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IONOSPHERIC DATA IN JAPAN

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CONTENTS

COMMUNICATIONS RESEARCH LABORATORY
MINISTRY OF POSTS AND TELECOMMUNICATIONS
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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

AUG. 1989

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	65	72	71	73	63	63	78	80	88	91	89	84	87	86	82	76	78	78	78	86	90	86	78	66
2	75	76	78	71	64	67	78	92	84	83	79	78	74	78	78	78	72	78	78	86	85	85	77	75
3		76	76	78	80	94	108	108	102	89	91	66	88	87	87	A	82	79	90		90	89	89	80
4	76	80	78	73	79	84	114	110	118	104	90	90	88	94	86	84	A	A	82	90		90	87	88
5	87	79	77	84	85	86	85	77	74		A				A	A	66	68	49	85	A	72	72	74
6	72	80	64	64	64	66	90	102	102	96	88	80	A	A		73	A	74	74	80	84	85	78	89
7	76	73	66		64	68	84	88	89	84	73	63			59	65	77	A		53	52		80	63
8	70	67	64	66	62	78	84	86	91	91	81	84	83	83	83	81		76	83	68	68	87	85	84
9	71	67	70	71	70	80	90	100	108	104	93	90	85	88	86	80	79	84	86	89	84	87	86	81
10	75		72	70	75	71	83		A	91	84		81	83	82	A	78		76	79	67	83	84	84
11	75		62	62		64	61	59	66	A	72	78	73	A	80	A	93	84	75	66	66	A	72	85
12	64	72	59	48	52	63	66	76	71	64	75	62	43	68	74	A	67	A	76	54	66	75	68	70
13	64	64	66	66	58	62	68	A			52	65	64	A	71	74	71	72	76	66	66	64	63	63
14	62	66	66	63	66	84	90	90	88	89	B		82	87	86	83	86	74	75	89	82	89	76	62
15	66	55	84		51	51	59	A	A	B			B				A	A	60	A	86	59	50	A
16	51	54	55	50	44	62	66	80	77	73	B	B	B				A		75	83	79	81		60
17	59	58	N	62	60	66	82	88	92	84	B				80	81	77	75	84	86	85	80	65	71
18	65	63		45	38	39	A	51	51							A	63	76	68	65	70	64	74	62
19	51									59				76	74	69	73	78	76	74	66	71	66	61
20	60	50	55	52	52	62	87	108	103	98	98	90	81	74		81	77	80	79	A	89	90	82	64
21	54	65	62	54	58	64	71	82	84	77	75	77	68		72	72	79	79	53	66	81	92	N	79
22	65	61	53	44	45	51	62	68	76	72	A	81		74	74	75	80	79	72	71	66	N	64	66
23	61	64	62	62	66	74	85	90	97	95	98	97	91	94	91	90	94	86	84	82	71	85	77	67
24	64	64	64	52	54	58	71	77		66	64	65	A	84	82	83	82	80	67	69	74	82	73	72
25	64	N	62	62	60	68	104	66	97	97	A	88	88	89	93	87	87	101	90	94	88	73	62	68
26	67	66	62	63	65	63	62	75	63			68	A	A	81	81	78	84	77	83	79	66	58	62
27	69	58	60	58	54	63	76	89	112	106	104	103	N	95	88	81	86	99	104	90	73	62	58	58
28	61	57	60	50	56	53	64	71			93	82	92	86	84	79	82	78	86	87	84	70		65
29	64	65	60	57	56	60	73	88	87	72	81		88	92	95	90	87	87	79	66	67	72	64	66
30	67	59	56	61	54	57	84	100	94	91	90	95	86	88	77	84	82	89	88	90	86	67	63	63
31	66	C	63	58	52	58	62	64	104	96	90	91	84	90	81	78	88	83	90	89	88	66	64	64
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	26	28	28	29	30	29	27	25	24	21	22	19	20	25	23	26	25	30	28	29	28	28	30
MED	65	65	64	62	60	64	78	86	89	90	88	82	84	86	82	81	79	79	78	82	79	80	72	66
U Q	71	72	70	68	65	71	86	92	102	96	92	90	88	89	86	83	86	84	84	88	85	86	79	79
L Q	62	59	60	53	53	60	66	75	76	75	75	68	74	80	75	75	77	76	75	67	67	68	64	63

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT WAKKANAI

AUG. 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	G	G	30	37	40	54	60	55	G	G	G	G	G	G	G	40	49	60	55	29	32	28
2	25	G	36	28	G	33	45	37	65	64	G	60	G	G	G	G	48	60	45	30	G	32	39	59
3		G	G	G	G	35	44	59	G	58	G	47	G	G	G	74	67	144	40	88	58	55	G	46
4	35	44	44	29	G	35	50	53	58	40	59	G	G	G	75	91	127	108	63	59	47	33	34	G
5	32	G	G	28	G	40	72	60	69	52	94	91	95	60	94	104	58	60	74	91	92	128	60	40
6	32	33	27	61	G	32	40	57	58	57	G	61	86	128		46	79	60	69	58	88	92	60	104
7	33	42	60	71	31	50	64	54	76	G	48	62	66	76	96	96	57	108		94	90	110	58	44
8	44	56	48	26	44	34	G	55	62	61	65	58	70	G	G	59		46	42	46	72	36	36	26
9	G	G	G	G	27	G	40	43	58	54	60		58	G	62	72	59	61	53	57	68	68	92	59
10	59	52	34	28	G	G	G	72	112	69	46	G	G	G	60	126	59	60	44	58	37	32	G	G
11	G	25	40	29	29	36	44	70	63	70	72	70	70	91	G	103	71	56	70	70	71	68	68	128
12	64	72	26	34	57	57	46	62	G	63	G	56	G	67	G	72	61	118	54	90	44	52	43	G
13	G	34	27	27	28	34	54	107	70	55	G	G	96	90	52	80	60	G	G	65	46	91	37	34
14	G	70	45	G	36	40	46	62	70	53	B		G	G	G	G	G	75	41	27	25	32	G	33
15	36	43	95	69	91	43	44	58	63	B		G	B			G	62	61	125	164	144	95	49	60
16	69	29	36	31	24	40	G	46	G	G	B	B	B			65	119	164	60	36	59	G	26	37
17	G	27	G	G	G	G	46	47	55	60	B				G	G	G	73	59	115	34	38	G	G
18	28	24	26	33	33	60	51	55	58	G	48	G	G	49	G	78	64	58	66	58	32	44	G	G
19	G									G	G	56	G	58	G	G	40	73	54	31	56	27	G	29
20	37	G	G	G	G	G	G	G	64	58	G	59	G	63	141	84	G	68	66	96	132	143	G	G
21	G	G	G	G	G	G	41	47	58	54	59	G	G	G	58	68	62	66	60	72	71	60	34	G
22	30	34	G	G	G	G	G	48	53	69	72	67	64	56	G	G	G	36	34	43	37	31	36	30
23	50	34	G	G	G	G	40	46	52	G	G	G	59	G	G	G	G	G	30	34	G	G	G	G
24	30	37	42	37	32	G	G	G	60	54	69	G	71	76	90	G	47	42	G	28	40	44	70	70
25	32	38	35	34	G	G	G	G	63	60	90	G	59	G	64	63	98	89	68	92	41	44	69	60
26	67	60	G	G	58	71	60	45	G	69	105	60	82	104	G	G	G	G	G	G	G	33	38	37
27	G	G	32	28		G	G	G		G	65	89	G	G	G	90	51	63	83	108	39	38	60	34
28	28	30	30		40	G	G	43	68	74	58	G	G	G	62	G	G	G	G	G	G	62	66	44
29	59	44	44	51	37	G	50	53	69	60	59	G	G	G	G	G	60	63	55	40	33	38	31	G
30	32	34	34	32	36	40	45	42	G	G	G	G	G	G	G	G	G	G	G	28	28	G	G	G
31	G	G	G	G	29	37	45	G	47	53	G	G	G	G	G	G	G	41	34	G	G	G	32	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	29	30	30	30	29	30	27	27	28	28	28	31	30	31	30	31	31	31	31	31
MED	31	34	28	28	28	34	44	50	60	55	48	G	G	G	G	59	58	60	54	58	44	38	36	33
U Q	37	43	40	33	36	40	46	58	66	61	65	60	68	65	62	80	62	73	66	90	71	68	60	46
L Q	G	G	G	G	G	G	G	43	52	40	G	G	G	G	G	G	G	41	34	31	32	32	G	G

HOURLY VALUES OF FMIN AT WAKKANAI

AUG. 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	15	15	15	16	15	21	23	29	35	37	52	55	58	41	48	49	26	34	18	16	17	15	17	18
2	15	17	16	17	16	17	22	38	34	36	53	40	54	54	55	38	33	22	18	20	15	15	18	16
3		15	17	16	16	18	26	34	45	51	56	41	63	62	51	39	34	41	18	16	17	17	17	17
4	14	15	16	14	16	18	20	23	36	41	38	62	43	42	40	38	35	28	18	18	16	17	18	15
5	18	16	15	17	15	17	20	24	27	38	40	39	40	37	41	43	24	20	18	15	15	17	16	16
6	16	16	15	15	16	17	20	27	28	39	53	40	45	40		40	35	33	17	16	18	16	16	18
7	17	16	17	16	17	17	21	22	38	64	40	43	41	42	40	44	36	27	18	17	18	17	17	15
8	16	16	17	15	16	18	40	32	35	39	40	40	40	100	42	39		29	21	18	16	16	17	15
9	16	16	17	16	17	17	21	24	36	38	40	54	40	50	43	35	36	20	20	17	17	16	16	15
10	17	17	17	17	20	23	20	24	28	39	43			80	39	30	24	20	20	17	17	17	17	17
11	17	17	16	17	15	20	20	22	38	39	44	43	43	40	40	38	22	22	20	16	17	17	16	17
12	15	15	18	16	16	18	26	29	63	40	44	38	44	43	46	39	35	23	18	18	16	16	16	16
13	16	16	17	15	20	20	23	29	36	39		48	40	38	45	30	23	30	26	17	17	17	16	20
14	17	16	15	15	17	17	18	29	26	26	B		50	49		32	36	18	18	18	18	16	17	15
15	15	16	16	17	16	17	26	30	32	B		100	B				38	21	20	18	18	15	16	16
16	17	15	17	15	16	18	32	39	57	58	B	B	B			53	52	30	20	17	17	16	16	17
17	17	16	16	15	16	17	22	24	38	39	B				58	42	38	22	18	15	17	17	15	17
18	18	17	16	15	14	20	26	32	37		70					40	33	27	17	15	16	20	15	15
19	15									39	43	40		45	50	38	30	24	17	16	17	15	16	15
20	16	15	15	16	15	22	27	30	35	39	54	44	52	52	42	36	27	20	17	23	16	15	15	16
21	15	15	15	16	15	16	26	28	40	39	39	60			45	34	26	21	17	16	16	17	15	20
22	16	15	14	16	15	21	28	30	36	42	40	38	40	36	53	48	34	27	17	16	15	16	16	16
23	15	14	15	17	15	16	22	27	34	52	48	52	41	52	50	38	35	34	21	18	16	18	15	18
24	17	16	15	16	14	16	27	28	39	35	46	54	47	39	47	42	23	22	17	17	16	15	14	15
25	17	15	15	15	16	20	28	28	34	36	39	50	45	53	41	30	42	23	20	17	17	17	16	15
26	16	18	15	16	16	17	23	23	32	36	49	39	49	33	50	43	33	32	22	17	16	17	18	16
27	18	15	17	18	15	20	27	27	28	45	33	40	50	52	48	35	26	18	17	16	16	16	17	17
28	17	16	15	18	17	17	27	32	43	33	38	35	49	50	39	39	29	28	24	16	15	15	18	18
29	17	16	17	16	17	20	24	27	33	35	47	55	52	48	42	27	26	24	18	17	16	17	15	16
30	16	17	17	16	16	17	17	26	45	45	50	50	52	50	50	42	40	18	23	15	18	16	18	17
31	16	16	16	18	15	18	27	29	29	36	43	54	47	50	39	38	33	21	17	16	17	17	16	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	29	26	26	24	26	26	30	30	31	31	31	31	31	31	31
MED	16	16	16	16	16	18	24	28	36	39	44	44	46	48	45	38	33	23	18	17	17	16	16	16
U Q	17	16	17	17	16	20	27	30	38	41	50	54	51	52	50	42	36	29	20	18	17	17	17	17
L Q	15	15	15	15	15	17	21	24	32	36	40	40	41	40	41	35	26	21	17	16	16	16	16	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT AKITA

AUG. 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	54	79	80	78	63	67	87	99	96	97	130	103	109	100	96	94	85	83	91	91	84	84	A	81
2	83	83	82	72	68	76	86	103	107	95	91	84	85	85	87	88	84	80		86	82	86	80	79
3	77	74	78	76	79	86	108	108	97	90	87		94	86	88	84	83	95	98	91	90	84	79	84
4	85	83	81	79	77	84	108	116	114	100	103	104	108	96		93	94	88	90	97	95	99	90	67
5	90	90	85	85	87	89	90	91		A	A	A	A			118	73	69			69	N		79
6	72		65	66	57	69	88	108	102	96	84		85	86	82	86	80	80	A	85	84	85		83
7	78	75		74	66	70	93	106	112	89	90		84	83	86	89	86	88	84	78	88	83	83	86
8	84	77	76	66	64	76	85	94	102	95	85	85	A	A		A	88	83		80		A	87	84
9	78	74	72	70	74	82	84	111	111	102	96	89	90	A	93	91	87	90	87	86	90	90	84	79
10	83	C	C	C	C	C	C	C	C	C	C	C	C	C	91	88	86	81	77	85	67	77	87	88
11	84	66	67	66	63	62		A		85		A	78	A	A	85	84	77	83	76	A	A	A	A
12	78		68	60	55			78	A	130	A	A	A	C	C	A	A	A	A	A	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C											
15																								
16																								
17																								
18											C	C												
19																								
20																								
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26																								
27																								
28																								
29																								
30																86	90	94	97	90	83	79	66	66
31	79	66	64	63	62	66	82	88	107	111	112	107	103	104	90	90	92	91	99	93	66	66	74	54
	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	10	11	12	12	11	10	11		11						12	13	13		12	11	10		12
MED	79	76	76	71	65	76	88	103		96						88	86	83		86	84	84		80
U Q	84	83	81	77	75	84	93	108		102						92	89	90		91	90	86		84
L Q	77	74	67	66	62	67	85	91		90						86	83	80		82	69	79		73

HOURLY VALUES OF FES AT AKITA

AUG. 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	33	30	30	31	29	G	G	G	53	77	73	74	85	84	78	80	62	38	39	31	32	43	54	36
2	34	24	26	24	G	21	52	54	50	51	54	74	69	64	55	55	68	74	72	48	80	55	34	G
3	G	G	G	G	30	G	37	43	43	39	G	G	58	42	48	60	79	58	80	84	44	29	37	48
4	33	43	32	G	G	32	44	61	58	68	69	55	96	52	59	58	49	85	70	107	55	34	28	34
5	40	G	G	G	G	32	56	91	84	118	170	160		67	56	113	96	55	72	57	54	176	72	124
6	91	65	36	30	50	30	43	50	92	55	84	83	57	G	40	37	54	69	78	38	36	72	67	78
7	69	90	60	56	31	30	39	69	74	79	74	101	77	59	58	53	33	36	28	97	114	116	112	107
8	72	70	60	91	49	33	53	59	58	71	61	69	92	108		126	58	55	58	73	116	115	59	48
9	31	28	32	41	32	G	G	62	68	85	104	78	64	102	82	G	128	54	70	28	70	52	33	30
10	65	C	C	C	C	C	C	C	C	C	C	C	C	C	G	59	G	37	38	59	117	69	58	G
11	G	28	27	49	73	37	G	90	103	75	132	132	158	110	71	56	G	G	G	36	36	65	102	82
12	40	28	57	27	28	32	55	68	106	120	182	140	130	C	C	76	109	119	98	127	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C											
15																								
16																								
17																								
18											C	C												
19																								
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28																								
29																								
30																52	G	69	32	50	34	G	G	31
31	G	24	28	G	G	27	38	49	53	51	G	G	53	49	G	49	G	G	31	G	29	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	12	12	12	12	12	12	12	12	12	12	12	11	11	11	14	14	14	14	14	13	13	13	13
MED	34	28	31	28	30	30	41	60	63	73	74	76	77	64	56	57	56	55	64	54	54	55	54	36
U Q	67	54	46	45	40	32	52	68	88	82	118	116	96	102	71	76	79	69	72	84	97	93	69	80
L Q	16	24	26	G	G	11	19	49	53	53	57	62	58	49	40	52	G	37	32	36	35	31	30	15

HOURLY VALUES OF FMIN AT AKITA

AUG. 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	16	15	15	15	16	23	18	21	21	22	34	36	35	34	32	26	24	20	17	16	16	16	17	15
2	16	15	15	15	15	21	16	18	23	23	23	28	36	28	26	33	21	20	16	16	16	16	16	16
3	15	15	15	16	15	21	16	17	20	23	50	62	33	27	22	22	20	21	18	16	16	16	16	16
4	16	15	15	15	18	16	16	17	21	22	35	37	34	33	27	22	22	17	16	15	16	16	16	16
5	15	16	16	16	15	17	17	18	26	26	26	33	36	35	24	36	20	17	15	18	15	16	16	16
6	16	16	16	16	16	16	17	20	22	24	36	24	40		34	23	21	21	17	15	16	16	16	16
7	16	15	15	16	16	16	16	16	21	46	38	27	30	30	27	39	24	21	16	18	16	15	16	16
8	16	15	15	15	15	16	34	21	22	39	26	28	35	28		36	22	21	16	17	16	17	18	17
9	16	15	15	15	15	15	26	18	20	24	23	35	43	39	35	26	21	20	17	16	16	16	16	16
10	16	C	C	C	C	C	C	C	C	C	C	C	C	C	33	23	22	20	17	17	16	15	16	16
11	17	16	15	15	15	18	17	21	26	38	45	50	48	45	49	49	50	45	49	16	17	16	18	16
12	17	15	15	16	15	16	20	26	62	49	49	49	53	C	C	54	50	50	49	41	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C											
15																								
16																								
17																								
18											C	C												
19																								
20																								
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26																								
27																								
28																								
29																								
30																26	21	21	17	16	15	16	17	16
31	18	15	15	15	15	18	16	16	21	26	38	36	27	28	26	22	20	17	17	17	15	18	17	21
	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	12	12	12	12	12	12	12	12	12	12	12	12	10	11	14	14	14	14	14	13	13	13	13
MED	16	15	15	15	15	16	17	18	22	25	36	36	36	32	27	26	22	20	17	16	16	16	16	16
U Q	16	15	15	16	16	19	19	21	24	38	41	43	41	35	34	36	24	21	17	17	16	16	17	16
L Q	16	15	15	15	15	16	16	17	21	23	26	28	33	28	26	23	21	20	16	16	15	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

AUG. 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	86	86	80	71	58	63	86		97	100	105	106	A	113	110		99	98	96	98	83		87	
2	95	90	84	76	72	74				101	96	87	90	97	97	96	95		92	98	84	75	85	78
3	78	77	76	77	74		106	106	88	83	90	96	101	90	90	87	91	105	109	105	86	85	84	81
4	86	90	85	82	81	90	107	117	108	104	108	113	85	106	110	108	104	100		100	95	98	102	104
5	102	104	85	91	100	98	95			79	A	77	79	71	76	76	77	77	76	71		70	78	78
6	77	70	63	60	60	72	95	102	90	87	85	74	86	87	90	90	86	84	96	96	87	85	87	87
7	86		91	70	64	69	98	114	116	A	88	96		94	97	100	94	94	94	96	86	79	84	88
8	88	84	79	76	64	75	89	106	102	92	A	89	94	101	86	86	92	86	93	89	90	91		86
9	89	80	76	74	77				116	A	109	102	98	101	105	98	97	90	119	84	98	98	84	87
10	92	85	84	78	74	76	88	99	97	86	84	91	98	87	95		90	87	84		82			90
11	73	72	72	83	71	63	69	80	86	100	98	105		95	92	98	92	89	90	81	71	72	N	81
12	82	80	99	89	60	61	86	88	85	87	91	95	A		82	86	94	91		80	82	83	77	82
13	67	68	100	99	69	63	72	83	76	75	85		89	89	96	96		102	97	82	A	99	77	80
14	75	80	74	66	70	78	85	90	88	A	B		A	105	104	97	100	91	84	86	91			
15		70	70	79	79	55	59	86		B	A		B				76	63	A	94	89	52		89
16	A	A	A	86	94	99	91	88	82	92	B	B	B	91	81	90	86	92	91	82	80	93	82	72
17										97	B		115	107			85				A	81	80	92
18	81	95	99	58	56	63	68		57	A		72		74	76	A	A	82	86	89	73	68	78	
19	66	73	73		63	68		84	A	71	76		77	84	96	91		91	96	92	74	74	74	68
20	82	62	70	73	58	81	90	107	102		104	95	90	93	91	87	86	95		104	98	82	71	69
21	58	70		92	70	72			102		105	100	99	96		95	A	86				89		
22	82	78	76	67		60	75		73	81	89	A	A	86	85	88	87	87	99	79	81	71	76	73
23	70	73	82	67	60	76	96	112	104			98	100	104	111		97	104	99	98	88	80	85	73
24		81		58	65	77	75	90		80		89	94	97	103	102		93		86	82	72		74
25	A	79	81	69	57	72	83	98	88	88	94	101	106	108	118	118	109	111	114	107	85	85	81	
26	74	70	64	67	59		A	117	104				102	106	104	106	104	107	108	97	83	79		56
27	82	81		65	57	59	83	93	103	105	72	109	105	108	108	100	105	118	117	96	65		73	74
28	82		77	73	55		74	92	90	95	100	112	113	113	106	98	88	96	103	97	80	81	82	80
29	72	77	67	74	54	62	83	96	96	80	91	118		120	112	118	114	105	84	70	66	70	92	70
30	82	65	64		73	61		106	92	87	99		115	112	99	97	93		107	109	83			80
31	80	99	62	72	89	62	77		106	111	111	107	115	110	108	103	95	98	115	95	84	78	80	77
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	26	28	29	26	24	22	25	22	21	22	21	29	28	25	26	28	24	28	27	26	22	26
MED	82	79	76	74	65	70	86	97	96	88	94	97	98	97	97	97	94	92	96	94	83	80	82	80
U Q	86	85	84	80	74	76	93	106	103	100	104	106	105	107	107	101	99	101	107	98	88	85	85	87
L Q	74	70	70	67	58	62	75	88	87	81	86	89	89	89	90	89	87	87	90	83	80	72	77	73

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

AUG. 1989

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	51	43	36	31	31	38	30		47	57	60	66	62	55	60		43	42	58	28	24		50	
2	38	33	30	26	23	24				52	75	60	51	46	54	55	70	68	61	97	60	59	58	40
3	28	26	G	G	G		60	72	61	53	61	102	43	46	42	49		44	59	110	79	70	59	59
4	40	29	28	35	26	35	42	49	68	70	61	68	74	78	53	89	73	65		59	60	60	33	32
5	57	34	G	34	25	34	58	176		92	185	58		54	47	47		52	52	33	42	58	65	88
6	92	60		36	34	30	44	67	43	52	55			59			52	58	108	86	43	56	39	60
7	59	G	30	24	29	G		44	74	132		50		63	55	58	G	49	37	40	30	81	93	92
8	70	70	68	75	46	34	46	70	61	86	90	62	77	60	52		90	42	36	49	42	48	117	92
9	92	111	93	51	60				59	113	145	68	76	69	94		76	72	82	64	55	58	58	34
10	32	30	26		25		34	42	46	51	56		55	74	58		56		34		31		90	88
11		50	35	30	29	33	34	58	78	96	76	64	88		69	59		G	32	69	59	50	73	91
12		56	46	33	33	31	34	56		73	84	90	135	143	75	70	73	65	96	136	97	94	41	66
13	60	49			47	37	34		47	52	56	G	104	84	60	77	55	38	32	36	48	49	34	34
14	28	28			28	34	G	57	58	97	B		54	58	56	50		54	86	82	56	108	111	106
15		44	33	34	32	29	41	57	58	B	49		B		G		69	74	71	44	34	28		58
16	70	108	134			50		58	76	53	B	B	B	G	G	G	44	62	80	59	36	94	92	50
17								46		52	B	G	G	G			60			59	127		163	106
18		103	49	52	32	G		51	54		84				70	87	91	80	81	81	81	44		
19			49					72	85	71	62			80	52	G		81	50	45	81	92	91	81
20				59					49	G	91	123	57	64	57	51	51	50						93
21	33			27					56		53	52		63		65	68	79	102	172		170	159	
22			52					G	81	59	82	114	142	117	50	49	41	81	47	81	81	81	79	81
23							38	46	54					51	82	G	42	43	32	39	37	27	49	28
24				59	32	43	51			73	G	50	50		G		44				34		59	
25	113	80		56	45		33	54	50	58	82	63	57	52	G	G	49	62	54	44	49	97	57	
26	30	32	33	47	61		35	129	90	91		G	59	50	62	84	74	G	G	48	38	40		
27	G	G	26	42	31		33	57	44	G				53		50	51		40	30	53	26	31	
28	26			34	40		41		58	49	63	58	G	G	G	G	53	51	34	33	23	G	36	26
29	G	G	G		34	50	G	50	57	53		62	60		G	G	44	48		59	54		68	53
30	37	29	29		37	59		53		46	77		63	G	G		51		32	38	58			26
31		24	26	47		G	36	G	46	53	51	G	52	G	47	75	54	60	54	97	40	33	G	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	23	21	21	23	18	20	23	25	27	23	21	21	26	27	22	26	26	26	28	29	24	26	23
MED	39	34	33	35	32	34	36	56	58	57	63	62	59	56	53	50	54	56	53	59	49	58	59	60
U Q	65	60	49	51	40	38	43	67	71	86	84	68	76	69	60	70	70	68	80	81	60	86	91	91
L Q	29	28	26	30	28	29	33	46	48	52	56	50	51	46	G	G	44	44	34	39	36	42	41	34

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

AUG. 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	14	15	14	15	15	16	18		23	24	35	36	40	32	34		24	18	16	15	14		15	
2	15	14	14	14	15	15				27	36	32	35	35	32	24	21	17	16	14	14	15	15	15
3	15	15	14	14	14		15	15	21	23	29	38	29	33	22	14	18	17	16	14	14	14	14	15
4	14	14	14	14	14	15	15	17	22	23	32	36	32	32	27	22	21	16	14	15	15	14	15	15
5	14	16	20	15	16	15	16	21		29	32	28	34	32	23	40	22	17	15	14	14	15	15	15
6	15	14	14	14	14	15	16	17	24	30	39		32	34	29	23	18	21	16	14	14	15	14	15
7	15		15	14	14	20	15	16	21	40	33	33	14	34	26	26	24	18	16	15	15	15	15	14
8	15	14	14	15	14	15	33	18	23	26	32	32	32	40	43	32	18	14	14	14	15	15	15	15
9	14	15	15	14	14				18	29	29	39	34	34	33	18	21	28	15	15	15	15	14	15
10	15	15	14	14	14	17	16	16	18	22	29		38	33	23		18	15	16		15		15	15
11	N	16	14	14	14	14	16	16	21	22	27	38	32	28	23	27	21	16	16	15	14	14	14	14
12	15	14	14	14	14	14	14	15	48	21	28	33	33	35	14	27	20	23	15	15	14	14	15	15
13	15	15	14	14	14	15	16	17	22	28	38	14	32	29	29	26	14	17	17	14	27	15	15	14
14	14	14	14	14	15	16	17	20	38	38	B		45	40	34	24	20	17	16	14	15	15	15	15
15		14	14	14	14	14	15	18	20	B	43		B				24	16	16	14	14	14		15
16	16	15	14	14	14	14	24	32	24	34	B	B	B			62	55	27	18	15	14	14	15	15
17								35		29	B		72	N			34			14	15	15	14	15
18	15	14	14	14	14	17	17	18	20	35	34			30	40	40	20	16	18	14	15	15	15	
19	14	14	14	14	15	14		20	26	38	40		42	42	28	18		15	15	14	16	15	15	15
20	15	14	14	15	15	17	17	18	20	14	24	36	42	32	26	20	18	16		14	15	15	14	15
21	15	14		14	15	16		14	21		26	34	32	34		22	20	21	15			15	14	
22	15	14	14	14		14	16		22	24	23	33	34	33	28	21	17	15	16	14	14	15	15	15
23	14	15	15	14	15	17	16	17	18			29	33	30	29	15	16	17	14	15	15	15	14	15
24		15	14	14	14	17	16	16	22	24	14	29	35	32	23	20	17	16		15	14	15	14	14
25	14	14	14	14	15	17	20	18	33	36	27	32	30	34	23	21	20	15	15	15	14	14	15	14
26	15	15	14	14	14		17	16	17	15	26	14	32	38	20	20	17		14	15	15	14		15
27	15	14	14	14	14	14	15	15	18	23	32	26	14	24	22	20	17	14	20	14	15	14	15	15
28	15	14	14	14	14		16	16	18	24	30	30		31	28	20	14	17	15	15	15	16	15	16
29	15	15	15	14	15	15	18	17	30	24	50	43	42	56	28	53	18	16	14	16	15	16	14	15
30	15	16	15		15	15		17	14	46	32	14	33	27	48	22	17		16	15	15		16	15
31	16	14	15	15	15	15	16	14	21	24	33	35	28	28	24	26	18	16	15	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	29	29	29	26	25	27	28	28	27	23	27	28	27	27	30	28	28	29	30	28	29	28
MED	15	14	14	14	14	15	16	17	21	25	32	33	33	33	28	22	19	16	16	15	15	15	15	15
U Q	15	15	14	14	15	17	17	18	23	32	35	36	38	34	32	27	21	17	16	15	15	15	15	15
L Q	14	14	14	14	14	14	15	16	19	23	27	29	32	30	23	20	17	16	15	14	14	14	14	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

AUG. 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	85	85	87	82	79	74	85	90	87	90	91	100	111	122	122	124	127	116	114	109	88	88	104	
2	111	90	91	86	85	83	86	111	111	94	87	91	103	104	106	105	100		111	111	83	79	84	86
3		86	86	86	81	81	84	109	86	81	84	94	95	104	96	92	101	110	118	127	86	A	87	85
4	90	88	88	84	75	81	87	111	110	94	101	110	112		N	120	119	121	123	111	111	88	89	87
5	88	87	80	76	86	86	87	88	88	86	90	99	95	91	90	91	89		87	80	79	76	86	82
6	A	80	78	68	58	66	80	87	86	91	91	84	87	90	88	92	92	93	97	90	90	90	84	86
7	87	84	86	79	67	61	83	86	89	A	85	87	90	98	104	N	103	109	116	108	87	86	81	82
8	84	A	86	80	74	77	85	88		90	91			107	104	103	107	110	108	109	98	90	92	82
9	85	86	86	87	82	77	81	105	108	95	N	94	100	A	103	108	106	103	102	100	88	87	86	84
10	83	85	90	84	84	77	85	100	104	82	91	96	105	93	105	105	103	103	88	96	84	64	86	86
11	88	83	66	83	80	69	72	80	87	102	102	N	108	105	N	108	102	99	103	90			83	78
12	86	84	85	68	62	61	74	80	90	91	93	107	107	90	95	A	A	A	A	A	A	74	87	86
13	86	87	85	74	65	66	78	88	85	117	96	102	108	98	106	110	110	112	119	112	88	109	86	109
14	86	87	86	79	68	64	77	86	89	85	B	91	108	108	108	112	137	106	85	91	90	80	84	A
15	A		78	80	74	62	64	64	N	B			B			80	92	74	78	80	68	A	54	A
16	55	55	62	58	51	A	66	78	A	84	B	B	B		86	90	98	106	106	90	78	64	68	A
17		N	79	75	66		86	104	97	91	B		118	125	114	102	108	111	113	109	88	A	84	A
18	76	A	65	A	58	A	66	A	A	A	A	80	88	90	86	87	84	85	103	86	74	54	78	81
19	76	66	66	67	66	63	81	92	97	88	85	88	89	97	106	108	110	113	114	107	81	65	63	66
20	77	78	78	66	66	66	84	88	96	102	93	96	94	95	96	98	99	102	107	111	91	82	A	74
21	66	A	84	49	74	80	83	89	102	108	106	106	118	110	117	117	115	116	123	126	110	88	86	90
22	86	88	86	77	59	66	74	82	71	119	136	79	89	94	96	102	97	98	93	91	84	74	76	69
23	76	A	78		66	63	83	101	88	90	82	99	112	109	123	118	115	114	116	121	85	A	87	86
24	85	85	84	68	N	65	66	88	112	75	86	95	107	120	113	114	109	104	108	114	74	62	A	83
25	80	83	74	68	66	72	84	88	97	97	93	94	108	N	116	124	139	142	138	134	88	108	86	112
26	85	86	111	75	70	62	73	90	92	106	120	113	108	117	121	113	110	106	122	111	88	84	87	84
27	86	86	84	72	62	62	67	88	106	90	103	109	113	124	123	121	123	128	129	113	87	89	84	86
28	86	84	80	79	A	63	68	88	104	80	88	126	126	129	123	121	116	110	116	111	89	83	83	87
29	86	84	81	87	52	63	71	86	88	81	87	122	129	137	148	142	141	121	108	86	81	73	82	A
30		80	77	72	66	51	67	90	82	93	108	127	126	81	123	117	111	110	112	110	82		79	
31	82	80	67	68	66	53	64	96	105	102	102	105	118	128	130	118	108	108	121	86	90	86		84
	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	31	29	29	28	31	30	27	28	25	26	28	26	28	29	30	28	30	30	29	25	28	24
MED	85	85	84	76	66	66	80	88	92	91	91	98	108	104	106	108	108	110	112	109	87	83	84	84
U Q	86	86	86	82	77	77	84	96	104	99	102	107	112	120	121	118	115	113	118	111	89	88	86	86
L Q	80	81	78	68	63	62	68	86	87	85	87	91	95	94	96	100	100	103	103	90	81	73	81	82

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

AUG. 1989

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	58	43	27	G	32	32	34	48	50	49	G	52	G	77	88	70	63	G	G	58	44	32	28	48
2	38	28	30	G	G	G	30	39	48	54	51	G	58	57	72	65	57		58		46	32	38	40
3	35	32	G	G	42	G	32	44	62	51	58	66	58	G	40	57	56	66	54	151	33	42	29	92
4	58	56	27	G	30	33	34	45	49	56	36	60	54		G	G	G	G	63	71	25	58		30
5	41	34	G	32	G	G	33	48	50	G	G	G	G	60	60	63	64	49	G	G	28	G	G	
6	91	72	71	37	45	91	65	59	71	66	64	63	55	G	G	54	67	42	35	65	73	44	92	68
7	46	54	27	35	28	G	43	41	54	82	59	58	G	61	68	72	81	87	56	47	43	67	66	58
8	89		92	148	92	70	40	45		76	57	127	125	70	95	65	65	47	38	31	71	56	46	40
9	45	58	25	G	G	G	G	42	56	69	144	110	75	95	91	G	53	G	G	G	28	26	G	58
10	52	35	32	G	G	31	30	36	42	53	G	58	52	60	62	48	G	G	G	31	29	38	38	72
11	72	G	28	26	G	G	G	G	44	48	63	66	G	60	64	58	67	57	47	60	68	72	43	33
12	30	39	30	31	G	G	G	42	G	50	68	74	60	68	68	114	105	92	95	132	128	69	69	41
13	48	41	35	26	28	30	40	44	54	106	68	60	90	62	90	94	64	55	75	44	G	G	28	40
14	G	G	38	25	32	G	G	G	G	G	B	67	65	74	78	66	G	49	73	61	58	48	79	145
15	92	84	G	26	G	G	G	38	49	B		G	B			66	G	54	41	36	36	40	32	48
16	39	46	37	28	36	69		45	89	78	B	B	B		G	G	G	G	60	46	G	G	58	91
17	70	32	32	37	42	39	52	80	77	78	B		G	122	101	G	75	65	72	64	94	77	65	91
18	70	91	90	57	29	127	43	93	150	92	96	62	60	61	G	54	65	45	86	55	58	37	58	33
19	35	G	G	G	G	G	G	42	58	78	56	G	62	60	G	G	G	G	39	29	G	G	91	G
20	28	34	37	40	43	32	G	36	52	45	G	G	G	G	G	G	G	72	76	37	G	41	69	49
21	91	79	130	69	49	59	64	37	64	70	94	74	73	88	59	59	G	G	43	48	40	G	58	48
22	G	32	45	49	55	32	G	G	46	94	128	94	62	61	G	70	54	47	38	37	41	48	33	49
23	38	38	37	40	35	35	40	46	45	51	59	63	66	97	90	58	51	60	76	77	91	90	90	88
24	59	26	G	31	38	G	32	40	54	55	G	G	G	G	G	G	G	G	G	31	32	24	58	30
25	41	37	27	G	24	37	G	43	54	61	65	51	50	G	G	G	G	G	36	G	32	34	29	G
26	G	35	41	35	32	G	G	G	43	48	49	79	52	64	53	G	G	G	34	26	G	G	G	G
27	G	G	G	28	26	24	31	36	57	G	G	60	G	G	G	G	G	44	39	G	26	G		G
28	48	G	G	32	59	44	38	39	56	63	78	G	53	G	G	G	G	G	32	34	G	28	G	G
29	G	G	G	G	G	G	G	37	42	G	G	G	G	G	G	G	47	60	34	32	G	G	G	59
30	48	32	G	G	28	40	G	38	50	54	G	G	G	72	54	G	G	47	58	38	32	57	58	32
31	30	27	G	G	G	G	G	42	48	52	G	55	G	50	48	G	G	G	32	94	65	37	32	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	30	31	30	30	27	29	29	28	30	31	31	30	31	30	31	31	29	30
MED	45	34	28	28	29	30	30	42	51	54	57	60	53	60	54	54	47	46	41	41	33	37	43	44
U Q	59	46	37	37	42	39	40	45	57	76	68	66	62	71	72	65	64	57	63	61	58	56	65	59
L Q	30	27	G	G	G	G	G	37	46	49	G	G	G	G	G	G	G	G	34	31	25	G	28	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

AUG. 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	17	17	22	27	44	44	64	40	39	36	26	23	17	16	15	16	15	16
2	15	16	15	15	15	17	16	23	21	26	28	52	29	45	30	29	24		18	15	15	15	15	15
3	15	15	16	16	15	16	16	18	21	26	34	28	42	56	33	27	24	32	17	17	15	15	16	15
4	15	16	17	15	15	16	16	16	21	23	26	41	46		58	29	23	21	16	15	18	15	15	16
5	15	15	15	15	16	15	17	20	23	24	30	54	51	34	28	44	28	22	20	16	18	15	15	15
6	15	15	15	16	15	15	15	16	20	22	40	33	36	47		29	22	40	16	15	21	15	15	15
7	15	16	15	15	17	15	16	16	21	46	43	42	68	46	34	33	29	24	21	16	15	15	15	15
8	16	15	15	16	15	15	20	17		22	39	32	29	27	30	43	22	21	16	15	15	15	15	16
9	15	15	21	17	15	16	15	16	18	24	23	32	41	44	34	27	22	21	20	20	15	16	15	16
10	15	15	16	15	16	15	16	16	21	22	21	42	33	39	27	23	22	20	18	15	15	15	15	15
11	15	15	16	15	15	15	23	17	20	23	29	44	52	33	30	41	28	24	17	16	16	15	15	15
12	16	15	15	15	16	15	24	17	49	24	39	41	45	46	45	42	22	39	17	16	16	15	15	16
13	15	15	16	15	15	15	16	16	22	26	38	37	38	32	32	35	27	23	21	18	15	15	15	16
14	16	16	15	16	15	15	23	20	22	42	B		48	45	42	33	27	21	17	15	17	16	16	16
15	16	15	16	16	18	15	21	18	21	B			B			44	48	21	20	16	16	15	16	16
16	16	16	20	15	15	16	17	23	24	34	B	B	B			68	58	40	24	16	15	15	15	15
17	15	16	15	16	16	15	17	21	32	36	B		76	56	54	46	34	35	20	15	16	16	15	15
18	15	16	15	16	15	15	17	20	21	32	36	36	48	45	45	28	26	23	18	15	15	15	16	15
19	15	15	16	15	15	15	16	17	21	26	39	46	48	34	52	43	24	22	20	16	15	16	15	15
20	15	16	15	15	15	15	22	20	22	23	28	45	48	49	45	29	26	21	18	16	15	15	15	15
21	15	15	16	15	15	16	16	18	21	24	29	42	44	43	44	24	22	21	17	15	16	16	16	16
22	16	16	15	16	15	15	20	20	21	24	29	33	39	32	28	24	21	20	17	15	15	16	15	15
23	15	15	15	16	15	15	16	18	21	22	27	27	33	34	29	27	21	20	16	16	15	15	15	15
24	16	17	15	15	17	16	16	17	21	21	28	28	51	53	43	27	21	21	16	16	15	15	15	15
25	15	15	16	16	15	15	21	17	20	21	27	30	29	49	30	26	23	20	17	17	15	16	15	16
26	15	15	15	15	15	16	16	18	21	23	28	33	33	32	29	26	20	18	16	15	16	15	15	16
27	15	15	15	15	16	15	15	16	20	21	26	29	49	33	27	23	22	18	17	17	16	15	15	15
28	16	15	15	15	15	15	15	17	18	28	35	37	51	52	30	41	22	21	16	16	15	17	16	16
29	15	15	15	15	15	15	20	16	22	21	26	53	51	44	50	27	21	20	16	16	16	16	15	15
30	15	15	16	15	15	15	21	18	21	34	29	32	50	36	34	27	20	21	16	15	15	15	16	15
31	15	15	16	15	15	15	20	16	21	23	44	33	29	33	29	24	21	20	16	16	16	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	30	30	27	28	29	28	28	31	31	30	31	31	31	31	31	31
MED	15	15	15	15	15	15	17	17	21	24	29	37	46	44	34	29	23	21	17	16	15	15	15	15
U Q	16	16	16	16	16	16	20	20	22	27	39	44	51	46	44	41	27	23	20	16	16	16	15	16
L Q	15	15	15	15	15	15	16	16	21	22	27	32	34	33	29	27	22	20	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

AUG. 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	86	87	87	86	71	64	80	90	87	86	94	96	106	130	141	146	156	147	140	138	129	146	167	163
2	165	164	168	136	85	86	87	107	108	98	91	104	106	111	112	112	110	127	130	120	87	90	108	87
3	88	105	90	112	96	85	90	96	85	87	96	102	101	117	106	105	113	122	126	103	86	102	86	87
4	88	90	96	86	80	77	85	108	107	86	105	105	121	128	134	138	142	140	139	139	110	85	90	87
5	84	85	78	68	80	84	78	85	90	88	93	98	94	97	104	105	105	95	101	91	88	90	86	88
6	84	84	92	85	64	73	A	A	89	94	86	84	96	98	100	104	104	106	105	A	106	104	84	103
7	86	109	85	85	84	73	80	90	86	96	82	85	97	112	107	102	A	119	127	104	88	88	83	86
8	76	80	84	76	62	60	84	A	92	96	90	103	102		117	121	132	144	N	158	146	90	88	87
9	90	78	109	85	84	76	84	99	90	94	94	97	104	104	112	116	122	111	119	111	103	103	90	67
10	N	90	85	86	85	77	86	97	100	81	91	96	106	104	105	104	112	122	105	85	97	82	85	87
11	84	83	78	71	77	58	65	80	86	104	106	94	112	123	116	113	104	103	120	104	84	88	84	86
12	82	91	91	80	67	65	76	84	91	95	75	108	103	96	119	111	114	105	107	104	98	84	85	84
13	87	86	86	67	66	66	80	86	88	90	88	104	121	119	123	110	121	142	146	161	164	179	164	157
14	163	140	163	122	84	66	69	85	87	91	B	89	102	107	119	119	105	105	102	110	103	85	86	86
15	A	80	A	85	78	66	55	70	79	B			B		92	115	112	96	84	96	88	72	65	52
16	55	34	65	67	49	54	66	82	78	81	B	B	B			87	109	119	104	97		77	65	63
17	76	80	82	86	75	66		96	87	89	B			142	146	A	126	138	137	135	88	104	86	100
18	86	78	A	A	66	52	52	66	64	A	67	91	97	106	106	106	112	112	128	122	90	89	80	86
19	87	85	76	76	76	66	66	99	100	81	90	90	107	105	122	120	142	146	138	121	88	98	95	111
20	110	110	97	85	78	76	80	89	98	96	96	94	104	103	108	105	106	118	136	126	110	88	78	80
21	74	66	81	84	72	67	73	90	105	108	104	104	115	109	122	141	147	N	N	172	145	90	142	143
22	136	143	88	87	86	79	77	95	84	80	97	104	103	98	104	112	118	123	112	119	103	81	64	82
23	83	80	78	71	67	A	78	98	94	85	89	106	119	141	145	148	160	164	171	171	159	145	91	88
24	90	100	106	85		A	72	102	105	73	96	112	111	132	130	123	125	141	141	102	88	97	109	108
25	129	108	110	86	80	67	78	89	96	95	88	105	112	121	130	143	165	180	187	177	163	162	171	164
26	176	156	130	84	85	75	80	90	103	107	120	119	122	136	137	134	129	133	139	143	122	108	90	88
27	87		87	78		63	66	100	102	91	93	103	127		141	141	142	120	144	140	126	109		143
28	122	120	104	84	74	66	70	103	88	76	83	134	141	142	154	152	146	146	163	164	108	144	176	169
29	164		128		81	66	74	81	83	88	91	137	144	161	181	175	181	182	159	145	107	89	N	108
30	90	98	88	90	82	66	72	88	94	111	118	142	149	145	148		138	118	143	128	108	107	108	84
31	85	106	87	72	61	62	76	N	105	105	107	116	136	160	131	132	102	135	138	122	92	108	141	108
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	31	29	27	28	28	27	30	29	30	30	29	30	30	31	29	31
MED	87	90	88	85	78	66	77	90	90	91	93	104	106	117	120	116	122	122	136	122	103	90	88	87
U Q	116	108	105	86	84	76	80	98	100	96	97	107	121	136	137	139	142	142	142	143	122	108	108	108
L Q	84	80	83	76	67	64	69	85	86	85	88	95	102	104	107	105	110	112	109	104	88	88	84	86

