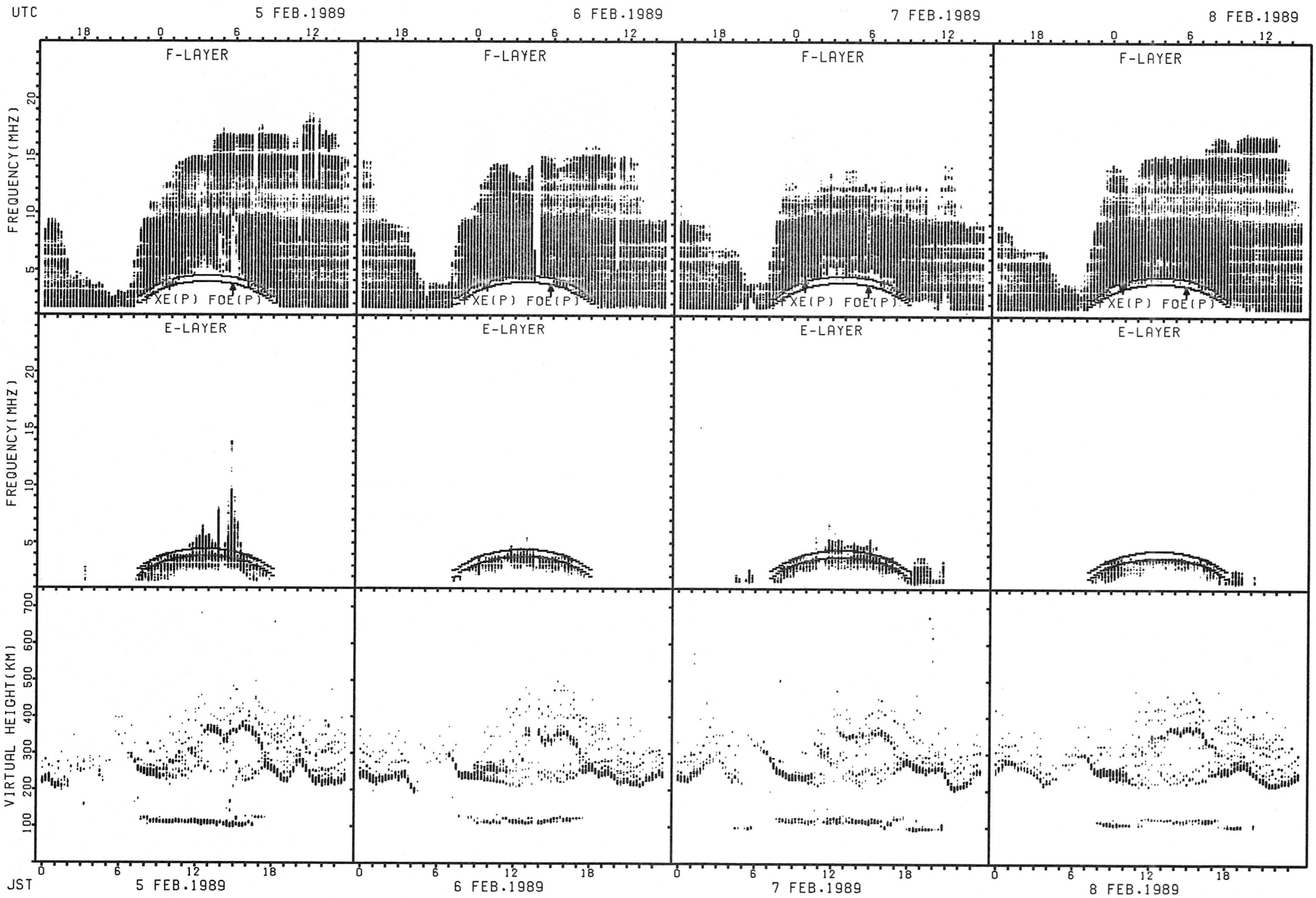
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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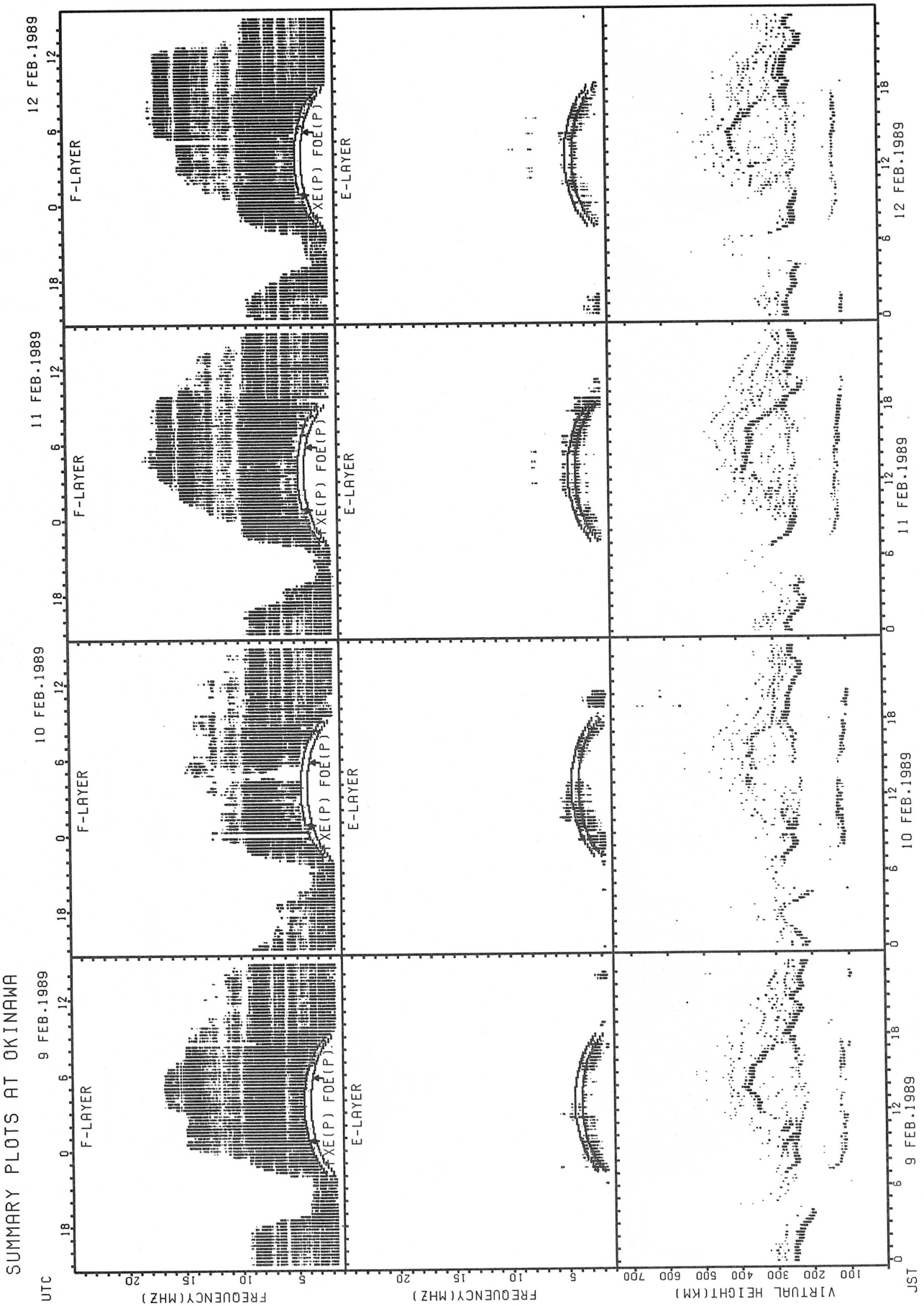
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
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11 FEB.1989
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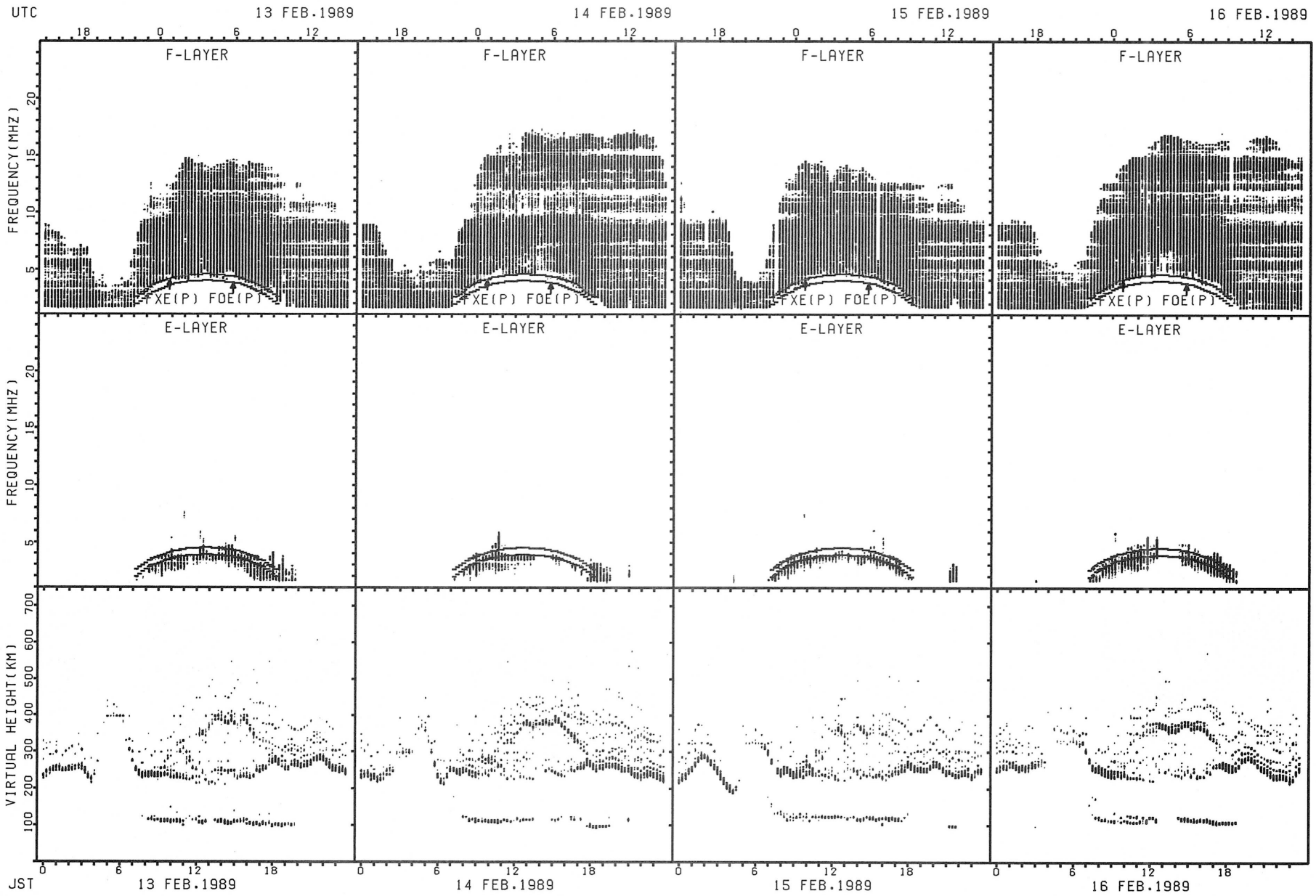
F-LAYER
E-LAYER
XE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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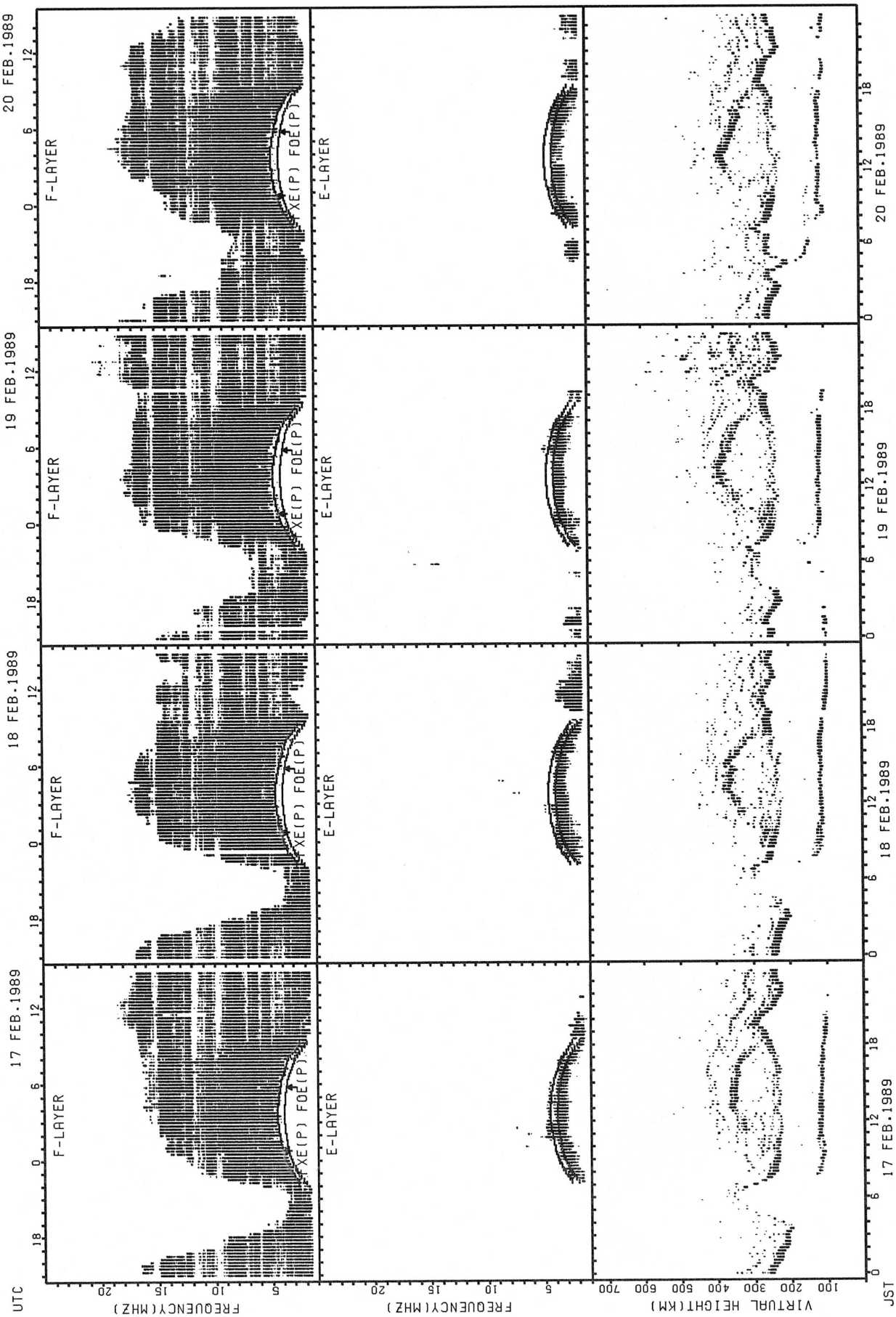
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
17 FEB.1989
18 FEB.1989
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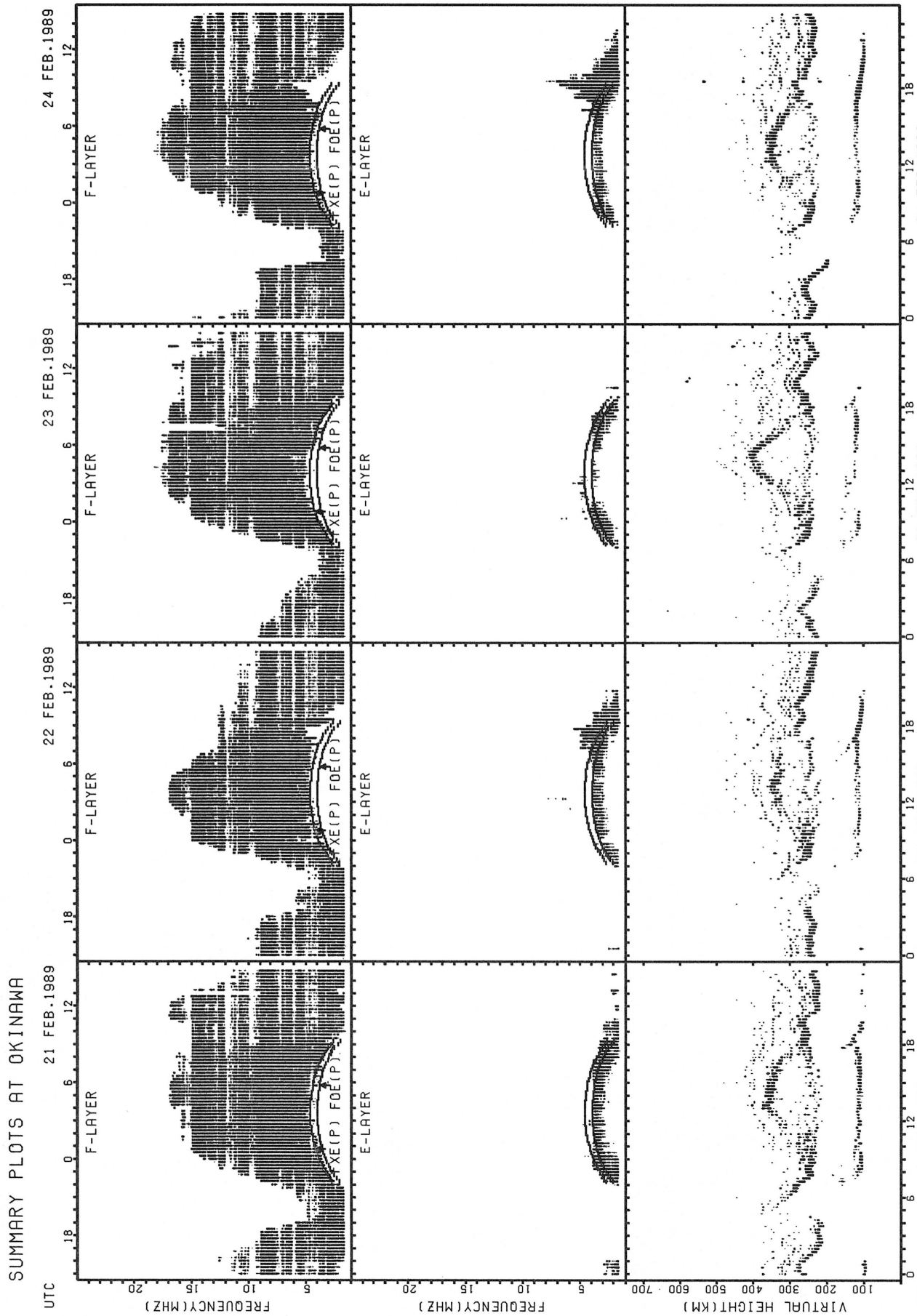
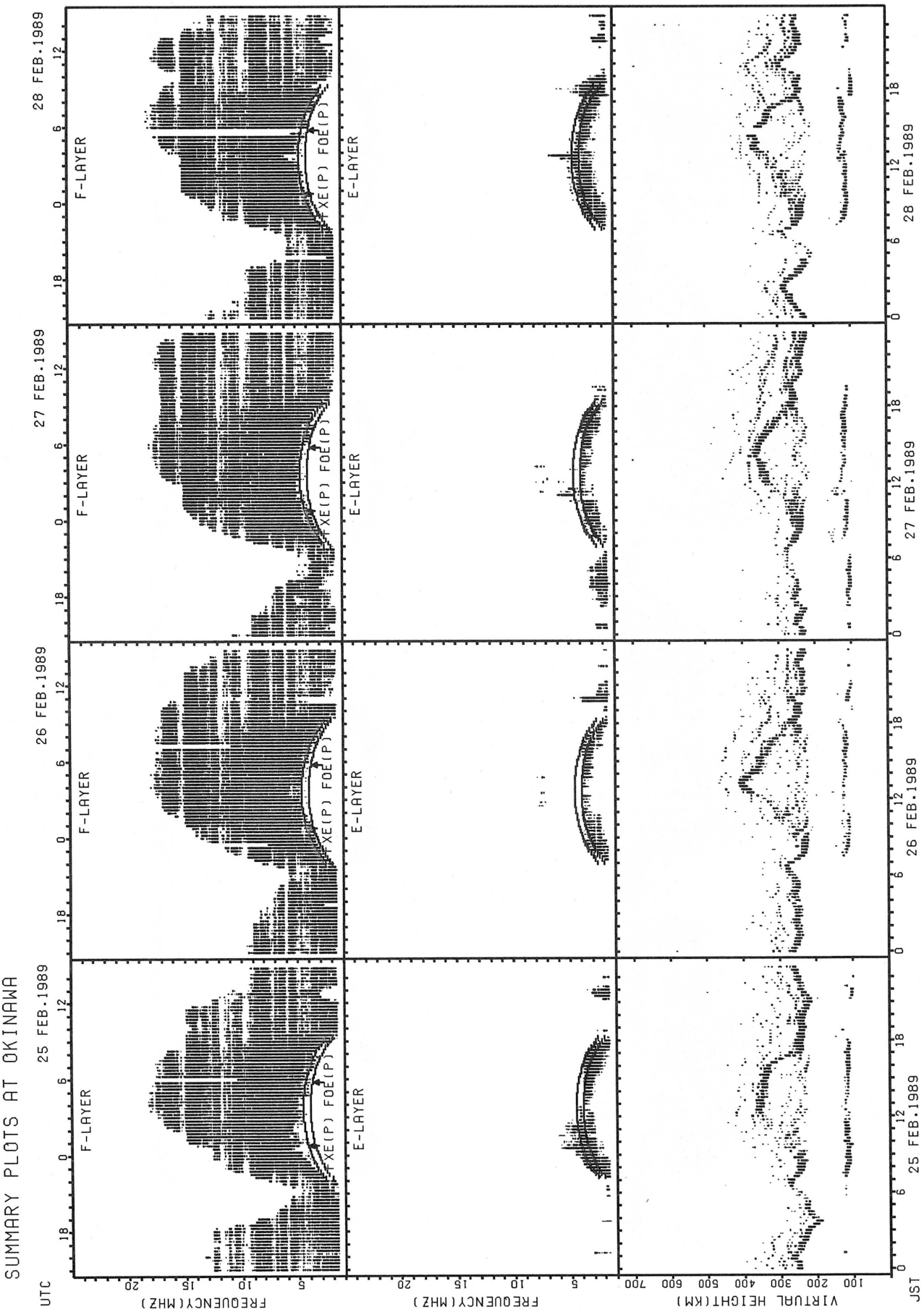
20 FEB.1989
UTC
JST
F-LAYER
E-LAYER
XE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
21 FEB.1989
22 FEB.1989
23 FEB.1989
24 FEB.1989
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
25 FEB.1989
26 FEB.1989
27 FEB.1989
28 FEB.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