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

AUG. 1989

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	40	60	49	69	104	55	55	71	77	90	52	69	59	65	45	26	28
2	G	G	G	G	27	38	G	39	40	70	64	62	58	55	64	53	54	60	91	81	46	32	34	29
3	24	G	G	G	G	29	39	48	56	58	84	66	47	91	52	45	53	55	50	40	70	40	34	24
4	26	G	G	G	G	G	26	44	48	48	72	56	G	G	G	40	42	46	44	45	28	31	G	24
5	40	37	G	G	G	G	G	G	39	56	47	43	G	51	74	58	62	57	40	57	48	34	32	G
6	G	G	G	56	40	43	93	146	56	60	74	67	57	61	42	41	43	41	81	86	110	70	33	32
7	48	35	26	28	G	G	G	38	40	G	42	41	52	61	69	72	100	81	93	80	92	60	42	40
8	58	92	36	36	37	33	92	94	143	109	60	98	68		G	67	86	51	50	48	67	45	32	G
9	G	G	G	G	G	G	22	37	42	G	G	G	G	G	58	50	G	G	38	30	G	32	41	G
10	G	G	G	G	G	G	G	G	42	G	G	G	G	G	53	52	G	G	G	29	G	G	G	84
11	24	58	38	44	25	26	26	G	41	51	51	G	G	G	G	71	57	G	39	G	G	G	G	37
12	57	34	32	23	G	G	24	35	G	46	53	G	G	G	50	60	73	81	66	38	31	26	70	92
13	80	49	39	40	149	37	34	82	71	66	65	G	G	79	67	67	68	65	65	34	40	28	G	24
14	25	29	G	31	G	G	G	G	G	G	B	G	G	69	69	74	63	46	G	32	G	G	33	39
15	94	134	109	49	34	G	G	G	42	B	G	G	B	G	G	G	G	49	64	36	30	26	146	38
16	38	84	G	G	G	G	25	G	46	56	B	B	B			G	G	G	44	40		30	G	30
17	G	G	G	G	29	G	60	42	57	75	B			99	178	113	93	74	82	71	44	59	54	49
18	G	34	93	78	38	42	58	50	58	99	G	58	G	G	G	G	G	49	40	34	43	26	24	36
19	33	27	G	G	G	G	G	45	54	96	67	51	55	G	G	G	G	51	87	48	37	G	29	24
20	41	37	32	G	G	G	44	G	G	G	G	G	G	G	G	49	G	51	61	80	56	60	47	40
21	40	30		25	G	G	G	42	50	70	G	65	78	63	58	49	G	G	G	G	G	G	G	39
22	42	33	26	G	25	24	G	36	43	G	56	66	G	76	66	55	48	91	66	69	32	39	48	34
23	39	40	50	36	24	58	39	56	56	56	62	67	58	58	89	66	58	70	96	58	39	29	26	G
24	92	72	71	46	31	82	40	37	G	49	G	G	G	G	G	G	G	G	G	G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	46	50	G	N	49	G	G	G	34	34	24	G	33	25
26	G	50	G	G	G	68	34	G	G	62	50	50	70	82	167	52	45	83	G	G	23	G	G	G
27	G		G	G	38	50	32	42	45	48	48	G	49	G	54	G	149	43	40	32	25	24	G	G
28	G	G	G	G	G	48	41	55	71	G	G	54	G	G	50	G	G	G	G	34	40	G	G	G
29	G		G		G	G	G	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G
30	G	G	G	G	G	G	28	36	G	44	61	G	G	G	62	G	74	103	62	56	40	58	34	33
31	G	G	G	G	G	24	25	36	41	51	70	83	57	76	48	68	53	79	69	38	58	30	29	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	29	30	30	31	31	31	31	31	30	28	29	28	28	30	31	31	31	31	31	30	31	31	31
MED	24	30	G	G	G	G	25	37	42	50	50	50	G	26	52	50	48	51	50	38	38	29	32	28
U Q	41	44	32	36	29	38	39	45	56	62	64	65	56	66	67	67	68	70	69	58	48	40	34	38
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	32	23	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

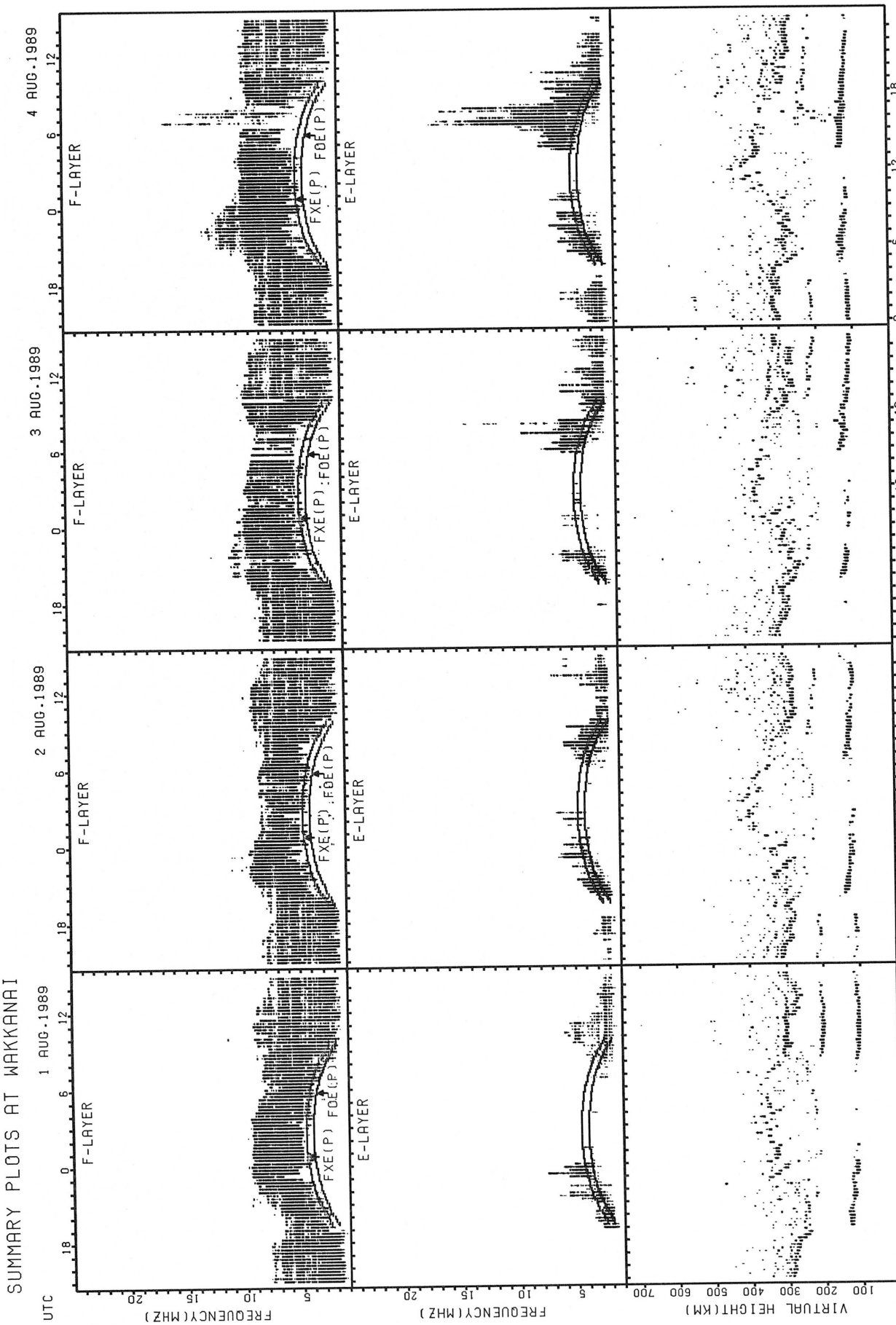
HOURLY VALUES OF FMIN AT OKINAWA

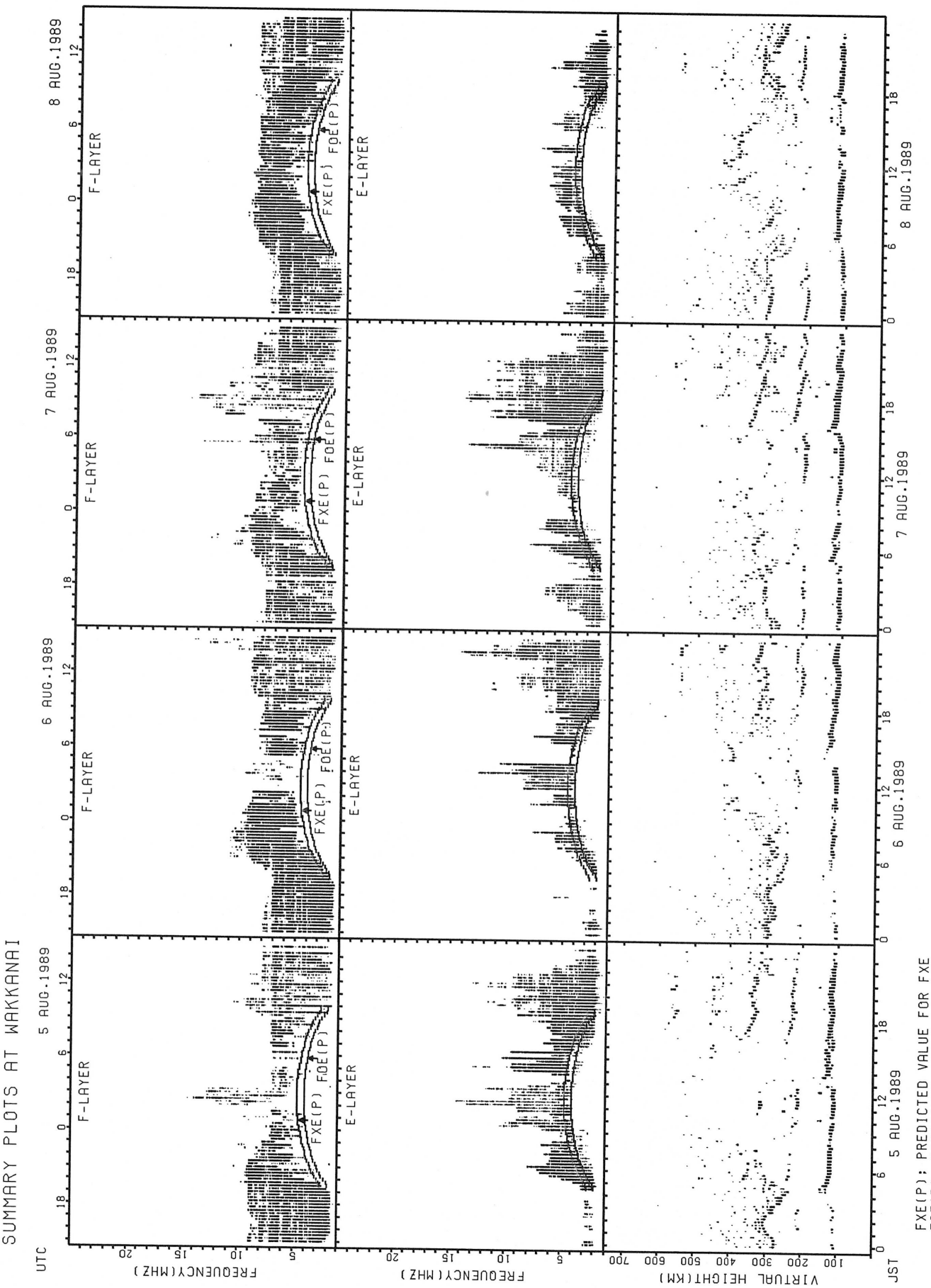
AUG. 1989

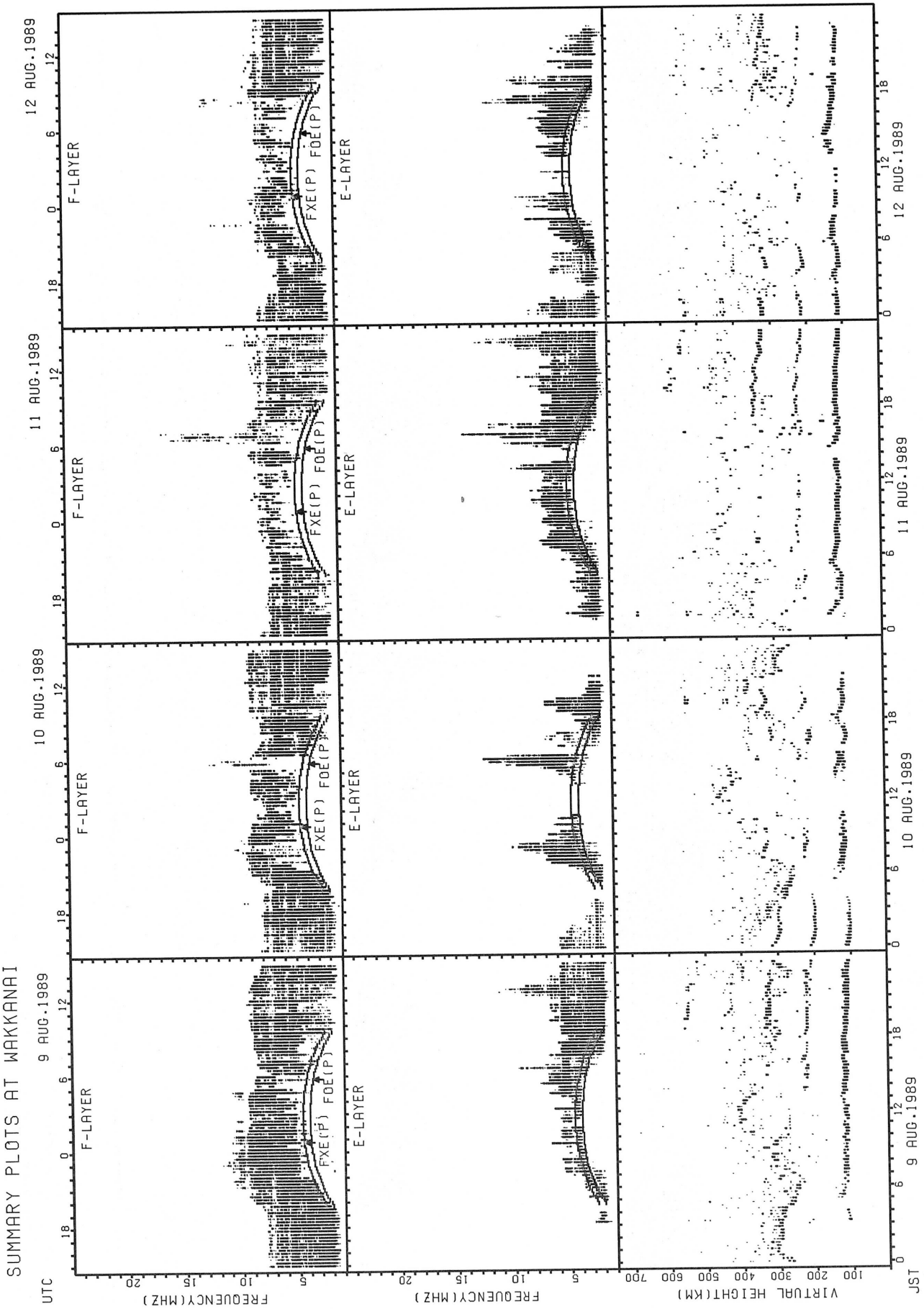
LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

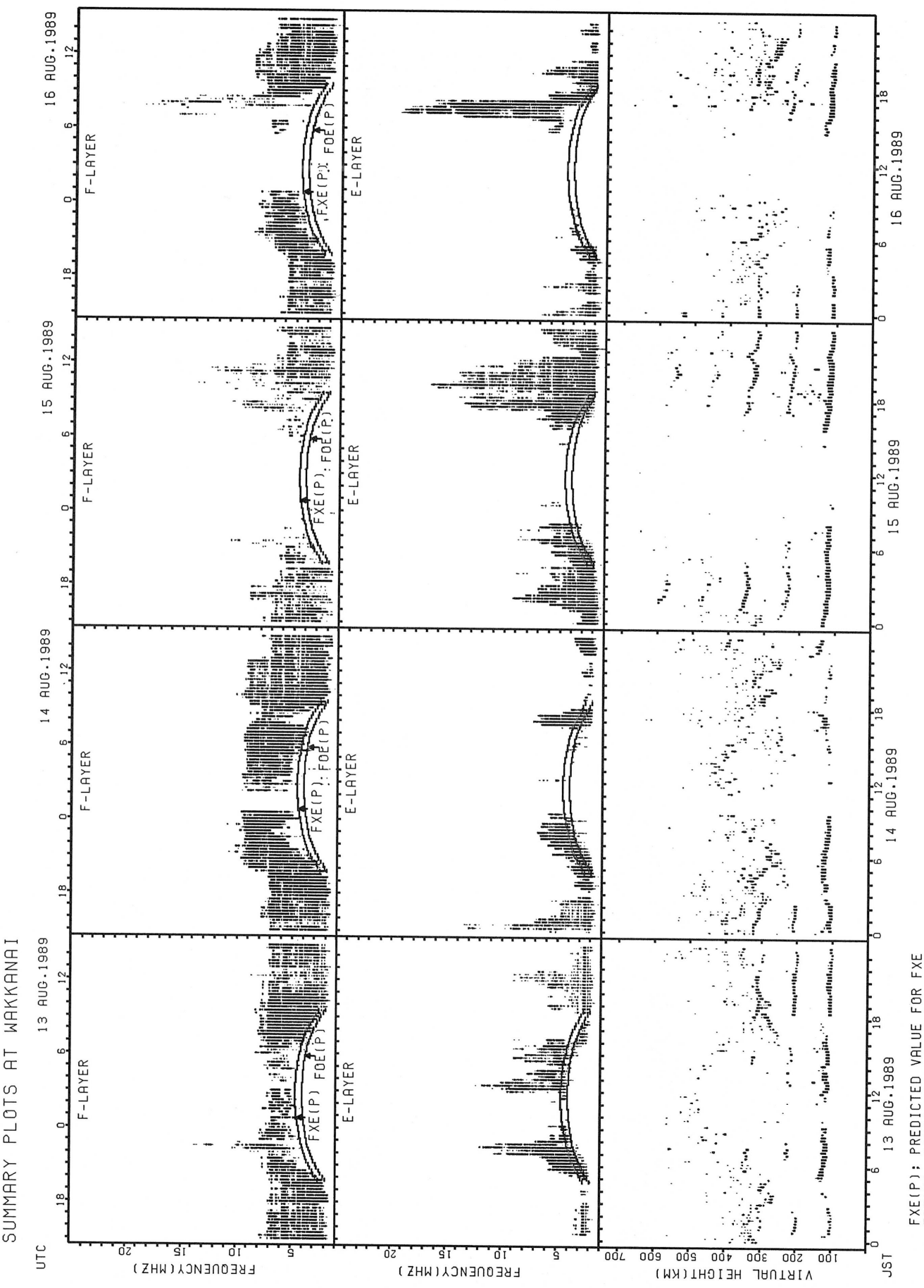
H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	17	15	15	15	15	15	26	28	28	34	32	38	29	33	28	27	17	15	15	15	15	15
2	15	15	15	15	15	15	23	15	26	27	28	29	33	32	32	29	27	29	18	15	15	15	15	15
3	15	15	15	15	15	15	16	26	23	28	29	34	36	33	34	29	28	28	20	15	15	15	15	15
4	15	26	15	15	15	15	15	16	21	32	29	35	46	46	36	33	28	21	14	15	15	16	16	16
5	15	14	16	15	16	15	21	28	35	29	29	32	63	63	30	46	32	26	20	18	15	15	15	15
6	15	15	15	15	14	15	15	15	22	26	36	33	39	42	32	29	28	40	14	16	15	15	15	15
7	15	15	16	15	18	15	22	15	22	61	29	33	34	33	32	30	30	28	18	15	14	15	14	15
8	15	15	15	15	15	14	15	16	26	27	27	32	30		46	43	28	18	17	14	15	15	15	16
9	15	15	15	15	15	15	15	18	20	26	29	30	32	56	30	29	28	26	16	15	15	15	14	16
10	15	15	15	15	15	15	21	16	26	27	28	75	33	35	32	29	28	21	17	15	15	15	16	15
11	15	15	15	15	15	15	15	15	24	27	29	35	32	62	30	30	28	27	23	26	15	15	15	15
12	15	15	15	15	15	15	18	20	60	40	30	55	58		33	30	30	40	17	16	15	15	15	15
13	15	15	14	15	14	15	15	18	28	28	59	51	38	48	35	33	30	27	18	16	15	14	29	15
14	15	15	15	14	15	15	18	17	34	29	B			50	38	33	30	27	15	14	15	15	15	15
15	15	15	15	14	14	15	17	18	27	B			B			46	34	28	17	16	23	20	20	15
16	16	15	15	15	16	15	18	34	27	32	B	B	B			80	62	53	28	16		15	15	15
17	15	17	16	21	15	15	16	26	29	33	B			62	55	49	33	28	27	15	15	15	15	15
18	15	15	15	15	15	15	15	17	28	38		46		59	52	30	29	32	17	15	15	16	16	15
19	15	16	16	15	15	15	21	26	27	28	32	37	38	58	32	57	30	27	18	16	15	15	15	17
20	16	15	15	17	15	15	15	18	23	28	32	53	34	36	34	32	29	29	18	15	15	15	15	15
21	15	16	15	15	15	15	18	17	27	27	29	29	34	45	35	32	29	27	28	15	15	15	15	15
22	15	16	16	16	15	16	16	15	22	27	27	32	35	33	28	27	27	18	15	14	15	15	15	16
23	16	15	14	15	16	15	15	16	21	28	28	32	33	30	30	29	28	20	18	14	15	15	15	15
24	15	15	15	15	15	15	14	16	23	28	29	32	33	33	29	28	28	20	16	16	15	15	15	15
25	15	15	15	15	15	15	17	18	18	26	28	28	29	29	29	27	26	24	15	15	15	16	15	15
26	15	16	15	15	15	15	15	27	18	27	27	28	34	33	29	28	26	20	27	17	16	15	15	15
27	15		15	15	15	15	14	16	20	27	29	32	32	33	32	26	23	16	22	15	15	16	15	15
28	15	15	15	15	14	14	14	16	22	32	30	30	32	50	32	29	27	23	14	14	14	15	21	15
29	15		14		15	15	15	20	24	28	43	57	47	45	46	32	29	32	16	17	15	15	15	15
30	15	16	15	15	15	15	16	16	23	33	28	44	38	39	33	30	27	18	16	14	15	15	15	15
31	15	15	15	15	15	15	15	16	24	29	37	34	30	33	30	29	27	21	15	14	15	15	15	18
	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	29	31	30	31	31	31	31	31	30	26	27	26	27	29	31	31	31	31	31	30	31	31	31
MED	15	15	15	15	15	15	15	17	24	28	29	33	34	39	32	30	28	27	17	15	15	15	15	15
U Q	15	15	15	15	15	15	18	20	27	32	30	44	38	50	35	33	30	28	20	16	15	15	15	15
L Q	15	15	15	15	15	15	15	16	22	27	28	32	32	33	30	29	27	21	16	15	15	15	15	15

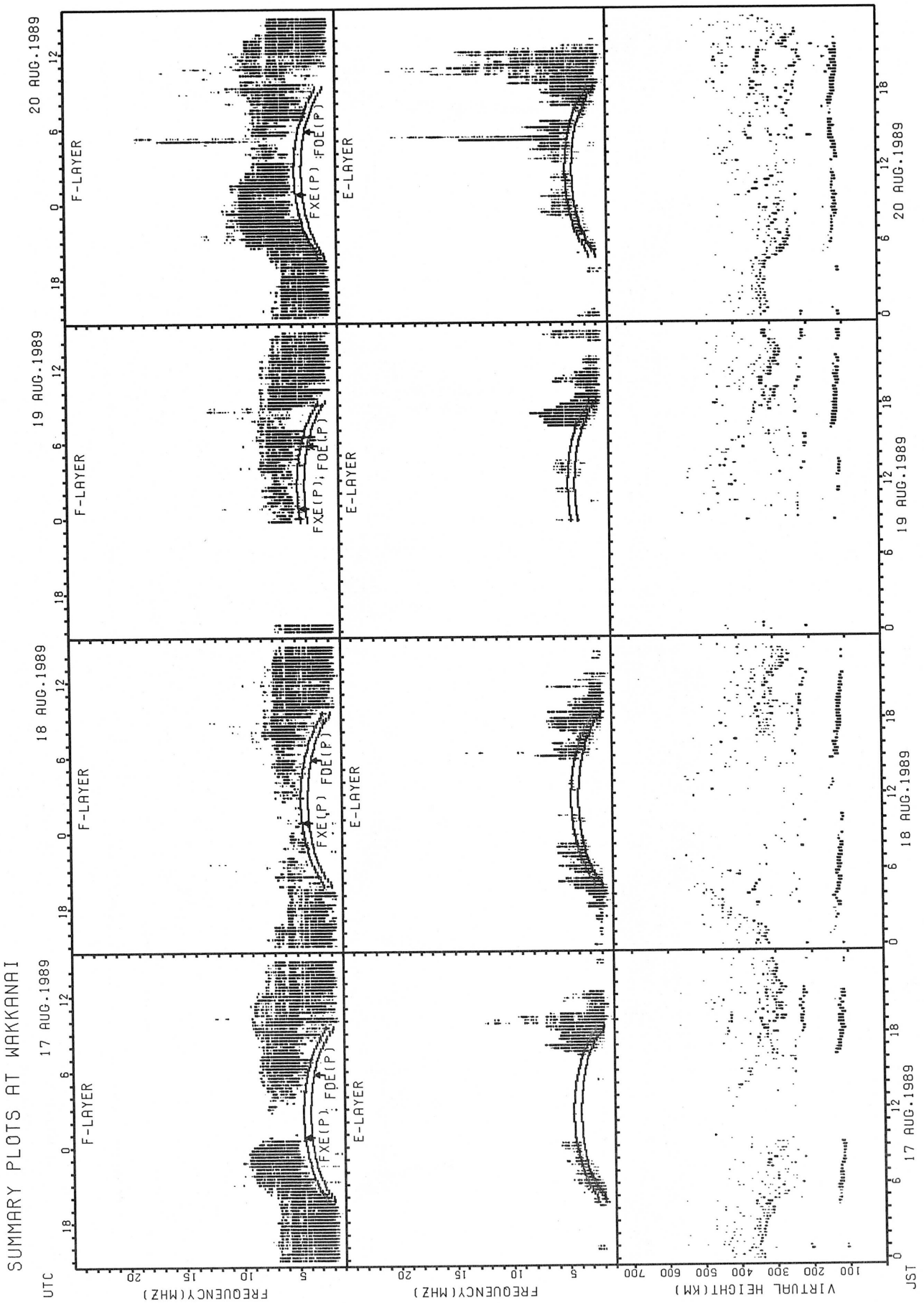
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT WAKKANAI
UTC
1 AUG.1989
2 AUG.1989
3 AUG.1989
4 AUG.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

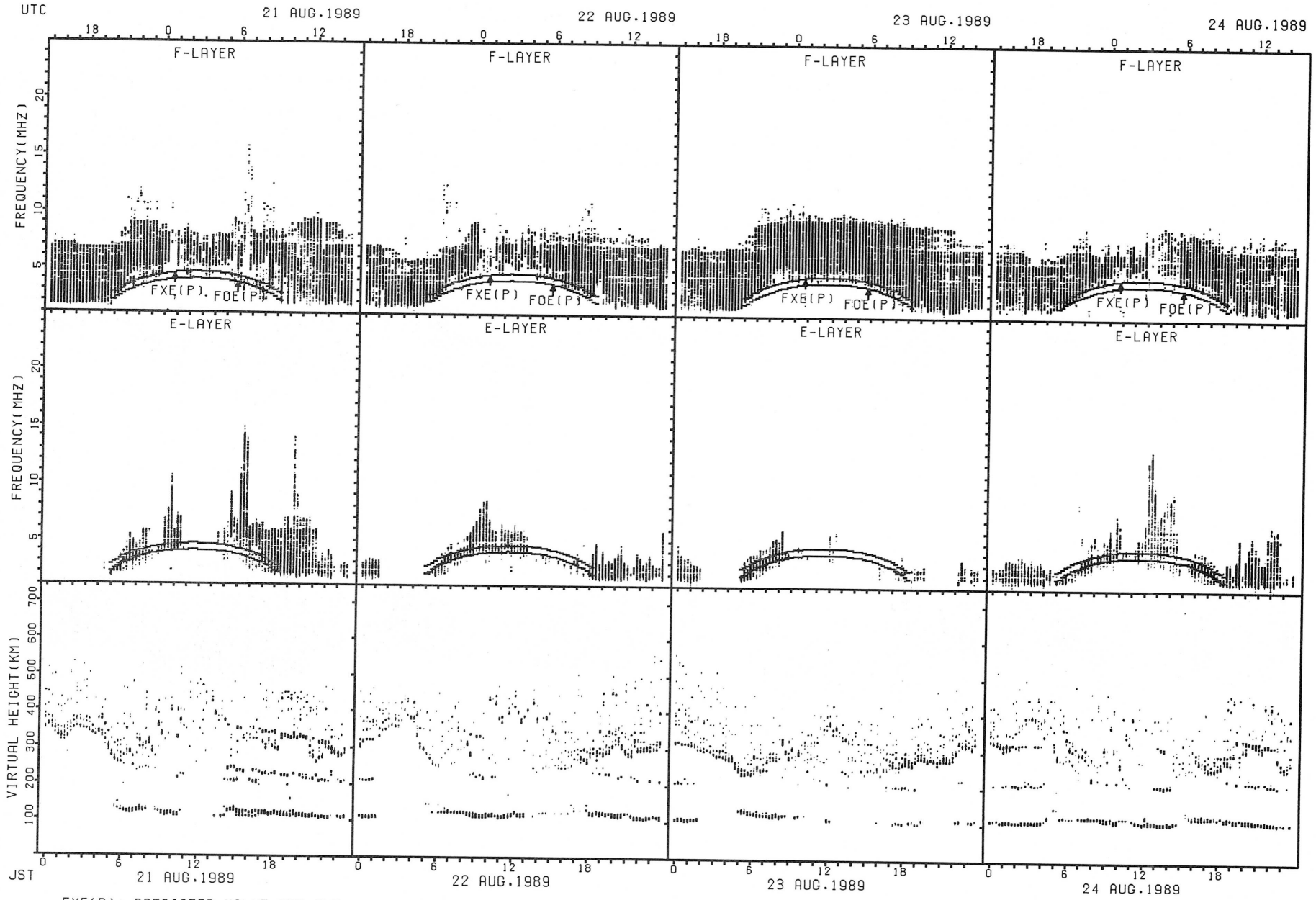

SUMMARY PLOTS AT WAKKANAI
UTC
JST
5 AUG.1989
6 AUG.1989
7 AUG.1989
8 AUG.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
9 AUG.1989
10 AUG.1989
11 AUG.1989
12 AUG.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

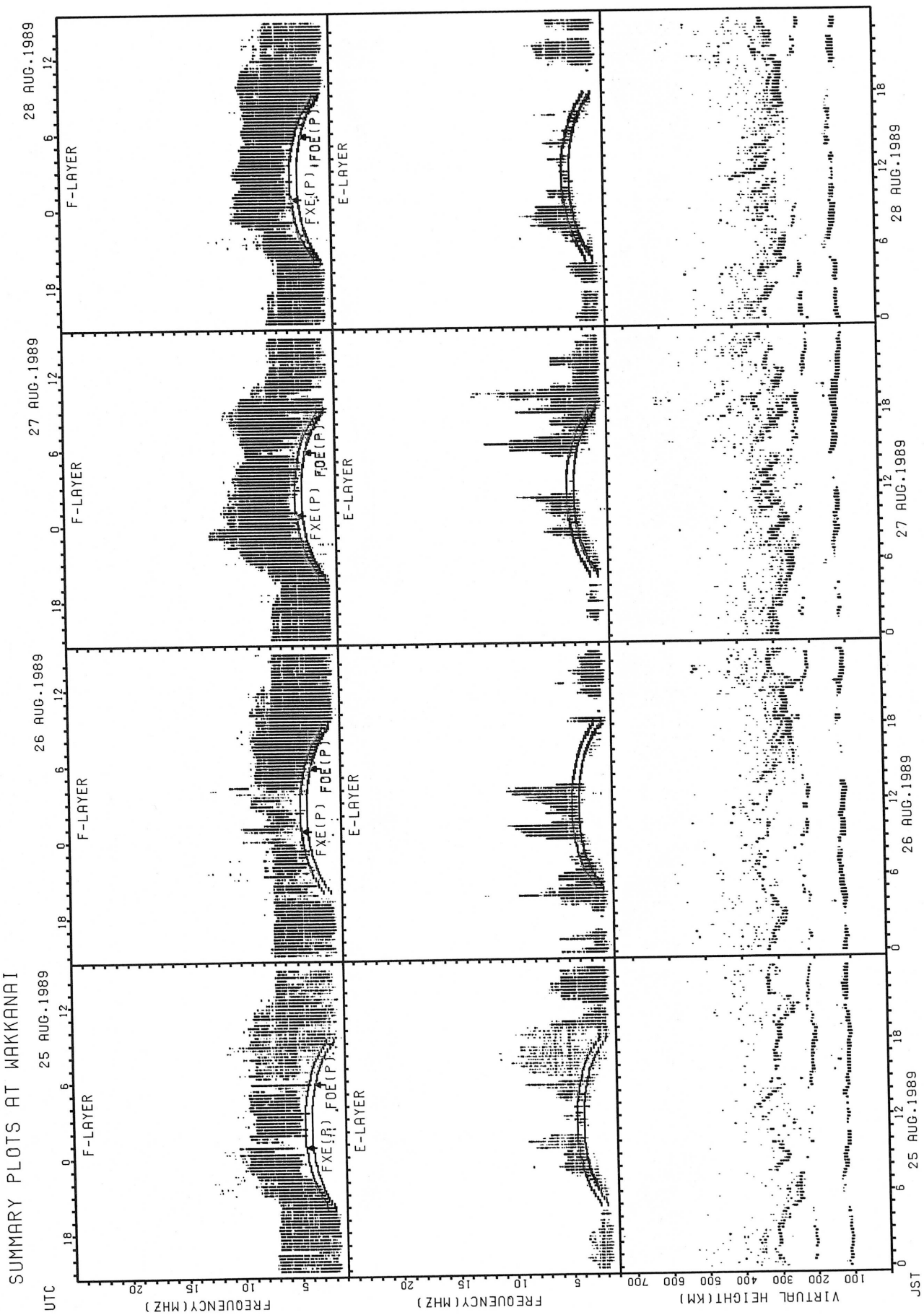

SUMMARY PLOTS AT WAKKANAI
UTC
13 AUG.1989
14 AUG.1989
15 AUG.1989
16 AUG.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
17 AUG.1989
18 AUG.1989
19 AUG.1989
20 AUG.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

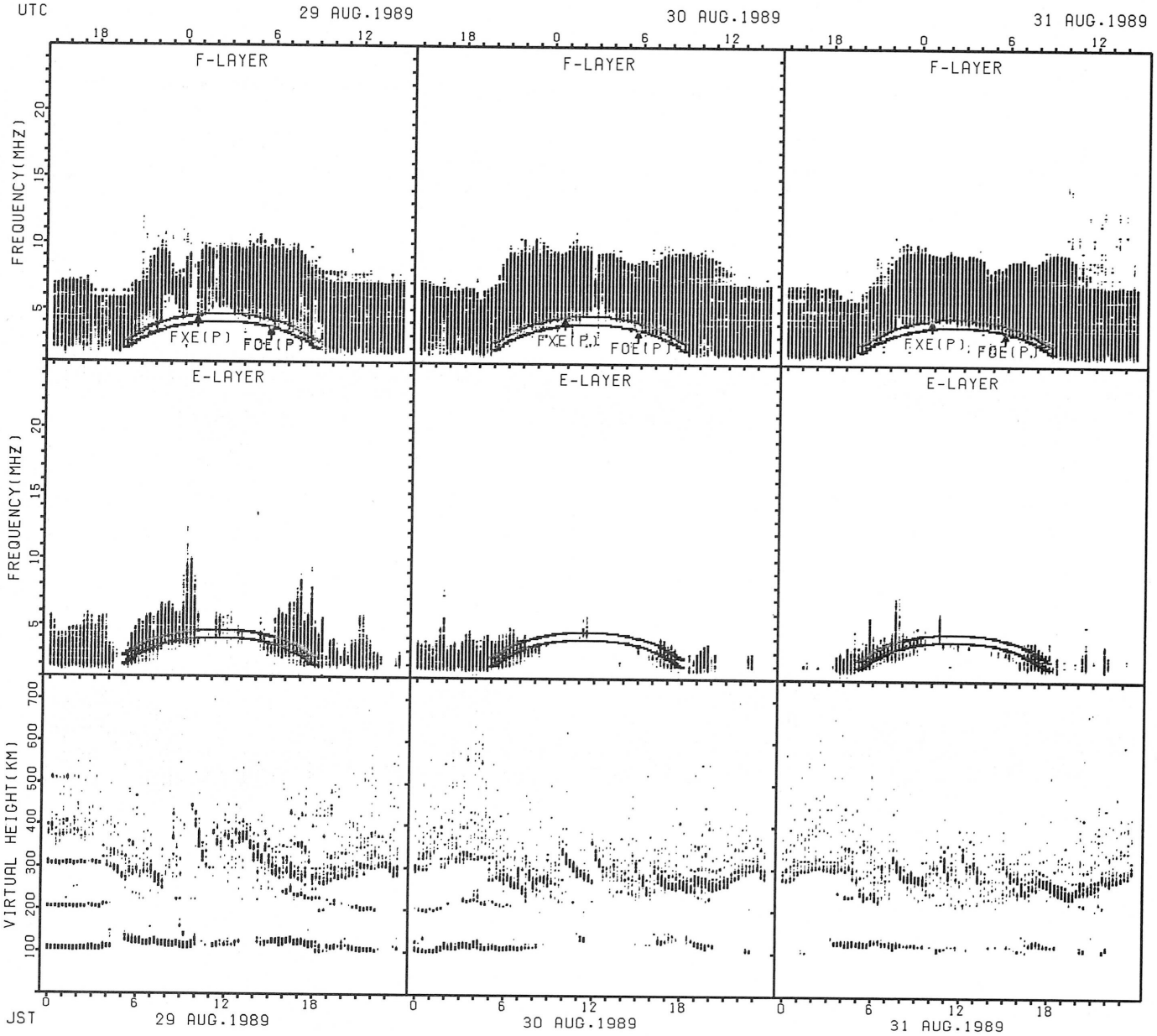
SUMMARY PLOTS AT WAKKANAI



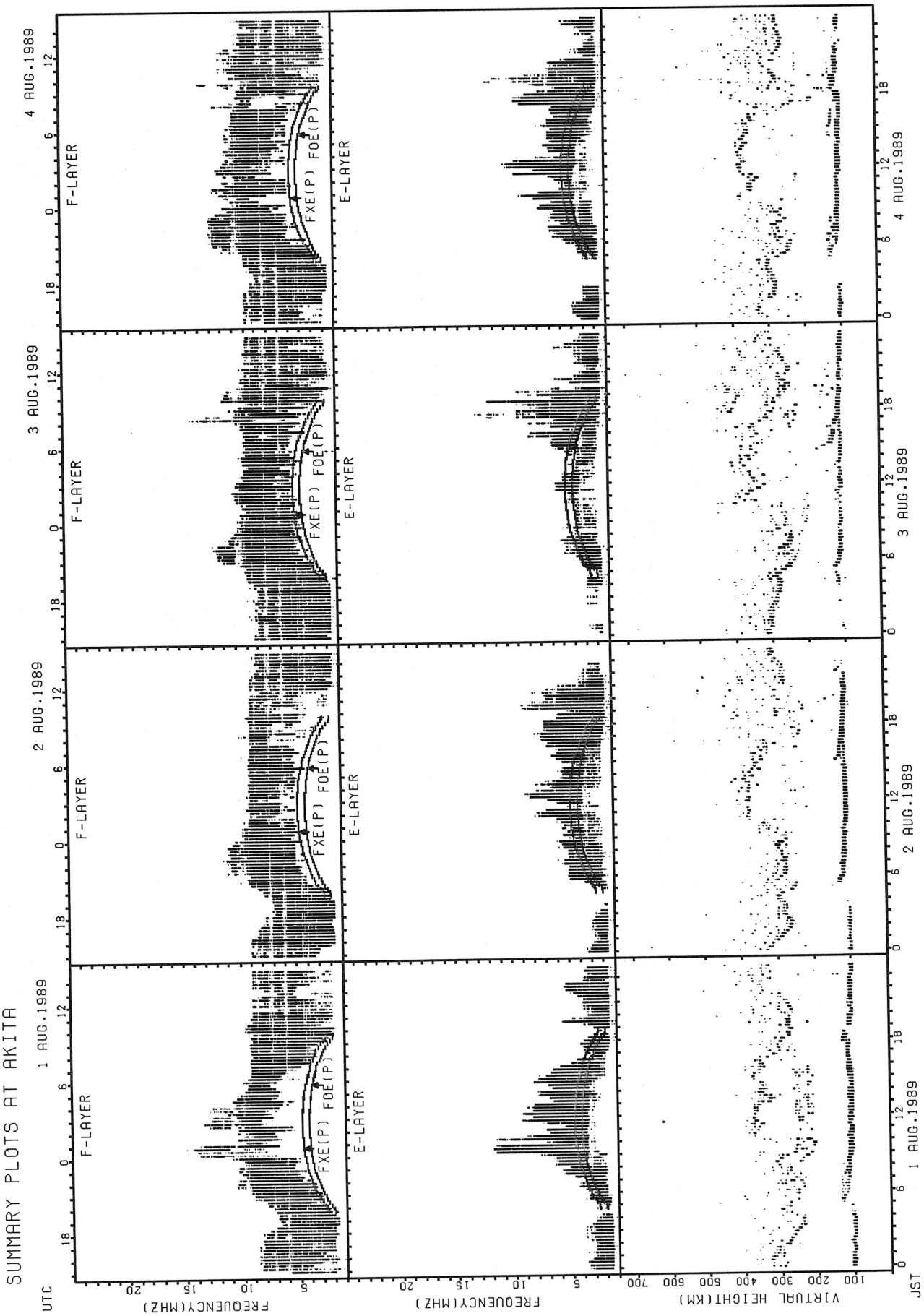
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
25 AUG.1989
26 AUG.1989
27 AUG.1989
28 AUG.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

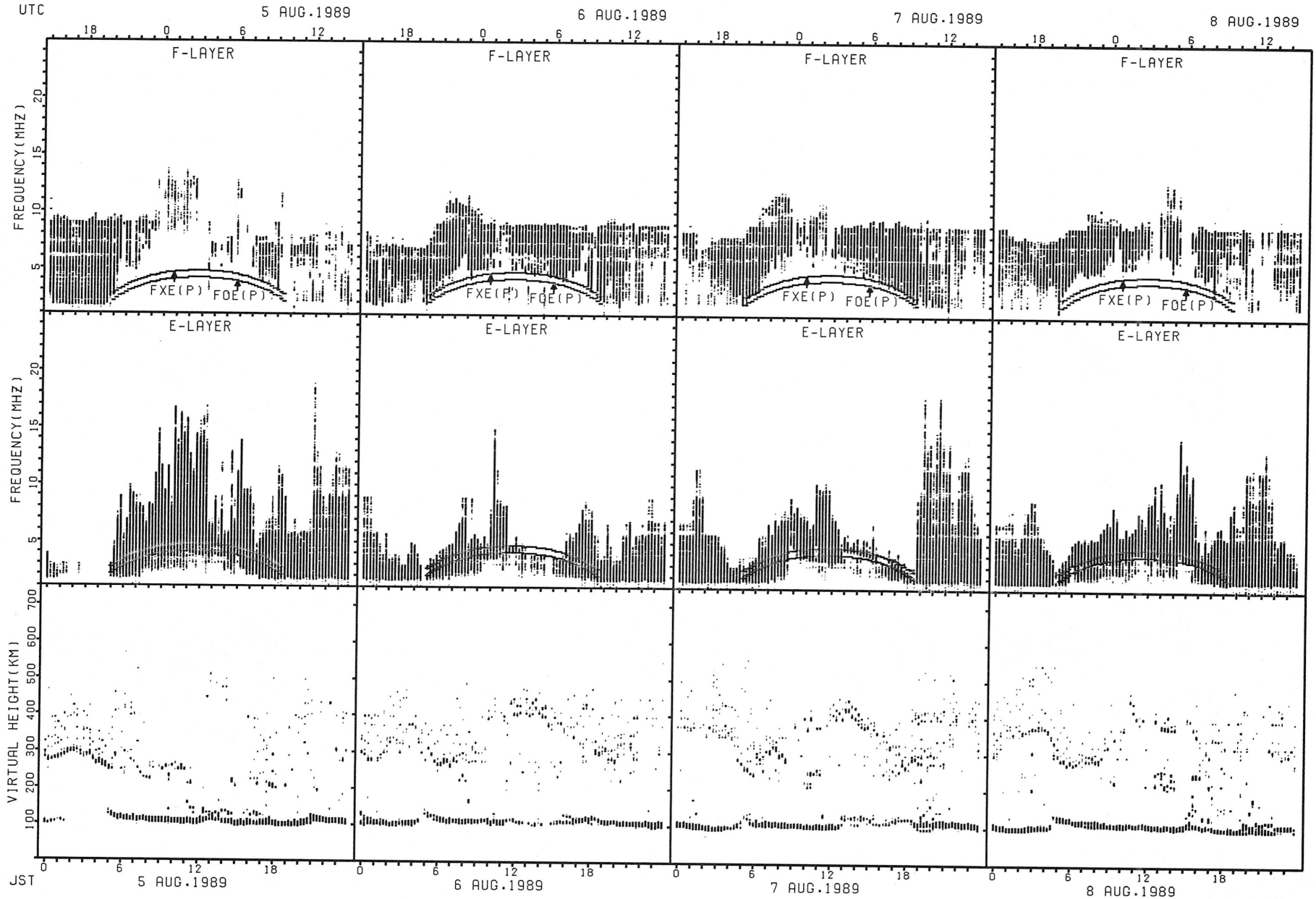
SUMMARY PLOTS AT WAKKANAI



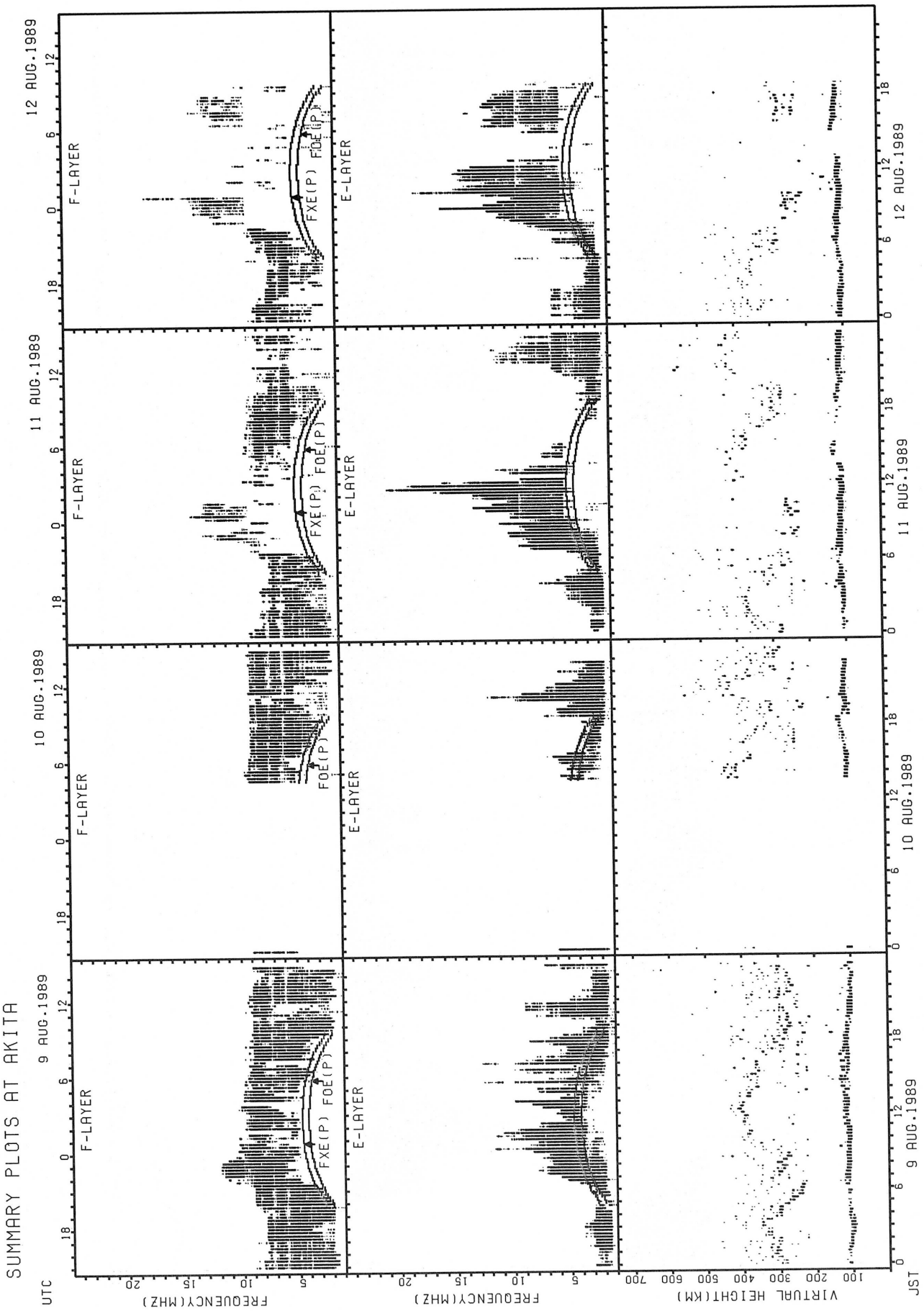
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

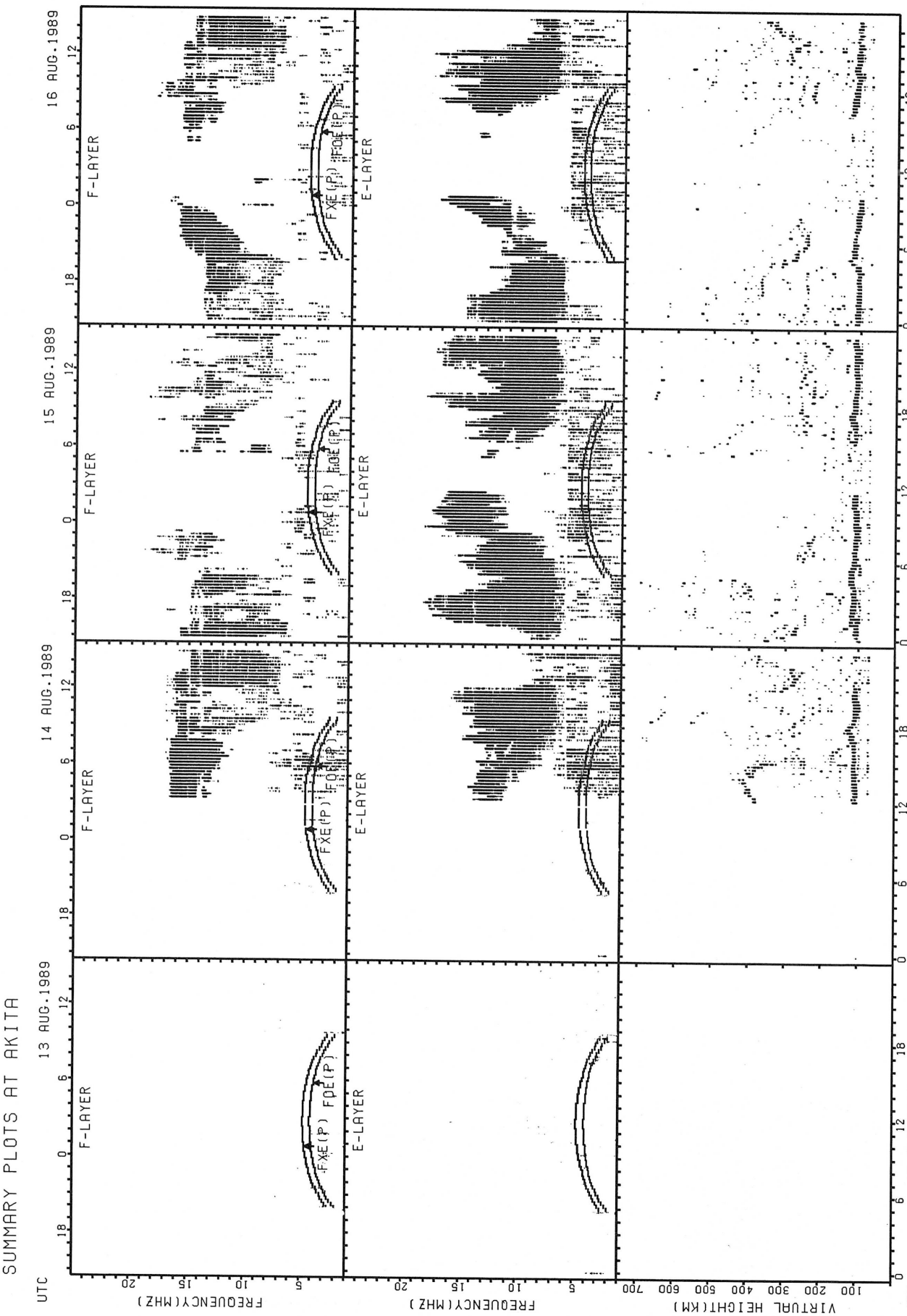

SUMMARY PLOTS AT AKITA
UTC
1 AUG.1989
2 AUG.1989
3 AUG.1989
4 AUG.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

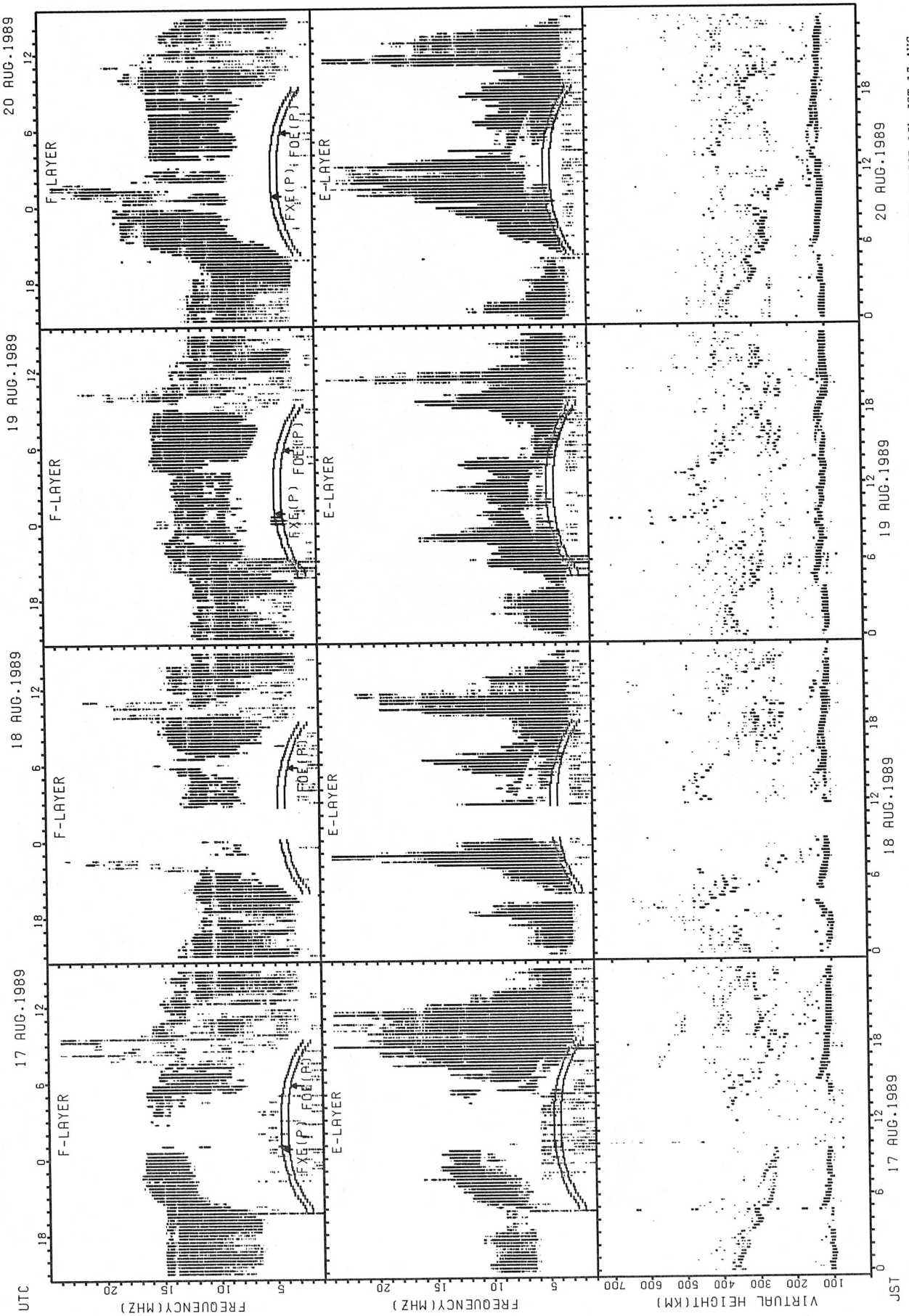
SUMMARY PLOTS AT AKITA



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

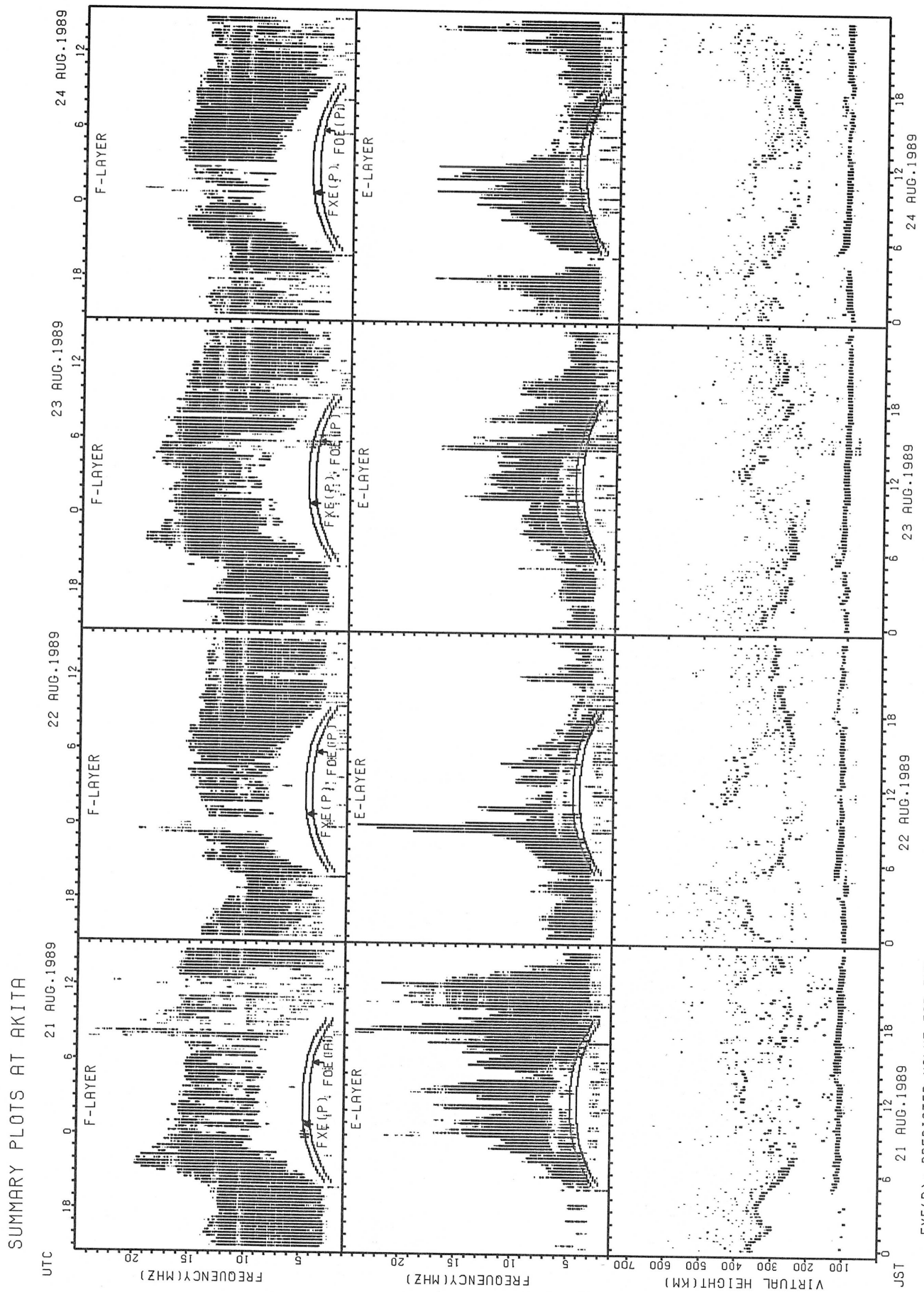

SUMMARY PLOTS AT AKITA
UTC
9 AUG.1989
10 AUG.1989
11 AUG.1989
12 AUG.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

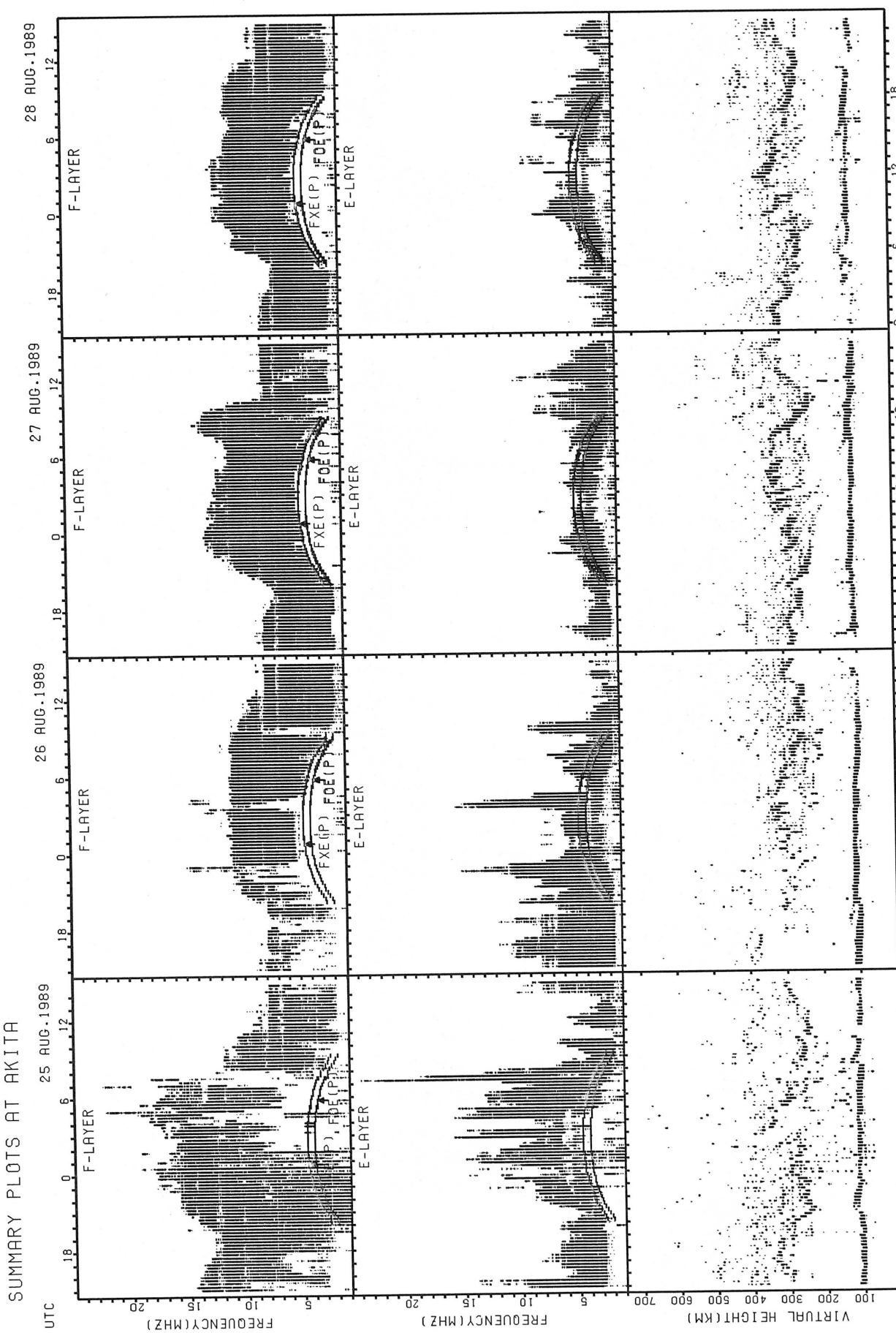

SUMMARY PLOTS AT AKITA
UTC
JST
13 AUG.1989
14 AUG.1989
15 AUG.1989
16 AUG.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE:NO DATA FOR THE PERIOD 20h JST 12 AUG. - 11h JST 14 AUG. AND
LOGARITHMIC SCALE IN FREQUENCY FOR THE PERIOD 12h JST 14 AUG.
- 10h JST 17 AUG.,BECAUSE OF MULFUNCTION OF IONOSONDE AT AKITA.



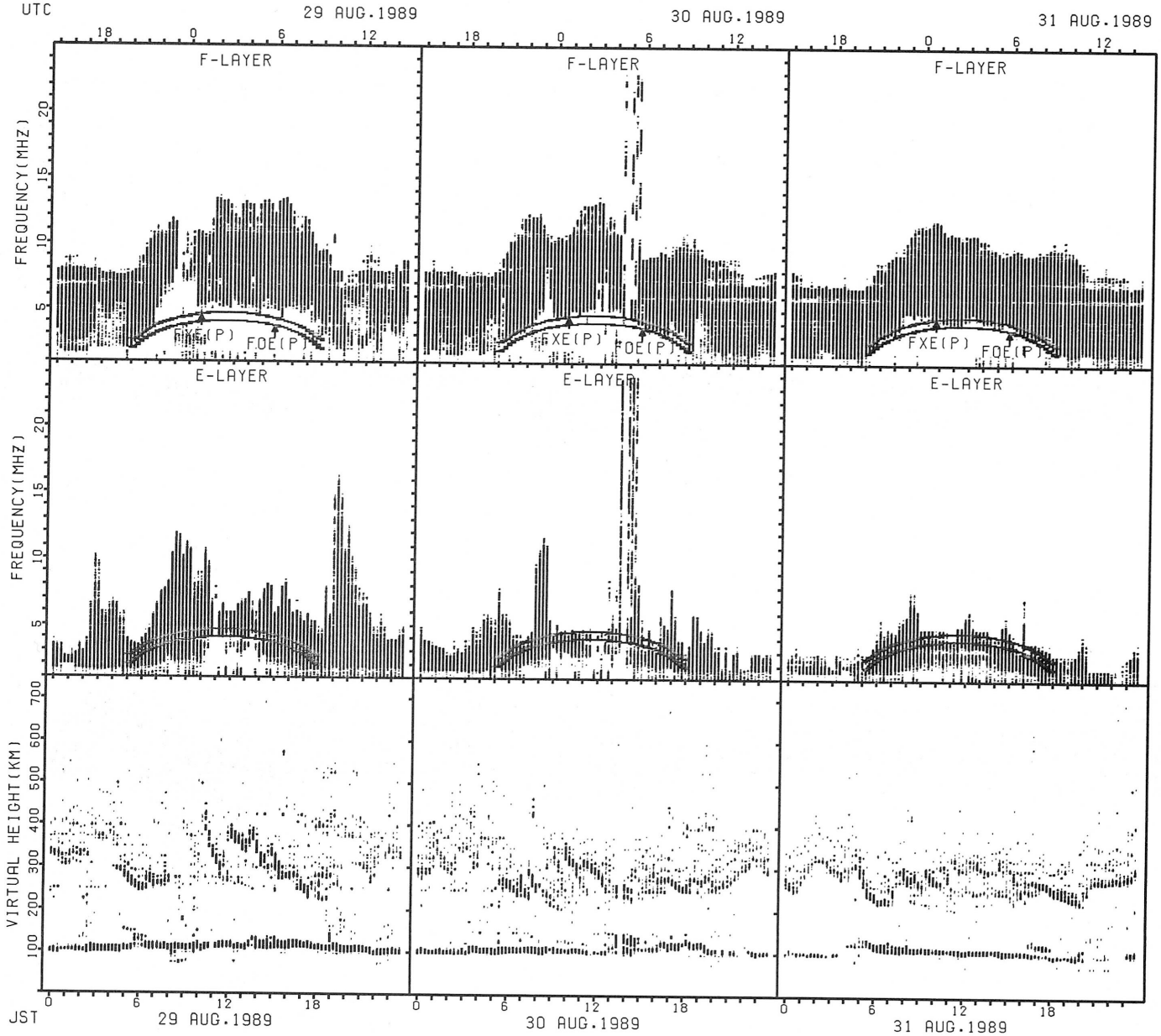
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

NOTE:LINEAR SCALE IN FREQUENCY FOR THE PERIOD 10h JST 17 AUG.-
17h JST 25 AUG. AND FREQUENCY RANGE IS 1.5 - 13.8MHz.


SUMMARY PLOTS AT AKITA
UTC
21 AUG.1989
22 AUG.1989
23 AUG.1989
24 AUG.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

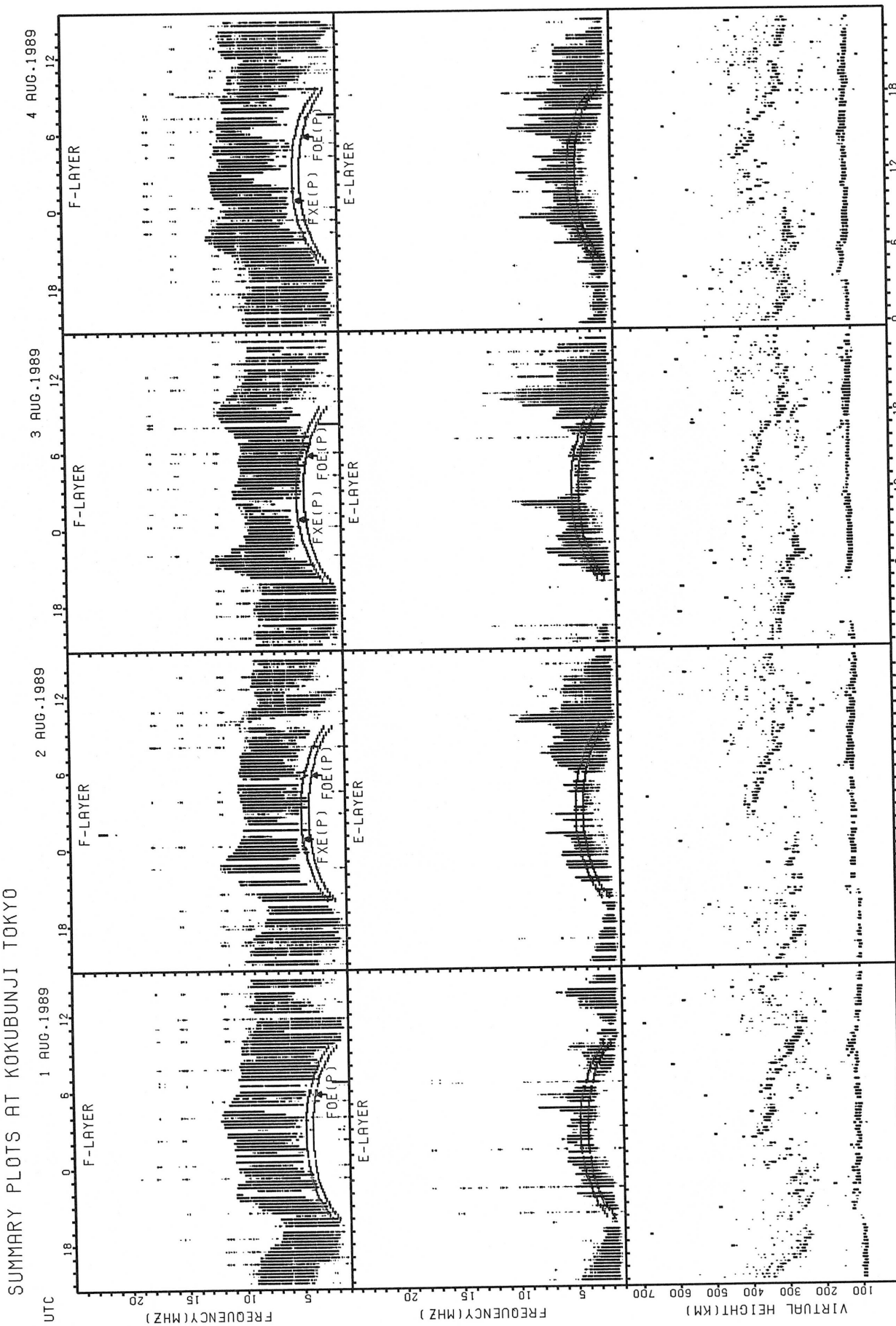

SUMMARY PLOTS AT AKITA
25 AUG.1989
26 AUG.1989
27 AUG.1989
28 AUG.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE:LINEAR SCALE IN FREQUENCY FOR THE PERIOD 17h JST 25 AUG.-
14h40m JST 30 AUG. AND FREQUENCY RANGE IS 1.0 - 19.9MHz.

SUMMARY PLOTS AT AKITA

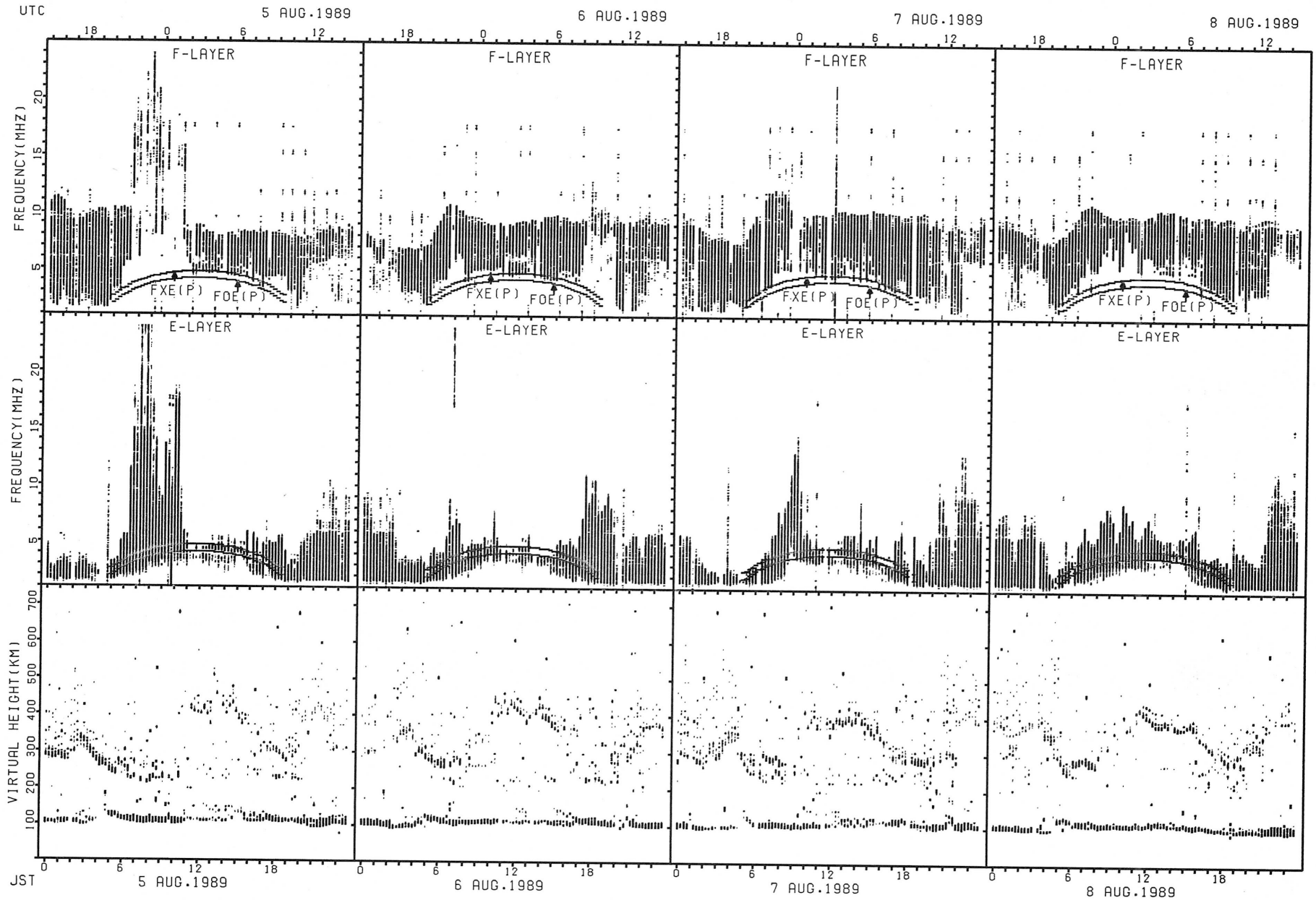


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

NOTE: FREQUENCY RANGE IS 1.0 - 25.0MHz IN LINEAR SCALE FROM 14h40m JST 30 AUG..

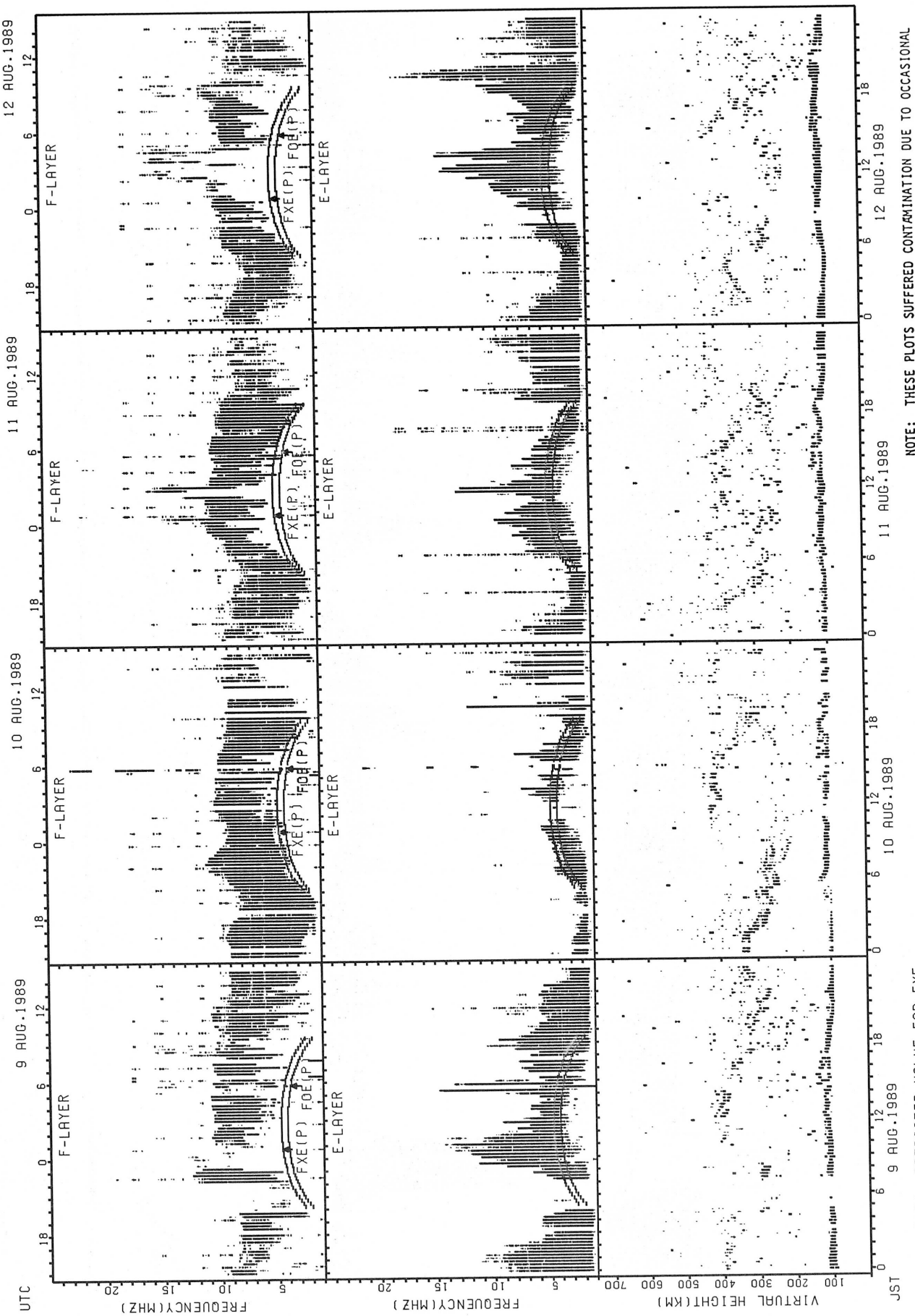

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
1 AUG.1989
2 AUG.1989
3 AUG.1989
4 AUG.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE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

SUMMARY PLOTS AT KOKUBUNJI TOKYO

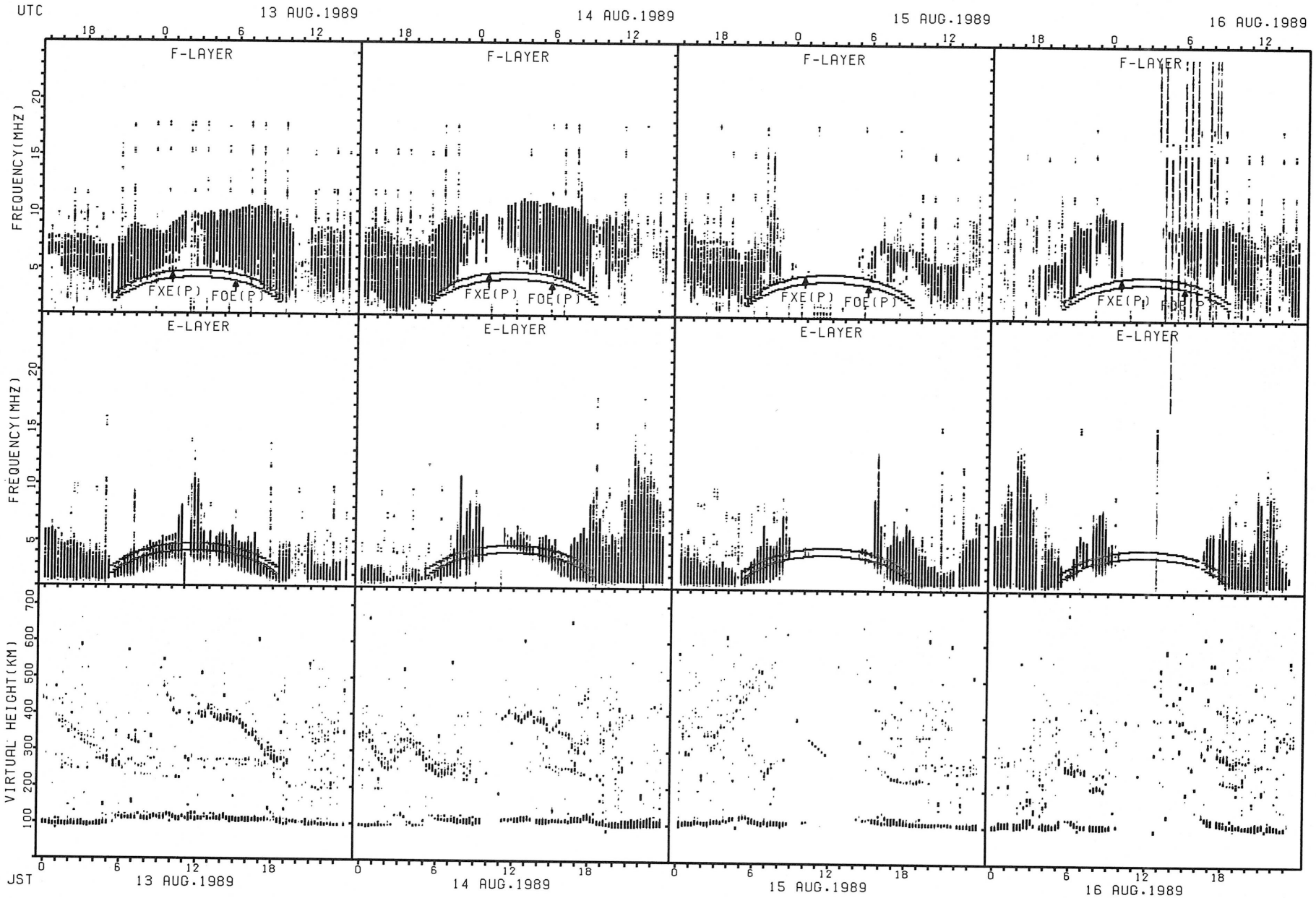


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

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

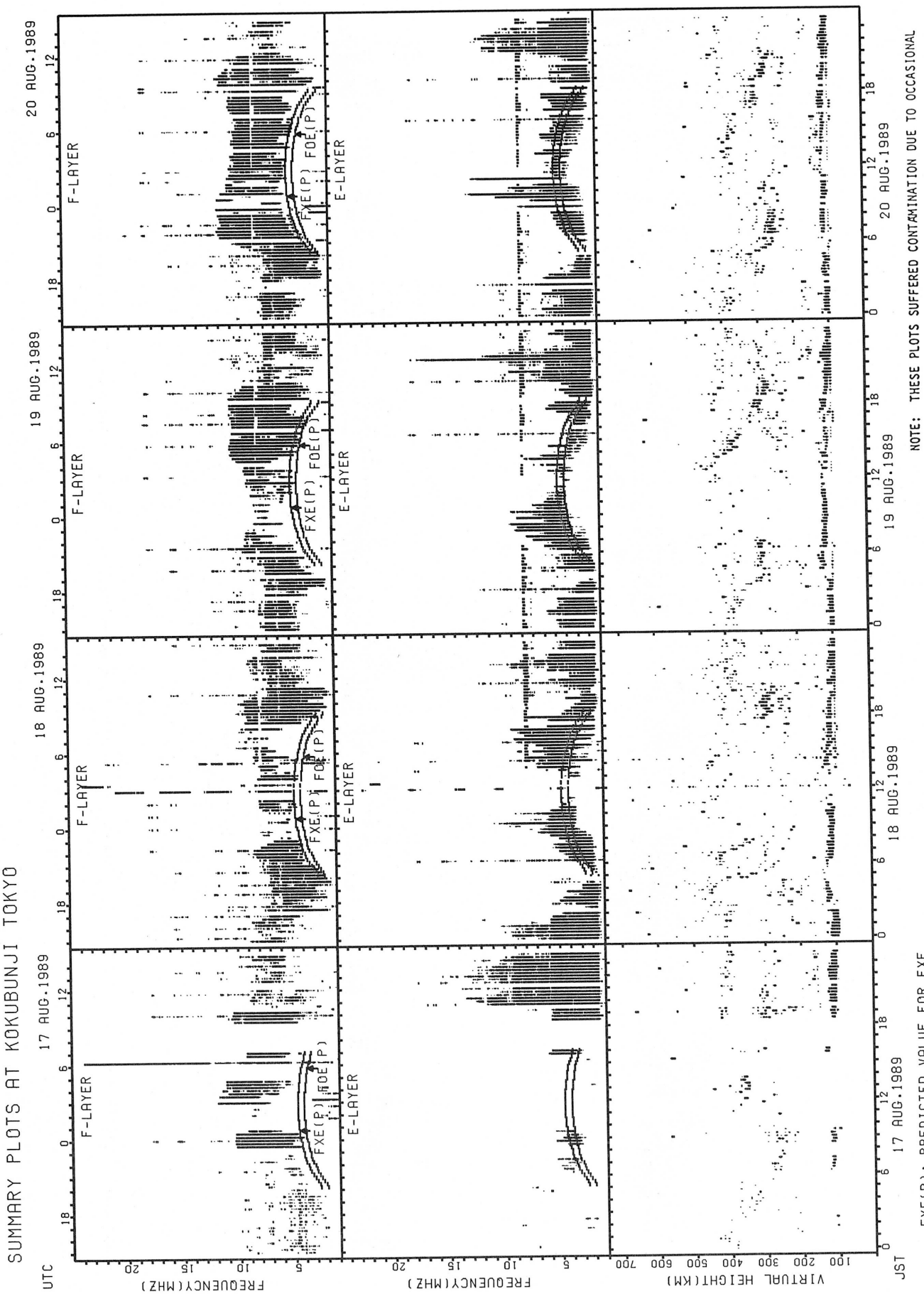

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
9 AUG.1989
10 AUG.1989
11 AUG.1989
12 AUG.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE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

SUMMARY PLOTS AT KOKUBUNJI TOKYO

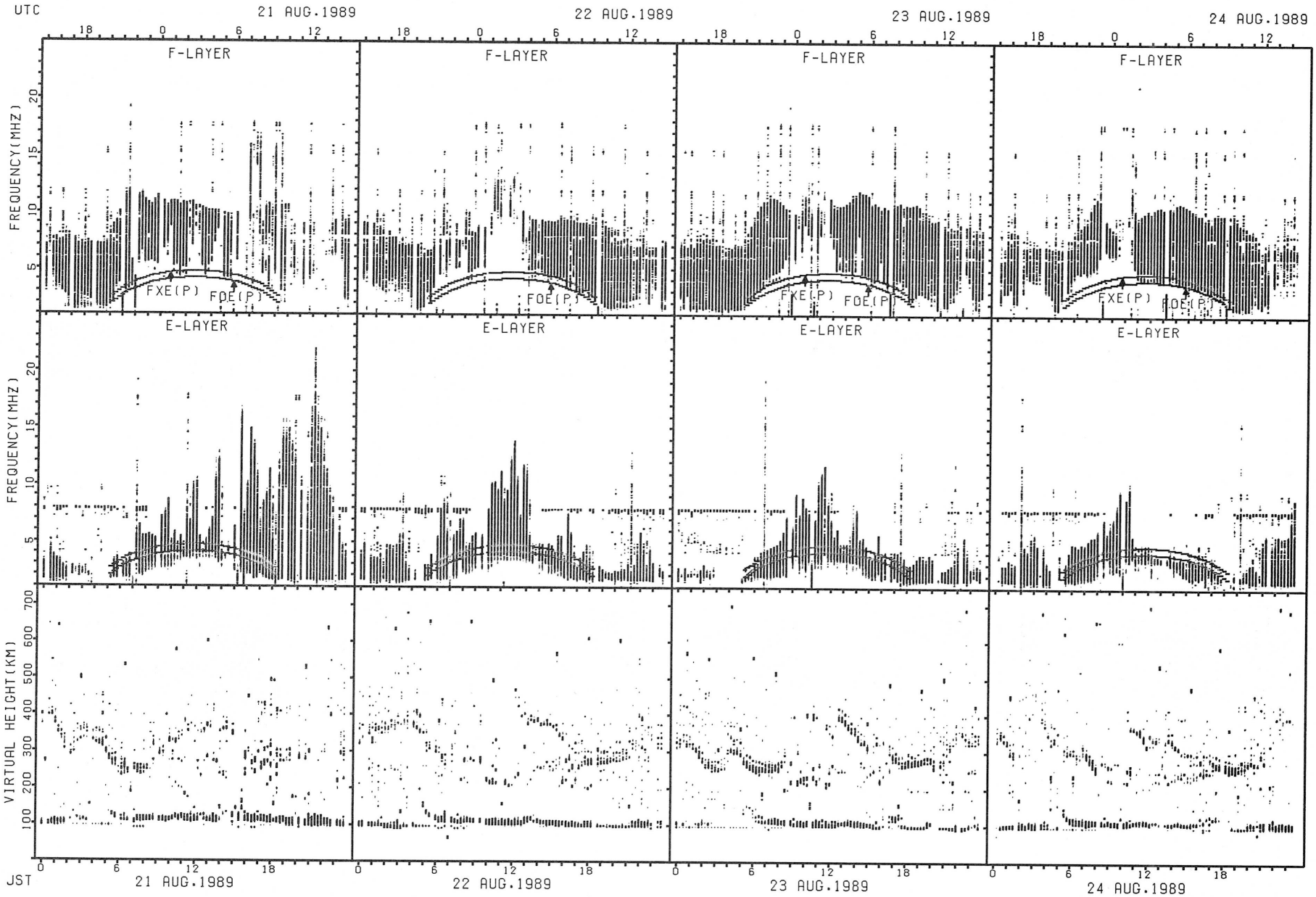


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

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

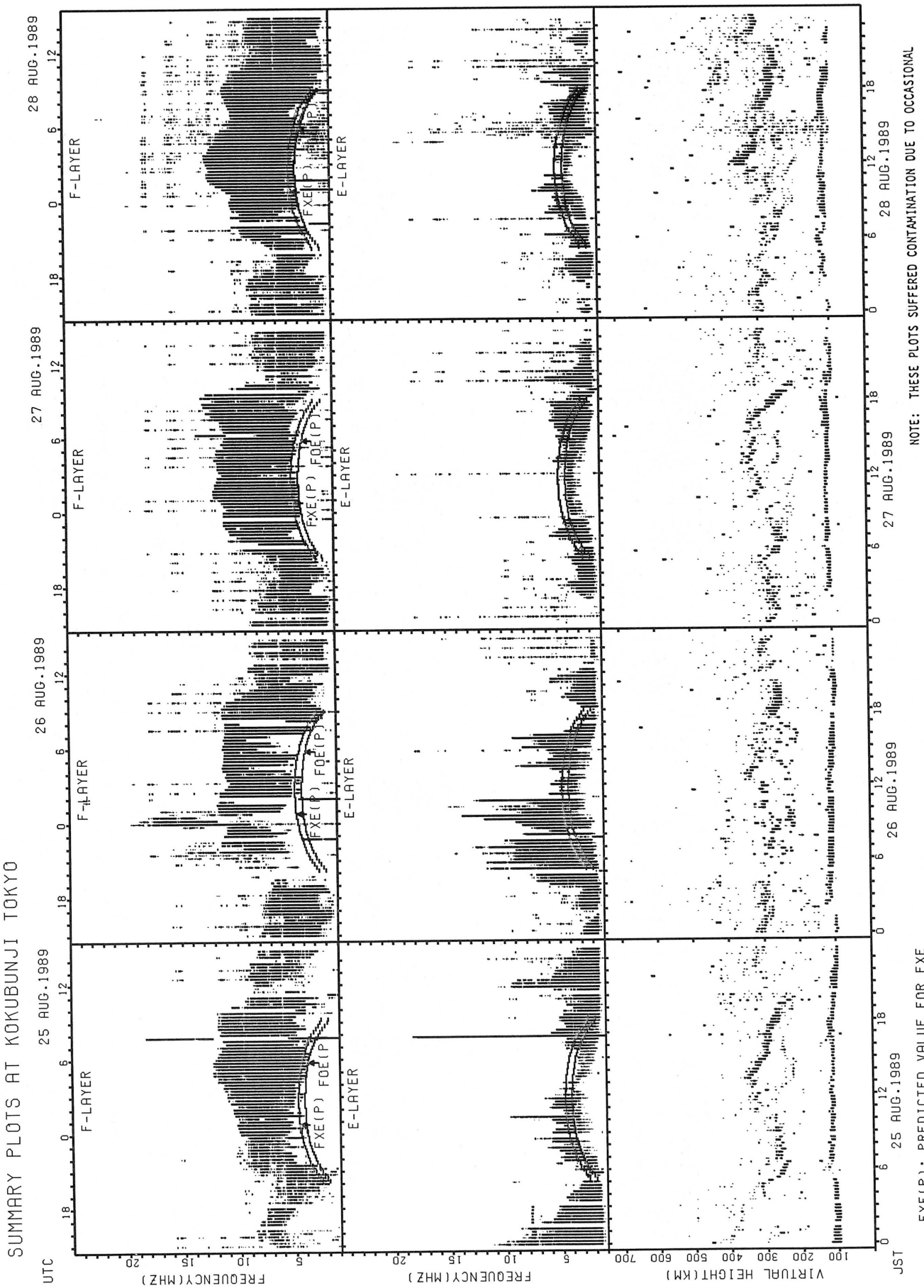

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
17 AUG.1989
18 AUG.1989
19 AUG.1989
20 AUG.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE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

SUMMARY PLOTS AT KOKUBUNJI TOKYO

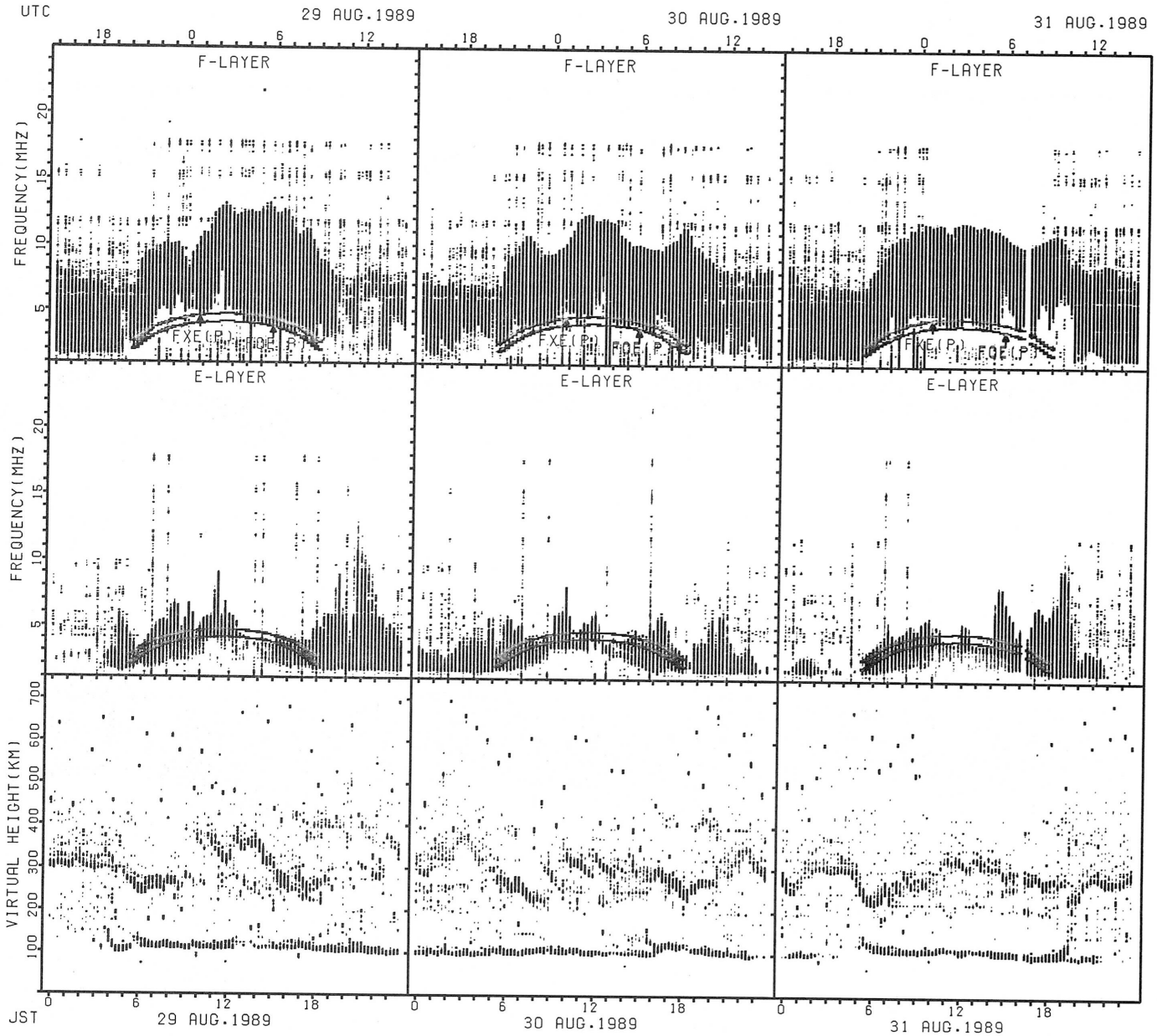


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

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


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 AUG.1989
26 AUG.1989
27 AUG.1989
28 AUG.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.