MONTHLY MEDIANS OF H'F AND H'ES
FEB.1989 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								26	31	31	31	31	28	31	31	31	30	30	30	23	12			
MED								258	234	234	238	238	242	246	254	252	255	263	276	278	285			
U Q								266	240	238	248	252	251	262	264	262	260	272	288	300	306			
L Q								242	226	228	230	232	234	238	250	246	242	254	264	264	136			

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								13	25	15	10	12			15	19	14		12					
MED								139	129	125	123	132			127	131	129		115					
U Q								238	143	143	264	264			143	149	258		227					
L Q								124	123	119	121	123			125	125	123		112					

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								28	31	30	31	26	20	29	31	31	30	31	29	23	12			
MED								263	236	240	246	254	262	268	266	270	272	278	292	300	297			
U Q								273	248	252	256	276	283	301	298	286	286	292	305	314	326			
L Q								250	232	230	238	244	234	258	258	262	260	264	281	284	286			

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						21	31	29	30	30	30	29	27	30	28	19	18	19	15		12	11
MED		105						141	123	119	116	114	118	115	115	119	119	111	109	105	105		105	103
U Q		111						166	141	126	119	119	149	123	127	123	125	117	111	125	147		196	133
L Q		101						125	119	111	113	109	113	112	113	113	105	99	99	99	99		102	99

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								28	31	30	30	20	14	23	29	29	28	31	30	30	26	14	13	
MED								262	236	244	258	256	259	276	284	278	278	282	287	290	310	316	314	
U Q								283	246	266	292	292	336	334	313	326	299	306	308	310	334	358	318	
L Q								244	232	236	240	244	252	254	263	263	267	264	270	278	284	298	281	

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								20	27	26	26	26	25	24	24	28	30	25	24	16	14	17		
MED								134	125	123	122	119	121	119	119	119	119	111	107	109	107	109		
U Q								147	137	173	129	125	125	129	133	135	125	118	111	119	119	155		
L Q								120	115	113	115	115	115	115	113	115	117	102	102	105	101	102		

MONTHLY MEDIANS OF H'F AND H'ES

FEB.1989 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	12		10					10	31	29	30	29	11	11	28	29	31	30	31	30	29	28	22	18
MED	303		285					298	242	244	251	262	290	320	302	318	322	293	276	285	290	289	309	303
U Q	337		320					314	254	260	266	283	342	362	337	341	336	302	290	304	305	309	332	344
L Q	283		228					288	234	239	244	245	254	252	264	277	278	278	264	274	274	274	292	290

H'ES

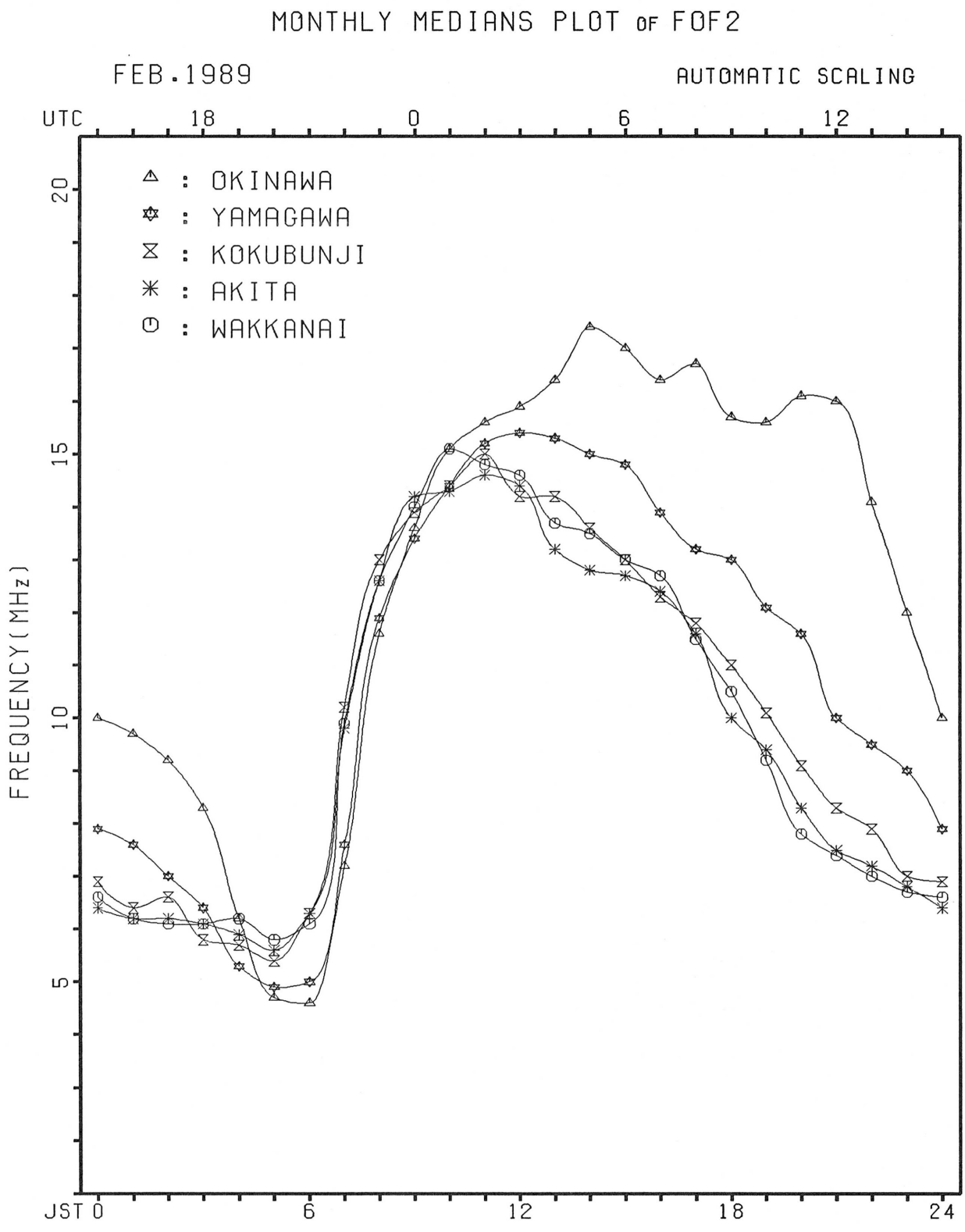
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									31	30	29	28	29	27	27	31	30	30	22	18	16	14	12	
MED									125	119	117	119	119	121	117	117	115	119	110	107	107	108	110	
U Q									143	131	125	123	140	129	125	125	119	127	117	113	114	119	224	
L Q									119	113	113	115	117	115	113	115	111	113	101	101	104	105	107	

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	28	29	19	15				10	31	30	31	30			20	30	30	31	31	31	30	31	31	30
MED	281	294	290	264				312	252	257	268	310			360	352	348	328	286	284	299	280	266	285
U Q	302	320	322	290				316	266	268	294	332			371	366	364	338	302	310	314	286	284	310
L Q	258	279	264	252				298	246	248	256	266			351	340	332	306	274	272	280	260	254	258

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									28	30	31	31	30	27	27	31	30	30	21	19				
MED									127	117	119	125	119	119	119	119	117	118	115	107				
U Q									143	125	131	131	127	125	125	123	119	125	158	113				
L Q									121	115	115	119	117	115	115	115	113	111	111	107				


MONTHLY MEDIANS PLOT OF FOF2
FEB.1989
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
✳ : AKITA
ⓘ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA

FEB. 1989 | 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 51	X 49	X 46	X 49	X 45	X 46	X 53												X 110	X 88	X 69	X 66	X 65	X 56
2	X 55	X 60	X 64	X 47	X 36	X 39	X 38												X 92	X 84	X 75	X 72	X 70	X 63
3	X 61	X 57	X 58	X 55	X 47	X 44	X 45												X 93	X 89	73	72	X 71	X 68
4	X 63	X 64	X 61	X 51	X 43	X 42	X 46												X 95	X 89	X 73	X 74	X 69	X 66
5	X 64	X 64	X 59	X 54	X 50	X 51	X 49												X 122	X 103	X 91	X 67	X 63	X 61
6	X 64	X 62	X 63	X 54	X 46	X 48	X 50												X 99	X 85	X 80	X 66	X 65	X 61
7	X 57	X 53	X 50	X 51	X 53	X 52	X 51												X 94	X 96	X 84	X 76	X 73	X 67
8	X 65	X 61	X 58	X 61	X 56	X 53	X 58												X 97	X 96	X 88	X 82	X 75	X 68
9	X 66	X 63	X 60	X 54	X 48	X 50	X 54												X 93	X 83	X 74	X 71	X 76	X 72
10	X 67	X 57	X 54	X 55	X 54	X 52	X 56												X 100	X 95	X 85	X 73	X 73	X 68
11	X 64	X 68	X 67	X 63	X 39	X 42	X 50												X 101	X 94	S	X 71	X 64	X 63
12	X 58	X 56	X 63	X 59	X 45	X 47	X 55												X 118	X 105	X 90	X 75	X 70	X 64
13	X 64	X 66	X 64	X 56	X 54	X 52	X 54												X 115	X 108	X 91	X 87	X 91	O X 80
14	X 90	X 88	X 66	X 62	X 60	X 63	X 70												X 117	X 104	X 87	X 86	X 77	X 74
15	X 64	X 60	X 60	X 63	X 57	X 52	X 58												X 105	X 94	X 85	X 78	X 66	X 64
16	X 65	X 64	X 61	O X 60	X 57	X 61	X 69												X 117	X 108	X 100	X 94	X 90	X 79
17	X 77	X 70	X 71	X 68	X 55	X 54	X 59												X 111	X 100	X 93	X 88	X 82	S
18	X 78	X 76	X 66	X 57	X 53	X 52	X 62												X 103	X 94	X 89	X 79	X 78	X 77
19	X 75	X 71	X 65	X 62	X 63	X 63	X 71												X 123	X 104	X 99	X 96	X 86	X 81
20	X 79	X 71	X 64	X 60	X 63	X 64	X 71												X 106	X 102	X 101	X 93	X 87	X 70
21	X 67	X 65	X 64	X 66	X 60	X 62	X 68												X 112	X 101	X 96	X 94	X 83	X 79
22	X 76	X 63	X 58	X 56	X 56	X 55	X 65												X 107	X 98	X 92	X 91	X 84	X 85
23	X 75	X 61	X 59	X 59	X 55	X 53	X 61												X 130	X 106	X 99	X 88	X 76	X 70
24	X 71	X 75	X 66	X 63	X 55	X 50													X 112	X 96	S	X 79	X 78	X 72
25	X 66	X 64	X 66	X 72	X 57	X 52													X 112	X 113	X 111	X 90	X 68	X 65
26	X 67	X 66	X 65	X 64	X 62	X 63													X 110	X 100	X 97	X 92	X 88	S
27	X 69	X 69	X 63	X 66	X 60	X 65													X 112	X 100	X 97	X 91	X 84	X 78
28	X 75	O X 72	X 68	X 67	X 66	X 68													X 108	X 99	X 88	X 76	X 72	X 68
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	23												28	28	26	28	28	26
MED	X 66	X 64	X 64	X 60	X 55	X 52	X 56												X 109	X 98	X 90	X 79	X 76	X 68
UQ	X 75	X 70	X 66	X 63	X 58	X 62	X 64												X 114	X 104	X 97	X 90	X 84	X 77
LQ	X 64	X 60	X 59	X 54	X 48	X 49	X 50												X 100	X 94	X 84	X 72	X 70	X 64

FEB. 1989 | FXI (0.1 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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	45	43	40	43	39	40	47	72	94	118	144	149	132	120	134	135	123	122	104	82	R 63	60	59	50
2	49	54	58	41	30	33	32	77	125	143	126	129	130	134	130	125	118	101	86	78	69	66	64	57
3	55	51	52	49	41	38	S 39	83	86	V 112	123	127	134	H 117	130	120	103	94	87	83	F 64	F 63	55	62
4	57	58	55	45	37	36	40	75	100	122	143	143	134	126	120	116	114	107	89	83	72	68	63	60
5	58	V 53	53	48	44	45	43	79	108	120	137	145	137	141	135	135	133	131	116	97	85	61	57	55
6	58	56	57	48	40	42	44	85	90	114	130	129	121	118	121	110	100	96	93	79	74	60	59	55
7	51	47	44	45	47	46	45	79	116	135	135	118	112	109	97	94	89	83	88	90	73	70	67	61
8	59	55	52	55	H 50	47	52	89	113	131	134	144	134	129	121	117	112	110	91	90	82	76	69	62
9	60	57	54	48	42	44	48	91	R 111	112	121	122	120	120	109	101	93	90	87	77	68	65	70	66
10	61	51	48	49	48	46	50	35	105	120	119	124	122	124	120	116	115	102	94	89	79	67	S 67	62
11	58	62	61	57	H 33	36	44	90	113	120	126	129	135	136	133	126	118	113	95	88	I S 75	65	58	57
12	V 52	50	57	53	39	41	49	94	116	118	127	137	140	138	136	140	138	130	112	99	84	69	64	58
13	58	60	58	50	48	46	48	89	128	132	144	147	145	137	130	124	118	114	R 109	102	85	81	85	U S 74
14	84	82	60	56	54	57	64	95	120	128	151	148	144	135	129	126	121	115	111	98	81	80	71	68
15	58	54	54	57	51	46	52	92	120	131	134	134	131	122	114	113	109	104	99	88	79	72	60	58
16	59	58	55	S 54	51	55	63	94	126	136	144	143	138	132	132	129	119	112	111	J S 102	94	88	84	73
17	71	64	65	62	49	48	53	94	130	139	135	139	134	133	124	120	116	112	105	94	87	82	76	I S 71
18	72	70	60	51	47	46	56	98	124	135	137	144	135	128	120	115	108	108	97	83	83	73	72	71
19	69	65	60	56	57	57	65	S 103	134	141	150	156	156	152	144	136	132	128	117	98	93	90	U S 80	75
20	73	S 68	58	54	57	58	65	103	130	128	137	142	142	135	131	126	120	112	100	96	95	87	81	64
21	61	59	58	60	54	56	62	103	129	I C 133	144	144	142	136	128	122	116	112	106	95	90	S 88	77	73
22	70	57	52	50	50	49	59	95	117	138	140	140	139	130	123	122	113	110	101	92	86	85	78	S 79
23	69	55	53	53	49	47	55	100	126	136	142	147	R 148	153	155	148	141	136	124	100	93	82	70	64
24	65	69	60	57	49	44	54	89	110	121	124	128	128	126	125	119	117	117	106	90	I S 79	73	72	66
25	60	58	60	66	51	46	57	96	130	130	130	142	141	137	133	127	118	110	106	107	105	84	62	59
26	61	60	59	58	56	57	66	112	132	136	130	140	140	138	129	124	123	116	104	94	91	86	82	I S 74
27	63	63	62	60	54	59	70	106	125	138	145	150	146	143	135	123	116	114	106	94	91	85	78	72
28	69	U S 66	62	61	60	62	74	102	120	131	139	138	142	140	136	127	117	111	102	93	82	70	66	62
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	60	58	58	54	49	46	52	93	120	131	136	141	136	134	130	124	117	112	103	92	82	73	70	63
UQ	69	64	60	57	52	56	62	99	127	136	144	144	142	138	134	127	120	116	108	98	90	84	78	72
LQ	58	54	53	48	42	43	46	85	110	120	128	129	132	125	121	116	112	106	94	88	76	66	64	58

FEB. 1989 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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

Day \ Hour	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										U L 550	L	L		U L 720	L	L								
2											L	L	L	570	L	L								
3										L	L	L	L 500	L	L									
4											L	L	A	A	A		L							
5											L	L	L	L	L	L		A						
6											L	L	L	L	L		L							
7										L			L	L										
8										L	L	L	L	L	L	L	L							
9										L	L	L	L	L	L									
10											L	L	L	L		L								
11										L	L	L	L	L	L									
12										L	L	L	L	L	L	L	L							
13											L			L	L	L								
14											L	L	L	L	L	L								
15										L		L	L	L	L	L								
16											L	L	L	L	L	L								
17												L	L	L		L								
18										L	L	L	L		L	L								
19										L	L	L	L	L	L	L								
20										L		L	L	L	L		L							
21										C	L	L	L	L	L	L								
22												L	L	L	L									
23										L	L	L	L	L	L		L							
24										L	L	L			L		L							
25									L		L	L	L	L										
26												L		L	L	L								
27										L	L	L	L	L	L		L							
28										L	L	L	L	L	L	A	A							
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1			1	2										
MED										U L 550			L 500	645										
UQ																								
LQ																								