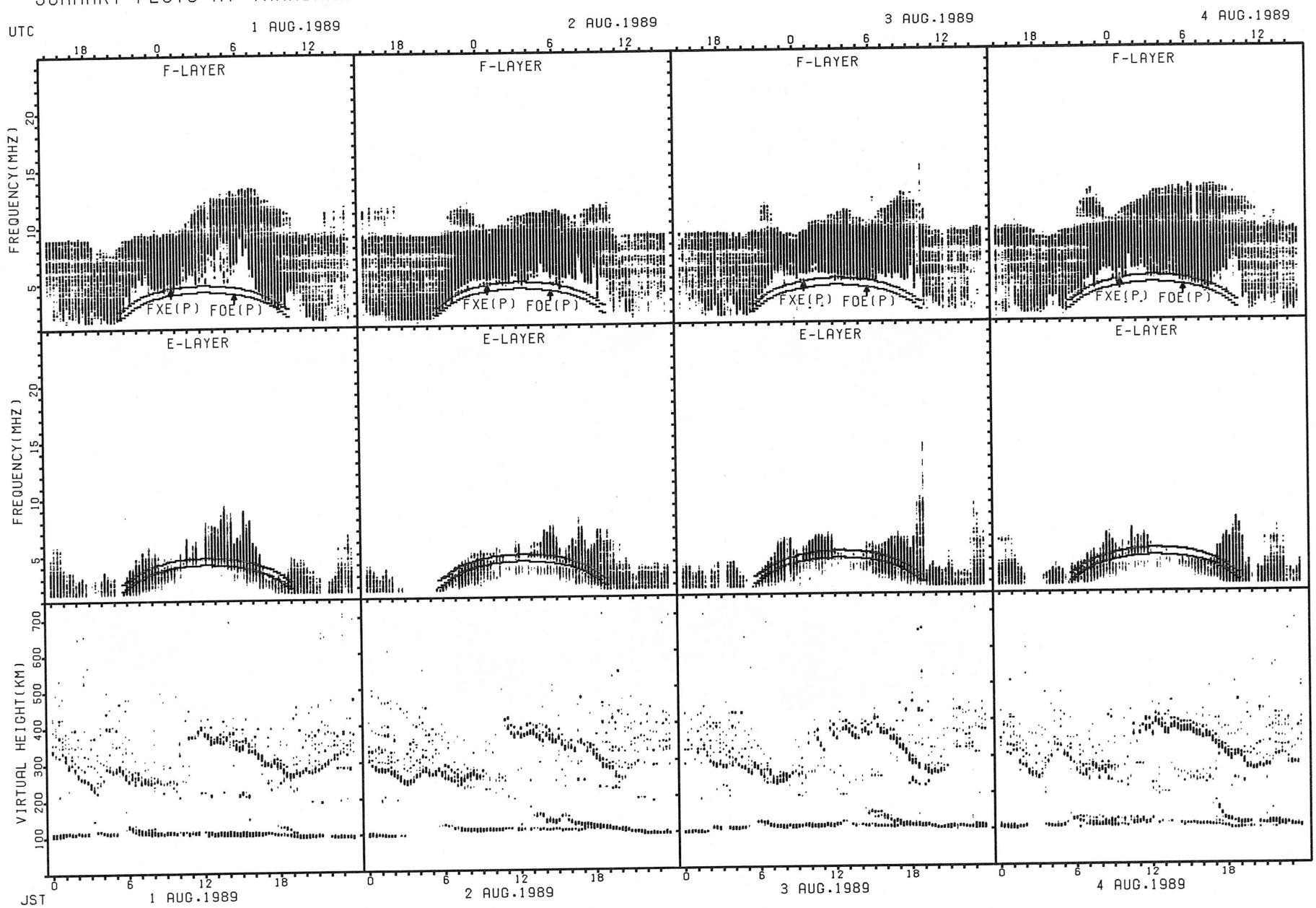
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

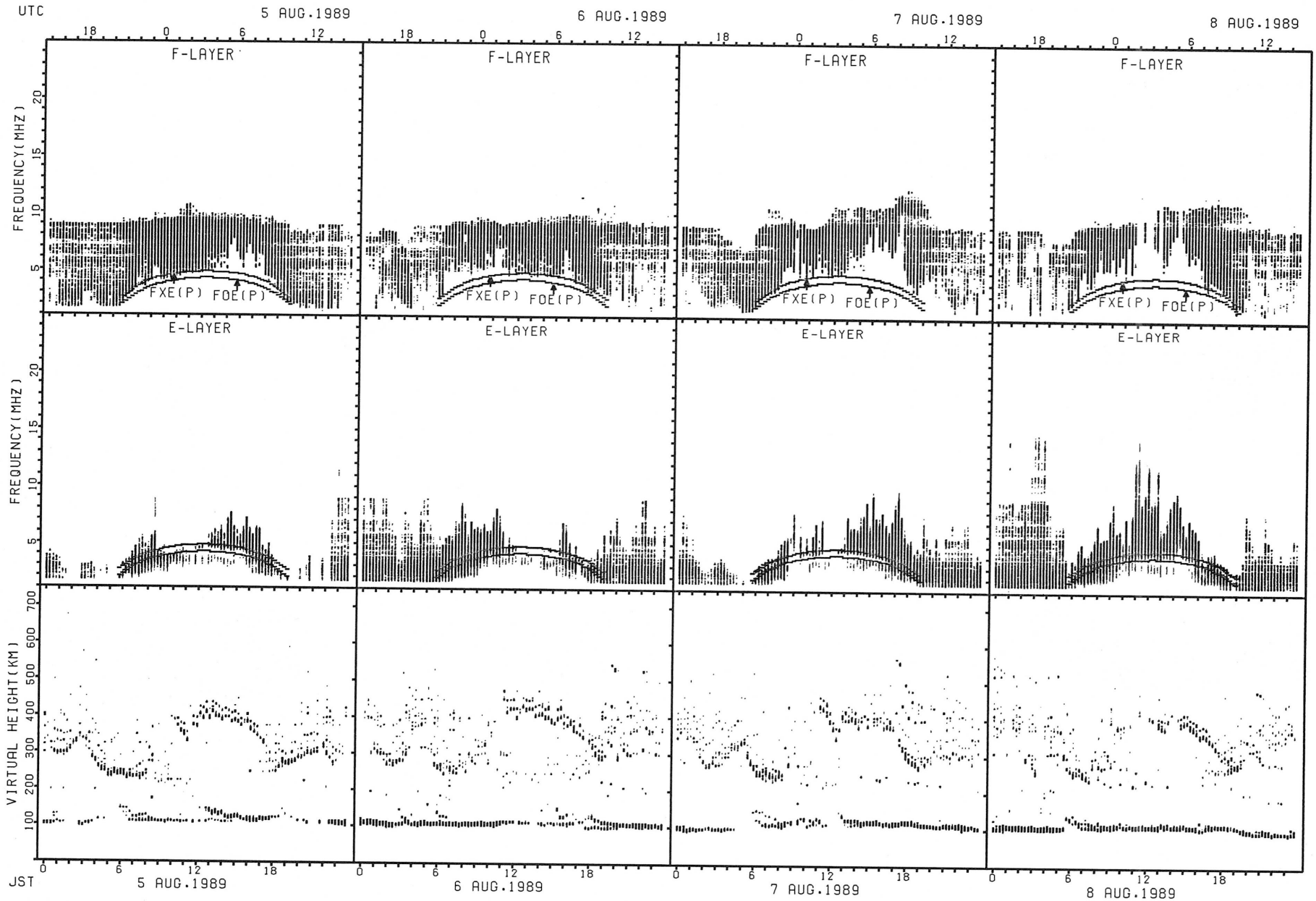
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT YAMAGAWA

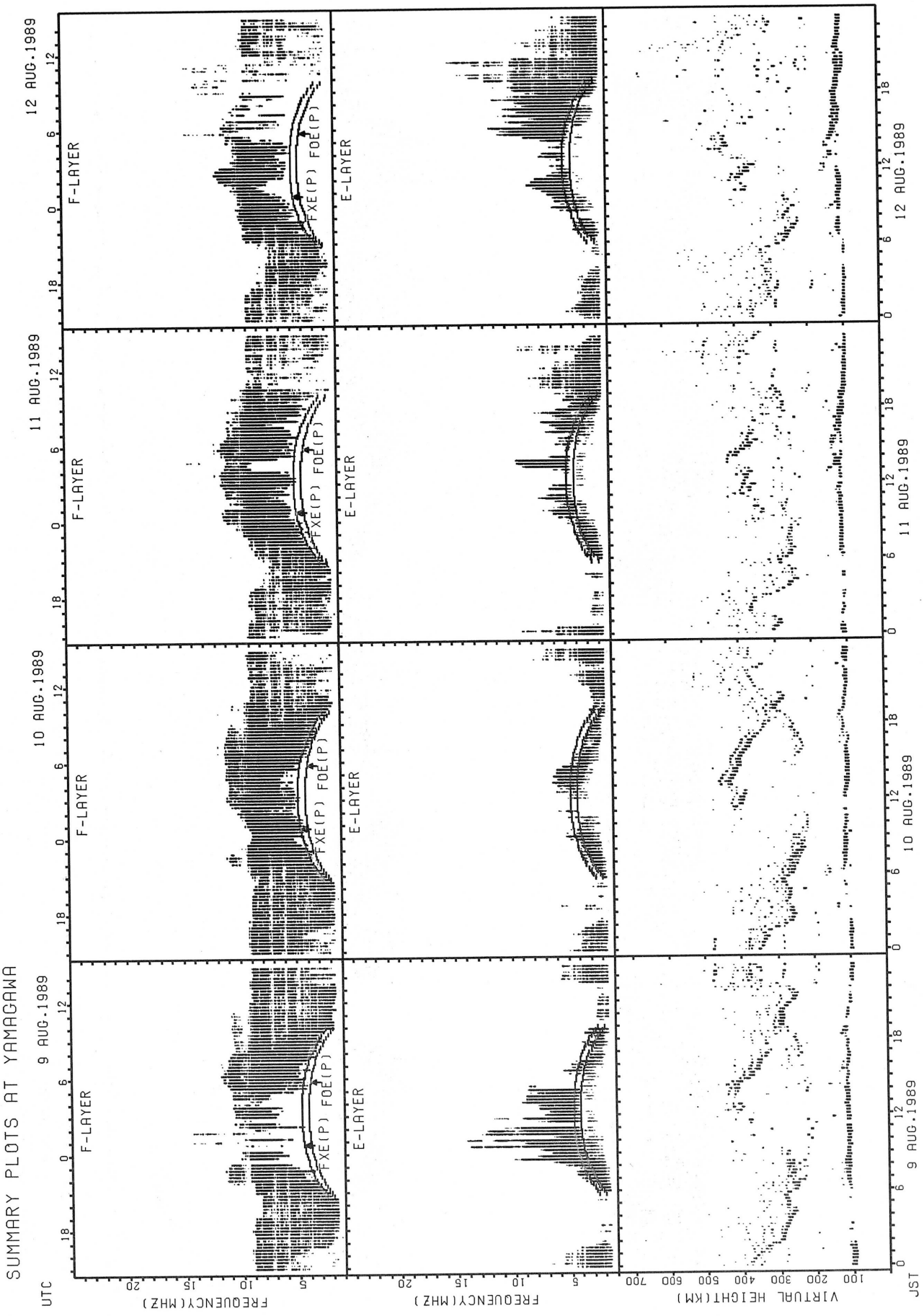


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

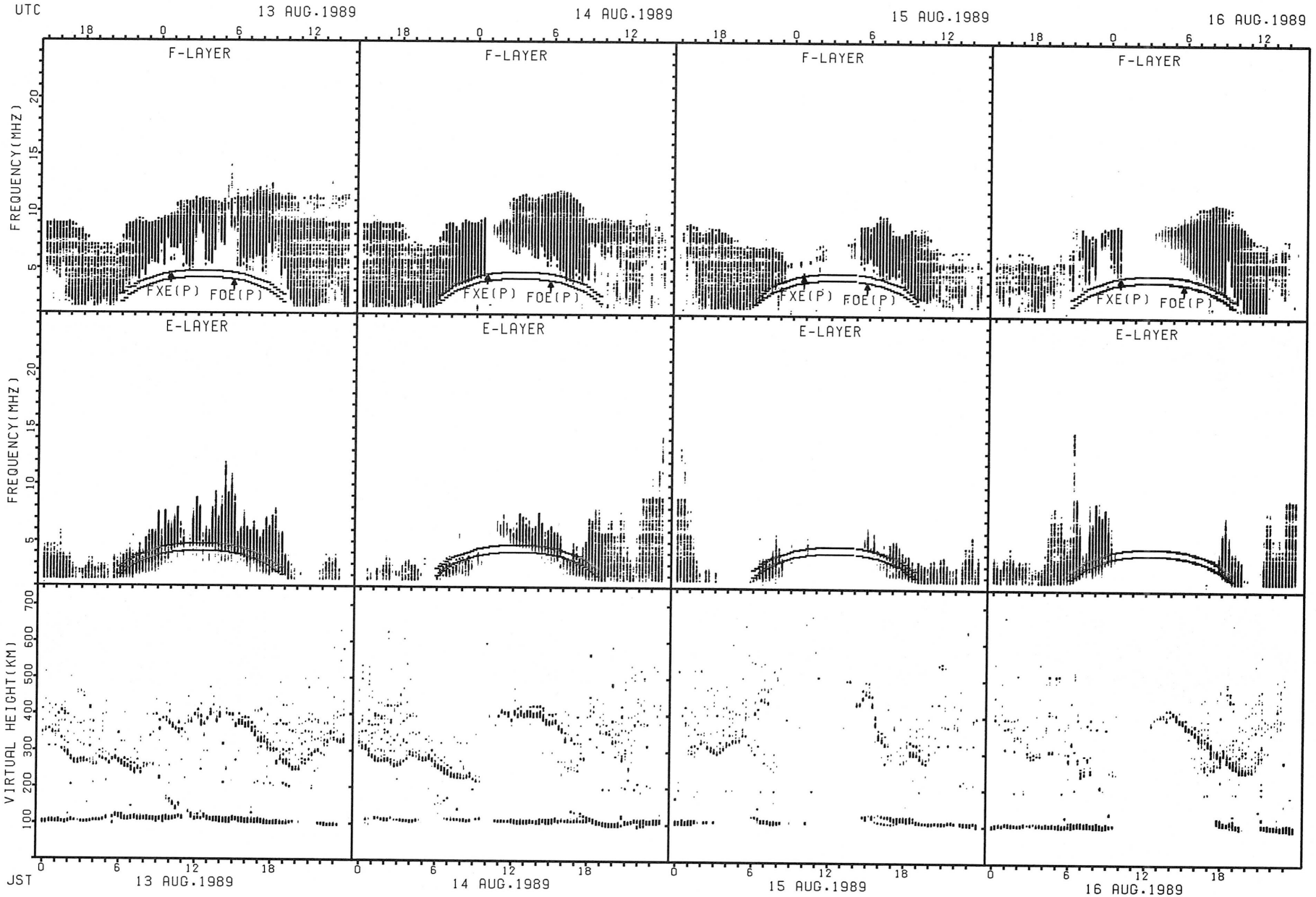
SUMMARY PLOTS AT YAMAGAWA



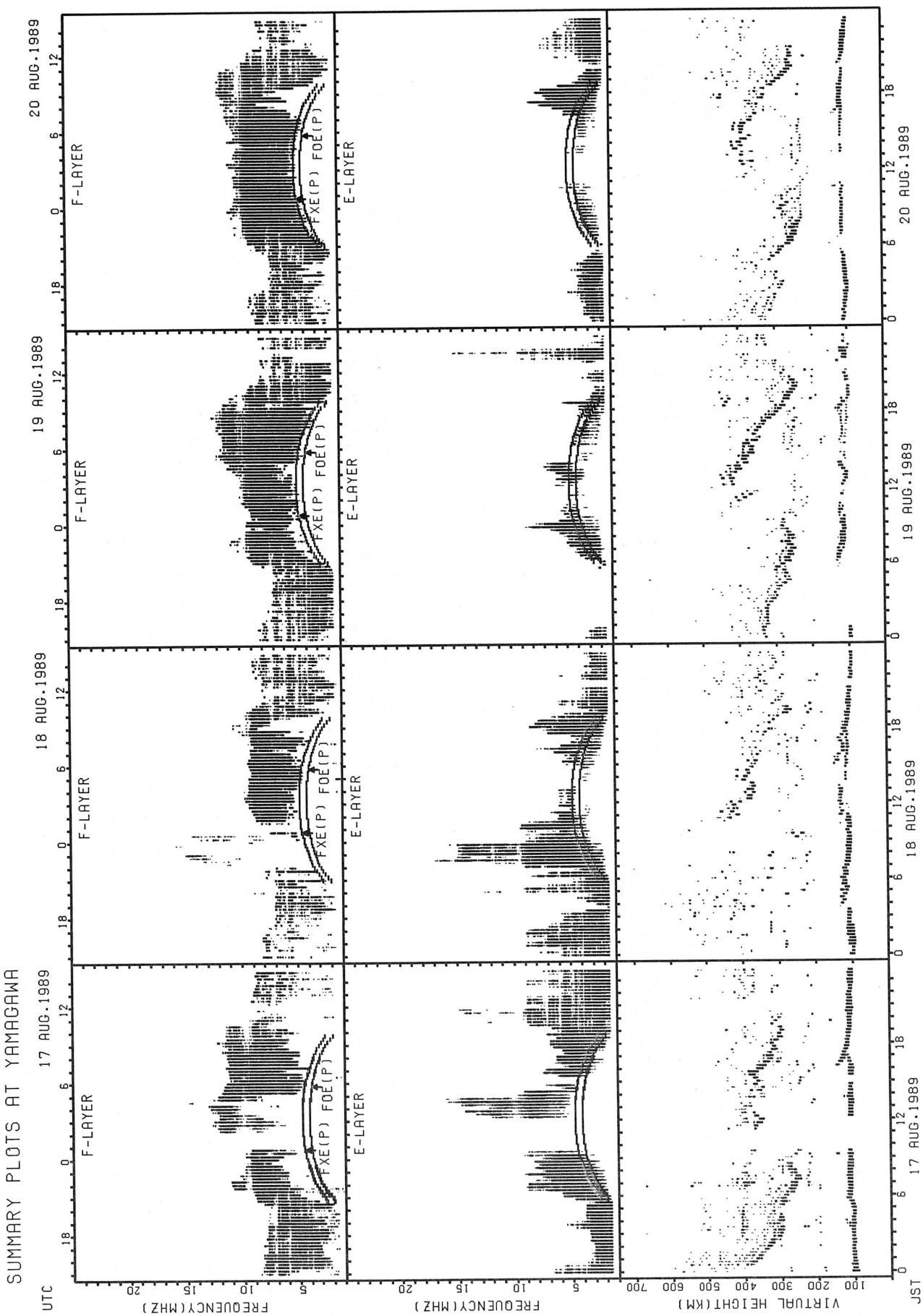
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
9 AUG.1989
10 AUG.1989
11 AUG.1989
12 AUG.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

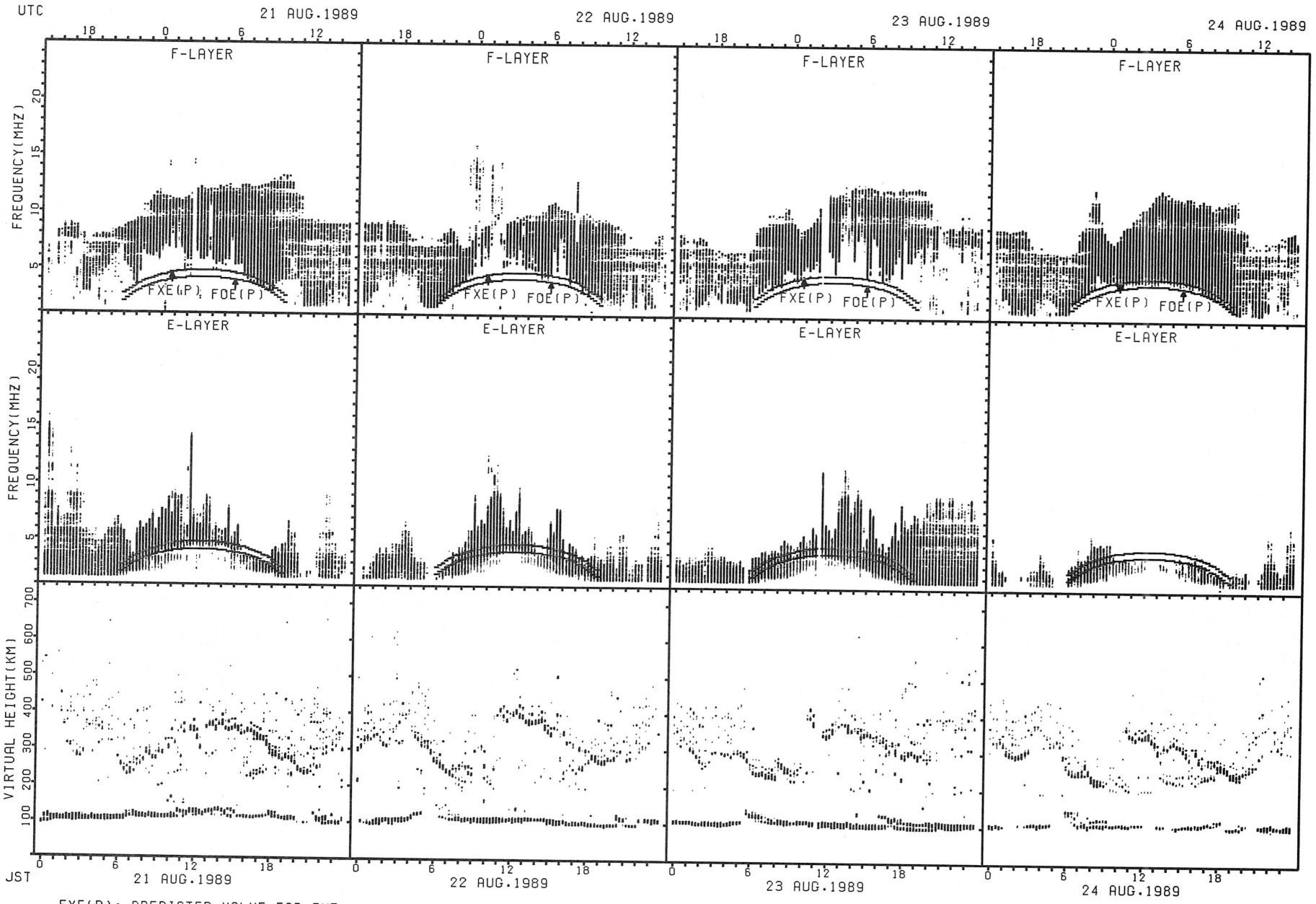
SUMMARY PLOTS AT YAMAGAWA



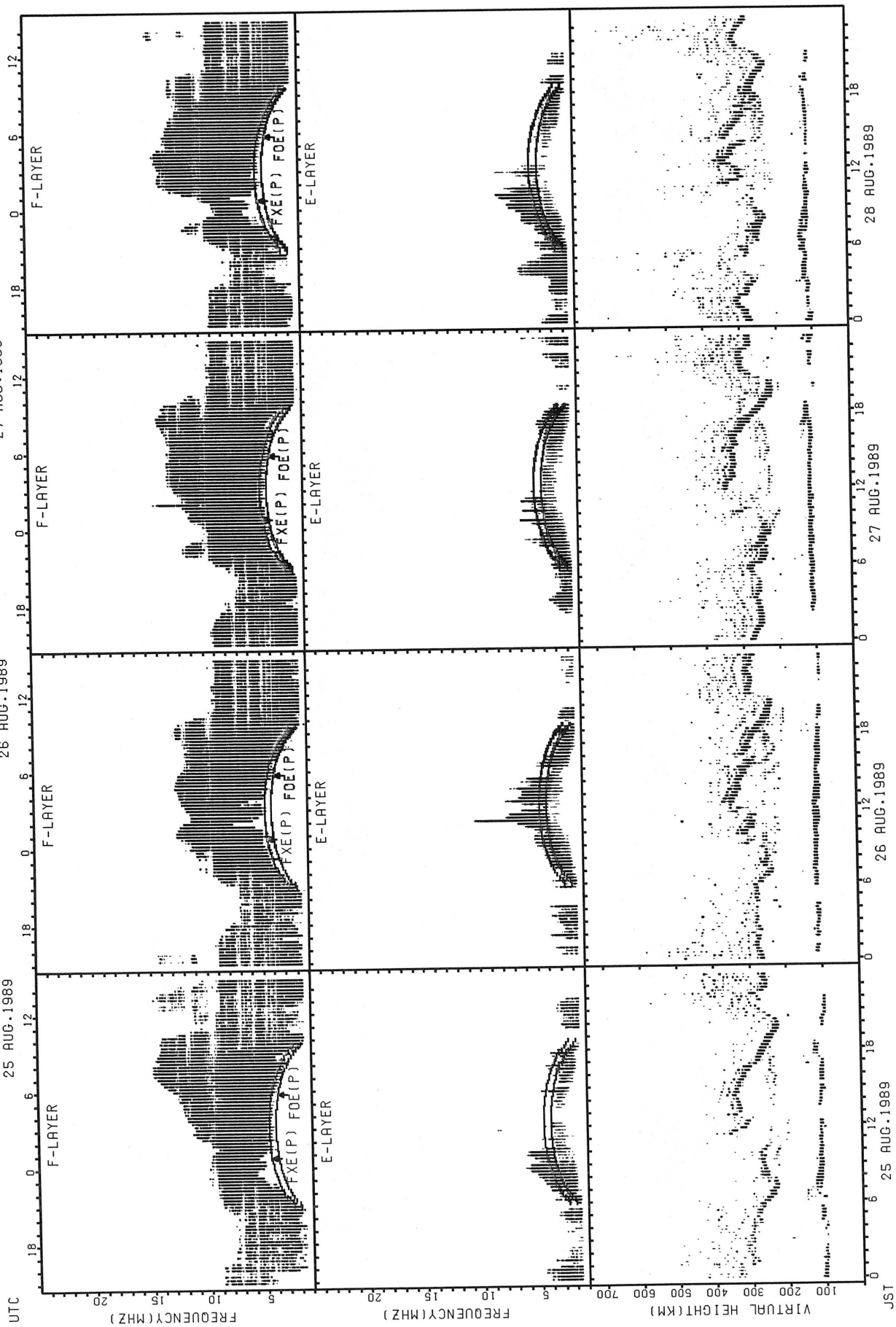
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

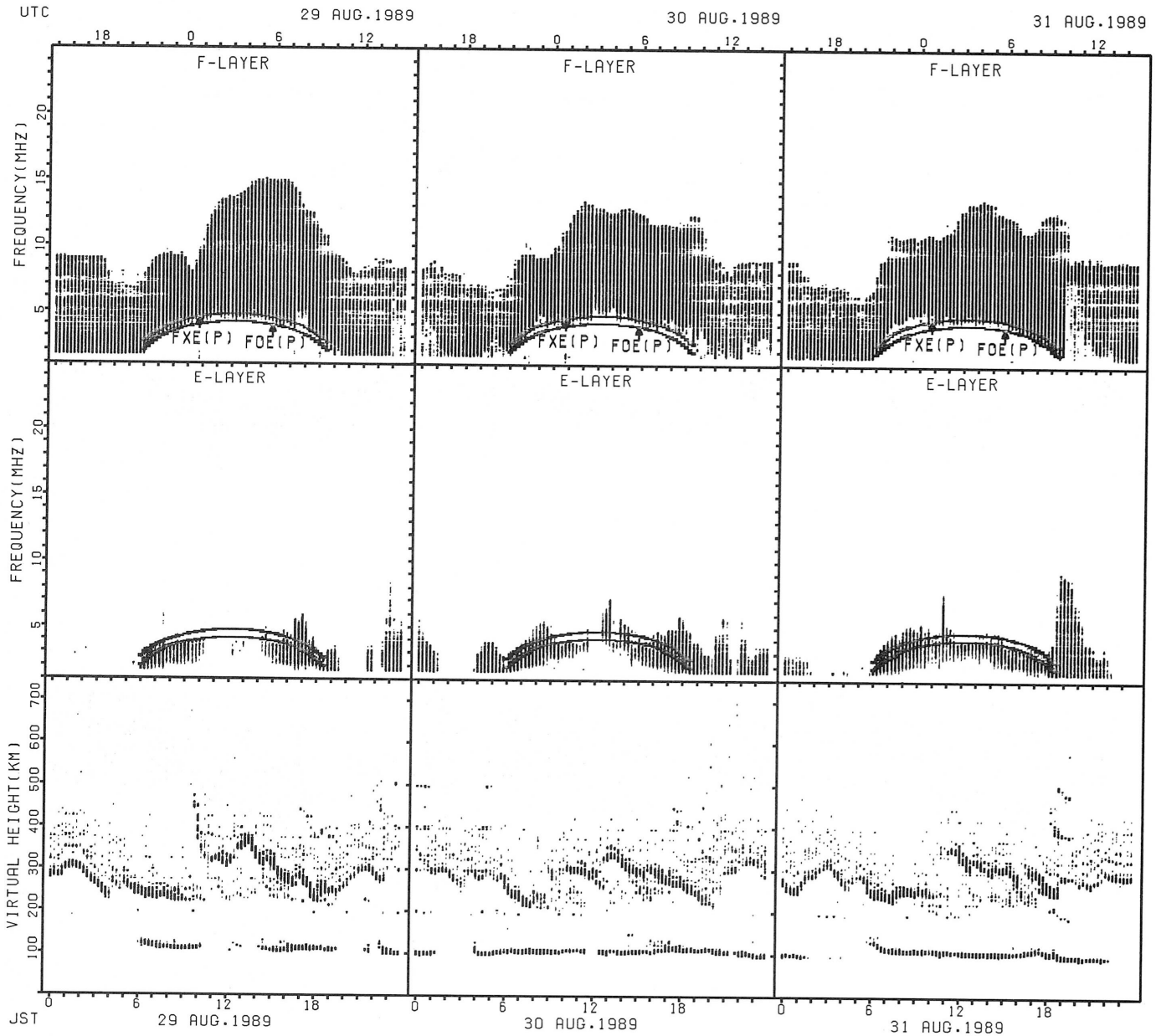
SUMMARY PLOTS AT YAMAGAWA



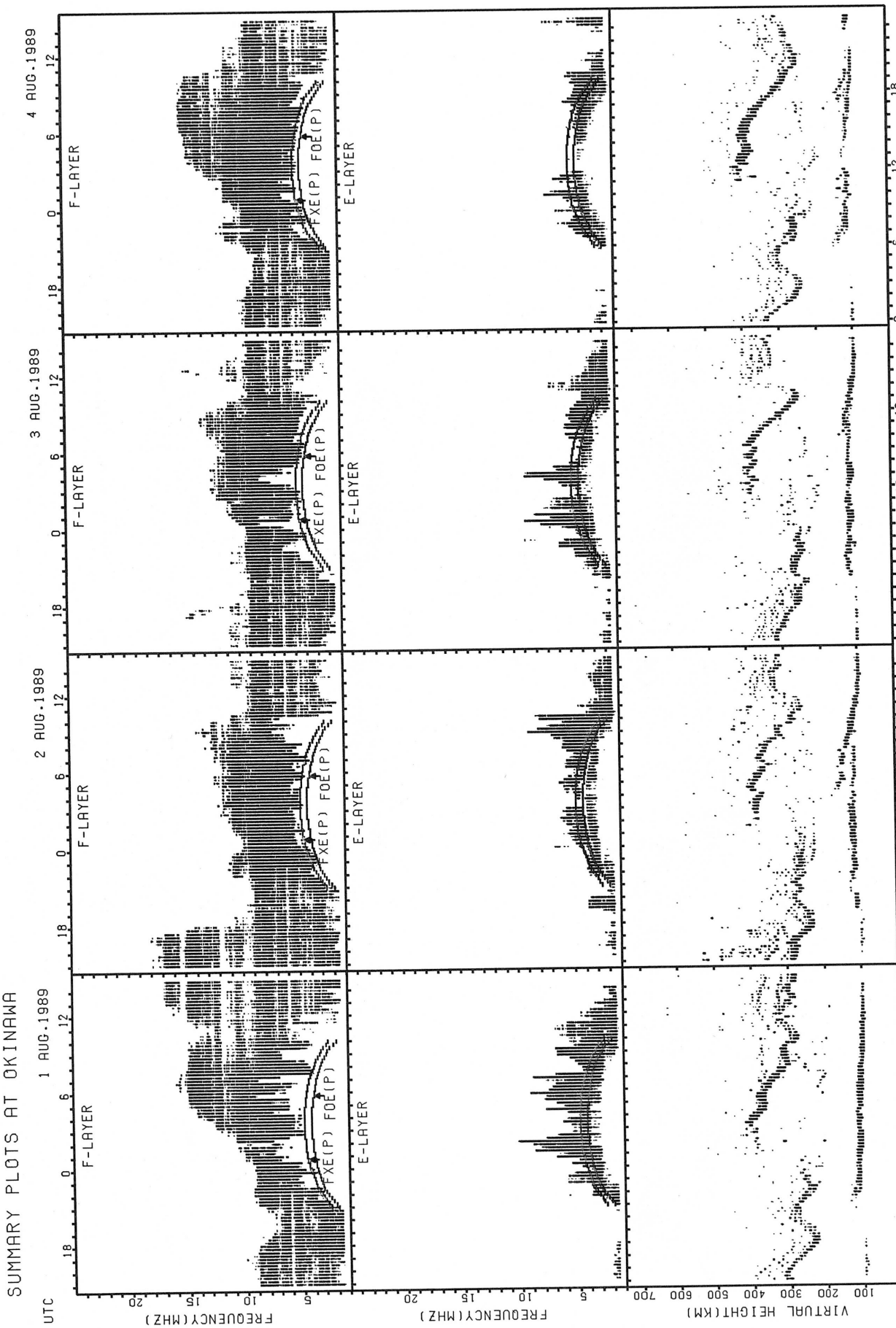
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 AUG.1989
26 AUG.1989
27 AUG.1989
28 AUG.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

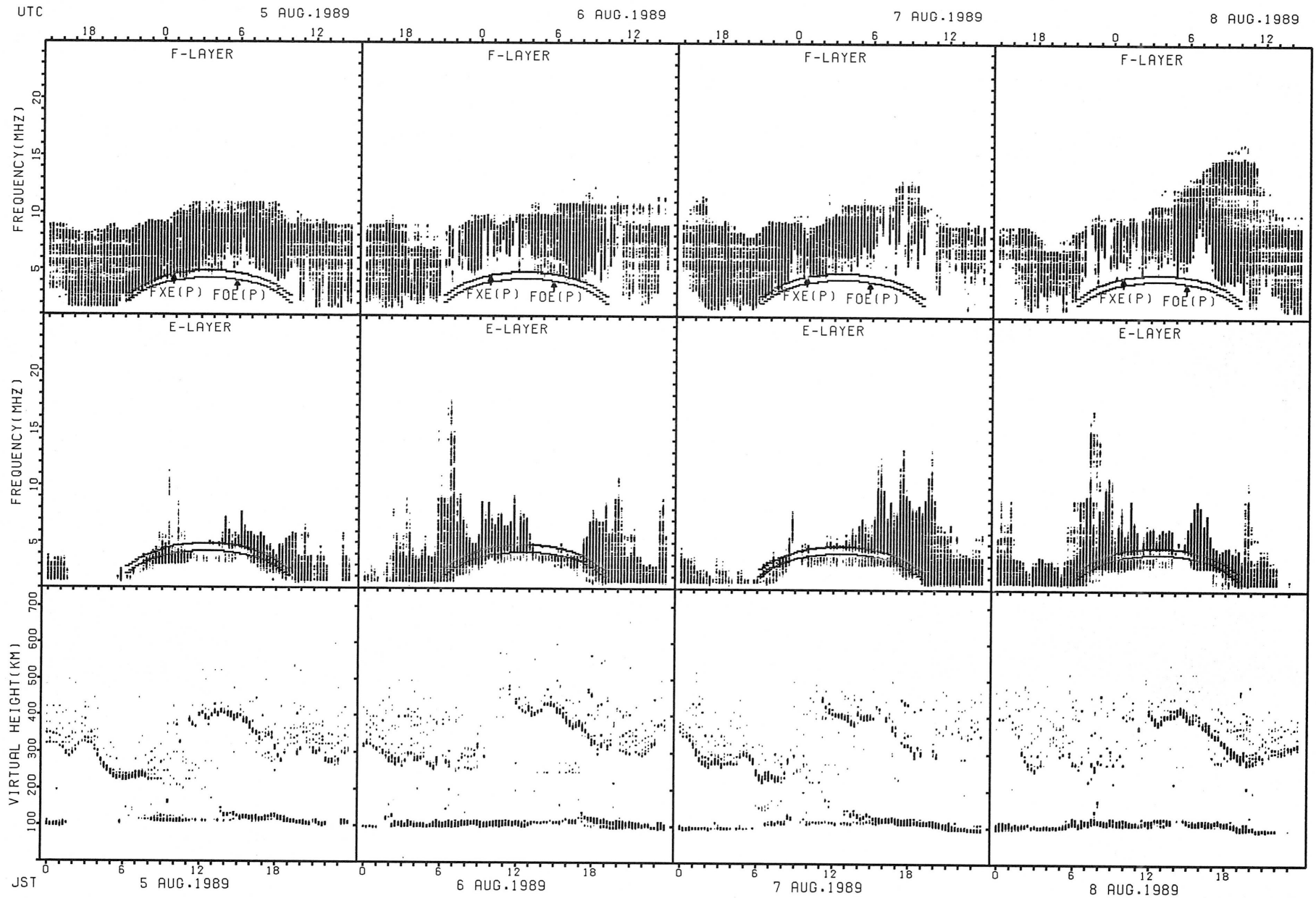
SUMMARY PLOTS AT YAMAGAWA



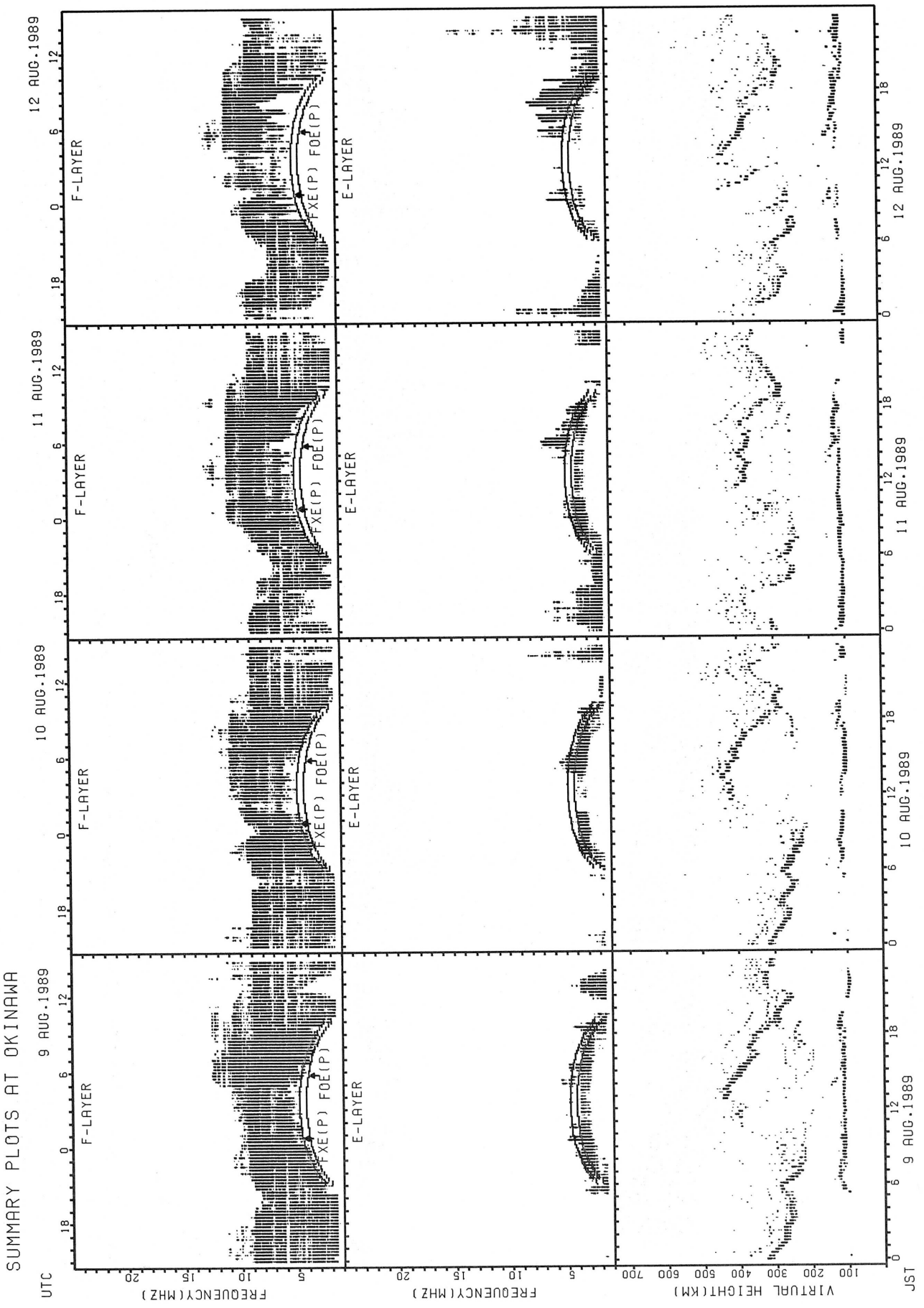
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
1 AUG.1989
2 AUG.1989
3 AUG.1989
4 AUG.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

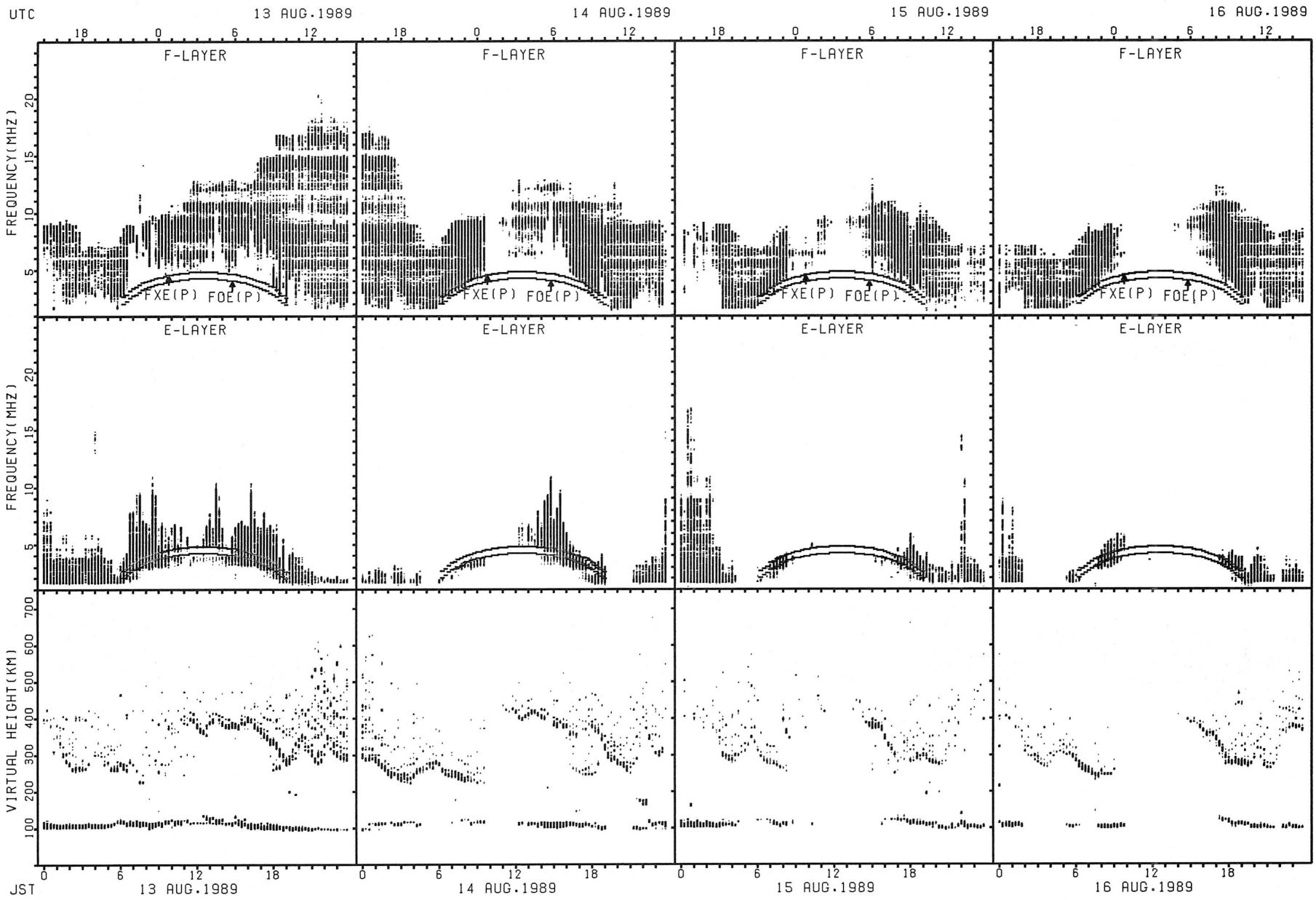
SUMMARY PLOTS AT OKINAWA



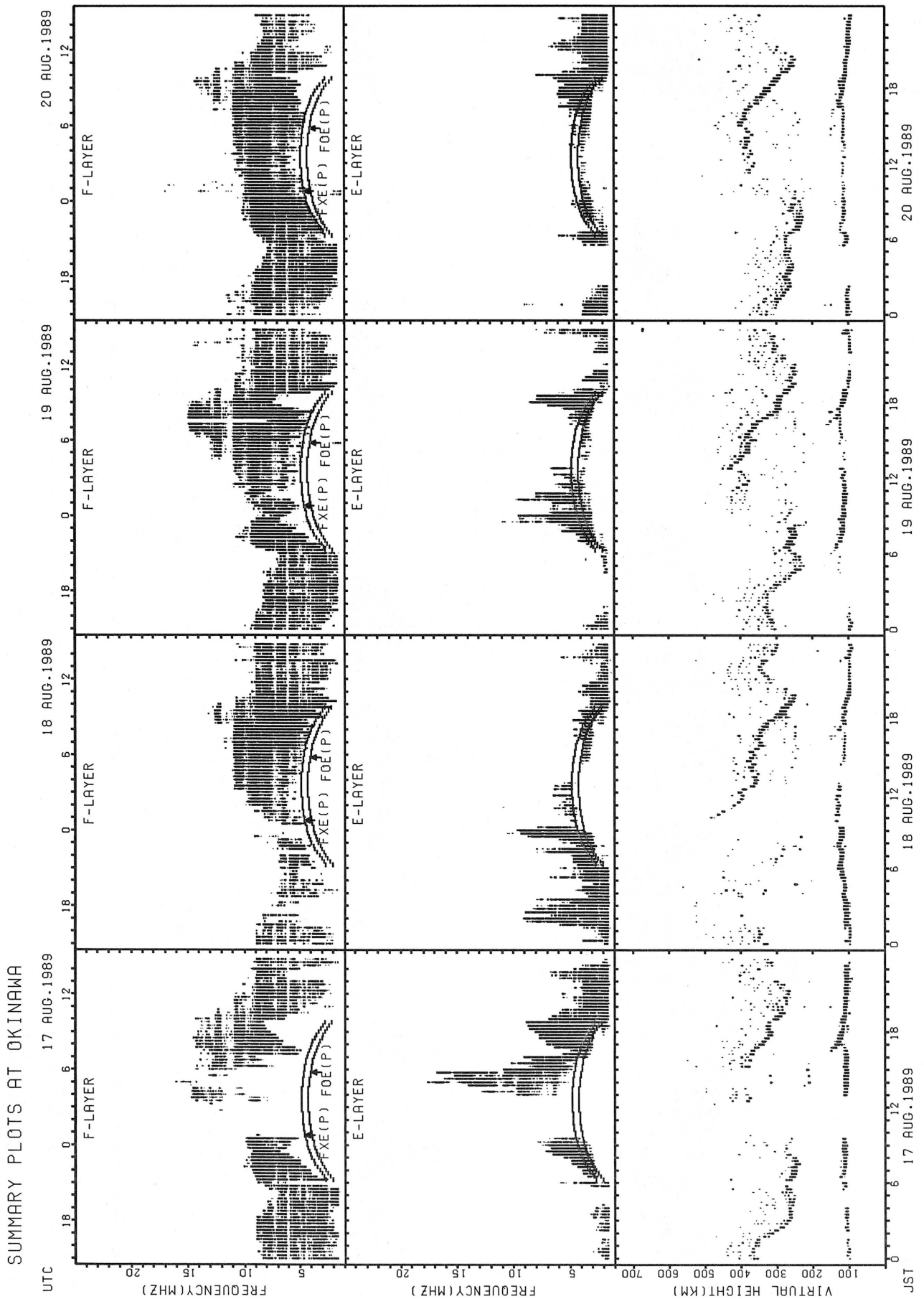
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
9 AUG.1989
10 AUG.1989
11 AUG.1989
12 AUG.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

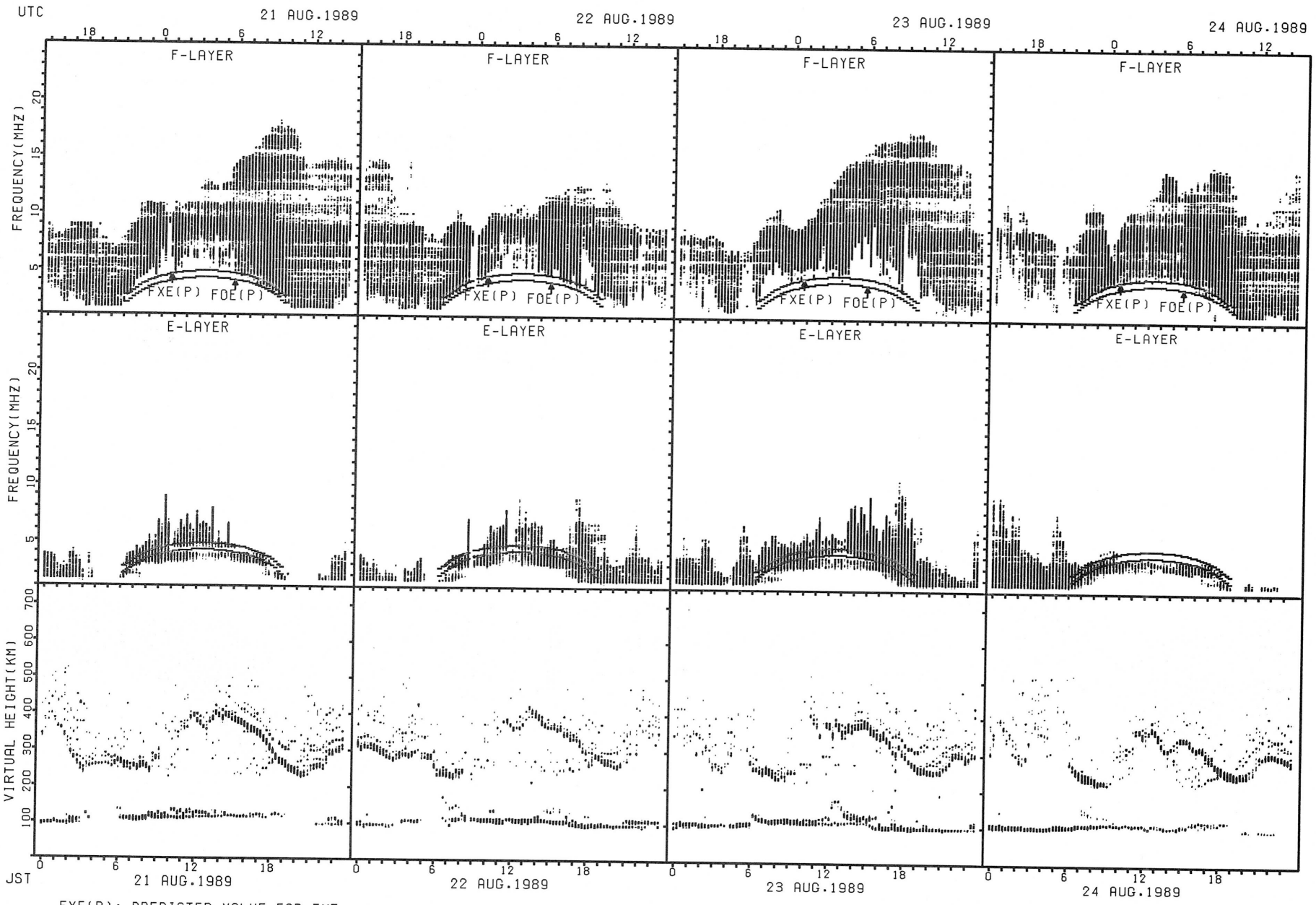
SUMMARY PLOTS AT OKINAWA



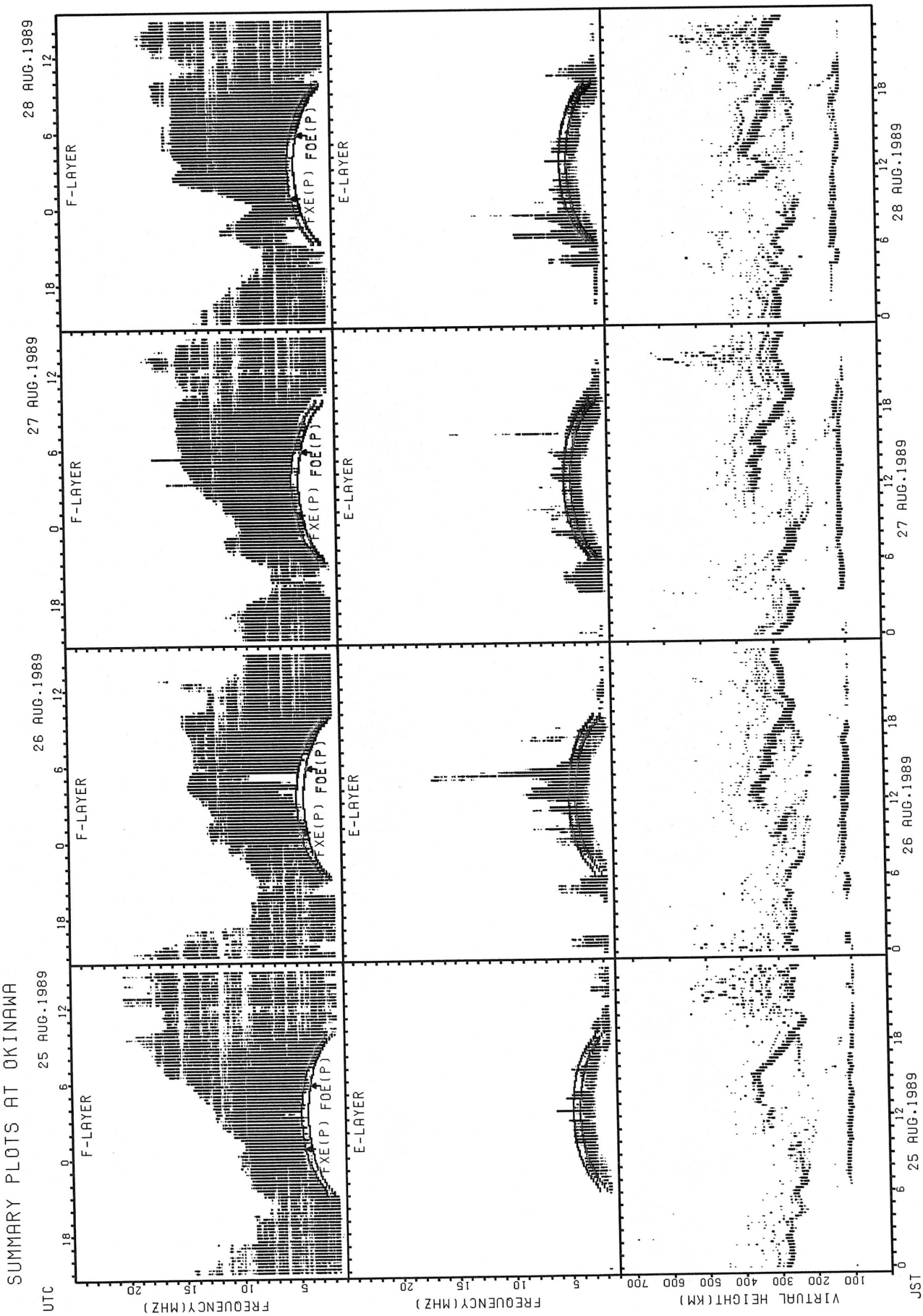
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
17 AUG.1989
18 AUG.1989
19 AUG.1989
20 AUG.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

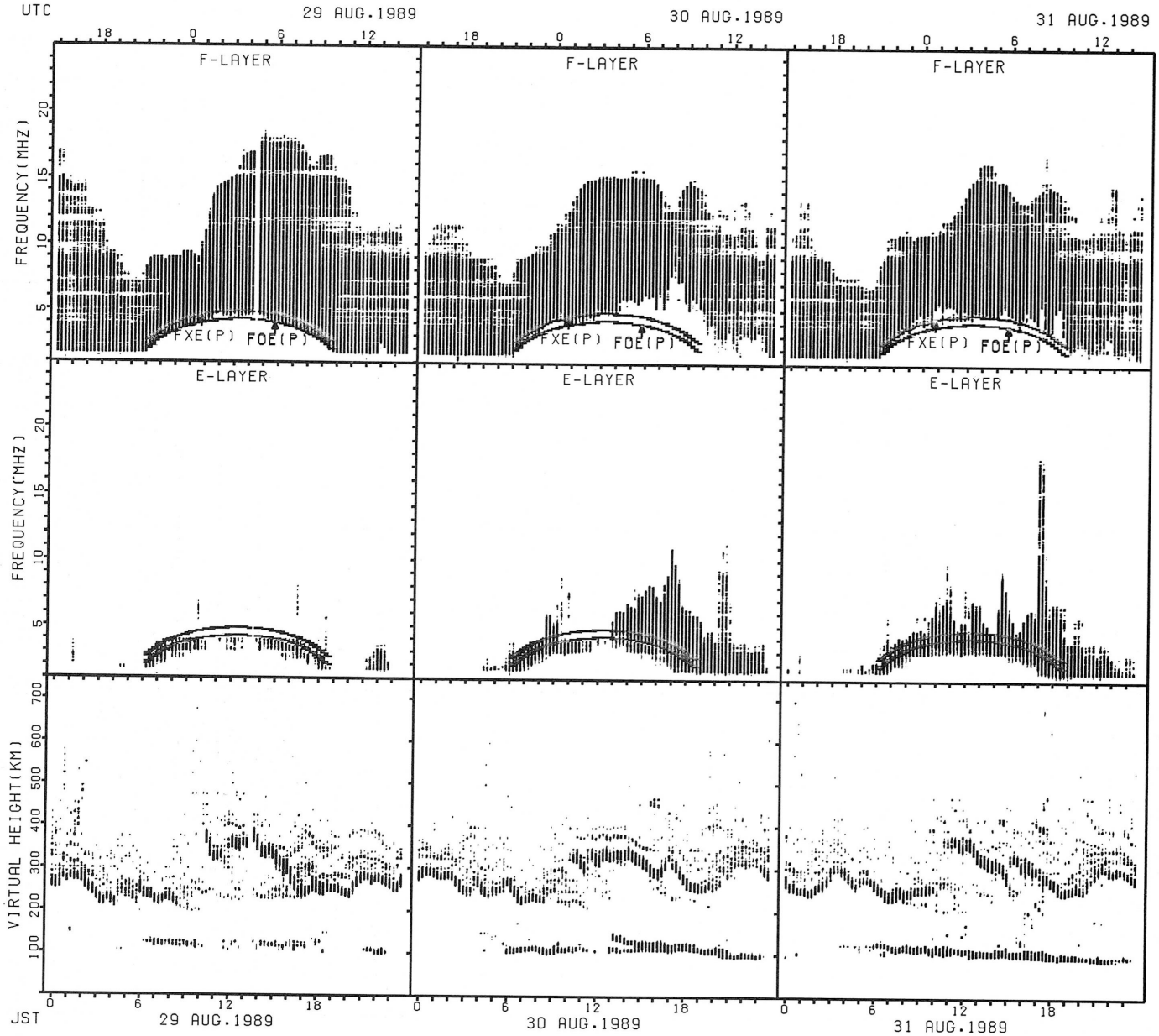
SUMMARY PLOTS AT OKINAWA



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


SUMMARY PLOTS AT OKINAWA
UTC
25 AUG.1989
26 AUG.1989
27 AUG.1989
28 AUG.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 OKINAWA



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

MONTHLY MEDIANS OF H'F AND H'ES
AUG.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							20	23	19							12	14	15	21	22	16	13		
MED							312	304	304							321	321	320	292	307	322	336		
U Q							344	332	330							332	356	338	325	352	347	355		
L Q							286	274	294							281	312	288	263	274	298	301		

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	21	19	18	17	18	22	26	25	23	16	13	12	12	11	17	20	26	25	28	26	27	22	19
MED	113	111	113	113	119	123	125	121	117	117	117	115	113	120	121	123	127	123	121	122	118	117	115	113
U Q	115	113	121	117	131	129	129	125	122	119	119	118	117	135	127	129	132	125	129	128	121	121	119	119
L Q	111	109	109	113	113	119	123	119	115	115	114	113	113	113	115	116	123	119	119	116	115	115	111	111

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							12	13	13								10	13	11	11				
MED							290	282	286								305	278	294	286				
U Q							308	304	299								346	328	320	322				
L Q							267	260	172								248	231	232	232				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	10	10					11	13	12	10	10	11	10		13	11	13	13	13	13	11	11	10
MED	107	108	105					119	115	111	112	109	109	111		119	119	119	117	111	113	113	113	110
U Q	111	111	107					121	118	114	117	113	115	115		128	129	122	124	116	117	119	123	115
L Q	105	103	103					115	111	107	109	107	107	109		105	113	115	113	107	105	109	109	101

H'F STATION KOKUBUNJI LAT. 35.7N LON. 139.5E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	14	15	14		10	18	23	24	10						21	22	28	24	28	20	13	18	13
MED	364	350	336	360		356	282	264	258	272						316	302	307	278	277	327	352	374	378
U Q	390	356	374	390		400	294	288	271	296						372	342	323	306	301	371	361	382	398
L Q	322	314	318	332		320	268	256	247	232						300	272	280	252	243	302	271	340	330

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	20	18	20	22	15	18	21	25	26	22	17	19	21	20	16	25	25	26	29	29	23	25	23
MED	103	107	106	107	111	107	122	115	113	111	113	111	111	115	115	121	121	119	115	111	107	111	107	105
U Q	109	111	107	115	119	121	125	119	116	117	117	115	117	122	125	131	127	121	121	117	112	113	115	115
L Q	99	98	101	104	101	103	115	110	111	109	107	108	107	108	109	109	112	112	113	108	101	101	102	101

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

MONTHLY MEDIANS OF H'F AND H'ES

AUG.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	13	18	19				20	29	24	19					10	11	24	26	28	29	18	10	10	12
MED	344	354	336				291	252	252	270					322	318	342	324	296	290	304	363	361	350
U Q	357	376	350				301	266	262	288					380	332	356	342	312	299	322	392	372	366
L Q	332	338	318				278	245	242	248					304	300	310	290	269	263	284	322	354	337

H'ES

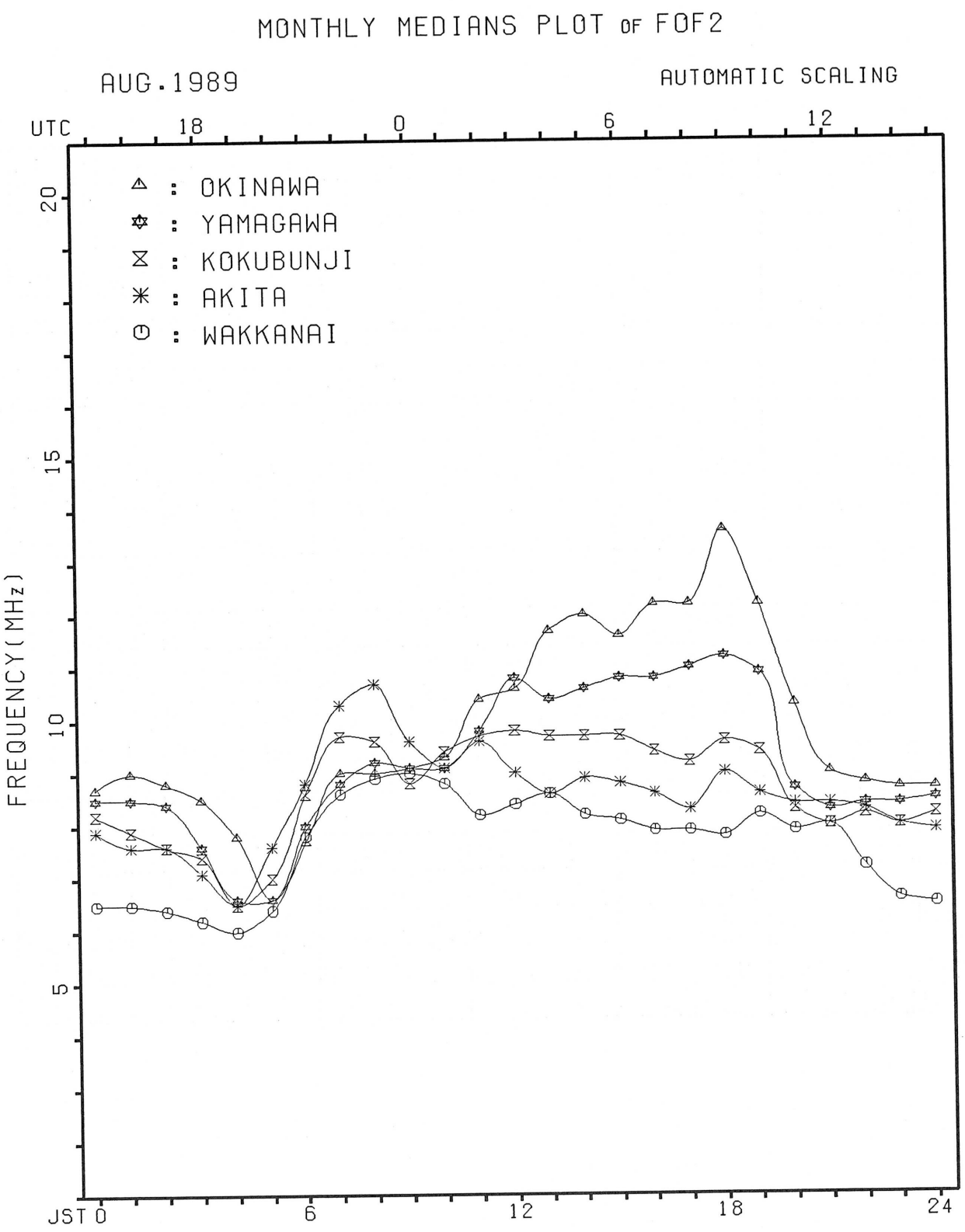
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	24	21	20	21	17	17	27	29	26	18	20	18	20	18	17	16	18	26	26	24	23	24	24
MED	105	105	107	108	109	111	125	119	115	113	113	112	116	111	115	123	117	119	118	113	110	107	111	107
U Q	111	111	111	112	113	115	137	123	118	115	123	115	123	129	123	134	122	121	119	113	112	113	115	113
L Q	101	102	104	105	107	108	119	113	111	111	111	109	113	107	107	108	108	117	115	107	103	105	101	100

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	18	23	25	21	13		16	27	27	26							20	27	31	30	31	24	20	20
MED	336	324	312	316	330		302	256	258	266							345	336	310	280	300	333	334	335
U Q	362	356	329	344	371		309	268	270	290							361	352	328	300	332	354	346	353
L Q	306	300	291	280	294		289	248	246	258							316	302	280	264	278	319	316	322

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	17	19	11	13	12	14	19	22	23	21	19	17	12	14	21	21	19	22	24	26	24	21	21	21
MED	105	107	107	107	107	110	113	120	115	115	111	115	118	114	119	119	121	122	117	112	105	101	99	99
U Q	115	111	107	110	109	115	121	125	119	119	117	119	128	143	128	129	131	131	119	113	115	107	106	106
L Q	97	101	99	103	105	105	109	115	111	109	109	110	113	107	106	110	109	117	113	103	101	99	97	97


MONTHLY MEDIANS PLOT OF FOF2
AUG.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

AUG. 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 91	X 91	X 88	X 80	X 70															X 104	X 91	X 94	X 97	C
2	X 99	X 98	X 91	X 82	X 77															X 102	X 93	X 87	X 91	X 89
3	X 88	X 87	X 86	X 88	X 82															X 109	X 99	X 96	X 94	X 96
4	X 96	X 96	X 95	X 91	X 87															X 106	X 104	X 108	X 111	X 113
5	X 110	X 111	X 97	X 99	X 105															X 79	X 79	X 84	X 89	X 88
6	X 88	X 74		X 71	X 71															X 102	X 98	X 98	X 97	X 95
7	X 95	X 88	0 X 84	X 79	X 76															X 104	X 97	X 90	X 90	X 96
8	X 97	X 93	X 86	X 80	X 77															X 100	X 99	X 103	0 X 102	X 95
9	X 99	X 90	X 86	X 84	X 86															X 104	X 109	X 108	X 97	X 97
10	X 95	X 92	X 93	X 88	X 84															X 98	X 96	X 92	X 99	X 104
11	X 101	X 84	X 85	X 87	X 83															X 91	X 82	X 86	X 87	X 88
12	X 88	X 89	X 81	X 76	X 74															V 92	X 85	X 87	X 88	X 82
13	X 81	X 79	X 81	X 79	X 72															X 90	S	X 86	X 89	X 88
14	X 88	X 89	X 83	X 76	X 76															X 101	X 99	X 102	X 99	X 88
15	X 88	X 80	X 84	X 78	X 73															X 70	X 62	X 63	X 62	X 60
16	X 60	A	A	X 61	X 61															X 93	X 84	X 87	X 89	X 84
17	S	0 X 78	S	S	S															X 108	X 98	X 94	X 89	X 93
18	X 87	X 85	X 75	X 70	X 69															X 98	X 82	X 83	X 85	X 83
19	X 78	X 80	X 77	X 76	X 72															X 97	X 85	X 82	X 78	X 78
20	X 77	X 76	X 75	X 75	X 69															X 112	X 105	X 92	X 77	X 81
21	X 77	X 80	X 80	X 75	X 76															X 108	X 98	X 97	X 92	X 90
22	X 93	X 90	X 82	X 78	X 72															X 89	X 84	X 79	X 83	X 81
23	X 81	X 80	X 83	X 75	X 71															X 105	X 97	X 90	X 94	X 87
24	X 86	X 87	X 81	X 75	X 75															X 93	X 84	X 79	0 X 80	X 84
25	X 82	X 87	X 82	X 78	X 75															X 116	X 94	X 91	X 94	X 87
26	X 83	X 78	X 80	X 76	X 69															X 105	X 84	X 87	X 86	S
27	X 87	X 0 X 83	X 77	X 74	X 64															X 102	X 75	X 81	X 83	X 84
28	X 84	X 84	X 85	X 78	X 64															X 101	X 88	X 81	X 85	X 87
29	X 84	X 80	X 77	X 75	X 69															X 79	X 76	X 0 X 78	X 81	X 75
30	X 80	X 75	X 74	X 71	X 72															X 99	X 88	X 0 X 86	X 82	X 83
31	X 88	X 72	X 72	X 0 X 73	X 71															X 103	X 88	X 88	X 89	X 83
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	28	30	30															31	30	31	31	29
MED	X 88	X 84	X 82	X 77	X 72															X 101	X 90	X 87	X 89	X 87
UQ	X 95	X 90	X 86	X 80	X 77															X 104	X 98	X 94	X 94	X 93
LQ	X 82	X 80	X 78	X 75	X 70															X 93	X 84	X 84	X 84	X 83

AUG. 1989 | FXI (0.1 MHZ)

IONOSPHERIC DATA

AUG. 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	85	85	82	74	64	67	90	104	100	103	106	108	113	117 R	110	104 I C	102	101	100	98	85	88	91	92 I C
2	93	92	85	76 J S	71	79	96 I C	111 I C	112 I C	102	98	93	95	97	100	98	93	89	95	96	87	81	85	83
3	82	81	80	82	76	81	108	109	92	90 H	91	98	100	94	94	93	93	104	111	103	93	90	88	90
4	90	90	89	85	81	90	110	121	110	109	113	115	115	109	111	109	109	103	105	100	93	98 F	105	107
5	104	105	91	93	99	100	97	89	A	89	A	79 V	81 V	74	72	80	80	80	78	73	73	78	83	82
6	80 F	68	65 F	62 F	62	71	96	102	93	92	86	83 R	88	92	93	94	90	89	92	96	92	92	91	89
7	89	82	78	73	67 F	75	99	116	118	A	96	99	99	99	99	102	99	98	98	93	91	84	84	84 F
8	87 F	84 F	80	74	71	80	92	105	102	96	96	96	99	102	102	97	97	95	96	94	93	97	96	89
9	93	84	80	78	80	C	S	S	119	106	103	104	102	104	107	103	101	101	98	98	103	102	91	91
10	89	86	87	82	78	78	90	105	100	90	90	95	101	97	97	97	95	92	88	92	90	86	93	98
11	95	78	79	81	77	69	75	83	93	105	102	105	101	98	94	99	96	92	90	85	76	80	81	78 F
12	82	83	75 S	70	68	67	86	88	89	93	94	91	A	A	84	86	92	91	90	86 V	79	81	82	76
13	75	73	75	73	66	67	73	83	80	79	87	A	94	94	97	97	101	101	99	84	I S 80	80	83	82
14	82	83	77	70	70	75	87	92	90	91	I B 96	R 102	U R 105	105	106	102	100	96	87	95	93	96	93	82
15	82	74	78	72	67	63	68	69	63	60	E G 54	B	B	B	70	66	76	68	64	64	56	57	56	54
16	54	A	A	55	55	61	86	89	88	95	B	B	B	99	91	90	89	89	93	87	78	79 F	83	78
17	S	S 72	S	S	S	S	S	S	S	99	B	109	116	111	C	C	90	C	C	102	92	88	83	87
18	81	79	69	64	63	67	71	78	60	U R 62	W	76	I C 76	76	75	79	A	85	87	92	76	77	79	77
19	72	74	71	70	66	71	86	85	83	80	80	80	82	86	97	96	96	94	99	91	79	76	72	72
20	71	70	69	69	63	66	95	107	105	102	104	98	95	92	92	90	90	95	95	106	99	86	71	75
21	71	74	74	69	70	77	105	125	104	I C 108	106	103	103	97	95	94	89	89	98	102	92	91	F 82	84
22	F 85	F 82	76	72	F 65	60	75	70	76	81	87	A	A	90	89	88	90	86	84	83	78	73	77	75
23	75	74	77	69	65	70	99	112	104	96	91	99	105	106	115	107	101	104	103	99	91	84	88	81
24	80	81	75	69	69	69	79	91	107	82	76	91	97	101	105	101	94	91	94	87	78	73	S 74	78
25	S 76	81	76	72	69	72	89	R 103	103	94	97	103	108	113	122	120	113	112	110	110	88	85	85	81
26	77	72	Z 74	F 67	63	A	83	105	107	105	113	114	103	108	108	110	108	107	J S 110	S 98	77	82	80	I S 78
27	81	77	U S 71	67	59	61	86	98	106	106	110	112	109	111	111	104	108	121	123	96	69	S 75	77	78
28	78	78	79	72	58	58	77	95	89	98	102	116	115	115	109	98	92	98	103	95	82	75	79	81
29	78	74	71	69	63	62	85	94	96	82	R 101	123	122	122	123	121	117	103	86	73	79	72	U S 75	69
30	74	69	68	65	66	66	86	104	84	90	101	R 119	117	114	101	96	94	99	110	93	82	80	U S 76	77
31	82	S 66	66	67	S 65	63	80	101	107	110	115	110	117	113	111	106	98	100	105	97	82	82	83	77
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	30	30	28	29	29	29	30	27	27	27	29	30	30	30	30	30	31	31	31	31	31
MED	82	78	76	71	66	69	86	101	100	94	97	102	102	101	100	98	96	96	97	95	82	82	83	81
UQ	87	83	80	74	71	76	96	105	106	105	104	110	111	111	109	104	101	101	103	98	92	88	88	86
LQ	76	74	71	69	63	64	80	89	89	89	90	94	96	94	93	93	90	89	90	87	78	78	78	77

AUG. 1989 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

AUG. 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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L	560	L	650	L	L	L	I C 530	L	L 500	L					
2							C	C	C	L	A	L	L 630	L 610	590	600	L 550	A	A					
3							L	L	L	L	L	600	L	L	L 590	U L 540	L 560	L	A					
4							L	L	A	L	U L 690	A	A	U A 620	590	A	A	A	A					
5								A	A	A	A	L 610	580	550	560	550	L	L	A					
6							L	A	L	L	L	L 610	600	560	600	550	L 570	L	A					
7							L	L	L	A	680	580	620	L	600	580	520	L	L					
8						L		A	A	A	A	L	U A 630	610	L	U L 600	L	L	L					
9						C		L	L	A	U A 630	A	630	630	A	L	A	A	A					
10								L	L	L	L	L 680	600	610	600	L 620	L 580	L	L					
11								L	A	A	720	L 680	U L 720	H 640	640	L 640	L	L	L					
12							L	L	L 620	630	B	A	A	A	A	A	A	A	A					
13								L	L	L	610	A	A	650	610	610	L 560	L						
14								L		A	B	R	L	620	H 650	L	U L 590	L	A					
15						L 290	400	460	490	R 510	560	B	B	B	540	520	A	A	A					
16								A	A	L 580	B	B	B	B	B	L 610	L	A						
17						S	S	S		L	B	B	L	L	C	C	L	C	C					
18						L	L 460	460	L	580	570	570	C	L 590	A	A	A	A						
19							L	A	A	A	620		U L 640	A	590	L 590	L 560	L	A					
20							L	L	L	U L 590	L	U L 670	L 650	630	600	L	L 560	L	A					
21								L		C	L 620	L	L	U L 640	U L 620	L 570	A	L	A					
22							A		A		A	A	A	L 590	590	L 590	U L 550	L						
23								L		A	A	A	L	600	A	U L 530	L	L						
24								L	A	A	640	U L 620	550	L	L	L	L							
25									L		L	L	L	L	580	U L 560	L	A						
26						A	A	A	A	A	A	L	L 570	590	L	A	A	L						
27								L		L	U L 620	L	L	L	U L 590	L	U L 530	A						
28								L	A	L	L	L	610	U L 570	L	L	L	L						
29									L	L	L	L	670	L 590	L	U L 560	L	L						
30								L	L	L	L	L 610	L	550	L	L	L	L						
31								L	L	L	L	L	U L 640	L	L	A	L	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	2	2	6	11	11	15	19	17	18	11	1						
MED						L 290	430	460	555	580	620	L 610	630	610	590	L 580	L 560	L 500						
UQ										L 590	660	L 660	L 640	625	600	L 600	L 575							
LQ										560	615	605	600	590	590	L 550	L 555							

AUG. 1989 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

AUG. 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	270	330	375	A	A	A	A	A	A	C	360	305	220					
2						B	C	C	I C 360	380	395	A	A	A	A	385	350	295	220					
3						S	A	A	A	A	A	A	415	410	A	385	345	300	A					
4						B	265	315	A	A	A	A	405	405	390	395	355	305	U A 210					
5						B	270	335	A	A	A	415	425	420	405	400	365	315	A					
6						160	A	A	A	A	A	A	430	425	415	390	360	320	230					
7						160	265	320	A	B	A	U A 430	430	420	410	390	365	320	A					
8						A	275	335	375	395	410	420	415	410	A	370	315	A	A					
9						C	C	C	360	390	A	410	420	420	410	390	360	310	190					
10						175	280	A	A	A	A	A	A	A	A	390	360	310	220					
11						A	A	325	370	395	410	A	410	425	415	405	355	310	A					
12						A	A	A	B	A	A	U A 415	A	A	A	400	360	310	200					
13						B	265	340	A	390	415	420	415	405	A	A	S	295	210					
14						B	255	320	A	A	B	B	B	A	A	A	350	305	205					
15						B	A	A	A	A	A	B	B	B	B	410	355	305	A					
16						B	265	A	A	A	B	B	B	B	B	B	B	325	A					
17						S	B	B	B	A	B	B	B	B	C	C	360	C	C					
18						160	245	310	350	A	A	420	I C 425	420	405	385	345	285	A					
19						A	245	315	350	370	395	A	A	A	400	380	340	300	200					
20						B	245	315	355	A	A	A	425	415	405	385	345	290	180					
21						B	240	315	350	I C 380	390	A	395	390	395	385	350	290	165					
22						145	235	305	335	365	380	385	A	A	A	A	A	280	A					
23						B	250	315	350	370	A	A	A	A	A	365	A	290	A					
24						160	245	305	350	370	A	390	A	400	380	360	330	295	220					
25						B	245	310	340	370	390	390	A	A	375	355	335	275	B					
26						B	A	A	A	A	A	A	A	A	A	A	A	A	190					
27						A	235	A	A	370	A	A	A	A	A	355	315	255	S					
28						B	A	305	325	360	A	A	B	R 400	385	S	320	260	B					
29						B	235	300	340	355	A	A	A	400	390	B	330	265	B					
30						B	A	A	360	U A 490	A	A	A	410	R 400	365	325	270	B					
31						B	225	305	350	A	A	A	A	A	A	A	A	A	B					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						6	20	19	17	15	8	10	12	16	15	21	25	27	14					
MED						160	248	315	350	370	395	415	418	410	400	385	350	300	208					
UQ						160	265	322	360	390	410	420	425	420	403	390	360	310	220					
LQ						160	242	308	350	370	390	390	412	402	390	370	335	288	190					

AUG. 1989 | FOE (0.01 MHZ)

IONOSPHERIC DATA

AUG. 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	48	JA 36	29	JA 25	JA 24	JA 33	30	39	43	JA 49	JA 52	60	61	47	JA 53	C	G 35	35	34	21	22	JA 26	JA 42	C
2	JA 32	31	JA 23	24	22	22	C	C	C	45	JA 69	JA 53	47	43	JA 49	49	JA 65	JA 60	59	97	JA 53	JA 49	JA 51	JA 33
3	JA 21	JA 21	E B 12	23	E B 15	E S 19	JA 54	JA 65	JA 57	JA 46	JA 54	JA 104	44	45	42	42	G	42	59	JA 102	JA 52	JA 52	JA 51	JA 51
4	JA 33	JA 21	27	26	JA 19	JA 30	34	42	JA 61	JA 66	60	JA 61	72	JA 71	45	33	JA 67	60	JA 64	58	50	JA 52	JA 26	22
5	JA 51	JA 26	JA 22	JA 28	23	JA 28	JA 52	177	D D 250	JA 84	JA 182	50	45	49	45	45	38	JA 44	JA 44	JA 26	JA 47	JA 56	JA 53	JA 61
6	JA 84	JA 52	JA 63	JA 29	JA 29	24	JA 39	65	JA 40	46	48	44	44	53	45	42	45	JA 51	JA 105	84	JA 19	JA 47	JA 29	JA 53
7	JA 53	JA 42	JA 24	JA 20	24	G	28	38	JA 67	131	JA 59	48	45	JA 56	50	51	G	JA 41	30	JA 34	JA 23	JA 75	JA 85	JA 85
8	JA 62	JA 63	JA 62	JA 68	JA 39	26	39	JA 62	JA 53	JA 82	88	JA 55	JA 70	52	52	JA 49	JA 48	JA 35	32	49	JA 40	JA 43	JA 111	95
9	JA 85	JA 104	JA 84	46	JA 54	C	37	40	JA 54	113	JA 135	61	JA 71	JA 62	JA 89	43	JA 69	JA 70	74	63	50	57	JA 51	JA 29
10	JA 26	JA 25	JA 20	20	JA 20	21	G	35	40	44	JA 50	44	47	JA 67	JA 51	44	JA 50	33	27	JA 47	32	JA 29	JA 84	JA 80
11	36	48	JA 29	23	JA 21	JA 26	28	JA 51	JA 71	95	JA 69	JA 58	JA 88	47	JA 62	53	39	G	JA 26	JA 62	JA 52	JA 44	JA 63	JA 86
12	JA 64	JA 49	32	JA 27	32	JA 24	28	JA 53	44	JA 66	84	JA 83	135	143	JA 63	JA 64	JA 67	JA 57	94	JA 133	JA 87	JA 88	JA 35	JA 60
13	JA 54	32	JA 43	JA 48	JA 36	JA 31	27	G	40	44	49	JA 128	JA 99	JA 53	JA 53	JA 56	JA 49	33	25	35	JA 49	JA 43	31	30
14	27	26	20	19	JA 21	JA 27	G	JA 52	56	82	B	58	53	50	49	43	37	52	JA 78	46	JA 50	JA 101	JA 104	JA 100
15	JA 46	JA 36	28	JA 27	29	21	JA 35	JA 51	JA 51	42	49	B	B	B	E B 47	42	JA 62	JA 62	JA 65	JA 44	31	JA 20	32	53
16	JA 63	JA 104	JA 132	JA 63	JA 45	JA 46	31	56	JA 71	JA 47	B	B	B	E B 77	E B 67	JA 51	43	JA 61	JA 73	JA 53	JA 28	JA 89	JA 38	JA 49
17	E S 22	39	E S 38	E S 22	E S 22	S	40	49	42	JA 48	B	E B 79	E B 67	52	C	C	JA 54	C	C	JA 53	JA 121	JA 96	JA 157	JA 99
18	JA 52	JA 97	JA 42	JA 43	JA 23	G	29	JA 44	JA 48	63	JA 88	45	C	46	JA 65	73	JA 84	60	JA 41	29	E B 14	JA 33	JA 87	52
19	JA 38	JA 50	JA 41	JA 30	E B 14	JA 35	36	JA 57	JA 78	JA 65	JA 57	45	46	JA 57	45	G	G	32	49	JA 38	JA 60	JA 87	JA 58	JA 42
20	JA 44	JA 38	JA 46	JA 53	JA 31	E B 16	27	38	43	JA 60	60	JA 117	50	58	50	44	43	JA 43	50	32	JA 42	JA 61	JA 92	JA 86
21	JA 26	JA 30	25	JA 22	E B 13	E B 16	30	44	JA 50	C	47	45	JA 84	JA 57	43	JA 58	95	JA 71	JA 100	JA 182	JA 119	JA 165	JA 157	JA 66
22	JA 42	JA 31	JA 48	JA 55	20	23	JA 49	JA 42	JA 67	JA 52	79	113	JA 137	JA 117	JA 47	JA 42	JA 39	31	JA 42	26	24	24	JA 57	JA 27
23	JA 20	22	JA 22	E B 13	E B 14	19	30	39	47	66	JA 77	83	JA 66	JA 46	JA 75	JA 38	42	36	25	JA 33	JA 30	26	JA 43	26
24	28	JA 29	JA 35	JA 54	JA 27	JA 41	JA 44	JA 44	JA 56	JA 83	JA 87	44	JA 44	42	G 36	G	37	G	G	E B 15	32	JA 48	JA 52	JA 53
25	JA 109	JA 62	JA 57	JA 48	JA 41	32	32	JA 47	43	JA 51	JA 55	JA 56	JA 50	45	G	G	42	JA 56	53	JA 37	JA 31	JA 83	JA 49	44
26	29	24	E B 13	30	JA 58	90	JA 96	JA 122	82	JA 85	92	JA 62	JA 52	45	JA 56	JA 78	74	JA 30	G	JA 42	JA 33	37	25	20
27	E B 13	E B 14	26	JA 35	JA 26	JA 30	G	JA 51	JA 39	G	39	40	48	JA 46	36	43	43	JA 48	36	JA 25	JA 45	24	JA 24	18
28	JA 21	E S 18	20	JA 24	JA 35	20	JA 45	33	JA 50	43	JA 56	JA 51	E B 46	G	G 35	G	JA 45	JA 45	JA 27	JA 26	20	E B 14	JA 29	19
29	E B 15	E B 14	E B 15	E B 14	JA 27	JA 46	G	JA 42	JA 50	JA 46	44	62	60	44	G	E B 42	36	JA 41	40	JA 53	JA 51	63	68	JA 47
30	34	JA 26	JA 21	JA 40	34	JA 52	31	JA 46	40	45	JA 72	48	JA 57	G 37	G 32	41	44	JA 48	25	JA 32	JA 51	JA 36	29	24
31	18	22	JA 22	28	19	E B 14	29	JA 41	40	JA 46	46	41	45	39	40	74	JA 47	52	52	JA 91	JA 22	JA 25	17	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	29	30	30	30	30	28	29	28	30	30	29	31	30	30	31	31	31	31	30
MED	JA 36	JA 31	JA 28	JA 28	JA 24	26	31	JA 45	JA 50	JA 52	JA 60	56	52	49	47	44	44	JA 44	43	JA 44	JA 42	JA 49	JA 51	JA 50
UQ	JA 52	JA 48	JA 42	JA 44	JA 33	JA 32	JA 39	JA 53	JA 61	JA 82	JA 82	JA 62	JA 70	JA 57	JA 53	53	JA 58	JA 59	64	JA 60	JA 51	JA 77	JA 84	JA 66
LQ	26	24	22	23	20	20	28	40	43	46	50	45	46	45	41	42	38	35	27	JA 32	JA 29	JA 34	JA 32	JA 27