FEB. 1989 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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 275	310		A 370		A	A	A	315	A	A						
2								A 280		A	355	375	380		A	310	275	A						
3								170	260	H 320	360	A	A	365	A	A	270	B						
4								195	285	320	370	375	380	360	A	A	275	B						
5								U A 190	285	330	A	A	A	A	360	330	A	A						
6								185	280	H 330	B	A	390	380	365	335	280	A						
7								190	285	330	370	385	390	385	370	A	280	180						
8								210	A	340	360	385	385	R	360	330	A	U A 190						
9								205	305	350	370	385	395	385	370	335	A	A						
10								200	290	345	365	390	395	385	R	360	275	200						
11								210	290	350	370	A	A	390	375	350	A	210						
12								210	A	R	370	390	400	395	375	325	260	A						
13								205	305	345	375	390	390	385	365	340	285	185						
14								215	300	A	390	I S 395	395	400	390	360	U A 300	A						
15								205	290	350	375	395	400	395	375	340	290	A						
16								215	295	355	385	395	405	410	S	360	285	A						
17								220	A	345	380	390	A	400	380	350	290	205						
18								225	310	350	375	390	400	395	A	A	280	A						
19								210	295	335	365	390	395	390	380	345	A	A						
20								H 240	295	350	375	400	400	400	375	350	290	A						
21								235	310	I C 350	370	385	390	385	365	345	295	200						
22								230	305	B	S 400		405	400	385	350	300	210						
23								245	310	350	365	375	B	390	380	340	295	A						
24							B	230	A	A	360	B	390	385	365	345	295	190						
25							B	245	A	355	A	390	395	385	380	350	300	200						
26							B	240	310	345	365	380	390	395	375	355	305	220						
27							B	245	310	350	370	390	400	395	375	350	300	205						
28							B	A 300		A	A	A	385	385	370	345	295	205						
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								25	23	22	22	22	22	24	21	24	22	13						
MED								210	295	345	370	390	395	390	375	345	290	200						
UQ								230	305	350	375	390	400	395	380	350	295	205						
LQ								205	285	330	365	385	390	385	365	335	280	190						

FEB. 1989 | FOE (0.01 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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	22	20	J A 18	20	E B 15	E B 16	30	36	J A 40	43	J A 53	J A 48	J A 41	J A 35	J A 32	J A 36	J A 32	J A 22	J A 22	J A 23	E B 16	J A 17
2	J A 20	J A 20	J A 30	J A 27	J A 40	J A 24	J A 19	J A 25	J A 30	J A 41	G	45	J A 45	J A 42	J A 54	J A 39	G 19	J A 24	J A 30	J A 27	J A 22	J A 17	20	E B 14
3	E B 15	E B 14	E B 15	E B 14	E B 15	E B 14	E S 17	G	G	36	J A 44	J A 46	40	G 35	37	33	G 26	22	E B 15	E B 15	E B 14	E B 14	E B 13	E B 15
4	E B 15	E B 14	E B 13	E B 15	E B 15	E B 16	E B 16	G	G	35	40	40	J A 57	J A 55	J A 77	J A 44	G 24	E B 20	J A 20	20	J A 24	J A 27	E B 15	E B 16
5	E B 15	E B 14	E B 14	E B 13	E B 15	E B 15	E B 16	J A 27	35	G	37	43	J A 51	J A 44	G 35	G 29	J A 54	J A 98	J A 72	J A 59	J A 49	J A 37	E B 15	E B 15
6	E B 15	E B 13	E B 13	E B 12	E B 13	E B 15	E B 13	G	G	G	E B 38	41	G	G	G	G	G 19	23	J A 40	J A 29	26	21	E B 16	E B 15
7	E B 15	E B 16	E B 16	E B 14	E B 15	J A 19	20	23	G	G	39	42	G 24	51	47	41	G 25	22	24	E B 16	E B 15	E B 16	E B 15	E B 16
8	E B 16	E B 14	E B 16	E B 13	E B 13	E S 17	E B 14	G	J A 34	35	G 29	G	G	G	G 32	39	29	19	J A 24	20	E B 14	25	19	20
9	E B 15	J A 23	J A 21	J A 17	22	E B 16	E B 15	G	32	39	G	G	G	43	40	36	30	25	J A 21	E B 16	E B 15	22	J A 26	E B 15
10	E B 14	E B 15	E B 15	E B 15	13	E B 15	19	G	G	36	G	G	G	G	G	G	G	G	J A 22	J A 18	E B 15	E B 14	E S 17	E B 14
11	E B 14	E B 13	E S 15	E B 13	E B 13	F B 15	E B 14	G	J A 46	G	G 36	J A 41	40	G	43	39	34	G	J A 25	J A 30	E S 17	J A 22	J A 23	J A 21
12	E B 16	E B 15	20	E B 15	E B 14	E B 15	E B 15	G	J A 40	G	G	G	G	G	40	38	30	J A 26	J A 24	J A 16	E S 16	E B 15	E B 15	E B 14
13	E B 15	E B 14	E S 14	E B 19	E B 14	E B 14	J A 17	27	G	36	40	G	G	G	G	G	G	G	J A 20	E B 15	24	J A 25	J A 24	E S 17
14	E B 14	E B 13	E B 17	E B 15	E B 17	E B 16	E B 13	J A 30	G	J A 41	G	G	G	G	G	G	31	23	J A 21	J A 18	J A 24	26	22	E B 15
15	E B 15	E B 14	E B 15	E B 14	E B 13	E B 15	E B 15	G	G	G	G	G	42	G	38	38	32	J A 65	J A 66	J A 50	J A 32	J A 32	E B 15	E B 16
16	J A 22	E B 15	E B 15	E S 18	E B 15	E B 14	E S 17	G 20	G 18	G	G 23	G 27	J A 50	G	E S 41	36	G 28	J A 29	J A 20	E B 15	E B 15	E B 14	E B 13	E B 16
17	E B 13	E B 15	E B 13	E B 13	E B 13	E B 15	E B 15	J A 30	J A 34	G 32	G	G	J A 47	J A 43	G 25	G 22	G 22	G 19	J A 21	20	E B 16	E S 17	E S 18	E S 16
18	E B 16	E B 13	E B 14	E B 15	E B 14	E B 14	E B 16	G	G	G	G	G 36	G	G	39	35	G 27	23	E B 16	E S 16	E B 14	E B 14	18	18
19	E B 14	E B 17	E B 15	E B 13	E B 13	E B 14	E B 14	J A 22	G	G	G	G 30	G	G 26	G 27	38	J A 40	J A 35	J A 29	E B 15	E B 15	J A 23	19	E B 15
20	E B 15	18	E B 15	E B 15	E B 13	E B 15	E B 15	G	G	G	G	G	G	G	G	G	G 27	J A 29	J A 28	J A 20	E B 15	E B 15	E B 16	E B 15
21	E B 14	E B 14	E B 13	E B 14	E B 13	E B 14	J A 15	G	G	C	G	G	G	G	G	G	31	G	E B 14	E B 14	E B 16	J A 17	19	E B 12
22	E B 16	E B 15	E B 13	E B 14	E B 12	E B 14	E B 15	G	G	E B 43	E S 42	46	48	48	49	45	J A 43	J A 43	J A 27	J A 31	J A 24	J A 19	20	21
23	E B 16	20	20	23	E B 13	E B 15	E B 15	G	G	G	39	G 33	E B 44	G	40	39	J A 47	J A 55	J A 57	J A 35	19	21	19	19
24	19	E B 13	E B 13	E B 14	E B 14	E B 15	E B 15	E B 16	G	33	34	39	E B 38	41	G	G	G	J A 53	J A 37	J A 53	J A 19	24	E B 14	E B 15	E B 14
25	E B 14	E B 15	E B 15	E B 15	E B 13	E B 15	20	G 23	30	G	J A 47	J A 45	G 30	G 33	G	44	J A 45	J A 45	J A 36	J A 55	J A 52	J A 51	J A 25	J A 51
26	27	J A 24	J A 23	J A 21	20	E B 14	E B 16	J A 43	G	G	G	G	G 26	41	39	41	37	G	E S 18	E B 14	36	J A 21	J A 29	E S 19
27	J A 33	J A 28	J A 27	J A 22	J A 24	J A 19	21	G 22	G	35	G 31	G 30	G	48	50	J A 53	37	J A 39	J A 27	33	J A 85	39	J A 31	J A 27
28	E B 13	J A 23	J A 21	J A 21	E B 15	E B 15	19	26	34	J A 46	J A 41	J A 41	G	G 28	48	J A 55	J A 72	J A 62	83	59	26	E B 14	E B 14	J A 24
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	E B 15	E B 15	E B 15	E B 15	E B 14	E B 15	E B 16	G	G	E G 32	U G 26	G 31	G 24	E G 26	38	37	30	26	J A 24	20	20	21	18	E B 16
UQ	E B 16	18	20	18	E B 16	E B 16	17	24	32	36	40	42	44	43	42	40	J A 38	J A 38	J A 34	J A 30	J A 25	J A 25	21	19
LQ	E B 14	E B 14	E B 14	E B 14	E B 13	E B 14	E B 15	G	G	G	G	G	G	G	G	E G 22	G 26	20	J A 20	E B 16	E B 15	E B 15	E B 15	E B 15

FEB. 1989 | FOES (0.1 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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 16	16	E B 15	E B 15	E B 15	E B 16	30	32	36	40	41	43	37	G 27	27	20	20	17	17	E B 16	E B 16	E B 15
2	E B 15	E B 15	26	26	18	16	17	17	G 19	34	G	40	39	39	36	G 25	G 18	20	20	19	E B 16	16	E B 15	E B 14
3	E B 15	E B 14	E B 15	E B 14	E B 15	E B 14	E S 17	G	G	35	G 27	38	39	G 31	37	33	G 25	E B 16	E B 15	E B 15	E B 14	E B 14	E B 13	E B 15
4	E B 15	E B 14	E B 13	E B 15	E B 15	E B 16	E B 16	G	G	34	39	40	50	52	74	35	G 22	E B 20	17	E B 14	E B 15	E B 15	E B 15	E B 16
5	E B 15	E B 14	E B 14	E B 13	E B 15	E B 15	E B 16	G 18	G 22	G	36	39	43	40	G 32	G 27	30	55	54	45	29	22	E B 15	E B 15
6	E B 15	E B 13	E B 13	E B 12	E B 13	E B 15	E B 13	G	G	G	E B 38	40	G	G	G	G	G 19	21	28	17	19	E B 17	E B 16	E B 15
7	E B 15	E B 16	E B 16	E B 14	E B 15	E B 15	E B 15	23	G	G	39	40	G 24	40	40	40	G 24	G 16	18	E B 16	E B 15	E B 16	E B 15	E B 16
8	E B 16	E B 14	E B 16	E B 13	E B 13	E S 17	E B 14	G	29	G 23	G 22	G	G	G	G 30	37	28	18	20	E B 16	E B 14	17	E B 13	E B 15
9	E B 15	21	17	15	16	E B 16	E B 15	G	32	37	G	G	G	42	G	G	29	23	19	E B 16	E B 15	E B 16	17	E B 15
10	E B 14	E B 15	E B 15	E B 15	E B 14	E B 15	E B 15	G	G	36	G	G	G	G	G	G	G	G	E B 15	E B 15	E B 15	E B 14	E S 17	E B 14
11	E B 14	E B 13	E S 15	E B 13	E B 13	E B 15	E B 14	G	32	G	G 28	39	40	G	41	37	32	G	23	24	E S 17	17	16	E B 16
12	E B 16	E B 15	E B 15	E B 15	E B 14	E B 15	E B 15	G	30	G	G	G	G	G	40	37	30	26	22	E B 14	E S 16	E B 15	E B 15	E B 14
13	E B 15	E B 14	E B 14	E S 19	E B 14	E B 14	15	25	G	36	39	G	G	G	G	G	G	G	18	E B 15	17	22	21	E S 17
14	E B 14	E B 13	E B 17	E B 15	E B 17	E B 16	E B 13	G 19	G	36	G	G	G	G	G	G	G 30	22	18	E B 15	17	17	E B 15	E B 15
15	E B 15	E B 14	E B 15	E B 14	E B 14	E B 15	E B 15	G	G	G	G	G	G	G	G	37	31	53	19	E B 14	18	21	E B 15	E B 16
16	E B 15	E B 15	E B 15	E S 18	E B 15	E B 14	E S 17	G 19	G 16	G	G 23	G 25	G 34	G	E S 41	34	G 26	24	19	E B 15	E B 15	E B 14	E B 13	E B 16
17	E B 13	E B 15	E B 13	E B 13	E B 13	E B 15	E B 15	G	32	G 23	G	G	39	G 31	G 24	G 22	G 21	G 18	18	E B 15	E B 16	E S 17	E S 18	E S 16
18	E B 16	E B 13	E B 14	E B 15	E B 14	E B 14	E B 16	G	G	G	G	G 35	G	G	39	35	G 24	21	E B 16	E S 16	E B 14	E B 14	E B 15	E B 15
19	E B 14	E B 17	E B 15	E B 13	E B 13	E B 14	E B 14	G 17	G	G	G	G 29	G	G 25	G 25	37	33	27	25	E B 15	E B 15	E B 14	E S 16	E B 15
20	E B 15	E S 15	E B 15	E B 15	E B 14	E B 15	E B 15	G	G	G	G	G	G	G	G	G	G 26	24	17	17	E B 15	E B 15	E B 16	E B 15
21	E B 14	E B 14	E B 13	E B 14	E B 13	E B 14	E B 15	G	G	C	G	G	G	G	G	G	31	G	E B 14	E B 14	E B 16	E B 16	E B 15	E B 12
22	E B 16	E B 15	E B 13	E B 14	E B 12	E B 14	E B 15	G	G	E B 43	E S 42	43	44	42	46	41	38	43	24	19	E B 15	17	E B 14	E B 15
23	E B 16	E B 14	E B 13	E B 15	E B 13	E B 15	E B 15	G	G	G	38	G 32	E B 44	G	40	37	40	52	51	30	E B 15	E B 16	E B 15	E B 15
24	E B 15	E B 13	E B 13	E B 14	E B 15	E B 15	E B 16	G	31	34	38	E B 38	41	G	G	G	39	36	48	17	23	E B 14	E B 15	E B 14
25	E B 14	E B 15	E B 15	E B 15	E B 13	E B 15	E B 15	G 24	30	G	39	G 33	G 29	G 32	G	39	41	41	33	22	33	30	E B 15	E B 15
26	20	19	18	18	E S 17	E B 14	E B 16	G 16	G	G	G	G	G 25	41	39	41	36	G	E S 18	E B 14	25	E B 14	E B 16	E S 19
27	20	17	18	16	19	E B 14	E B 16	G 20	G	G 30	G 30	G 29	G	41	42	42	35	32	19	25	50	27	17	24
28	E B 13	17	E B 15	E B 14	E B 15	E B 15	E B 15	25	34	37	37	39	G	G 27	39	55	69	61	66	53	18	E B 14	E B 14	E B 14
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	28	23	28	28	28	28	28	28
MED	E B 15	E B 15	E B 15	E B 15	E B 14	E B 15	E B 15	G	G	E G 23	G 24	G 30	E G 24	E G 25	32	34	30	22	19	E B 16	E B 16	E B 16	E B 15	E B 15
UQ	E B 16	E B 15	E B 16	E E 15	E B 15	E B 15	E B 16	G 18	30	34	37	39	40	40	40	37	34	34	24	19	13	17	E E 16	E B 16
LQ	E B 14	E B 14	E B 14	E B 14	E B 13	E B 14	E B 15	G	G	G	G	G	G	G	G	G	G 24	16	18	E B 15	E B 15	E B 14	E B 15	E B 15

FEB. 1989 | FBES (0.1 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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	16	14	15	15	15	16	16	15	16	25	21	18	17	16	18	14	14	13	14	16	16	15
2	15	15	14	13	14	15	14	15	14	14	16	16	18	16	18	14	13	14	14	14	16	14	15	14
3	15	14	15	14	15	14	E S 17	13	14	16	17	16	18	19	17	17	15	16	15	15	14	14	13	15
4	15	14	13	15	15	16	16	15	16	15	19	19	22	21	21	17	16	20	13	14	15	15	15	16
5	15	14	14	13	15	15	16	15	16	17	18	23	18	22	18	17	16	14	14	15	13	16	15	15
6	15	13	13	12	13	15	13	15	14	17	38	25	24	24	22	20	16	13	14	15	14	17	16	15
7	15	16	16	14	15	15	15	15	18	19	18	18	18	17	15	14	17	14	13	16	15	16	15	16
8	16	14	16	13	13	E S 17	14	16	15	17	18	18	19	27	20	16	16	15	15	16	14	14	13	15
9	15	14	12	13	13	16	15	16	18	21	22	22	19	17	14	17	17	15	13	16	15	16	13	15
10	14	15	15	15	14	15	15	15	15	18	21	22	19	22	37	19	17	15	16	15	15	14	E S 17	14
11	14	13	E S 15	13	13	15	14	17	17	19	17	16	22	26	16	17	19	16	13	15	E S 17	14	13	16
12	16	15	15	15	14	15	15	16	17	22	18	22	20	24	22	19	15	14	17	14	E S 16	15	15	14
13	15	14	14	E S 19	14	14	13	14	17	20	21	26	23	25	19	17	16	14	13	15	14	15	15	E S 17
14	14	13	17	15	17	16	13	16	16	21	28	29	27	30	33	25	19	15	15	15	15	14	15	15
15	15	14	15	14	13	15	15	15	17	24	29	31	28	32	26	21	19	15	14	14	15	15	15	16
16	15	15	15	E S 18	15	14	E S 17	16	13	19	20	19	19	34	E S 41	16	14	14	13	15	15	14	13	16
17	13	15	13	13	13	15	15	15	16	16	19	20	20	17	17	15	16	14	13	15	16	E S 17	E S 18	E S 16
18	16	13	14	15	14	14	16	16	17	17	23	19	24	23	23	18	16	16	16	E S 16	14	14	15	15
19	14	17	15	13	13	14	14	13	15	18	18	23	22	20	17	17	14	13	15	15	15	15	E S 16	15
20	15	E S 13	15	15	13	15	15	15	15	17	24	22	23	25	23	21	17	14	13	13	15	15	16	15
21	14	14	13	14	13	14	15	14	15	C	17	21	21	23	18	18	16	15	14	14	16	16	15	12
22	16	15	13	14	12	14	15	15	16	43	E S 42	E S 34	23	22	21	21	16	15	13	14	15	12	14	15
23	16	14	13	15	13	15	15	14	15	18	20	23	44	24	30	16	16	14	15	16	15	16	15	15
24	15	13	13	14	15	15	16	15	16	22	21	38	21	19	19	17	16	16	14	13	E S 19	14	15	14
25	14	15	15	15	13	15	15	15	16	E C 23	20	19	21	20	21	18	17	14	16	14	15	15	15	15
26	15	15	13	15	E S 17	14	16	15	16	16	18	20	21	20	16	16	16	15	E S 18	14	16	14	16	E S 19
27	14	13	14	13	13	14	16	14	15	16	17	22	23	20	17	17	15	12	14	16	15	14	13	15
28	13	13	15	14	15	15	15	13	14	16	18	17	23	18	18	14	16	13	17	E S 18	14	14	14	14
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	15	14	14	14	14	15	15	15	16	18	18	22	21	22	18	17	16	14	14	15	15	14	15	15
UQ	15	15	15	15	15	15	16	16	16	20	22	24	23	24	22	18	17	15	15	16	16	16	16	16
LQ	14	14	13	13	13	14	14	14	15	16	18	19	19	19	17	16	16	14	13	14	14	14	14	15