AUG. 1989 | FOES (0.1 MHZ)

IONOSPHERIC DATA

AUG. 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	32	29	20	19	16	G	29	37	40	45	48	58	61	46	48	C	G 32	34	32	E B 14	E B 12	20	31	C
2	23	28	15	17	16	19	C	C	C	43	67	50	42	43	43	45	53	56	41	86	31	17	34	20
3	17	E B 13	E B 12	E B 13	E B 15	E S 19	41	45	44	43	48	54	44	43	40	41	G	37	42	51	24	18	23	37
4	21	18	18	22	E B 14	23	33	38	51	56	50	61	68	62	45	70	62	49	51	50	32	39	22	16
5	25	20	E S 15	17	E B 16	24	47	52	A A 250	81	A A 182	48	44	47	43	44	G	33	44	21	27	28	25	26
6	37	27	34	19	18	22	34	56	38	43	46	44	44	51	45	41	43	48	60	73	18	E B 14	22	32
7	23	18	15	E B 14	16	G	28	35	53	A A 131	49	47	G	56	43	48	G	35	27	30	20	42	18	43
8	29	26	39	24	17	24	37	59	51	64	83	53	63	50	49	49	44	33	29	35	25	21	45	33
9	49	31	52	35	37	C	37	40	45	104	63	61	39	59	65	43	63	54	67	60	40	46	19	19
10	18	16	E B 13	E B 13	E B 13	G	G	33	38	43	44	44	46	50	43	42	43	33	27	E B 15	22	43	52	51
11	24	25	18	E B 13	18	22	28	38	65	90	67	55	61	45	52	48	38	G	23	39	31	27	33	28
12	39	41	27	21	24	23	28	35	44	55	76	79	A A 135	A A 143	65	61	63	54	84	50	17	38	23	41
13	46	32	29	22	28	19	G 22	G	40	41	47	A A 128	66	51	43	42	36	32	24	20	45	29	19	20
14	18	17	E B 13	E B 13	E B 14	17	G	G	44	76	B U R 57		52	49	47	41	37	43	35	34	20	64	61	50
15	23	21	18	16	20	20	28	34	39	U Y 42	46	B	B	B	E B 47	41	47	45	51	34	28	18	24	44
16	49	A A 104	A A 132	44	25	20	31	51	66	44	B	B	B	E B 77	E B 67	47	U Y 42	52	31	30	22	61	48	21
17	E S 22	37	E S 38	E S 22	E S 22	S	S	42	U S 42	42	B	E B 79	E B 67	48	C	C	42	C	C	36	50	24	45	37
18	41	51	19	31	17	G	27	34	39	52	45	43	C	44	60	64	A A 84	48	24	18	E B 14	26	33	24
19	27	30	29	23	E B 14	30	30	62	75	65	55	44	46	57	43	G	G	31	44	32	57	23	17	19
20	34	17	21	31	19	E B 16	27	35	40	43	46	47	47	54	48	41	39	36	42	23	36	45	21	43
21	17	E B 12	E B 13	E B 13	E B 13	E B 16	30	39	43	C	45	43	56	53	41	51	78	43	45	18	34	43	69	46
22	33	24	28	23	E B 13	22	44	39	60	48	76	A A 113	A A 137	44	41	39	34	24	23	17	16	E B 15	19	20
23	16	E B 14	E B 13	E B 13	E B 14	18	30	35	44	53	72	73	60	42	59	G 32	36	32	22	28	28	18	27	16
24	16	26	27	26	17	E B 13	41	38	55	53	58	42	42	41	G 34	G	35	G	G	E B 15	16	24	26	23
25	28	21	39	44	40	25	32	44	42	50	51	54	41	43	G	G	40	47	37	25	29	57	32	33
26	19	16	E B 13	E B 13	18	A A 90	72	51	60	77	61	60	47	44	52	72	64	29	G	34	25	16	E B 15	E S 14
27	E B 13	E B 14	E B 16	26	19	23	G	37	35	G	39	40	44	42	U R 36	40	40	39	29	20	22	18	16	E B 14
28	E B 13	E S 18	E B 13	E B 13	29	18	25	33	49	40	52	49	E B 46	G	G 32	G	40	29	20	19	E B 14	E B 14	21	E B 16
29	E B 15	E B 14	E B 15	E B 14	E B 14	29	G	40	41	43	43	57	U R 60	41	G	E B 42	34	31	24	44	19	26	30	31
30	25	E B 17	16	27	27	26	27	39	38	44	43	43	56	G 36	G 32	39	37	36	23	22	22	26	E B 16	18
31	E B 15	17	18	E B 15	E B 15	E B 14	28	35	39	39	43	41	43	39	40	59	41	49	52	54	18	22	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	29	29	30	30	30	28	29	28	30	30	29	31	30	30	31	31	31	31	30
MED	23	21	18	19	17	20	29	38	44	46	50	52	48	46	43	42	40	36	32	30	24	26	24	25
UQ	32	28	28	25	20	23	34	44	53	64	65	59	60	52	48	48	46	48	44	42	31	40	33	37
LQ	18	16	E B 15	E B 14	E B 14	E G 16	27	35	40	43	46	44	44	43	40	40	36	32	24	20	18	18	19	19

AUG. 1989 | FBES (0.1 MHZ)

IONOSPHERIC DATA

AUG. 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	13	14	16	14	13	17	18	20	20	22	32	32	E S 38	26	33	C	24	18	16	14	12	15	13	C
2	15	12	13	12	15	15	C	C	C	20	21	24	26	23	28	20	18	16	15	13	12	14	15	14
3	14	13	12	13	15	E S 19	14	15	18	21	19	35	23	26	21	20	18	16	15	13	12	15	16	15
4	15	13	13	12	14	14	15	17	20	20	20	22	23	24	22	21	18	15	16	15	15	14	15	14
5	14	14	E S 15	14	16	15	16	18	24	23	27	24	30	27	21	32	18	16	15	14	13	14	14	15
6	15	13	14	14	14	12	16	16	23	26	34	37	25	27	28	18	18	20	16	13	13	14	15	14
7	15	15	14	14	12	13	15	16	19	41	33	33	24	25	20	21	17	18	14	14	15	13	15	14
8	15	13	14	14	13	14	25	17	19	24	25	29	29	25	35	29	18	16	13	13	15	14	15	13
9	13	14	14	13	13	C	E C 34	E C 40	17	22	22	33	23	26	25	18	20	22	14	14	16	14	12	15
10	15	14	13	13	13	14	16	15	16	21	26	39	33	28	21	20	18	14	14	15	14	18	15	14
11	14	16	13	13	13	13	16	15	18	21	22	33	28	23	22	23	19	16	16	13	16	14	13	14
12	15	14	13	12	13	14	13	15	41	19	25	28	31	32	24	25	19	19	14	15	12	15	14	15
13	14	E S 16	16	13	13	15	16	17	20	23	33	26	27	26	24	22	19	17	15	13	E S 19	14	15	14
14	13	12	13	13	14	15	17	19	34	E S 33	B	53	45	34	27	21	17	16	14	13	13	13	14	15
15	13	13	13	12	13	14	14	17	17	36	38	B	B	B	17	32	23	16	16	13	12	13	15	15
16	15	15	13	15	12	14	20	29	23	31	B	B	B	77	67	44	39	21	18	14	13	13	15	13
17	E S 22	E S 25	E S 38	E S 22	E S 22	S	35	30	37	27	B	79	67	41	C	C	24	C	C	15	14	13	14	15
18	13	13	13	13	13	12	15	17	19	34	32	31	C	29	25	32	17	14	18	12	14	15	14	13
19	14	12	12	13	14	13	15	17	22	25	32	38	40	E S 26	24	18	16	15	15	12	15	15	13	14
20	16	13	12	13	14	16	16	18	19	20	23	35	32	30	23	19	18	15	14	E S 14	15	14	12	13
21	13	12	13	13	13	16	16	16	20	C	23	26	26	28	23	23	19	17	14	13	15	15	16	15
22	13	13	14	12	13	12	16	18	21	22	20	27	32	25	23	19	17	15	14	15	12	15	15	15
23	13	14	13	13	14	14	16	17	18	22	20	24	26	25	24	17	17	16	13	14	15	14	15	12
24	13	15	14	14	14	13	15	16	20	22	21	24	32	28	22	17	16	20	15	15	13	15	13	14
25	14	12	14	12	14	16	18	17	24	25	23	28	27	28	18	19	17	14	15	13	13	14	13	E S 16
26		13	13	13	12	15	16	16	16	18	27	28	27	34	20	20	18	13	14	14	13	13	15	E S 14
27	13	14	16	14	14	15	15	16	18	20	27	25	27	23	20	19	16	13	E S 18	14	15	14	14	14
28	13	E S 18	13	13	12	13	16	17	16	21	25	29	46	25	24	26	20	17	14	15	14	14	15	16
29	15	14	15	14	14	15	16	16	24	22	E S 34	36	39	32	24	42	18	16	16	16	15	16	16	15
30	15	17	14	14	14	14	16	17	23	32	28	30	33	27	26	21	17	15	15	15	15	16	16	15
31	15	15	14	15	15	14	15	19	20	22	31	25	25	26	21	21	18	16	19	15	15	14	13	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	29	30	30	30	30	31	31	30	31	30	29	31	30	30	31	31	31	31	30
MED	14	14	13	13	14	14	16	17	20	22	26	30	29	27	24	21	18	16	15	14	14	14	15	14
UQ	15	14	14	14	14	15	16	18	23	26	32	36	38	30	26	25	19	17	16	15	15	15	15	15
LQ	13	13	13	13	13	13	15	16	18	21	22	26	26	25	21	19	17	15	14	13	13	14	14	14

AUG. 1989 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

AUG. 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	270	285	295	315	280	270	295	305	305	270	270	255	265	R 270	270	I C 275	280	280	290	295	295	270	270	I C 270
2	270	285	295	J S 290	280	285	C	C	C	285	275	265	255	265	270	270	275	280	285	285	300	265	270	265
3	270	270	275	280	295	290	295	325	315	H 315	260	270	265	265	260	270	275	275	290	295	290	290	270	265
4	270	275	285	285	270	275	295	290	285	255	245	265	270	250	260	265	270	280	285	285	285	F 270	270	280
5	270	280	280	265	285	315	315	315	A	A	A	V 255	V 260	280	260	270	270	280	285	290	270	260	260	275
6	F 285	285	F 285	F 275	F 275	290	310	300	295	275	300	R 250	250	265	250	265	265	270	275	280	285	275	270	265
7	275	280	285	285	F 265	275	305	285	305	A	250	265	265	260	255	260	270	280	285	285	285	270	280	F 265
8	F 270	F 280	280	275	260	270	290	290	305	280	260	255	250	260	265	270	265	280	290	280	265	265	285	265
9	270	275	265	270	270	C	S	S	295	A	250	270	255	255	260	265	265	275	285	285	275	285	270	270
10	265	265	275	280	280	295	295	295	300	275	265	250	255	250	250	255	265	270	280	275	280	260	255	260
11	280	275	245	260	280	280	290	275	255	260	260	260	265	265	245	260	275	285	295	290	265	250	250	F 265
12	255	275	S 275	265	260	260	300	310	270	250	275	250	A	A	255	265	270	275	A	V 285	285	265	270	270
13	255	265	275	285	290	300	305	285	280	245	250	A	265	250	260	265	270	275	290	295	I S 275	265	265	260
14	260	275	295	270	270	295	310	305	290	265	I B 260	R 250	U R 270	255	255	265	270	280	265	270	275	255	270	265
15	245	280	265	265	250	235	235	250	230	215	G	B	B	B	240	225	250	270	280	285	270	250	260	235
16	A	A	A	A	275	285	295	320	290	285	B	B	B	275	270	265	275	280	290	290	285	F 250	270	265
17	S	S 255	S	S	S	S	S	S	S	295	B	265	265	270	C	C	270	C	C	280	280	280	265	260
18	260	255	265	245	235	265	245	265	305	U R 225	W	255	I C 260	265	255	285	A	280	290	285	280	255	260	280
19	260	265	270	275	280	295	295	305	A	270	255	335	255	255	265	265	270	285	285	290	295	275	275	265
20	270	270	275	285	270	275	300	300	285	285	300	270	265	260	260	270	270	270	280	280	290	310	275	265
21	250	255	270	260	260	270	300	305	300	I C 290	280	275	270	265	270	275	A	280	280	290	290	290	F 265	270
22	F 270	F 270	265	255	F 250	265	300	325	300	305	A	A	A	260	265	260	280	285	285	285	285	280	270	260
23	265	270	290	295	270	280	300	315	305	290	250	265	265	255	270	280	270	280	290	290	290	280	265	265
24	265	270	290	250	255	265	285	280	320	325	245	270	285	280	275	285	290	300	305	300	290	285	S 275	265
25	S 275	270	285	275	285	290	315	R 305	305	300	285	280	280	270	275	285	285	285	300	310	295	275	270	285
26	275	285	Z 285	F 290	275	A	A	300	305	285	285	290	285	285	280	285	290	290	J S 300	S 315	275	265	265	S
27	285	300	U S 295	280	270	275	310	305	295	290	275	285	285	275	280	270	275	285	305	335	275	S 275	275	270
28	280	270	285	295	285	295	310	305	330	275	265	275	275	290	285	290	290	295	300	300	300	285	265	270
29	270	275	270	275	275	285	310	300	305	320	R 265	255	285	265	260	280	295	290	315	300	265	270	U S 280	270
30	275	275	265	260	275	280	300	310	340	285	275	R 285	285	285	290	290	290	295	310	305	300	275	U S 275	270
31	285	S 300	275	275	S 280	285	325	320	295	285	285	280	275	275	285	295	290	300	300	310	300	275	285	285
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	29	30	28	27	28	27	28	27	27	27	29	30	30	29	30	29	31	31	31	31	30
MED	270	275	275	275	275	280	300	305	300	285	265	265	265	265	262	270	270	280	290	290	285	270	270	265
UQ	275	280	285	285	280	290	310	310	305	290	275	275	275	275	270	280	280	285	300	298	290	280	275	270
LQ	265	270	270	265	265	270	295	290	290	268	250	255	260	260	255	265	270	275	285	285	275	265	265	265

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

IONOSPHERIC DATA

AUG. 1989 | M(3000)F1 (0.31) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L 370		L	A	L	L	L	C	L	L 355	L					
2							C	C	C	L	A	L	L 390	L 375	365	355	A	A	A					
3							L	L	L	L	L	A	L	L	L 395	U L 370	L 365	L	A					
4							L	L	A	L	U L 355	A	A	A	365	A	A	A	A					
5								A	A	A	A	L 355	390	365	380	355	L	L	A					
6							L	A	L	L	L	L 390	390	A	365	375	L 360	L	A					
7							L	L	L	A	365	400	385	L	380	325	375	L	L					
8						L		A	A	A	A	L	A	350	L	A	L	L	L					
9						C		L	L	A	A	A	A	A	A	L	A	A	A					
10								L	L	L	L	L 370	385	335	365	L 360	L 350	L	L					
11								L	A	A	A	A	A	H 385	330	L 350	L	L	L					
12							L	L	L 355	330	B	A	A	A	A	A	A	A	A					
13								L	L	L	375	A	A	355	375	365	L 370	L						
14								L		A	B	R	L	355	H 350	L	U L 365	L	A					
15						L 295	325	360	370	R 340	355	B	B	B	350	355	A	A	A					
16								A	A	L 380	B	B	B	B	B	L 335	L	A						
17						S	S	S		L	B	B	L	L	C	C	L	C	C					
18						L	L 350	350	L	345	395	385	C	L 375	A	A	A	A						
19							L	A	A	A	340		U L 350	A	385	L 395	L 390	L	A					
20							L	L	L	U L 365	L	U L 360	L 375	345	L 365	L	L 360	L	A					
21								L		C	L 395	L	L	A	U L 365	A	A	L	A					
22							A		A		A	A	A	L 375	375	L 370	U L 365	L						
23								L		A	A	A	L	370	A	U L 370	L	L						
24								L	A	A	A	U L 395	395	L	L	L	L							
25									L		L	L	L	L	385	U L 370	L	A						
26						A	A	A	A	A	A	L	L 355	345	L	A	A	L						
27								L		L	U L 395	L	L	L	U L 375	L	U L 350	A						
28								L	A	L	L	L	385	U L 415	L	L	L	L						
29									L	L	L	L	R	L 375	L	U L 365	L	L						
30								L	L	L	L	L 395	L	385	L	L	L	L						
31								L	L	L	L	L	U L 375	L	L	A	L	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	2	2	6	8	8	11	15	17	15	10	1						
MED						L 295	338	355	362	355	370	L 388	385	370	365	L 365	L 365	L 355						
UQ										L 370	395	L 395	390	L 375	380	L 370	L 370							
LQ										340	355	L 365	L 375	352	365	355	L 360							

AUG. 1989 | M(3000)F1 (0.31)

IONOSPHERIC DATA

AUG. 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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								270	275	345	315	395	375	345	355	I C 350	335	325	295					
2							C	C	I C 280	305	355	385	410	375	360	360	550	E A 325	310					
3							290	250	260	265	L 380	365	365	365	380	365	360	330	295					
4							270	275	280	L 365	395	A 345	350	405	370	380	350	310	295					
5								260	A	A	A	430	405	375	425	410	370	L 345	310					
6							285	A 265	L 295	L 330	L 305	415	430	385	420	380	375	365	E A 355					
7							280	290	270	A	420	380	405	385	395	375	355	315	295					
8						340		280	270	A 325	A	L 375	415	395	385	385	365	340	310					
9						C		300	280	A	400	360	405	410	385	355	375	325	E A 335					
10								280	260	L 350	L 350	415	400	420	415	390	375	340	315					
11								L 325	E A 400	E A 440	400	380	390	380	430	375	340	310	290					
12							280	270	360	420	E A 385	A	A	A	435	385	365	330	A					
13								335	L 325	L 465	440	A	390	420	385	385	355	320						
14								270		E A 420	B	R 400	400	395	390	355	350	320	325					
15						445	475	460	525	595	G	B	B	B	500	560	395	370	E A 380					
16								255	E A 360	320	B	B	B	390	405	400	355	330						
17						S	S	S		265	B	E B 395	360	355	C	C	340	C	C					
18						340	415	380	325	555	W	435	I C 405	395	445	A 375	A	330						
19							285	310	A	E A 410	440		425	420	380	365	350	300	290					
20							280	265	260	305	290	345	370	390	375	345	360	320	305					
21								250		I C 305	330	330	355	370	355	355	A	L 305	310					
22							300		E A 345		A	A	A	390	385	380	340	305						
23								255		265	E A 400	A 375	L 365	390	350	320	305	295						
24								320	255	260	480	365	320	H 310	340	305	295							
25									260		305	315	330	345	325	310	300	305						
26							A	A	230	270	330	300	305	310	330	310	A 315	305	280					
27								240		290	330	305	L 300	330	330	310	325	290						
28								270	245	290	L 360	315	350	310	315	280	L 305	280						
29									275	255	375	360	315	355	340	315	265	280						
30								265	230	320	330	320	310	305	305	305	L 300	280						
31								260	265	300	280	295	330	310	320	305	305	275	265					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						3	10	26	24	26	25	25	27	29	30	30	29	29	17					
MED						340	285	270	272	314	365	365	370	380	380	362	350	313	302					
UQ						392	300	300	U 302	U 378	400	395	405	395	405	380	365	330	312					
LQ						340	280	260	260	290	330	330	340	345	340	315	305	300	295					

AUG. 1989 | H'F2 (KM)

IONOSPHERIC DATA

AUG. 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

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	EA 320	A 310	265	250	260	285	260	245	235	230	A	A	A	220	EA 290	C	H 220	260	A	270	260	300	325	C
2	310	300	265	285	285	280	C	C	C	215	A	EA 250	225	230	235	EA 265	335	A	A	A	275	295	A 335	315
3	315	310	300	290	270	280	EA 280	A	EA 245	235	245	A	200	235	220	230	245	EA 275	A	EA 285	A 265	270	A 300	EA 340
4	315	290	275	280	305	280	245	240	A	EA 275	EA 255	A	A	A	240	A	A	A	A	EA 295	EA 295	EA 325	290	275
5	290	280	295	310	270	255	A 250	A	A	A	A	EA 255	220	EA 245	230	EA 255	235	260	A	280	EA 305	EA 335	A 340	315
6	A 315	A 305	A 325	325	320	285	EA 270	A	215	225	245	215	H 220	A	245	235	A 255	A	A	A	275	285	310	335
7	310	290	265	290	325	290	245	230	A	A	H 245	205	225	A	225	A	240	260	265	EA 285	260	EA 345	285	EA 375
8	A 340	305	A 335	A 325	335	290	260	A	A	A	A	A	A	EA 255	EA 265	A	EA 285	245	EA 280	A 285	310	310	EA 325	EA 335
9	EA 355	A 320	EA 365	A 330	EA 340	C	255	255	270	A	A	A	A	A	A	260	A	A	A	EA 330	EA 310	EA 300	265	300
10	315	315	295	275	265	270	260	240	220	210	215	230	215	EA 285	240	245	EA 260	255	285	295	285	A	EA 380	EA 380
11	290	305	355	325	285	275	265	255	A	A	A	A	A	H 220	A 290	270	H 240	250	275	EA 295	EA 335	EA 370	EA 385	EA 355
12	EA 375	A 330	315	320	EA 350	310	255	245	245	EA 290	A	A	A	A	A	A	A	A	A	EA 320	275	EA 360	325	EA 360
13	EA 405	EA 375	EA 325	A 300	A 295	270	260	260	240	250	235	A	A	265	225	235	230	260	280	255	EA 345	EA 335	315	330
14	325	290	255	290	305	280	245	240	235	A	B	R	EA 275	A 260	EA 260	245	235	EA 275	A	EA 320	A 315	A	A	A
15	A 370	A 275	325	305	A 360	355	290	255	235	280	255	B	B	B	270	260	A	A	A	EA 325	EA 345	360	A 345	A
16	A	A	A	A	EA 340	310	260	A	A	225	B	B	B	B	B	EA 275	Y	A	A 300	285	280	A	EA 360	320
17	360	EA 405	S	335	315	S	S	S	265	215	B	B	B	EA 270	C	C	265	C	C	EA 300	A 310	285	EA 360	EA 365
18	EA 370	A	350	EA 410	A 415	320	260	260	A 230	EA 270	210	220	I C 240	225	A	A	A	A	275	285	265	355	A 355	270
19	340	EA 345	A 330	320	280	285	265	A	A	A	E A 290	210	260	A	225	H 205	H 225	245	A	A 275	A	300	275	320
20	EA 355	315	325	A 330	290	290	255	235	230	240	235	240	235	A	A 255	230	250	EA 270	A	280	A 270	A 265	A 305	EA 365
21	345	345	295	330	325	295	245	240	235	C	210	H 205	A	A	240	A	A	A	A	265	EA 290	EA 300	A	EA 355
22	EA 315	345	A 345	A 340	365	325	A	A 250	A	H 265	A	A	A	230	230	230	245	250	270	270	280	290	310	325
23	320	320	275	255	280	295	255	240	A 250	A	A	A	A	225	A	235	240	265	265	270	275	265	A 325	305
24	315	320	290	A 375	345	315	EA 295	EA 260	A	A	A	205	205	225	235	230	235	250	260	255	265	290	EA 340	335
25	A 340	A 320	A 320	EA 340	EA 330	285	255	A 260	240	270	A 270	A	200	230	220	230	255	A	A 260	250	245	A	A 315	A 310
26	300	280	275	270	305	A	A	A	A	A	A	A	235	215	A	A	A	250	255	A 255	260	290	275	290
27	275	250	260	A 270	260	285	255	235	220	210	205	215	205	225	225	245	255	A	245	210	250	285	285	300
28	285	305	275	250	EA 305	265	250	240	A	205	EA 280	EA 260	B	185	240	240	260	255	255	250	245	260	325	305
29	310	305	315	295	295	A 305	250	245	245	235	235	A	E R 255	225	240	255	230	250	235	A	A 300	A 325	E A 315	E A 325
30	315	290	320	A 350	A 325	310	270	A	225	230	225	215	A	225	235	245	250	E A 275	255	255	255	A 300	315	310
31	285	255	305	305	310	295	230	225	225	220	210	220	220	225	225	A	A 255	A	A	E A 265	240	280	270	270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	30	31	28	27	21	19	20	17	14	16	21	24	21	23	18	16	28	30	27	29	28
MED	312	305	300	305	300	288	255	242	235	228	230	215	221	225	235	240	242	254	264	268	268	292	A 308	308
UQ	A 332	A 318	325	A 328	327	308	261	255	245	U 253	250	230	234	238	245	250	255	262	276	E A 295	U A 290	A 315	A 332	E A 348
LQ	310	290	275	285	284	280	250	240	228	218	215	210	210	225	225	230	235	250	255	258	260	284	295	305

AUG. 1989 | H'F (KM)

IONOSPHERIC DATA

AUG. 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	120	120	120	115	A	A	A	A	A	C	E A 135	120	130					
2						B	C	C	C	120	120	115	A	A	A	120	115	125	130					
3						S	115	120	115	A	115	A	120	120	115	120	115	115	130					
4						B	120	115	A	110	110	A	120	120	115	120	120	A 120	125					
5						B	120	120	120	120	120	115	120	115	110	125	E A 130	115	125					
6						E B 120	125	115	A	A	125	A	115	120	115	115	115	120	130					
7						E B 140	E A 140	115	110	B	A	A	E A 160	115	115	115	115	120	130					
8						A	E B 140	125	120	120	115	120	120	120	A	125	115	A	A					
9						C	C	C	115	115	115	125	125	125	120	115	120	125	125					
10						E B 160	125	110	115	110	A	A	120	115	A	E A 140	E A 125	A 120	125					
11						A	A	120	120	115	120	120	120	E A 130	115	120	120	120	125					
12						A	A	110	B	115	115	120	120	120	115	120	120	125	125					
13						B	E A 160	125	115	120	125	120	120	120	120	A	S	115	E A 135					
14						B	125	120	A	A	B	B	B	120	A	A	115	115	130					
15						B	115	110	105	A	A	B	B	B	B	125	120	115	130					
16						B	125	A	110	A	B	B	B	B	B	B	B	125	A					
17						S	B	B	B	125	B	B	B	B	C	C	120	C	C					
18						130	125	115	110	A	115	120	I C 120	120	115	120	115	115	A					
19						A	125	120	120	120	130	A	A	A	120	110	115	E A 125	E B 130					
20						B	125	125	120	110	A	A	120	120	120	115	115	115	E B 130					
21						B	120	115	110	I C 120	115	115	115	125	120	A 125	120	115	E B 125					
22						E B 120	125	115	115	120	115	115	A	115	A	A	A	E A 140	A					
23						B	125	115	115	120	110	115	A	A	A	E A 140	A	125	A					
24						150	125	120	120	115	115	115	A	120	E A 135	110	115	120	125					
25						B	125	115	120	120	120	115	120	115	110	120	115	A 130	B					
26						B	A	A	110	110	115	120	115	115	110	110	A	A	130					
27						A	120	A	A	115	A	115	115	A	A	120	120	120	S					
28						B	125	120	115	115	115	120	B	115	E A 150	115	115	120	B					
29						B	120	120	125	115	A	A	A	130	120	B	120	120	B					
30						B	A	A	E A 150	A	A	A	A	E A 125	120	E A 125	E A 125	125	B					
31						B	125	120	115	115	A	A	A	A	A	A	A	A	B					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						6	24	24	24	23	19	16	17	22	19	23	25	27	19					
MED						E B 145	125	120	115	115	115	118	120	120	115	120	118	120	128					
UQ						E B 160	125	120	120	120	120	120	120	120	120	122	120	124	130					
LQ						E B 130	120	115	112	115	115	115	120	115	115	115	115	115	125					

AUG. 1989 | H'E (KM)

IONOSPHERIC DATA

AUG. 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

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	100	100	100	100	105	115	140	130	135	115	115	110	110	110	110	C	120	145	130	125	115	110	105	C
2	110	100	110	105	105	100	C	C	C	120	115	115	115	125	120	140	125	125	120	115	110	125	105	110
3	110	110	B	110	B	S	115	115	110	115	110	125	145	E G 180	125	E G 160	G	135	120	115	125	120	130	115
4	110	110	110	115	130	125	130	125	115	110	110	120	115	115	125	130	125	120	115	115	115	110	110	120
5	110	115	115	125	120	125	120	120	115	115	115	130	160	140	140	135	E G 155	125	120	120	115	120	125	115
6	110	110	110	100	105	125	125	115	120	115	115	120	E G 180	135	E G 195	E G 180	135	125	120	115	115	125	110	110
7	120	125	105	105	100	G	E G 185	140	115	110	115	145	E G 165	135	140	125	G	135	125	120	120	115	120	120
8	115	110	110	105	140	130	130	130	135	120	120	120	120	125	120	120	115	110	105	120	110	120	120	120
9	120	115	110	105	105	C	115	C	125	110	110	120	120	120	120	140	135	125	115	115	105	105	115	100
10	100	100	105	105	125	110	G	115	120	115	110	120	115	110	120	145	135	E G 180	125	110	110	120	105	115
11	105	110	105	105	110	110	120	135	120	115	120	115	115	145	135	130	140	G	130	115	110	105	115	120
12	115	110	105	100	100	100	115	115	135	120	115	110	115	110	115	130	125	120	115	130	120	115	115	110
13	105	105	100	105	100	120	120	G	125	125	125	110	140	115	115	115	110	145	125	105	110	105	105	100
14	100	95	95	125	105	115	G	120	110	125	B	115	115	115	150	110	E G 175	120	125	105	105	110	110	115
15	115	110	110	115	115	120	115	115	110	125	115	B	B	B	B	E G 160	125	115	115	110	110	115	110	110
16	105	110	115	120	120	115	125	110	105	110	B	B	B	B	B	140	145	125	120	115	110	115	110	110
17	S	110	S	S	S	S	125	120	135	120	B	B	B	115	C	C	135	C	C	120	110	115	110	110
18	110	115	120	120	120	G	135	125	115	115	110	150	C	140	125	125	115	115	120	115	B	105	115	110
19	105	105	105	105	B	125	125	120	125	120	120	120	120	120	135	G	G	E G 150	115	110	115	130	115	105
20	115	105	110	105	115	B	E G 140	125	120	115	110	110	135	120	135	135	130	125	115	115	110	110	110	110
21	105	110	110	110	B	B	120	125	120	C	120	120	115	115	E G 160	130	120	115	115	115	110	120	110	110
22	105	105	100	110	110	145	120	120	110	115	110	110	110	120	110	110	105	110	105	100	100	105	115	105
23	110	105	110	B	B	170	130	125	120	115	110	105	105	110	105	110	100	125	105	105	115	95	100	100
24	100	105	110	110	110	105	130	130	115	115	115	115	110	E G 165	110	G	135	G	G	B	110	110	110	110
25	110	110	105	105	110	110	125	120	120	125	120	110	125	115	G	G	135	125	115	115	110	105	105	110
26	105	100	B	115	115	110	115	110	110	105	110	110	110	110	110	105	105	105	G	95	100	100	100	100
27	B	B	100	110	110	105	G	110	110	G	115	115	120	110	115	135	120	115	115	110	115	100	100	115
28	105	S	125	115	110	125	125	140	120	125	110	115	B	G	115	G	120	115	110	115	100	B	105	100
29	B	B	B	B	145	105	G	115	120	115	120	115	115	140	G	B	130	115	115	110	110	115	105	105
30	105	110	105	105	105	110	150	110	145	130	110	115	105	105	105	140	130	120	115	115	110	105	110	100
31	110	105	105	135	110	B	125	120	125	115	115	120	110	115	110	110	105	105	105	115	105	110	105	100
	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	27	28	26	23	26	28	30	29	28	28	26	28	26	24	28	28	28	30	30	30	31	30
MED	110	110	110	108	110	115	125	120	120	115	115	115	115	116	119	129	125	121	115	115	110	110	110	110
UQ	110	110	110	115	120	125	130	125	125	120	118	120	122	130	130	138	135	125	120	115	115	120	115	115
LQ	105	105	105	105	105	110	120	115	115	115	110	110	110	112	110	118	118	115	115	110	110	105	105	105

AUG. 1989 | H'ES (KM)

IONOSPHERIC DATA

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

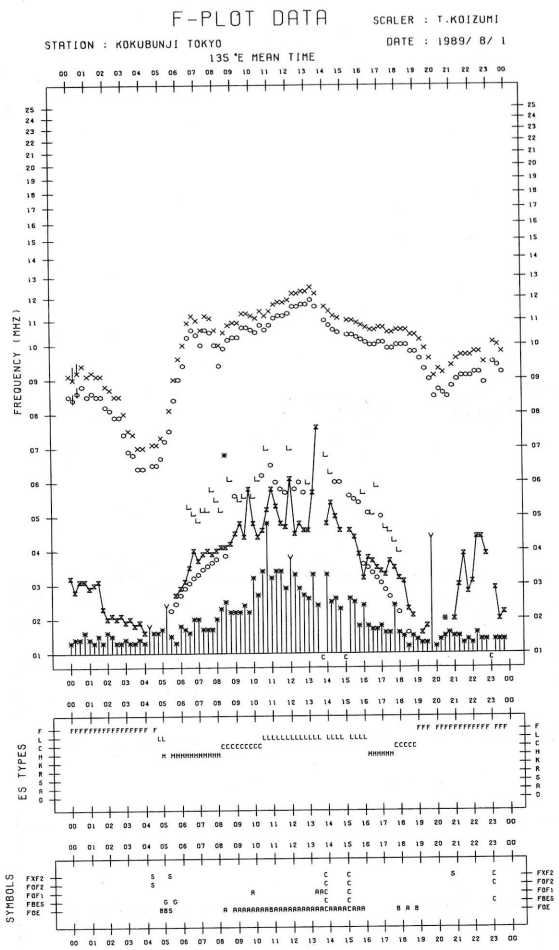
Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

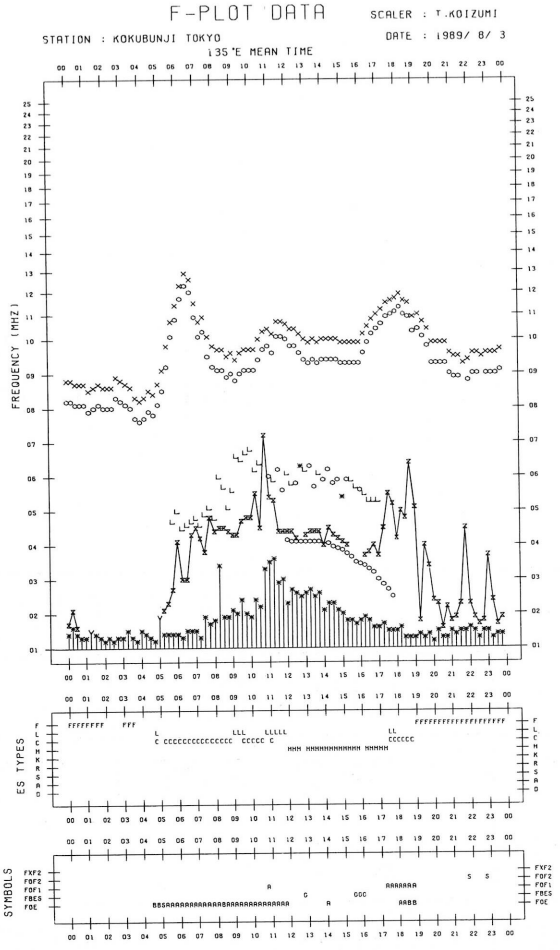
Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 3	F 5	F 3	F 2	F 2	LH 11	H 1	H 2	H 1	C 2	C 2	L 2	L 1	L 2	L 2		L 1	H 1	C 3	F 2	F 2	F 2	F 5	
2	F 3	F 4	F 3	F 2	F 2	L 2				C 2	C 2	C 2	L 1	L 1	L 2	H 2	H 3	C 3	C 4	F 4	F 5	FF 12	F 4	F 3
3	F 2	F 2		F 1			C 3	C 3	C 3	L 2	C 2	CL 22	H 1	H 1	H 1	H 1		H 2	C 4	F 4	FF 22	F 4	FF 14	F 4
4	F 5	F 3	F 2	F 3	F 2	L 3	C 2	C 2	C 2	C 2	C 2	L 2	C 2	C 2	CH 11	H 3	H 3	CL 42	C 5	F 7	F 3	F 5	F 4	FF 11
5	F 3	FF 12	F 1	FF 11	F 1	C 2	C 3	C 3	C 3	C 3	C 2	H 1	H 1	H 1	H 1	H 1	HL 11	H 3	C 4	F 2	F 5	FF 25	FF 35	F 4
6	F 5	F 4	F 3	F 4	F 2	CL 21	C 3	C 4	L 2	L 2	C 1	C 1	H 1	H 1	H 1	H 1	H 2	H 2	C 4	F 7	F 4	F 3	F 4	F 4
7	FF 32	FF 12	F 2	F 1	F 3		HL 12	HL 12	C 3	L 2	L 2	HL 21	HL 11	H 1	H 1	H 2		H 2	C 3	F 4	FF 31	F 4	FF 13	F 4
8	F 4	F 5	F 5	F 3	FF 13	C 3	C 1	C 3	C 3	C 2	C 3	C 2	C 2	C 2	C 1	C 1	C 2	L 3	LC 42	FF 35	FF 23	FF 23	FF 23	FF 35
9	FF 32	FF 31	F 4	F 6	F 5		L 1		C 3	C 3	C 3	C 2	CL 21	CL 21	C 3	H 1	H 2	C 3	C 4	F 4	F 6	F 5	FF 25	F 4
10	F 3	F 3	F 2	F 2	FF 11	L 1		C 2	C 1	C 2	L 1	L 1	C 1	C 2	CL 12	HL 12	HL 21	HL 11	C 2	F 2	FF 22	FF 31	F 5	F 4
11	F 5	F 3	F 5	F 2	F 4	L 4	L 2	HL 22	C 3	C 4	C 3	C 2	C 3	HL 11	H 2	H 2	H 1		C 2	F 4	F 6	F 5	FF 35	FF 34
12	FF 44	F 4	F 3	F 4	F 4	L 3	CL 22	C 2	C 1	C 2	C 2	C 3	C 3	C 3	C 2	H 3	C 3	C 3	C 5	FF 26	F 4	FF 42	FF 43	F 5
13	F 4	F 5	F 5	F 5	F 6	CL 11	L 1		C 1	C 1	CL 11	C 3	HC 12	C 2	C 2	L 2	L 2	H 1	HLC 22	F 4	F 2	F 4	F 5	F 5
14	F 5	F 4	F 2	FF 11	F 2	CL 11		LC 11	C 2	L 2		L 1	C 1	C 1	HL 12	L 2	H 1	H 3	C 4	F 7	F 4	FF 36	FF 34	FF 14
15	FF 31	F 3	F 2	F 2	F 4	C 3	C 2	C 2	C 2	L 1	L 1					H 1	HC 12	H 3	C 4	F 3	F 6	F 3	F 5	F 5
16	F 6	F 6	F 5	F 4	FF 27	L 2	C 1	C 2	C 2	L 1						H 1	H 1	H 2	C 3	F 4	F 5	F 6	F 4	FF 14
17		F 1					C 1	LI 1	L 1	C 1				L 1			H 2			F 5	F 4	F 5	F 4	F 4
18	FF 43	FF 23	FF 42	F 6	F 5		H 2	H 2	H 2	L 2	C 1	H 1		H 1	H 2	H 1	C 4	C 4	C 4	F 3		F 4	F 5	FF 14
19	F 5	F 5	F 5	F 3		C 5	C 3	C 4	C 2	C 2	C 2	C 1	C 1	C 2	H 1			HL 12	C 4	F 3	F 5	FF 15	F 4	F 5
20	F 3	F 2	FF 13	F 5	F 2		H 1	CI 1	C 1	C 2	L 2	L 2	H 1	H 2	H 2	H 1	H 2	H 3	C 3	F 3	F 5	F 5	F 5	F 5
21	F 4	F 2	F 2	F 2			C 2	H 3	C 3		C 2	C 1	C 2	C 2	H 1	HL 21	C 3	C 4	C 4	F 4	F 4	FF 24	F 4	F 5
22	F 5	F 3	F 5	FF 24	F 1	H 3	C 4	C 1	C 3	C 2	C 3	C 3	C 2	C 3	L 2	L 2	L 3	L 3	L 3	F 3	F 2	FF 22	FF 34	F 4
23	F 3	F 1	F 1			H 1	H 2	H 2	C 3	C 3	C 3	C 3	L 3	L 2	L 3	L 2	L 3	C 3	L 4	F 4	FF 51	F 3	F 7	F 2
24	F 2	F 5	FF 21	FF 62	F 2	L 1	C 3	CI 3	C 3	C 2	C 3	C 1	L 1	H 1	L 1		H 1				F 3	FF 52	F 5	F 4
25	F 4	F 3	FF 52	F 5	F 6	L 2	C 1	C 2	C 2	C 2	C 2	C 2	C 1	C 1			H 2	CL 31	C 4	F 5	F 6	F 5	F 4	F 2
26	F 4	F 2		F 2	F 7	L 5	L 5	C 3	C 3	C 2	CL 33	C 2	C 2	C 1	C 3	L 3	L 4	L 3		F 7	F 2	F 4	F 1	F 1
27			F 1	F 6	F 3	L 5		C 3	L 2		L 1	C 1	C 1	L 2	L 1	H 2	H 3	C 4	C 2	F 5	FF 23	F 2	F 2	F 1
28	F 2		F 1	F 2	F 6	C 2	C 2	H 1	C 3	C 1	C 2	C 2			L 1		H 1	C 3	C 3	FF 32	F 2		F 3	F 1
29					FF 11	L 3		CI 3	C 2	C 2	L 1	L 1	L 1	H 1			H 1	C 2	L 2	F 4	F 3	F 3	F 3	F 4
30	F 4	F 2	F 2	F 5	F 6	CL 23	HL 12	LI 3	HL 12	HL 11	L 2	L 1	L 2	L 2	L 1	HL 11	HL 12	C 3	L 2	F 5	F 4	F 4	F 2	F 3
31	F 1	F 1	F 1	FF 11	F 1		C 2	CI 3	C 1	C 1	L 1	L 1	L 2	L 1	L 1	L 3	L 3	L 5	L 3	FF 52	F 1	FF 31	F 1	F 1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

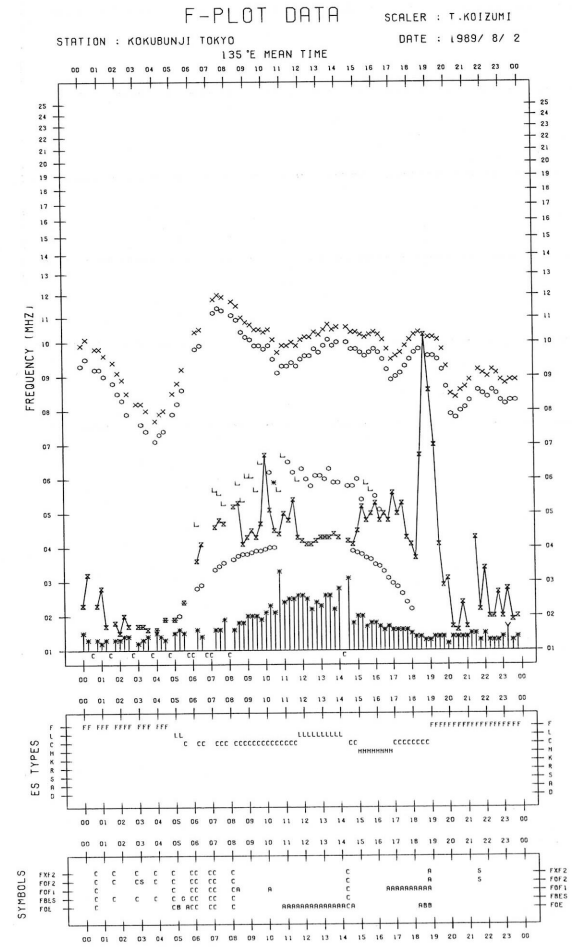
AUG. 1989 | TYPES OF ES

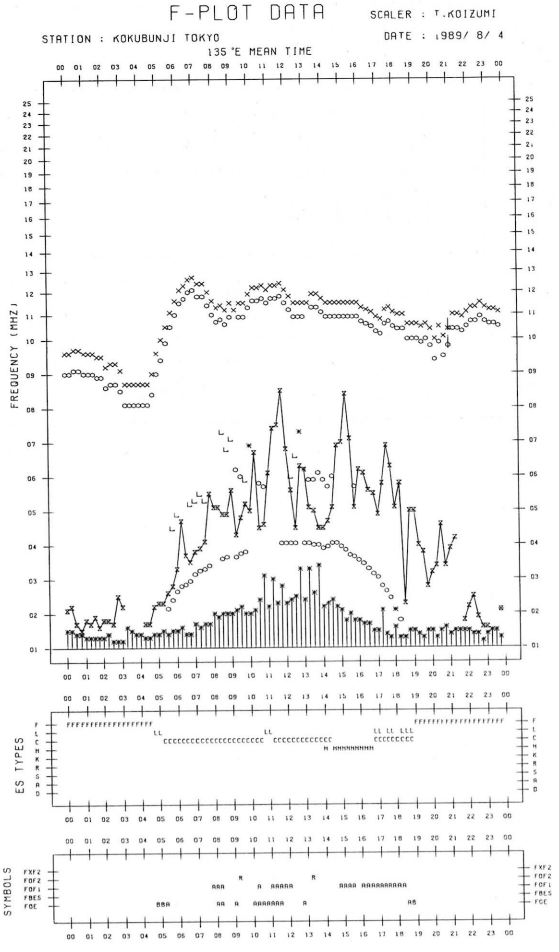
f-PLOTS OF IONOSPHERIC DATA

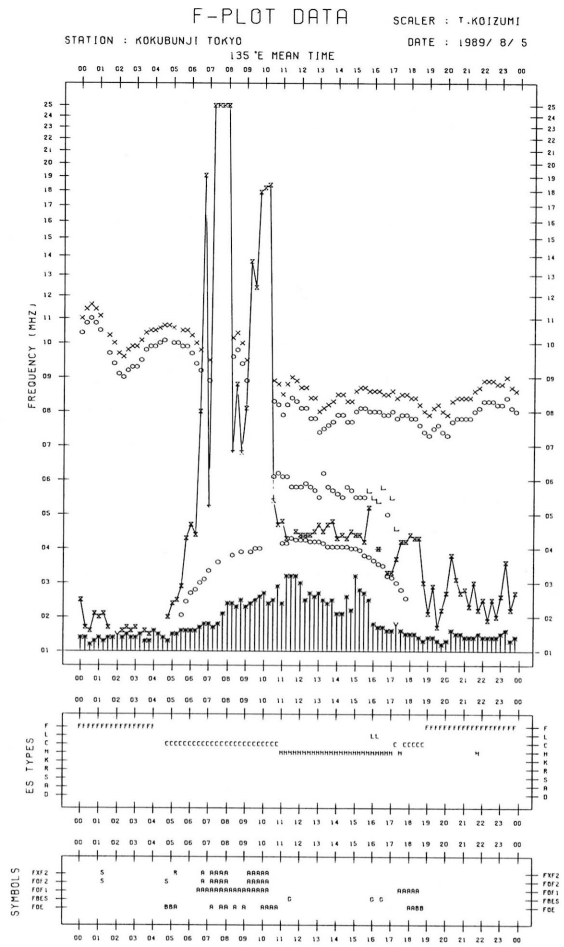
KEY OF F-PLOT	
I	SPREAD
○	FOF2,FOF1,FOE
×	FXF2
✳	DOUBTFUL FOF2,FOF1,FOE
⧖	FBES
L	ESTIMATED FOF1
*,Y	FMIN
∧	GREATER THAN
∨	LESS THAN

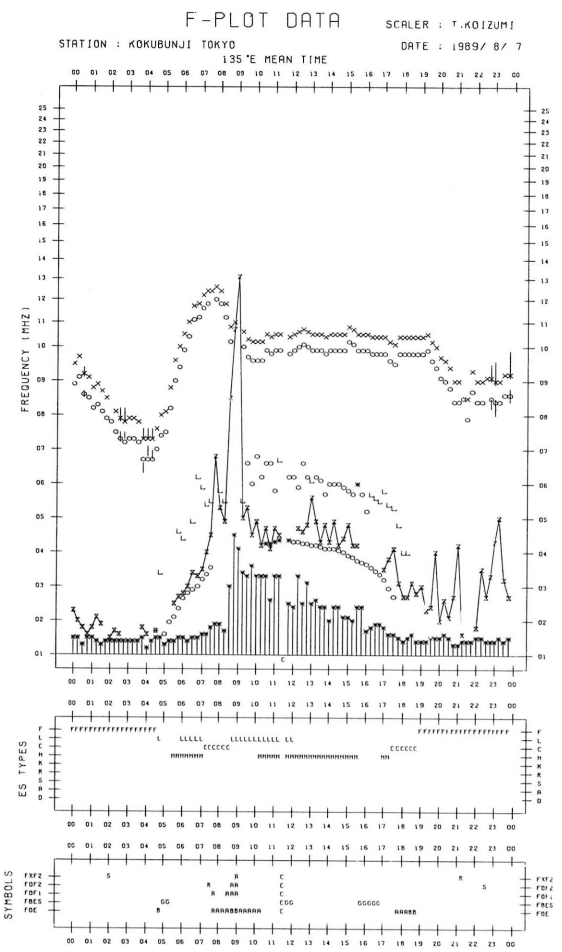

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

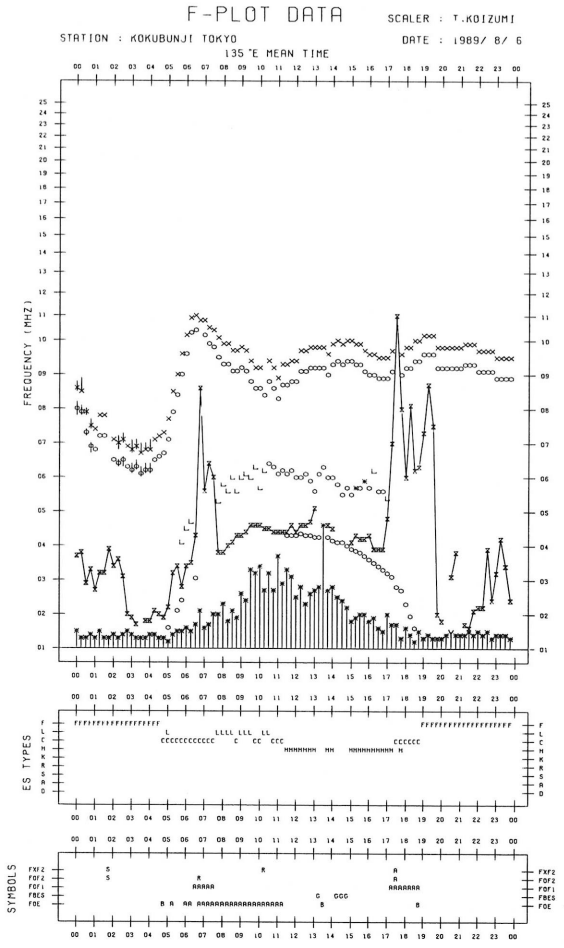

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

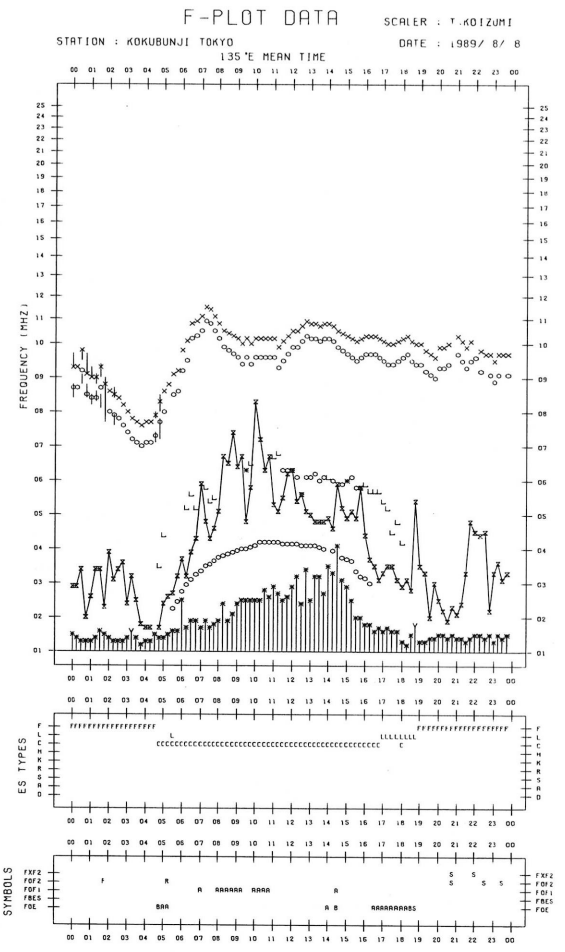

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

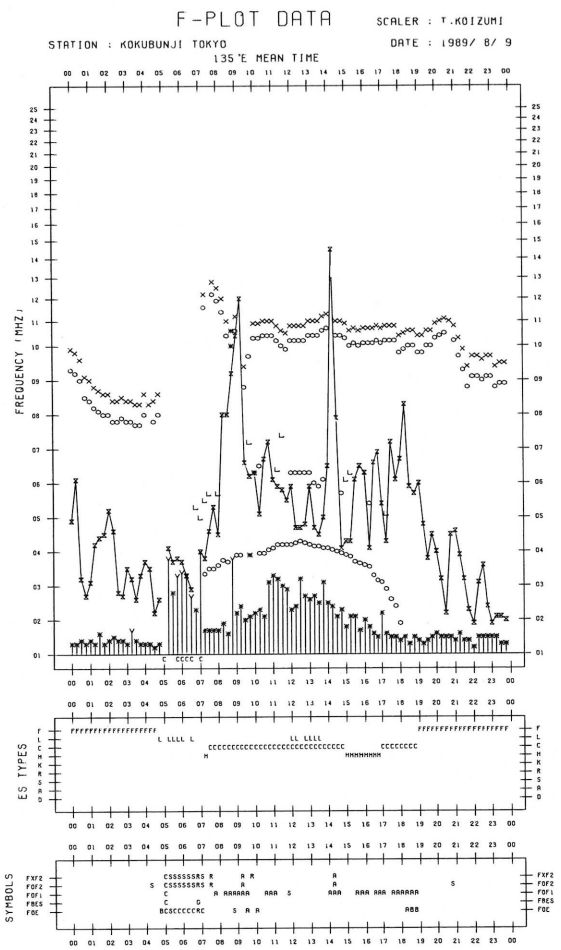

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

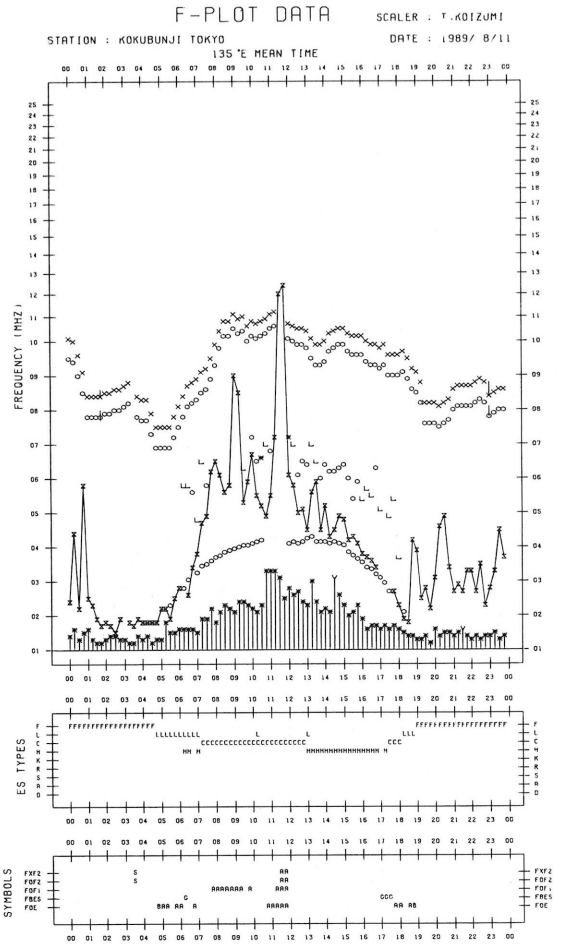

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 5
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

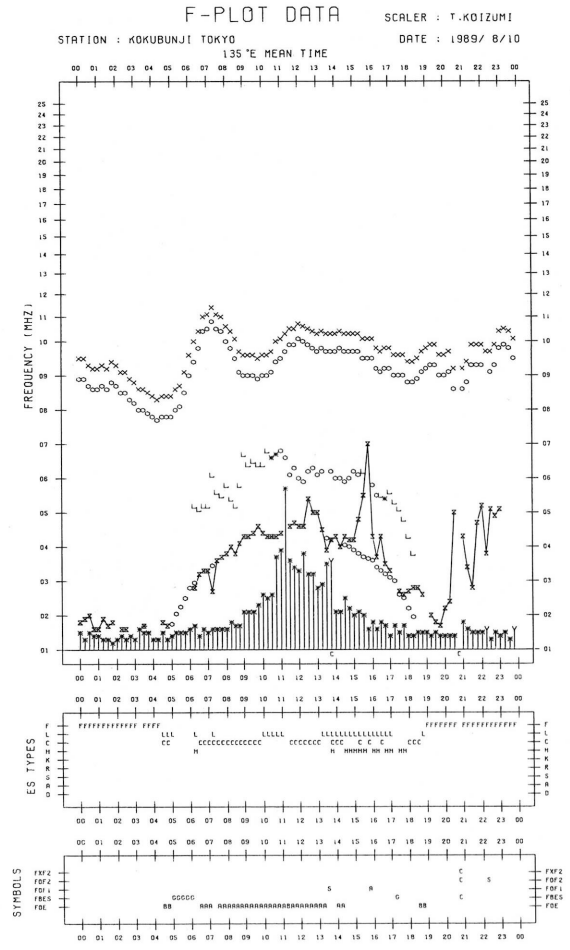

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

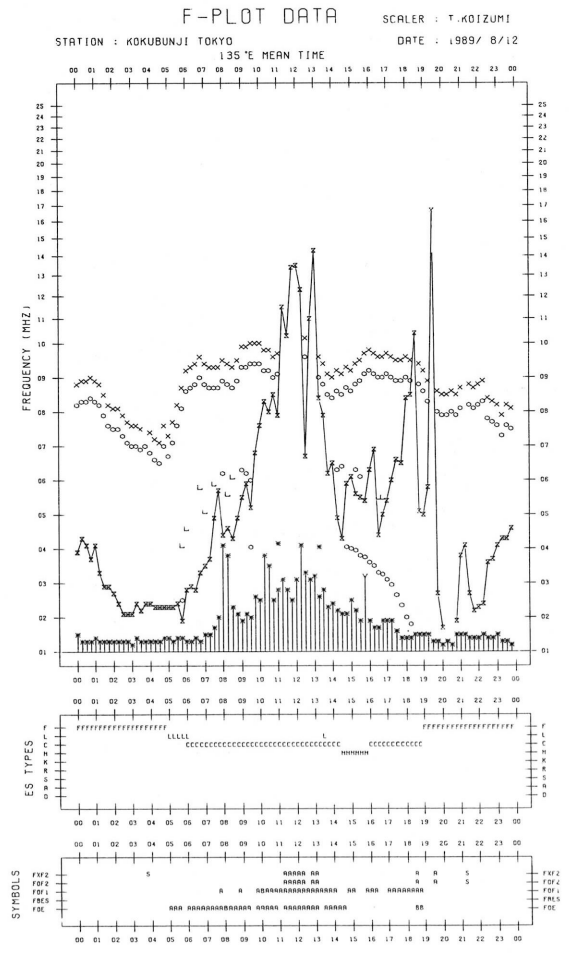

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

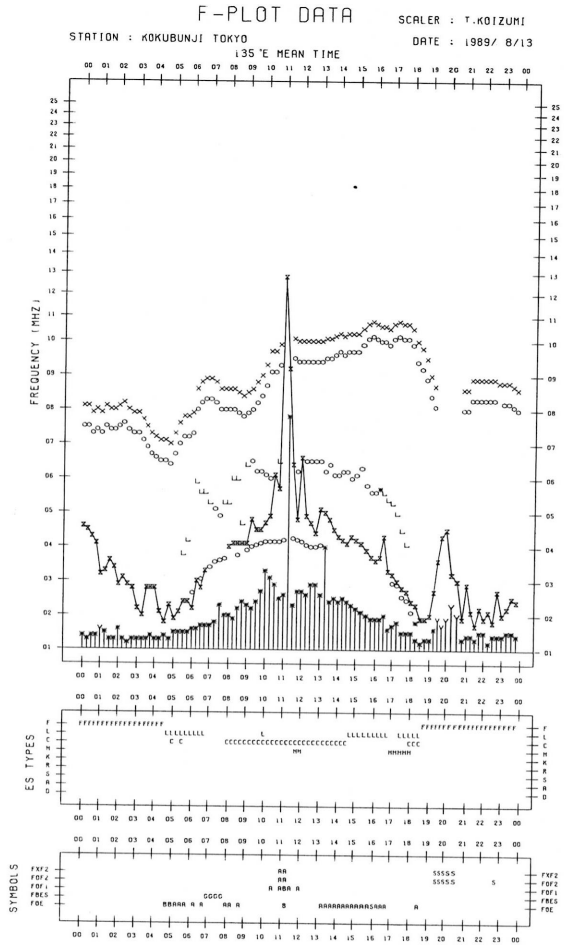

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

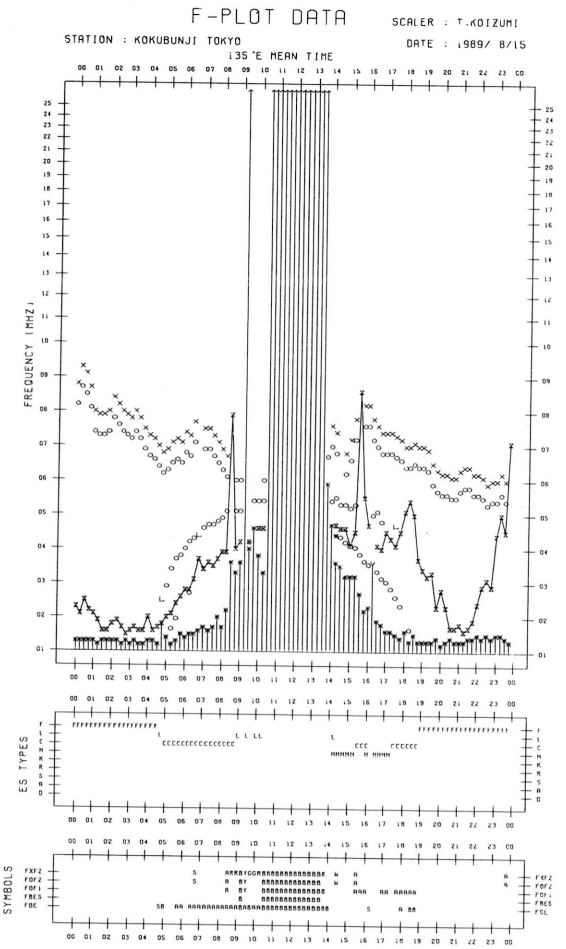

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

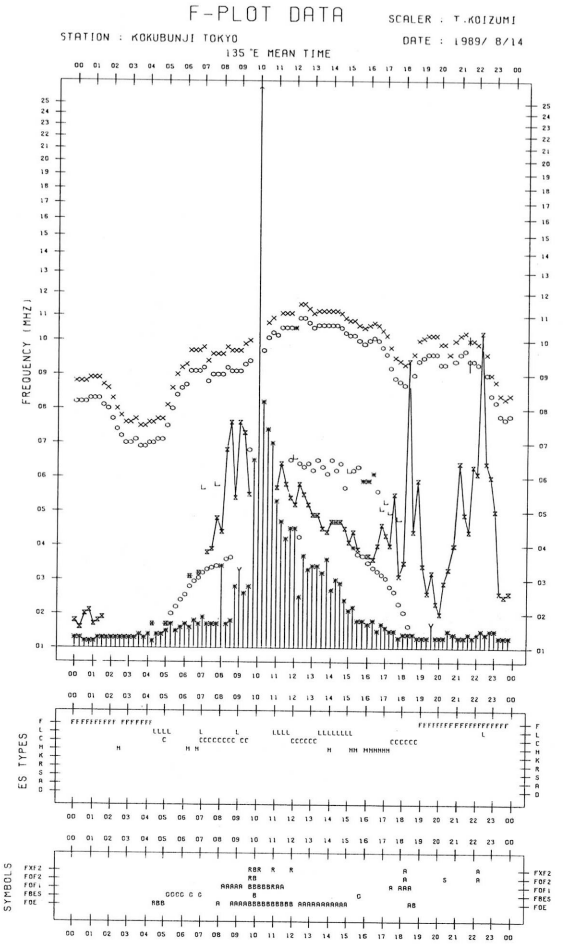

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

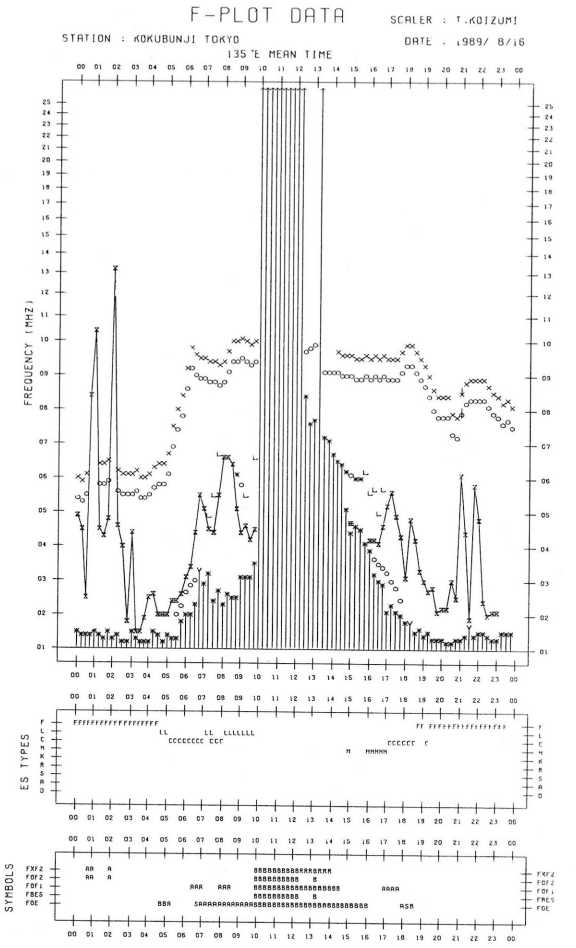

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

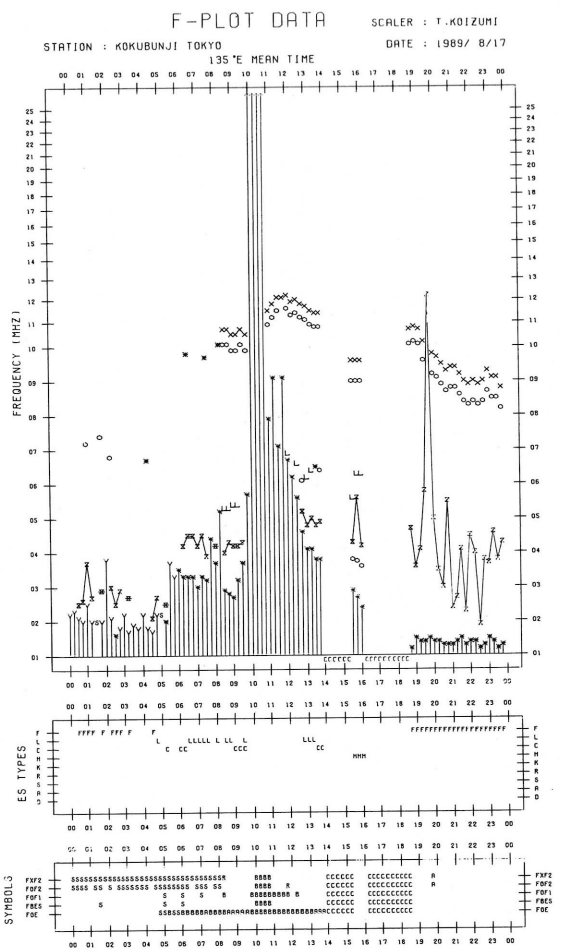

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

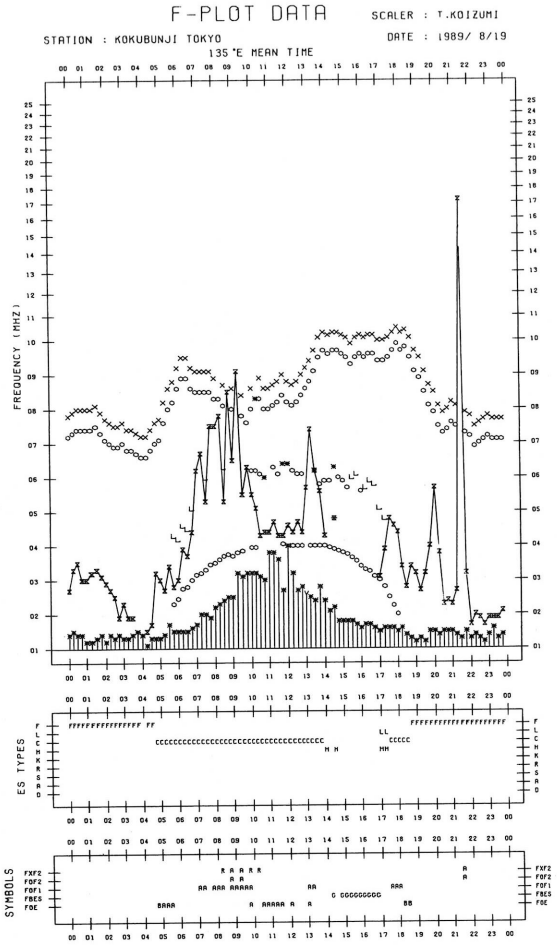

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

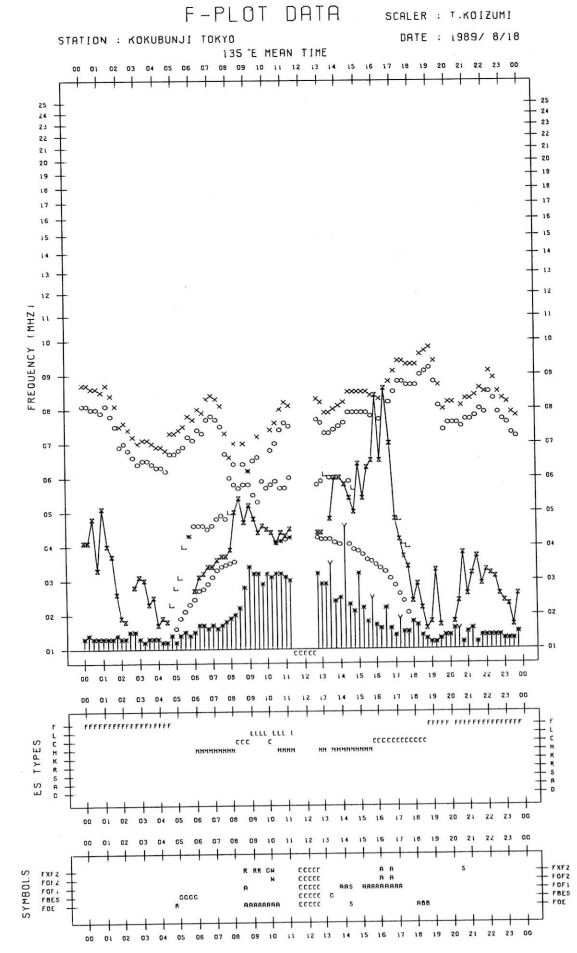

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

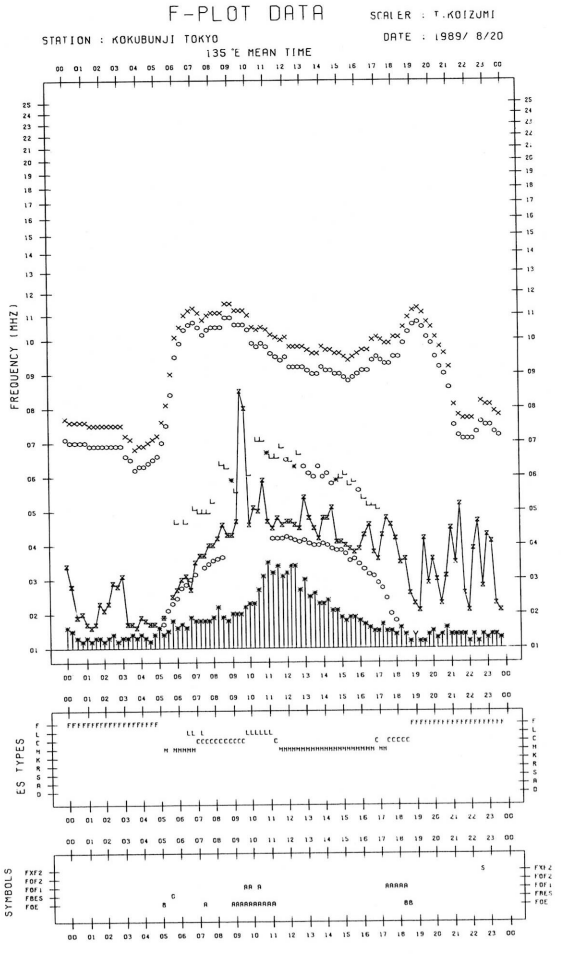

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

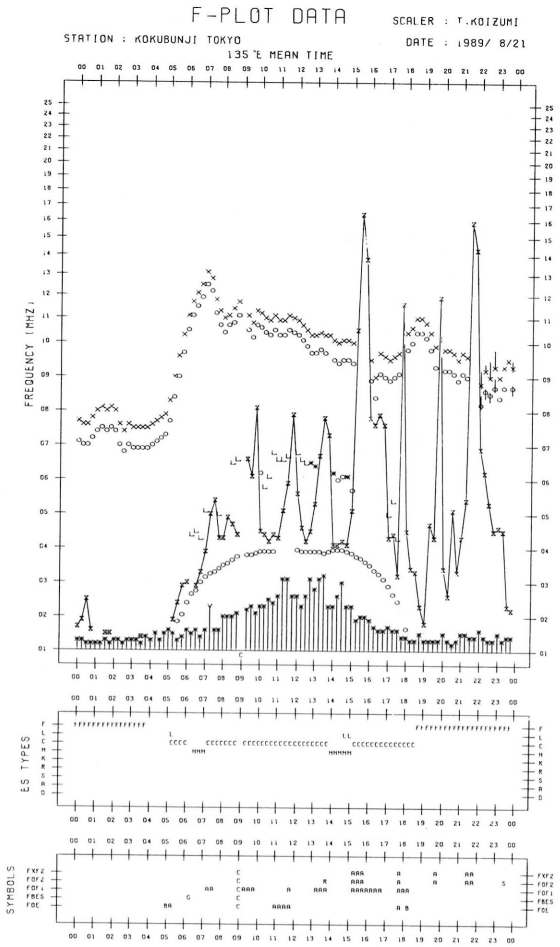

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

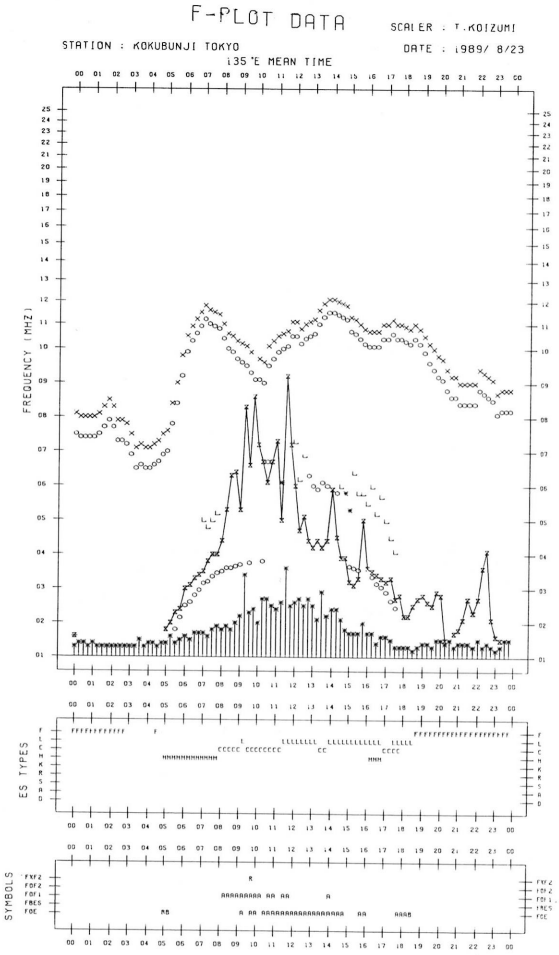

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

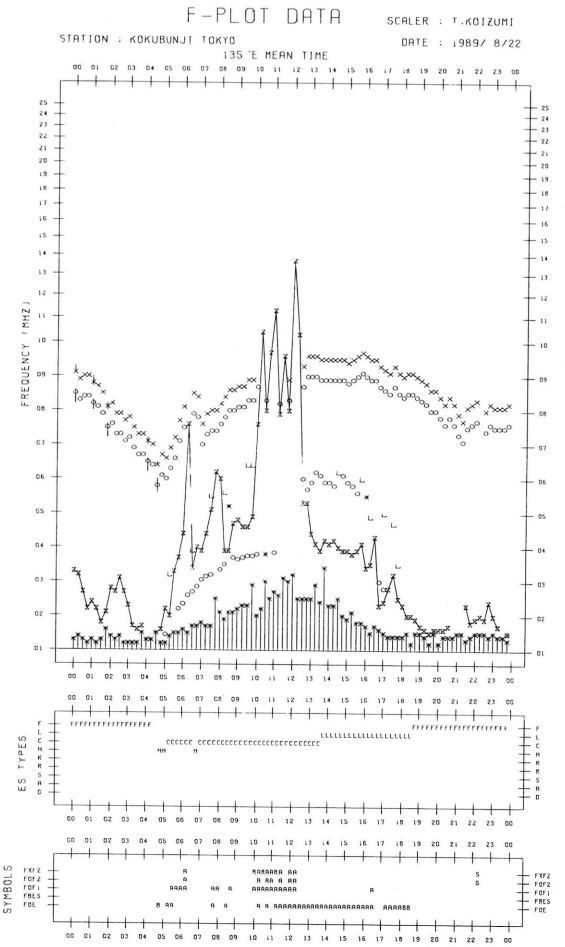

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

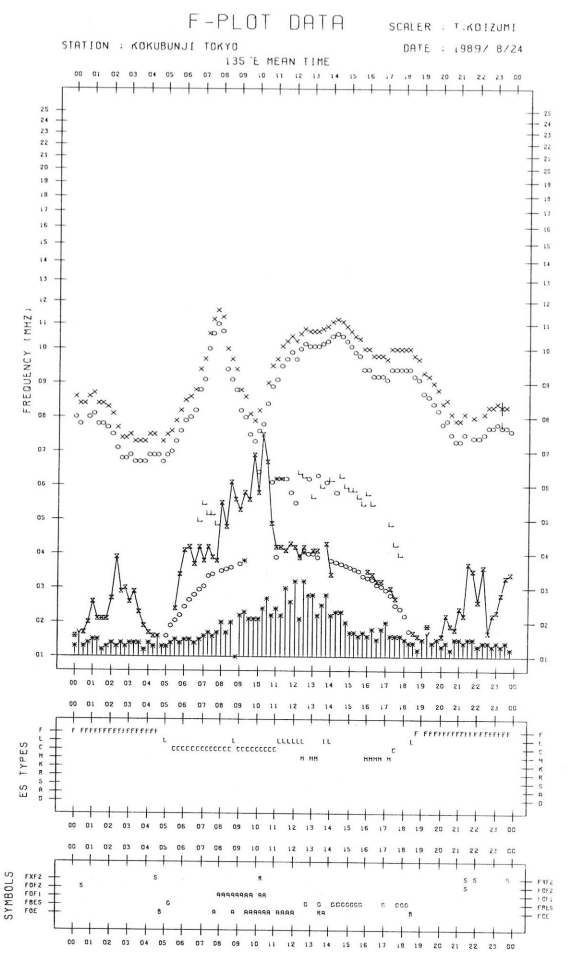

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

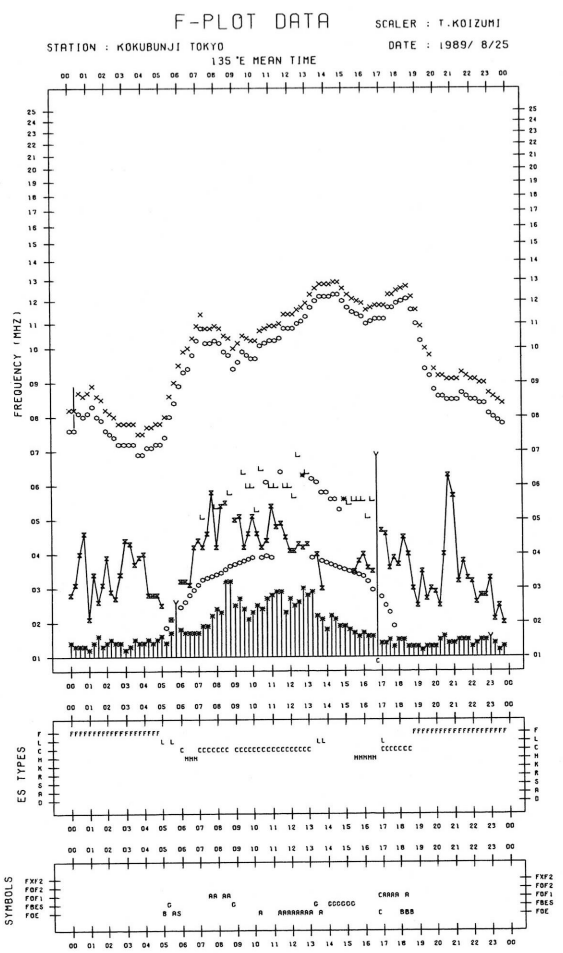

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

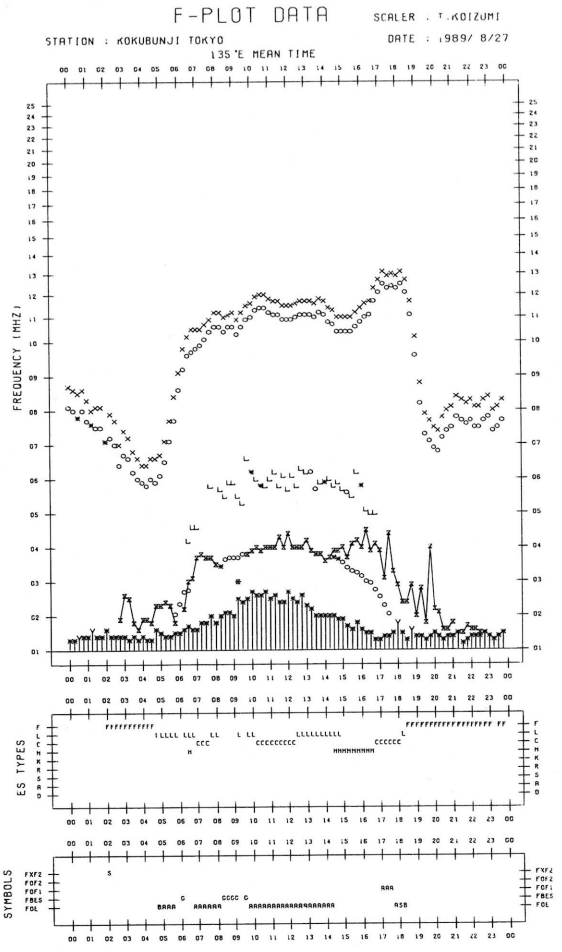

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

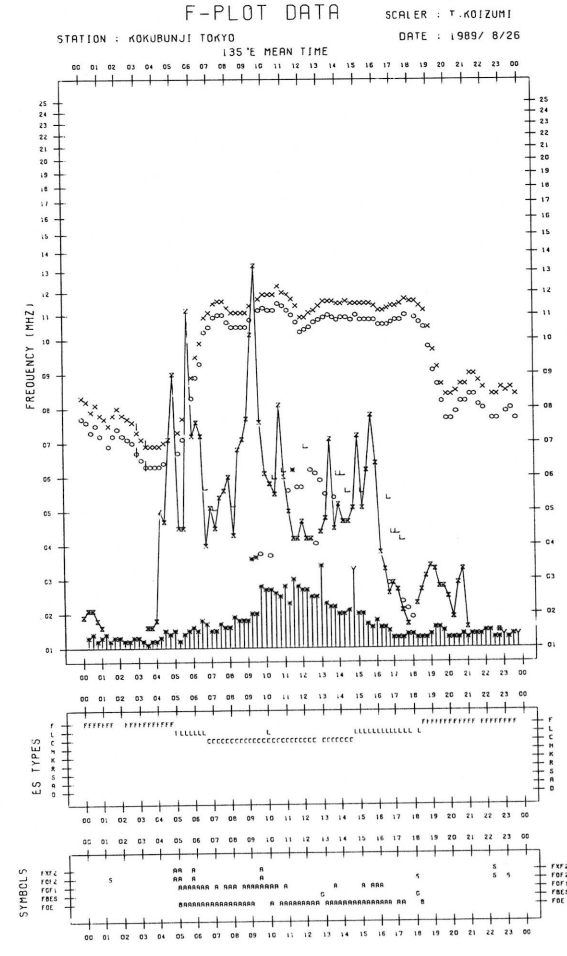

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

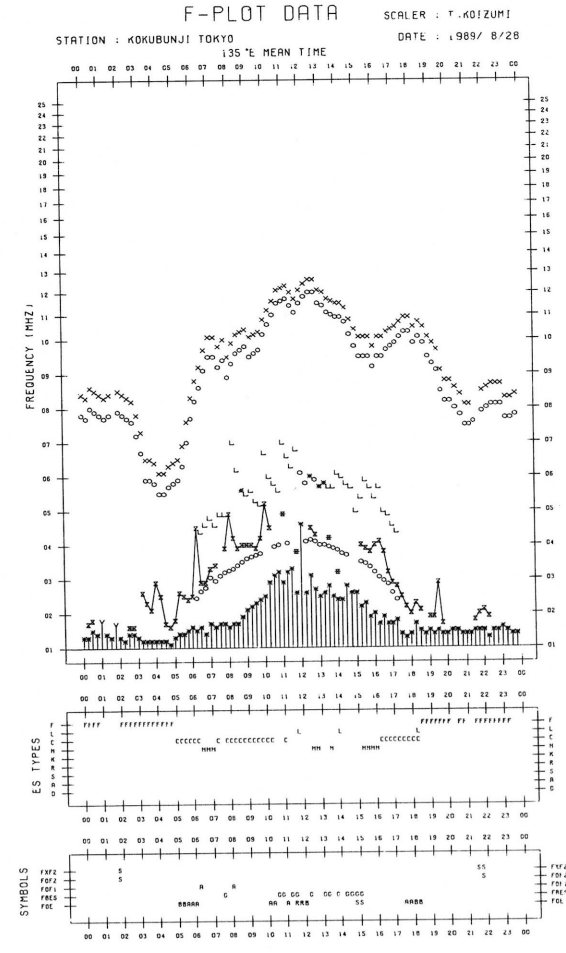

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

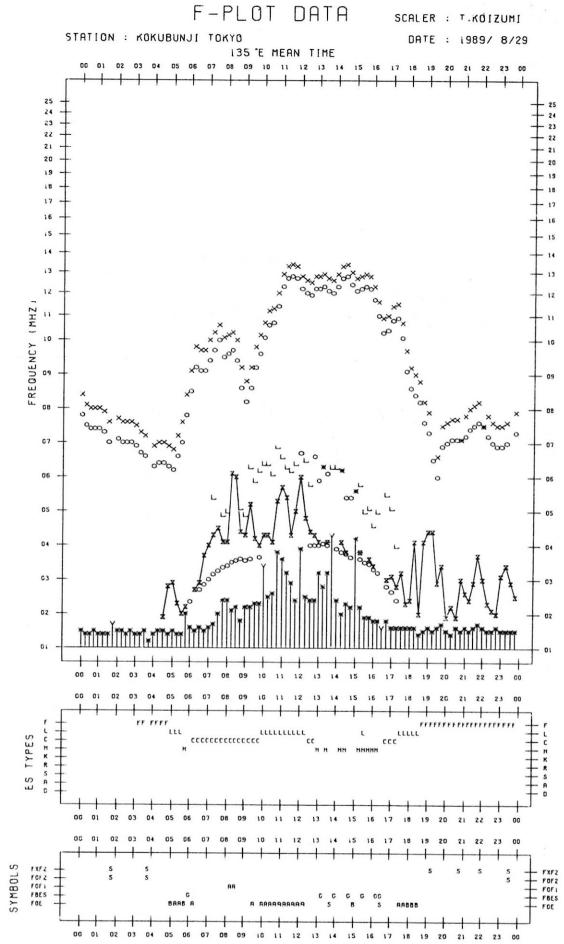

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

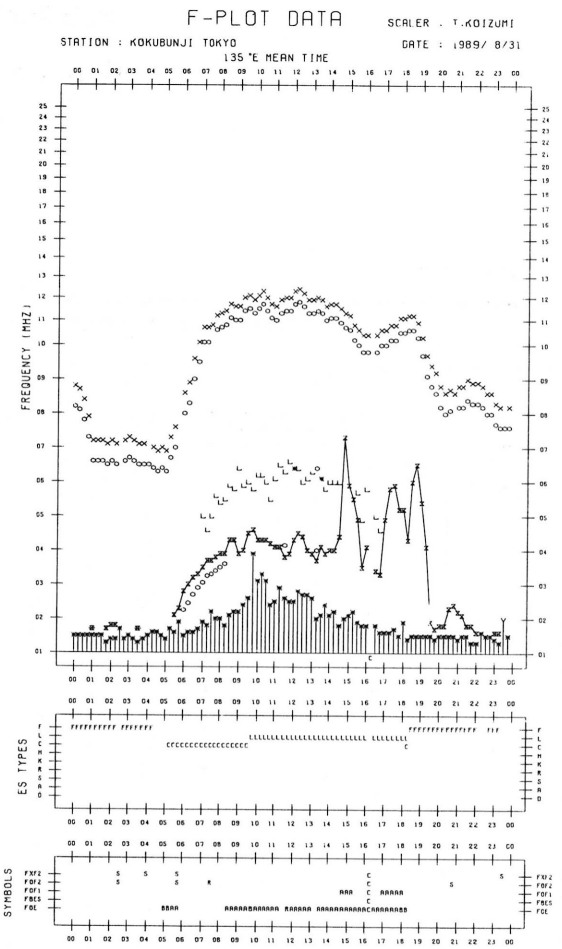

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

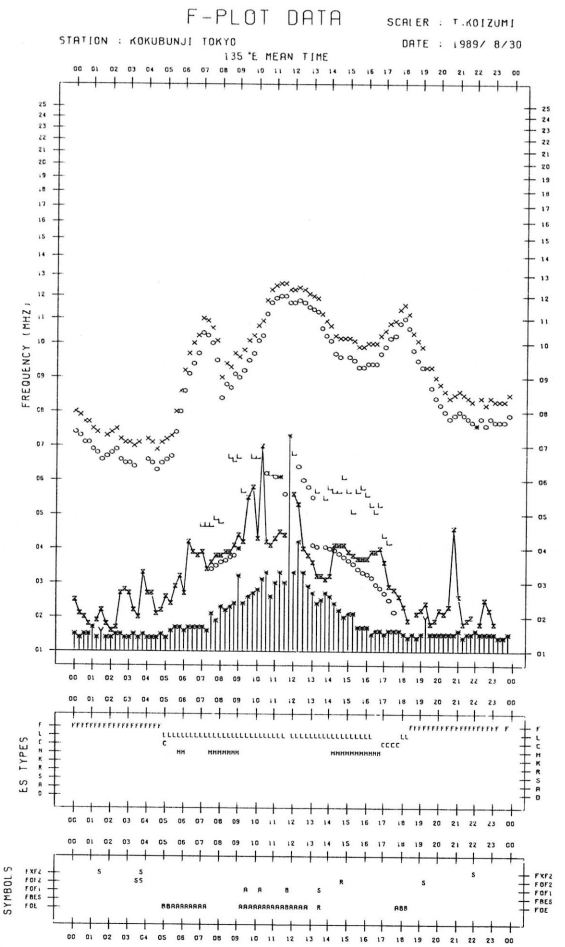

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/31
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 8/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso August 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	11	10	10	10	10	*	0	0	0	0
2	11	12	11	B	11	*	*	*	3	*
3	B	B	B	B	B	3	3	3	3	3
4	B	B	B	B	B	3	3	3	3	3
5	B	B	B	B	B	3	2	3	2	3
6	-	-	-	-	-	-	-	-	-	-
7	B	B	B	-	B	3	2	2	-	2
8	-	B	B	B	B	-	2	2	2	2
9	B	B	B	B	B	2	1	1	1	2
10	B	B	B	B	B	1	2	1	1	1
11	B	B	B	B	B	1	0	1	1	1
12	B	B	B	B	B	2	2	1	0	1
13	B	B	B	B	B	0	0	0	2	0
14	B	B	B	B	B	1	2	2	2	2
15	B	B	B	B	B	2	2	2	2	2
16	B	B	B	B	B	3	3	3	2	3
17	B	B	B	B	B	2	2	2	3	2
18	B	B	B	B	B	3	3	3	2	3
19	B	B	B	B	B	2	2	2	3	2
20	B	B	B	B	B	2	3	2	2	3
21	B	B	B	B	B	3	2	2	3	2
22	B	B	B	12	B	3	2	2	1	2
23	B	B	B	B	B	1	2	2	3	1
24	B	B	B	B	B	2	3	3	3	3
25	B	B	B	8	B	2	2	1	1	2
26	10	10	10	11	10	0	1	1	*	1
27	12	12	11	-	11	*	*	0	-	*
28	-	-	12	12	-	-	-	3	1	-
29	12	12	13	B	12	2	2	1	2	2
30	B	B	B	B	B	2	2	1	1	2
31	B	B	B	B	B	2	2	2	2	2

Note: No observations during the following periods.