FEB. 1989 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

FEB. 1989 | 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	295	290	285	295	265	265	305	325	330	280	305	305	300	275	285	295	295	300	300	315	R 325	305	300	290
2	255	275	335	365	265	275	285	310	320	325	315	305	290	270	290	275	310	315	310	325	320	300	315	300
3	300	290	295	330	330	325	S 300	325	350	V 315	285	295	295	H 310	280	305	300	305	290	305	F 300	F 285	290	300
4	285	290	310	325	295	240	290	340	315	295	295	295	295	295	285	295	295	315	300	310	320	310	300	305
5	295	V 305	320	305	315	305	330	325	325	300	300	290	280	290	275	280	280	295	285	305	325	330	290	290
6	295	295	310	315	340	290	305	325	345	295	305	290	290	285	285	295	295	305	305	300	315	305	295	300
7	300	285	270	265	280	325	290	315	325	300	300	300	295	295	300	290	290	295	290	305	310	305	305	290
8	290	285	295	290	H 300	320	300	315	325	295	290	285	280	280	270	280	285	295	305	315	305	305	305	310
9	295	305	305	330	290	295	305	320	R 330	315	290	290	285	285	285	285	290	290	310	300	305	295	290	315
10	315	315	270	285	305	300	325	320	325	300	290	280	280	270	280	265	285	295	300	290	305	290	S 295	295
11	275	300	315	335	H 355	275	300	325	315	310	295	285	285	275	280	285	290	295	305	305	I S 310	315	300	295
12	V 260	290	305	325	320	250	300	335	335	305	285	285	270	265	265	265	275	285	290	300	305	310	320	300
13	275	290	300	300	255	250	310	325	315	300	285	275	280	280	280	275	285	280	R 285	295	300	270	290	U S 280
14	290	315	330	285	255	275	330	325	325	295	285	275	270	270	265	270	280	285	295	300	290	290	305	305
15	300	275	265	300	330	295	295	315	315	305	290	290	280	285	285	285	300	290	295	305	300	310	315	290
16	280	285	285	S 270	265	270	305	315	305	290	290	285	265	265	265	270	280	285	280	J S 295	290	295	300	300
17	290	290	290	325	325	275	285	305	315	300	305	280	275	270	275	275	285	285	295	295	295	295	300	I S 300
18	295	315	320	305	300	285	295	310	320	300	295	285	285	275	275	275	285	295	300	300	300	290	285	290
19	290	275	310	275	270	270	285	S 305	320	300	290	275	275	270	270	270	280	290	295	295	300	295	U S 310	295
20	300	S 310	300	265	265	290	295	300	320	305	285	285	280	270	280	275	280	290	285	285	305	295	305	310
21	285	275	275	305	285	270	290	320	320	I C 305	290	275	275	270	270	280	280	290	290	290	295	S 305	305	295
22	305	320	295	270	280	280	300	320	310	300	295	290	275	275	275	275	285	290	295	290	285	285	290	S 315
23	310	305	285	290	315	290	290	310	305	300	285	285	R 275	270	275	275	275	285	290	285	300	300	300	290
24	300	305	315	315	325	290	305	320	315	300	295	295	280	275	275	285	290	295	295	295	I S 295	295	310	295
25	285	275	290	315	325	295	305	320	315	305	290	285	290	275	280	285	290	290	290	300	315	325	320	300
26	285	285	285	295	290	280	295	320	315	305	300	290	290	280	275	280	285	300	300	300	300	305	305	I S 300
27	300	290	290	300	305	290	305	325	315	295	285	290	285	280	280	280	290	300	300	305	305	305	300	305
28	290	U S 295	285	295	285	295	315	335	310	295	290	285	280	275	275	280	285	295	295	295	305	310	285	295
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	292	290	295	300	293	288	300	320	320	300	290	285	280	275	278	280	285	295	295	300	305	302	300	300
UQ	300	305	310	320	322	295	305	325	325	305	298	290	290	282	282	285	290	298	300	305	310	308	305	302
LQ	285	285	285	288	275	272	292	315	315	295	288	285	275	270	275	275	280	290	290	295	300	295	292	292

FEB. 1989 | M(3000)F2 (0.01)

IONOSPHERIC DATA

FEB. 1989 | 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 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										U L 365	L	L		U L 370	L	L								
2											L	L	L	395	L	L								
3										L	L	L	L 400	L	L									
4											L	L	A	A	A		L							
5											L	L	L	L	L	L		A						
6											L	L	L	L	L		L							
7										L			L	L										
8										L	L	L	L	L	L	L	L							
9										L	L	L	L	L	L									
10											L	L	L	L		L								
11										L	L	L	L	L	L									
12										L	L	L	L	L	L	L	L							
13											L			L	L	L								
14											L	L	L	L	L	L								
15										L		L	L	L	L	L								
16											L	L	L	L	L	L								
17												L	L	L		L								
18										L	L	L	L		L	L								
19										L	L	L	L	L	L	L								
20										L		L	L	L	L		L							
21										C	L	L	L	L	L	L								
22												L	L	L	L									
23										L	L	L	L	L	L		L							
24										L	L	L			L		L							
25									L		L	L	L	L										
26												L		L	L	L								
27										L	L	L	L	L	L		L							
28										L	L	L	L	L	L	A	A							
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1			1	2										
MED										U L 365			L 400	382										
UQ																								
LQ																								

FEB. 1989 | M(3000)F1 (0.01)

IONOSPHERIC DATA

FEB. 1989 | 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

Day \ Hour	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	255	255		335	300	280								
2											235	260	L 285	340	280	L								
3										255	280	260	270	H 245	305									
4											285	260	260	A 255	E A 310		275							
5											240	285	335	265	310	L 295		255						
6											265	255	265	270	310		260							
7										260			265	L 285										
8										260	255	L 295	H 260	L 315	L 325	315	310							
9										260	L 295	L 290	H 270	300	L 320									
10											L 290	L 310	270	L 305		L 340								
11										245	255	L 295	L 290	L 320	L 320									
12										265	L 300	290	L 305	355	L 315	L 345	L 305							
13											270			L 325	H 265	L								
14											290	L 315	L 330	L 325	330	L 305								
15										250		L 295	270	L 315	265	330								
16											265	L 295	L 340	H 290	L 330	L 320								
17												295	H 260	270		L								
18										255	260	230	L 285		L 315	320								
19										250	260	320	L 295	320	325	L 330								
20										260		265	260	L 295	305		L 295							
21										C	265	L 315	L 310	L	L 335	L 300								
22												280	L 290	L 335	L 310									
23										250	270	L 300	L 300	325	300		290							
24										265	250	275			315		280							
25									250		245	L 295	255	L 300										
26												260		L 300	L 300	L 305								
27										255	275	265	L 285	295	L 290		L 290							
28										L 270	265	H 260	310	310	L 305	A 265	E A 300							
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	15	22	26	24	25	24	13	9	1						
MED									250	260	265	288	285	305	310	L 315	290	255						
UQ										262	280	L 295	L 302	L 325	L 320	L 330	300							
LQ										252	255	260	265	290	300	L 300	280							

FEB. 1989 | H'F2 (KM)

IONOSPHERIC DATA

FEB. 1989 | 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	300	300	345	305	365	365	265	220	235	245	240	225	230	230	230	225	235	240	230	225	225	260	270	280
2	380	315	225	230	E A 410	345	350	260	230	240	225	220	225	205	230	230	230	235	240	235	230	255	255	260
3	275	300	290	245	240	260	285	245	210	220	235	225	205	230	225	240	220	245	H 210	235	260	275	285	260
4	290	285	260	230	275	445	310	220	225	245	240	235	A	A	A	245	240	230	230	250	240	250	260	270
5	275	260	245	255	255	275	240	250	235	H 220	225	210	230	255	H 220	H 220	245	A	A	E A 265	A 250	220	285	295
6	285	285	260	245	235	310	270	250	220	240	235	225	215	220	225	235	235	250	A 255	245	240	255	275	255
7	260	300	350	345	320	245	295	255	235	225	240	H 235	225	230	220	235	240	260	265	250	240	255	250	280
8	285	295	280	285	235	255	280	260	225	230	230	H 220	230	235	230	235	230	235	235	245	235	250	250	255
9	275	275	265	245	290	295	265	255	245	240	H 220	235	230	240	230	235	235	250	250	245	250	265	280	245
10	250	260	340	310	260	275	250	240	235	230	230	225	240	235	245	245	255	250	240	255	225	255	270	275
11	310	260	245	225	H 210	330	275	245	230	235	225	H 220	H 190	240	H 230	240	240	255	230	250	240	250	255	275
12	345	315	260	245	260	410	280	230	225	225	H 220	220	230	H 230	230	245	240	240	240	255	235	240	250	250
13	330	300	280	285	390	405	250	230	230	235	230	230	235	235	225	230	240	260	260	255	230	320	280	300
14	270	230	230	295	375	335	225	235	235	225	220	240	235	230	240	245	245	255	245	245	230	275	260	245
15	260	315	345	280	230	265	265	245	235	225	235	235	230	235	230	235	245	A	250	240	255	260	245	285
16	300	295	315	350	340	345	260	245	230	230	230	225	230	235	245	240	240	245	280	255	250	250	250	255
17	265	285	275	240	215	310	310	255	235	235	230	225	230	230	H 230	H 225	240	250	245	245	245	255	260	255
18	265	255	250	260	260	300	285	255	240	230	230	225	220	240	H 220	235	235	250	245	245	235	260	285	280
19	280	315	255	295	315	320	305	255	250	230	230	225	240	235	225	245	245	245	240	245	235	260	235	270
20	270	255	275	335	335	280	275	255	230	225	240	220	210	220	235	245	240	245	255	270	250	235	255	245
21	295	290	305	265	265	330	305	255	240	I C 240	240	H 215	H 215	H 225	235	240	245	250	245	255	260	240	240	260
22	260	230	270	335	300	285	280	245	230	245	235	225	230	235	235	240	240	E A 270	250	250	260	275	250	245
23	240	255	295	295	240	270	295	255	250	240	230	H 230	240	240	255	255	245	E A 265	E A 270	A 255	240	240	260	265
24	265	265	250	255	240	280	275	225	235	230	235	215	240	H 220	225	245	A 255	A 250	E A 265	240	255	260	245	260
25	285	305	290	250	225	280	270	240	240	230	230	225	225	235	230	240	240	A 255	A 260	265	A 255	A 230	235	270
26	305	300	285	275	280	300	275	240	230	220	220	210	235	240	230	235	A 260	240	235	245	260	245	250	250
27	260	280	280	260	265	280	255	235	235	230	220	225	230	230	235	A 265	235	A 245	240	A 255	A	255	250	A 255
28	270	270	300	275	310	270	255	225	235	A 240	215	220	225	230	245	A	A	A	A	E A 305	240	245	270	275
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	28	28	28	27	27	27	27	27	25	26	28	27	28	28	28
MED	275	285	278	270	264	293	275	245	235	230	230	225	230	235	230	240	240	248	244	248	240	255	255	260
UQ	298	300	298	295	315	332	290	255	235	240	235	228	232	235	235	245	245	252	252	255	252	260	270	275
LQ	265	260	258	245	240	275	262	235	230	225	225	220	225	230	225	235	235	245	240	245	235	245	250	255

FEB. 1989 | H'F (KM)

IONOSPHERIC DATA

FEB. 1989 | 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 125	115	115	125	115		A	A	E A 140	A	A						
2								A 140	E A 140	115	120	115	115	A	A	E A 135	125	A						
3								140	120	115	120	A	115	E A 135	A	A	A	B						
4								E B 165	120	120	120	120	120	120	120	A	E A 130	B						
5								A	E A 140	125	115	120	A	120	E A 135	E A 130	A	A						
6								135	115	115	B 120	120	120	125	125	120	120	A						
7								E B 155	125	120	120	E A 120	B 125	E A 120	E A 130	A 120	E A 135	E B 155						
8								E B 160	A	E A 130	120	115	115	120	E A 130	A 120	120	A						
9								135	125	120	120	120	120	E A 125	120	E A 130	A	A						
10								135	120	120	125	125	125	120	E B 135	115	120	E B 150						
11								140	125	125	E A 135	115	120	125	E A 130	A 120	120	E B 150						
12								145	120	120	120	120	120	120	120	125	E A 130	A						
13								B 140	120	120	125	120	125	120	120	120	120	130						
14								E A 135	120	125	125	120	120	125	130	125	120	A						
15								125	120	120	125	120	125	120	120	120	120	125						
16								E A 165	120	120	120	120	E A 135	B 130	S	E A 135	E A 130	A						
17								130	A	E A 130	120	120	A	E A 130	120	115	A 120	E A 135						
18								145	120	115	120	E A 145	120	125	A	A	E A 130	A						
19								E A 135	115	120	115	E A 120	115	E A 120	E A 120	E A 125	A	A						
20								120	115	120	125	120	120	120	120	120	E A 130	A						
21								120	120	I C 115	115	120	115	120	115	120	125	130						
22								125	120	B	S	E S 145	120	125	115	120	120	125						
23								135	115	115	115	A 130	B	120	125	120	125	120						
24							B	130	115	120	120	B	120	115	120	120	120	E B 125						
25							B	E A 160	A	125	A	E A 140	E A 125	E A 135	120	120	125	125						
26							B	120	115	115	115	115	125	120	115	120	125	125						
27							B	E A 135	120	E A 135	E A 125	E A 125	120	115	115	120	115	E A 120						
28							B	125	115	115	115	A	115	E A 120	E A 120	115	115	120						
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								25	25	27	25	25	25	26	23	25	23	14						
MED								130	120	120	120	120	120	120	120	120	120	122						
UQ								140	120	121	122	122	122	122	124	A 122	124	E 135						
LQ								128	115	115	115	120	115	120	120	120	120	125						

FEB. 1989 | H'E (KM)

IONOSPHERIC DATA

FEB. 1989 | H'ES (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

Day \ Hour	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	105	150	115	110		B	E G 150	135	115	125	120	115	110	105	110	110	110	105	105	105	B	110
2	110	110	105	105	105	105	105	110	120	125	G	130	120	120	105	110	110	105	105	105	105	110	110	B
3	B	B	B	B	B	B	S	G	G	E G 190	115	120	120	115	120	125	110	100	B	B	B	B	B	B
4	B	B	B	B	B	B	B	G	G	E G 165	E G 155	155	125	115	110	110	110	B	105	105	100	110	B	B
5	B	B	B	B	B	B	B	120	125	G	120	125	115	115	110	110	105	105	105	100	95	100	B	B
6	B	B	B	B	B	B	B	G	G	G	B	125	G	G	G	G	110	105	100	105	100	105	B	B
7	B	B	B	B	B	120	150	145	G	G	E G 165	E G 160	105	125	125	120	115	100	100	B	B	B	B	B
8	B	B	B	B	B	S	B	G	115	115	110	G	G	G	105	130	125	110	115	120	B	105	105	105
9	B	100	105	105	100	B	B	G	E G 175	E G 160	G	G	G	E G 165	E G 160	140	120	95	100	B	B	110	115	B
10	B	B	B	B	115	B	100	G	G	E G 180	G	G	G	G	G	G	G	G	105	105	B	B	S	B
11	B	B	S	B	B	B	B	G	140	G	115	120	120	G	135	130	120	G	110	105	S	105	105	105
12	B	B	105	B	B	B	B	G	125	G	G	G	G	G	140	130	120	95	100	100	S	B	B	B
13	B	B	B	S	B	B	155	145	G	E G 155	145	G	G	G	G	G	G	G	110	B	105	105	105	S
14	B	B	B	B	B	B	B	120	G	125	G	G	G	G	G	G	125	115	110	115	100	100	100	B
15	B	B	B	B	B	B	B	G	G	G	G	G	E G 180	G	E G 170	140	130	110	110	115	110	105	B	B
16	110	B	B	S	B	B	S	125	110	G	115	110	105	G	S	105	100	105	105	B	B	B	B	B
17	B	B	B	B	B	B	B	130	115	115	G	G	105	105	110	105	100	105	105	105	B	S	S	S
18	B	B	B	B	B	B	B	G	G	G	G	120	G	G	120	115	115	110	B	S	B	B	105	100
19	B	B	B	B	B	B	B	115	G	G	G	105	G	110	105	140	105	100	100	B	B	110	105	B
20	B	100	B	B	B	B	B	G	G	G	G	G	G	G	G	G	115	110	110	115	B	B	B	B
21	B	B	B	B	B	B	155	G	G	C	G	G	G	G	G	G	E G 185	G	B	B	B	130	125	B
22	B	B	B	B	B	B	B	G	G	B	S	E G 155	150	140	130	130	130	120	110	115	110	160	140	130
23	B	125	120	115	B	B	B	G	G	G	E G 155	110	B	G	E G 170	155	135	115	110	110	115	110	110	110
24	110	B	B	B	B	B	B	G	120	120	125	B	E G 200	G	G	G	120	120	115	115	125	B	B	B
25	B	B	B	B	B	B	125	115	115	G	105	105	110	105	G	135	130	115	110	115	105	110	115	110
26	100	105	105	105	120	B	B	105	G	G	G	G	115	E G 170	E G 165	150	E G 170	G	S	B	110	110	115	S
27	105	110	110	110	105	110	110	125	G	115	110	110	G	135	130	125	130	110	110	110	105	105	105	105
28	B	110	110	110	B	B	110	130	130	115	115	110	G	110	135	130	120	115	115	110	110	B	B	115
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	5	7	8	7	6	4	8	12	12	13	14	16	14	14	19	21	26	22	24	19	15	18	14	9
MED	110	110	105	110	110	110	118	122	120	120	115	118	118	115	U 118	130	118	110	110	110	105	108	108	110
UQ	110	110	110	112	115	115	152	130	130	E G U 160	130	126	122	U 128	133	135	128	115	110	115	110	110	115	110
LQ	105	102	105	105	105	108	108	115	115	115	115	110	110	110	110	110	110	105	105	105	102	105	105	105

FEB. 1989 | H'ES (KM)

IONOSPHERIC DATA

FEB. 1989 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

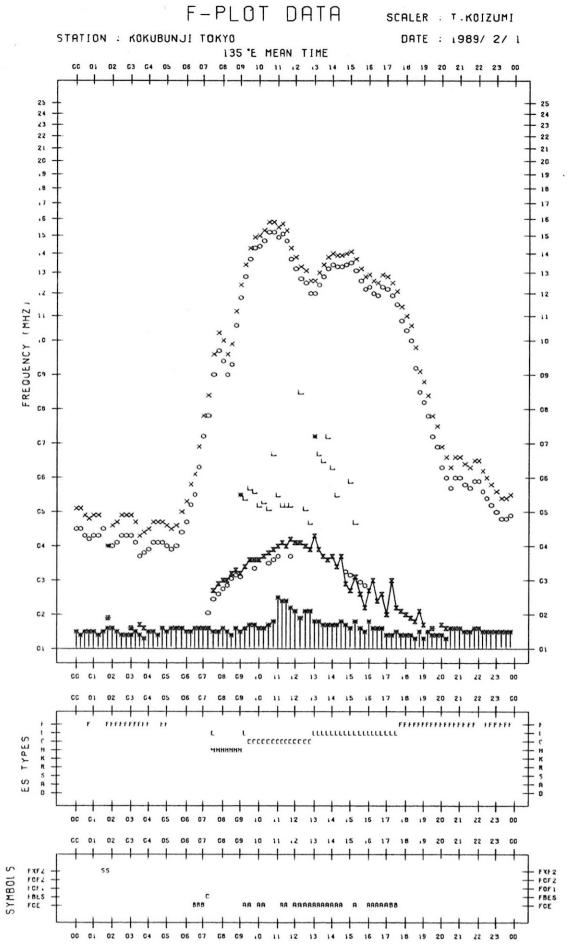
Station KOKUBUNJI TOKYO Lat. 35° 42' 4 N, Long. 139° 29' 3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

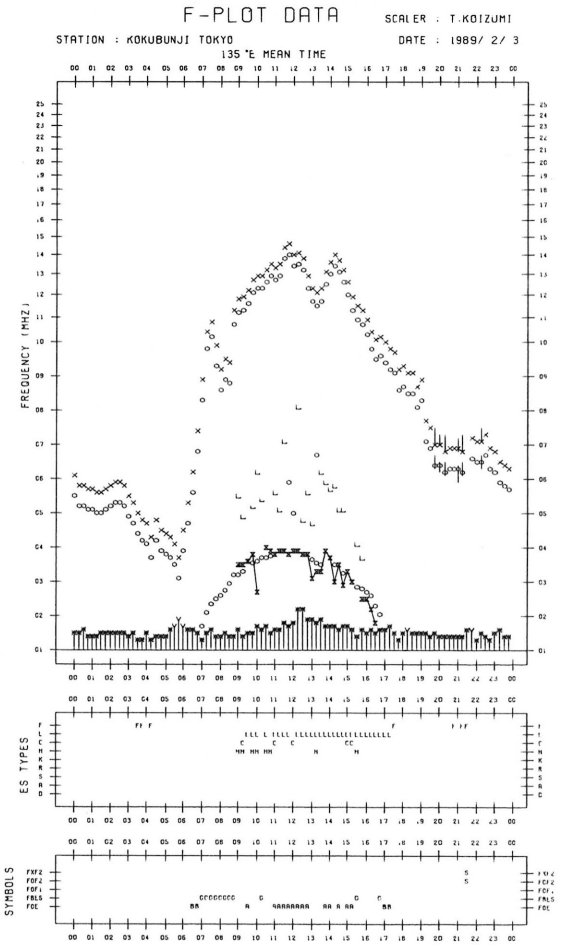
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			F 1	F 1	F 1	F 2			H 2	H 1	C 1	C 2	C 2	L 2	L 2	L 3	L 2	L 3	F 3	F 3	F 1	F 2		F 1
2	F 1	F 1	F 2	F 5	F 3	F 2	F 2	L 1	L 2	C 1		C 1	C 2	L 2	L 2	L 2	L 2	L 3	F 4	F 2	F 1	F 1	F 1	
3										H 1	LH 11	LC 11	C 1	L 1	LL 11	CL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

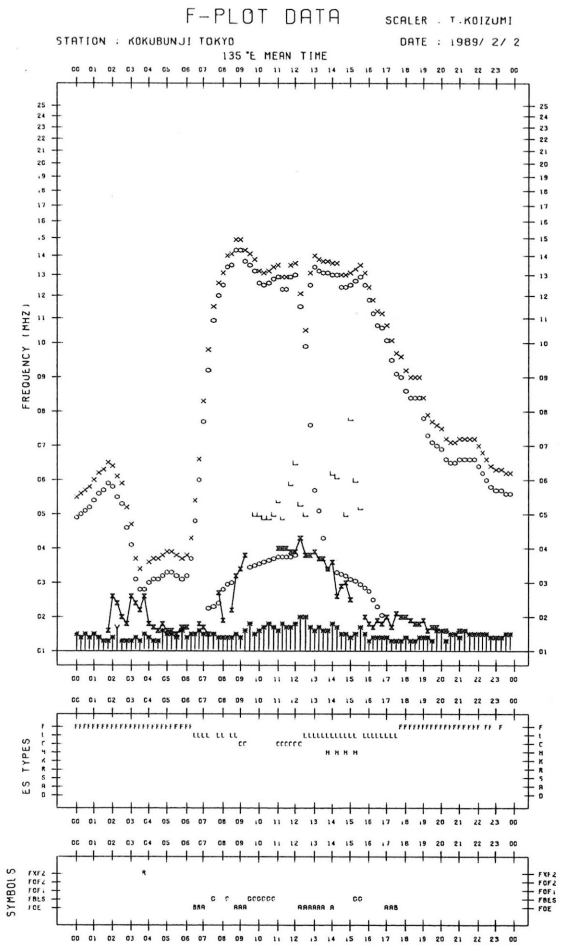
FEB. 1989 | TYPES OF ES

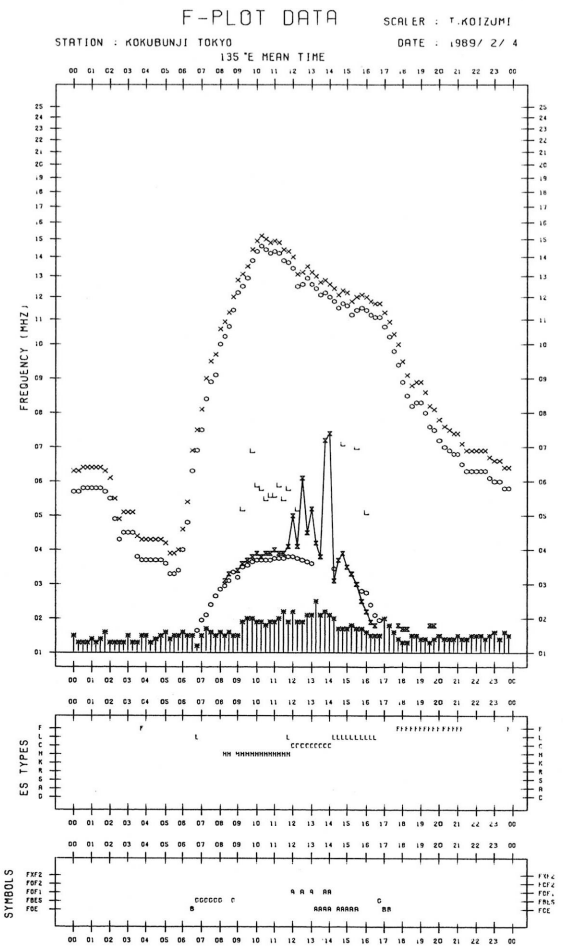
f-PLOTS OF IONOSPHERIC DATA

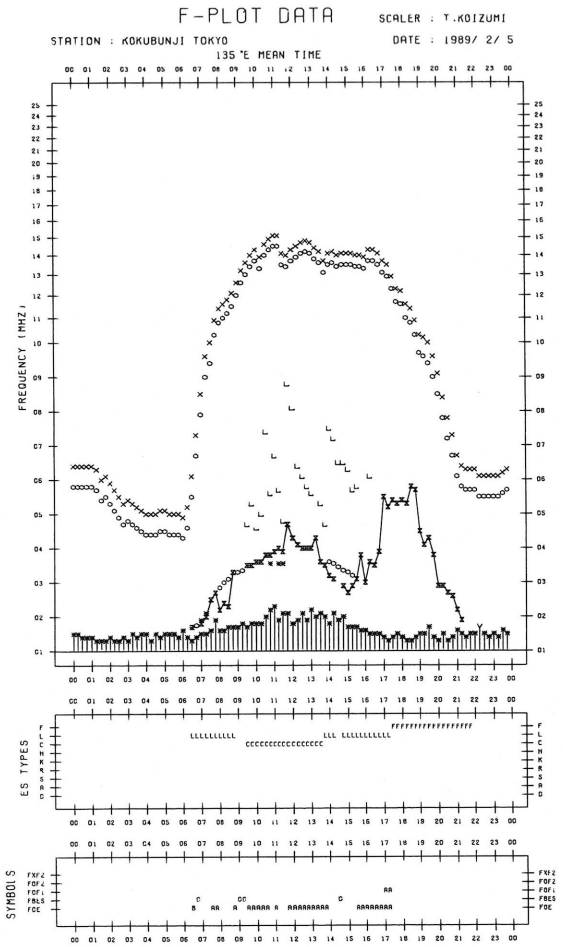
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2,FOF1,FOE
×	FXF2
✳	DOUBTFUL FOF2,FOF1,FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑,↑	FMIN
∧	GREATER THAN
∨	LESS THAN

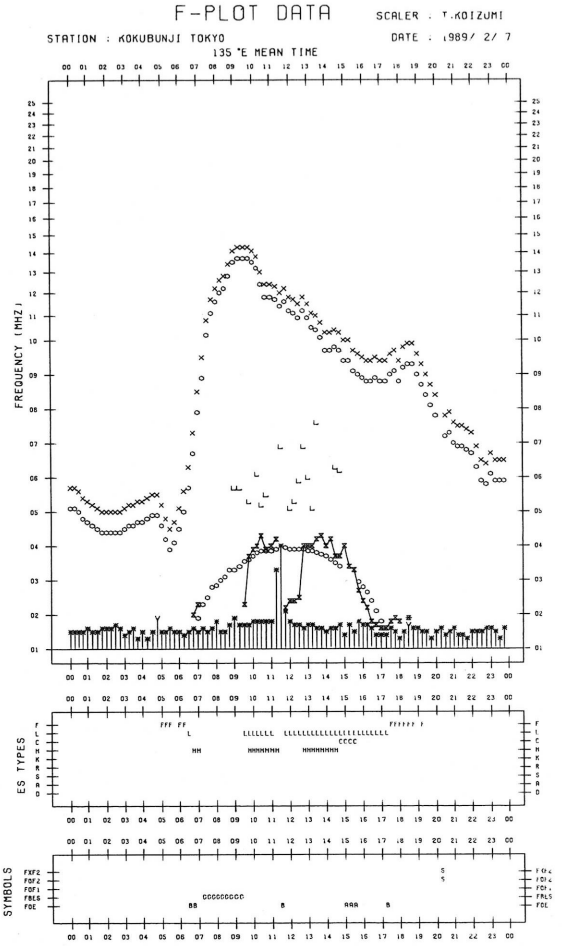

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

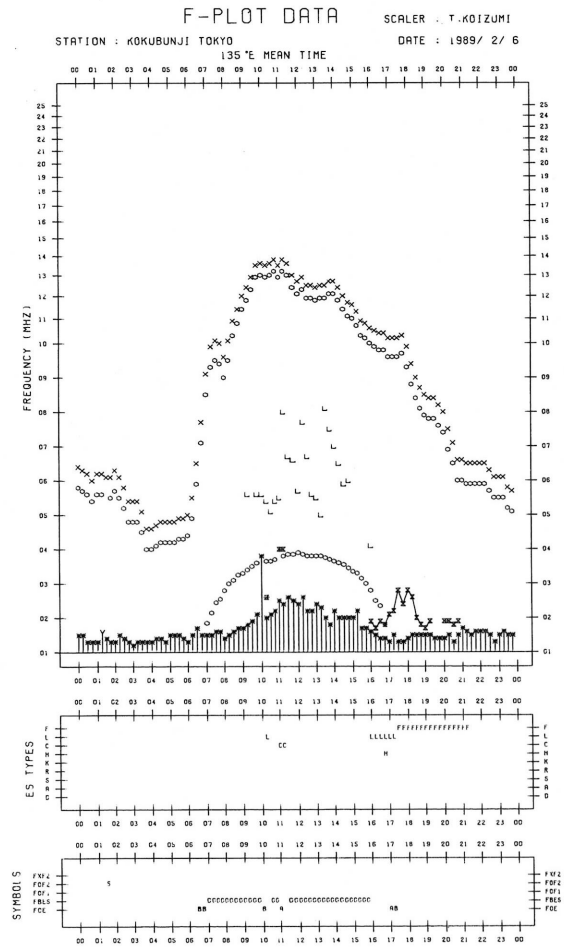

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

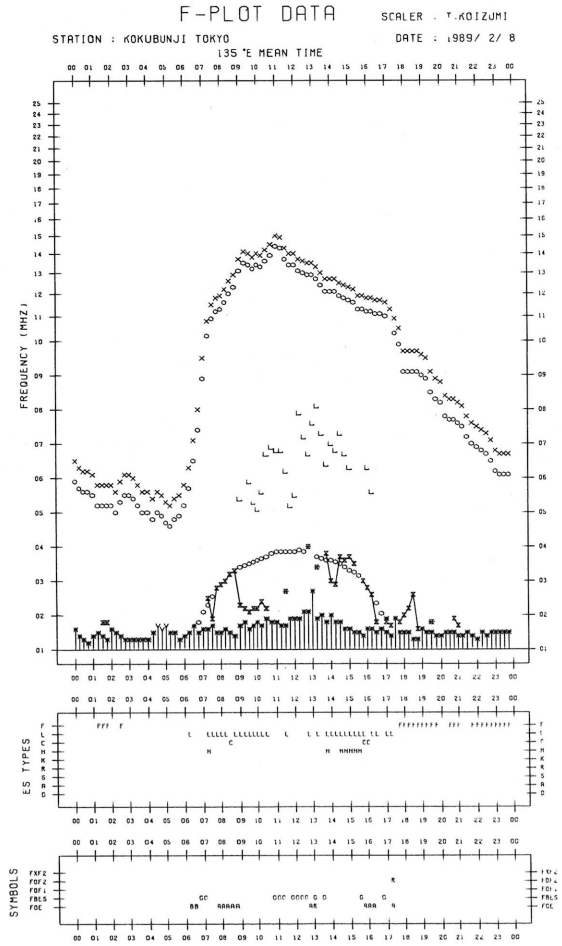

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

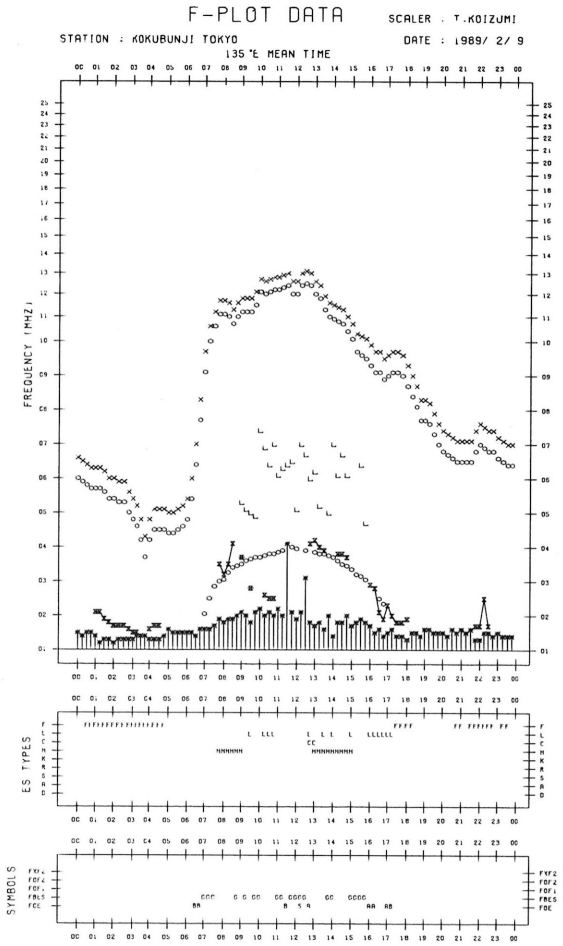

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

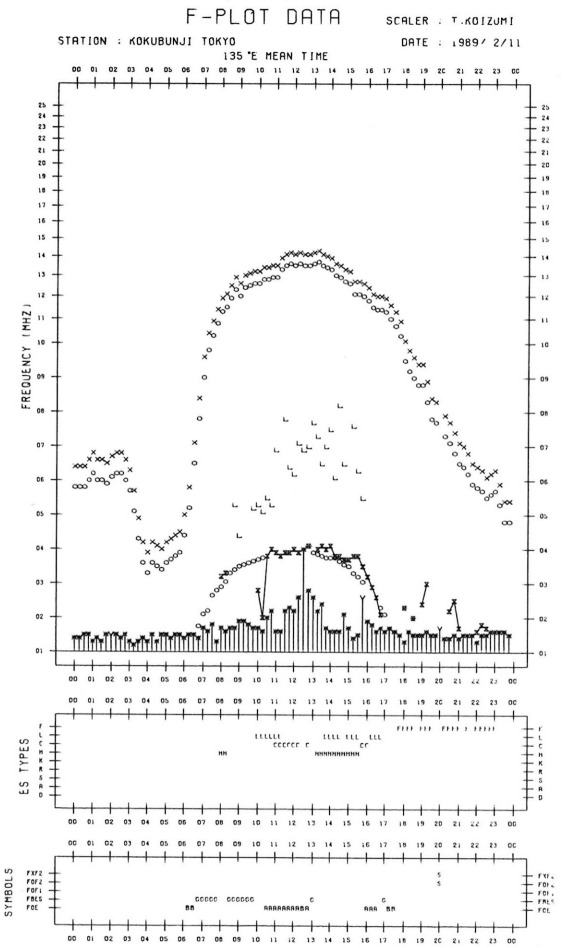

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

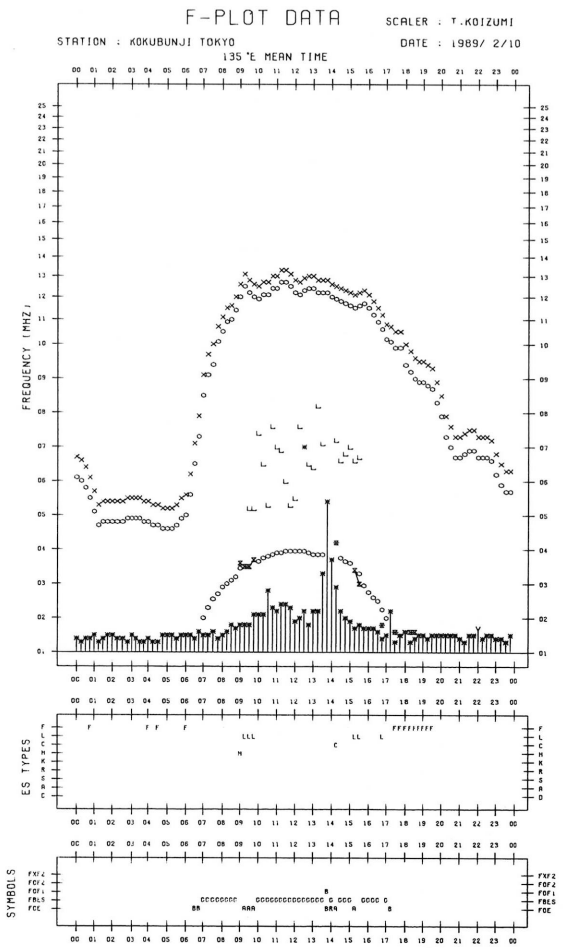

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

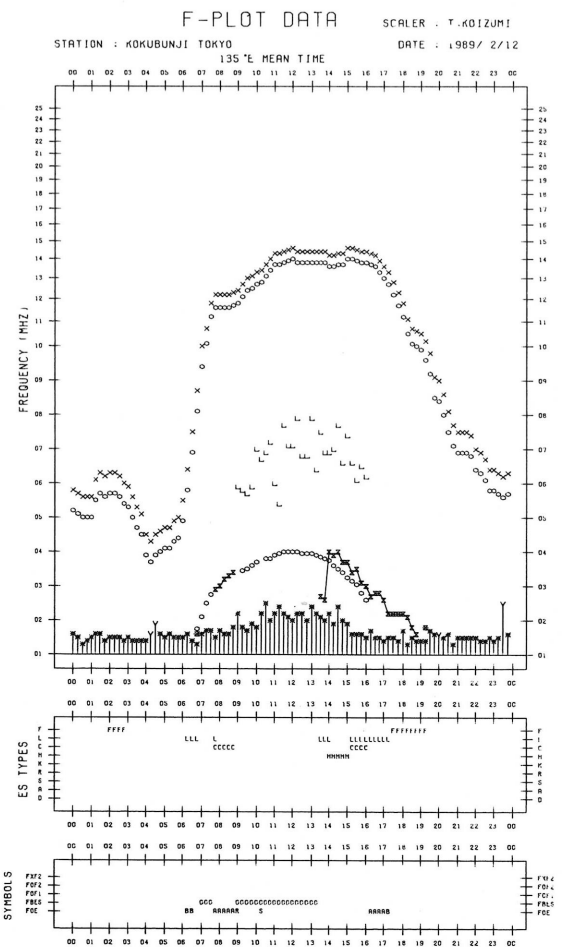

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

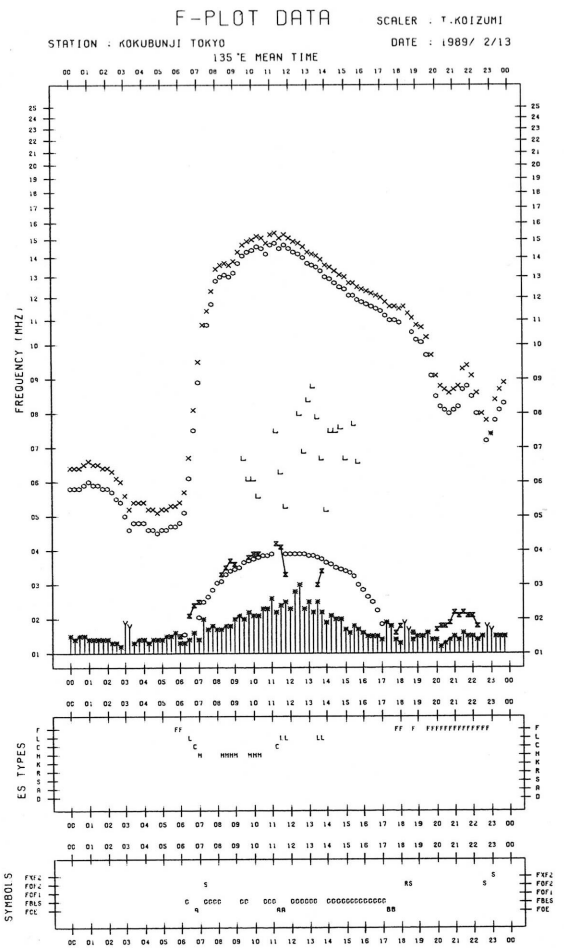

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

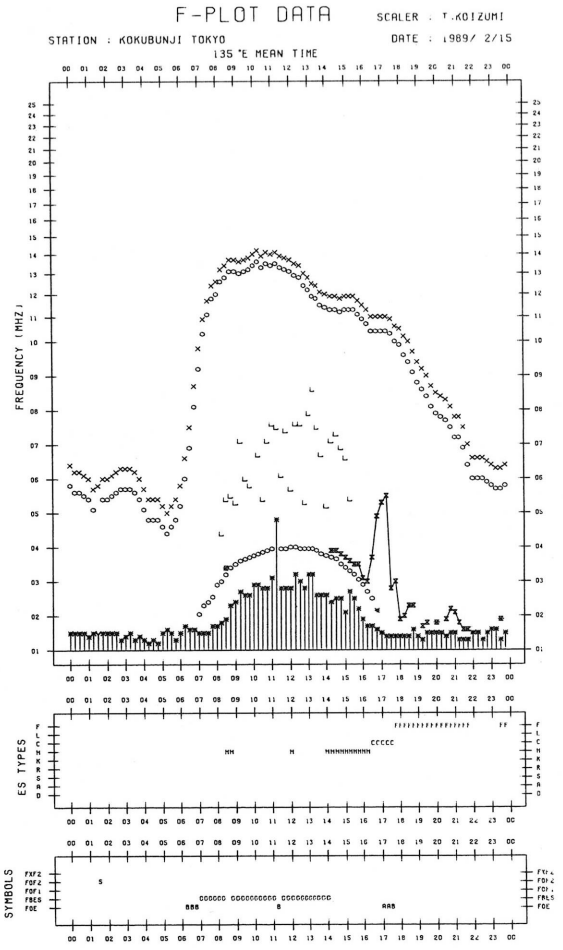

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

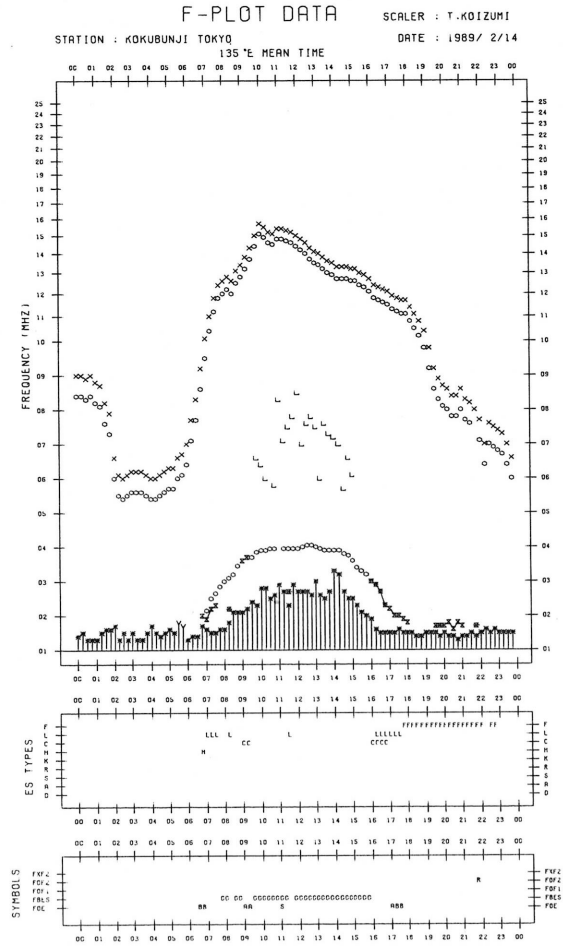

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

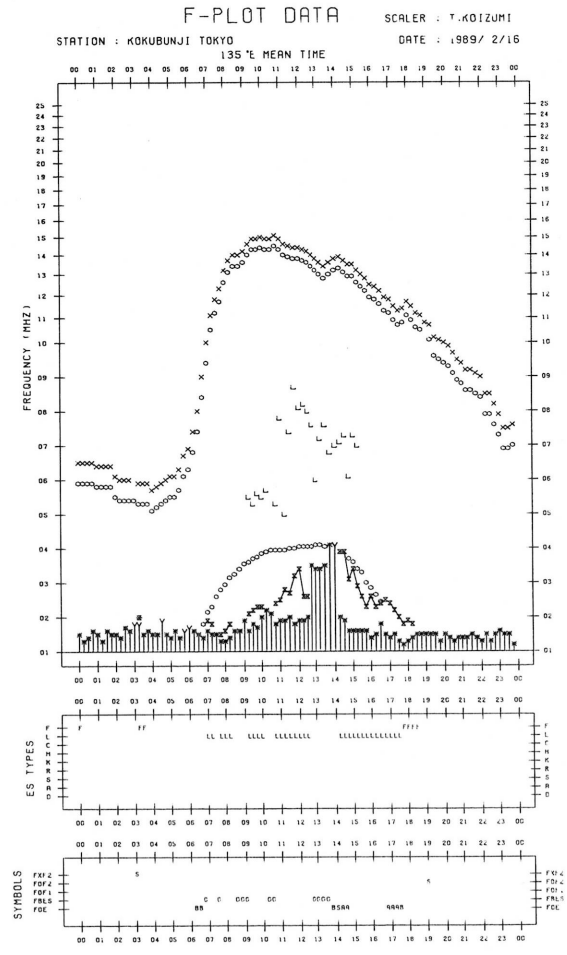

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

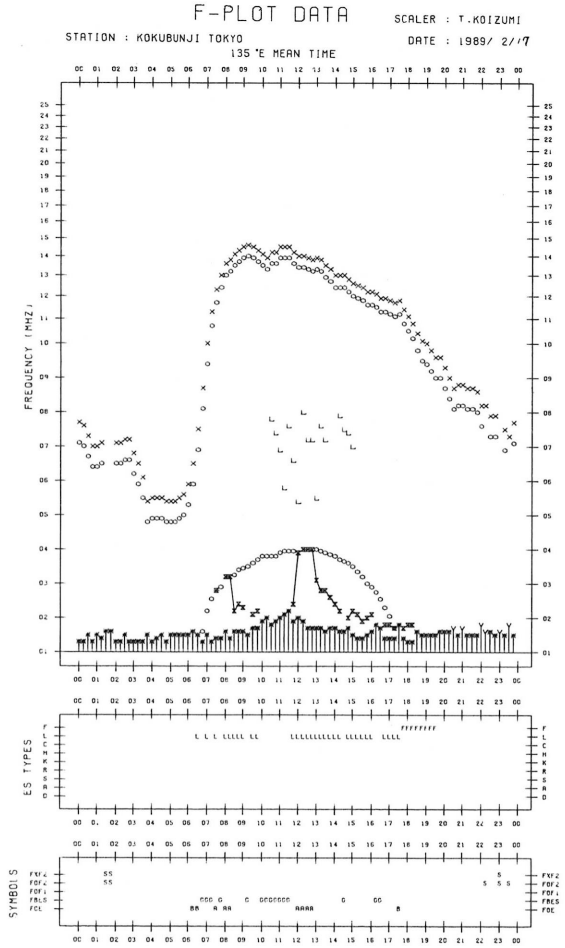

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

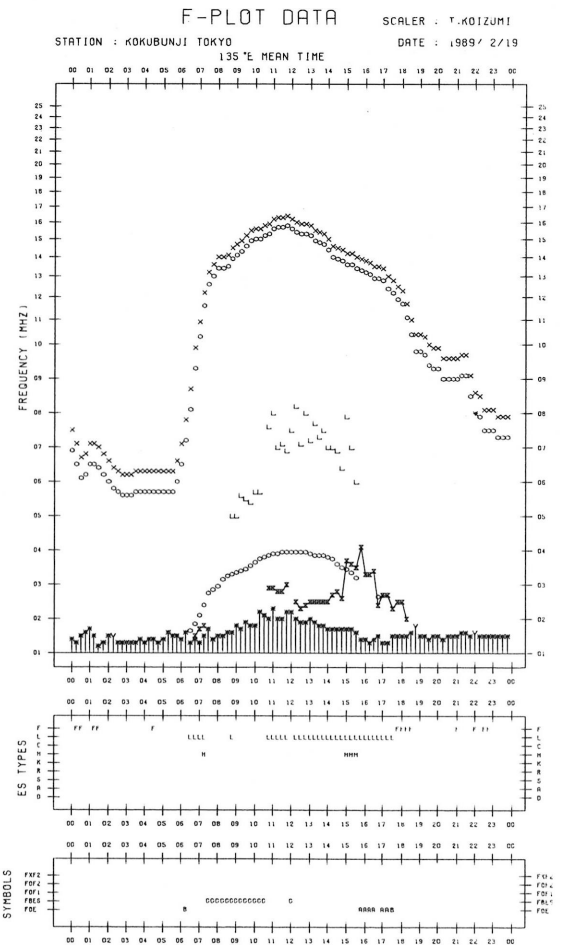

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

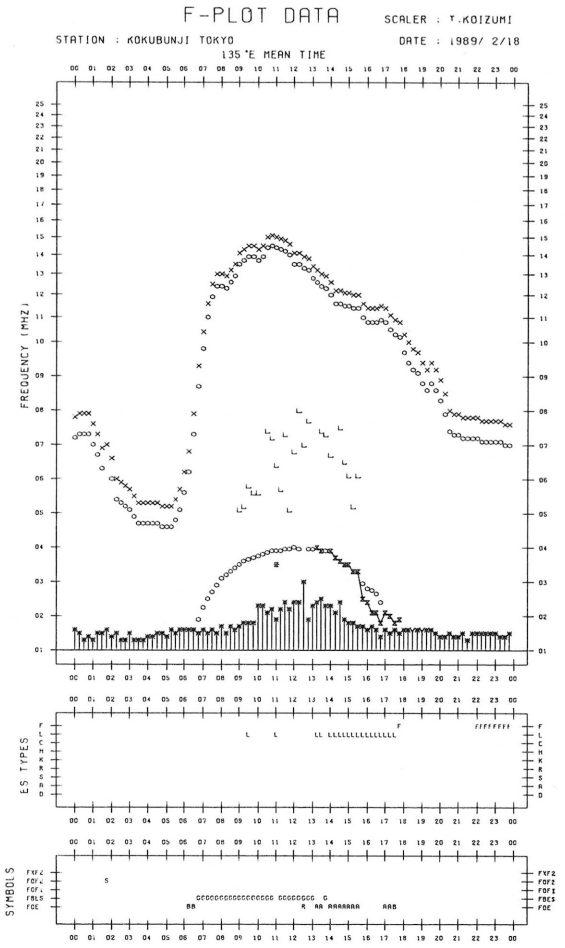

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

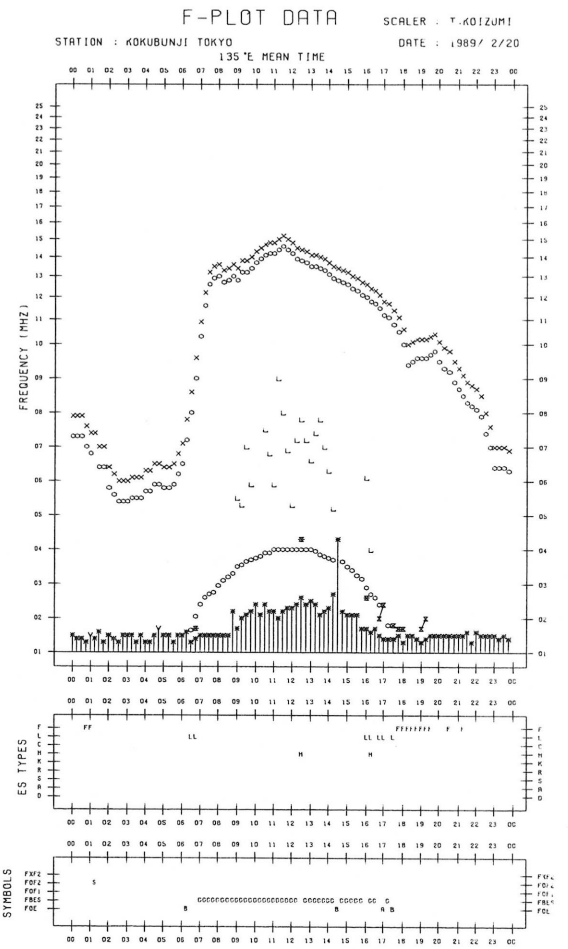

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

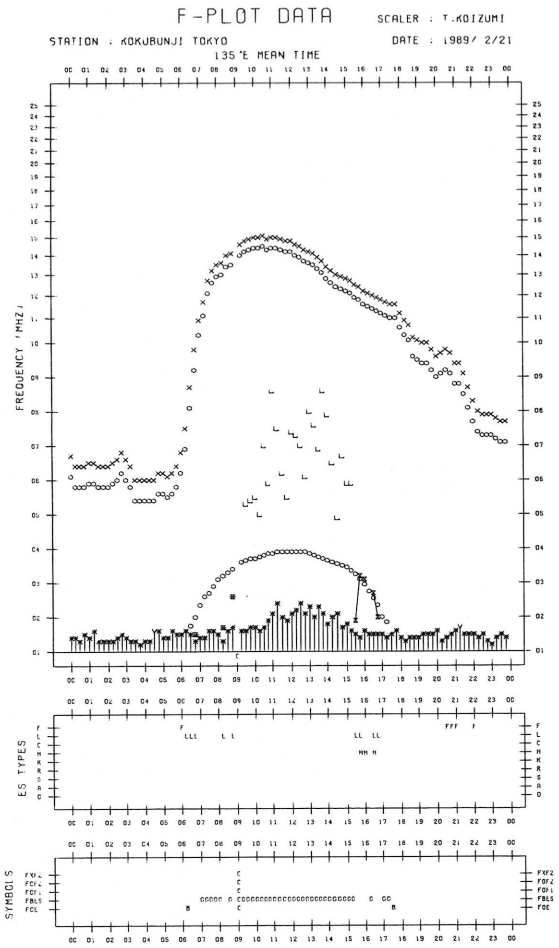

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

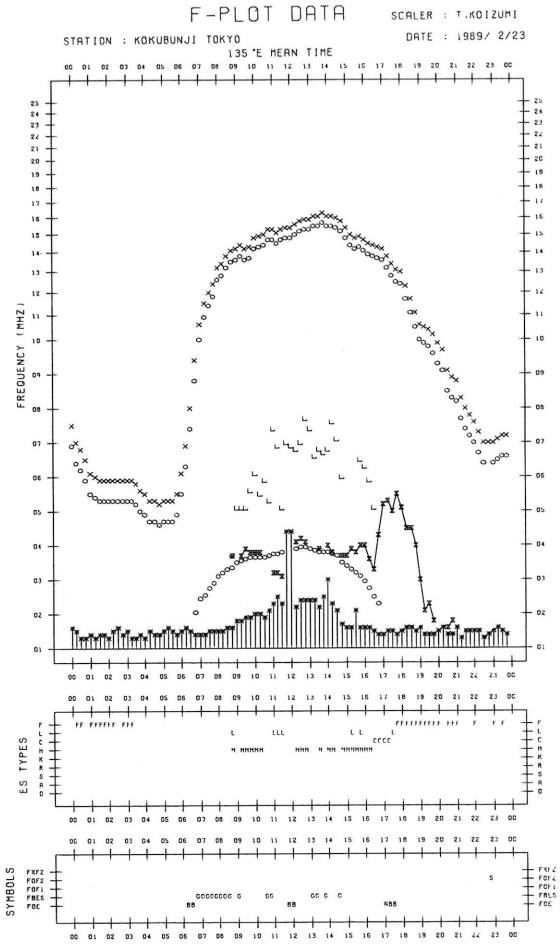

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

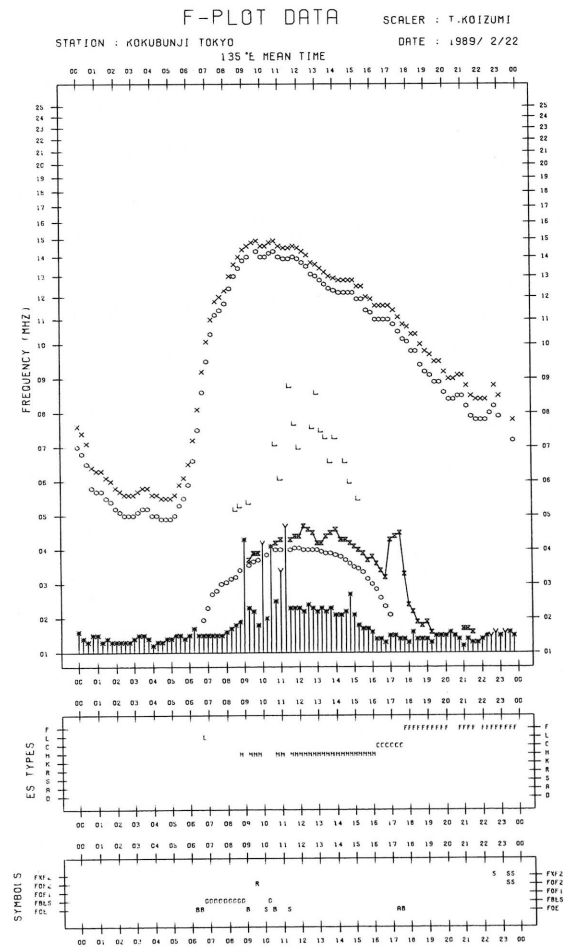

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

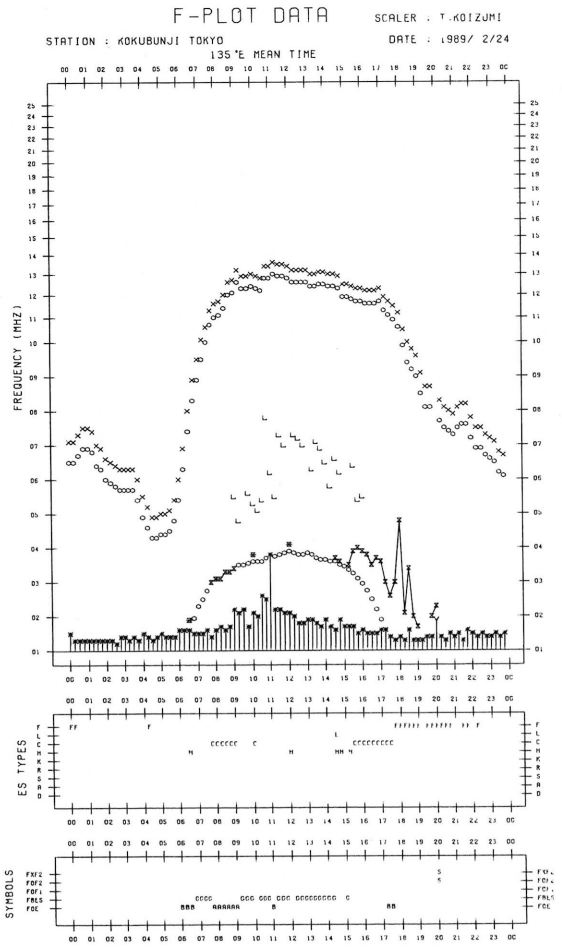

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

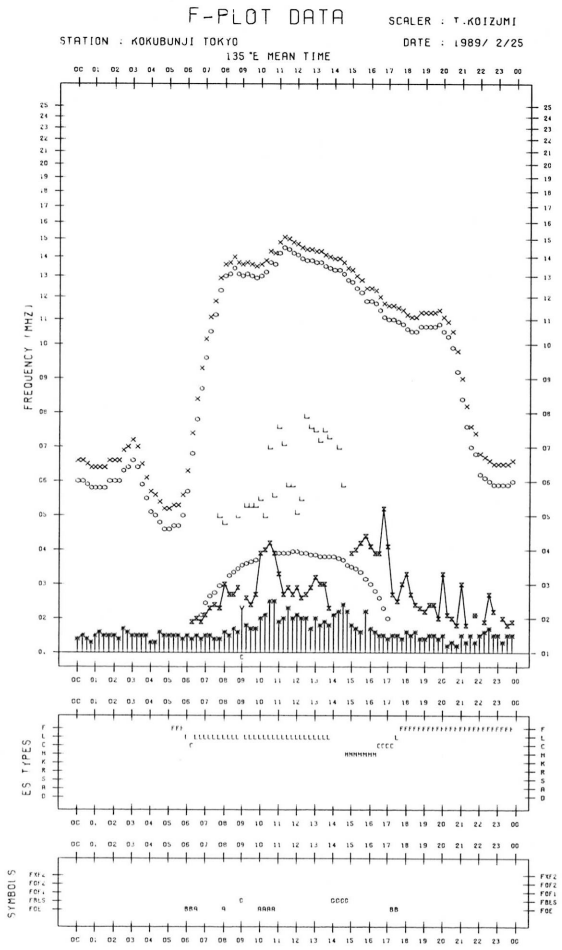

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

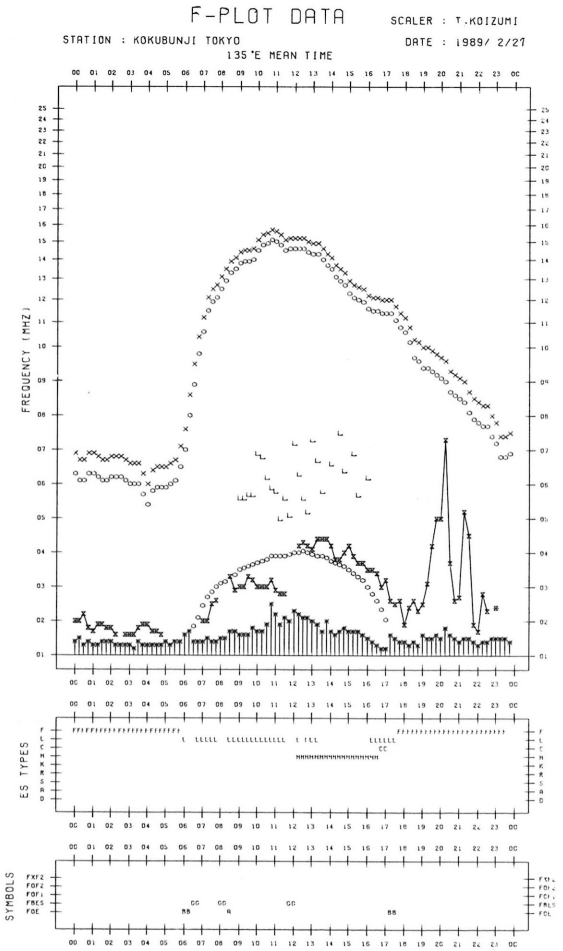

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

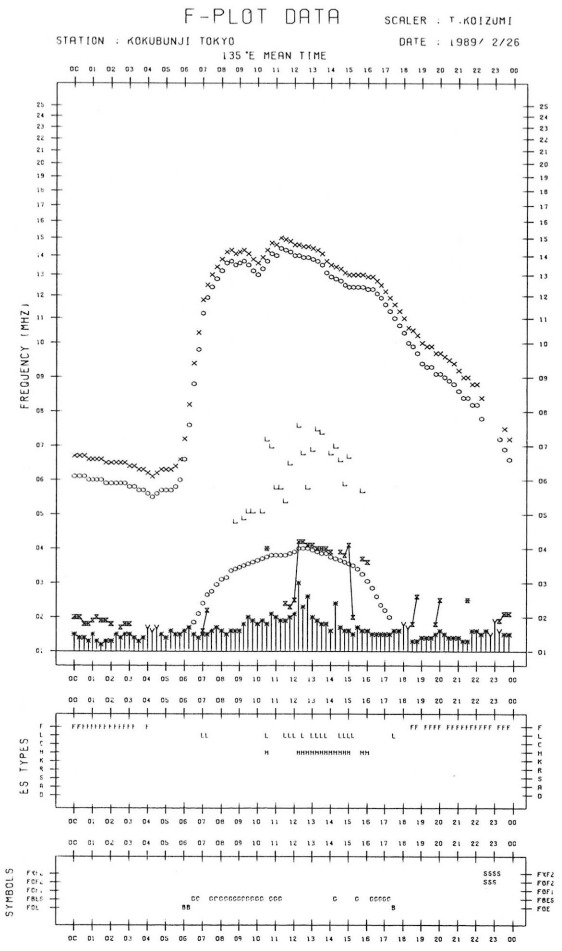

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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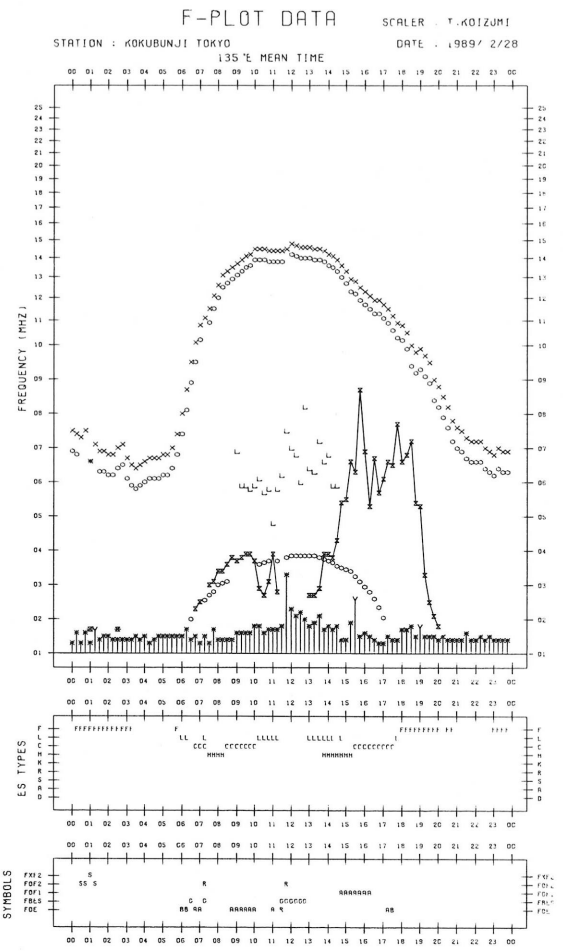
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 2/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso February 1989

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	B	B	B	12	B	2	1	(2)	1	2
2	12	12	12	13	12	1	1	1	0	1
3	B	B	B	B	B	3	2	2	2	2
4	B	13	12	11	B	2	0	0	0	1
5	11	12	13	12	12	0	0	0	0	0
6	11	11	12	-	12	0	0	0	-	0
7	B	B	B	B	B	1	1	1	3	1
8	B	B	B	B	B	1	2	1	3	2
9	(B)	-	(B)	B	B	(1)	-	(1)	2	1
10	B	B	B	13	B	1	1	2	1	1
11	12	12	13	13	12	0	0	0	1	0
12	B	B	12	12	B	3	3	0	0	2
13	13	13	13	B	13	2	1	0	1	1
14	B	B	B	B	B	2	3	(3)	3	2
15	B	B	B	B	B	2	2	2	1	2
16	16	15	14	B	16	1	1	*	3	1
17	B	B	B	B	B	3	3	3	2	3
18	B	B	B	-	B	2	2	(2)	-	2
19	-	-	13	-	-	-	-	0	-	-
20	12	12	(11)	-	11	0	0	(0)	-	0
21	12	12	12	B	12	0	*	*	1	*
22	B	B	B	13	B	0	1	1	3	1
23	12	B	B	B	B	1	3	3	2	2
24	B	B	13	B	B	3	1	(0)	2	2
25	B	B	B	B	B	1	1	1	1	1
26	B	B	B	B	B	1	1	1	3	1
27	B	B	B	B	B	3	3	(1)	3	2
28	B	B	B	B	B	2	3	3	2	3

Note: No observations during the following periods.

6th 2135 - 2348 9th 0100 - 0700
18th 2122 - 19th 0553 19th 2122 - 2400
20th 2122 - 2340

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso February 1989

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	46	46	46	47	46
2	48	48	48	49	48
3	49	49	49	50	49
4	50	50	50	51	50
5	51	51	51	53	51
6	53	53	52	55	53
7	56	57	56	55	56
8	57	61	59	65	58
9	65	-	(63)	56	64
10	58	59	61	59	59
11	59	60	60	58	59
12	62	63	59	59	61
13	61	61	59	60	60
14	61	62	64	63	62
15	64	64	64	62	64
16	62	64	63	60	63
17	62	61	59	57	60
18	58	58	58	57	58
19	59	59	57	-	58
20	56	55	54	56	55
21	56	55	54	57	55
22	57	56	54	63	56
23	64	61	62	63	62
24	71	62	59	59	64
25	60	58	60	56	59
26	58	56	55	54	56
27	54	53	52	53	53
28	53	51	50	51	52

Note: No observations during the following periods:

9th 0100 - 0700
19th 2120 - 2400

B, Solar Radio Emission

B2, Outstanding Occurrences at Hiraiso

Hiraiso — February 1989

Single-frequency observations

Normal observing period: 2130 - 0820 U.T. (sunrise to sunset)

FEB 1989	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
3	200	43 NS	0000	0130	480D	6	3	0
	200	44 NS	2136E	2312	380D	5	2	0
	200	46 C	2226.5	2226.9	3.5	71	-	0
4	200	46 C	0016.2	0019.8	8.6	58	-	0
	500	46 C	0017.3	0020.5	8.0	105	24	0
	100	46 C	0017.8	0020.5	6.7	430	-	-
5	200	41 F	0332.7	0333.1	3.1	42	-	0
6	500	41 F	0034.8	0035.6	2.3	107	-	0
	100	44 NS	2348E	0013	490D	74	21	-
	200	44 NS	2348E	0322	490D	13	8	WR
7	100	46 C	0027.7	-	2.2	1000D	-	-
	200	46 C	0028.1	0028.1	2.0	105	-	0
	200	44 NS	2133E	2325	620D	9	4	0
8	200	42 SER	0509.0	0546.5	43.0	290	-	0
	100	42 SER	0636.8	0639.6	6.2	625	-	-
	200	42 SER	0637.0	0639.6	5.6	485	-	0
	200	44 NS	2133E	-	620D	-	-	-
	100	44 NS	2133E	-	620D	-	-	-
	500	27 RF	2219.5	2232.3	70	20	-	WR
	100	42 SER	2213.1	2213.9	14.5	510	-	-
	200	46 C	2225.9	2233.0	12.0	150	75	WL
	200	46 C	2258.7	2300.0	1.5	480	-	-
9	200	44 NS	2130E	2221	630D	19	6	WL
	200	46 C	2229.7	2230.1	4.6	70	-	0
	100	42 SER	2229.7	2231.2	4.2	890	-	-
10	500	46 C	0432.1	0433.2	7.9	13	-	0
	100	42 SER	0442.2	0443.6	13.2	560	-	-
	500	46 C	0523.0	0527.4	24.5	40	7	0
12	200	43 NS	0010	0123	310	17	6	MR
13	200	43 NS	0033	0046	109	4	1	WR
	200	46 C	0127.7	0128.1	2.2	67	-	SR
	200	44 NS	2130E	0700	630D	70	20	WL
14	100	42 SER	0010.8	0011,4	7,5	960	-	-
	100	43 NS	0323	0700	280D	140	41	-
	200	44 NS	2130E	-	630D	-	-	-
14	200	24 R	2326	0226	526D	415	225	SR
	500	24 R	2328	0003	528D	23	8	WR
	100	24 R	2335	0300	515D	710	650	-
	100	42 SER	2350	2353.5	5.3	1000D	-	-
16	200	42 SER	0014.5	0042.0	61	135	-	WR
	200	27 RF	0240	0300	66	9	4	WL
	100	43 NS	0243	0304	92	40	5	-
	500	46 C	0341.4	0342.5	10.6	160	-	0
	500	42 SER	0422.8	0424.8	4.0	42	-	0
	200	44 NS	2122E	0630	650D	10	7	WR
17	500	42 SER	0620.5	0623.7	8.5	30	-	0
	200	44 NS	2122E	0523	650D	17	8	MR
18	500	46 C	0346.5	0401.4	32.0	52	17	0
20	500	46 C	2215.5	2220.5	11.5	50	12	0
21	200	27 RF	2117E	2216	650D	37	10	ML
	100	44 NS	2117E	2304	340D	95	30	-
	500	42 SER	2349.5	2355.0	9.5	370	-	0
22	200	42 SER	0313.8	0312.8	6.2	780	-	0
	200	41 F	0421.0	0433.0	32.0	140	-	0
	200	44 NS	2117E	0528	650D	7	2	0
23	100	42 SER	0246.0	0246.3U	5.9	1000D	-	-
	200	42 SER	0246.2	0246.2	6.1	530	-	0
	200	44 NS	2117E	0209	495D	39	6	ML
24	200	44 NS	2114E	0507	650D	8	3	WL
25	100	42 SER	0244.9	0245.5U	2.6	1000D	-	-
	200	44 NS	2114E	0717	650D	5	2	WR
26	500	46 C	0320.5	0326.0	9.5	50	18	-
	200	44 NS	2110E	0226	675D	33	15	MR
27	100	43 NS	0200	0718	380D	54	23	-
	500	23 GRF	2110E	2140	115D	47	14	-
	100	44 NS	2110E	2143	675D	170U	36U	-
	200	44 NS	2110E	2332	675D	56	27	SR
	500	46 C	2137.5	2142.0	10.5	50	7	0
28	200	44 NS	2110E	0522	675D	158	26	SR

C. RADIO PROPAGATION

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

FEB 1989 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

FEB 1989 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	1	6	0	10	13	16	23	22	21	8	6	-5	-8	-14	ES -26	ES -26	ES -26	ES -26	ES -26	-14	-1	6	5	-2
2	5	6	5	13	16	15	23	23	16	13	6	-4	-9	-12	ES -26	ES -26	ES -26	-13	ES -26	ES -26	0	6	1	4
3	-3	2	12	7	16	22	21	27	13	10	13	16	10	11	1	ES -26	ES -26	-5	ES -26	ES -26	-7	8	0	-2
4	-7	-2	1	7	12	18	24	22	16	13	-2	-10	-6	-10	ES -25	-12	ES -25	ES -25	ES -25	ES -25	-1	3	-6	-10
5	1	-12	-1	5	14	19	15	28	23	24	19	21	2	10	-1	-13	-13	ES -25	ES -25	ES -25	-2	8	8	-2
6	-2	-1	-1	8	16	17	16	25	16	24	13	8	13	-12	ES -25	ES -25	ES -25	ES -25	ES -25	-2	2	7	3	-5
7	-2	-4	1	8	12	16	19	23	21	13	21	26	21	ES -16	ES -25	ES -25	ES -25	ES -25	ES -25	11	6	11	4	-1
8	1	2	5	7	17	23	22	22	22	14	17	9	14	-13	-13	-13	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-13
9	-10	C	C	C	C	C	21	25	6	0	ES -25	ES -25	ES -16	ES -16	ES -16	ES -16	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25
10	ES -24	-12	0	9	ES -24	17	20	24	22	25	26	23	6	6	-12	-11	-11	ES -24	ES -24	ES -24	1	3	-4	-11
11	-9	ES -24	-9	-1	9	15	22	21	22	20	19	10	21	4	-12	14	-4	10	ES -24	ES -24	2	2	-3	-12
12	-10	ES -15	-3	5	14	19	21	23	30	25	20	25	18	6	-12	ES -25	ES -25	ES -25	ES -25	ES -25	0	2	-2	-7
13	-11	-12	-10	0	8	16	21	22	24	23	25	16	14	16	18	13	15	ES -24	ES -24	ES -24	6	3	-6	-12
14	-12	US -9	-5	2	7	20	20	20	20	21	20	23	20	15	-11	ES -24	ES -24	16	2	1	10	1	-3	-9
15	ES -24	-12	-5	1	12	18	16	25	22	19	12	6	ES -9	-2	-12	-12	ES -24	ES -24	ES -24	ES -24	6	12	-2	2
16	-9	-2	-2	-9	9	19	22	21	21	23	27	19	0	10	-12	-12	-12	26	7	-11	4	-3	1	-11
17	-9	-11	-2	7	16	20	21	21	22	24	16	14	8	14	19	-11	-11	18	16	0	2	4	-12	-7
18	-10	-10	3	6	15	18	25	26	24	31	19	21	2	16	0	ES -24	ES -24	-4	ES -24	-9	8	6	2	-4
19	-8	-8	0	4	14	20	28	29	26	28	24	22	C	C	C	C	C	C	C	C	C	C	C	C
20	-13	-6	-1	8	9	15	18	21	21	24	23	22	12	-7	ES -25	ES -25	ES -25	20	11	-7	3	5	-1	-5
21	-4	-3	3	5	14	22	25	27	C	C	22	23	13	14	-13	ES -25	ES -25	ES -25	ES -25	ES -25	7	-11	-10	-10
22	-11	-5	0	2	9	20	21	26	22	26	2	17	17	18	1	ES -25	ES -25	1	5	5	6	-3	2	-10
23	-9	-5	-4	6	9	19	20	25	25	24	24	23	20	20	10	13	ES -25	-12	ES -17	-12	3	1	1	-5
24	-12	-10	-1	6	13	20	21	21	20	15	4	18	24	-9	-8	-13	-14	7	7	4	-3	1	-3	-5
25	-10	-10	-2	9	13	23	22	26	28	21	21	23	-3	-10	-4	ES -25	ES -25	23	16	-1	6	9	2	-1
26	-2	-1	1	5	11	18	24	29	23	25	18	0	-2	-3	-8	ES -16	ES -16	12	13	10	12	8	2	5
27	-6	-12	0	5	15	19	20	25	22	20	21	19	12	-1	-10	-13	ES -25	18	6	6	13	4	-1	-1
28	-2	-4	3	8	14	20	26	26	21	26	17	17	15	-2	-6	ES -25	ES -25	-10	-10	4	4	1	2	-2
CNT	28	27	27	27	27	27	28	28	27	27	28	28	27	27	27	27	27	27	27	27	27	27	27	27
MED	-9	-6	0	6	13	19	21	24	22	23	19	18	12	-1	-12	US -16	ES -25	-12	ES -24	-12	3	3	-1	-5
UD	1	2	5	9	16	22	25	28	26	26	25	23	21	16	10	13	-11	20	13	6	10	9	4	2
LD	-13	-12	-5	0	8	15	16	21	16	10	2	-5	-9	-14	ES -25	ES -26	ES -26	ES -25	ES -26	ES -25	-7	-11	-12	-12

C. Radio Propagation

c2. Radio Propagation Quality Figures at Hiraiso

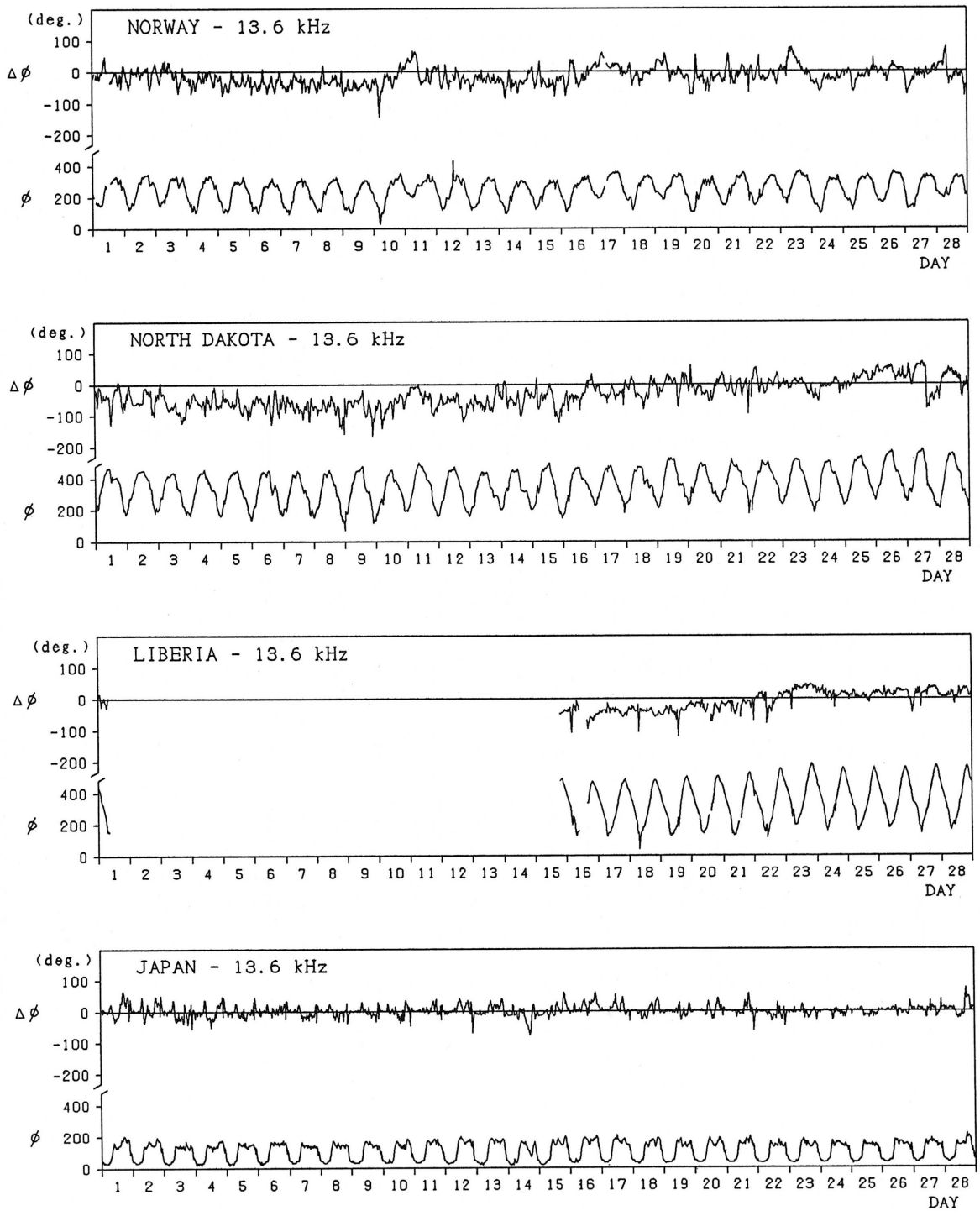
Hiraiso — Time in U.T

Feb. 1989	Whole Day Figure	W W V 00-06	W W V 06-12	W W V 12-18	W W V 18-24	W W V H 00-06	W W V H 06-12	W W V H 12-18	W W V H 18-24	Conditions 00-06	Conditions 06-12	Conditions 12-18	Conditions 18-24	Principal Geomagnetic Storms Start	Ene	Range
1	3+	4	3U	3U	S	4	3	3U	4	N	N	N	N			
2	3+	3U	3U	3U	S	4	3	3U	4	N	N	N	N			
3	4o	4	4U	4U	4U	4	4	4	4	N	N	N	N			
4	3o	3U	2U	3U	S	4	3	3U	4	N	N	N	N			
5	3+	2U	2U	3U	S	4	4	4	4	N	N	N	N			
6	3+	3U	3U	3U	4U	4	3	3U	4	N	N	N	N			
7	4-	3U	3U	4U	S	4	4	3U	4	N	N	N	N			
8	3+	3U	3U	3U	S	4	4	4	2U	N	N	N	N			
9	3-	C	3U	3U	S	4	2	3U	2U	N	N	N	N			
10	3+	3U	3U	3U	S	3	4	4	4	N	N	N	N	NONE		
11	4-	3U	3U	3U	S	4	4	5	4	N	N	N	N			
12	4o	4U	5U	4U	S	4	4	4U	4	N	N	N	N			
13	4-	4	4U	4U	S	3	4	4	3	N	N	N	N			
14	4o	3	5U	4U	S	4	4	4	4	N	N	N	N			
15	3+	4U	3U	3U	S	3	3	3U	4	N	N	N	N			
16	4o	4	4U	4	4U	4	4	4	4	N	N	N	N			
17	4+	5	5U	4U	5U	4	4	5	4	N	N	N	N			
18	4+	4	4U	5	5U	4	4	4	4	N	N	N	N			
19	4o	4	5U	C	C	4	3	C	C	N	N	N	N			
20	4+	4	5U	5	5U	4	4	5U	4	N	N	N	N			
21	4o	5	4U	4U	4U	4	4	4U	3	N	N	N	N			
22	4+	5	5U	5	5U	4	4	4	4	N	N	N	N			
23	4+	4	5U	5	5U	4	4	5	4	N	N	N	N			
24	4+	4	4U	5	5U	4	4	4	4	N	N	N	N			
25	4+	4	4U	5	5U	4	4	4	5	N	N	N	N			
26	5-	5	5U	5	5U	4	4	4	5	N	N	N	N			
27	4+	5	5U	4	5U	4	4	4	5	N	N	N	N			
28	4+	5	5U	4U	5U	4	4	4	4	N	N	N	N			

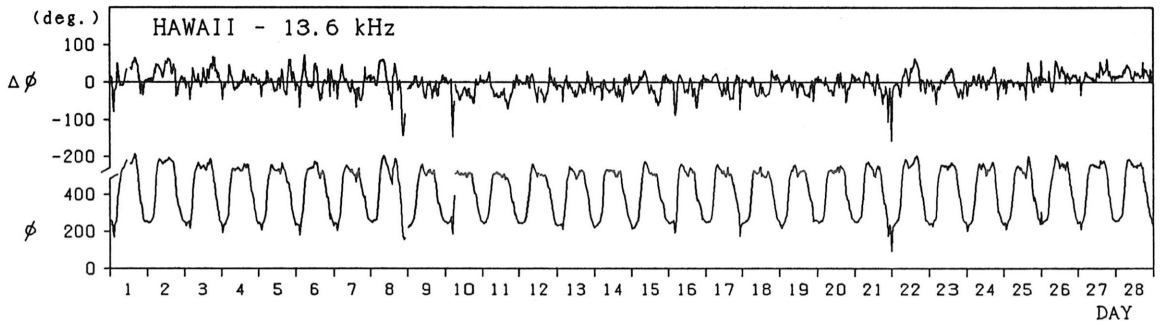
C. Radio Propagation

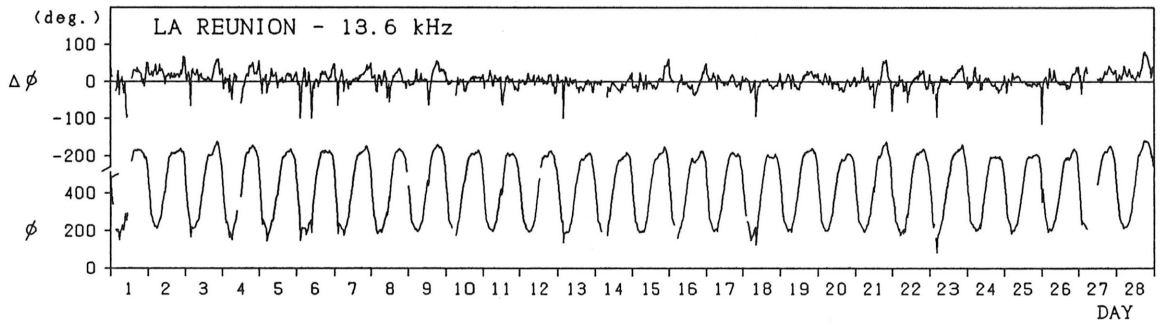
C3. Phase Variations in OMEGA Radio Waves at Inubo

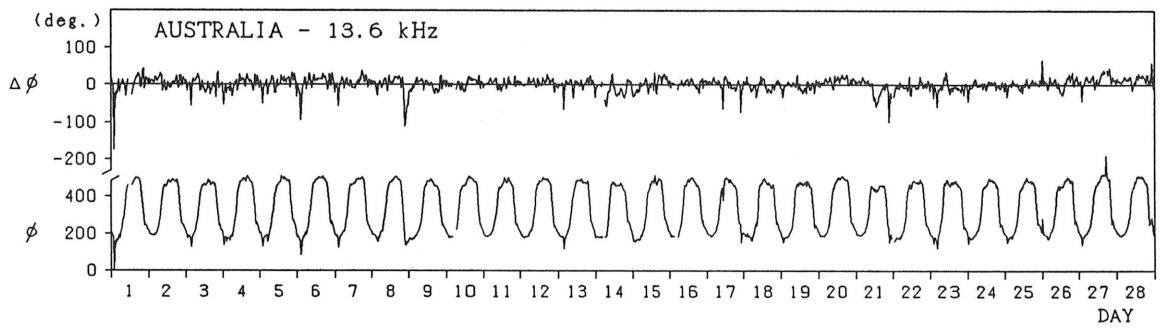
Inubo February 1989

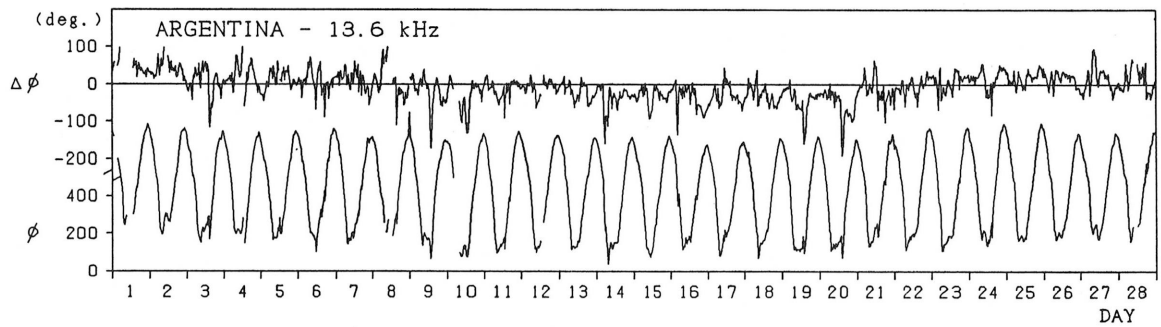


Inubo February 1989









Note: As for LIBERIA - 13.6 kHz, no record during February 01 - February 15, due to the maintenance of transmitter.

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

NONE

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso Time in U.T.

Feb. 1989	S W F									Corresepondence		
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
	CO	HA	1)	2)	3)							
1	x	x	21			0145	58	G	2-	x	x	
3			13		15	0238	82	G	1			
3			10		35	2349	311	G	2+			
4			10			0010	20	SL	1-		x	
5			10			0458	22	S	1-	x		
6	x		14			0213	32	S	1	x	x	
6			8			0522	38	SL	1-	x	x	
7		x	17			0208	28	SL	1+		x	
9	x	x	x	24		1258	31	S	2-	x		
10	x	40	18		x	0414	86	G	3+	x	x	
11				7		1203	37	SL	1-	x		
11				18		1857	77	SL	1+			
13			12			0320	23	SL	1	x	x	
14	x	x	18			0440	78	SL	1+	x	x	
14			6			0800	12	S	1-	x	x	
14			7			0830	30	SL	1-	x	x	
14			6			0703	19	SL	1-	x		
16	15	28	20	x	15	0342	58	SL	2-	x	x	
21	x	22				2308	110	G	2+	x	x	
23			10		x	0451	22	SL	1-	x		
25			10			0415	15	S	1-			
26			10			0325	21	SL	1-			
27	28	28	18		12	0134	18	SL	3-	x		

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Feb. 1989	S				P		A		
	Phase Advance (degrees)						Time (U.T)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1					6		0004	0032	0011
1		—		38*	—		0101	0149D	0124
1	—	—		128	—	—	0149E	0328	0210
1		—	10	8	5		0327	0343	0330
1		—		10			0347	0405D	0353
1		—	67		26		0457	0620	0515
1		—	10				0651	0716	0700
1		—	65				0737	0807D	0744
1		—	80	26			0807E	0900	0816
1		—	110				0943	1027D	1014
1		—	125				1027E	——	1038
1		—			13		2119	2132	2123
2		—		6			0207	0241	0217
2		—	6	6			0543	0609	0548
2		—	15*	10			0822	0857	0825
2		—	9				1002	1019	1004
2		—	22				1122	1151	1127
3		—		6			0033	0051D	0039
3		—		31	23*		0051E	0206	0105
3	27	—	103	79	57	20	0258	0432	0317
3		—	10	9			0447	0544	0500
3		—	30	12			0800	0922	0817
3		—	22*				1050	1139	1108
3		—		10*	13		2259	2337	2305
4		—		60	49	33	0009	0147	0025
4		—	23	26	15	16	0212	0256	0226
4		—	31	30	16		0300	0336	0306
4		—	50	40	22	11	0416	0514	0424
4		—	91	54	24		0525	0608D	0538
4		—	55	36			0608E	0748	0626
4		—	14	12			0801	0847	0817
4		—	250	67			0950	1336	1012
4		—			11		2205	2224	2207
4		—		17	13		2313	2354	2321
5	16	—	46	49	24		0127	0155D	0144
5	31	—	55	66	36		0155E	0310	0200
5		—	126	90	32		0449	0612D	0505
5		—	27	21			0612E	0714	0622
5		—	8	6			0733	0756	0739
5		—	40	23			0806	0914	0810
5		—	30				1052	1224	1108
5		—			31		2107	2201	2120
5		—			6		2245	2300	2248
5	15	—	17	51	44	33	2329	0023	2336
6		—		—	4		0027	0057	0042
6	15	—	23	—	12		0116	0141	0123
6		—	40	—	12	12	0146	0210	0152
6	38	—	132	—	78	34	0212E	0333D	0221
6	14	—	12	—	8		0333E	0352	0340
6	25	—	83	—	28	7	0533	0628D	0538
6		—	42	—			0628E	0730	0641
6		—	49	25			0805	0838D	0811
6		—	18				0838E	0906	0847
6		—	183	41			0916	1040	0931
6		—	24				1107	1155	1114

Inubo

Feb. 1989	S				P		A		
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
6		—			36		1916	1954	1924
6		—			23		2037	2110	2050
6		—			49		2120	2204	2128
6		—		6	5		2323	2333D	2326
6		—	11	31	27	22	2333E	2351D	2339
6		—		24	16	12	2351E	0020	2357
7		—		10	7		0029	0048	0032
7		—		11	8		0053	0112	0057
7		—	68	67	49	30	0132	0212D	0138
7	26	—	112	92	73	46	0210E	0304	0218
7		—	8				0406	0440	0416
7		—		6			0440	0506	0447
7		—	6				0511	0544	0525
7	11	—	38	26			0621	0650D	0625
7		—	24	14			0650E	0716	0653
7		—	9*	8			0741	0754D	0744
7		—	17	18			0754E	0840	0757
7		—	28				0917	0951	0928
7		—	17				1045	1143	1057
7		—			9		2238	2312	2248
8		—		5	3		0115	0136	0122
8		—	9	6	5		0256	0310	0300
8		—	53	47	27		0323	0444D	0346
8		—	28	27	26		0444E	0526	0446
8		—	6	9			0532	0603	0544
8		—	42	30			0604	0647D	0616
8		—	14*	9*			0647E	0735	0705
8		—		30			0816	0900	0818
8		—	53				0944	1047	0951
8		—	76				1100	1224	1115
9		—	33	40	14		0131	0229	0136
9		—	26	23	13		0235	0306	0240
9		—	11	11			0542	0628	0602
9		—	15	18			0801	0841	0809
9		—	85				1258	1421	1304
9		—			26		1927	2022	1933
10		—	12	9	8		0146	0230	0159
10	101	—	331	197	171	76	0406	0758	0440
10		—	17	6			0845	0917	0850
10		—	17				1036	1054	1042
10		—	15				1213	1316	1232
11				6	5		0056	0119	0102
11			10	6			0633	0718	0640
11		—	51				1137	1320	1219
11		15					1620	1650	1628
12			24	24	14	11	0204	0250	0215
12			8	10	12	15	0357	0423	0404
12					4		2205	2230	2211
12				—	8		2241	2322	2250
13				—	3		0151	0203	0154
13		28	94	—	40	20	0322	0500	0332
13		—	12	—			0902	0944	0912
13		—	9				1207	1246	1211
13				28	24		2332	0045	2339
14	18		10	8	8		0350	0427	0402
14	46	65	185	108	52	49	0439	0604D	0517
14	32	14	106	83		15	0604E	0628D	0608
14	40		106	94			0628E	0704D	0644
14	38	114*	129	116			0704E	0816	0717
15					16		0003	0119D	0034
15					12		0119E	0221	0137
15		15	45	34	22		0327	0421	0336
15			15	13			0425	0447	0431
15		13	6	6			0521	0552	0530
15			5	6			0600	0618	0603
15			17	13			0641	0739	0652
15		—	30	10			0850	0948	0858
16				9	6		0051	0111	0054
16		9	7	10	4		0308	0332	0313
16	45	64	140	126	86	49	0340	0425D	0400
16	44	88	201	132	102	61	0425E	0645	0431
16			24	10			0700	0748	0710
16			11				0835	0909	0839
16		48					1633	1804	1645
16						24	1915	2010	1928
16					12		2111	2133	2117
16	27				26		2151	2232	2159
17				7	5		0027	0045	0034
17			8				0520	0552	0523
17			28	13			0714	0805	0721

Inubo

Feb.	S				P		A		
1989	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
17	12	14	13	—	106	68	2213	2316	2225
18				—	7	13	0115	0206	0122
18			60	39			0347	0656	0502
18	18	95	110	—			0746	0954	0756
19				30	23	20	0018	0100D	0040
19	8			55	40	30	0100E	0246	0115
19			6				0436	0506	0442
19			12	6*			0640	0728	0659
19			6				0911	0937	0915
19		91					1350	1536	1408
19		10					1738	1758	1744
19					37	35	2111	2249	2127
20		7		20	15	11	0032	0134	0040
20				6	3		0307	0328	0311
20		147	7				1352	1540	1410
21				—	5		0026	0046	0029
21			4	—			0318	0342	0327
21			9	—			0519	0556	0525
21			6				0739	0808	0747
21			10				0820	0841	0824
21			18				0903	1006	0913
21		22	9				1030	1104	1035
21		162	53				1206	1351D	1225
21		37					1351E	1427	1406
21		19					1458	1525	1510
21					24	15	1817	1900	1827
21					23	19	2106	2126D	2114
21					99	102	2126E	2310D	2158
21	6	9		35	56	40	2310E	2346D	2336
21	69	60	68	153	151	164	2347E	0146	2359
22			9	10	11		0212	0237	0218
22			10	12	7		0247	0312	0252
22			15	16	8		0331	0423	0354
22		15	38*	30	19		0431	0613	0440
22			20	10			0649	0753	0657
22		99	81	36			0758	0900	0802
22		79	40				0943	1031D	0957
22		70	18				1031E	1142	1051
22		11					1244	1301D	1246
22		54					1301E	1348	1308
22		15					1403	1422	1408
22		24					1442	1507	1447
22		15					1600	1625	1609
22	8			11	10		2352	0041	0001
23	24	23	51	53	32	27	0157	0328	0209
23	22	20	63	47	17	13	0351	0431D	0413
23	41	55	114	67	20	18	0431E	0613D	0500
23	17		24	16			0613E	0725	0626
23			13	12			0757	0854	0804
23		12					1716	1754	1724
23					32		1943	2013	1951
23					12		2110	2125	2114
24	21	21	18	60	54	50	2357**	0111	0009
24				14	9	14	0134	0218D	0150
24				9			0218E	0251	0227
24			8	6	9		0510	0535	0514
24			6	6			0607	0636	0618
24		29	22				0805	0825D	0817
24		35	31				0825E	0909	0833
24		33	19				0917	0939	0925
24		24					1221	1253	1229
24		66					1421	1521	1433
24		13*					1602	1622	1614
24					54	24	2008	2059	2020
24					29	23	2106	2131	2111
24		16	19	27	41	26	2258	2346D	2303
24				18*	14*	19*	2348	0036	0002
25	21	19		51	33	29	0117	0232	0132
25	14	15	24	26	15		0336	0414D	0344
25		20	35	41	10		0414E	0512	0421
25			15	5			0747	0813	0752
25					23		2152	2236	2157
25	16	9	10	22	24*	29	2327	2349D	2333
25	—			14		29	2349E	0019	2358
26				8	4		0230	0248	0235
26		21	41	47	19	17	0324	0442	0342
26			11	10			0546	0637	0556
26			9				0805	0856	0808
26		7					1655	1713	1657
26	13	8		15	17	20	2310	2352	2325
27	44	47	85	—	85	64	0135	0330	0141
27		49	—	10			0849	0925	0859
27		25	—				1007	1040	1013
27					13	23	2113	2142	2120
28			6	8	4		0305	0337	0312
28			12	14	7		0410	0455	0419
28					48		1814	1908	1827
28					17		2140	2204	2146
28	13	12	17	23	28	33	2323	0024	2327

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