6th 0042 - 0930, 1950 - 2336
7th 1950 - 8th 0220
27th 0700 - 0930, 2000 - 28th 0513

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso August 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	54	55	53	54	54
2	54	54	54	56	54
3	56	55	55	56	56
4	58	58	58	56	58
5	58	58	59	61	58
6	60	-	-	-	-
7	65	65	B	73	B
8	70	74	74	74	73
9	74	B	B	B	B
10	B	B	B	B	B
11	B	B	71	66	B
12	68	66	64	64	66
13	64	62	61	60	63
14	B	66	65	62	B
15	66	B	68	63	B
16	69	67	65	59	66
17	B	B	B	64	B
18	62	65	63	58	63
19	59	59	57	61	58
20	63	B	B	-	B
21	B	B	B	B	B
22	59	54	56	56	60
23	55	53	56	60	55
24	58	55	53	52	57
25	54	50	51	-	52
26	-	-	-	-	-
27	-	-	-	-	-
28	-	52	61	55	56
29	55	59	B	58	59
30	59	58	58	58	58
31	58	B	B	B	B

Note: No observations during the following periods:

6th 0045 - 0930
6th 2000 - 7th 0033
20th 2000 - 2338
25th 2000 - 28th 0340

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso — August 1989

Single-frequency observations

Normal observing period: 2000 - 0930 U.T. (sunrise to sunset)

AUG 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
1	500	4 S/F	0136.5	0138.0	1.6	6	-	0
	100	42 SER	2103.3	2104.3	15.8	505	-	-
	200	42 SER	2103.3	2106.6	17.8	170	-	0
	500	46 C	2103.8	2105.0	1.3	17	-	0
2	200	44 NS	1945E	0010	840D	10	7	0
	100	42 SER	2304	-	17.8	1000D	-	-
	500	46 C	2308.5	2310.5	9.5	104	-	0
	200	46 C	2308.6	2312.5	10.6	865	140	0
3	500	41 F	0121.5	0122.7	1.5	19	-	0
	200	44 NS	1945E	0250	840D	31	14	WL
	500	41 F	2114.8	2115.2	1.2	58	-	WR
4	500	42 SER	0014.8	0015.1	9.3	47	-	0
	200	44 NS	1945E	0022	830D	24	7	ML
5	200	46 C	0237.1	0238.4	1.5	223	-	WR
	100	43 NS	0700	0817	230D	110U	70U	- SUNSET
	200	44 NS	1950E	-	330D	-	8	-
	500	41 F	2123.0	2124.5	2.0	63	-	MR
6	200	44 NS	2336E	-	600D	-	50	-
	100	44 NS	2336E	0430	600D	380	150	-
	100	41 F	2336	-	15.8	1000D	-	-
7	100	41 F	0052	-	31.7	1000D	-	-
	100	41 F	0330	0330.7	6.6	970	-	-
	500	21 GRF	0515	0807	250D	75	-	ML SUNSET
	200	24 R	0621	0754	180D	1210	420	SL SUNSET
	100	24 R	0637	-	165D	1000D	730D	- SUNSET
	500	46 C	2051.0	2054.0	19.5	580	64	MRWL
8	200	44 NS	0220E	0320	420D	180	110	SL
	100	44 NS	0220E	0500	420D	530	190	-
	100	41 F	0728	0735.6	14	1000	-	-
	200	44 NS	1950E	0525	830D	510	184	SL
	100	44 NS	1950E	0820	830D	930	410	-
9	500	24 R	0317	0854	370D	116	-	ML SUNSET
	500	22 GRF	1950E	2015	250D	125	40	ML SUNRISE
	200	44 NS	1950E	0309	830D	710	254	SL
	100	44 NS	1950E	0700	830D	620	417	-
10	500	22 GRF	0200	0314	450D	35	15	ML
	200	44 NS	1950E	2130	820D	930	272	SL
	100	24 R	1950E	2140	820D	700	610	-
	500	44 NS	1950E	2142	340D	324	97	SL
11	100	44 NS	1955E	2145	820D	480	210	-
	200	44 NS	1955E	-	820D	120D	87D	SL
12	100	24 R	1955E	2035	810D	740	170	-
	200	24 R	1955E	2100	810D	270	132	SL
13	200	44 NS	1955E	-	810D	-	22	-
	100	44 NS	1955E	-	810D	-	46	-
14	500	48 C	0041.8	0122.8	94	4800	650	MR
				0051.5		1500		SL
				0112.5		1600		MR
				0135.8		3600		SL
	200	49 GB	0043.6	0046.5	80.5	19000	1250	0
				0123.1		5100		MR
				0136.3		3600		0
	100	48 C	0043.7	0044.7	208	3000	340	0
				0109		890		ML
	200	29 PBI	0205.3	0222.4	127	175	35	ML
	500	29 PBI	0218.5	0228.5	37	21	10	WL
	200	44 NS	1955E	-	810D	-	23	-
	200	46 C	2024.9	2025.7	3.3	1400	-	0
15	500	42 SER	0013.7	0014.0	9.0	77	-	0
	100	48 C	0036.3	0237.0	183	950	172	-
				0037.4		230		-
	200	46 C	0130.7	0205.3	210	280	16	WL
				0144.9		32		ML
				0248.2		136		ML
	500	46 C	0136.0	0142.5	17.5	85	-	ML
	500	42 SER	0158	0211	20	12	-	0
	500	27 RF	0218.5	0346	118	17000	3750	0
	500	29 PBI	0415.8	0415.8	145	250	46	0
	200	44 NS	2000E	0420	800D	35	19	MR
	100	43 NS	2300	0035	198	70	15	-
	500	41 F	2316.5	2319.0	39	16	-	WR
16	500	48 C	0059.7	0115.0	65.5	15000	790	WR
	200	48 C	0100.8	0106.1	37.6	10000	260	0
	100	48 C	0101.3	-	50	1000D	490D	-
	500	41 F	0514.8	0517.8	38.5	9	-	0
	200	44 NS	2000E	-	800D	-	25	-
	200	27 RF	2323	2345.5	158	150	32	MR
	100	43 NS	2328	0138	580D	480	95	-
	500	27 RF	2328.5	2342.5	37.5	39	11	MR
17	500	48 C	0034.0	0059.0	77.5	732	89	WR
				0120.0		459		0
	200	48 C	0046.9	0055.8	35.6	1650	110	0
	100	48 C	0050.8	0055.2	22	4400	-	WR
	500	22 GRF	0200	0344	440D	40	-	WR
	200	24 R	0320	0647	360D	240	112	MR

AUG 1989	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} $Wm^{-2}Hz^{-1}$) PEAK	MEAN	POLARIZATION REMARKS
17	100	44 NS	2000E	2055	800D	580	150	-
	200	44 NS	2000E	0332	800D	330	81	SR
18	100	44 NS	2000E	2043	250D	85	24	-
	200	44 NS	2000E	0011	800D	72	14	SR
19	500	41 F	0000	0008	21	9	-	WR
	500	42 SER	0207.8	0207.8	2.3	32	-	0
	500	46 C	0424.0	0424.5	3.0	102	-	0
	500	46 C	0508.2	0515.8	21	13	-	WR
	200	44 NS	2000E	2310	800D	195	82	MR
	100	44 NS	2000E	2311	800D	530	62	-
	500	43 NS	2232	0819	630D	43	4	MR
20	200	44 NS	2000E	2209	800D	200	57	SR
	100	44 NS	2000E	0018	300D	115	23	-
	500	44 NS	2338E	2344	55D	42	12	MR
21	500	43 NS	0258	0651	300	25	10	MR
	200	44 NS	2000E	2224	800D	150	38	SR
	500	44 NS	2000E	2158	240D	26	16	WR
	100	44 NS	2000E	2300	250D	140	34	-
22	500	41 F	0700	0708.5	35	49	-	WR
	200	43 NS	2300	0153	600D	21	10	WR
23	200	46 C	0205.7	0206.4	2.5	175	-	WR
	200	44 NS	2000E	0655	800D	110	20	0
	500	41 F	2107.5	2129	115	17	-	0
24	200	42 SER	0720.5	0728.4	8.6	365	-	0
	200	44 NS	2000E	0510	690D	24	8	0
25	200	42 SER	0411.2	0500	124	330	-	0
	500	42 SER	0546.5	0548.1	2.4	25	-	0
26	200	48 C	0402.6	0402.6	2.0	24000	-	0
	200	46 C	0517.8	0518.5	2.3	23	-	0
	200	41 F	0551.5	0601.0	38	27	-	0
	200	8 S	0647.9	0648.2	0.8	1100	-	0
28	500	42 SER	0421.8	0423.3	12	110	-	0
	200	42 SER	0530.7	0530.7	5.3	340	-	0
	500	42 SER	0531.0	0552.5	32.5	164	-	WR
	200	48 C	0550.7	0551.7	2.2	12000	-	0
	500	41 F	0612.0	0800	112	9	-	WL
	200	46 C	0735.0	0735.6	2.0	610	-	0
	100	46 C	2241.2	2241.6	2.8	2000	-	0
	500	4 S/F	2241.5	2241.8	2.0	17	-	0
29	100	42 SER	0147.7	0152.8	20.0	1800	-	WR
	200	48 C	0150.2	0152.1	14.5	11000	900	0
	500	46 C	0151.8	0154.3	29.5	175	35	0
	100	46 C	0320.5	0321.1	2.6	1700	-	0
	500	46 C	0324.5	0333.2	26.0	18	-	WL
	200	42 SER	0408.3	0408.9	59	160	-	0
	500	21 GRF	0420	0551	147	33	17	WL
	500	46 C	0647.3	0648.2	10	127	-	WL
	500	46 C	0726.8	0731.0	6.5	60	-	WL
	200	41 F	0737.0	0743.0	61	115	-	WL
	500	46 C	0810.5	0850U	58D	355U	86U	WL SUNSET
29	200	44 NS	2007E	2052U	720D	65	9	ML SUNRISE
	100	27 RF	2007.3	2051.0	198	730	157	-
30	200	41 F	0239.3	0242.2	4.0	3400	-	0
	500	46 C	0312.0	0312.8	4.0	290	-	WL
	500	42 SER	0333.0	0343.2	14.0	13	-	0
	200	46 C	0554.8	0555.4	1.0	1300	-	0
	200	43 NS	2230	0700	630D	32	12	ML
	500	4 S/F	2329.5	2333.7	6.0	10	-	0
31	200	46 C	0056.1	0057.4	5.3	1200	-	WL
	500	42 SER	0057.7	0112.0	17.5	147	-	0
	100	43 NS	0330	0720	330D	320	116	-
	500	21 GRF	0420	0605	183	242	27	MR
	200	44 NS	2008E	0500	780D	195	94	SL
	100	44 NS	2008E	0530	780D	580	272	-
	500	27 RF	2055	2115	38	29	17	WL
	500	41 F	2302	2314	45	41	-	WL

C. RADIO PROPAGATION

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

AUG 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	ES -24	ES -24	ES -24	-3	-7	-4	3	9	9	9	1	ES -12	-2	13	-4	10	7	10	3	-6	-9	ES -24	ES -24	ES -24
2	ES -24	ES -24	ES -24	-15	-6	3	ES -24	ES -24	ES -24	10	-4	-6	14	12	6	-2	-3	2	-6	2	-15	-12	ES -24	ES -24
3	ES -15	ES -24	ES -24	-15	-4	8	6	16	-9	ES -9	ES -9	ES -11	5	6	13	-2	-5	-4	-1	-9	ES -22	ES -22	ES -11	ES -22
4	ES -22	ES -22	ES -22	-4	-10	3	11	7	4	3	3	1	-3	11	2	-2	-8	-16	ES -22	ES -22	ES -22	ES -22	ES -7	ES -7
5	ES -22	ES -22	ES -22	-4	-1	8	8	16	18	17	11	1	15	21	9	3	-1	-1	-3	ES -2	ES -10	-1	ES -10	ES -10
6	ES -22	ES -22	ES -22	-3	-7	-1	19	12	11	17	10	5	13	23	12	10	ES -9	ES -9	ES -9	ES -9	ES -5	ES -11	ES -7	ES -7
7	ES -24	ES -24	ES -6	ES -15	-2	4	4	12	-3	-3	ES -6	2	33	32	33	26	20	20	9	10	13	ES -1	ES 13	ES -2
8	ES -24	ES -15	ES -24	ES -24	0	-3	1	4	1	-12	-12	ES -6	0	24	16	11	3	7	ES -24	-9	ES -12	ES -15	ES -12	ES -24
9	ES -15	-1	-11	-6	-3	6	9	9	2	4	4	ES -1	16	15	8	10	ES 3	10	7	1	ES -2	-9	ES -3	ES -15
10	ES -24	-9	ES -24	ES -24	ES -24	11	6	ES -24	-7	ES -24	ES -15	ES -24	1	15	10	-9	-15	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
11	-14	ES -23	ES -23	-14	ES -23	ES -23	ES -23	ES -23	ES -14	ES -23	ES -14	ES -23	ES -10	-14	4	-1	ES -23	-14	ES -23	ES -23	-8	ES -23	ES -23	ES -23
12	ES -23	ES -23	ES -23	ES -23	-1	7	ES -23	ES -23	ES -23	ES -23	ES -23	ES -14	ES -14	-1	ES -14	ES -14	-14	4	ES -14	-11	-6	ES -23	-12	ES -23
13	ES -23	ES -23	-11	-14	-17	3	5	4	ES -23	ES -23	ES -14	ES -14	ES -14	-5	-8	-5	-14	-14	ES -23	ES -23	-14	-14	-14	ES -23
14	ES -23	ES -23	ES -23	ES -23	-14	12	-2	ES -23	ES -23	ES -23	ES -23	-11	ES -14	ES -14	ES -2	ES 0	ES -14	ES -14	ES -23	ES -11	ES -23	ES -23	ES -23	ES -23
15	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -22	-4	ES -22	ES -22	ES -22	ES -5	ES -22	ES -22	ES -22
16	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -11	ES -23	ES -23	ES -23	ES -23	ES -14	ES -4	-5	-11	ES -23	ES -23	ES -14	-11	ES -23	-14	ES -14	ES -23	ES -23
17	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-11	ES -23	ES -23	-8	-11	-8	ES -11	-1	4	4	-6	ES -14	ES -23	ES -23	-14	ES -23	ES -23	ES -23
18	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-12	-11	ES -23	ES -23	ES -14	ES -14	-11	1	-14	-4	-9	ES -14	-8	ES -23	ES -23	ES -23
19	ES -23	ES -23	ES -23	ES -23	-3	12	ES -23	-11	0	2	-5	ES -14	ES -14	6	-10	-8	-9	-3	-11	-11	-11	ES -17	ES -23	ES -23
20	ES -23	ES -23	ES -23	ES -23	0	0	6	-4	ES -14	ES -23	0	-5	0	11	-6	ES -8	5	-14	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
21	ES -22	ES -22	ES -22	ES -22	-2	-1	5	15	11	0	ES -13	ES -13	ES -13	27	ES -13	5	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -9	ES -22
22	ES -22	ES -22	ES -22	-1	ES -22	13	ES -22	ES -22	ES -13	ES -22	ES -22	-3	-9	-9	ES -22	ES -22	-1	2	0	-7	-11	-10	ES -22	ES -22
23	ES -22	ES -22	-13	-3	-1	3	-7	3	-1	ES -22	ES -22	ES -13	ES -13	7	ES -13	ES -13	-3	ES -13	ES -7	ES -13	ES -22	ES -22	ES -22	-10
24	ES -22	ES -22	-13	-8	ES -22	5	9	10	5	2	0	ES -22	ES -22	14	0	-3	ES -22	ES -22	-7	ES -22	ES -22	ES -13	ES -22	ES -22
25	ES -22	ES -22	ES -22	-8	2	2	-1	6	6	5	3	-9	ES -22	11	-3	7	-9	-4	-4	ES -13	ES -10	-7	-10	ES -13
26	ES -22	ES -22	ES -22	-7	-2	8	14	17	-1	ES -3	ES -3	ES -7	ES -6	ES 0	ES 0	ES -2	ES 0	3	-2	ES -6	ES 0	ES -6	ES -1	ES -1
27	ES -7	ES -7	ES -13	ES -22	2	14	ES -22	ES -13	-12	-9	-7	ES -12	ES -12	ES -9	ES -9	-9	-3	4	ES -5	0	-12	-12	ES -9	ES -15
28	ES -21	ES -21	ES -21	ES -21	C	8	9	12	-15	ES -24	ES -24	ES -13	ES -22	ES -22	ES -22	4	4	0	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21
29	-13	-3	ES -22	ES -14	ES -23	2	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -22	ES -22	ES -22	ES -21	ES -21	ES -21	ES -22	ES -22	-12	ES -21	ES -21	ES -21
30	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -15	ES -24	ES -24	-6	-11	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
31	ES -23	ES -23	ES -23	ES -23	-11	1	-2	1	ES -14	ES -23	ES -23	ES -23	ES -23	ES -23	-14	-14	-5	-5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
CNT	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	ES -23	ES -23	ES -23	US -15	-7	3	-1	1	-12	US -11	ES -12	ES -12	ES -11	6	US -4	US -2	US -6	-5	ES -11	ES -13	ES -12	ES -21	ES -22	ES -22
UD	ES -14	ES -7	ES -11	-3	0	12	11	16	11	10	4	1	15	24	13	10	5	10	3	1	ES -2	ES -6	ES -3	ES -7
LD	ES -24	ES -24	ES -24	ES -24	ES -23	ES -23	ES -23	ES -24	ES -23	ES -24	ES -23	ES -23	ES -22	ES -23	ES -22	ES -22	ES -22	ES -22	ES -24	ES -23	ES -23	ES -24	ES -24	ES -24

C. RADIO PROPAGATION

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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	-10	ES -24	-7	-3	0	15	18	23	24	23	19	21	24	25	26	19	21	19	16	9	-1	-1	-7	-12
2	-12	-9	-4	4	8	14	14	17	21	18	19	17	18	16	21	10	12	10	16	-4	-1	-9	-9	-9
3	-6	-7	-3	-2	-1	9	16	18	22	26	21	20	23	17	10	26	20	12	5	5	-8	3	-3	-5
4	ES -22	-16	-7	-4	1	7	13	14	24	17	15	16	18	18	14	21	12	8	3	1	-7	-9	ES -7	ES -7
5	ES -22	ES -22	-2	5	7	12	15	19	23	28	23	25	20	24	24	26	21	14	1	3	7	-1	ES -10	ES -7
6	ES -22	-1	2	1	9	12	24	18	25	20	21	23	23	20	15	20	8	16	3	0	-2	ES -5	ES -7	ES -7
7	ES -24	ES -24	-3	-1	6	14	17	17	24	28	24	26	33	40	41	36	36	31	24	17	11	ES 5	8	ES -2
8	-7	-7	1	-1	6	3	19	20	22	22	25	24	26	24	18	11	19	13	2	14	2	-5	-5	-9
9	-12	-5	-3	1	7	13	21	24	23	19	20	22	24	25	15	13	21	14	16	3	3	2	-3	ES -15
10	-12	ES -24	ES -24	ES -24	3	9	12	21	25	23	17	19	16	23	18	21	10	26	10	-2	-3	-3	-3	-5
11	-8	ES -23	-11	3	-1	9	17	19	17	22	20	20	13	6	12	15	7	20	7	-1	-10	-10	ES -23	ES -23
12	ES -23	ES -23	-14	-5	3	13	17	17	23	22	26	22	22	15	8	18	14	10	10	-2	-5	ES -23	-19	ES -23
13	ES -23	ES -23	-5	-5	4	9	17	17	22	17	25	15	16	12	17	13	22	20	4	5	-6	-8	ES -23	ES -23
14	ES -23	ES -23	ES -23	-14	2	13	18	23	17	18	20	20	24	14	15	11	12	1	-5	-11	ES -14	-3	ES -23	ES -23
15	ES -23	ES -23	ES -23	ES -23	-14	-11	4	11	13	10	10	8	5	0	3	6	21	12	4	-9	ES -22	ES -22	ES -22	ES -22
16	ES -23	ES -23	ES -23	ES -23	ES -23	-11	4	16	21	21	18	13	23	6	-5	-17	-8	16	5	-2	-5	-14	ES -23	ES -23
17	ES -23	ES -23	ES -23	ES -23	-5	5	10	18	22	22	24	18	19	18	14	-4	-11	10	ES -23	ES -23	-3	ES -23	ES -23	ES -23
18	ES -23	ES -23	-17	ES -23	3	13	18	20	24	19	14	10	20	25	9	0	-1	17	ES -14	-1	-11	-10	ES -23	ES -23
19	ES -23	ES -23	ES -23	-2	2	15	18	20	24	29	25	22	20	17	11	12	0	11	-3	0	-9	-14	ES -23	ES -23
20	ES -23	ES -23	ES -23	-3	10	12	17	18	20	19	20	20	20	25	21	ES -8	20	-5	5	7	1	-4	-10	ES -23
21	ES -22	-13	-9	3	11	12	21	23	26	23	22	27	24	19	7	8	12	14	ES -22	2	-2	ES -13	-11	ES -22
22	ES -22	ES -22	-8	4	7	10	17	23	27	26	22	22	19	22	21	14	17	22	-5	1	-1	-4	-13	ES -22
23	ES -22	ES -22	-9	-3	10	12	17	23	22	24	22	23	26	10	17	13	20	19	2	-2	ES -10	-8	-10	-13
24	ES -22	ES -22	-3	1	8	19	20	22	26	28	27	30	15	21	15	17	17	13	11	-1	-1	-7	-13	ES -22
25	ES -22	-9	-8	1	10	16	22	22	22	26	26	23	26	21	20	19	14	24	7	4	2	-3	-8	-11
26	ES -22	-8	-7	0	9	19	23	25	24	26	18	24	21	14	24	3	ES -3	17	25	9	7	-2	ES -1	ES -1
27	ES -7	ES -13	-8	2	10	22	23	25	27	9	-6	2	0	-4	-12	ES -12	ES -3	12	-4	2	4	-9	ES -9	ES -15
28	ES -21	ES -21	-8	-6	C	15	20	23	20	16	18	28	13	17	29	26	5	28	13	18	8	1	ES -21	-12
29	ES -22	ES -22	-9	1	3	15	15	18	3	20	13	21	22	20	4	-15	ES -21	18	ES -22	4	1	0	ES -21	ES -21
30	ES -24	-11	ES -24	-15	5	13	21	22	22	14	18	13	17	12	18	-12	1	11	ES -24	-12	3	-11	ES -24	ES -24
31	ES -23	-11	-2	2	8	17	19	21	18	16	15	19	10	10	10	11	-1	10	ES -23	1	-14	ES -23	ES -23	ES -23
CNT	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	ES -22	ES -22	-8	-2	6	13	17	20	22	22	20	21	20	18	15	13	12	14	4	1	-2	US -7	ES -11	ES -21
UD	ES -7	-7	-2	4	10	19	23	24	26	28	26	27	26	25	26	26	21	26	16	14	7	ES 2	ES -3	ES -5
LD	ES -23	ES -24	ES -23	ES -23	-5	3	10	16	17	14	13	10	10	6	3	ES -12	ES -8	8	ES -23	-11	ES -14	ES -23	ES -23	ES -23

C. Radio Propagation

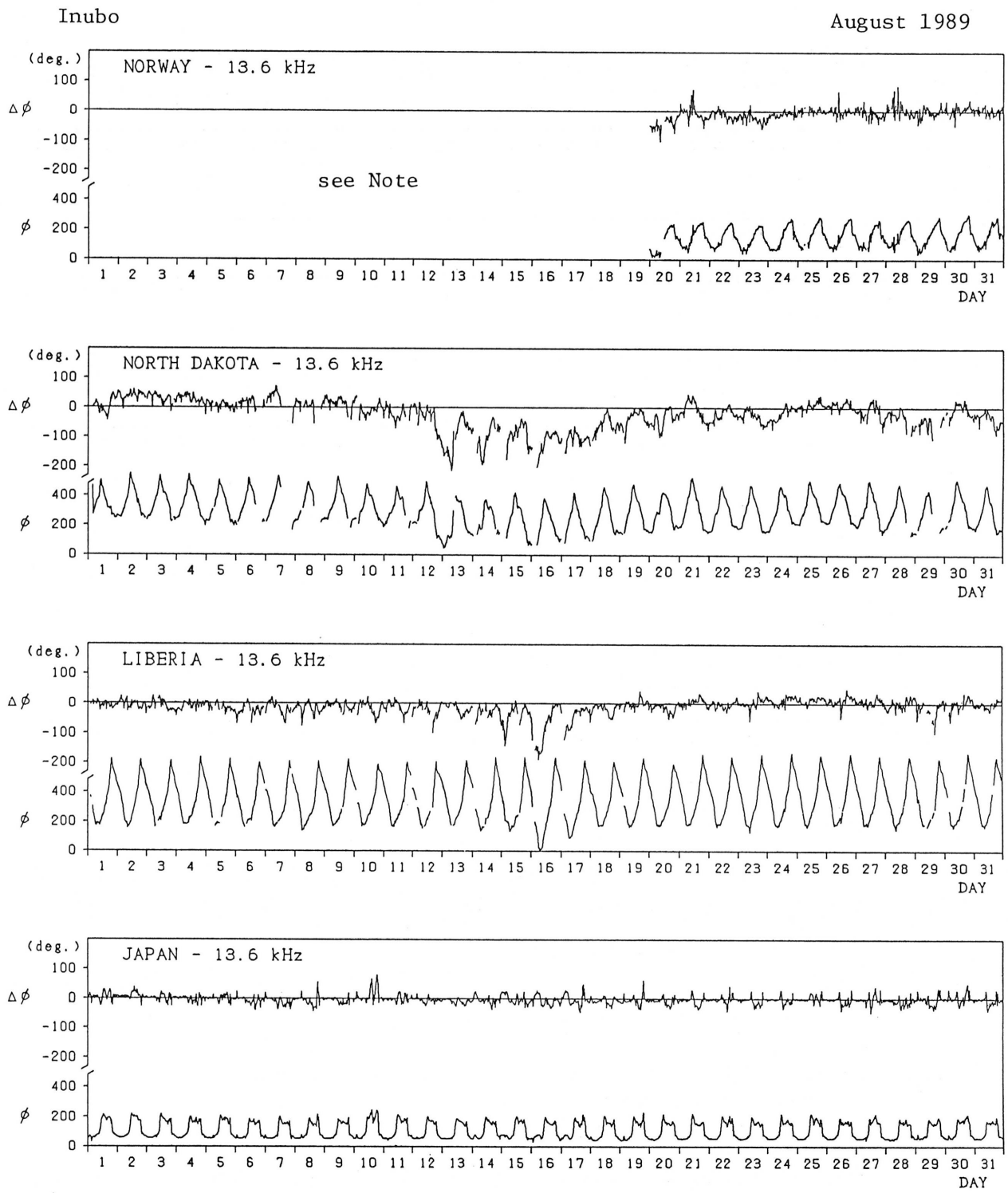
c2. Radio Propagation Quality Figures at Hiraiso

Hiraiso — Time in U.T

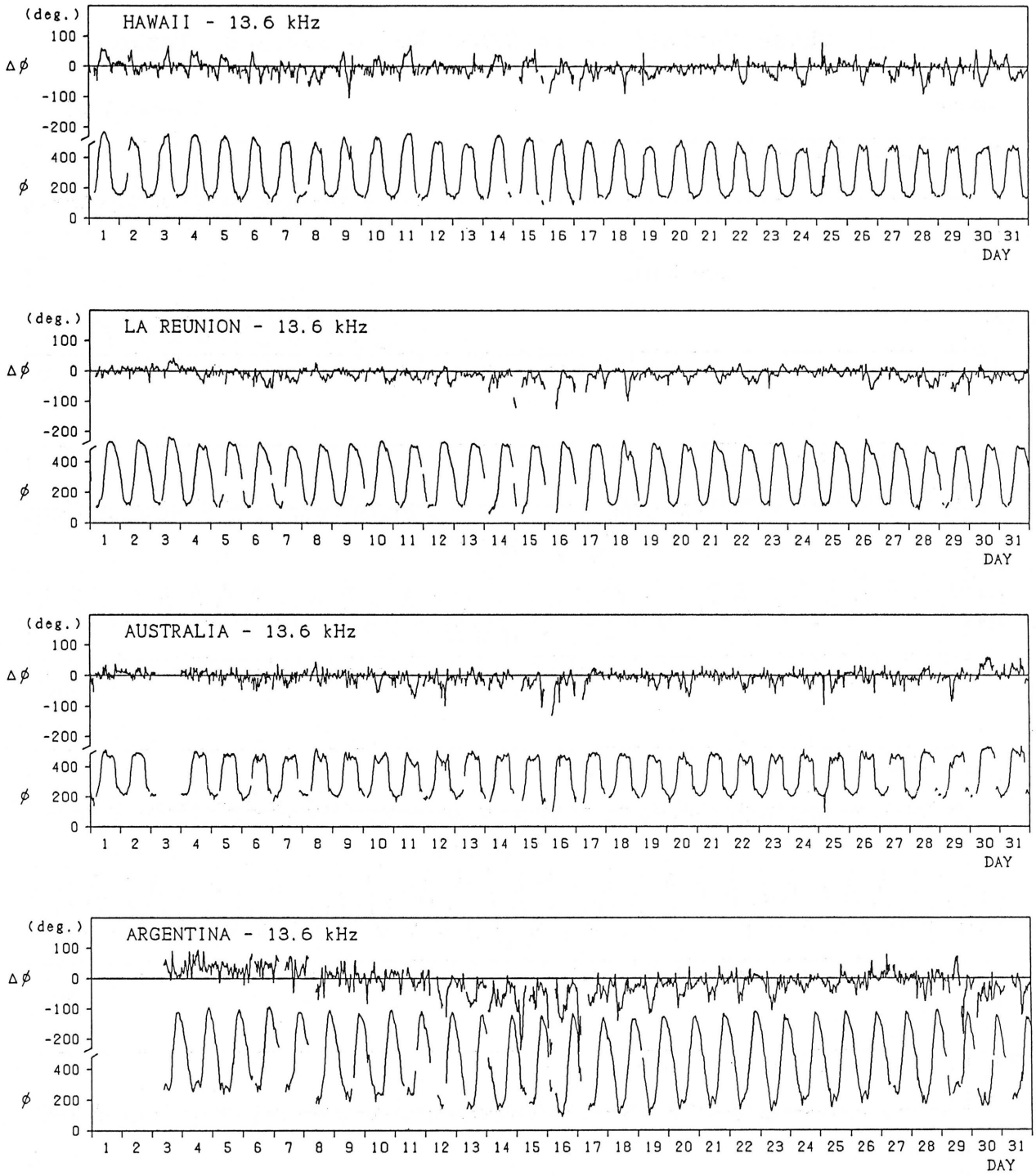
Aug. 1989	Whole Day Figure	W W V 00|06 06|12 12|18 18|24	W W V H 00|06 06|12 12|18 18|24	Conditions 00|06 06|12 12|18 18|24	Principal Geomagnetic Storms Start	End	Range
1	5-	4 5 5 5U	4 4 5 5	N N N N			
2	4o	3U 4U 5 5U	4 4 4 4	N N N N			
3	4o	4 5U 4 4U	4 4 4 4	N N N N			
4	4o	4 5 4 S	4 3 4 4	N N N N			
5	5-	5 5 5 5U	4 4 5 4	N N N N			
6	4+	4 5 5U S	4 4 4 4U	N N N N			
7	5-	4U 5 5 5U	4 4 5 5U	N N N N			
8	4+	4U 4 5 S	4 4 4 5	N N N N			
9	5-	5 5 5 5U	4 4 4 5	N N N N	1831	---	148
10	4o	4U 4U 4 S	3U 4 4 5	N N N N	---	---	
11	3+	3U 2U 3 S	4 4 4 4	U U U U	---	19.0	
12	4-	3U 2U 3U 5U	4 4 4 4U	U U U U			
13	4o	4 4U 3 5U	4 4 4 4	U N N N			
14	3+	4U 3U 3U S	3 4 4 3U	N N N N	0613	---	203
15	2+	2U 2U 2U S	2U 3 3 3U	U U U U	---	---	
16	3o	2U 3U 3U S	2U 4 3 4	U U U U	---	20.0	
17	3o	2U 3U 4 S	3U 4 3 2U	U U U U			
18	3o	2U 3U 3 4U	2 4 3 3U	U U U U			
19	4-	3U 4U 4 4U	4 4 4 3	U U U U			
20	4o	4U 4U 4 S	4 4 4 4	N N N N			
21	4-	4U 5 3U S	4 4 3 3U	N N N N			
22	4-	3U 3U 3U 5U	4 4 4 4	N N N N			
23	4o	4 4U 3U S	4 4 4 4U	N N N N			
24	4o	4U 5 3U S	4 4 4 4	N N N N			
25	4o	4 4 4 5U	4 4 4 4	N N N N			
26	4+	4 5U 4U S	4 4 4 5	N N N N			
27	3+	4U 3U 3U 5U	4 3 2 4	N N N N	1338	---	74
28	4o	4U 4U 3U S	4 4 4 5	N N N N	---	03.0	
28					19.0	---	117
29	3-	4U 2U 2U S	4 4 3 3U	N N N N	---	20.0	
30	3o	2U 2U 2U S	4 4 3 3U	N N N N			
31	3+	4U 4U 3 S	4 4 3 2U	N N N N			

C. Radio Propagation

C3. Phase Variations in OMEGA Radio Waves at Inubo



Inubo August 1989



Note: As for NORWAY - 13.6 kHz, no record during August 01 - August 19, due to the maintenance of transmitter.

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

NO DATA

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Aug. 1989	S W F									Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
2		25				2306	28	SL	3-	x	x
3					7	0745	17	SL	1-		x
5			15	x	16	0548	36	SL	1		x
6			9	x		0049	7	S	1-	x	
6				x	20	0748	46	S	1+	x	
6					21	1200	54	SL	1+	x	
6	x	x	23			2338	32	SL	2-	x	x
7				x	13	0822	37	SL	1	x	x
7		x			10	2046	22	SL	1-	x	x
8	32	33	16	x	22	0514	28	SL	3+	x	x
10	x	15	12	x		0142	26	S	2-	x	x
11		x	5	x		0302	30	S	1-	x	x
12			10	x	13	0757	23	S	1	x	x
12	42		10	18	23	1343	210	G	3+	x	
13	32		8	x	8	0715	28	SL	1-	x	x
14		x	34	x		0045	254	S	3-	x	x
14			22			2321	25	SL	2-	x	x
15			10			0001	15	SL	1-		x
15			10			0017	21	SL	1-	x	x
15			7			1329	27	SL	1-	x	
16			19			0026	20	SL	1-		x
16			23			0047	478	SL	2-	x	x
17			23	x	x	0034	322	G	2-	x	x
28		15				2240	14	SL	2-		
29	24	15	15			0124	16	SL	2		x
29			13			0423	28	SL	1		
29	22	30	8		5	0806	92	G	3		
29					13	1304	34	SL	1	x	
29		24				1346	40	G	3-		
29		29			18	1522	118	G	3		
29		42	C			1758	94	SL	3+	x	
30		27	10	12		0236	86	SL	3-	x	x
30		38	10	x		0440	22	SL	3	x	
30	22				10	1639	26	S	2-	x	
31		19	12			0046	60	G	2	x	x
31	21	25				1612	68	G	3-	x	

NOTES CO: Colorado(WWV) HA: Hawaii(WWVH) 1): Australia 2): Mosco 3): Londn

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Aug. 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		—		63	—	—	0125	0247	0140
1		—		36	—	—	0323	0429	0332
1		—	36	25	—	—	0435	0458D	0446
1		—	31	27	—	—	0458E	0542	0502
1			26	14		—	0546	0646	0600
1	—		20	10		—	0651	0739	0657
1	—		24				0927	1037	0938
1	—				18	18	2105	2200	2114
2	—			8	5		0132	0202	0138
2	—	23	15	19	9		0450	0521	0454
2	—		29	13			0746	0825	0757
2	—		6	14	25	26	2227	2307D	2236
2	—	44	45	70	92	93	2307E	0053	2316
3	—			6	5		0151	0225	0156
3	—		10	10	5	10	0307	0332D	0313
3	—			10			0332E	0350	0336
3	—		15	13			0658	0732	0707
3	—	64	94	51		27	0746	0847	0754
3	—	37	20				1109	1207	1127
3	—				36	27	2045	2147	2057
3	—				20	23	2217	2313	2231
4	—		24*	29*			0411	0549	0453
4	—		13	22	33	29	2243	2356	2253
5	—	18	33	32	17	18	0216	0307	0225
5	—			9			0326	0348	0334
5	—	23	22	21	10	15	0437	0514	0444
5	—	98	129	74	21	31	0545	0720	0603
5	—	39	36				1024	1105	1035
5	—	121	52				1110E	1225	1131
5	—				15	18	1950	2041	1959
5	—				21	23	2117	2156D	2128
5	—				32	34	2156E	2318	2220
5	—				5		2330	2355	2338
6	—		13	35	30	26	0005	0044D	0025
6	—	48	54	92	73	62	0044E	0202	0055
6	—			10	5	13	0203	0225	0207
6	—			11*			0347	0418	0350
6	—		17				0430	0509	0437
6	—		10				0510	0523D	0513
6	—		24				0523E	0628	0545
6	—		15	6			0647	0727	0700
6	—	—	138	80			0749	0858D	0757
6	—	—		91			0828E	0957	0833
6	—	—	47				1005	1045	1012
6	—	30					1205	1301	1214

Inubo

Aug.	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
6	—				22	17	2238	2320D	2255
6	—	51	84*	—	123	113	2320E	0043D	2352
7	—	17	27	—	45	22	0043E	0215	0046
7	—		23	—	14		0338	0439	0345
7	—		31	—			0711	0818	0731
7	—	—	118	34			0924	1112	0935
7	—	20			129	129	2036	2142D	2059
7	—				43	30	2142E	2305	2145
8	—		9	14			0431	0457	0440
8	—	—	207	127	76	56	0512	0646D	0524
8	—		37	26			0646E	0721	0652
8	—				6	—	2051	2112	2053
8	—				5		2133	2149	2137
8	—				6		2156	2216	2201
9	—			6	8		0030	0107	0041
9	—		19	18	10		0332	0417	0339
9	—		8	9			0502	0538	0506
9	—		20	10			0647	0740	0657
9	—	60					1423	1516	1440
10	—	66	73	95	72	64	0142	0207D	0155
10	—	96	132	116	89	81	0207E	0346	0217
10	—			6			0522	0605	0525
10	—				13		2111	2137	2113
10	—			16	25	27	2326	0011D	2331
11	—			11	12	26	0011E	0124	0019
11	—	24	23	46	29	23	0135	0252	0145
11	—	29	78	60	26	26	0525	0637	0538
11	—	60					1624	1708	1636
11	—				61	41	2003	2137	2029
11	—	66	83	108	134	145	2244	0047D	2305
12	—			14	21		0047E	0113D	0053
12	—		27	21	19		0113E	0158	0124
12	—		42	11	10		0209	0230	0215
12	—	84	152	105	82	69	0302	0422	0311
12	—		17	6			0703	0737D	0709
12	—		76	33			0737	0758D	0747
12	—		183	88		14	0758E	0921D	0807
12	—		44				0921E	1035	0937
12	—	202					1400	1707	1439
12	—				13		2225	2256	2230
13	—	24	42	54	42	34	0057	0204	0105
13	—		17	12			0626	0713	0631
13	—	71	130	78			0718	0742	0728
13	—	29					1354	1431	1404
13	—	13					1621	1659	1631
13	—				17		2024	2059	2028
13	—				14		2123	2155	2132
13	—				21*		2210	2243D	2227
13	—				19		2243E	2331	2251
13	—			—	10		2336	0005	2346
14	—	110	243*	—	203	178	0025	0402D	0053
14	—	24	90	—	24	12	0402E	0610	0410
14	—		17	—			0610	0647	0613
14	—	29	55	—			0700	0739D	0708
14	—	31	39	—			0739E	0830	0744
14	—	18	24	—			0902	0940	0919
14	—	54	59	—			1014	1129	1026
14	—	54*	13	—			1202	1334	1230
14	—				66	38	1918	2010D	1926
14	—				16	29	2010E	2054	2022
14	—				10	26	2147	2224	2205
14	—	44	68	104	102	82	2314	2353D	2332
14	—	46	89	—	103	86	2353E	0049D	0008
15	—	20	85	—	76	71	0049E	0120D	0053
15	—	50	112	—	84	80	0120E	0209D	0131
15	—	93	256	—	112	84	0152E	0530D	0308
15	—		84				0530E	0623D	0533
15	—		63	8			0623E	0637D	0625
15	—		60	14			0637E	0808	0645
15	—	21	47				0928	1020	0935
15	—	116					1333	1505D	1407
15	—	26					1505E	1530	1514
15	—				110	71	2028	2123D	2050
15	—				84	50	2123E	2146D	2133
15	—				91	60	2146E	2341D	2201

Inubo

Aug.	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
15	—		34	38	50	18	2341E	0025D	0006
16	—	12	81	79	84	37	0025E	0053D	0045
16	—	201	373	270	271	214	0053E	0649	0118
16					23		1907	1951	1926
16					16		2115	2200	2129
16			20	37	35		2228	2316D	2256
16		29	29	69	42	20	2316E	0007D	2334
17	43	84	138	183	129	110	0007E	0049D	0042
17	75	132	254	163	182	153	0049E	0605	0117
17		32					1302	1412	1312
17					61		1853	2020	1917
17	30	37	30	69	59	37	2339	0200	0005
19		59	83	72	49	28	0247	0422	0258
19	—				23	16	2134	2229	2140
20		24		54	33	24	0125	0335	0150
20			11				0825	0855	0831
20				11	17		2250	0005	2303
21			11	—			0454	0541	0456
21					10		2324	2351D	2335
21					11		2351E	0037	0000
22		11		26	12		0206	0330	0226
23				11	8	12	0223	0256	0233
23		60	61				0852	1035	0926
24			9	10			0452	0542	0507
24		27	20	11			0731	0812	0737
24		36					1333	1442	1359
25			17	17	6	15	0339	0426	0347
25			11	6			0616	0656	0620
25	—	30	35				0816	0920	0836
26		22	19	14			0534	0642	0553
26		83	24				1151	1323	1206
27				12	17		2333	0021	2339
28				—	15	—	0115	0133D	0119
28				—	15	11	0133E	0210	0139
28			21	—	10	13	0221	0301	0227
28			22	—	8		0343	0425	0355
28			80	—	26	21	0426	0546D	0439
28			35	—			0546E	0709	0604
28		37	41	10			0720	0853	0742
28	29		26	40	63	41	2242	0024	2248
29			14	—	9		0035	0112	0046
29	45	58	108	—	87	58	0130	0154D	0141
29	48	79	149	—	94	68	0154E	0317	0203
29			9	—	5		0325	0346	0334
29			14	14	8		0350	0427D	0405
29	30	42	93	60	37	15	0427E	0606	0437
29			10	5			0636	0655D	0640
29			12				0655E	0728	0703
29		80	110	40			0824	0933D	0833
29		35	71				0933E	1028D	0938
29			60				1028E	1134	1035
29		56					1253	1405	1312
29		60				—	1509	1611	1526
29				—	20	—	2047	2121	2053
29			54	71	67	35	2353	0120	0002
30			10	10	6		0205	0232	0211
30	66	75	177	132	98	70	0237	0311D	0247
30	74	87	174	121	86	50	0311E	0433D	0320
30			85	59	16		0433E	0516D	0450
30			71	50			0516E	0615D	0527
30			20	15			0615E	0702	0621
30	28	23	29	14			0720	0810	0733
30		20	20				1004	1046	1012
30		109				49	1637	1809	1647
30				11	15		2310	0000	2325
31	37	25	43	73	48	24	0057	0237	0103
31			14	10			0540	0603	0550
31			17	8			0627	0637	0630
31			34	16			0639	0741	0658
31			24	6			0818	0840	0823
31			27				0849	0908	0851
31		61					1608	1744	1636

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Queries about "Ionosperic Data in Japan" should be forwarded to:
Communications Research Laboratory, Ministry of Posts and Telecommunications,
2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN.