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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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PREFACE

July, 1988

Ionospheric sounding in Japan dates back to 1931. Results of the work have been published monthly as "Ionospheric Data in Japan" since 1946. Observation, data coordination, and publication have been carried out successively by various organizations as dictated by reorganizations of government offices. Several progressive changes have been made in the observing system and data processing method.

Communications Research Laboratory, formerly Radio Research Laboratory, which has been operating ionospheric observatories since 1952, has just completed a new full-automatic system attached to traditional ionosondes for data collecting and processing of ionospheric observation. After extensive comparison of automatically-scaled parameters with manually-scaled values, it was decided to publish monthly reports based on the data processed with the new system beginning June 1988.

At present, the number of ionospheric parameters to be published is restricted to five because values of other parameters processed by the new system are not reliable. New daily plots called Summary Plots, made from quarter-hourly digital ionograms are published to present general ionospheric conditions. With respect to data obtained at Kokubunji, fourteen manually-scaled parameters are, as heretofore, being inserted along with *f*-plots to supplement those automatically-scaled.

We intend to improve the system to extend the ability of automatic scaling and to provide, on request, various digital data including ionograms in computer-readable form.

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Director General
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Ministry of Posts and Telecommunications

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. 1988

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	75	71	66	62	58	60	70	72	73	71	80	80	69	73		69	76	69	67	72	78	76	74	80
2	74	68	62		57	62	74	78	76	78	77	70	79	74		68	50	74	80	78	74	78	76	76
3	70	69	67	58	64		64	74	78	80	81		82	78	81	81		80	77	82	77	77	84	84
4	82	70	71	67	66	70	85		83	95	88	90	86	83	80	78	78	78	74	75	80	A	75	62
5			64	64	66		67		73	79		80	78	81	73	71	78	77	75	79	78	70	74	72
6	66	67	67	67	63	68	62	65	53	A				64	64	70		71	59	62	64	64	72	68
7	66	66		59	59	72	80	77	78	73		75	74	76		72	80	81	72	82	72	71	66	71
8		66	62	65	A	71	58	74	71	65	68	69	75	A	71	73	74	74	62	A	80	86	85	79
9	72	66	67	60	67		75	68	69	76	80	80	79			75	80	77	77	80	81	77	80	70
10		72	73	65	57	53	63		66	A	63	67	70	77	73	72	77	70		80	83	76	74	72
11	79	74	66	61	65	66	66	A	78	68		68	76	78	82	81		76	74	77		76	76	66
12	72	62	63	57	56	66	A	86	A	75		A	A	A	A	75	71	78	71	A	80	86	74	68
13	56	59	63	52	44	52	58	62	63	63	61	60	56	62	59	62	64	68	64	70	67	70	67	58
14	57	56	56	60	58	52		A		A			A	A	A	53	53	53	55	58	63	59	57	63
15	53	50	38	39	44	32	51	55	52		63	59	61	A	68	67	73	A	64	69	64	68	A	55
16	62	A	54	43	A	46	40		A	60		78	A	A	A	54	A	53	50	A	64	58	50	53
17	51	49	50	45	36	43	40	53	62	62	A	73	70	60	66	68	A	64		64	53	70	67	58
18		54	52		44	55	60	61	64	71	68	72	69	67	63	63	71	64		67	66	68	66	62
19	58	57	54	55	52	46	64	64	63	62		A		59	60	62	62	62	60	62	66	64	66	58
20	57	50	51	48	53	51		66	66	62	65	71	74	73	68	67	70	76	75	78	A	A	60	62
21		51	45	53	50	54	62	65	72	70	A	72	74	80		72	66	67		A	80	81	66	58
22	52	58	56	52	54	55	74	70	72	76	68	73	77	74	80	79	103	87	85	64	58	58		A
23	60	54	56	56	52		60	64	69	64	72	67	68	73	72	72	78	A	A		78		66	59
24	62	56	54	54	65	64	80	A	73	71	A	77	81	84	80	81		83	86	90	78	73	66	73
25	66	62	55	55		54	68	61	76	69	74	74	80	74		76	76	81	81	84	80	68	67	63
26	53	57	56	44	60	A	67	73	63	71	77	82	79	78	77	77	84	85	90	88	82		66	66
27	67	61	55	44	62	61	A	62	62		65	72	76	70	76	74	75	79	84	81	75	65	56	53
28	48	44	50	48	50	57		75		70	74	73			71	75		72	86	80	77		68	60
29		57	N	53	52	62	82	95	100	93	87	85	90	94	C	A		86	85	90	85	78	67	67
30		60	55		65	67	86			90	97		C	C	87	C	C	85	82	86	84	87	64	68
31	53	C	53	C	57	55	59	66	75	73	87	88	81	86	86	79	80	77	76	82	85	83	70	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	24	28	29	27	28	26	26	23	26	26	20	25	24	23	21	29	22	29	26	26	29	26	29	30
MED	62	60	56	55	57	56	65	66	72	71	74	73	76	74	73	72	76	76	75	78	78	72	67	65
U Q	71	66	65	61	63	66	74	74	76	76	80	80	79	80	80	76	78	80	82	82	80	78	74	71
L Q	54	55	53	48	52	52	60	62	63	65	66	69	70	70	67	67	70	68	64	69	66	68	66	59

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT WAKKANAI

AUG. 1988

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	50	33	40	33	32	G	45	67	64	94	64	54	96	57		42	50	57	39	142	65	59	30	33
2	G	36	36		G	G	G	G	G	43	54	G	G	51	G	G	41	G	G	G	29	G	G	26
3	27	30	33	30	26		G	G	G	G	G	G	G	G	G	G		50	64	66	59	28	35	32
4	36	85	25	28	32	G	40		66	47	75	G	G	G	69	64	44	44	60	58	65	127	33	48
5			38	29	G		G		G	51	G	90	57	67	54	65	G	35	G	G	G	G	27	27
6	G	G	G	G	G	G	34	G	G	58	G		G	G	G	G		G	G	G	G	33	26	G
7	G	G		33	34	G	G	G	G	65	G	G	G	G	75	G	57	50	40	G	57	G	G	32
8		42	34	42	60	67	55	38	67	72	60	66	54	91	92	43	56	77	70	114	67	65	57	G
9	G	24	28	27	24		42	55	61	56	54	57	G			G	G	G	40	86	G	57	41	79
10		49	29	40	33	39	48		61	67	59	G	45	60	G	G	50	59		68	43	33	32	23
11	G	33	26	24	32	35	38	82	58	42		G	53	50	66	50		44	G	28		28	28	58
12	71	57	37	90	65	73	84	89	138	42		128	82	76	82	71	60	46	51	72	58	68	52	60
13	28	G	G	G	24	33	36	G	G	44	49	G	G	G	59	G	51	36	37	40	33	35	46	37
14	58	36	26	G	26	39	78	65	48	53			54	G	54	40	58	G	36	37	59	37	40	24
15	24	G	23	G	G	G	36	40	50	G	G	G	G	55	G	50	54	79	62	60	76	50	60	91
16	40	59	57	44	46	34	35		55	59	82	78	149	58	70	52	60	41	56	60	68	55	G	G
17	23	G	G	G	G	G	34	G	G	50	62	66	86	55	G	40	64	74	82	57	69	55	56	G
18		G	G		G	G	G	44	52	62	G	G	G	G	42	55	G	33		34	49	38	94	57
19	58	32	G	29	G	G	60	63	51	53		55	G	G	42	G	G	G	G	G	28	43	42	32
20	G	27	35	55	58	36	44	60	64	G	51	62	G	G	G	G	G	40	39	65	94	136	86	80
21		57	69	55	44	35	54	56	82	59	92	66	G	63		G	37	64		80	69	58	38	80
22	60	32	28	G	G	G	36	40	42	G	G	G	G	G	G	G	G	36	G	G	G	G		59
23	41	28	32	68	34		37	55	58	G	44	G	G	68	50	G	56	83	96		44		59	70
24	61	34	44	34	35	55	68	86	92	79	93	66	65	44	G	G		57	39	81	29	78	84	59
25	36	36	37	26		G	G	44	40	G	G	G	58	56		G	38	50	49	60	68	69	41	34
26	40	32	34	30	G	40	38	43	G	G	G	G	G	G	G	G	44	48	41	39	48		G	24
27	G	G	G	G	G	G	46	41	47	G	G	G	G	G	57	G	46	64	81	40	34	37	G	G
28	G	G	G	35	G	G	G	40		G	G	G	G		42	G	G	50	40	33	G		33	37
29		40	47	37	30	30	37	50	G	G	G	G	G	G	C	41		32	33	43	37	33	37	33
30		24	G		G	G	G	G	G	G	G		C	C	G	C	C	53	54	70	39	60	G	30
31	G	C	G	C	G	32	36	G	G	G	G	G	G	G	G	G	G	38	33	35	G	44	33	28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	29	30	27	30	27	31	27	30	31	27	28	30	28	26	30	25	31	28	30	30	28	30	31
MED	28	32	28	30	25	G	37	43	49	44	G	G	G	22	42	G	44	46	40	50	46	44	36	33
U Q	45	38	37	40	34	36	46	60	61	59	60	64	54	57	59	43	56	57	58	68	65	59	52	59
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	35	33	33	29	33	27	24

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

AUG. 1988

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT AKITA

AUG. 1988

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	64	60	51	58	79	78	84	88	A	112	102	100	85	83	86	75	70	66	67	80		80
2	81	64	59	56	54	56	66	77	78	81	76	78	77	80	80	72	75	81	80	81	78	78		71
3	74	72	66	67	64	71	65	80	82	86	82	84	90	93	88	88	85	88	80	79	78	78	83	88
4	78	77	73	66	63	67	86	90	89	88	96	94		92	89	86	80	84	A	A	79		74	76
5	70	71	68	63	A	62	70	78	85	82	72	75	A	81	82	81	A	83	A	A	A	69	66	66
6	66	52	56	65	69	74	C	C	C	C	63	61	68	68	72	70	76	71	64	A	66	66	66	A
7	66	54	63	63	54	64	80	69	80	66	71	72	76	76	81	85	86	86	82	61	73	A	76	74
8	71	67	70	68	67	66	74	66		72	74	72	A		78	80	78	78	76	76	86	84		A
9	78	68	66	63		57	81	79	86	81	84	84	90	86	84	82	84	87	83	84	83		74	76
10	74	71	78	68	58	62	79	64	66	69	69		76	82	86	74	77	76	80	A	A	A	73	
11		73	66	63	63	66	66	80	83	88	76	74	88	88	90	85	79	82	85	78	57	79		52
12	A	52	55	52	52	62	50	84	89		88	86	92	96	85	84	80	76	77	A	79		83	A
13	54	52	61	52	52	52	A	52	68	73	72	72	62	65	A	64	70	70	72	N	66		69	64
14	64	63	52	62	57	60	54	66	A	50				A	A		A	A	A	61	63	54	A	52
15	52	47	42	39		44	54	62	85	86	A		72	59	A	72	77	69	A	52	A	66	A	54
16	52	53	54	48		48	A	64	62	A	A	A	A	A	A	47		54	57	57	63	51	57	51
17	52	51	49	A	A	50	54	66	67	72	72	75	74	60	67	67	73	A	67	A				65
18	52	51	54	53	51	49	60	73	50	70	60	74	67	72	70	78	75	77	73	A	62	A	A	54
19	A	54	54	52	54	52	59	70	80	66	62	A	A	52	64	68	68	66	68	66		64		66
20	66	A	52	53	48		53	63	79	75	69	71	80	73	72	76	77		A	53	52	A	66	62
21	52	A	48	A		53	62	55	A	70	A	67		84	89	78		67	65	74	79	66	54	52
22	A	54	59	52	52	53	76	71	70	66	A	71	82			98	106	105	94		52		56	
23	51	50	52	52	48	48	73	82	76	72	72	72	68	74	83	79	85	92	85	78			C	C
24	C	C	C	C	C	C	C	C	C	C		80	82	86	90	86	84	87	87	86	69	66	A	55
25	66	68		57	51	51	80	76	85	76	83	83	80	84	80	79	83	86	86	85	71	64	73	69
26	66	67	58	52	52			70	76		77	84	84	86	85	84	84	90	B	89	79	54	78	76
27	75	66	53	53	51	51	55	66	46	68	76	82	82	82	83	87	78	86	93	88	A	A	52	52
28	47	A	A	47	48	59	73	72	83	83	77	78	83	82	79	72				79		72	67	54
29	N	52	59	54	48	50	77	101	103	90		102	95	109	92	84	81	88	85	86	87	79	66	
30	66	63	57	60	57	66	89	81	84	85	111	108		102	94	86	81	86	84	A	88	81	66	67
31	53	62	52	52	43	52	52					102	94	93	90	91	83	79	80	86	86	80	67	66
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	27	28	28	24	28	26	28	25	25	22	26	23	27	26	30	26	27	24	21	23	19	20	24
MED	66	62	58	55	52	56	68	72	80	75	75	78	82	82	84	80	80	82	80	78	73	69	67	66
U Q	72	68	65	63	57	63	79	79	85	85	82	84	90	92	89	85	84	87	85	85	79	79	74	72
L Q	52	52	52	52	51	51	55	66	69	69	71	72	74	73	79	72	77	75	71	63	63	64	66	54

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

AUG. 1988

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		37	47	34	27	35	40	46	59	54	92	54	G	49	58	50	G	36	31	G	27	45	32	30
2	40	35	31	34	G	G	G	G	47	42	54	56	52	G	69	43	44	59	39	32	34	29	30	G
3	28	28	30	40	32	G	G	40	52	54	54	52	58	51	G	G	51	82	60	106	33	40	59	40
4	38	32	32	29	25	G	34	43	56	69	57	73		G	71	90	72	54	83	91	37	29	60	33
5	36	33	71	58	70	54	33	38	50	54	57	64	81	54	48	74	82	64	80	58	85	28	29	29
6	26	29	G	24	28	G	C	C	C	C	58	54	G	G	47	42	44	48	50	56	32	G	G	30
7	G	28	32	33	33	49	G	G	G	G	G	G	G	G	G	57	62	57	62	93	68	54	33	37
8	G	G	50	G	G	30	38	49	50	55	55	G	90	69	51	G	G	82	126	102	89	58		91
9	46	29	26	G		G	49	52	62	71	56	67	49	54	48	G	G	35	38	40	31	34	28	30
10	25	G	G	G	31	30	36	G	84	109	56	G	G	56	57	58	51	48	90	83	91	107	31	37
11		G	28	26	37	35	35	50	45	48	50	53	69	G	G	67	69	74	57	48	33	38	44	G
12	35	G	G	G	G	40	59	50	55		60	69	72	90	75	69	61	58	58	41	84		81	82
13	44	33	24	G	24	G	47	40	40	43	44	G	54	50	67	46	45	57	37	39	31	30	68	57
14	41	44	28	32	31	28	44	40	63	52	72	80	50	81	70		77	59	52	41	35	26	59	37
15	32	28	27	G		G	36	44	88	62	94		54	46	87	44	57	54	66	55	72	77	78	48
16	46	33	26	36		41	51	49	56	49	64	58	57	69	59	54		44	29	37	69	84	56	57
17	28	32	24	41	37	G	G	42	47	48	G	48	69	58	46	47	56	85	91	72			54	44
18	35	41	G	G	G	G	G	43	49	48	45	47	50	G	48	53	48	G	31	73	82	69	92	56
19	56	48	24	30	27	G	G	46	78	57	55	66	59	50	G	48	G	36	31	32	28	G	48	34
20	31	35	G	G	41	37	33	44	44	50	58	53	50	54	48	62	70	59	70	72	90	128	57	34
21	58	72	92	69		30	44	46	77	56	69	59		66	55	58		59	36	89	79	82	49	50
22	68	29	31	G	27	37	31	41	53	47	74	50	G	G	G	G	40	G	28	32	34	G	G	40
23	35	29	G	G	G	28	55	51	91	91	67	68	61	48	G	42	48	43	58	32	32	30	C	C
24	C	C	C	C	C	C	C	C	C	C	55	69	62	47	44	G	64	35	38	27	110	114	114	49
25	44	36		27	28	30	34	46	G	57	102	54	50	44	44	50	42	G	31	35	58	58	59	52
26	35	30	27	31	24			68	62		63	55	G	G	G	G	G	57	B	46	30	51	47	30
27	30	G	28	G	G	26	39	46	55	48	46	G	50	58	54	61	61	43	46	58	92	58	46	29
28	26	30	29	28	26	34	32	46	49	61	58	G	G	53	54	58				32	39	38	30	34
29	37	28	G	G	G	G	G	67	51	51		64	48	46	46	55	58	37	46	81	29	G	G	24
30	G	72	48	26	30	37	33	37	G	53	G	G	58	G	G	G	G	40	40	85	60	56	G	G
31	G	23	G	G	G	G	33	45	46	48		G	G	44	G	G	38	32	34	31	G	44	G	39
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	29	30	26	29	28	29	29	27	29	30	29	31	31	30	28	30	29	31	30	29	29	30
MED	35	30	27	26	27	28	34	45	52	53	57	54	50	49	48	49	50	51	46	48	38	44	47	37
U Q	42	35	31	33	31	36	42	49	62	57	65	64	60	56	58	58	61	59	64	81	82	63	59	49
L Q	27	28	G	G	G	G	16	40	46	48	52	G	G	G	G	G	39	36	35	32	32	29	29	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

AUG. 1988

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

AUG. 1988

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	76	72	65	57	56	52	72	91		105	101	110	108	112		106	91	87	72	75	74	78	75	
2	76	65	59	56	54		66	68	75	87	84	85	N	79	82	83	83	85	82	85	N	78	76	A
3	73	70	67	64	71	72	78	85		84	89	93	88	87	104	94	94	99	A	82	76	74	86	93
4	A	73	72	68			83	92	92		102	100	99	97	97	97	90	90	91	84			74	73
5	66	N	68	58	52	57		87	89	78	74	81	A	82	87		90		86		73	72	74	72
6	72		64	68	72	74	68	67	68	68		A	76	75	77	A	A	N	A		A	77	77	76
7	74	70		66	70	77	77	70	68	71	71	76	77	85	86	89	90	88	85		73	76	78	80
8	76	70	78	78	66	64	72	74	70	72	82	79	83	80	85	81			78	80		81	88	84
9	78	76	71			66	74	77	82	82	84	88	96		97	92	90	88	86	80	84	78	80	72
10	72	68		70	66	64	73	62	68	78	71	76	83		94	88	75	79	76	79	75		74	70
11	70	73	67	64	54	58	69	84	88	90	86	94		104	100	94	97	92		81	84			66
12	65	72		62	56	58	70	83	88	93	90	92	96	107	103	97	82	81	82	86	72	73		82
13	56	70		54	59	53	76	82	72	77	81	88	74	70	71	68	78		76	74			66	65
14	60	66	60	56	57	59		74	67	58	67		61			70	60		N					66
15			48		45	46	68	70	60	66		81	75	82	76		76	75	71	65				58
16	69	58	53	44	41	42	50	68	62	A	A	A	A	55	56	56	55	57	56	69	62	58	A	52
17	50	49	49	47	41	45	51	70		74	75	81	72	71	66	70	A		A	A		A	64	66
18	66		62			56	65	77	69	74		75	68		82	85	85	83	84	71	63	63	58	A
19	A	56	58	52	52	58	72	84	78	A	A	68	A	A	75	76	81		77		62	66	54	65
20	66	60	58	54		56	54	68	72	85	76	N	81		83	82	86	82	83	85			60	A
21	57	52	50	54		53	58	79	82	N	70			90				70	A	84	78	70	A	52
22	60	54	58	56	54	56	73	76	80	70		77	86	95	87	114	111	115	A	A	A	54	54	56
23	54	55	55	50		45	71	87	82	75	74	70	76	73	89	100	98	101			86			
24	66		54		58	52		76	52		77	84	83						101	93	70	72	76	71
25	66	66	65	60	55	56	84	85	80	75	82	92	80	86	81	85	97	95	95	82	68	66	66	A
26	66	71	67	59	55	53	75	78	80	86	84	93	94	95	100	97	96	101	103		80		85	84
27		77	77	68	52	59	72	71	72	78	84	93	93	100	104	102	91	96	N	83	54	A	A	55
28	54	48	45	58	52	60	70	71	95	98	87	82	88			80	85	90	91			70		70
29	66	68	58	50		50	78	102	106	94	94	112			110	100	91	95			90		75	65
30	71	64	65	62	67	72	87	99	98	90	118	116	114	110	105		95	88	96	92	87	77		76
31	65	64	64	64	56	58	81	85	90	97	105	113	107	102		91	80		85	86	83	81	77	76
	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	26	27	27	24	29	28	31	28	26	25	26	24	22	25	25	26	22	21	20	20	19	21	25
MED	66	67	62	58	56	57	72	77	79	78	84	86	83	86	87	89	90	88	84	82	74	73	75	70
U Q	72	71	67	64	62	62	76	85	88	90	89	93	95	100	100	97	94	95	91	85	83	78	77	76
L Q	60	58	55	54	52	52	68	70	68	74	74	79	76	79	79	80	81	82	76	77	69	66	65	65

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

AUG. 1988

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	60	56	29	33	30		50	36	58	55	51	53	49	54	58	55	56	G	40	40	58	32	51	
2	56	32	40	27	26			39			58	55	55	61	54	60	G	G	37	38	40	29	30	
3	36	33	30	36	30	37	36	38				54	56		73	71	41	73	104	57	62	71	58	
4	26	27	29	25	23	G	37	41		60	56	55	58	60	58	46	40	57	37		33	29	24	G
5	G	G	G	G	G	34	34	41	46			46	84	78	52	51	57		35	29	G	G	29	40
6	29	27	31	26	G	26	36	54	53	56	46	65	56		61	98	91	116	74	54	80	60	42	29
7	G	G	G	33	29	30	40	41		43	57	58	G			54	83	50	G	60	55	48	34	24
8	55	23	32	G	32	35	43	43	50	48	48	54		60		56	111	93	101	58		54	50	
9	65	40	30	32	30	G	38	54	53	58	70	58	58	60		58	41	40	34		42	34	24	26
10	G	G		G	G	26	36	42	48	62	58	74	52	47	71	62	43	53	50	60	82	55	70	59
11	51	52	48	47	47	30	44	52	53	51	G	G	G	G	56	92	G	72		64	30	53	58	40
12	41	39	26	G	G	G	35	43	51	54		62	47	47	54	52	78	54	43	63	45	58	58	48
13	44	54	30		G	24	34	56	55	49		58			54	44	84	70	47	51	40		G	35
14	58	50	47	30	29	28	G	55	58	47	49	60		48		G	53		74	48	73	70	92	66
15	38	45	25	G	24	G	G	G	62	67	94	92		51	49		56	50	48	49	42		33	G
16	G	G	G	G		26	40	64	49	59	95	76	86	54	51	G	44	40	47	66	46	60		49
17	38	40	32	42	31	G		40	47		51	65	56	51	53	58	100	84	134	110	94	59	58	50
18	50	55	71	73	84	29	34	40	59	59	52	66	61		61			G	G	33	29	G	24	
19	70	58	43	36	50	30	G	40	60	83	74	52	46			62	47		55	58	40	30	24	38
20	29	24	28	G	24	23		G	48	58	64	80	58	104	60	62	76	60	48	33	33	56	58	88
21	56	58	34	56	24	G	40	44	54			47		53					73		27	26	49	58
22	58	52	44	44	55	34	38	44	61	83	89	62	53	49	56	46	59	108	169	61	106	56	53	56
23	72	30	29	26	G	24		49	50	68	G	G	G	G	G	46		37	G		G			
24	36	46	40		29			38	54			45	54						34	54	G	49	36	G
25	G	G	G	G	32	38	G	G	G	G	G	G	G	G	58	58	G	34	41	26	48	46	49	72
26	61	55	40	39	40	30	38	61	92	62	109	76	56	51	44	G	45	61	64	36	41	60	59	62
27	36	30	32	30	22	24	36	47	41	56	48	G	59	48	68	61	61	45	64	57	59	90	58	32
28	24	40	37	27	G	G	43	60	69	49	54	55				84	92	69	107	114	58	41		50
29	33	G	G	G	G	24	34	44	76	57	55		49	56	46	47	43	40	26	89		94	31	27
30	24	G	24	51	31	24	G	G	59	44	G	G			G	99	38	50	50	74	72	49	54	24
31	G	G	G	G	G	G	32	G	48	51	50	52	49	G	G	G	G		33	55	29	48	58	33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	29	30	28	26	31	27	25	25	30	24	22	23	27	27	25	30	27	29	28	28	25
MED	38	33	30	27	28	25	36	42	53	56	54	55	54	51	54	56	53	53	48	57	42	51	50	40
U Q	56	52	40	37	31	30	40	52	59	61	67	65	58	60	60	62	78	71	73	63	60	59	58	57
L Q	24	G	25	G	G	G	34	38	48	49	48	47	48	47	49	46	41	40	35	40	31	33	30	26

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

AUG. 1988

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	14	14	14		15	20	21	26	28	38	28	38	39	38	33	20	16	16	15	16	14	14
2	15	14	14	14	15		17	17	24		23	27		32	28	26	20	15	17	16	16	15	15	16
3	14	14	15	14	14	16	17	18	14	27	26	29	32		35	22	23	17	17	15	15	15	15	15
4	15	14	14	15	14		16	17	18	24	35	30	35	38	29	27	17	18	16	17	24	16	15	21
5	21	16	16	14	15	15	16	17	22	22	29	29	40	35	26	20	21		15	15	15	15	15	14
6	15	14	14	15	14	14	14	16	20	21	24	35	33	32	34	27	18	17	16	15	15	15	16	14
7	16	15	15	16	14	14	15	16	20	20	26	28				28	20	16	16	14	16	15	15	17
8	16	15	14	14	15	16	15	16	21	35	51						26	17	17	15		15	15	15
9	14	14	14	15	15	18	15	16	20	18	35	29	30	29	29	22	21	16	15	18	14	15	15	15
10	16	15		17	15	18	15	17	18	28	26	30	38	32	29	20	18	17	16	15	15	15	15	15
11	15	15	15	14	14	14	14	16	17	20	24	26	26	23	22	20	20	18		15	15	15	15	16
12	15	14	17	16	15	18	16	17	18	26	27	30	30	27	26	23	18	16	15	15	15	14	14	15
13	15	15	14	16	14	17	14	16	17	20	22	26	23	21	27	21	15	15	16	16	16		16	15
14	15	14	14	14	15	15	15	15	18	20	20	28	21	22		21	17		15	15	15	15	14	15
15	15	14	14	15	15	16	15	15	15	16	22	21	18	21	24		16	15	15	14	15		15	15
16	16	14	15	14	16	20	15	16	20	23	29	33	26	32	30	24	20	16	16	15	15	15	16	15
17	15	14	14	15	14	16	14	15	16	20	21	27	24	23	35	21	16	15	15	16	15	15	14	15
18	14	14	15	16	14	15	14	17	17	18	18	34	33		24	22	20	20	15	15	14	15	15	15
19	14	15	14	14	15	14	15	15	18	20	30	26	30	27	21	16	16		15	15	15	14	15	15
20	15	16	16	16	15	17		16	21	23	26	28	30	24	23	20	17	15	16	14	14	15	14	15
21	14	14	14	14	15	18	15	15	16	20	26	29		24				17	15	14	15	16	15	14
22	15	14	14	14	14	14	16	14	18	21	27	29	26	22	16	17	16	15	15	15	15	15	15	15
23	15	15	14	16	14	15	14	15	16	21		21	28	28	23	22	17	15	35		28			
24	14	14	15		15			17	21										16	14	15	15	15	16
25	15	14	15	14	15	15	16	16	18	21	26	29		23	28	23	17	16	15	14	14	18	15	15
26	14	14	14	14	15	14	14	15	18	22	28	24	26	22	28	20	16	14	15	14	14	14	15	14
27	15	15	15	14	15	15	14	16	22	14		30	27	24	24	20	17	14	18	18	15	15	15	15
28	15	14	15	15		15	15	16	21	29	28	26				23	18	16	14	15	15	14		15
29	14	16	15	17	15	18	17	18	21	32	33		32	28	23	20	17	17	14	15	14	15	14	15
30	15	14	15	15	14	16	16	15	18	20		40	44	22	32	29	20	16	14	15	15	15	15	15
31	15	16	14	15	15	15	15		18	29	28	30	26	26		20	18		16	17	15	15	15	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	30	27	29	30	31	29	27	28	24	25	24	27	29	26	30	30	30	28	29	30
MED	15	14	14	15	15	15	15	16	18	21	26	29	29	26	28	22	18	16	16	15	15	15	15	15
U Q	15	15	15	16	15	17	16	17	21	26	29	30	32	32	29	24	20	17	16	16	15	15	15	15
L Q	14	14	14	14	14	15	14	15	17	20	24	26	26	22	23	20	17	15	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

AUG. 1988

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	83	87	71	69	67	63	69	88	88	88	93	94	110	121	131	126	104	94	94	86	73	76	72	74
2	79	65	66	55	51	57	58	69	71	78	87	82	88	90	94	100	99	101	106	108	90	86	88	85
3	75	75	78	74	64	60	71	84	78	78	84	87	97	107	101	111	106	102	102	86	85	79	83	84
4	76	78	76	73	66	62	76	88	80	90	93	95	99	102	100	102	95	102	104	100	78	74	76	76
5	75	80	70	58	62	60	71	87	76	71	75	75	80	80	A	94	99	99	92	86	78	73	75	75
6	80	66	67	61	74	75	65	70	72	A	67	74	90	88	97	88	85	86	88	89	84	90	87	81
7	79	81	76	77	72	67	80	70	68	68	72	A	A	88	97	102	98	90	87	82	87	88	88	86
8	85	87	88	84	76	56	62	67	74	74	78	87	91	96	95	94	91	88	90	86	81	78	77	78
9	85	82	80	67	66	66	77	82	77	78	83	88	92	103	107	108	108	104	96	88	88	85	84	83
10	78	74	76	72	69	63	63	71	65	73	76	86	90	96	104	106	94	81	86	80	A	71	77	79
11	80	77	73	68	53	53	61	75	84	88	82	84	96	102		105	107	A	103	104	88	A	76	75
12	67		70	62	56	57	62	75	85	72	72	80	88	108	117	116	113	109	106	86	68	66	66	72
13	66	66	60	70	66	62	75	88	71	81	84	87	84	90	90	88	90	90	97	86	73	66	68	74
14	68	64		56	53	57	66	80	75	72	76	77	77	93	103	88	80	76	71	80	A	66	63	A
15	52	52	57	A	A	51	57	78	74	67	70	72	84	92	90	95	83	82	A	69	61	A	71	73
16	66	73	58	49	46	44	68	72		A	64	60	66	74	84	72	70	68	72	77		53		A
17		54	62	64						71	80	72	71	A	74	76	77	77	81	79	76	73	A	66
18	65	A	64	54	46						A	A	74	88	102	106	102	91	93	87	66	58	59	52
19	52	50	54	51	51	53	60	88	82	75	80	A	95	96	100	101	103	102	104	86	76	A	65	63
20	68	62	52	54	51	44	50	68	72	78	71	A	80	88	86	90	91	80	85	88	76	69		65
21	58	56	53	53	60	A	52	82	72	62	71	74			90	96	89	88	87	90	74	52	A	44
22	52	50	53	48	47	42	58	78	68	71		78	90	100		120	129	137	88	82	A	54	A	66
23	66	70	62	59	59	62	65	97	73	80	70	75	84	82	94	112	121	121	A	80	71	76	71	76
24	76	84	71	66	64	51	56	66	73	76	70	80	100	96	96	95	97	107	122	106	84	82	77	66
25	74	67	67	52	51	58	61	88	76	82	89	96	90	87	95	100	99	103	95	84	A	72	67	74
26	70	66	66	66	61	59	68	88	81	88	89	101	116	122	116	117	102	102	101	96	81	79	78	77
27	A	78	80	66	58	A	82	90	101	92	90	A	110	114	119	130	117	A	116	102	64	36	A	A
28	57	66	62	68	71	66	54	67	90		92	92	96	100	107	98	96	93	A	A	A	A	74	78
29	77	80	64	57	50	45	59	90	99	86	95	112	128	132	135	122	111	106	110	103	94	80	73	69
30	A	A	67	67	64	62	78	80	76	86	107	111	116	116	123	126	112	98	103	88	89	80	80	80
31	77	76	77	72	68	59	79	88	88	92	102	110	113	112	112	111	103	98	99	91	86	77	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	28	28	30	30	29	27	29	29	28	27	29	26	29	29	28	31	31	29	28	30	25	27	25	27
MED	74	72	67	65	61	59	65	80	76	78	80	85	90	96	100	102	99	98	96	86	78	74	76	75
U Q	78	79	76	69	66	62	73	88	83	86	89	94	99	107	109	112	107	102	103	91	86	80	79	79
L Q	66	64	62	55	51	53	58	70	72	72	71	75	84	88	94	94	91	87	87	82	73	66	69	66

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

AUG. 1988

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	39	34	31	24	G	G	39	36	40	52	67	55	G	48	G	52	57	60	60	57	46	54	32	40
2	44	46	45	43	32	G	38	G	39	46	52	52	58	82	57	55	54	49	32	31	30	30	33	G
3	G	30	46	37	40	33	33	68	46	44	G	G	45	56	60	79	52	72	59	31	G	G	24	25
4	G	G	G	G	G	G	28	40	44	49	G	G	G	G	44	G	43	41	50	49	37	G	G	G
5	G	G	G	32	G	57	87	46	44	G	G	G	G	46	96	91	58	39	G	G	G	29	G	37
6	34	G	43	G	24	24	G	G	71	68	61	57	53	58	62	45	56	55	69	41	35	43	29	86
7	32	G	G	G	34	27	G	45	41	44	56	79	113	G	53	59	95	71	71	78	92	41	G	24
8	40	38	40	43	30	24	26	G	44	46	52	70	80	46	48	G	73	54	46	29	25	G	G	32
9	57	48	38	G	G	G	G	60	81	73	62	68	56	52	G	45	56	37	36	31	G	140	38	G
10	G	G	G	G	G	G	G	G	39	42	71	61	G	65	79	80	71	64	73	34	66	59	45	70
11	30	30	31	36	29	26	32	40	46	70	88	88	54	60	55	61	94	126	70	69	91	83	39	G
12	G	G	G	G	G	G	G	G	41	G	46	G	G	63	46	48	63	61	G	G	G	G	G	28
13	34	25	G	28	32	33	44	G	41	60	69	49	52	74	60	66	68	89	61	57	37	33	36	29
14	28	32	29	24	G	G	G	G	40	60	72	81	G	G	G	59	66	48	60	49	40	24	68	79
15	58	58	72	71	46	35	36	34	46	52	81	57	54	50	65	68	70	80	59	91	50	59	47	38
16	36	30	28	G	G	G	29	G		71	53	G	45	G	51	48	58	58	60	54	29	38	39	58
17	37	46	30	31						48	53	59	59	98	52	54	66	48	48	40	72	56	40	44
18	45	79	72	71	52						88	98	82	77	67	51	44	60	42	G	G	24	G	G
19	G	G	G	G	G	24	32	44	51	50	100	90	94	64	45	57	44	38	56	43	41	39	G	G
20	G	G	G	G	G	G	G	40	41	45	51	112	79	84	68	68	58	45	55	58	50	41	34	44
21	28	37	31	55	68	46	44	G	46	45	47	G		G	G	83	71	64	37	68	90	45	46	29
22	26	32	24	G	G	G	G	35	38	46	52	85	80	73	124	128	57	44	G	29	28	G	59	48
23	33	29	G	G	G	G	G	36	44	54	72	69	64	G	G	49	50	67	110	58	40	50	38	38
24	37	32	34	28	25	24	28	38	56	58	G	71	54	54	66	118	96	69	53	G	57	45	40	G
25	28	G	G	G	G	G	G	G	38	49	46	G	G	G	G	G	G	37	52	45	40	G	43	40
26	58	38	24	24	G	24	32	43	73	79	108	98	80	61	62	48	48	52	59	50	30	46	48	44
27	32	G	G	G	34	38	36	58	63	43	62	109	56	81	55	66	84	51	56	47	38	69	50	36
28	59	58	36	29	G	G	32	38	60		63	76	51	60	62	G	43	54	39	150	113	90	57	30
29	28	G	G	G	G	G	G	39	43	49	56	58	G	49	45	G	53	50	40	26	56	46	38	34
30	41	85	34	25	32	24	25	33	47	G	G	G	53	G	G	G	42	52	55	51	40	46	38	40
31	28	24	G	G	G	G	G	37	45	44	46	G	G	G	96	62	56	61	46	43	69	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	29	29	29	28	29	31	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	32	30	28	24	G	G	28	36	44	49	56	59	54	54	55	55	57	54	55	45	40	41	38	34
U Q	40	38	36	32	32	26	34	41	49	59	71	81	64	65	65	68	70	64	60	57	57	54	45	44
L Q	26	G	G	G	G	G	G	G	41	44	46	G	G	G	44	45	50	48	40	31	29	24	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

AUG. 1988

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	15	15	15	15	16	18	22	24	22	23	21	36	27	23	17	15	15	15	15	15
2	15	15	15	15	15	15	15	15	16	18	23	22	33	36	34	27	20	17	15	15	15	15	15	15
3	15	15	15	15	15	15	15	15	16	20	27			32	38	26	26	18	17	15	15	15	16	15
4	15	15	15	15	15	15	15	15	16	20	26	33	44	49	34	26	20	17	16	15	15	15	16	15
5	15	16	15	15	15	15	15	15	16	21	23	36	42	35	33	22	20	21	16	18	16	15	15	16
6	16	15	15	15	15	15	15	15	16	17	22	27	29	36	36	23	17	18	16	15	15	15	15	15
7	16	16	15	15	15	15	15	15	17	21	26	34	30	56	23	21	21	17	16	15	15	15	16	16
8	17	15	15	15	15	15	15	15	23	33	22	35	39	36	39	39	24	18	16	15	15	15	15	15
9	16	16	15	15	15	15	15	16	16	20	35	30	32	35	28	24	20	17	16	15	15	15	15	15
10	17	15	15	15	15	15	20	16	22	21	32	28	56	27	28	22	18	23	16	15	15	15	15	17
11	15	15	15	15	15	15	15	15	20	17	21	23	20	21	20	20	21	17	15	15	15	15	15	15
12	15	15	15	15	16	15	18	16	22	21	24	33	32	30	30	23	18	17	16	16	15	16	15	15
13	15	15	16	15	15	15	15	15	15	17	23	33	27	28	28	23	18	15	15	15	15	15	15	15
14	15	15	15	15	15	15	20	15	16	20	23	36	35	38	24	23	17	16	15	15	15	15	15	15
15	15	15	15	15	15	15	15	15	15	16	22	22	24	22	21	18	18	16	15	15	15	15	15	15
16	15	15	15	15	15	15	15	16		20	33	30	30	36	32	30	21	22	16	15	15	15	15	15
17	15	15	15	15						20	21	38	23	38	24	20	16	16	15	15	15	15	15	15
18	15	16	20	15	15						21	35	35	32	23	21	18	18	16	15	15	15	15	15
19	15	15	15	15	16	15	15	15	15	17	22	22	29	30	28	20	16	16	15	15	16	15	15	15
20	15	15	15	15	15	15	16	15	16	23	22	24	34	34	36	20	17	16	15	15	15	15	15	16
21	15	15	14	15	15	15	15	16	15	17	18	20		32	29	24	20	17	16	16	15	15	15	15
22	16	15	15	15	15	15	16	15	16	18	18	22	36	35	32	22	17	16	17	15	16	15	18	15
23	15	15	15	15	15	15	15	15	16	18	21	24	33	34		22	17	16	16	15	15	15	15	15
24	15	15	15	15	15	15	15	15	17	28	38	36	40	40	24	20	20	18	15	18	15	15	15	16
25	15	16	15	15	15	15	17	16	16	17	22	39	43	42	23	23	18	16	17	15	15	15	16	15
26	15	15	15	15	15	15	15	15	16	21	21	27	24	24	22	20	16	16	17	16	15	15	15	15
27	15	15	16	15	15	15	15	15	16	17	24	33	27	23	24	22	17	17	15	15	15	15	15	16
28	16	15	15	15	15	16	15	15	17		29	27	35	27	23	21	18	16	15	15	15	15	16	15
29	15	15	15	15	15	16	18	16	17	22	35		32	23	23	21	18	17	17	16	15	15	15	16
30	15	15	15	16	15	15	17	15	15	18	22				33	39	23	16	15	16	15	15	15	15
31	15	15	15	15	15	15	17	15	17	21	23	26			27	22	20	17	15	15	15	16	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	30	29	29	29	28	29	31	28	27	29	30	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	15	16	20	23	29	32	34	28	22	18	17	16	15	15	15	15	15
U Q	15	15	15	15	15	15	16	15	17	21	26	34	36	36	33	24	20	18	16	15	15	15	15	15
L Q	15	15	15	15	15	15	15	15	16	17	22	24	27	27	23	21	17	16	15	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

AUG. 1988

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	85	86	89	80	76	C	78	88	87	80	80	90	110	126	143	147	137	131	121	90	84	78	80	62
2	66	76	60	64	65	58	62	73	C	77	84	82	89	100	A	115	121	C	145	146	141	C	106	86
3	84	65	65	76	66	67	78	80	74	72	79	90	93	100	112	A	122	118	110	108	86	90	78	84
4	84	78	78	71	67	61	74	75	75	80	84	90	96	93	97	122	121	122	119	119	90	85	78	84
5	86	85	78	66	58	59	76	85	69	73	77	79	79	94	102	103	111	111	C	88	A	79	80	77
6	C	80	73	65	66	64	63	70	72	72	73	A	97	104	109	103	107	101	105	120	136	161	145	108
7	86	86	84	88	86	79	76	71	66	72	86	82	86	96	97	111	102	A	90	91	108	132	108	107
8	C	141	110	107	71	53	52	71	76	72	76	91	106	C	104	104	105	98	102	91	A	84	83	83
9	84	82	83	74	77	63	75	84	80	78	84	88	101	121	133	137	137	128	111	111	111	106	107	109
10	84	85	86	84	80	30	43	64	69	77	85	95	101	96	107	113	105	104	102	77	65	67	64	72
11	80	77	82	62	50	36	42	71	84	90	C	86		107	112	108	123	112	119	104	86	84	86	78
12	85	80	86	84	64	50	54	66	74	74	76	82	105	118	146	156	159	154	150	122	89	88	87	86
13	85	87	84	89	84	77	83	87	70	75	87	94	97	105	105	107	106	102	89	C	A	A	A	78
14	C	80	78	66	64	67	73	66	74	85	81	88	88	114	112	111	104	100	88	84	78	66	C	52
15	52	A	58	42	51	53	C	A	78	62	70	77	96	105	111	108	96	96	81	66	65	58	66	76
16	C	71	53	54	55	A	54	73	62	63	70	73	88	A	112	108	112	106	90	97	62	52	53	43
17	47	63	65	A	40	34	40	64	70	70	72	75	81	84	91	92	93	96	103	87	85	88	78	80
18	71	C	83	66	60	55	54	70	75	71	79	A	A	96	A	122	121	128	126	120	77	50	58	53
19	50	55	A	51	53	C	58	80	68	70	80	88	97	91	117	121	121	148	165	146	102	87	78	76
20	60	58	58	60	52	48	48	77	75	79	73	75	88	105	112	102	98	94	89	72	85	75	66	67
21	66	58	55	61	62	54	43	66	65	67	78	C	C	91	92	94	96	109	112	100	59	56	A	54
22	62	66	62	55	60	51	49	70	70	74	84	96	102	129	137	145	169	146	110	103	108	88	A	77
23	85	83	N	64	65	64	65	85	74	77	76	74	90	105	112	130	147	150	122	103	88	88	88	108
24	112	86	90	86	82	70	53	66	80	83	76	92	112	105	106	102	105	120	122	111	104	90	87	88
25	84	87	84	74	54	63	72	78	66	85	94	101	112	105	112	111	118	111	94	77	C	72	66	67
26	66	54	66	66	62	54	66	78	80	96	95	110	135	146	161	145	126	121	122	111	103	88	90	83
27	83	84	88	72	53	56	65	84	96	86	86	118	143	145	158	162	157	140	138	104	90	88	87	88
28	87	88	87	88	C	C	48	72	90	102	93	101	116	118	121	121	111	103	96	91	72	66	61	A
29	66	66	62	60	52	44	57	86	88	74	85	130	146	157	157	146	144	136	138	122	86	85	80	67
30	76	78	76	54	67	63	73	82	78	84	101	119	122	127	138	C	136	113	C	87	90	80	78	74
31	84	86	87	79	65	63	78	84	82	93	105	106	121	C	135	136	123	111	106	103	88	85	C	74
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	29	30	30	27	30	30	30	31	30	28	28	28	29	29	31	29	29	30	27	29	26	30
MED	84	80	78	66	64	58	62	74	74	77	80	90	99	105	112	113	121	112	110	103	88	85	80	78
U Q	85	86	86	80	67	64	74	84	80	84	86	98	112	119	136	136	136	129	122	111	103	88	87	86
L Q	66	66	63	61	54	51	52	70	70	72	76	82	89	96	105	105	105	102	95	88	78	69	66	67

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

AUG. 1988

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	30	G	G	G	G	G	G	33	45	44	G	G	G	G	G	G	49	45	37	41	G	46	40	G
2	44	41	38	40	37	39	32	G	38	42	51	53	56	67	47	68	51	40	38	38	33	37	58	31
3	G	24	25	26	G	G	G	34	46	49	47	G	G	57	64	130	72	90	62	73	69	G	29	26
4	28	26	G	G	G	G	30	39	44	47	48	60	48	55	48	G	G	42	36	G	26	G	G	G
5	G	G	G	G	G	G	G	32	41	G	G	G	G	52	G	44	94	91	174	84	58	33	34	33
6	29	37	32	26	24	29	G	36	42	47	52	110	88	89	56	66	61	40	34	33	31	33	24	G
7	36	52	38	33	24	32	39	35	40	49	51	59	63	93	93	72	80	106	82	66	32	G	24	G
8	G	G	G	G	G	G	24	40	45	47	51	56	55	58	55	52	51	83	58	54	69	33	G	G
9	G	40	32	G	G	G	G	36	62	92	63	74	83	96	102	77	77	70	58	28	30	G	G	G
10	28	G	G	G	G	G	G	34	40	57	G	45	60	70	58	45	G	38	35	48	32	30	41	40
11	40	34	32	29	24	34	30	50	72	55	C	63		94	114	55	G	49	169	179	170	38	25	31
12	39	38	40	35	31	24	32	G	G	G	66	55	57	58	57	46	66	70	61	58	32	28	G	31
13	G	34	G	G	G	G	G	33	66	G	69	100	81	46	51	68	92	75	83	126	115	84	59	40
14	28	G	G	G	G	G	24	G	66	G	G	51	46	84	78	45	G	G	34	G	G	G	34	28
15	G	40	48	G	G	48	45	60	43	44	48	50	57	66	83	62	41	G	34	G	G	38	32	80
16	44	40	33	48	38	58	60	103	82	45	65	64	50	G	50	68	83	72	44	36	34	48	G	34
17	69	45	37	46	32	24	30	36	49	44	80	61	58	47	51	65	62	47	58	40	41	40	40	39
18	32	59	59	82	31	37	39	48	49	66	102	117	60	100	G	51	47	58	50	39	29	24	25	G
19	34	40	61	37	38	28	31	32	50	46	64	59	93	72	84	85	68	61	40	33	32	G	G	G
20	33	G	G	G	G	G	28	36	43	67	72	60	50	54	72	55	78	72	79	66	48	48	32	G
21	27	36	64	40	32	39	28	43	72	50	65	C	57	52	50	49	67	49	48	44	58	58	66	40
22	33	32	G	G	24	G	29	33	54	46	46	72	66	51	54	80	84	61	47	30	29	40	40	33
23	80	49	29	24	G	G	24	34	42	64	66	58	51	78	73	51	63	80	51	40	32	23	26	91
24	48	40	37	G	G	G	G	39	40	78	G	52	58	66	90	79	92	67	72	46	39	39	33	G
25	G	G	G	G	G	G	G	39	41	49	G	52	G	68	G	48	50	41	46	33	40	G	23	33
26	46	40	46	38	34	28	33	43	46	54	51	53	110	80	94	80	52	40	34	37	59	32	40	34
27	30	30	24	G	G	G	G	36	40	65	84	60	56	79	50	62	63	68	66	58	48	39	28	39
28	38	32	33	31	C	G	25	39	59	72	66	55	G	53	53	G	42	65	61	162	85	44	84	84
29	33	G	G	G	G	G	24	33	42	49	54	48	G	46	45	G	G	39	34	29	38	33	40	34
30	33	G	26	69	32	32	33	36	41	48	49	58	63	80	G	G	G	40	106	36	39	29	34	38
31	40	36	28	G	G	G	25	36	43	50	50	64	59	G	54	54	42	48	48	46	49	29	82	40
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	33	34	29	G	G	G	25	36	44	49	51	58	57	66	54	55	61	58	50	40	38	33	32	33
U Q	40	40	38	37	31	32	32	39	54	57	66	63	63	80	78	68	77	72	66	58	58	40	40	39
L Q	27	G	G	G	G	G	G	33	41	44	47	52	48	52	48	45	42	40	37	33	31	23	24	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

AUG. 1988

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
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CNT	31	31	31	31	30	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	15	16	21	26	27	28	28	27	26	23	17	15	15	15	15	15	15
U Q	15	15	15	15	15	15	16	15	16	24	27	28	29	29	28	27	26	20	15	15	15	15	15	15
L Q	15	15	15	15	15	15	15	14	15	17	22	24	26	27	26	23	21	16	14	14	15	15	15	15

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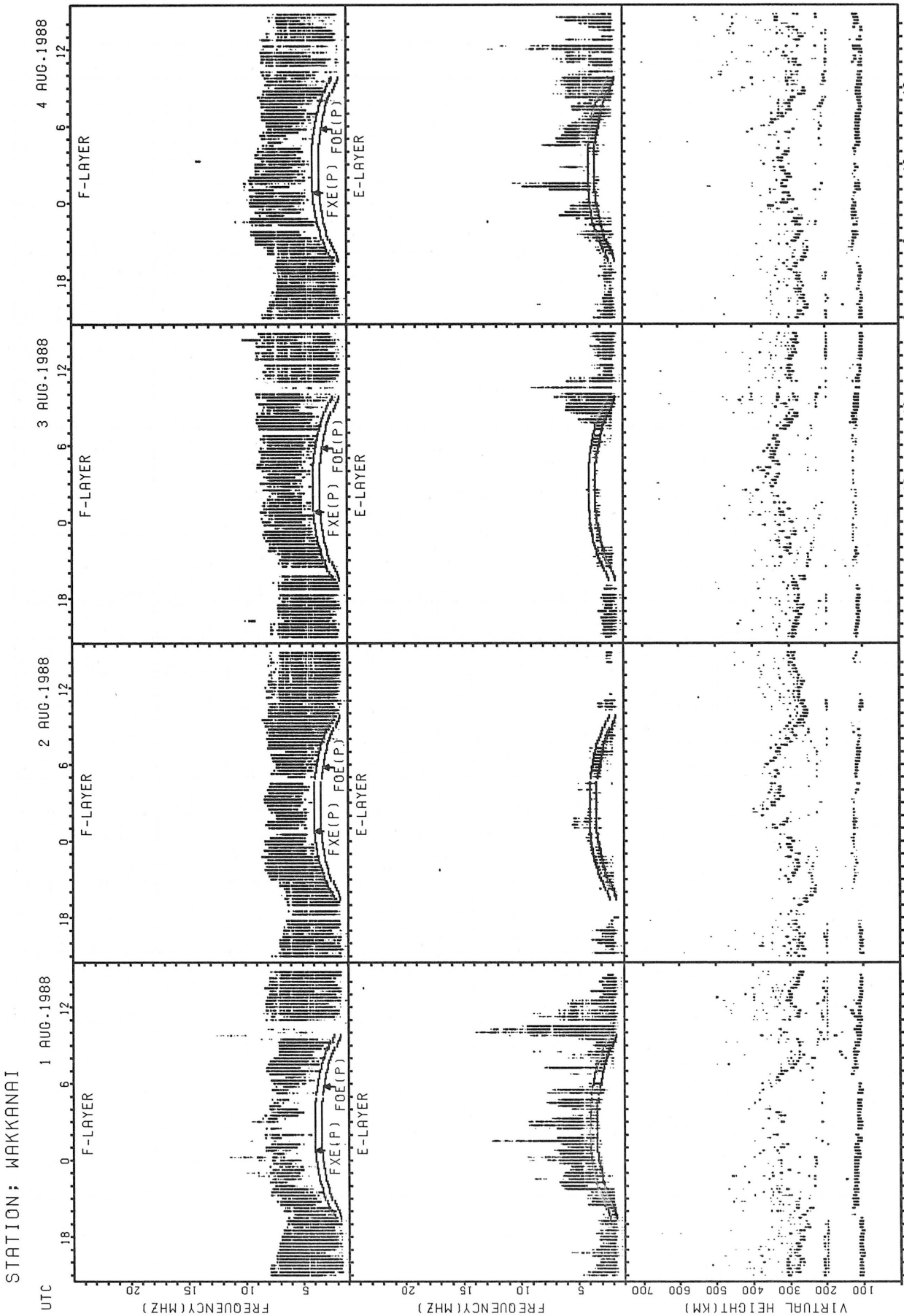
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UTC
JST
1 AUG.1988
2 AUG.1988
3 AUG.1988
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E-LAYER
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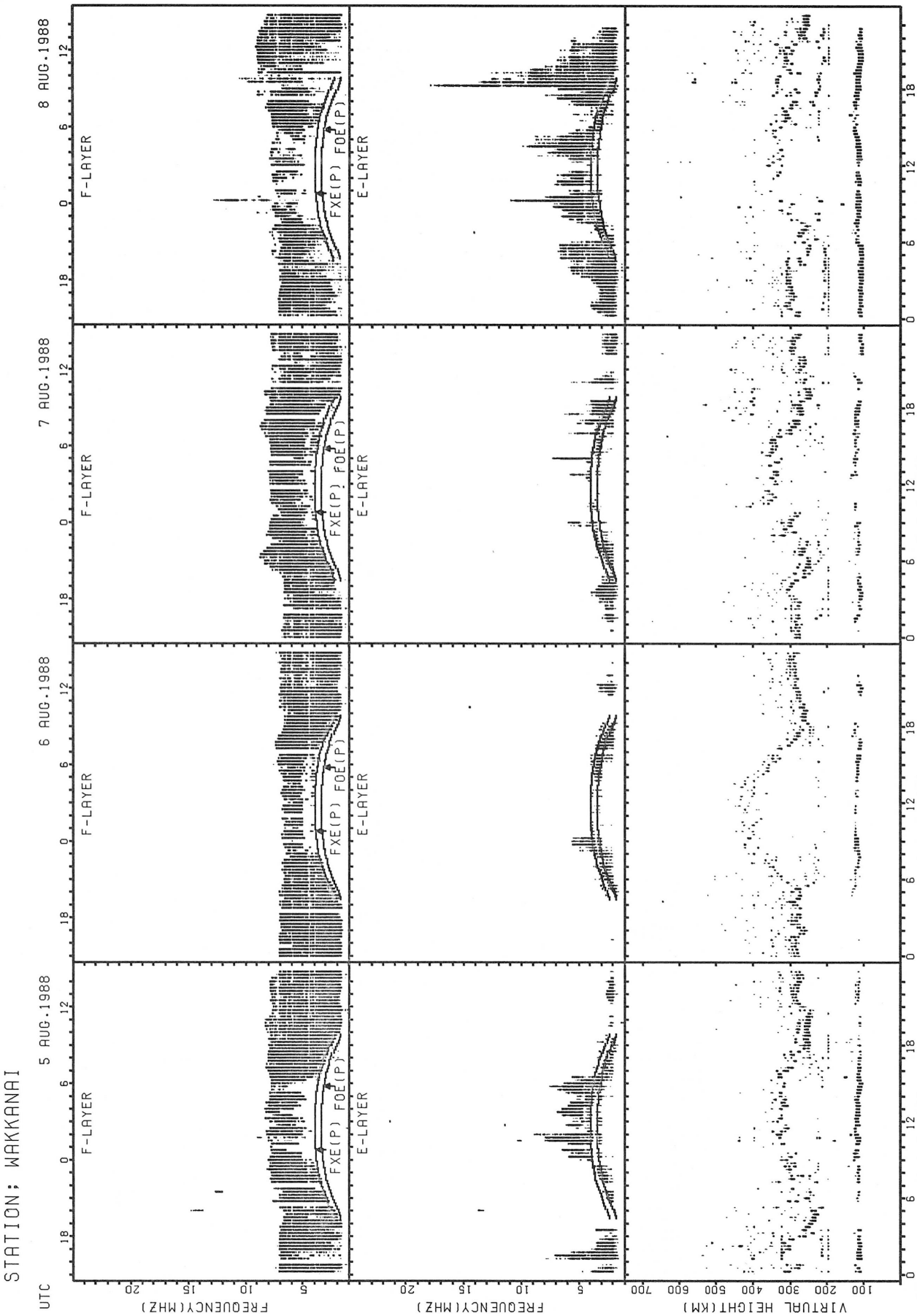
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE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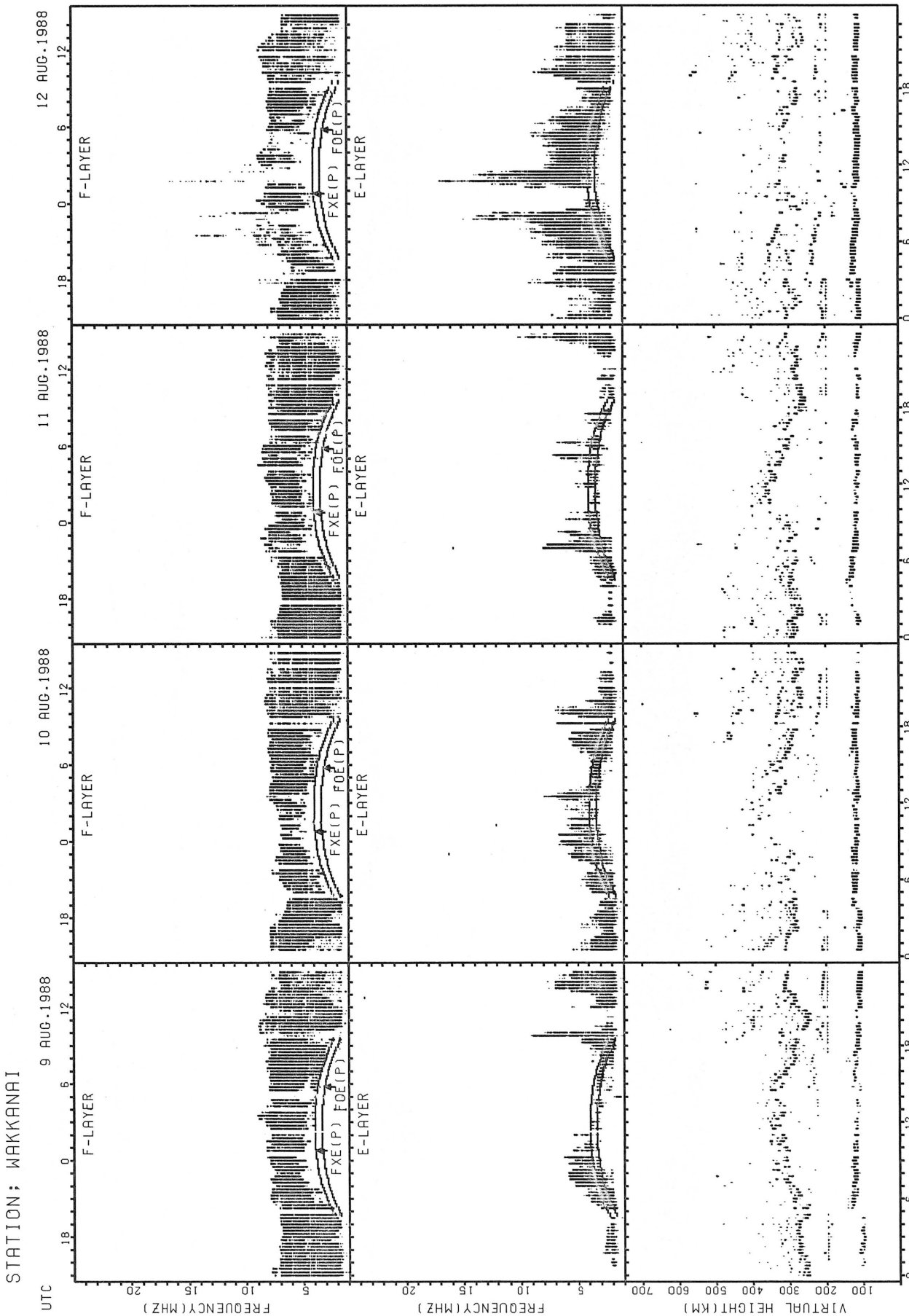
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FXE(P) FOE(P)
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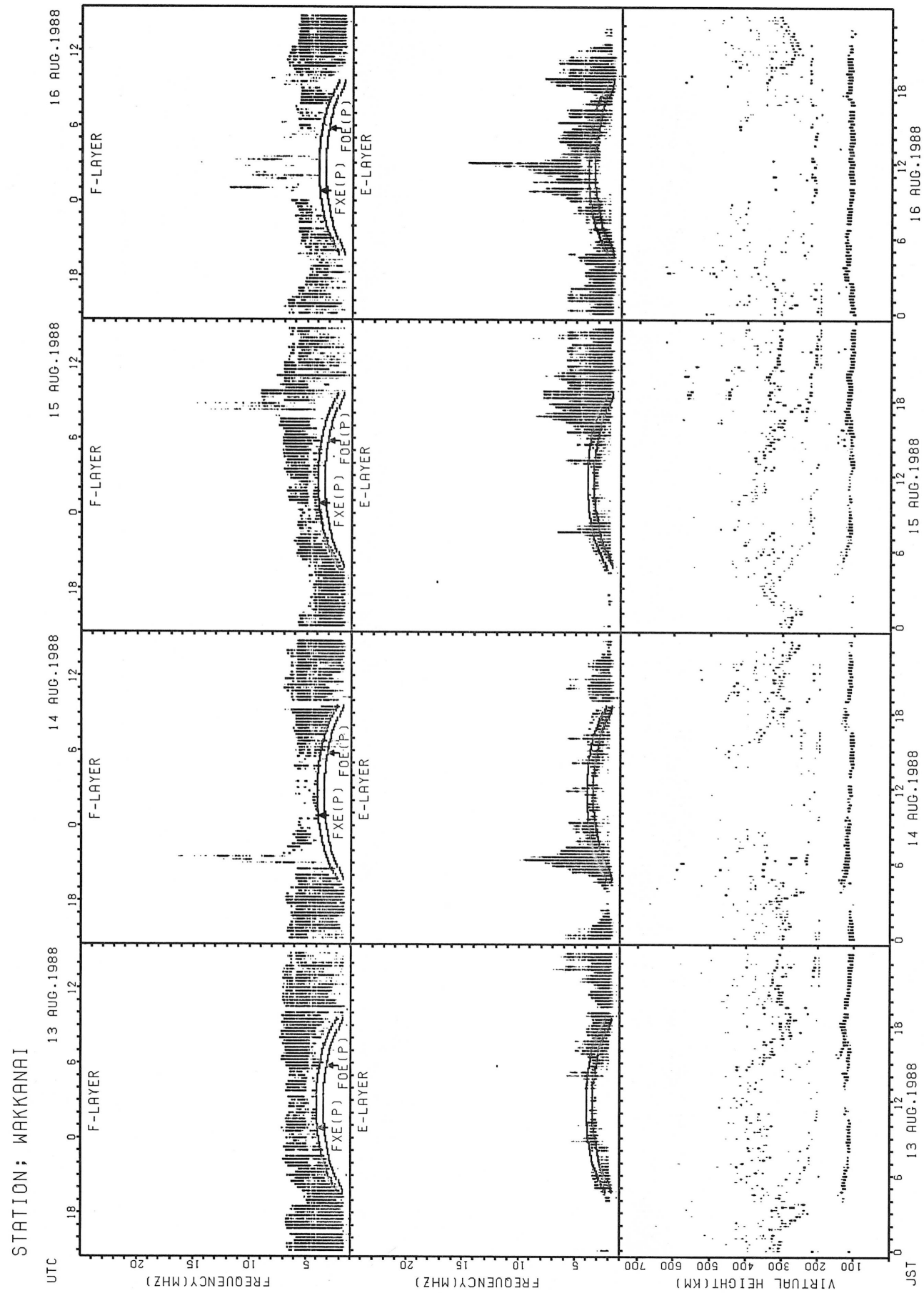
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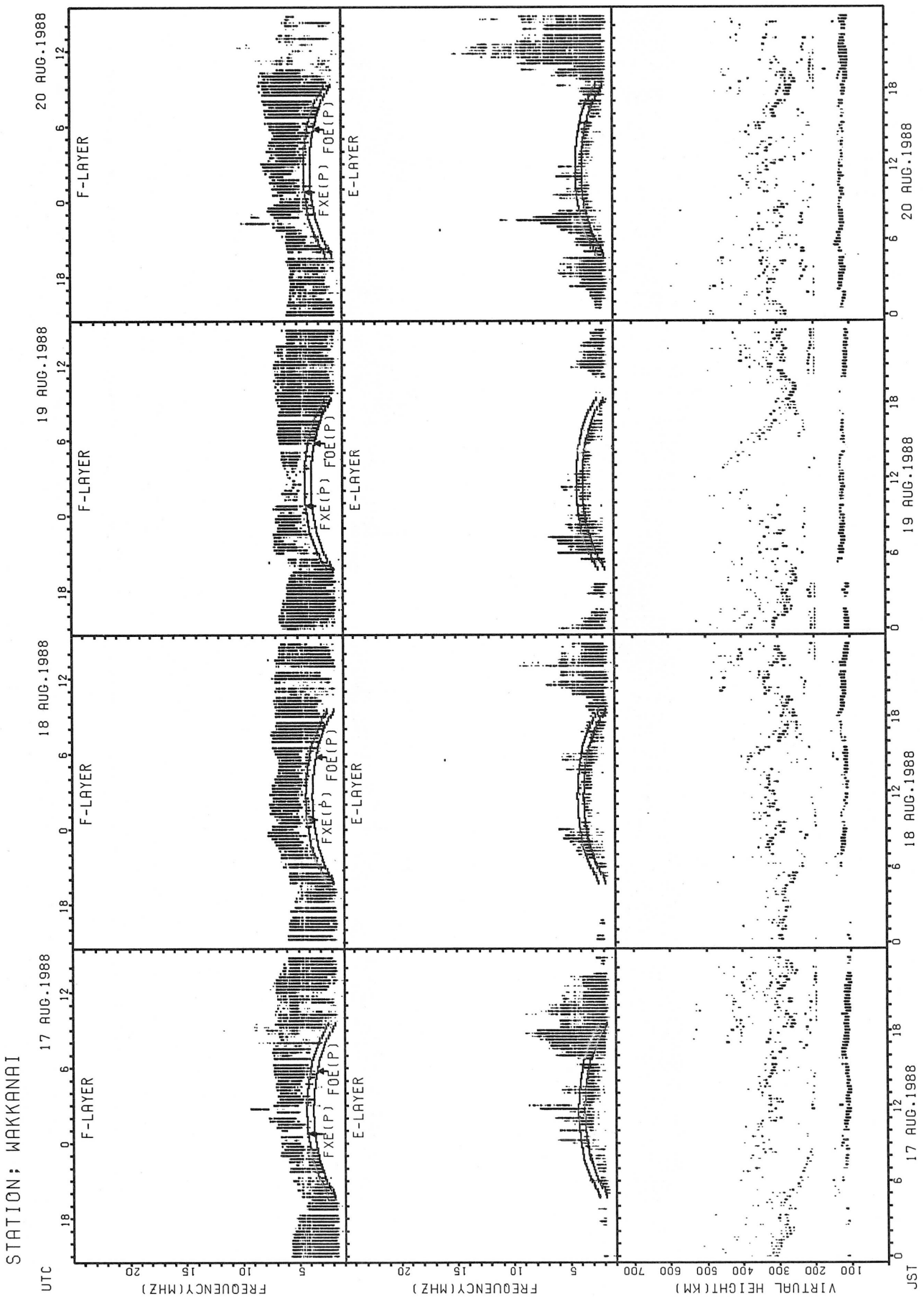
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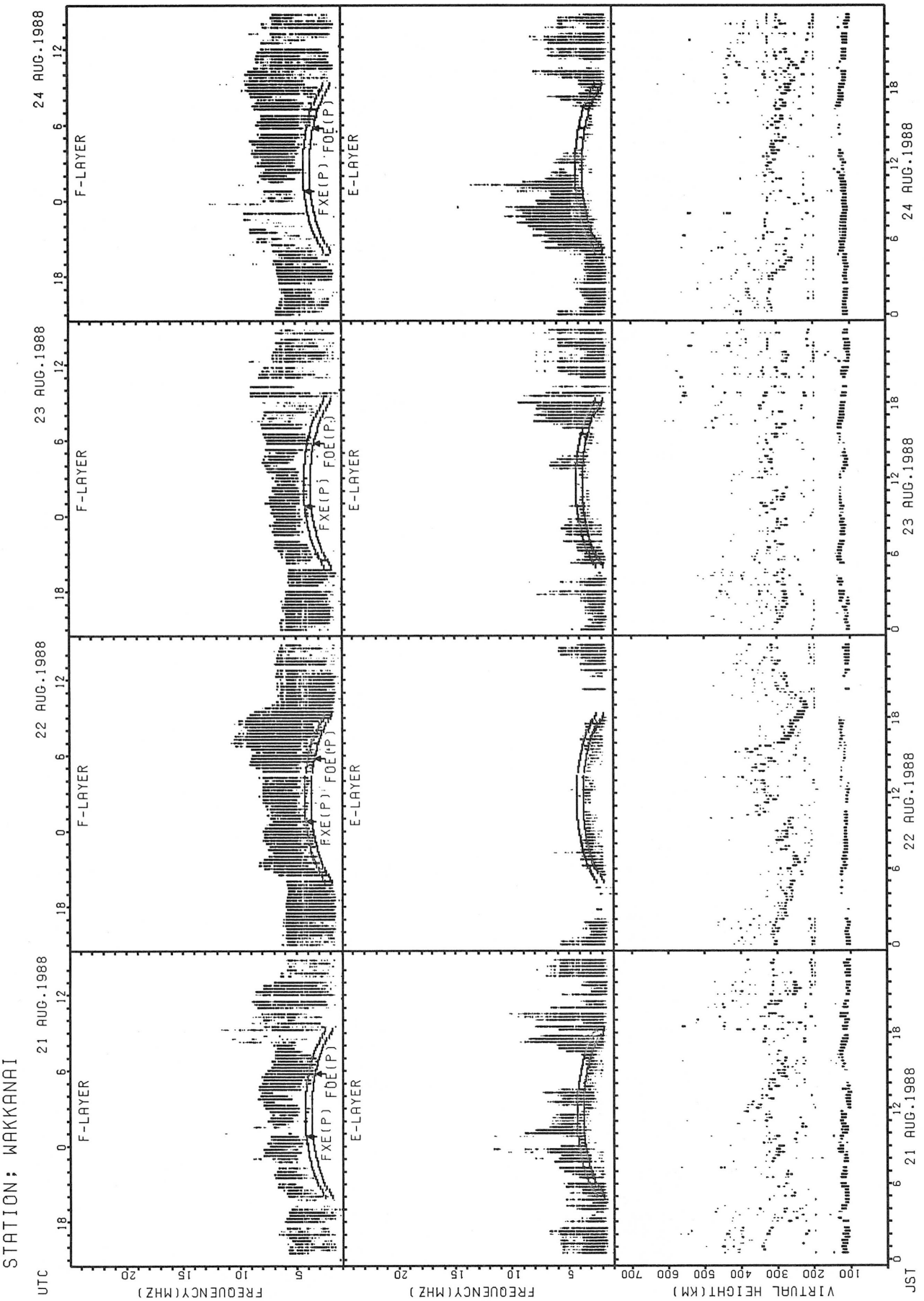
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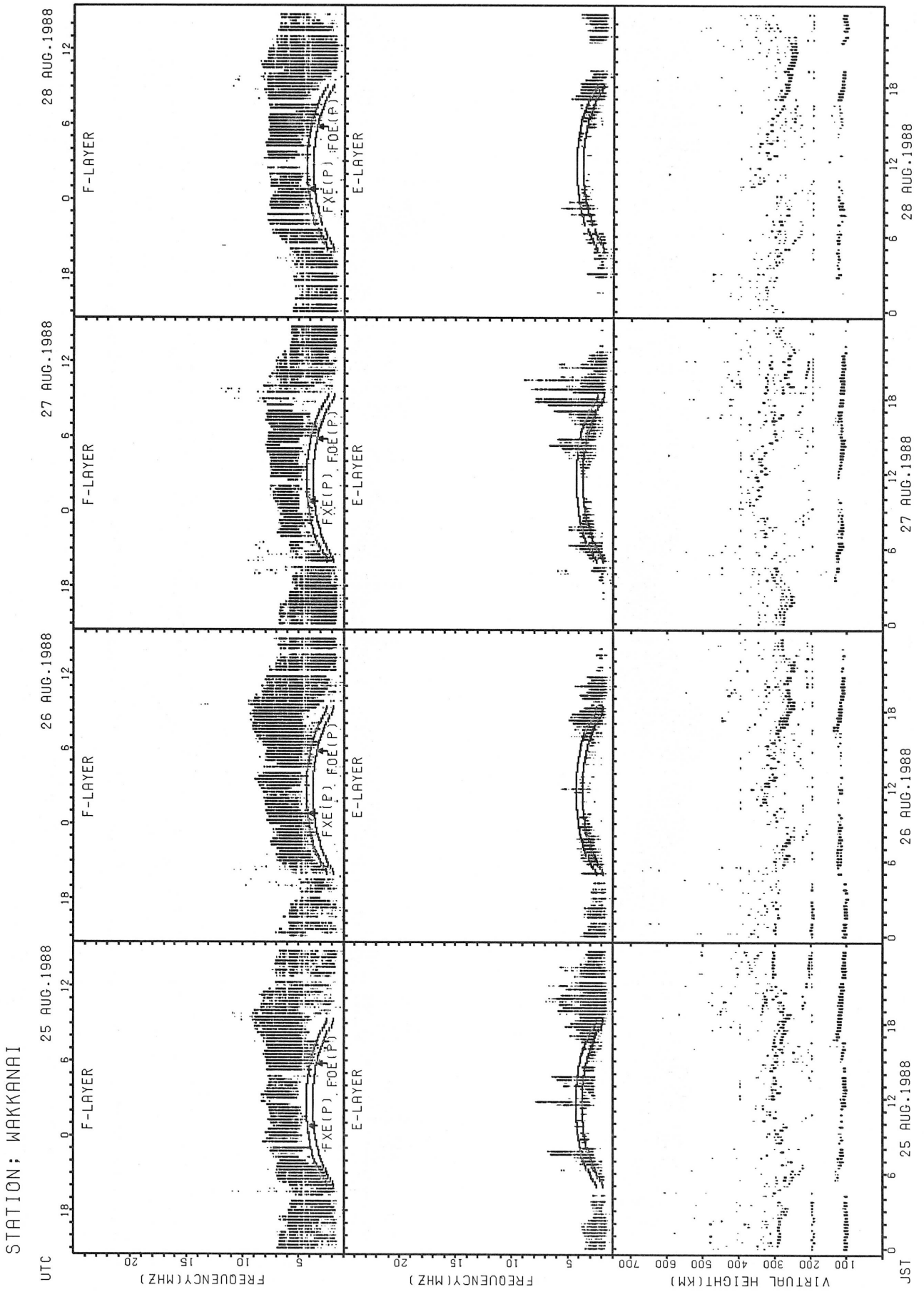
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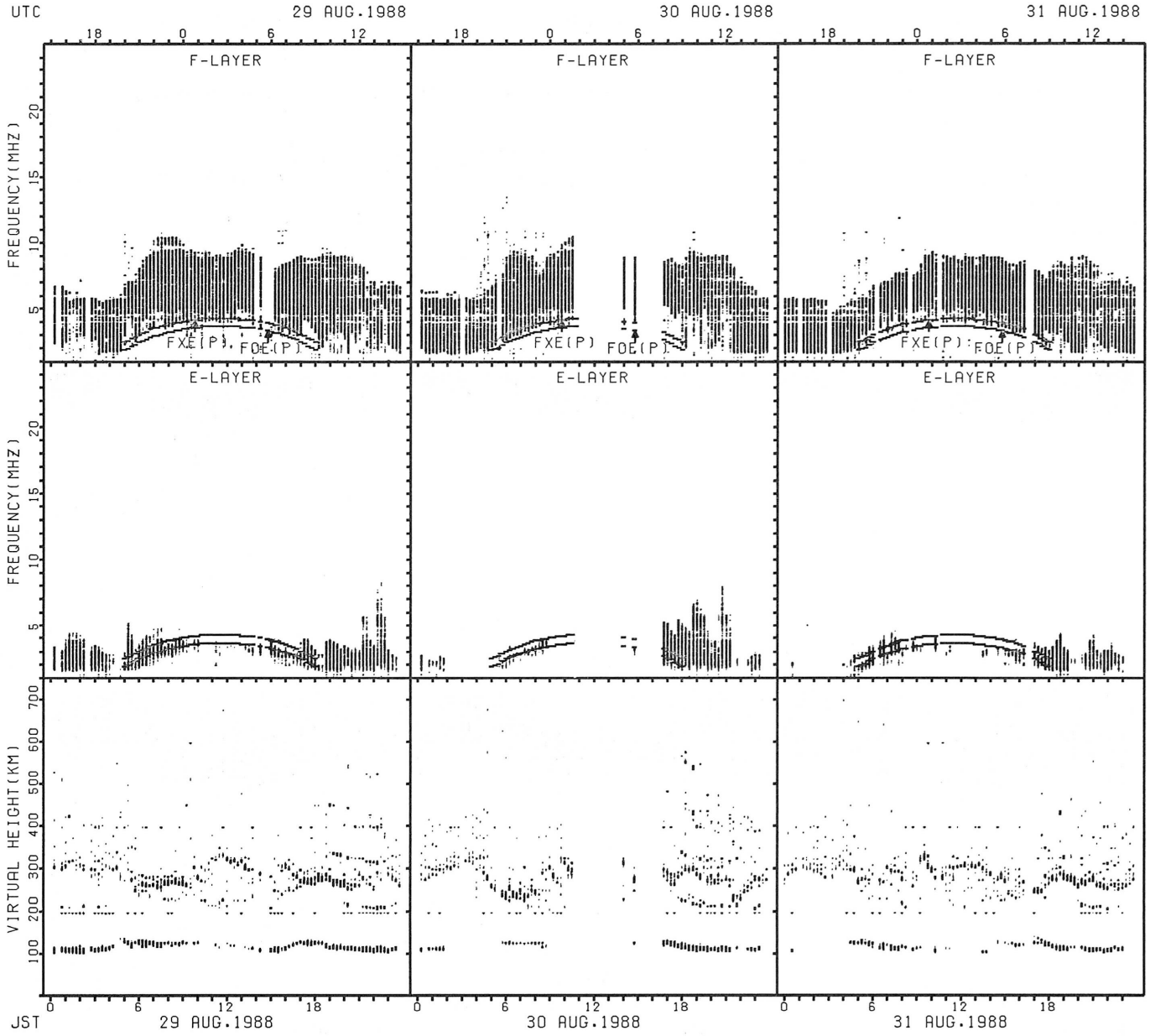
STATION; WAKKANAI



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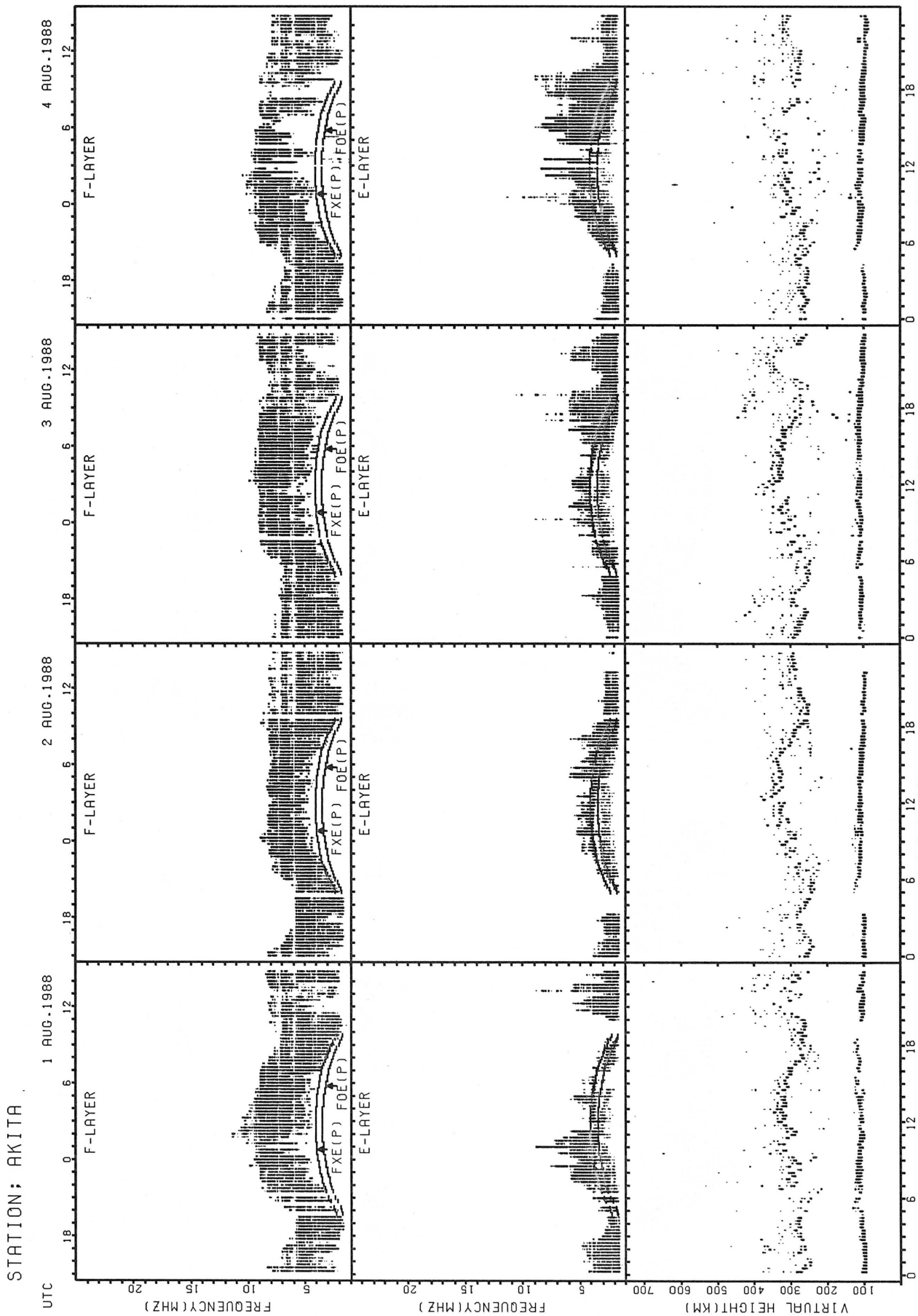
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4 AUG.1988
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UTC
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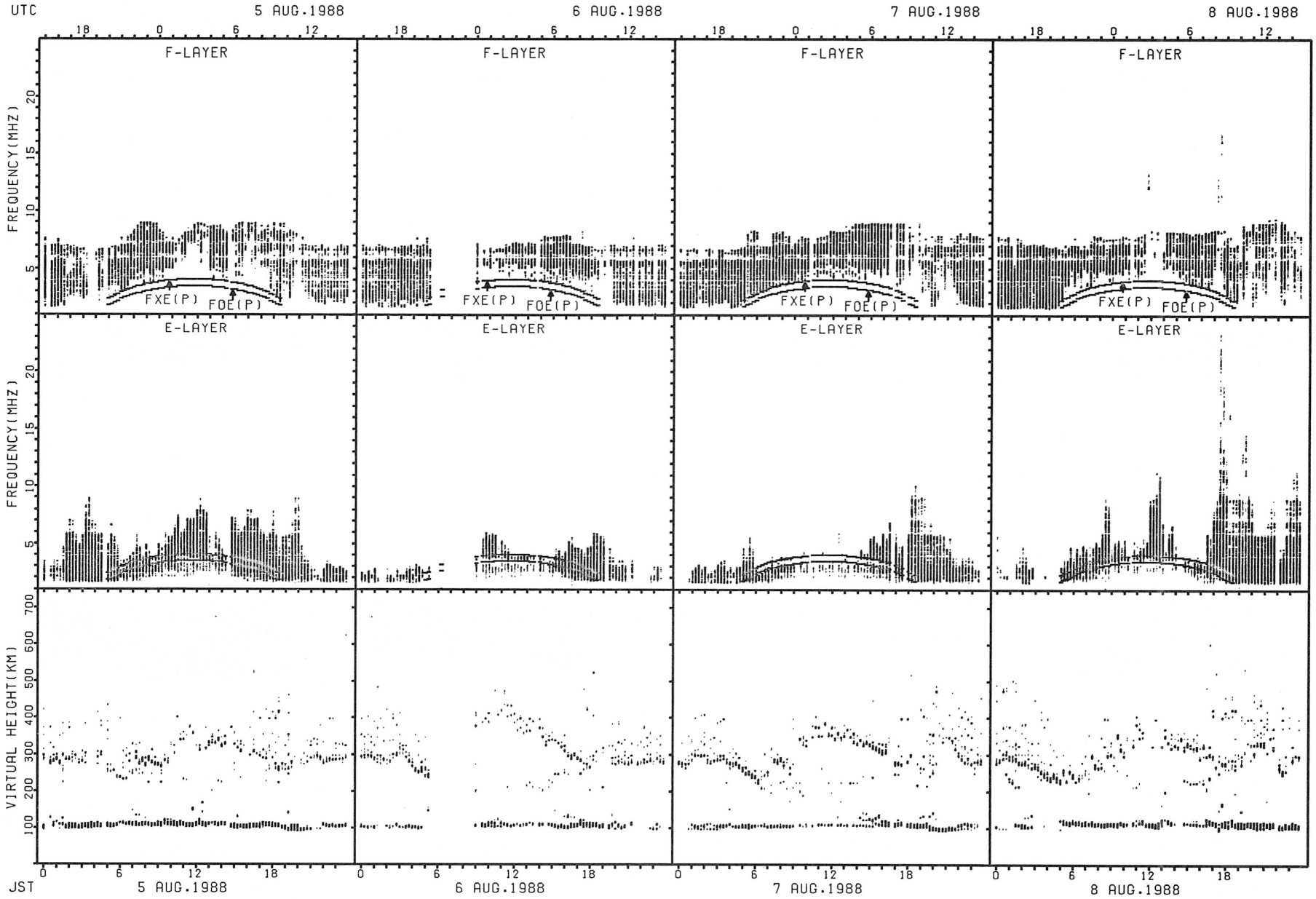
FOE(P); PREDICTED VALUE FOR FOE

STATION: AKITA



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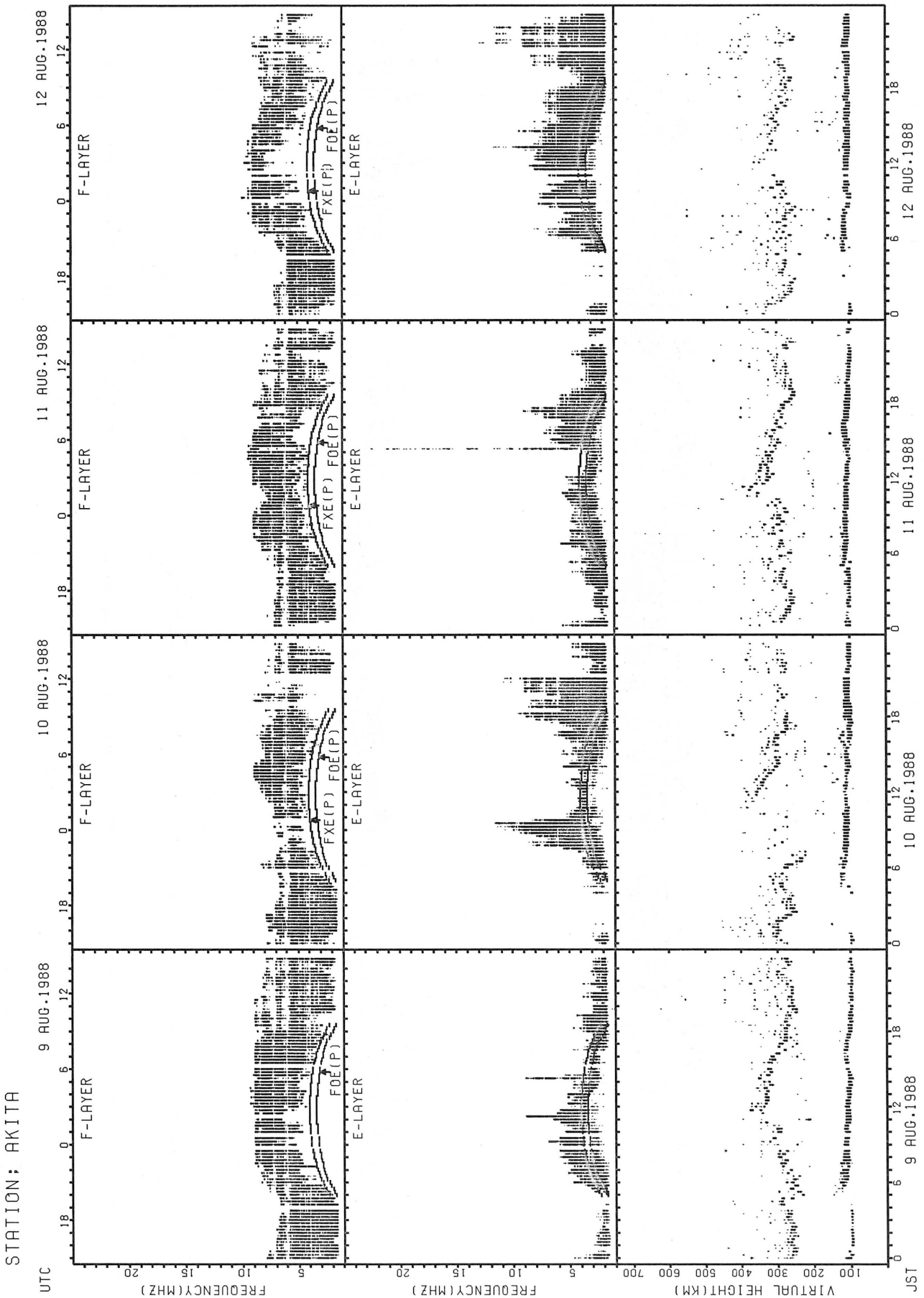
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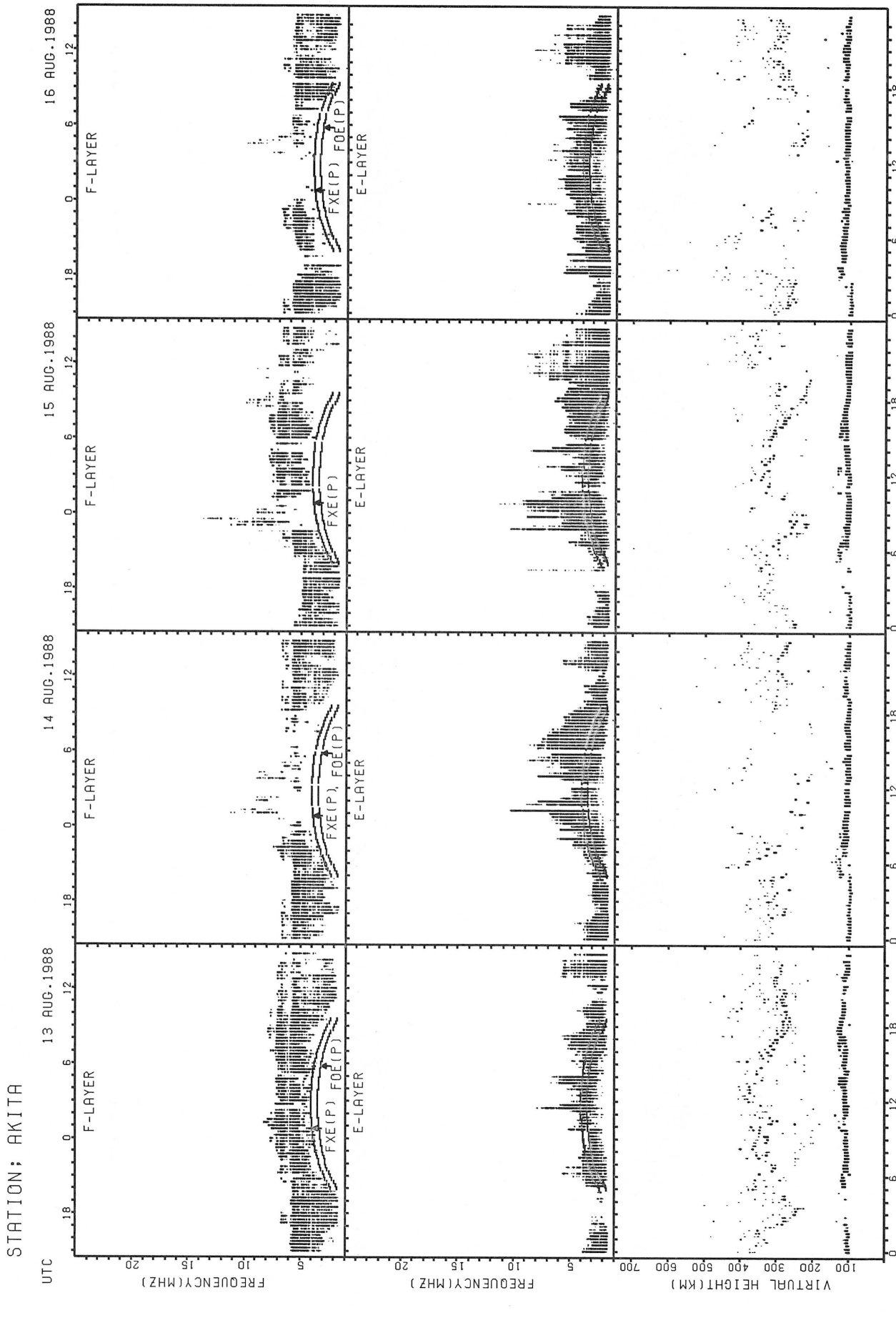
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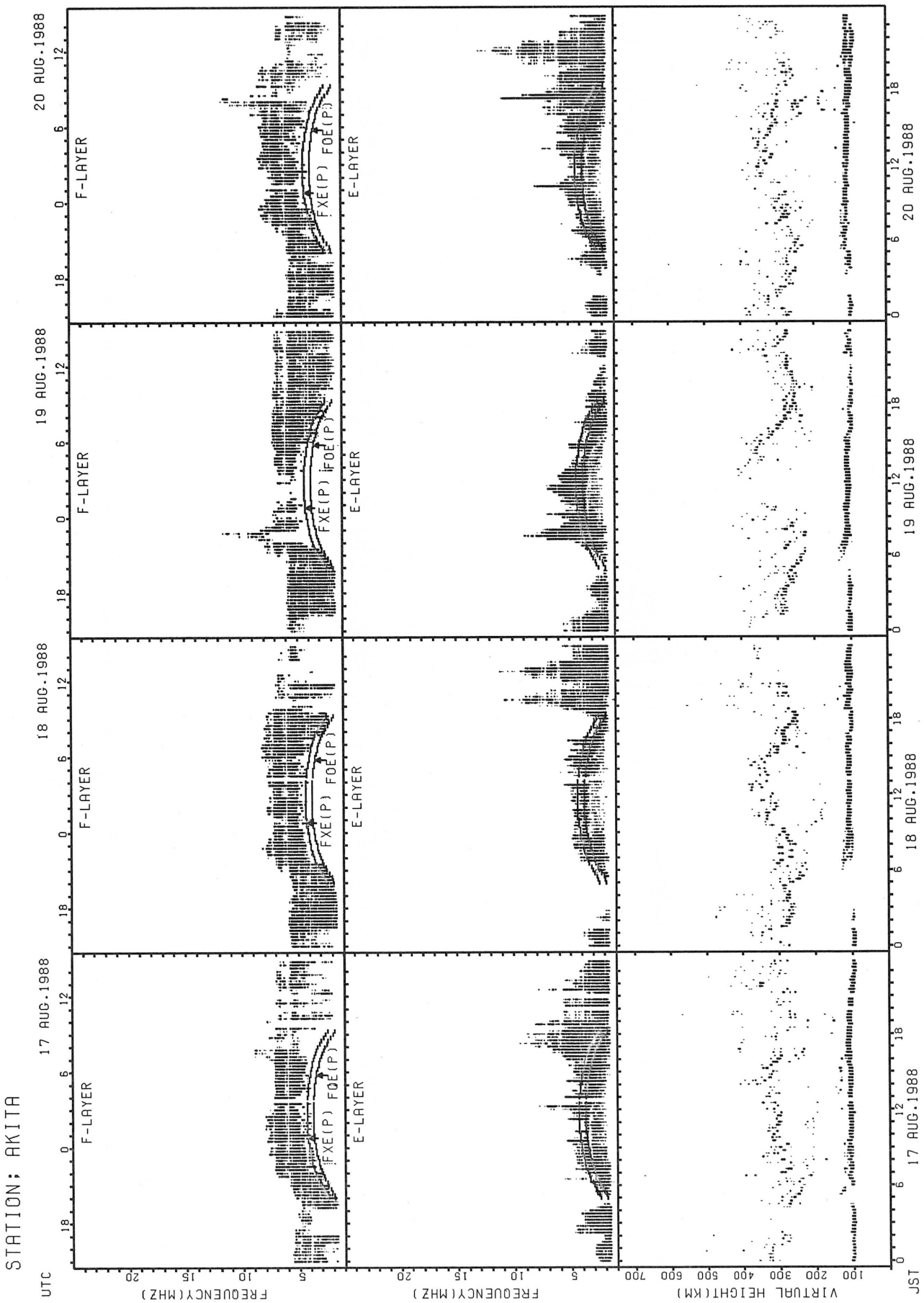
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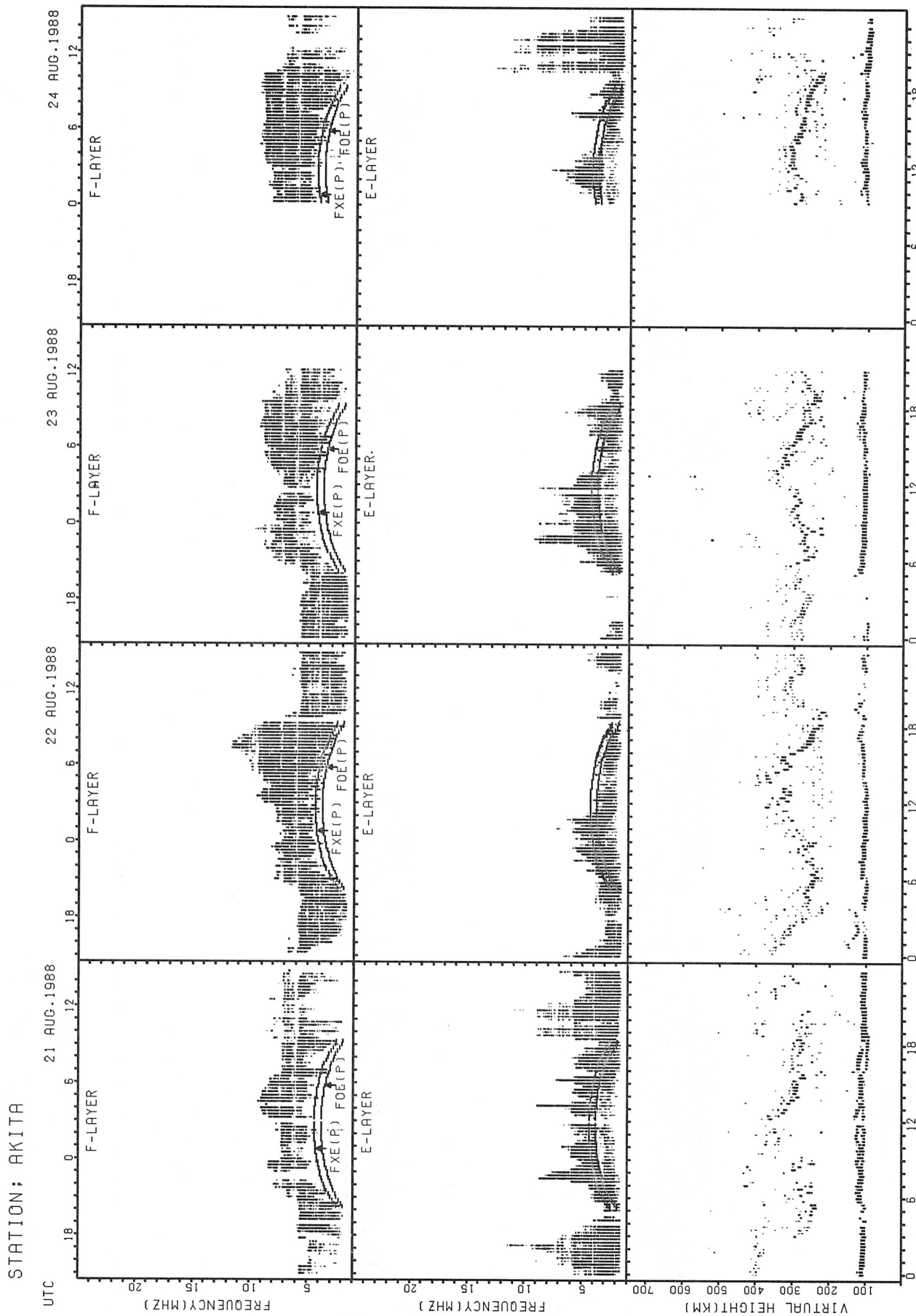
FOE(P); PREDICTED VALUE FOR FOE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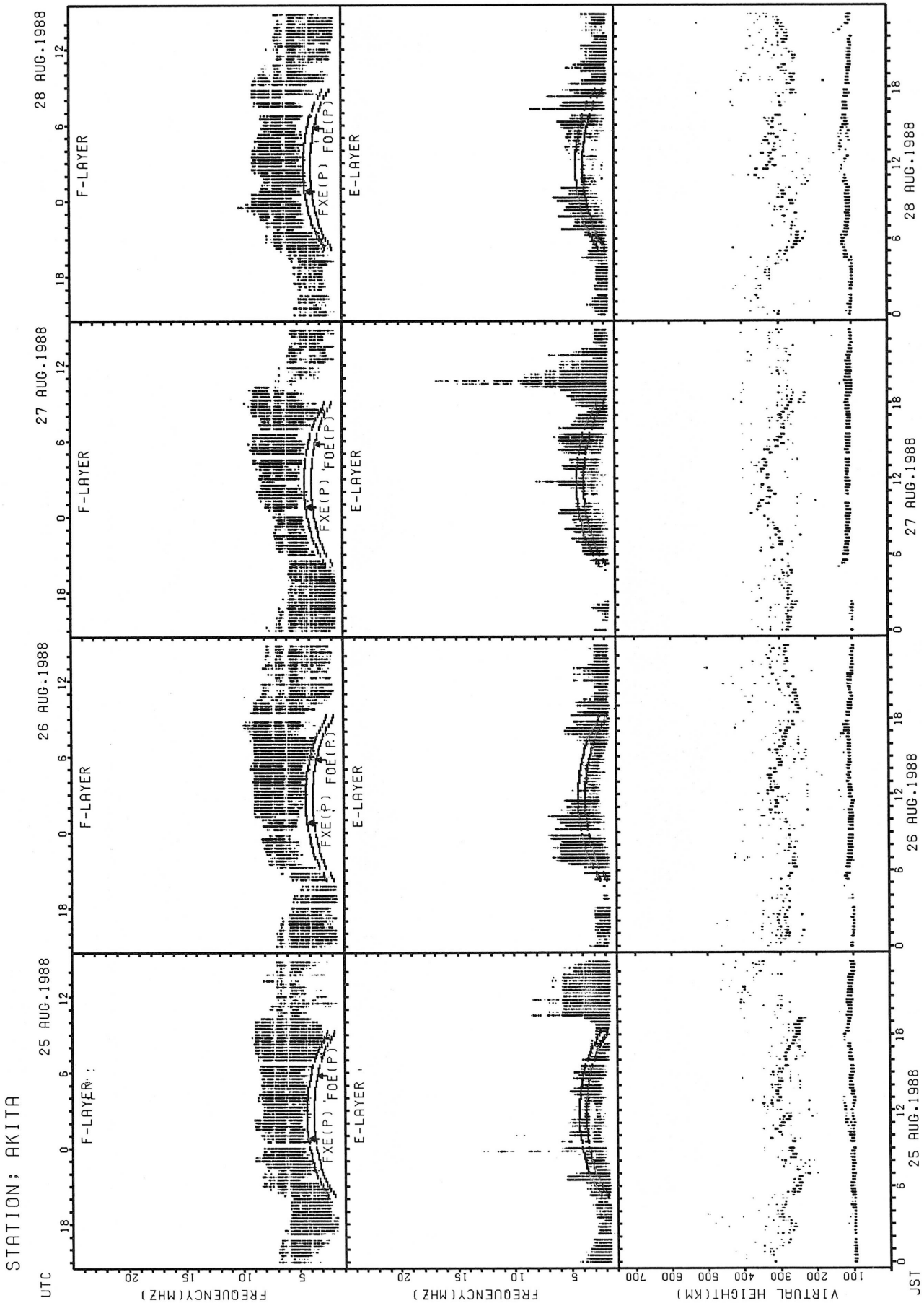
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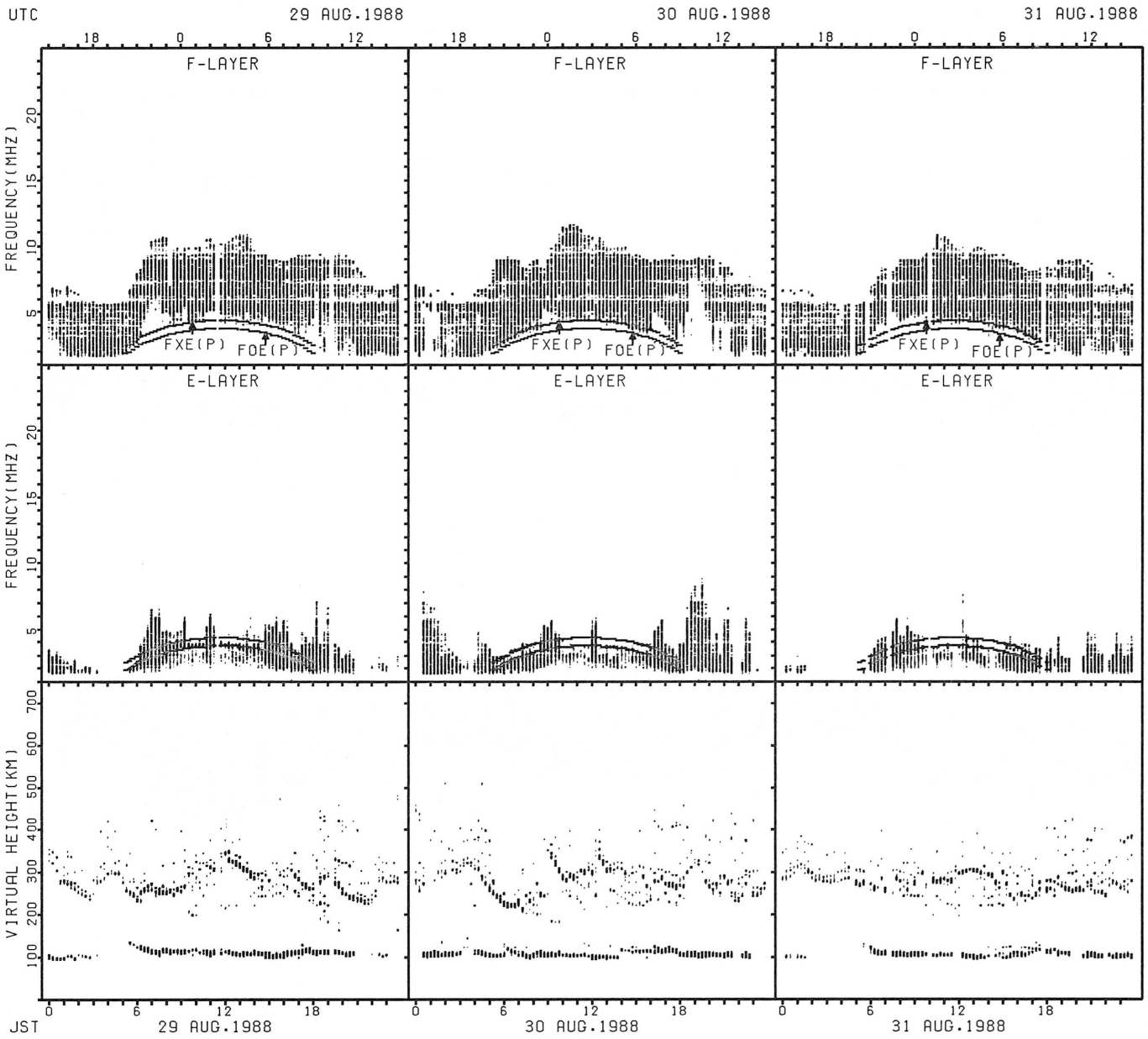
STATION; AKITA



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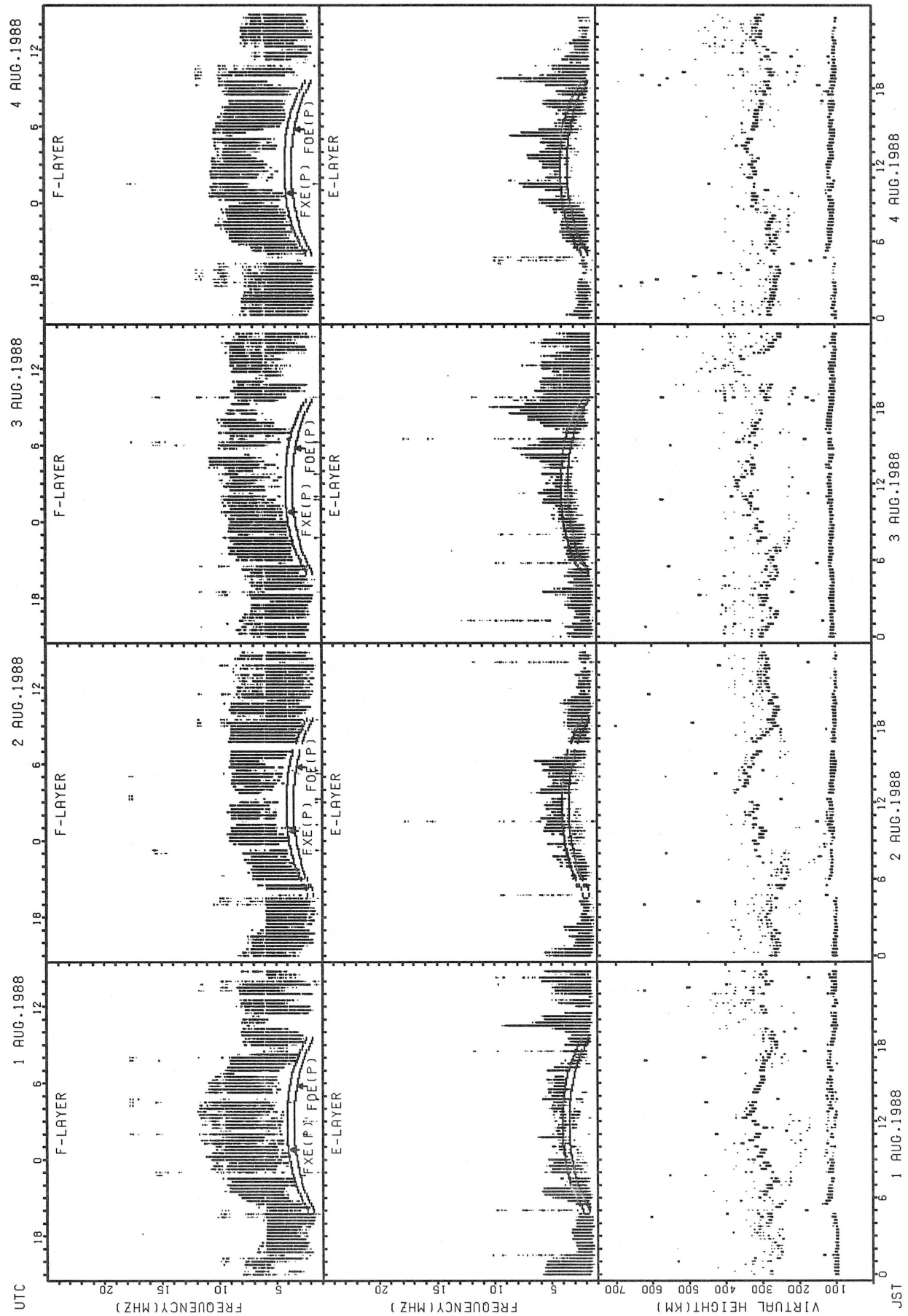
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3 AUG.1988
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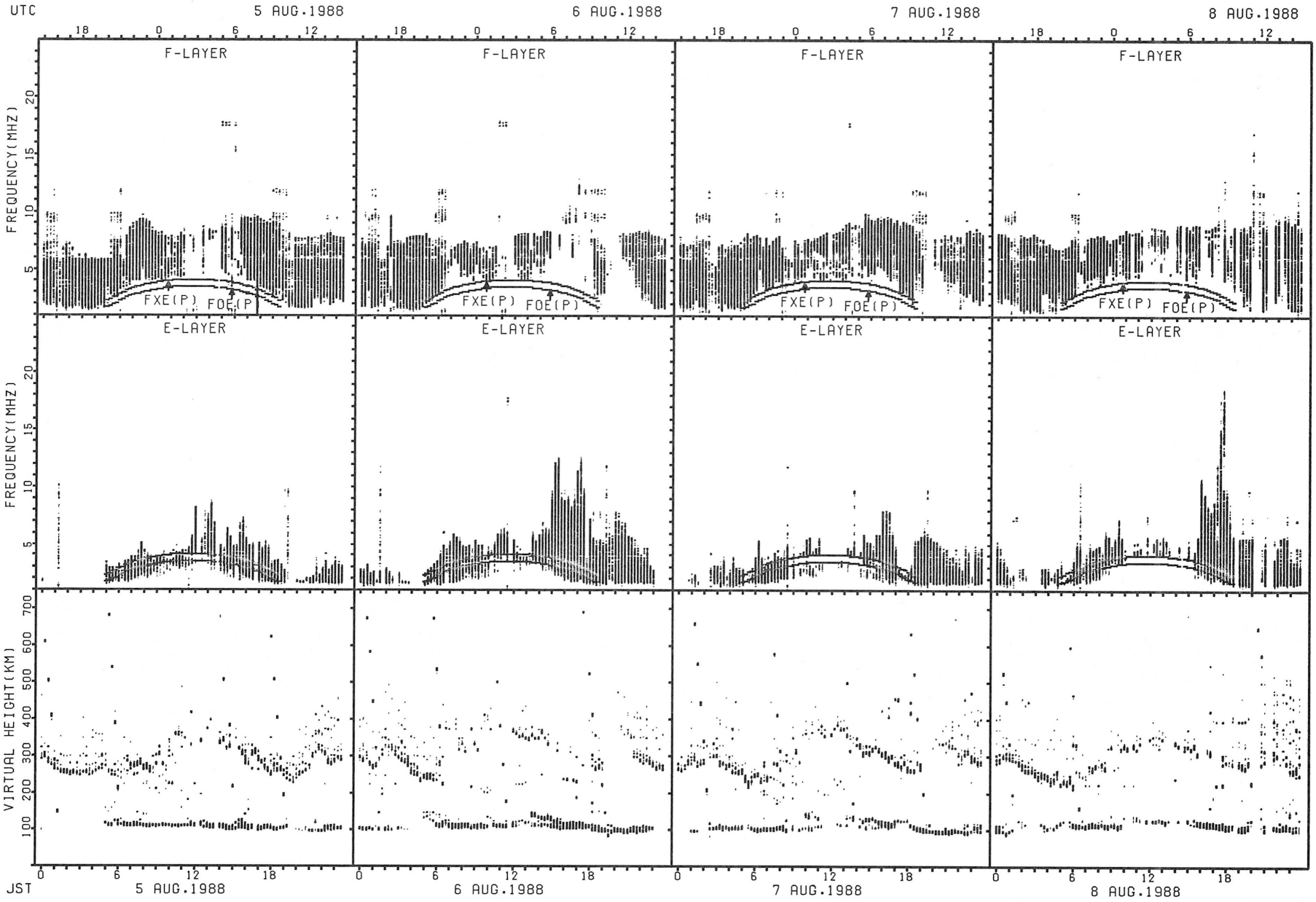
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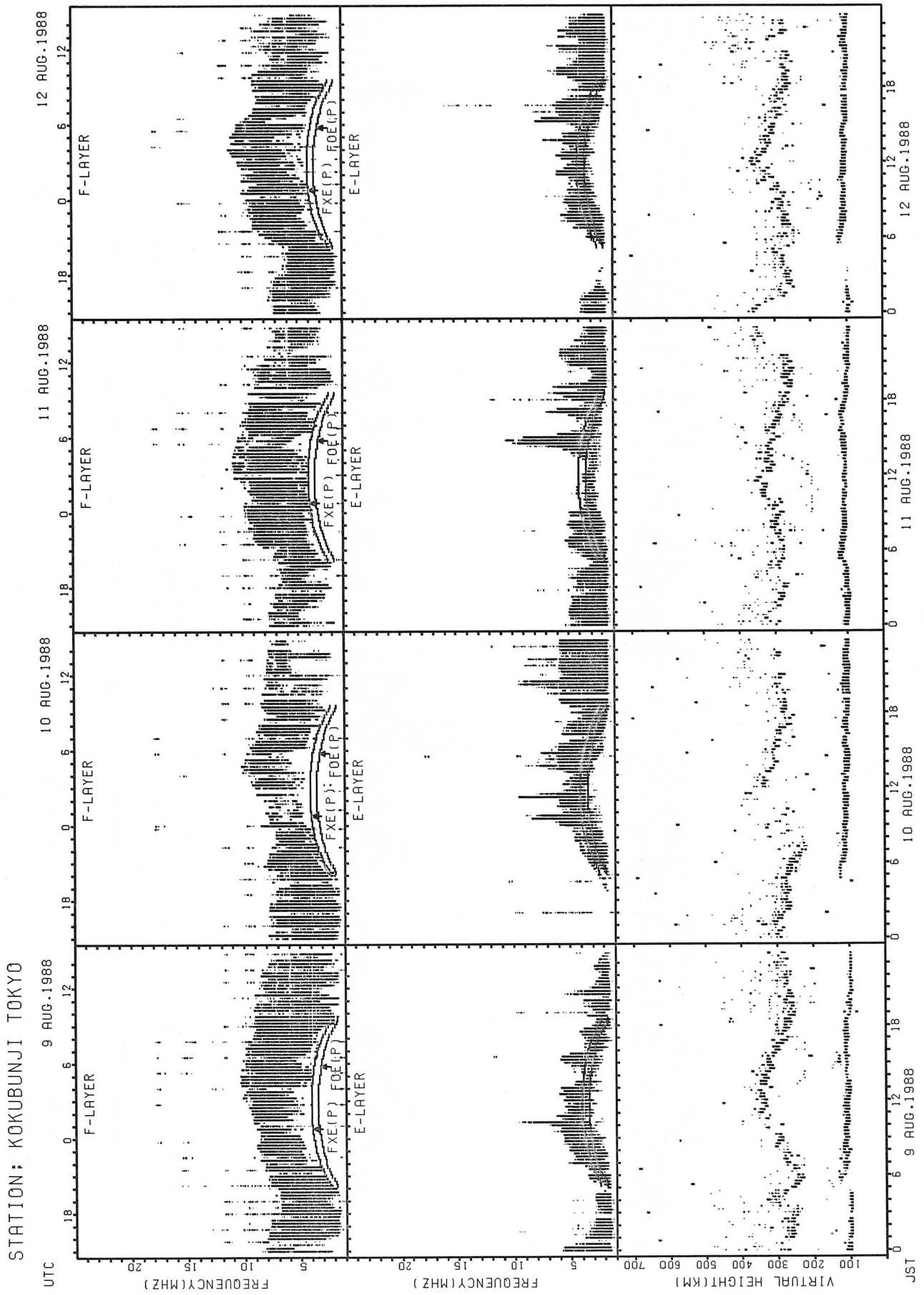
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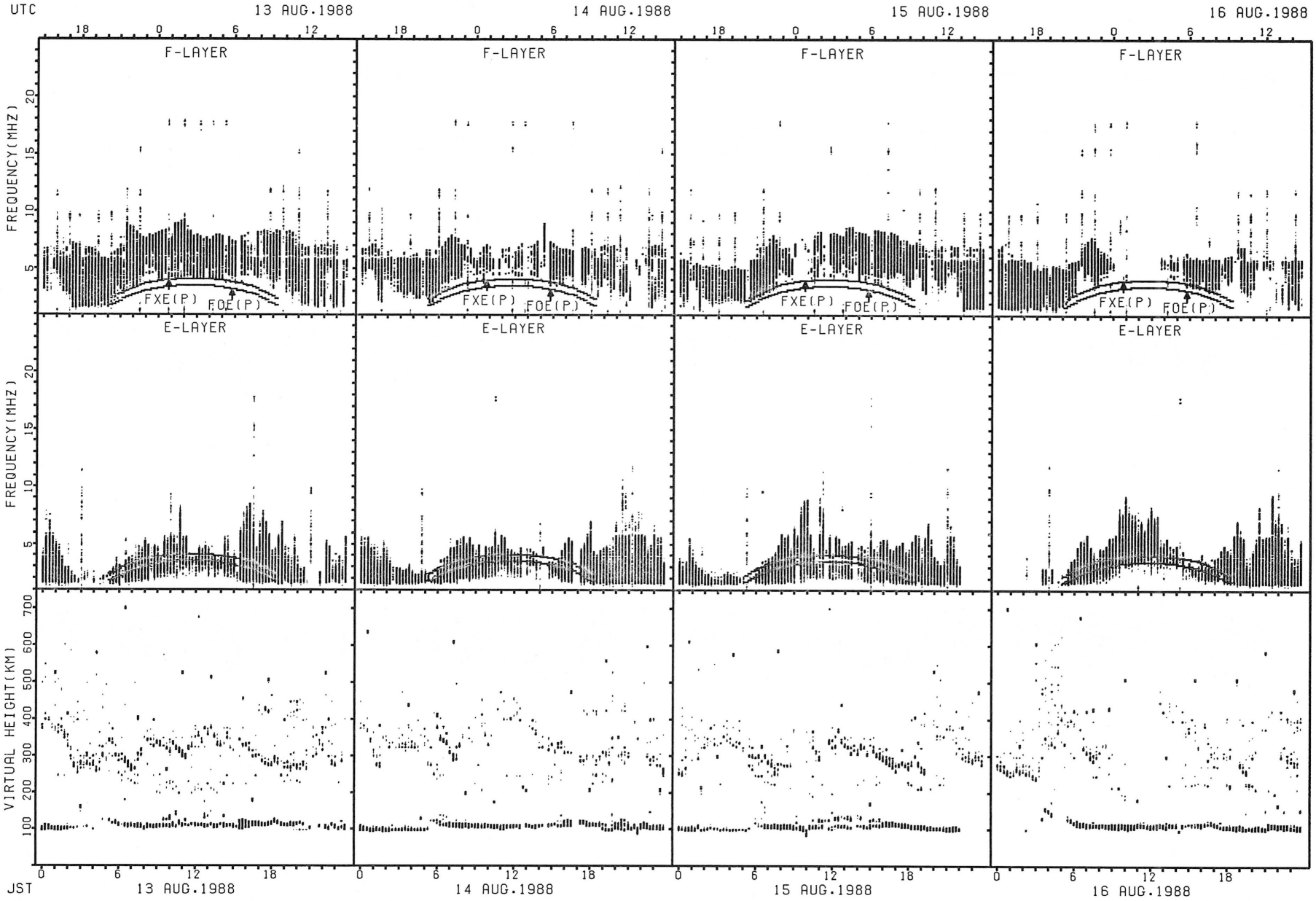
STATION; KOKUBUNJI TOKYO



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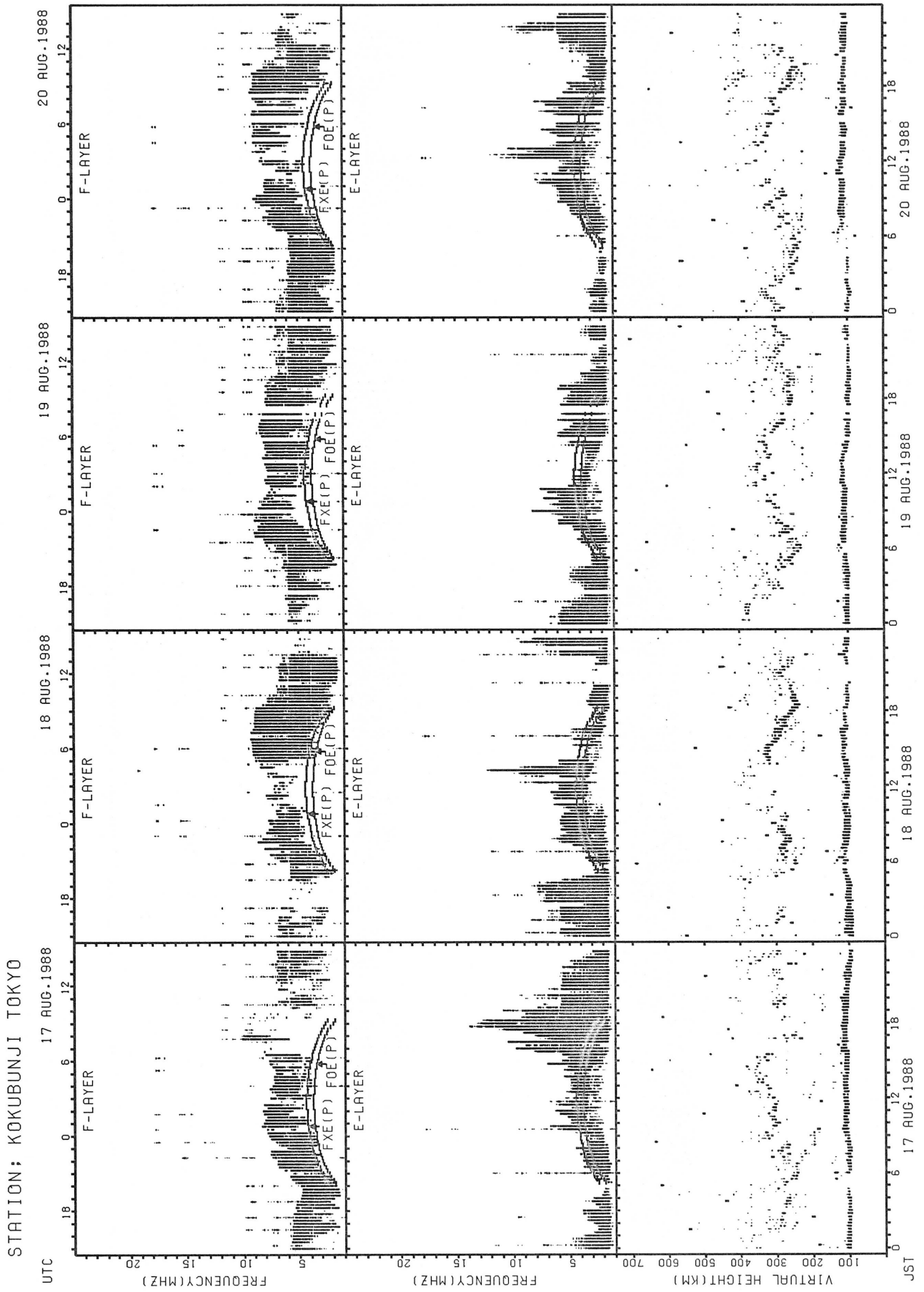
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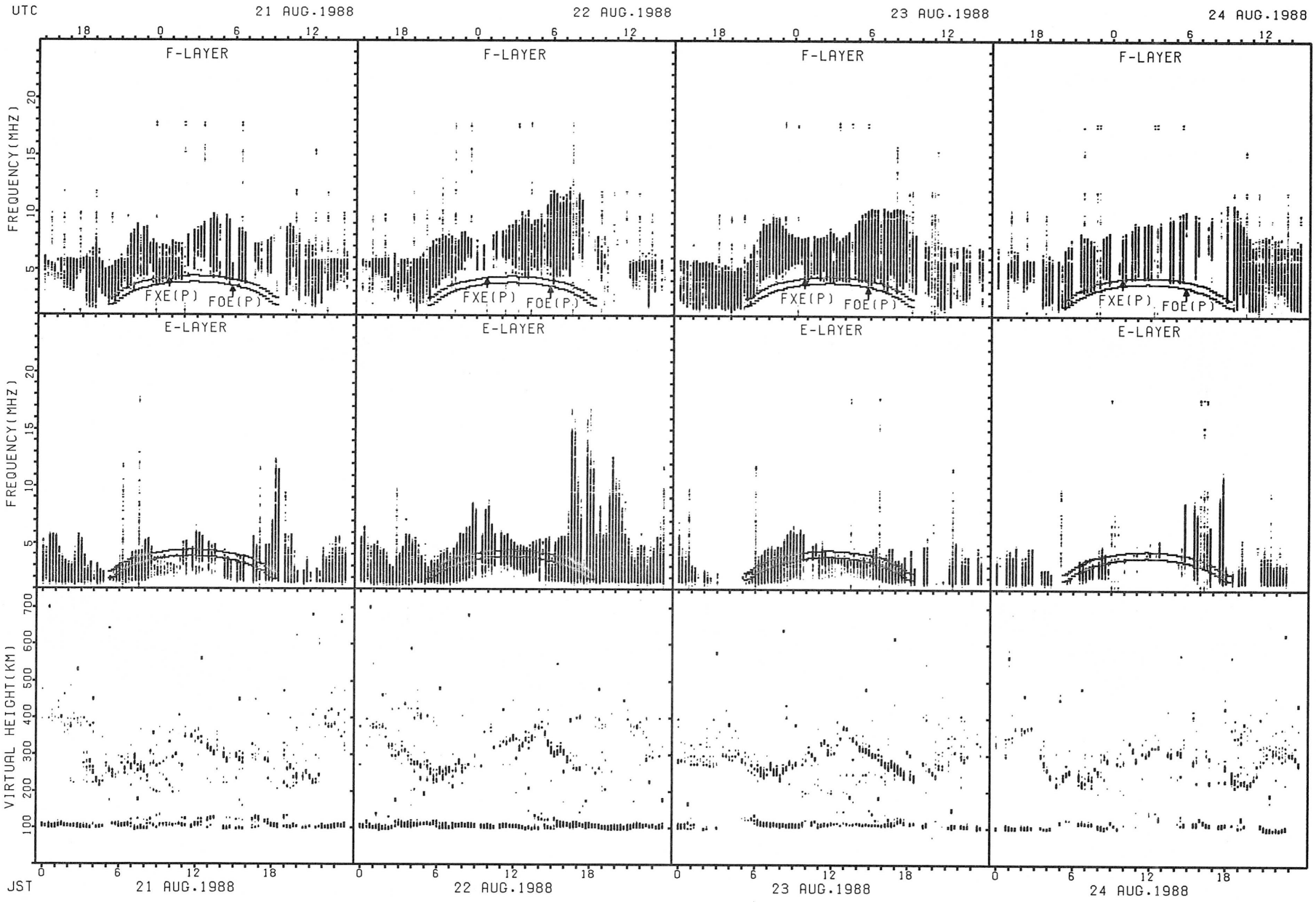
STATION; KOKUBUNJI TOKYO



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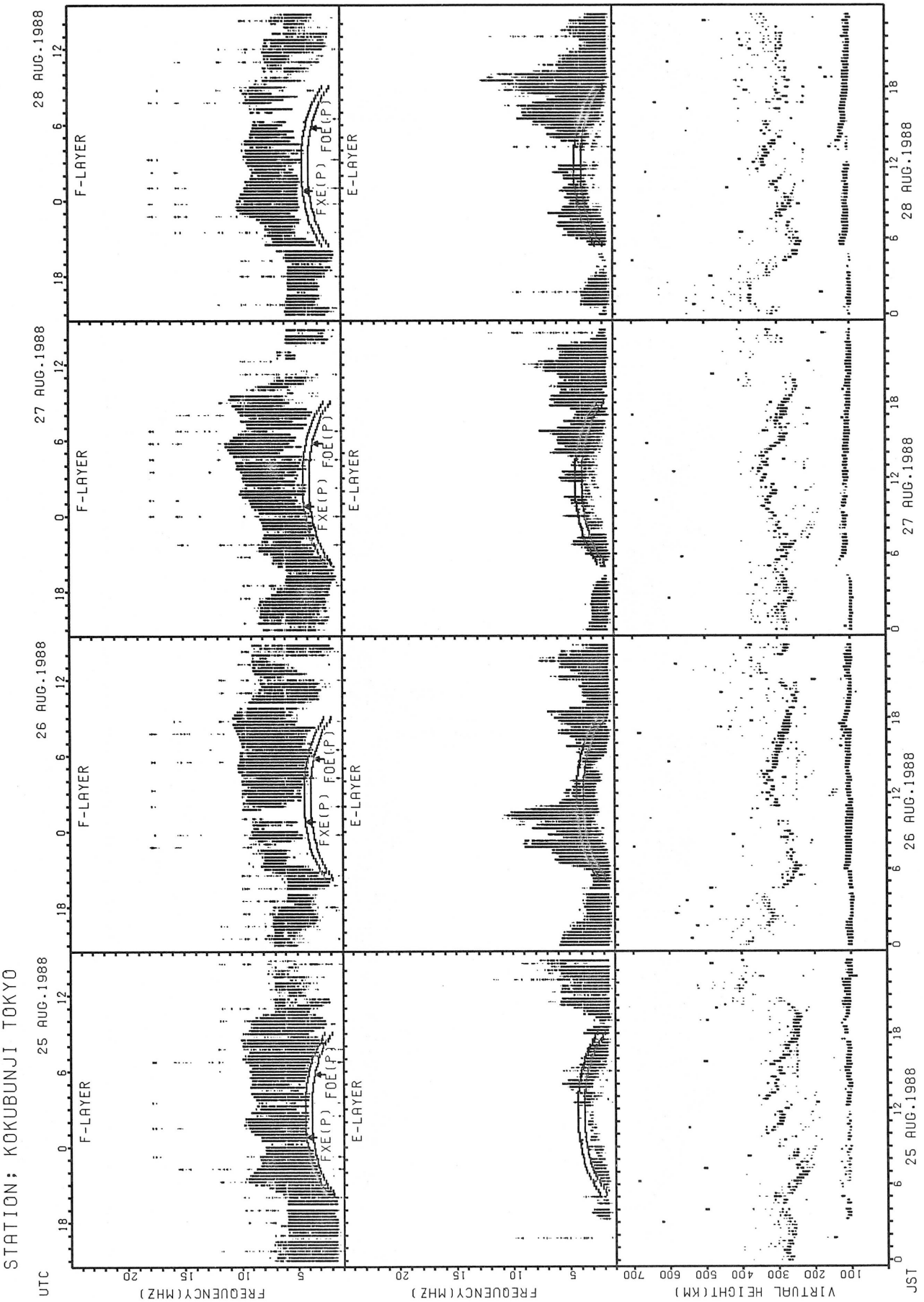
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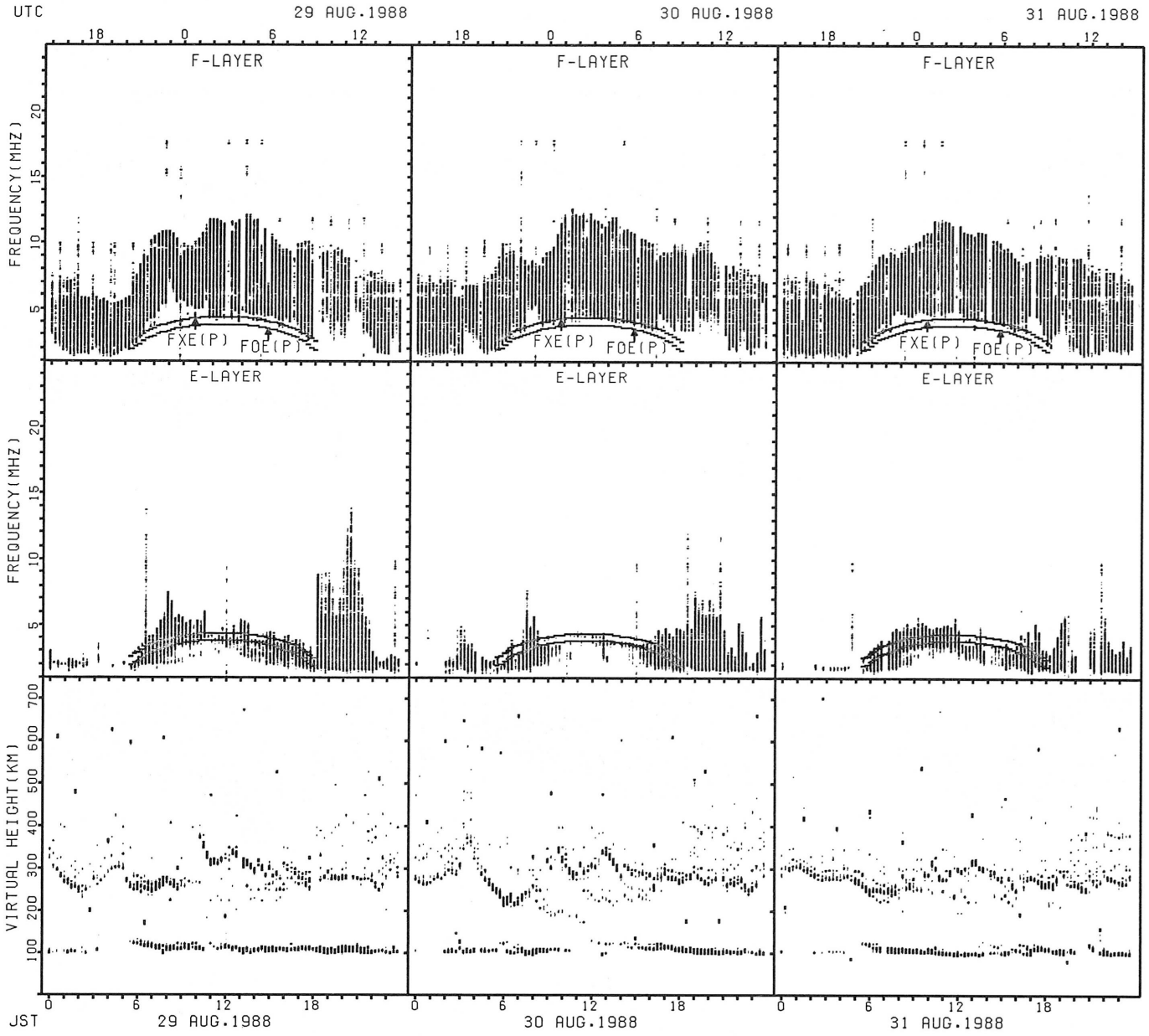
STATION; KOKUBUNJI TOKYO



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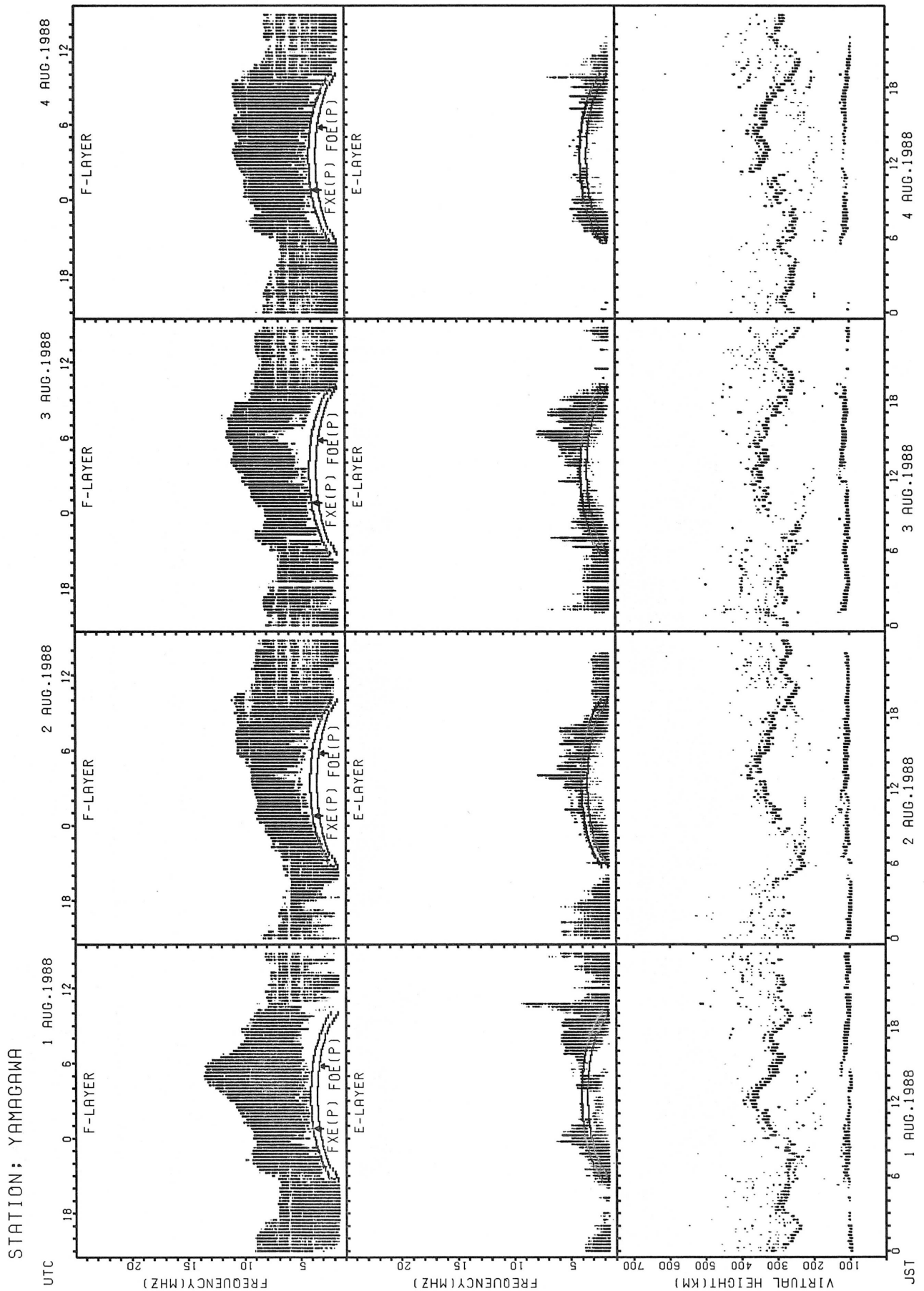
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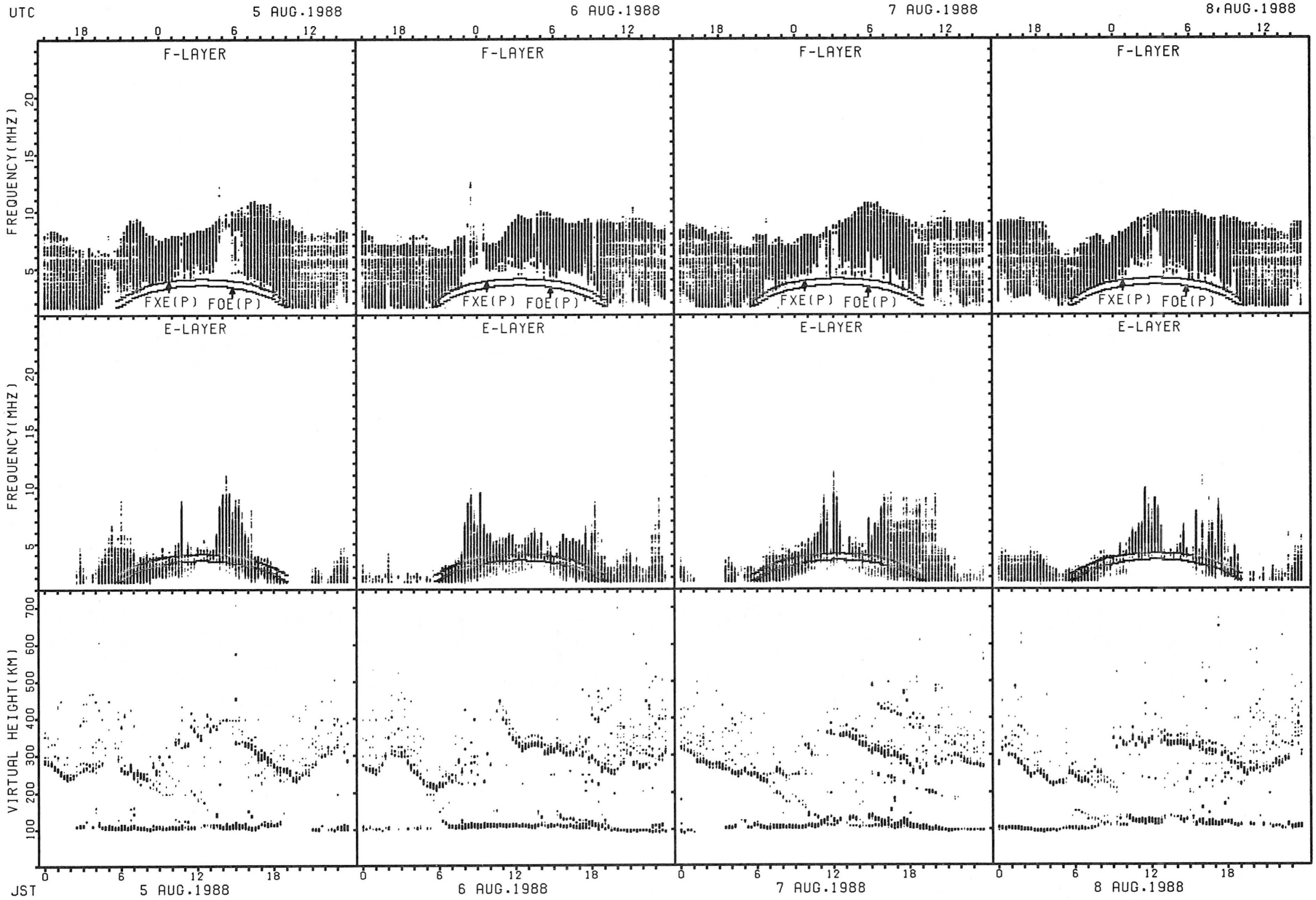
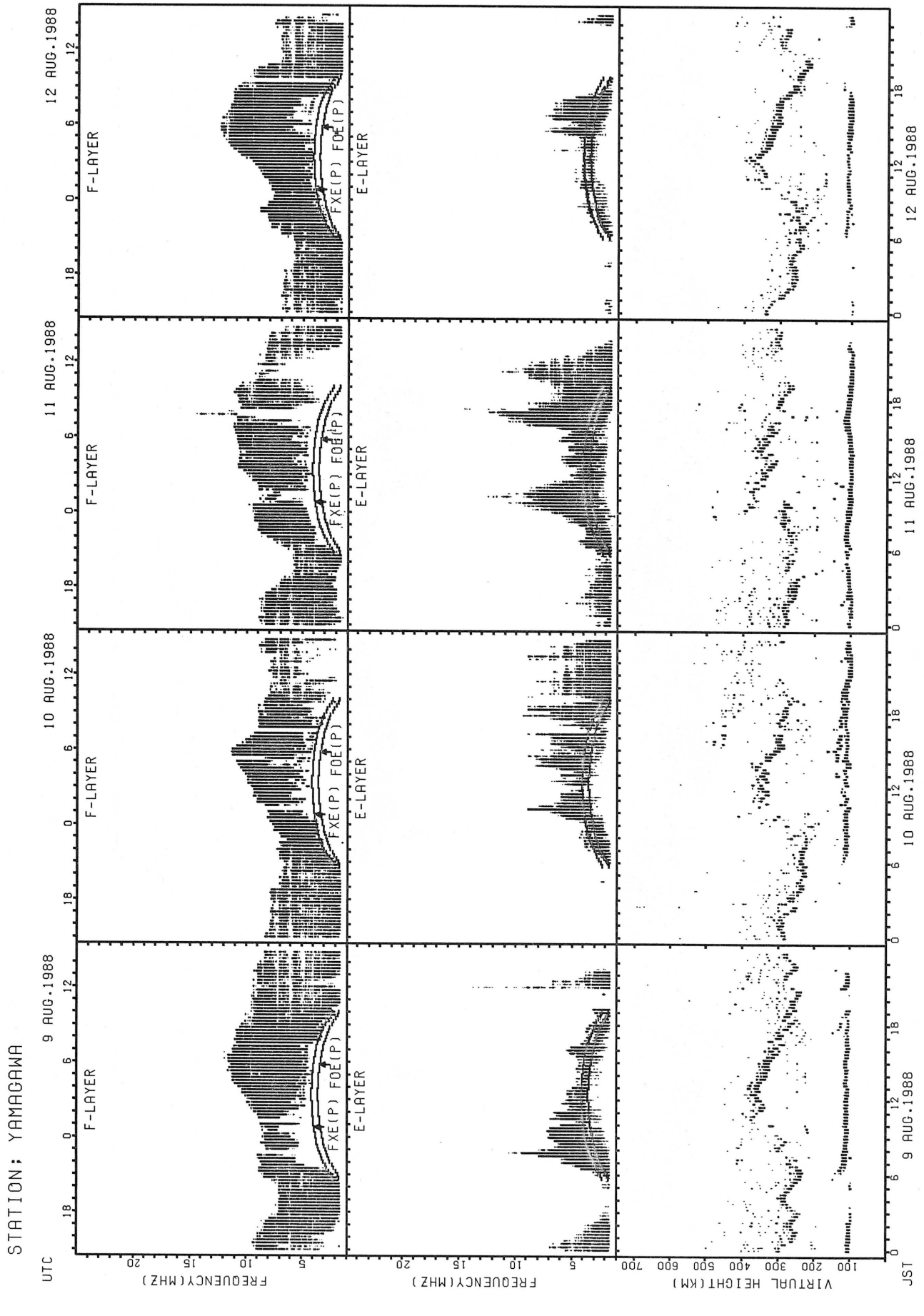
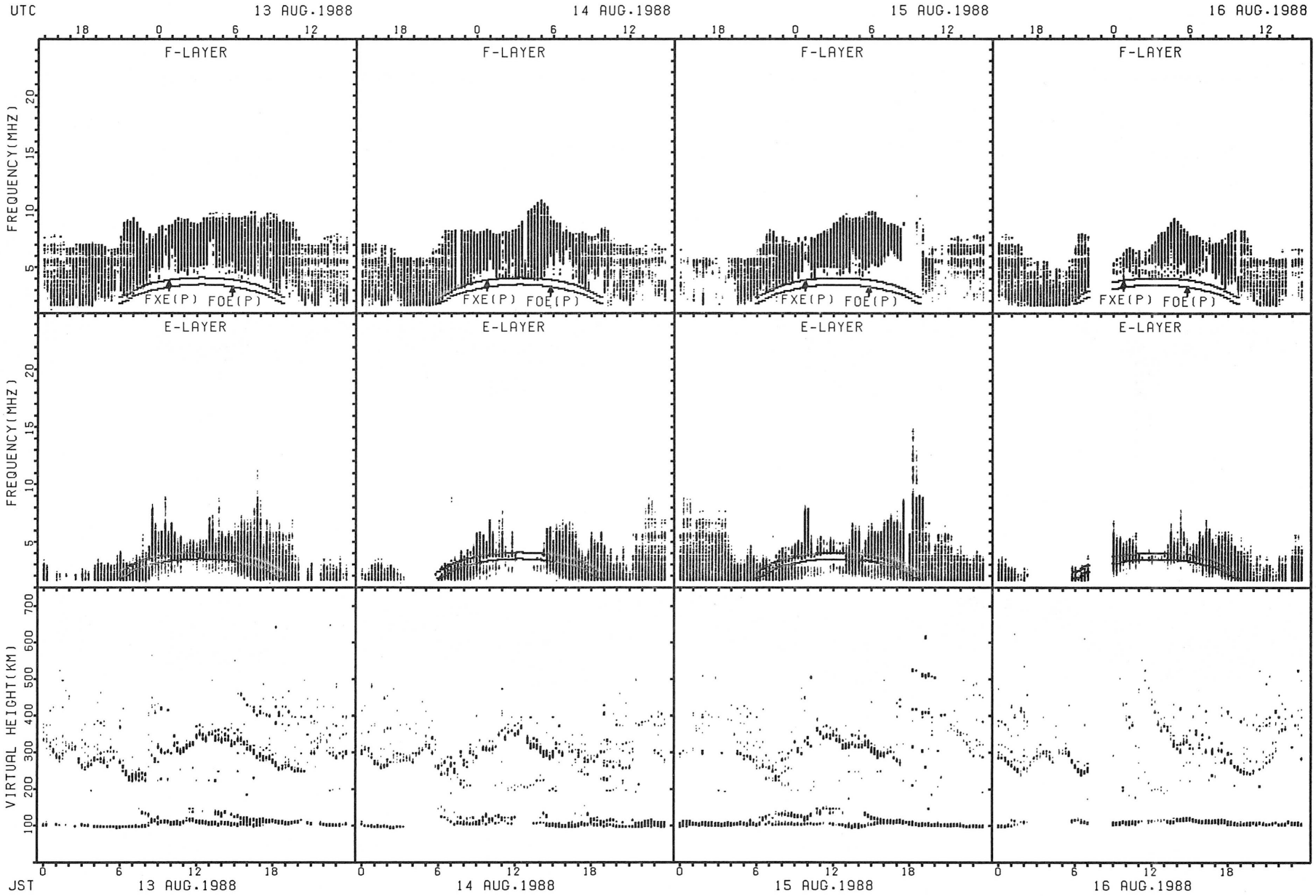


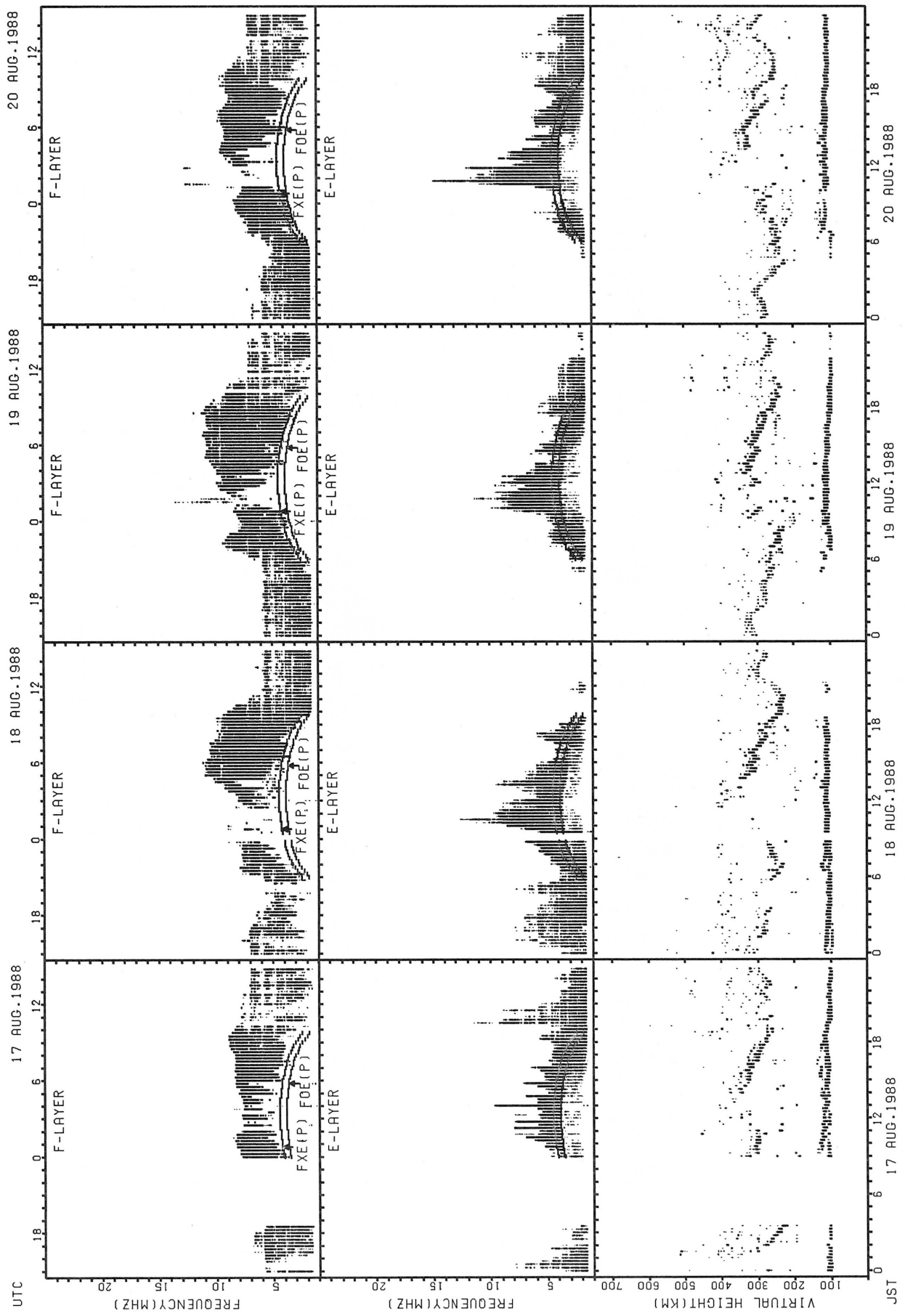
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


STATION: YAMAGAWA
UTC
9 AUG.1988
10 AUG.1988
11 AUG.1988
12 AUG.1988
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

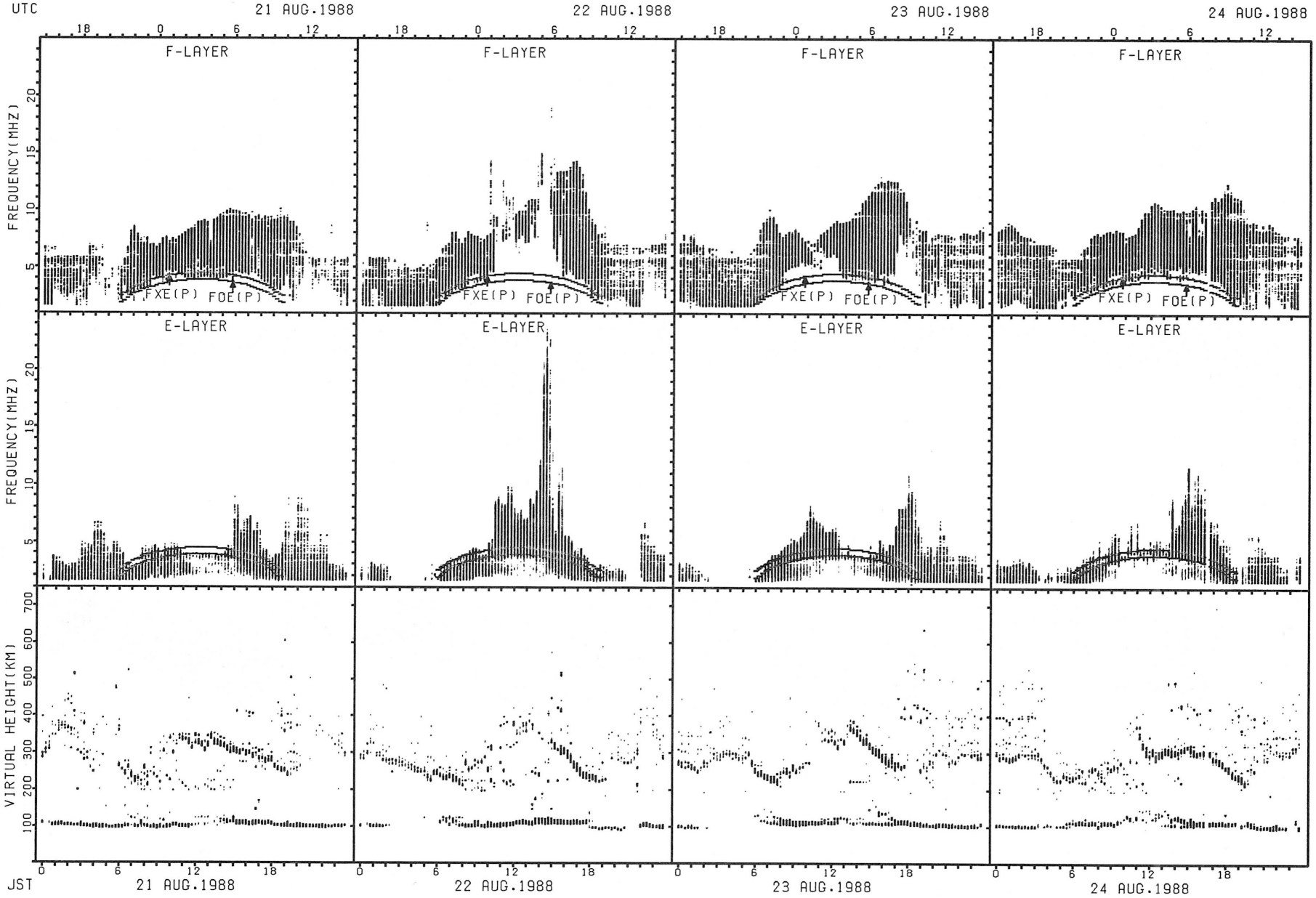
STATION: YAMAGAWA



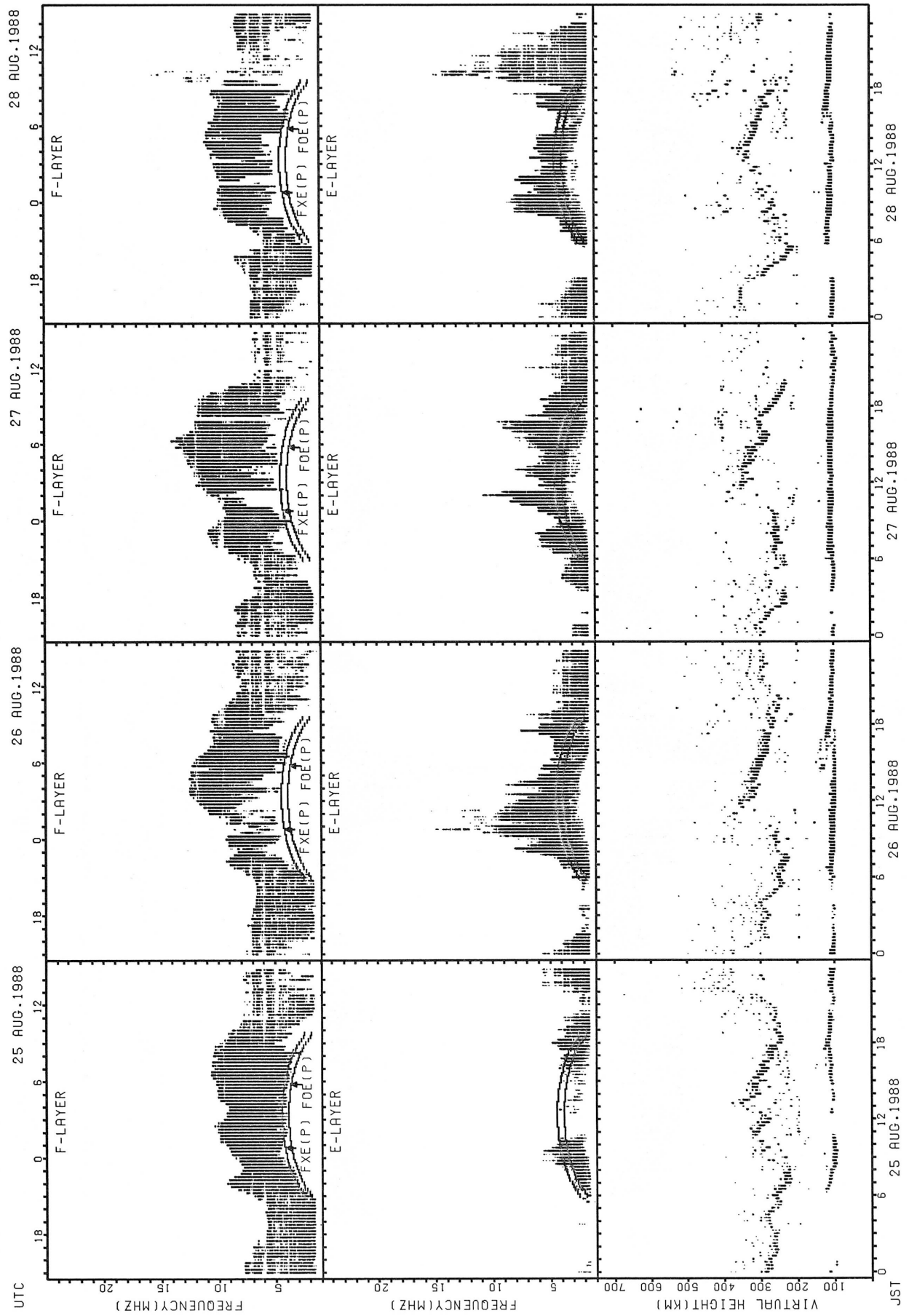
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


STATION; YAMAGAWA
UTC
17 AUG.1988
18 AUG.1988
19 AUG.1988
20 AUG.1988
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
17 AUG.1988
18 AUG.1988
19 AUG.1988
20 AUG.1988
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

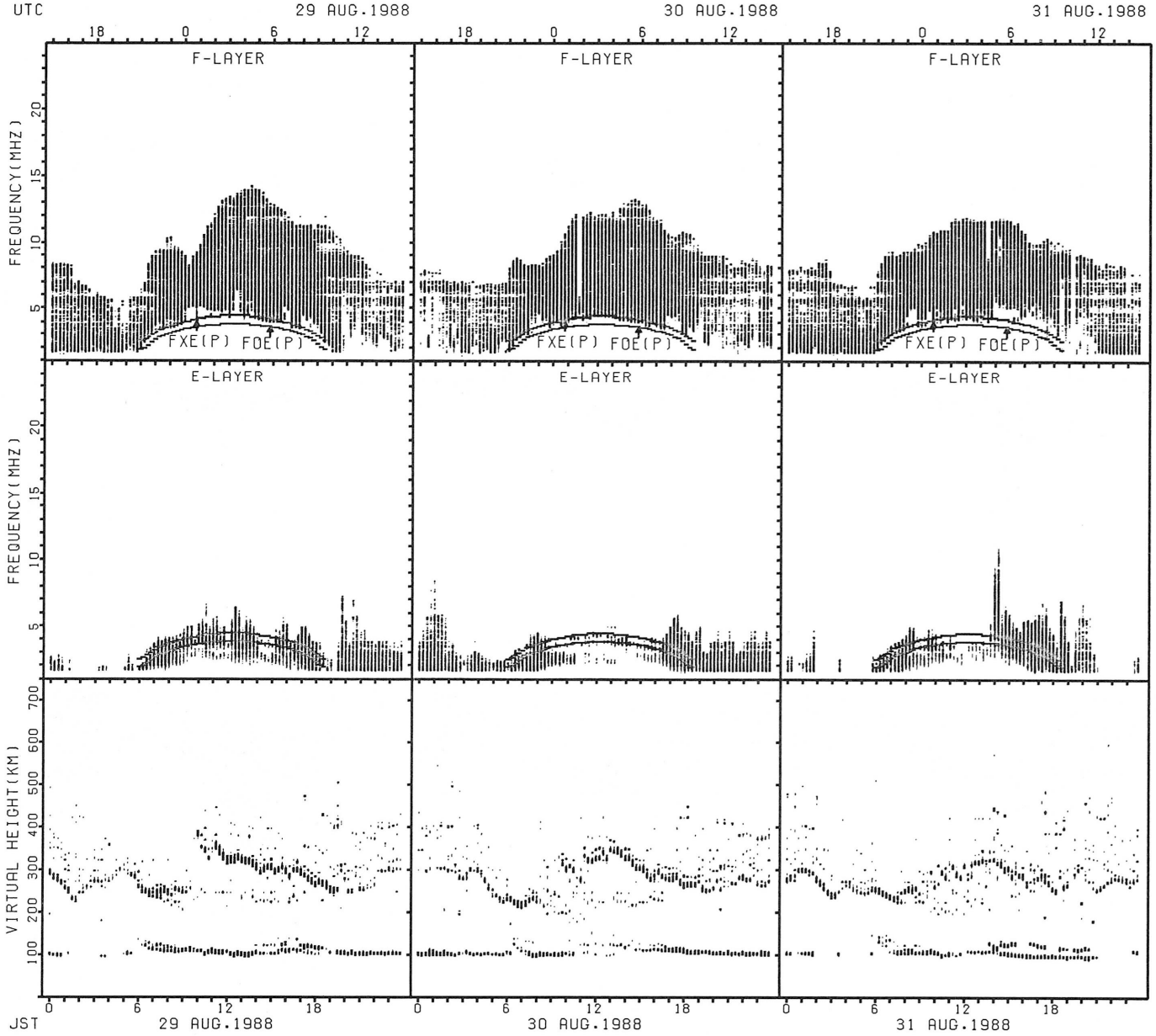
STATION; YAMAGAWA



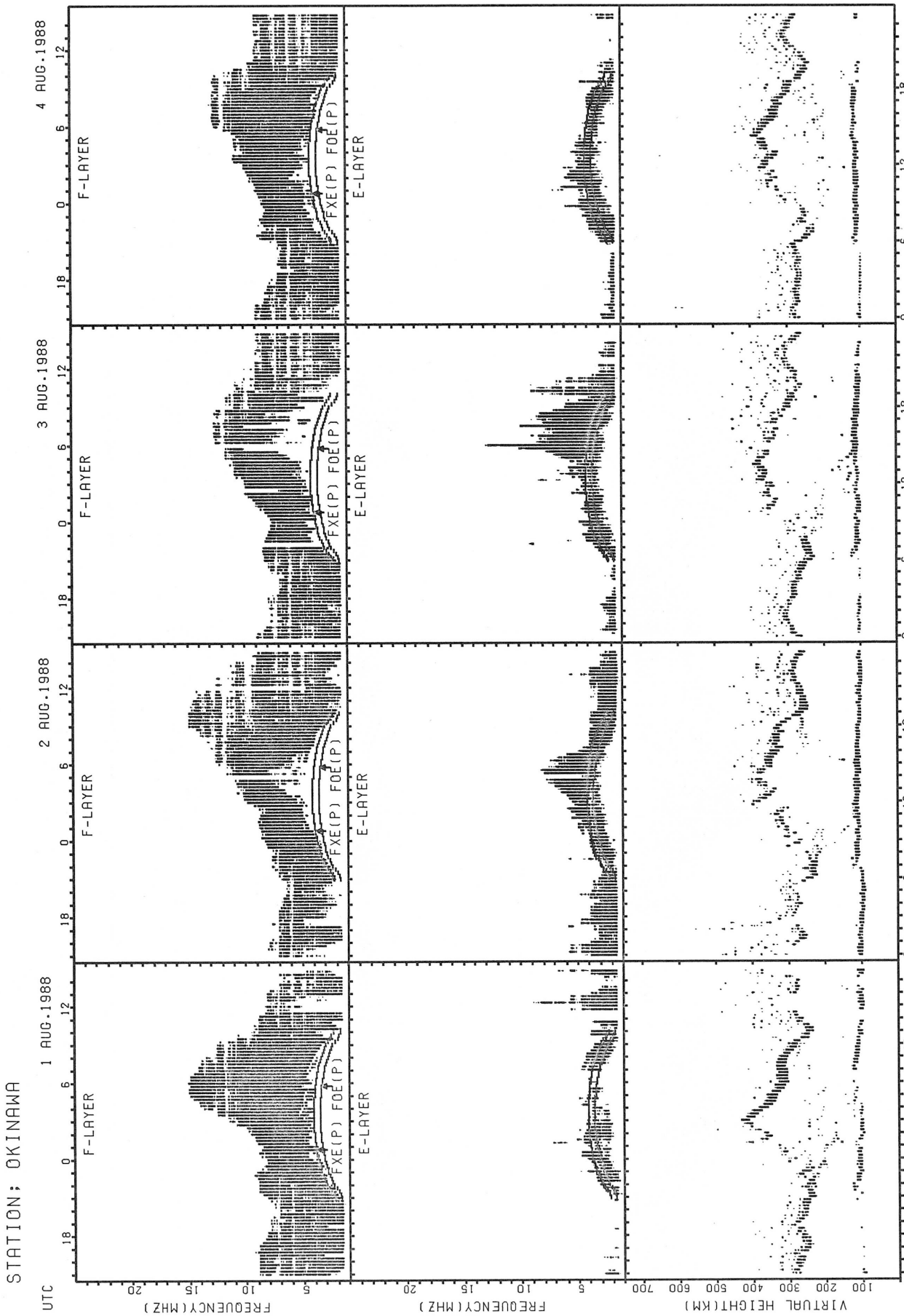
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


STATION; YAMAGAWA
UTC
25 AUG.1988
26 AUG.1988
27 AUG.1988
28 AUG.1988
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

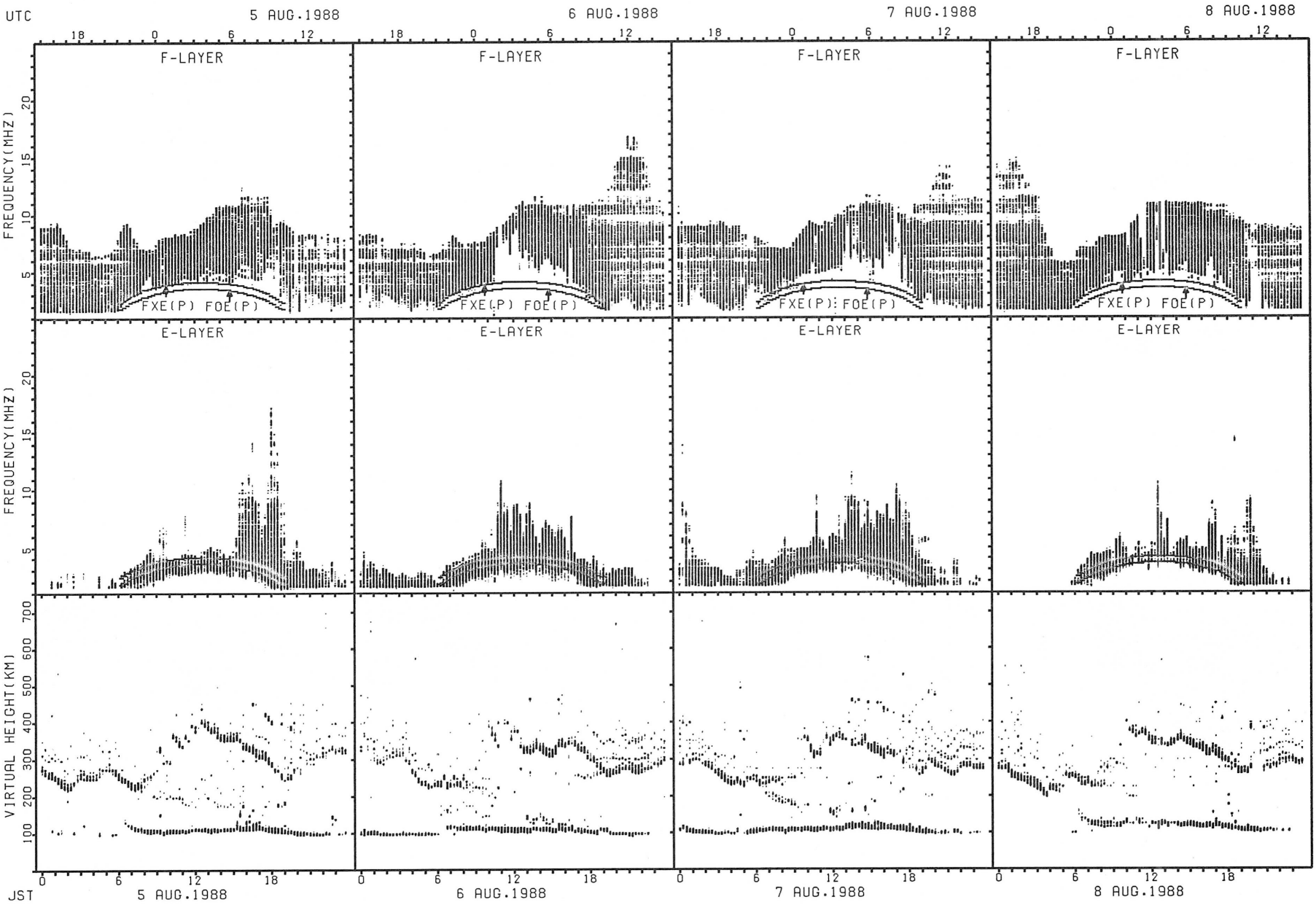
STATION; YAMAGAWA



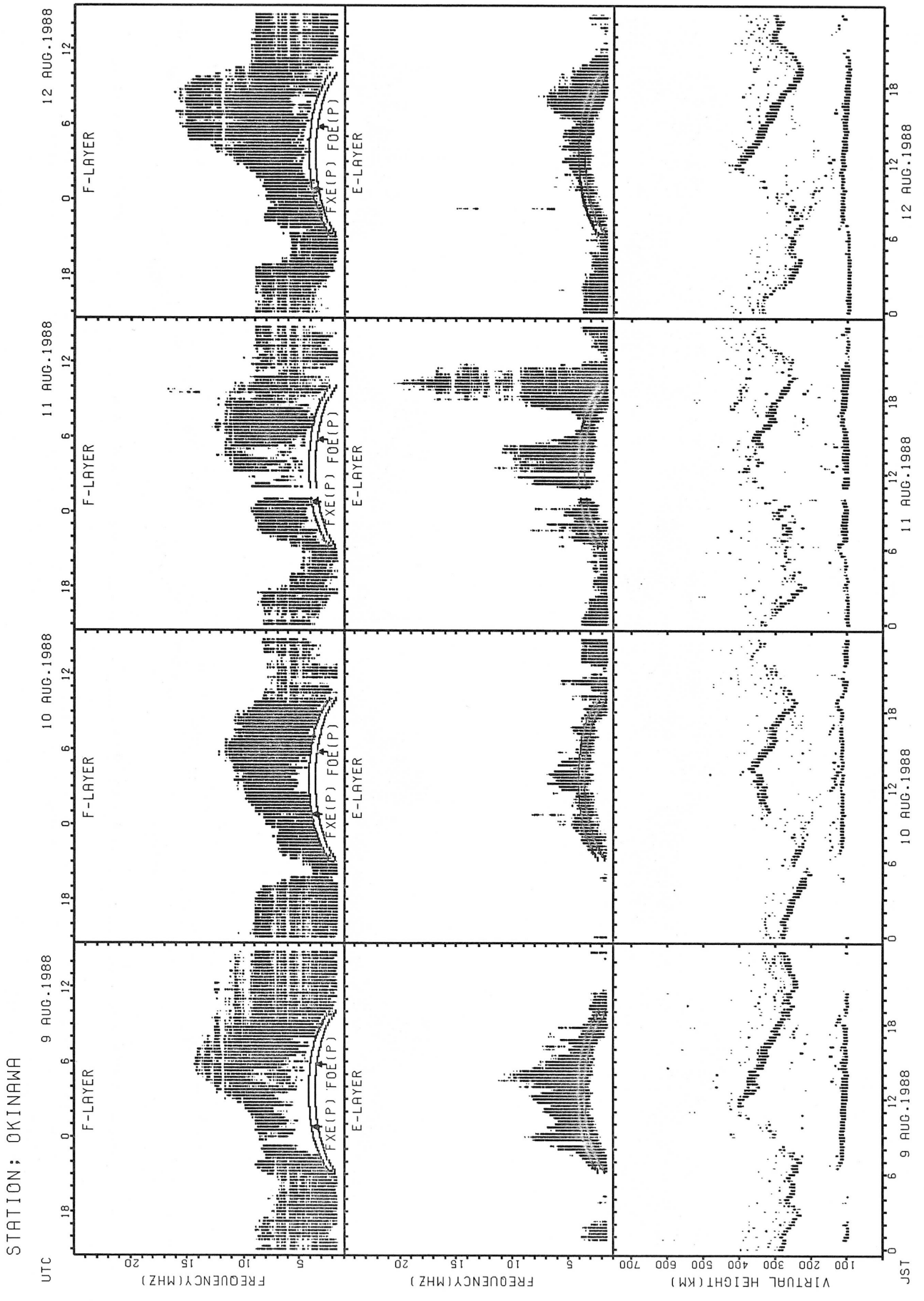
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


STATION: OKINAWA
UTC
1 AUG.1988
2 AUG.1988
3 AUG.1988
4 AUG.1988
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

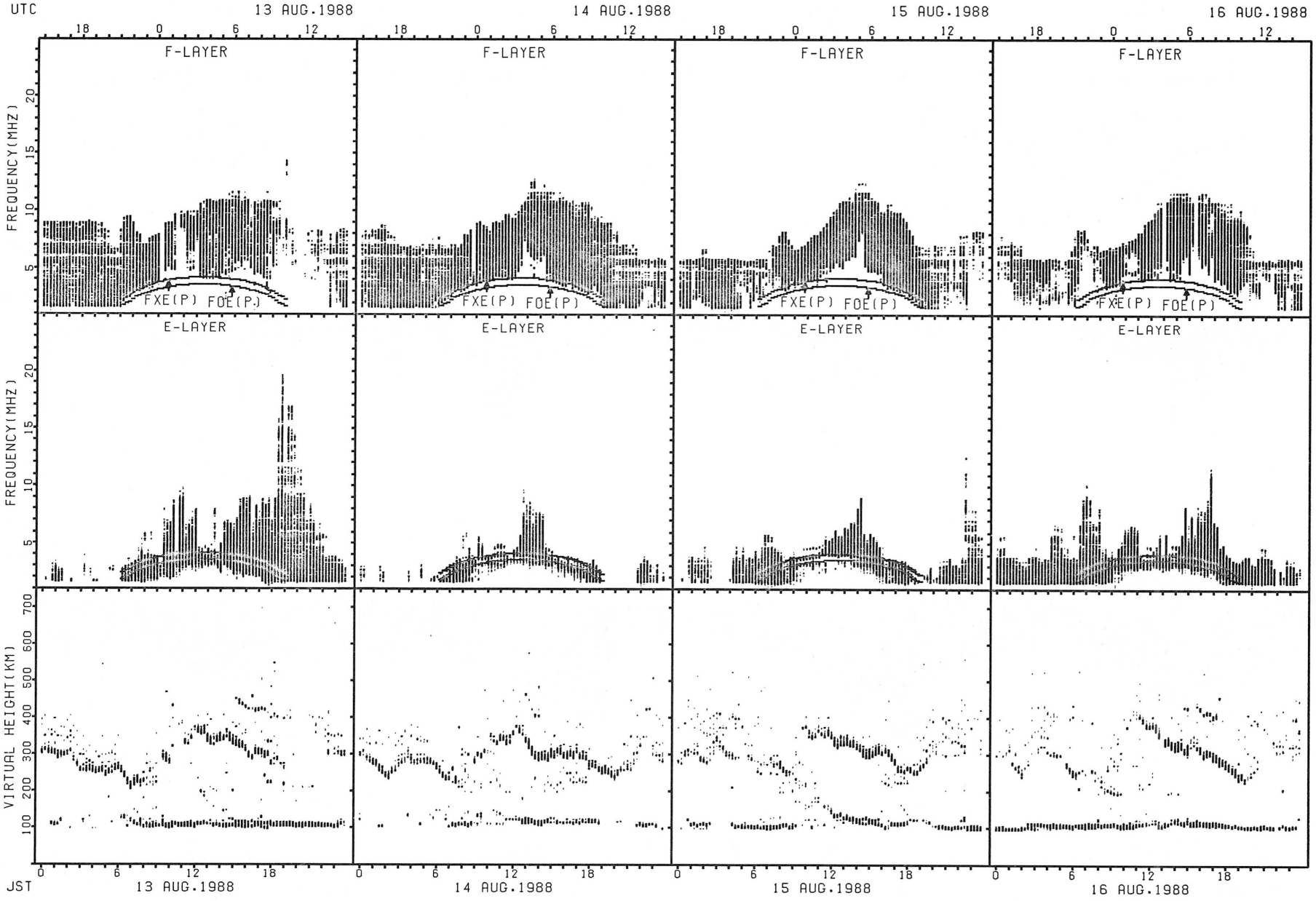
STATION: OKINAWA



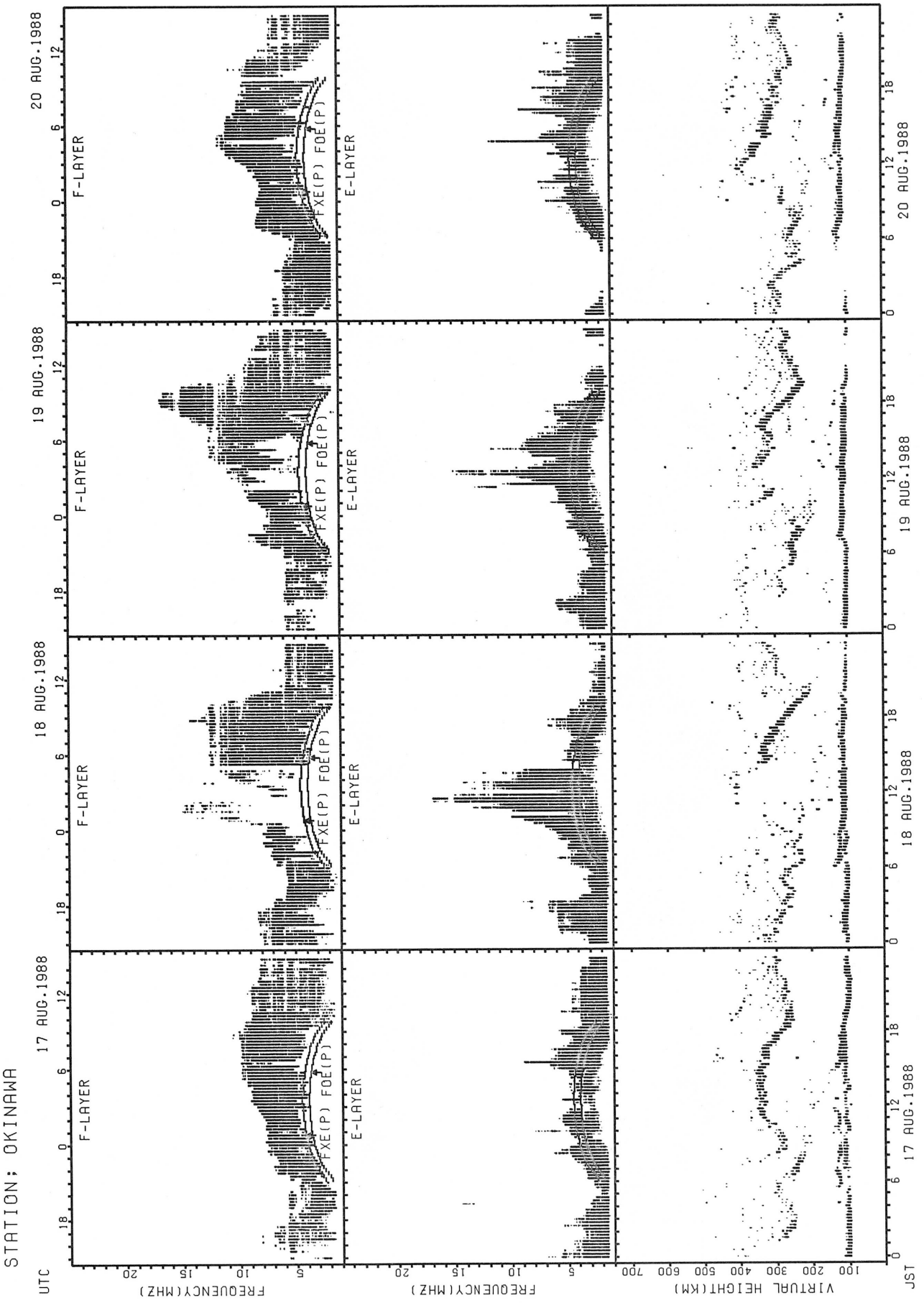
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


STATION: OKINAWA
UTC
9 AUG.1988
10 AUG.1988
11 AUG.1988
12 AUG.1988
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

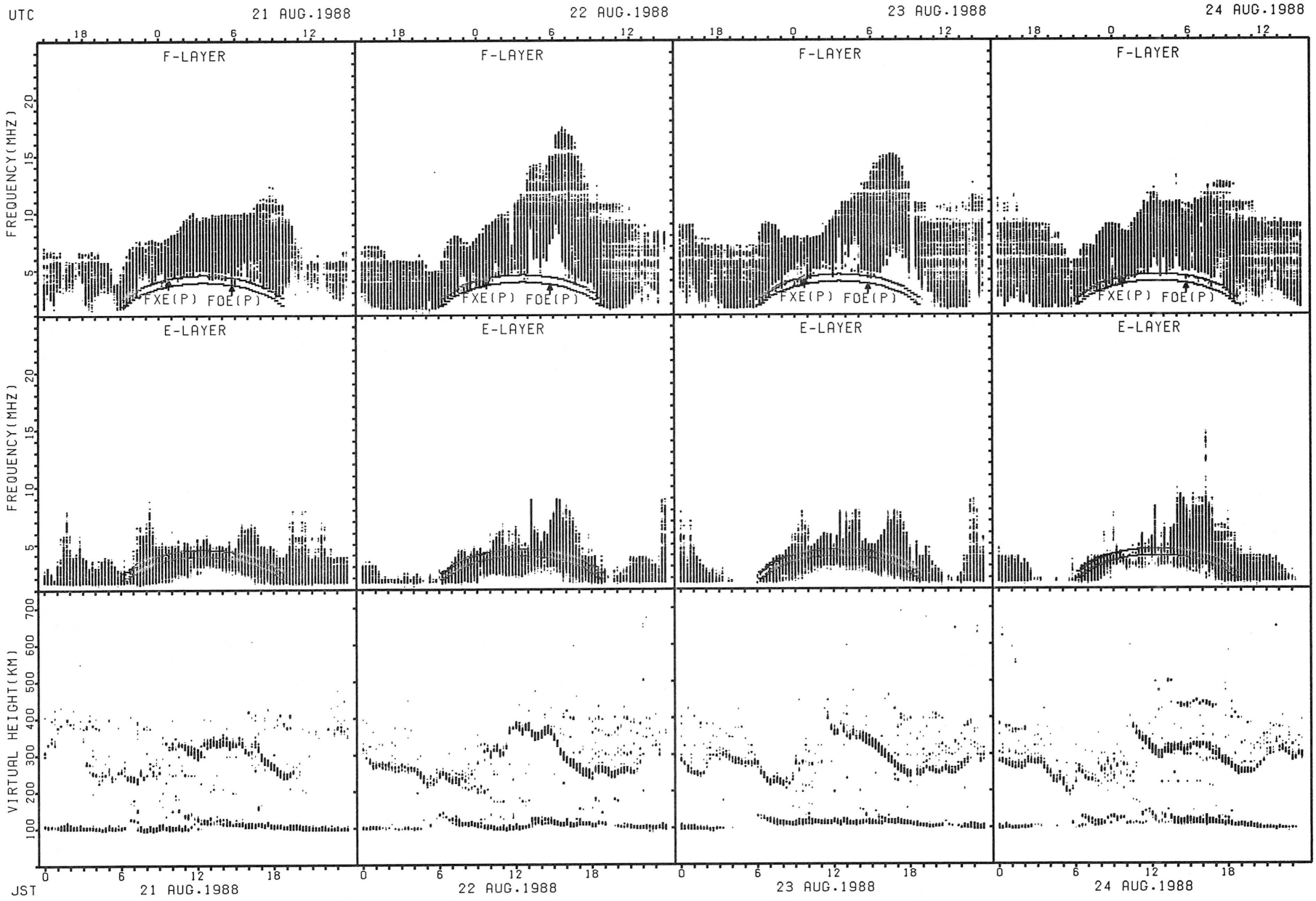
STATION; OKINAWA



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

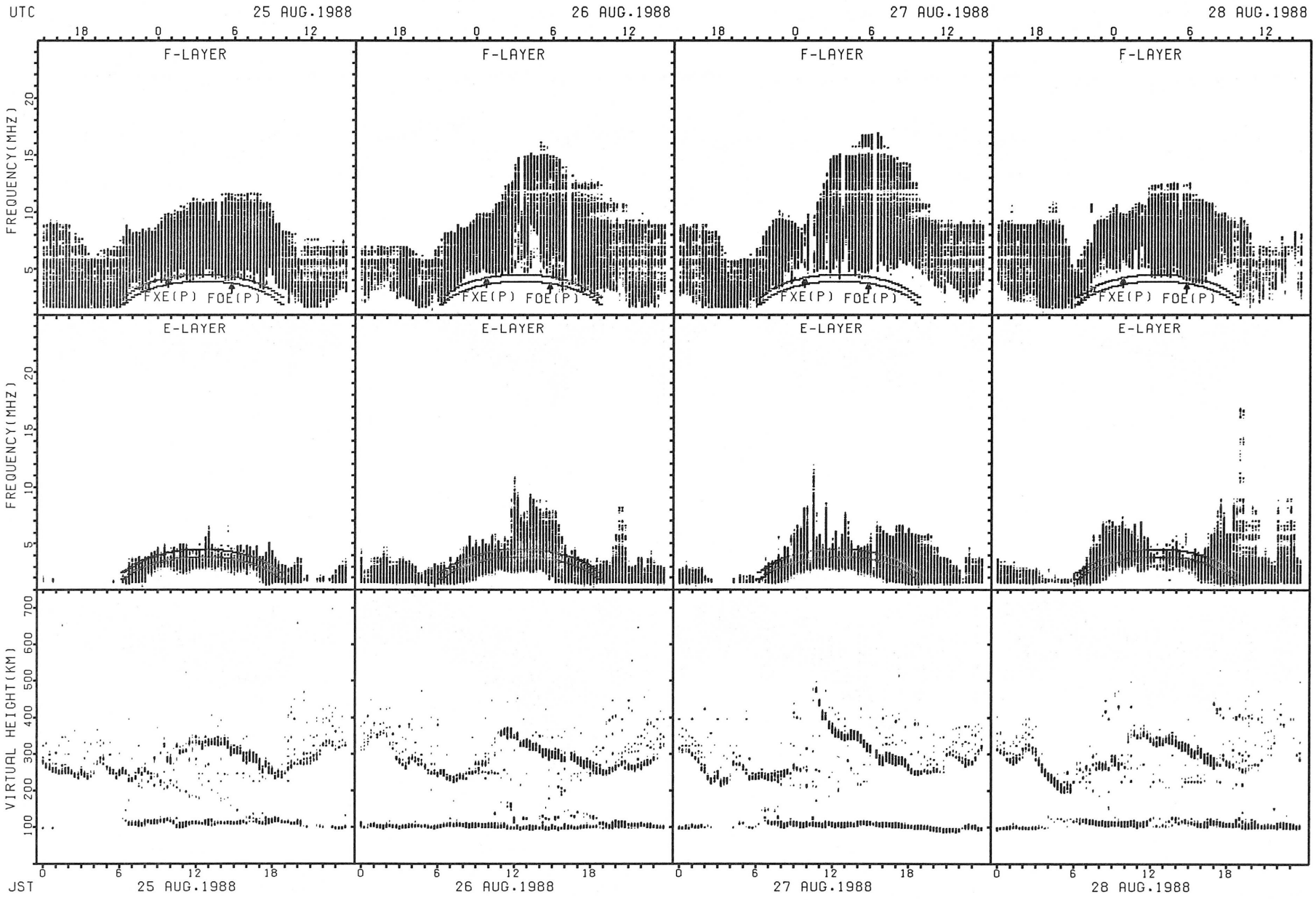

STATION: OKINAWA
UTC
17 AUG.1988
18 AUG.1988
19 AUG.1988
20 AUG.1988
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
17 AUG.1988
18 AUG.1988
19 AUG.1988
20 AUG.1988
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

STATION; OKINAWA



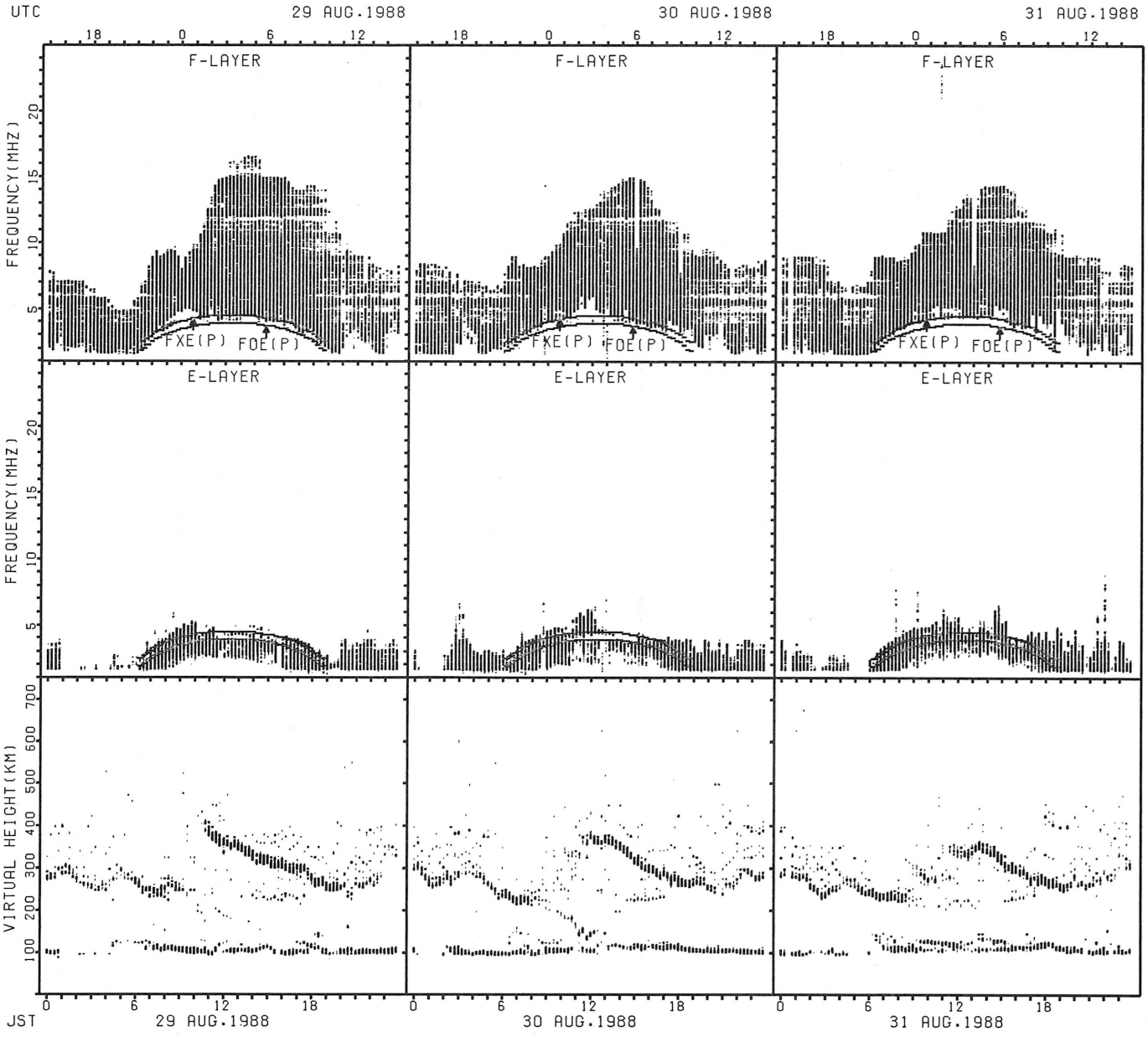
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

STATION: OKINAWA



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

STATION; OKINAWA



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

MONTHLY MEDIANS OF H'F AND H'ES
AUG. 1988 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							11	17									15	26	19	19	11	14	11	
MED							280	306									304	298	294	302	324	321	352	
U Q							290	326									316	312	310	316	342	346	378	
L Q							274	267									284	272	282	286	294	282	290	

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	21	21	21	17	15	31	27	30	29	21	21	20	25	24	28	26	31	25	24	24	25	25	26
MED	111	111	111	113	119	121	121	117	119	119	117	117	117	115	115	117	121	121	117	115	115	113	113	112
U Q	113	116	117	122	124	127	127	125	121	123	123	122	120	123	121	121	125	123	120	117	118	119	121	115
L Q	106	108	105	107	109	119	119	117	115	115	115	115	111	110	112	113	117	119	115	113	113	111	108	107

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							13	22	12								28	26	17	13				
MED							268	277	271								307	296	286	284				
U Q							288	296	280								315	308	296	307				
L Q							181	262	252								293	284	274	271				

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	25	25	21	17	18	17	30	30	30	27	30	30	27	30	30	29	31	31	30	30	29	25	24	27
MED	101	103	103	103	105	113	118	115	113	113	111	111	111	111	111	109	115	113	112	111	109	109	107	105
U Q	105	108	109	107	107	119	125	119	115	117	115	113	113	119	115	117	121	119	115	115	114	113	112	109
L Q	100	99	99	99	101	107	115	111	109	109	107	107	107	109	107	109	107	109	107	107	104	102	101	103

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		12					17	25	13								24	24	21	21	12	16	13	
MED		347					274	274	272								290	287	282	292	307	355	356	
U Q		369					311	296	291								301	300	297	316	408	379	375	
L Q		311					259	255	252								285	268	266	262	280	281	351	

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	25	23	24	20	22	22	30	30	31	30	30	30	27	26	24	28	29	27	28	30	27	26	28	27
MED	103	101	101	103	103	119	118	113	109	109	111	114	113	111	109	112	117	115	111	105	105	106	107	105
U Q	108	103	105	106	107	133	125	115	115	113	115	125	115	119	112	123	122	119	113	111	109	111	111	107
L Q	101	99	99	100	99	107	113	111	107	107	109	107	107	107	107	107	113	111	107	103	101	103	101	103

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

MONTHLY MEDIANS OF H'F AND H'ES
AUG.1988 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	15		13				13	26	25	10							14	27	27	27	15			
MED	346		330				286	250	254	252							292	290	276	276	310			
U Q	358		348				293	264	272	258							296	298	286	288	332			
L Q	334		300				253	234	244	228							282	280	264	260	292			

H'ES

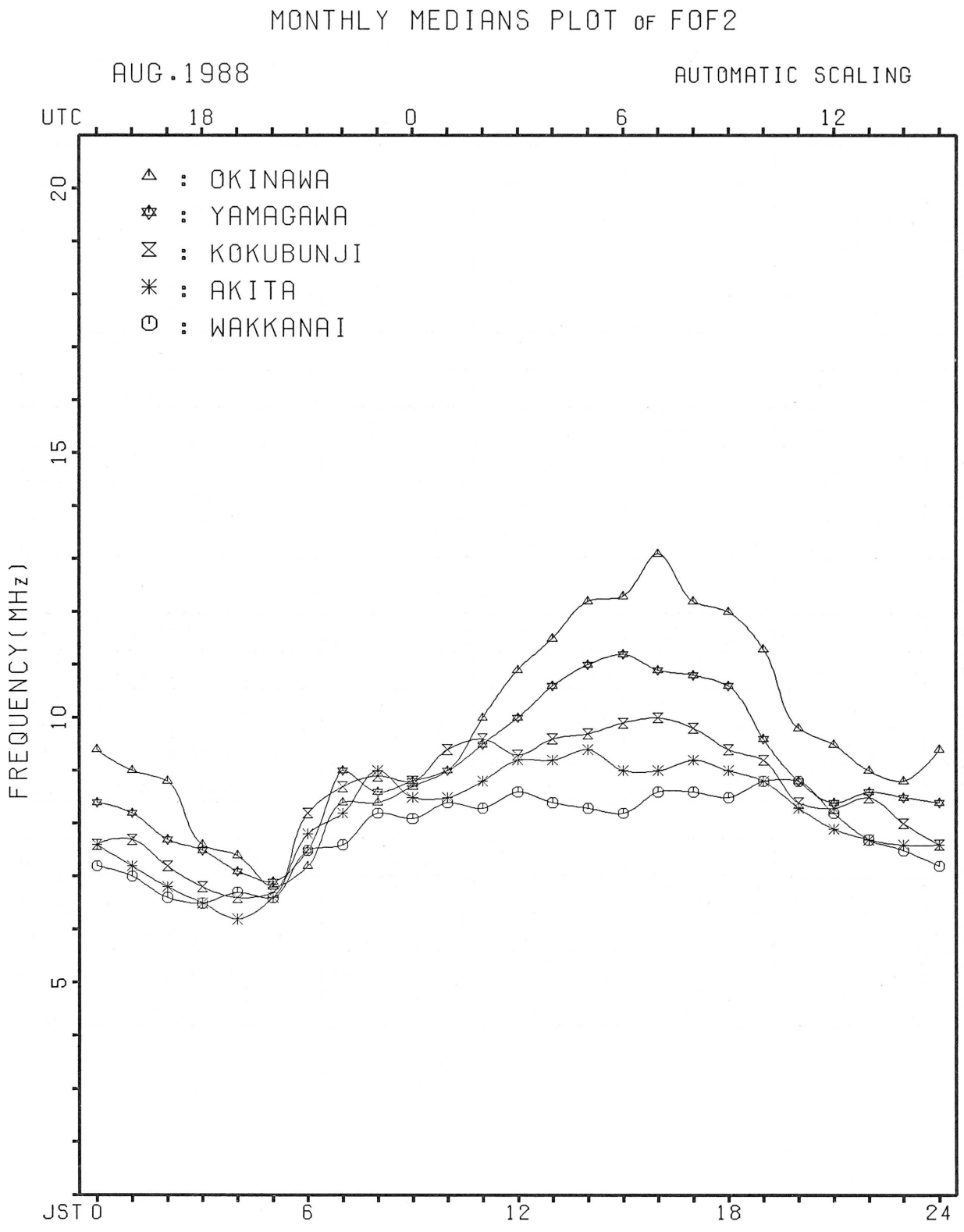
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	20	18	16	13	14	18	31	31	30	31	30	26	27	30	30	31	31	31	27	26	24	23	23
MED	105	104	105	105	105	107	112	117	113	113	111	113	114	111	116	117	117	113	113	109	107	105	105	105
U Q	108	108	109	108	107	111	115	131	121	119	119	123	121	125	121	127	125	117	117	111	111	108	107	111
L Q	101	102	101	102	100	105	103	109	107	107	107	107	111	105	107	107	113	111	109	105	101	103	103	103

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	18	18	14			12	26	23	10							14	30	31	30	19	14	13	16
MED	344	316	297	297			266	251	254	275							298	299	272	276	296	322	336	334
U Q	366	350	344	330			274	266	266	284							306	308	292	286	316	334	349	350
L Q	313	292	288	278			262	238	248	264							292	278	262	258	276	298	313	320

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	24	22	20	15	14	13	21	31	31	31	30	30	30	31	31	31	31	31	30	28	28	24	25	21
MED	102	101	103	103	103	103	111	119	115	113	113	113	123	123	119	119	117	119	115	109	105	105	105	105
U Q	108	105	104	103	107	110	130	131	127	131	127	125	137	141	131	125	121	127	119	113	110	107	107	112
L Q	99	99	99	99	99	99	101	111	109	109	107	107	111	111	113	113	113	113	111	106	102	101	100	103


MONTHLY MEDIANS PLOT OF FOF2
AUG.1988
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. 1988 | 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 79	x 79	x 70	x 66	x 64															x 82	x 80	83	x 84	S
2	x 85	x 74	x 66	x 63	x 60															x 94	x 88	x 87	x 88	S
3	x 86	x 83	x 75	x 76	x 76															x 86	x 87	x 87	x 94	x 101
4	x 83	x 79	x 78	x 77	x 68															x 94	S	S 79	x 83	x 76
5	x 75	S	x 73	x 66	x 62															x 90	x 79	x 79	x 81	x 80
6	x 78	x 73	x 71	x 76	x 80															x 77	x 80	84	x 84	x 84
7	x 78	x 75	x 78	x 72	x 74															S	x 81	x 82	x 84	x 87
8	x 84	x 80	x 83	x 84	x 75															x 89	C	x 88	96	95
9	84	x 80	x 74	x 70	x 70	73														x 90	x 90	x 89	x 87	x 83
10	x 79	x 76	x 77	x 77	x 71															x 86	0 S 82	80	x 79	x 78
11	x 78	x 77	x 75	x 71	x 68															x 89	x 89	0 x 88	x 75	x 73
12	x 74	x 77	x 72	x 68	x 64															x 90	x 78	x 77	x 93	86
13	66	71	x 70	x 66	x 67															x 85	x 75	S 76	x 76	x 74
14	x 69	x 74	x 68	x 65	x 65															x 73	x 69	x 67	x 69	x 73
15	x 66	x 56	x 54	x 52	x 53															x 74	x 69	S	x 70	x 70
16	x 69	x 63	x 59	x 51	50	52														x 72	x 67	x 65	A	x 64
17	x 60	x 55	58	x 56	x 50															A	x 76	x 71	x 72	x 71
18	x 70	x 70	68	x 62	60	59														x 78	x 71	70	x 66	63
19	63	61	65	x 64	64															x 80	x 70	x 71	x 74	x 73
20	x 73	x 68	x 66	x 62	x 57															x 92	x 73	S 70	x 69	x 69
21	x 64	x 63	x 59	x 65	x 74															x 90	x 82	x 76	x 57	69
22	x 65	x 62	x 63	x 64	64															x 67	A	x 64	x 68	x 64
23	x 63	x 62	x 59	x 56	x 56															C	C	C	C	C
24	x 71	x 71	x 67	C	x 66															x 101	x 78	x 83	x 81	x 76
25	x 78	x 74	x 70	67	x 62															x 93	x 72	x 74	77	84
26	82	77	x 74	x 67	x 61															x 99	x 87	x 87	x 91	x 93
27	x 91	x 85	x 85	x 75	x 65															x 97	x 66	A	x 69	x 61
28	x 64	x 59	x 56	x 58	x 58															0 x 84	x 78	x 78	x 75	x 76
29	x 75	x 76	x 67	x 62	x 57															0 x 100	x 97	x 82	x 80	x 75
30	x 79	x 73	x 73	x 71	x 69															x 100	x 96	x 85	x 82	x 79
31	x 73	x 73	x 74	x 71	x 65															x 93	x 91	x 86	x 84	x 82
	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	30	31	3														28	27	27	29	28
MED	x 75	x 74	x 70	x 66	x 64	59														x 90	x 79	x 80	x 80	x 76
UQ	x 79	x 77	x 74	x 71	x 68	66														x 94	x 87	x 86	x 84	x 84
LQ	x 68	x 63	x 66	x 62	x 60	56														x 81	x 72	x 72	x 72	x 70

AUG. 1988 | FXI (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

AUG. 1988 | 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	73	73	64	60	58	R 62	76	92	J R 100	106	104	114	114	113	I R 110	106	92	85	73	76	74	F 74	78	I S 82
2	79	68	60	57	54	56	66	70	76	88	86	86	I R 85	82	86	86	85	90	85	88	82	81	82	I S 81
3	80	S 77	69	70	70	71	79	86	87	86	93	R 92	94	U R 103	104	96	95	97	A	80	81	81	88	95
4	77	73	72	71	62	I S 67	81	94	92	94	103	101	101	97	100	98	92	90	94	88	I S 79	S 73	77	S 70
5	69	I S 67	67	60	56	58	69	88	91	80	75	79	A	83	89	91	92	90	87	84	73	73	75	74
6	72	67	65	70	74	75	66	64	71	70	66	I R 64	75	77	77	A	A	A	71	71	74	F 74	78	78
7	72	69	72	66	68	77	76	68	73	71	72	76	79	85	93	91	91	90	86	I S 80	75	76	78	81
8	78	J S 74	77	78	69	64	68	72	78	71	82	80	83	82	86	84	83	83	82	83	I C 84	82	F 85	F 87
9	F 75	74	68	64	S 64	F 65	74	80	84	82	87	90	95	97	99	95	93	90	87	S 84	84	83	81	77
10	73	70	S 71	71	65	67	76	65	70	77	71	77	85	U R 94	94	90	83	80	78	80	F 76	S 74	73	72
11	72	71	69	65	62	61	70	87	90	91	88	94	R 105	104	102	96	96	92	U S 90	83	83	S 82	69	J S 67
12	68	71	S 66	62	58	59	73	86	90	93	91	94	98	107	104	97	85	80	83	84	72	71	J S 87	F 75
13	F 58	F 63	S 64	60	R 61	54	70	80	71	79	83	88	74	71	74	70	78	80	78	79	69	I S 67	70	68
14	63	68	62	59	59	60	R 63	76	66	59	67	64	62	67	70	68	62	I C 63	I S 63	67	63	61	63	67
15	60	50	48	46	47	46	61	69	61	69	75	81	77	82	77	76	78	75	71	68	63	I S 68	64	64
16	63	57	53	45	F 40	F 43	52	69	62	55	E G 48	A	A	59	56	57	54	56	58	66	61	59	A	58
17	54	49	F 49	50	44	44	58	68	69	73	78	78	71	70	J R 68	73	76	74	A	A	70	65	66	65
18	64	64	F 60	56	F 48	F 51	64	77	72	71	65	75	69	76	83	86	88	83	85	72	65	F 62	60	F 55
19	F 54	F 54	F 57	J S 58	F 56	59	70	83	82	A	74	71	I R 73	75	74	C	C	C	74	74	64	65	J S 68	67
20	67	62	60	56	51	54	58	70	72	85	76	69	80	80	84	84	85	85	85	86	67	S 64	63	63
21	58	57	53	59	68	46	58	82	82	68	71	73	82	92	I C 94	I C 84	I C 75	71	S	84	76	70	J R 51	F 59
22	59	56	57	58	F 57	60	73	76	79	72	71	81	91	98	95	116	115	113	A	61	A	58	62	58
23	57	56	53	50	50	S 50	76	88	86	76	76	74	79	77	91	100	99	101	I C 89	I C 74	I C 71	I C 70	I C 70	I C 66
24	65	65	61	I C 60	60	61	I C 76	V 73	69	I C 79	79	86	86	I C 91	I C 94	I C 98	I C 92	I C 94	104	95	72	77	75	70
25	72	68	64	F 59	56	59	84	84	83	77	84	94	82	85	87	87	96	95	95	87	66	68	F 68	F 72
26	F 72	F 68	68	61	55	55	75	77	81	85	89	96	97	95	101	97	95	100	103	93	81	81	85	87
27	85	79	79	69	59	64	77	74	76	80	87	97	95	99	105	105	92	97	104	91	60	A	63	55
28	58	53	50	52	52	62	71	72	97	98	90	84	90	92	86	92	85	89	92	S 78	72	72	69	70
29	69	70	61	56	51	54	80	101	106	94	99	115	R 111	118	112	102	91	96	99	S 94	91	76	74	69
30	73	67	67	65	63	72	95	Z 87	R 91	92	120	119	116	114	108	101	95	92	95	94	90	79	76	73
31	67	67	68	65	59	62	75	91	90	96	109	114	109	105	101	93	83	85	91	87	85	80	78	76
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	31	30	29	31	31	29	29	29	27	30	30	30	30	31
MED	69	67	64	60	58	60	73	77	81	80	82	85	85	91	93	91	91	90	86	83	74	73	74	70
UQ	73	70	68	65	62	64	76	86	90	91	90	94	97	98	101	98	93	94	93	87	81	79	78	76
LQ	62	60	58	56	53	54	66	71	72	71	73	76	79	78	84	84	83	80	78	74	67	67	66	66

AUG. 1988 | FOF2 (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

AUG. 1988 | 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	U L 460	L 580	L 530	H 540	500	H 500	510	A	490	L 490	L						
2							L	L	L	L 530	510	L 550	530	540	520	510	L 480	L 450	L					
3							L	L	L	L 500	L 530	530	550	530	520	500	L 500	A	A					
4							L	L	L	A	500	580	U A 500	L	H 530	500	L 490	L	L					
5								L	U L 480	L 530	H 510	520	A	A	520	L	L 440	L 430	L					
6							L	450	480	480	510	A	510	510	510	A	A	A	A					
7							L	L	L	L	L 530	540	H 560	540	510	500	A	L	L					
8							L		L	520	530	L 500	520	520	L 530	520	A	A	A					
9							L	L	L	L	A	550	540	530	520	500	H 490	L	L					
10							L		L 490	L	H 530	530	520	530	520	A	L	L	A					
11							L	L	510	L 490	L 500	H 510	R 510	480	520	A	L 490	L	A					
12						L	L	L	L	H 550	L 500	L	530	H 540	510	L 480	L	L	L					
13							L	L 430	L 480	500	530	520	H 540	520	510	L 480	490	L	L					
14						L	400	430	U A 440	L 490	480	A	500	490	480	490	A	C	A					
15						L	L	L	A	510	530	500	500	510	490	490	L 440	L	A					
16						L 250	360	U A 410	440	A	480	A	A	460	470	450	L	L	A					
17								L	450	L 500	500	A	520	510	510	470	A	A	A					
18							L	L 440	L 470	510	L 510	A	A	A	490	480	L 440	L	L					
19							L	L	A	A	A	530	530	500	510	C	C	C						
20								L	L	A	530	A	510	530	490	480	450	A						
21						L	L	L	450	L	530	520	520	500	I C 520	I C 480	C	L	A					
22							L	L	A	L	A	L 540	540	550	520	500	A	A	A					
23							L	L	470	A	L 500	L	L 530	L 570	L 510	500	L 460	L 410	C					
24							C	L	L	C	L	L 510	L 540	C	C	C	C	C						
25							L	L	L	L 550	L 570	520	530	L 540	L 550	L 540	L	L						
26							L	A	A	L	A	540	570	550	L 540	L 530	L	L	A					
27							L	L	L 500	L	L 560	530	560	550	550	U A 500	L	L	A					
28							L	A	L	L	L	L	L 580	L 580	L 520	A	A	A	A					
29							L	L	A	A	L	L 560	L 580	L 560	L 540	L	L 550	L	A					
30							L	L	L	L 590	L 570	L	L	580	L	L	L	A	A					
31							L	L		L	L	L	L 570	L 560	L 530	L	L	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	6	13	15	23	20	27	27	23	21	13	3						
MED						L 250	380	435	480	L 510	530	530	530	530	520	500	L 490	L 430						
UQ								L 450	L 490	L 530	530	540	545	550	525	500	L 490	L 440						
LQ								430	450	500	500	515	515	510	510	480	L 450	L 420						

The Radio Research Laboratory, Japan

AUG. 1988 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

AUG. 1988 | 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	A	320	345	370	385	385	390	385	A	375	345	295	200					
2						S	270	310	355	375	380	390	A	A	A	A	340	300	A					
3						B	A	315	S	375	395	395	A	A	A	A	A	305	A					
4						B	A	A	350	375	385	390	395	380	A	A	345	A	A					
5						190	270	A	350	365	A	400	400	A	A	A	A	A	A					
6						A	260	305	340	355	375	380	A	395	U A 390	U A 365	325	A	A					
7						B	A	305	335	370	390	400	R 405	R 390	B	365	335	280	220					
8						B	A	290	340	A	A	400	B	395	390	375	345	A	A					
9						B	265	320	345	370	A	A	A	A	390	370	A	U A 295	A					
10						A	A	300	345	A	A	A	A	405	A	A	A	A	A					
11						A	240	A	A	A	380	385	R 390	380	A	A	330	A	A					
12						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
13						B	240	290	A	A	385	390	395	395	375	355	330	A	A					
14						B	235	295	330	355	A	A	A	A	S	350	320	C	A					
15						A	230	295	A	A	A	375	380	375	360	355	320	270	A					
16						B	230	A	A	A	A	A	A	A	A	340	A	A	A					
17						B	240	290	A	340	370	A	A	A	A	A	A	260	A					
18						A	240	280	A	330	A	A	A	A	A	A	305	A	A					
19						A	225	235	A	A	A	A	A	I R 380	A	C	C	C	A					
20						B	220	285	330	360	A	395	390	A	A	A	310	A	A					
21						A	A	U A 285	320	345	365	390	385	385	C	C	C	A	A					
22						B	A	285	A	A	A	A	A	A	370	340	305	A	A					
23						B	A	285	325	A	360	A	A	390	375	345	310	250	C					
24						S	C	300	A	C	370	R 390	390	C	I C 360	C	C	C	B					
25						B	235	300	340	360	370	385	B	A	A	A	310	U A 265	A					
26						B	A	A	A	A	A	A	A	A	A	350	305	250	A					
27						B	A	A	A	A	A	395	A	A	A	A	A	A	B					
28						B	A	A	A	A	A	A	R 405	400	395	365	320	265	B					
29						B	240	305	340	370	A	A	A	A	A	A	A	A	B					
30						B	205	A	A	A	375	405	410	395	385	370	335	270	B					
31						B	220	270	A	A	A	A	A	R 395	B	360	330	U A 250	B					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	17	22	15	15	14	17	12	15	10	15	19	13	2					
MED						190	240	295	340	365	378	390	392	390	380	360	325	270	210					
UQ							240	305	345	370	385	395	402	395	390	368	335	295						
LQ							230	285	332	355	370	385	390	382	370	350	310	260						

AUG. 1988 | FOE (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

AUG. 1988 | 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

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	JA 53	JA 49	JA 21	32	JA 24	23	JA 42	35	JA 51	JA 48	45	47	42	JA 49	58	49	49	G	JA 34	JA 33	JA 51	JA 27	JA 43	JA 54
2	JA 49	JA 26	JA 34	JA 22	25	ES 21	G	37	39	40	JA 51	48	JA 49	JA 54	47	JA 53	G 30	G 26	JA 31	JA 33	JA 32	JA 22	JA 23	23
3	JA 29	JA 26	JA 23	JA 36	JA 24	JA 29	JA 34	JA 32	ES 36	41	44	48	49	43	JA 67	JA 64	36	JA 67	JA 98	JA 50	JA 53	JA 57	JA 50	JA 54
4	JA 33	JA 21	JA 27	JA 20	22	EB 20	JA 40	JA 38	G	JA 54	JA 48	48	50	JA 53	JA 52	JA 39	39	JA 51	JA 30	JA 53	34	JA 22	JA 19	21
5	26	ES 15	EB 14	EB 13	EB 14	JA 28	27	JA 37	40	40	38	46	84	JA 71	JA 48	JA 48	JA 50	JA 46	JA 30	JA 22	19	21	JA 27	JA 33
6	JA 22	JA 20	JA 23	JA 20	EB 13	20	30	53	JA 48	JA 49	46	JA 58	49	42	JA 58	98	89	114	72	JA 49	JA 76	JA 53	JA 35	JA 22
7	21	JA 19	EB 13	JA 27	JA 23	JA 24	JA 33	JA 34	39	38	50	JA 53	G	43	44	47	JA 78	JA 46	27	JA 54	JA 49	JA 42	JA 28	24
8	JA 48	23	JA 26	20	JA 26	JA 34	JA 38	37	45	45	JA 42	48	47	JA 52	43	50	JA 104	JA 87	JA 91	JA 52	C	JA 48	JA 43	JA 27
9	JA 52	JA 34	JA 24	JA 24	JA 24	20	33	JA 47	JA 47	51	JA 70	JA 53	JA 51	JA 54	41	50	36	33	JA 28	JA 23	JA 36	JA 28	JA 18	JA 19
10	EB 14	EB 13	EB 15	EB 14	EB 12	20	JA 29	36	41	JA 57	JA 53	JA 67	JA 49	JA 45	JA 72	JA 56	JA 37	JA 46	JA 43	JA 53	JA 84	JA 49	JA 64	JA 51
11	JA 50	JA 46	JA 41	JA 41	JA 44	JA 23	JA 37	JA 48	JA 47	JA 45	G 34	G 35	G	G	JA 50	JA 84	G	JA 66	JA 41	JA 57	JA 24	JA 47	JA 50	JA 34
12	JA 36	JA 33	JA 21	EB 16	EB 14	EB 17	28	37	JA 44	JA 46	40	JA 54	40	JA 51	JA 47	JA 45	JA 75	JA 45	JA 38	JA 54	JA 38	JA 50	JA 51	JA 41
13	JA 35	JA 46	JA 22	18	21	EB 14	JA 27	34	JA 47	JA 42	JA 55	51	44	50	JA 51	39	JA 79	JA 63	JA 40	JA 42	JA 32	ES 17	EB 15	JA 30
14	JA 53	JA 42	JA 41	JA 25	JA 22	JA 23	26	JA 40	JA 53	40	JA 43	JA 55	41	41	37	G	JA 45	C	JA 69	JA 41	JA 70	JA 63	JA 85	JA 63
15	JA 35	JA 42	JA 19	JA 17	JA 21	20	26	33	JA 55	JA 61	JA 89	JA 88	46	48	44	JA 50	JA 49	JA 44	JA 41	JA 42	JA 35	47	JA 26	EB 15
16	EB 15	EB 13	EB 14	EB 13	EB 14	18	JA 32	JA 56	41	JA 53	JA 87	66	JA 79	JA 47	43	G	36	33	45	JA 58	JA 38	JA 51	JA 62	JA 42
17	JA 33	JA 32	JA 26	JA 36	JA 23	20	G 21	34	JA 40	38	43	JA 57	48	JA 43	JA 47	JA 53	JA 92	JA 77	JA 128	JA 104	JA 64	JA 59	JA 51	JA 43
18	JA 37	JA 45	JA 65	JA 69	JA 78	JA 23	29	37	JA 52	JA 53	JA 46	JA 59	59	JA 84	JA 54	34	JA 39	27	26	JA 25	JA 22	EB 14	JA 17	JA 50
19	JA 61	JA 49	JA 36	JA 29	JA 44	JA 24	25	35	JA 53	JA 81	JA 67	45	41	G	38	C	C	C	JA 48	JA 52	JA 33	JA 24	24	JA 32
20	JA 23	JA 22	JA 23	JA 19	JA 20	22	26	32	42	JA 54	JA 59	JA 73	JA 51	JA 98	JA 56	JA 61	JA 70	JA 53	JA 42	JA 26	26	JA 50	JA 51	JA 83
21	JA 50	JA 51	JA 27	JA 48	JA 21	JA 16	JA 26	37	JA 47	38	41	47	JA 61	46	C	C	C	33	72	JA 53	26	26	JA 44	JA 50
22	JA 51	JA 46	JA 37	JA 36	JA 51	JA 28	JA 30	37	JA 53	JA 79	JA 83	JA 57	JA 47	50	49	41	JA 52	JA 114	JA 173	JA 61	JA 106	JA 49	JA 47	JA 42
23	JA 65	JA 25	JA 22	JA 20	EB 14	JA 18	29	JA 44	JA 46	JA 62	38	40	41	45	39	39	33	32	C	C	C	C	C	C
24	JA 28	JA 39	JA 31	C	JA 22	ES 16	C	33	JA 50	C	39	44	46	C	C	C	C	C	JA 27	JA 43	EB 14	JA 44	JA 34	EB 15
25	EB 16	EB 14	19	EB 13	JA 25	JA 29	G	G 23	G 26	G 29	G 31	G 35	EB 51	JA 41	JA 52	JA 51	35	30	JA 35	JA 12	JA 42	JA 43	JA 50	64
26	JA 54	JA 50	JA 33	31	JA 33	JA 23	JA 30	JA 54	JA 87	JA 56	94	JA 63	50	JA 48	38	G 32	38	JA 53	JA 57	JA 33	JA 35	JA 52	JA 52	JA 54
27	JA 30	JA 23	JA 25	JA 23	22	JA 18	JA 30	JA 40	36	JA 49	JA 42	G	JA 53	JA 42	JA 65	JA 57	JA 57	JA 39	JA 57	JA 51	JA 51	JA 84	JA 52	28
28	23	JA 33	JA 30	JA 22	ES 20	EB 15	JA 37	JA 53	JA 62	JA 44	JA 48	JA 48	43	43	JA 60	JA 81	JA 86	JA 62	93	JA 110	JA 52	JA 33	JA 30	JA 41
29	JA 29	JA 19	JA 18	20	EB 14	23	27	37	JA 69	JA 50	48	40	JA 44	JA 51	40	JA 40	JA 37	JA 36	JA 39	JA 84	JA 85	37	JA 25	JA 21
30	23	EB 14	JA 17	JA 45	JA 25	JA 18	24	31	JA 52	36	G	G	44	42	G	G	35	JA 43	JA 43	JA 70	JA 66	JA 44	JA 43	23
31	JA 17	EB 15	20	EB 14	19	19	25	33	JA 42	JA 45	JA 44	JA 45	JA 44	G 34	EB 43	G 26	36	JA 45	25	JA 49	JA 22	JA 37	JA 51	JA 27
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	30	31	31	30	31	31	31	30	29	28	28	28	30	30	29	30	30	30
MED	JA 33	JA 26	JA 23	JA 22	JA 22	20	29	37	JA 47	JA 47	JA 46	48	47	JA 46	47	48	JA 42	JA 46	JA 42	50	JA 38	JA 46	JA 44	JA 34
UQ	JA 50	JA 44	JA 30	JA 32	JA 25	JA 23	JA 33	JA 40	JA 52	JA 54	JA 54	JA 57	50	JA 51	JA 54	JA 54	JA 72	JA 62	JA 69	JA 54	JA 53	JA 51	JA 51	JA 50
LQ	JA 23	JA 20	JA 20	18	20	18	26	34	40	40	42	45	44	42	43	39	36	33	JA 31	JA 33	JA 32	27	26	JA 23

AUG. 1988 | FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

AUG. 1988 | 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

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	30	28	17	22	17	21	32	34	41	41	43	43	41	43	55	46	46	G	32	28	38	18	19	21
2	29	17	19	17	17	E S 21	G	35	38	39	48	45	42	49	40	48	G 29	G 23	25	23	20	18	18	E B 16
3	23	19	17	17	16	23	26	G 23	E S 36	39	42	42	45	41	45	42	35	60	A A 98	42	44	28	31	25
4	26	16	17	E B 14	E B 14	E B 20	27	32	G	48	45	46	50	50	41	39	39	32	24	37	U S 34	19	E B 15	E S 19
5	18	E S 15	E B 14	E B 13	E B 14	14	25	32	38	40	38	42	A A 84	62	38	44	34	31	24	19	E B 14	E B 15	18	22
6	18	16	17	E B 13	E B 13	18	28	42	38	46	41	54	45	42	41	A A 98	A A 89	A A 114	63	26	50	29	22	16
7	E B 14	E B 15	E B 13	16	16	17	28	26	37	37	46	41	G	41	43	45	49	32	G	34	43	E B 14	E B 15	17
8	18	16	E B 12	E B 13	E B 13	20	25	32	37	42	42	43	46	50	43	42	78	67	37	28	C	E B 14	29	E B 14
9	19	20	E B 14	E B 13	16	E B 15	28	34	43	48	53	44	49	49	40	47	35	30	24	20	29	24	E B 13	17
10	E B 14	E B 13	E B 15	E B 14	E B 12	17	26	32	37	41	39	47	42	G 35	46	51	35	29	33	27	31	35	27	27
11	21	38	30	18	26	17	32	37	33	37	G 29	G 32	G	G	43	52	G	36	39	27	18	27	23	21
12	21	21	17	E B 16	E B 14	E B 17	24	34	35	40	39	46	39	39	43	35	32	28	23	38	20	29	24	25
13	22	34	14	E B 14	E B 14	E B 14	18	32	41	37	41	41	G	41	G 29	37	35	33	21	22	26	E S 17	E B 15	E B 14
14	22	25	22	17	16	16	25	35	45	35	38	52	39	37	37	G	44	C	U S 44	34	31	14	19	22
15	19	E B 13	E B 13	E S 16	E B 14	18	25	G	42	43	40	43	41	41	39	41	41	36	34	29	28	40	19	E B 15
16	E B 15	E B 13	E B 14	E B 13	E B 14	16	26	41	36	47	42	A A 66	A A 79	42	41	G	33	29	35	22	32	38	A A 62	22
17	20	18	18	32	19	E B 16	G 19	31	36	36	41	53	39	39	42	38	62	68	A A 128	A A 104	22	27	26	29
18	27	19	21	34	23	18	26	34	39	47	42	56	55	62	46	32	G 27	26	20	20	20	E B 14	E B 14	19
19	29	30	21	20	29	17	25	32	49	A A 81	61	42	40	G	36	C	C	C	27	29	22	23	E B 15	E B 15
20	17	17	18	E B 14	E B 14	22	24	31	39	46	47	51	41	44	44	40	43	41	29	22	19	20	31	18
21	19	20	17	26	E B 15	15	24	26	38	35	40	44	45	43	C	C	C	33	50	27	17	18	27	22
22	40	19	19	28	17	22	29	32	48	37	61	48	41	40	43	38	50	45	A A 173	46	A A 106	35	28	27
23	23	16	17	18	E B 14	E B 15	26	38	40	53	38	39	39	40	39	37	33	30	C	C	C	C	C	C
24	20	20	21	C	19	E S 16	C	32	34	C	39	43	42	C	C	C	C	C	23	20	E B 14	19	25	E B 15
25	E B 16	E B 14	E B 15	E B 13	E B 15	E B 15	G	G 21	G 25	G 27	G 31	G 34	E B 51	39	46	36	33	30	33	18	22	25	23	41
26	39	35	28	31	24	20	25	52	67	48	65	45	47	42	38	G 30	37	36	56	28	29	26	34	21
27	24	20	23	20	E B 15	E B 15	25	36	35	44	40	G	48	40	49	50	41	34	55	48	32	A A 84	48	18
28	17	22	23	E B 15	E S 20	E B 15	29	50	51	40	42	45	43	42	48	60	67	58	51	U S 52	27	23	19	26
29	21	E B 16	E B 14	E B 15	E B 14	E B 19	26	36	66	47	42	40	42	46	40	38	35	30	31	69	20	31	20	17
30	E B 15	E B 14	16	E B 13	19	18	24	31	36	36	G	G	44	42	G	G	G	40	34	54	39	27	21	E B 15
31	E B 14	E B 15	E B 13	E B 14	E B 15	E B 15	25	32	41	41	42	44	42	G 33	E B 43	G 26	35	43	23	44	21	E B 15	20	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	31	31	30	31	31	30	31	31	30	31	31	31	30	29	28	28	28	30	30	29	30	30	30
MED	20	18	17	E 16	E B 15	16	25	32	38	41	42	44	42	42	42	40	35	33	33	28	27	24	22	19
UQ	24	20	20	20	18	19	27	36	42	47	44	46	46	44	44	46	45	42	50	42	32	29	27	22
LQ	18	E 16	E B 14	E B 14	E B 14	E B 15	24	32	36	37	39	42	40	39	39	36	33	30	24	22	20	18	18	E E 16

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AUG. 1988 | FBES (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1988 | 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

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	15	13	13	13	14	18	14	18	17	23	23	29	27	24	38	32	28	18	15	16	15	15	15	15
2	14	13	13	13	14	E S 21	16	16	20	24	18	20	26	26	21	21	18	15	14	15	15	14	13	16
3	14	14	14	13	13	15	16	17	E S 36	24	25	25	30	38	24	19	21	16	16	14	14	16	15	14
4	14	13	13	14	14	20	16	14	18	20	30	26	29	23	22	20	17	17	15	14	E S 22	14	15	E S 19
5	15	E S 15	14	13	14	13	16	17	18	18	22	27	32	25	21	19	18	15	15	14	14	15	15	13
6	15	14	13	13	13	13	15	16	18	18	21	25	23	26	23	22	16	17	13	14	14	13	14	13
7	14	15	13	15	13	14	15	16	19	20	23	26	29	30	42	21	16	14	15	14	15	14	15	15
8	15	14	12	13	13	14	14	16	18	34	34	28	42	32	24	24	18	17	17	14	C	14	14	14
9	14	13	14	13	13	15	15	16	18	18	26	25	28	26	26	21	20	15	13	E S 18	13	14	13	13
10	14	13	15	14	12	13	15	17	18	24	22	25	32	28	26	19	17	17	15	15	16	15	15	14
11	15	13	15	13	13	14	14	16	16	13	21	24	24	20	21	18	18	13	17	14	14	14	14	15
12	15	13	14	16	14	17	15	16	18	22	25	25	24	25	23	20	18	15	14	14	15	13	15	14
13	14	14	14	14	14	14	13	15	17	17	19	22	21	17	22	18	15	15	16	15	16	E S 17	15	14
14	14	14	13	15	14	14	15	16	17	18	18	22	17	22	E S 27	20	17	C	14	14	14	13	13	15
15	14	13	13	E S 16	14	14	14	15	15	16	19	20	19	18	20	15	16	14	15	13	14	E S 18	15	15
16	15	13	14	13	14	14	15	15	17	21	23	26	23	20	21	21	18	15	16	14	13	15	15	13
17	15	13	13	15	13	16	14	13	16	17	19	24	22	18	33	16	15	13	13	16	15	14	14	15
18	13	13	15	15	14	14	14	16	16	20	19	28	27	25	21	19	17	15	15	14	13	14	14	14
19	14	15	13	14	15	13	14	14	16	20	21	21	24	22	18	C	C	C	13	15	14	13	15	15
20	14	16	15	14	14	16	18	16	20	20	19	24	24	23	17	16	17	15	15	14	15	15	14	14
21	14	15	14	14	15	13	15	16	16	17	21	25	22	22	C	C	C	16	14	14	15	16	14	13
22	16	13	13	14	14	15	14	13	17	20	22	23	21	22	17	17	17	15	15	15	16	15	15	14
23	16	14	13	14	14	15	15	16	16	18	22	19	21	23	20	19	17	14	C	C	C	C	C	C
24	14	13	15	C	14	E S 16	C	18	17	C	24	25	28	C	C	C	C	C	15	14	14	14	16	15
25	16	14	15	13	14	15	16	17	18	21	23	25	51	22	25	19	17	15	15	13	14	E S 16	15	14
26	15	14	13	14	15	13	15	16	17	21	26	25	23	22	24	19	16	13	15	12	14	14	16	13
27	15	14	15	13	15	15	13	15	16	22	23	28	25	23	21	19	16	14	17	E S 15	16	16	15	15
28	15	13	14	15	E S 20	15	15	15	18	23	21	24	21	24	19	17	17	16	15	14	15	15	15	14
29	14	16	14	15	14	19	15	18	18	21	22	26	27	26	22	18	16	17	15	15	15	15	13	14
30	15	14	13	13	13	14	13	14	17	18	22	33	31	21	23	22	18	15	14	15	14	15	15	15
31	14	15	13	14	14	15	15	18	18	21	22	25	22	23	43	19	18	13	16	17	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	30	31	31	30	31	31	31	30	29	28	28	23	30	30	29	30	30	30
MED	14	14	14	14	14	14	15	16	17	20	22	25	24	23	22	19	17	15	15	14	14	14	15	14
UQ	15	14	14	14	14	16	15	16	18	22	23	26	28	26	24	21	18	16	15	15	15	15	15	15
LQ	14	13	13	13	13	14	14	15	16	18	21	24	22	22	21	18	16	14	14	14	14	14	14	14

AUG. 1988 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1988 | 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	300	300	310	290	290	300 R	295	305	J R 290	280	275	280	275	280	I R 290	290	290	300	305	295	285	F 280	280	I S 290
2	300	300	310	290	300	315	315	300	290	285	300	285	I R 280	280	290	290	300	295	300	300	295	285	285	I S 285
3	285	300 S	305	290	290	300	305	305	305	290	290	R 285	270	U R 285	280	285	285	290	A	295	280	260	275	305
4	285	300	300	305	290	S	305	305	315	285	295	280	290	280	285	290	290	290	300	300	S	S 290	280	S 285
5	285	S	315	305	305	305	320	315	315	310	305	290	A	295	290	290	300	295	305	320	300	285	280	295
6	285	300	275	285	300	315	315	280	295	290	270	I R 275	280	285	285	A	A	A	A	305	270	F 280	285	290
7	290	290	285	285	300	320	325	350	315	285	280	280	280	275	290	295	290	305	310	I S 300	290	280	285	285
8	290	J S 290	295	315	325	330	365	325	315	290	290	285	295	285	295	295	A	300	295	295	I C 290	285	F 285	F 295
9	F 315	310	300	310	S 285	F 310	320	310	285	305	290	275	280	275	275	280	290	290	300	S 300	295	285	290	285
10	285	280	S 295	300	305	305	335	345	295	290	290	285	285	U R 285	305	295	305	310	300	290	F 295	S 295	280	285
11	285	295	315	300	290	295	310	295	305	295	295	285	R 285	290	285	295	295	295	U S 310	310	295	S 315	290	J S 285
12	270	290	S 305	305	300	295	305	325	290	305	300	280	280	285	285	295	300	300	315	305	305	275	J S 280	F 300
13	F 265	F 280	S 270	300	R 305	285	305	330	295	285	300	310	285	285	295	295	295	305	310	315	315	I S 280	270	295
14	270	300	280	280	280	270	R 265	300	300	270	300	260	270	285	305	305	300	I C 305	S	300	285	285	280	300
15	325	295	295	285	285	300	315	320	320	295	290	315	305	295	305	300	310	325	320	320	280	I S 280	285	290
16	295	310	305	330	F 290	F 265	275	300	310	A	G	A	A	270	265	285	265	300	315	310	295	290	A	300
17	285	285	F 300	310	320	290	330	315	320	305	315	305	305	305	J R 285	295	305	A	A	A	305	295	295	285
18	300	295	F 305	305	F 290	F 300	315	315	330	315	285	305	275	285	290	285	315	305	320	315	300	F 290	310	F 290
19	A	F 290	F 290	J S 295	F 300	310	325	330	305	A	310	290	I R 290	290	305	C	C	C	320	315	305	285	J S 290	295
20	290	285	295	320	330	330	335	335	300	315	295	315	280	290	290	295	305	300	320	315	295	S 295	280	295
21	275	270	265	295	325	320	305	330	335	325	305	285	285	295	I C 300	I C 305	I C 300	305	S	305	325	325	J R 320	F 275
22	290	290	285	290	F 305	320	330	335	335	305	285	300	280	285	265	290	290	315	A	320	A	270	285	300
23	300	295	300	295	295	S 285	320	320	335	320	300	300	300	275	285	295	310	315	C	C	C	C	C	C
24	280	285	265	C	305	335	C	V 325	325	C	300	315	300	C	C	C	C	C	305	325	315	285	285	285
25	295	295	305	F 300	295	290	305	310	320	305	280	300	315	285	290	300	300	300	310	305	310	275	F 265	F 275
26	F 260	F 285	285	280	285	305	325	325	330	315	295	300	285	285	290	290	295	305	305	315	300	275	275	285
27	295	285	290	295	290	285	305	335	305	295	285	290	290	285	285	300	295	305	310	330	315	A	290	290
28	285	265	265	285	290	330	335	320	290	310	300	300	285	285	290	295	315	300	315	S 315	285	295	290	285
29	275	295	315	300	290	285	315	315	310	300	260	285	R 285	275	285	290	290	300	305	S 295	300	310	290	275
30	285	290	285	280	275	305	340	Z 335	R 305	285	275	280	280	275	290	305	305	295	300	295	315	290	305	305
31	285	280	290	290	285	300	320	325	300	300	290	290	295	285	305	305	315	300	305	295	300	300	285	290
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	31	30	31	30	30	31	31	28	31	30	29	30	30	28	27	27	24	29	28	29	29	30
MED	285	290	295	295	295	302	315	320	305	298	290	288	285	285	290	295	300	300	306	305	298	285	285	290
UQ	295	300	305	305	305	315	325	328	320	303	300	300	290	285	295	298	305	305	315	315	305	295	290	295
LQ	285	285	285	290	290	290	305	305	298	288	285	280	280	280	285	290	290	298	302	300	290	280	280	285

AUG. 1988 | M(3000)F2 (0.01)

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IONOSPHERIC DATA

AUG. 1988 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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

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							L	U L 375	L 385	L 400	H 395	395	H 420	375	A	A	A	L						
2							L	L	L	L 395	A	L 360	380	A	385	A	L 375	L 365	L					
3							L	L	L	L 395	L 375	380	380	395	A	360	L 380	A	A					
4							L	L	L	A	365	385	A	L	H 395	365	L 365	L	L					
5								L	U L 390	L 390	H 420	395	A	A	390	L	370	L 370	L					
6							L	A	375	A	395	A	350	370	370	A	A	A	A					
7							L	L	L	L	A	395	H 390	390	355	A	A	L	L					
8							L		L	395	385	L 370	370	A	L 375	365	A	A	A					
9							L	L	L	L	A	375	A	A	380	A	H 380	L	L					
10							L		L 395	L	H 395	A	380	R	A	A	L	L	A					
11							L	L	385	L 395	L 405	H 420	R 415	400	A	A	L 395	L	A					
12						L	L	L	L	H 420	L 390	L	395	H 430	A	L 385	L	L	L					
13							L	L 380	A	395	380	400	H 390	385	395	L 385	385	L	L					
14						L	365	A	A	L 395	385	A	380	395	395	330	A	C	A					
15						L	L	L	A	A	395	A	405	370	385	360	A	L	A					
16						L 335	335	A	365	A	A	A	A	A	A	380	L	L	A					
17								L	390	L 395	A	A	395	400	355	360	A	A	A					
18							L	L 380	L 385	A	L 390	A	A	A	A	385	A	L	L					
19							L	L	A	A	A	385	400	385	390	C	C	C						
20								L	L	A	A	A	395	355	350	360	A	A						
21						L	L	L	385	L	395	365	365	350	I C 370	I C 330	C	L	A					
22							L	L	A	L	A	A	395	360	A	380	A	A	A					
23							L	L	380	A	L 395	L	L 400	L 395	L 390	380	L 360	L 370	C					
24							C	L	L	C	L	L 335	L 380	C	C	C	C	C						
25							L	L	L	L 395	L 395	395	3	L 395	A	L 365	L	L						
26							L	A	A	L	A	365	355	385	L 390	L 375	L	L	A					
27							L	L	L 395	L	L 380	390	A	385	A	A	L	L	A					
28							L	A	L	L	L	L	L 375	L 390	A	A	A	A	A					
29							L	L	A	A	L	L 415	L 380	350	L 375	L	L 370	L	A					
30							L	L	L	L 395	L 395	L	L	380	L	L	L	A	A					
31							L	L		L	L	L	L 395	390	L 370	L	L	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	3	11	12	18	17	23	22	18	16	9	3						
MED						L 335	350	L 380	385	L 395	395	385	390	385	382	378	L 375	L 370						
UQ								L 380	L 390	L 395	L 395	395	395	395	390	380	L 380	L 370						
LQ								L 378	L 382	L 395	L 385	375	380	370	370	362	L 370	L 368						

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AUG. 1988 | M(3000)F1 (0.01)

IONOSPHERIC DATA

AUG. 1988 | 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							315	280	335	330	320	320	325	325	330	315	310	295						
2							270	L	L 320	325	305	340	330	370	335	325	310	315	275					
3							270	270	L 285	305	320	330	370	335	330	315	320	305	A					
4							280	280	270	315	285	335	325	340	325	315	315	310	280					
5								280	270	290	315	325	A	A 355	345	330	290	290	275					
6							L 280	370	330	340	410	R	370	355	350	A	A	A	A					
7							255	240	270	360	365	385	360	375	340	310	310	280	270					
8							215		275	330	335	330	340	360	335	330	A	E A 330	290					
9							255	280	L 320	300	320	355	340	355	340	330	305	L 280	285					
10							250		320	330	340	360	340	345	305	315	310	275	280					
11							285	310	300	285	290	330	330	315	310	290	305	305	265					
12						310	285	270	290	290	295	330	350	330	325	305	310	290	270					
13							300	260	315	340	315	305	360	360	330	315	325	305	275					
14						360	380	310	330	L 405	335	435	415	365	320	330	310	C	A					
15						330	305	290	A 270	355	335	295	325	330	310	335	290	260	270					
16						410	390	315	325	A	G	A	A	415	430	370	L 395	315	A 290					
17								275	280	320	305	310	310	330	355	330	E A 330	A	A					
18							285	285	265	310	360	330	E A 400	E A 365	325	325	290	280	260					
19							265	295	290	A	A 320	360	345	355	325	C	C	C						
20								260	L 315	295	335	315	355	350	325	320	295	305						
21						275	L 305	265	255	270	335	375	330	325	I C 305	I C 300	I C 285	310	E A 310					
22							245	265	260	310	E A 380	330	350	345	375	305	305	255	A					
23							275	260	240	A 275	295	290	310	380	340	310	285	265	C					
24							I C 260	240	270	I C 290	L 295	290	310	I C 320	I C 310	C	C	C						
25							270	240	270	300	345	300	285	335	320	305	295	285						
26							260	A 260	E A 285	280	A 320	310	325	325	315	310	295	A	275					
27							280	250	295	325	325	310	340	325	330	285	L 295	285	E A 280					
28							250	E A 275	310	265	305	300	340	330	290	320	E A 320	E A 295	270					
29							270	260	270		L 365	315	325	330	295	310	315	285	265					
30							220	H 230	H 265	330	325	295	310	340	285	290	285	285	265					
31							260	255		275	290	285	305	325	295	280	260	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						5	28	28	30	28	31	29	29	31	31	28	27	25	19					
MED						330	270	269	285	310	320	325	335	340	325	315	305	288	272					
UQ						360	285	282	315	330	336	335	350	356	338	328	311	305	279					
LQ						310	258	260	270	290	305	305	325	330	310	305	292	280	270					

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AUG. 1988 | H'F2 (KM)

IONOSPHERIC DATA

AUG. 1988 | H°F (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270	A 275	250	A 290	275	265	A 260	235	225	205	H 205	210	H 180	235	A	A	A	250	A 265	280	E A 320	300	310	275
2	A 270	255	265	295	270	255	240	240	230	210	A	E A 255	225	A	220	A	230	240	260	265	265	280	295	280
3	295	270	250	290	280	255	240	235	235	210	235	230	230	215	A	E A 255	225	A	A	E A 280	A	A 355	A 330	265
4	275	270	265	260	260	265	255	230	220	A	E A 250	H	A	A	H 205	A 245	240	A 265	A 255	A 275	I S 280	290	305	310
5	300	270	255	255	255	250	255	H 225	220	220	H 185	210	A	A	220	A	235	E A 250	245	245	245	265	300	285
6	295	265	310	295	260	240	230	A	225	A	205	A	E A 260	235	E A 235	A	A	A	A	A 270	A	E A 315	235	270
7	270	285	290	300	270	260	A	H 195	220	H 195	A	210	H 190	215	E A 260	A	A	235	265	A 270	E A 315	290	285	285
8	280	290	270	255	230	225	230	230	215	215	225	240	240	A	235	E A 240	A	A	A	A 280	I C 270	285	A 310	260
9	250	260	250	245	285	255	235	240	E A 265	A	A	225	A	A	230	A	H 225	235	A 265	255	275	275	270	285
10	290	305	275	275	270	270	245	220	210	H 230	H 210	A	230	A	A	A	240	255	A	265	E A 300	E A 305	E A 310	A 305
11	295	A 310	A 285	270	E A 300	285	A	E A 245	215	200	195	H 190	195	210	A	A	215	E A 265	A	A 250	265	255	300	A 320
12	340	290	260	260	275	285	255	230	215	H 185	210	A	210	H 180	A	225	235	225	A	A 270	260	E A 315	A 315	A 275
13	E A 355	E A 350	315	270	275	285	255	225	A	205	230	205	H 215	220	210	220	220	E A 260	A	A 255	A 260	275	320	270
14	A 335	290	320	305	310	300	240	A	A	205	225	A	220	220	210	225	A	C	A	E A 305	E A 320	E A 290	320	A 290
15	245	285	305	305	315	E A 295	255	230	A	A	210	A	195	230	225	E A 250	A	A	A	A 265	E A 320	E A 360	310	280
16	270	255	265	240	325	E A 285	280	A	A 240	A	E A 290	A	A	A	A	230	235	E A 265	A	A 270	E A 305	A	A	285
17	A 330	320	280	E A 300	260	285	245	220	210	205	A	A	210	210	E A 250	E A 245	A	A	A	A	270	E A 300	A 295	E A 325
18	A 300	280	290	E A 315	E A 325	280	240	225	220	A	220	A	A	A	A	220	A	240	260	245	255	290	265	315
19	A	E A 345	A 320	295	E A 310	265	235	220	A	A	A	225	205	225	215	C	C	C	A 260	A 260	A 250	A 305	280	265
20	280	295	285	250	235	A 245	245	215	225	A	A	A	H 210	E A 260	E A 265	E A 250	A	A	260	250	230	290	A	290
21	340	A 350	355	A 325	250	210	225	220	215	200	215	245	240	E A 265	I C 240	I C 230	C	260	A	260	230	240	E A 320	E A 350
22	A	315	A 320	A 310	270	265	A 250	230	A	210	A	A	210	E A 250	E A 260	225	A	A	A	A	A	E A 375	325	E A 290
23	285	275	275	270	295	290	250	245	A 230	A	200	H 195	205	210	220	235	250	240	I C 245	C	I C 265	I C 270	I C 300	I C 305
24	310	A 315	A 340	I C 320	265	235	I C 255	225	205	I C 210	195	A 225	225	C	I C 220	C	C	C	265	225	225	295	305	305
25	270	270	260	265	285	290	245	220	220	210	210	215	B	210	A	240	230	245	255	245	240	A 315	A 355	E A 355
26	E A 375	E A 310	315	E A 325	A 325	270	245	A	A	A	A	E A 250	A 245	220	215	230	250	A	A	240	260	A 295	E A 340	290
27	275	280	280	270	280	280	245	A 235	210	E A 255	225	220	A	225	A	A	A	E A 270	A	A 250	E A 260	A	A	285
28	305	E A 355	A 360	305	305	250	A 235	A	A	210	230	E A 250	230	H 225	A	A	A	A	A	S	A 285	290	285	305
29	315	270	250	270	295	305	255	245	A	A	E A 245	H 185	225	E A 265	230	230	235	250	A	A	265	A 265	275	280
30	280	270	285	315	325	270	235	220	225	205	H 210	H 195	245	230	230	225	225	A	A	A	A 260	A 270	260	255
31	285	310	285	275	270	265	245	235	A 235	225	215	A 245	205	215	E B 245	240	240	A	260	E A 310	260	260	290	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	29	31	31	31	31	31	29	26	23	20	23	20	24	22	21	19	16	17	13	25	28	29	28	31
MED	288	280	285	280	272	265	245	229	220	209	212	216	215	218	222	228	235	245	260	A 260	262	282	300	282
UQ	305	301	312	302	296	284	255	235	226	211	225	234	230	230	E E 240	A 236	240	A 255	265	A 270	274	A 298	314	298
LQ	275	270	265	268	268	255	240	220	215	205	208	208	205	215	220	225	225	240	255	250	255	272	285	275

AUG. 1988 | H°F (KM)

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IONOSPHERIC DATA

AUG. 1988 | 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	115	120	115	115	E A 135	120	E A 125	E A 125	A	E B 135	E B 130	125	125					
2						S	120	120	115	115	110	115	115	115	A	A	E A 125	E A 130	A					
3						B	A	E A 125	S	110	120	115	120	A	120	A	A	115	120					
4						B	A	110	110	110	120	115	115	115	110	A	115	A	A					
5						E A 160	A	A	115	115	A	E A 130	B 120	120	A	A	A	A	A					
6						A	120	110	110	115	120	115	115	120	A	A	E A 135	A	A					
7						B	A	E A 125	E A 125	110	110	115	120	120	B	120	115	120	130					
8						B	115	E A 120	115	A	135	130	B	E B 135	120	120	120	120	A					
9						B	120	115	115	110	110	115	120	A	115	E A 130	A	A	A					
10						A	115	115	110	115	110	A	A	E A 135	A	A	A	A	A					
11						A	110	110	105	A	115	120	115	110	105	110	115	115	A					
12						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
13						B	120	115	A	A	115	115	115	115	E A 130	E A 130	110	110	130					
14						B	125	115	115	110	A	A	A	A	S	110	110	C	A					
15						A	120	120	115	A	A	115	105	115	115	110	115	115	A					
16						B	125	115	115	115	A	A	115	110	115	115	A	A	A					
17						B	E A 135	E A 130	A	A 120	110	115	115	115	A	A	A	120	A					
18						A	E A 135	120	A	115	115	120	A	A	A	115	E A 140	A	A					
19						A	125	115	115	110	115	115	A	120	A	C	C	C	A					
20						B	120	110	115	115	115	120	120	110	110	115	120	A	A					
21						A	A	A	E A 125	E A 125	110	A	E A 120	E A 130	C	C	C	A	A					
22						B	A	E A 130	115	110	115	A	A	A	E A 125	E A 120	110	115	A					
23						B	125	120	115	115	115	115	115	120	115	115	115	120	C					
24						S	C	125	115	C	115	115	120	C	C	C	C	C	B					
25						B	130	115	E A 130	E A 120	E A 135	E A 135	B	A	A	A	E A 140	A	A					
26						B	A	110	115	A	A	A	A	A	A	E A 130	120	E A 130	125					
27						B	120	115	115	115	A	120	115	A	A	A	A	A	B					
28						B	120	115	115	110	A	110	120	E A 125	125	110	115	120	B					
29						B	125	120	A 125	125	120	120	115	110	A	A	A	A	B					
30						B	E A 125	A	A	A	115	E B 130	E B 130	120	115	115	115	120	B					
31						B	125	E A 120	110	110	A	A	A	E A 130	B	E A 125	115	A	B					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	22	27	25	23	22	23	21	21	13	17	19	14	5					
MED						E A 160	120	115	115	115	115	115	115	118	115	112	115	119	125					
UQ							125	119	115	115	118	120	120	E E 125	118	E A 125	118	120	130					
LQ							120	115	115	110	110	115	115	115	115	115	115	115	125					

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AUG. 1988 | H'E (KM)

IONOSPHERIC DATA

AUG. 1988 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	100	100	105	105	110	120	130	120	125	120	120	120	120	125	125	120	G	120	115	110	115	130	110
2	105	100	105	105	100	S	G	160	140	E G 155	125	120	120	110	110	110	110	110	105	105	105	105	110	115
3	110	110	110	110	115	115	115	115	S	140	130	120	120	120	115	110	120	115	110	110	105	110	105	105
4	105	105	100	105	105	B	115	120	G	110	115	115	115	115	110	115	145	110	110	105	105	110	110	105
5	105	S	B	B	B	120	120	115	140	150	115	160	115	115	110	105	145	110	105	110	110	105	105	105
6	110	105	105	105	B	140	145	120	115	115	130	120	115	E G 175	140	135	125	120	120	105	110	110	105	110
7	105	105	B	110	105	110	105	100	180	130	140	135	G	E G 165	135	125	125	125	135	110	110	105	105	105
8	115	95	120	115	110	120	115	120	120	145	140	135	135	135	135	125	125	120	115	110	C	115	110	110
9	105	100	100	105	100	150	140	120	120	110	110	115	110	110	E G 165	135	120	140	120	105	105	105	105	105
10	B	B	B	B	B	125	120	120	115	115	110	110	115	115	110	110	120	115	110	105	110	105	110	105
11	105	105	105	105	105	105	115	115	110	115	110	110	G	G	115	115	G	115	105	100	105	105	105	105
12	100	95	105	B	B	B	120	120	115	115	115	115	110	115	115	110	130	110	110	110	110	105	120	110
13	110	110	110	115	105	B	120	115	105	110	130	130	150	140	115	E G 150	120	115	120	115	120	S	B	110
14	105	100	105	105	105	105	E G 160	130	115	115	115	105	E G 155	110	110	G	135	C	115	125	120	115	110	110
15	110	105	105	105	100	105	E G 160	150	115	110	105	130	145	140	135	130	120	120	115	115	110	105	105	B
16	B	B	B	B	B	135	125	115	115	115	120	120	115	115	115	G	115	120	110	110	110	110	115	105
17	110	105	105	105	105	120	115	145	110	145	120	110	110	115	110	140	125	115	115	110	120	110	115	105
18	95	115	110	105	105	115	135	125	115	115	120	115	105	105	110	115	115	110	120	110	110	B	110	110
19	110	110	110	110	110	110	135	120	115	120	115	120	110	G	110	C	C	C	110	100	95	100	100	105
20	105	100	105	105	100	100	135	135	120	120	115	125	125	110	115	115	120	120	110	115	115	130	110	110
21	110	110	115	105	115	115	110	120	120	135	E G 155	130	115	125	C	C	C	125	115	120	110	115	110	110
22	110	105	105	125	125	120	125	125	115	110	110	110	110	105	130	135	115	110	115	105	110	110	115	110
23	110	110	105	110	B	135	130	120	115	115	130	115	120	145	E G 170	150	E G 155	130	C	C	C	C	C	C
24	110	110	110	C	115	S	C	130	115	C	130	155	140	C	C	C	C	C	115	110	B	105	105	B
25	B	B	135	B	115	125	G	110	115	105	115	110	B	115	110	115	140	135	120	120	115	115	125	110
26	110	110	105	105	110	105	115	110	105	110	110	110	145	110	115	110	135	115	120	110	110	130	115	115
27	105	105	105	100	105	135	120	115	120	115	115	G	110	115	110	110	110	105	110	110	110	110	110	110
28	110	105	105	100	S	B	115	115	110	110	110	115	E G 160	E G 155	120	120	115	115	110	110	110	110	110	105
29	110	110	115	115	B	135	130	125	115	120	115	125	120	115	115	115	110	115	110	110	115	115	110	110
30	110	B	110	130	110	110	130	125	110	115	G	G	E G 175	E G 180	G	G	155	115	110	110	105	105	105	105
31	110	B	110	B	105	115	130	120	115	110	110	110	105	110	B	110	145	115	115	115	105	130	105	105
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	25	27	24	23	25	28	31	29	30	30	29	28	28	27	25	27	27	30	30	28	28	29	28
MED	110	105	105	105	105	115	120	120	115	115	115	120	116	115	115	115	120	115	115	110	110	110	110	110
UQ	110	110	110	110	110	125	131	125	120	122	128	125	U 129	U 128	123	128	134	120	120	115	110	115	110	110
LQ	105	100	105	105	105	110	115	115	115	110	110	110	110	110	110	110	118	112	110	105	105	105	105	105

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AUG. 1988 | H'ES (KM)

IONOSPHERIC DATA

AUG. 1988 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

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

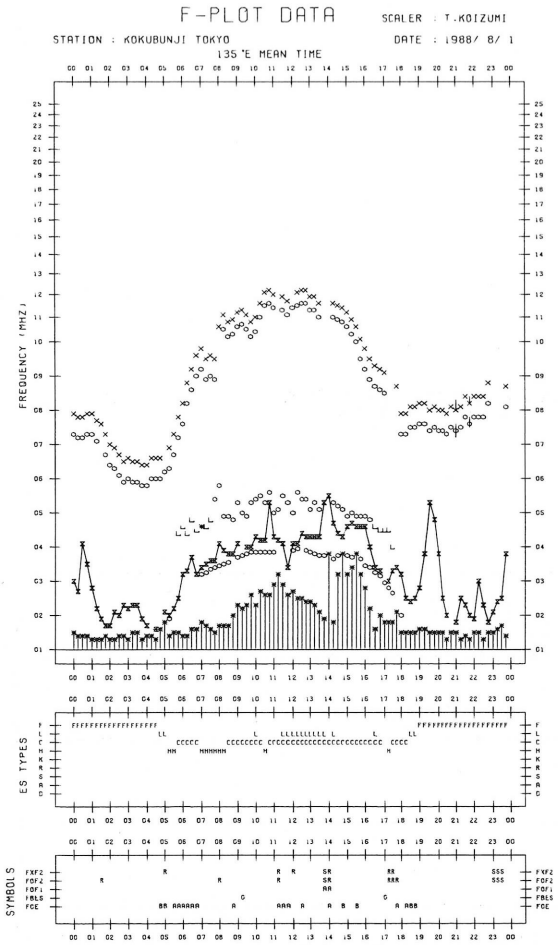
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 5	F 5	F 5	F 4	F 3	L 1	C 3	H 1	H 2	C 2	CL 11	C 1	CL 11	CL 11	C 1	C 1	C 2		C 3	F 3	F 3	F 2	FF 24	F 2
2	F 5	F 2	F 3	F 2	F 2			H 1	H 1	H 1	H 2	C 1	C 1	C 2	C 2	L 3	L 2	L 3	L 3	F 3	F 4	F 3	F 3	F 1
3	F 5	F 3	F 3	F 2	F 2	L 3	L 2	L 2		H 1	H 1	C 2	C 1	C 1	C 2	L 2	L 1	C 4	C 5	F 3	F 5	F 4	F 5	F 4
4	F 5	F 2	F 2	F 1	F 1		L 2	C 2		C 3	C 2	C 2	C 2	C 2	C 2	L 2	H 2	L 3	L 2	F 4	F 2	F 3	F 1	F 1
5	F 1					L 1	L 1	L 2	CL 21	H 1	L 1	HL 11	C 2	C 2	L 2	L 2	HL 12	L 3	L 2	F 1	F 1	F 2	F 2	F 5
6	F 2	F 2	F 3	F 1		L 2	HL 21	C 3	C 2	C 2	H 1	C 2	C 2	H 1	HL 21	HL 32	HL 42	CL 42	CL 42	F 3	F 4	F 4	F 3	F 2
7	F 2	F 1		F 2	F 2	L 2	L 3	L 2	HL 11	H 1	H 2	H 1		H 1	H 1	H 2	H 3	C 2	C 1	F 2	F 3	F 2	F 2	F 2
8	FF 22	F 2	F 2	F 1	F 1	L 1	C 3	C 1	C 2	HL 22	C 1	C 1	C 1	C 1	C 1	C 1	C 3	C 3	C 3	F 4		FF 13	F 5	F 2
9	F 4	F 3	F 2	F 2	F 2	H 1	H 2	C 1	C 3	C 2	C 2	C 2	C 2	L 2	H 1	HL 21	L 1	HL 12	L 3	F 2	F 3	F 3	F 2	F 1
10						L 2	C 2	C 2	C 1	C 2	C 1	L 2	L 1	L 1	L 2	L 3	CL 21	L 2	L 3	F 3	FF 34	FF 23	FF 23	F 5
11	F 4	F 4	F 3	F 2	F 3	L 2	C 3	C 3	C 2	L 2	L 1	L 1			C 2	C 3		C 3	L 2	F 5	F 2	F 5	F 4	F 4
12	F 2	F 2	F 1				L 2	CL 22	C 2	L 2	L 1	L 2	L 2	LC 11	L 2	L 2	CL 12	L 2	L 2	F 4	F 3	F 5	F 4	F 3
13	F 3	F 4	F 2	F 1	F 1		LH 21	C 1	L 3	L 2	C 1	H 1	H 1	HL 11	LH 11	HL 11	C 2	C 3	C 3	F 5	FF 31			F 2
14	F 3	F 4	F 3	F 2	F 2	L 1	HL 12	H 2	C 3	C 2	L 2	L 2	HL 11	L 1	L 1		HL 21		C 2	FF 53	FF 32	F 4	F 5	F 3
15	F 4	F 2	F 2	F 1	F 2	L 1	H 1	HL 12	C 4	L 2	L 2	H 1	H 1	H 1	H 2	H 1	C 3	C 4	C 4	F 4	F 5	F 2	F 4	
16						L 1	C 2	C 3	C 3	C 3	L 2	L 2	C 2	C 2	C 2		L 2	L 2	L 4	F 4	F 4	F 5	F 4	F 4
17	F 3	F 4	F 3	F 4	F 5	L 1	L 1	HL 23	L 3	HL 11	C 2	C 2	C 1	C 2	L 2	HL 22	CL 42	C 5	C 5	F 5	F 5	F 4	FF 23	F 4
18	F 4	FF 23	FF 24	F 5	F 4	L 1	CL 22	C 3	CL 21	C 3	CL 11	C 2	L 2	L 3	L 2	C 1	L 1	L 1	LC 11	F 2	F 4		F 2	F 3
19	F 4	F 4	F 5	F 3	F 5	L 2	C 1	C 3	C 3	C 3	C 3	C 2	L 1		L 1				L 3	F 5	F 5	F 4	F 2	F 2
20	F 1	F 2	F 2	F 1	F 2	L 1	H 1	H 2	C 2	C 3	C 2	C 1	C 1	C 2	C 2	C 2	C 3	CL 42	C 3	F 4	F 3	FF 12	F 5	F 3
21	F 4	F 3	F 3	F 4	F 2	L 1	L 3	LH 21	CL 22	HL 12	H 1	HL 12	CL 21	CL 22				C 1	L 3	FF 25	F 4	F 2	F 5	F 5
22	F 5	F 4	F 3	FF 41	FF 32	L 1	CL 31	CL 22	C 3	C 2	C 3	L 2	L 2	LH 21	HL 22	HL 21	C 3	C 4	C 4	F 4	F 4	FF 33	F 4	F 4
23	F 4	F 2	F 2	F 2		L 1	C 1	C 4	C 3	C 3	C 1	C 1	C 1	H 1	H 1	H 1	H 1	H 3						
24	F 2	F 5	F 3		F 2			C 2	C 1		H 1	H 1	H 1						C 3	F 3		F 3	F 4	
25			F 1		F 2	L 1		L 1	L 2	L 1	L 1	L 1		L 1	L 2	L 2	HL 12	HL 23	L 3	F 1	F 4	F 2	FF 25	F 5
26	F 5	F 3	F 5	F 6	F 4	L 2	L 3	C 4	C 4	C 3	L 3	L 3	HL 11	L 2	L 2	L 2	H 2	CL 32	C 5	F 5	F 4	FF 13	F 5	F 4
27	F 4	F 4	F 3	F 4	F 2	L 1	C 3	C 3	C 1	C 3	L 2		C 2	L 2	L 3	L 3	L 4	L 4	L 3	F 4	F 4	F 4	F 5	F 4
28	F 2	F 4	F 3	F 2			C 3	C 4	C 3	C 2	L 2	C 2	HL 11	HL 21	CL 21	C 4	C 4	C 4	L 5	F 4	F 4	F 3	F 2	F 5
29	F 4	F 2	F 1	F 1		L 1	C 2	C 2	CL 31	CL 21	CL 21	C 1	C 1	C 2	CL 11	L 2	L 2	L 3	L 4	F 3	F 3	F 4	F 4	F 2
30	F 2		F 2	FF 12	F 4	L 1	CL 21	CL 22	L 2	L 2			H 1	HL 11			H 1	C 4	C 4	F 4	F 4	F 5	F 4	F 2
31	F 1		F 1		F 1	L 1	C 2	C 1	C 3	C 2	L 2	L 2	L 2	L 1		L 1	H 1	CL 22	C 3	F 6	F 4	F 1	F 4	F 3
	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																								

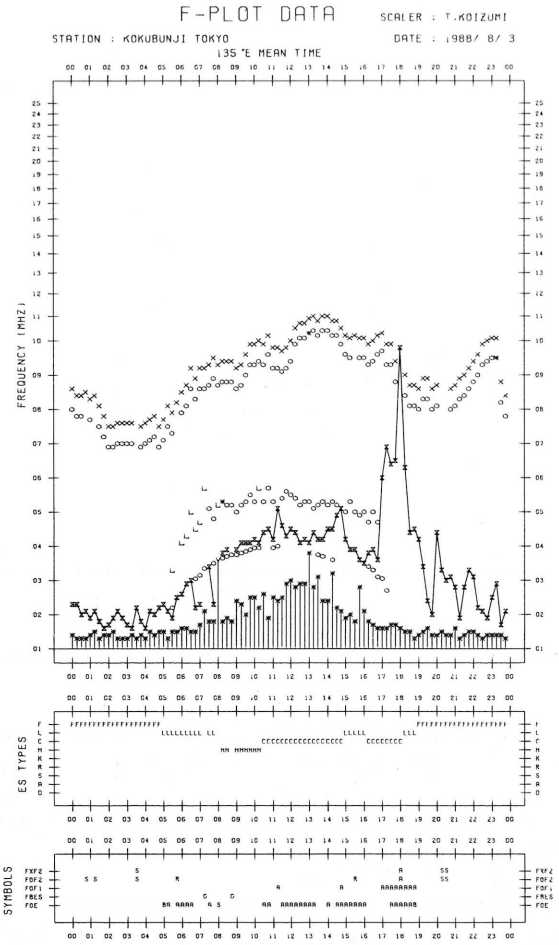
The Radio Research Laboratory, Japan

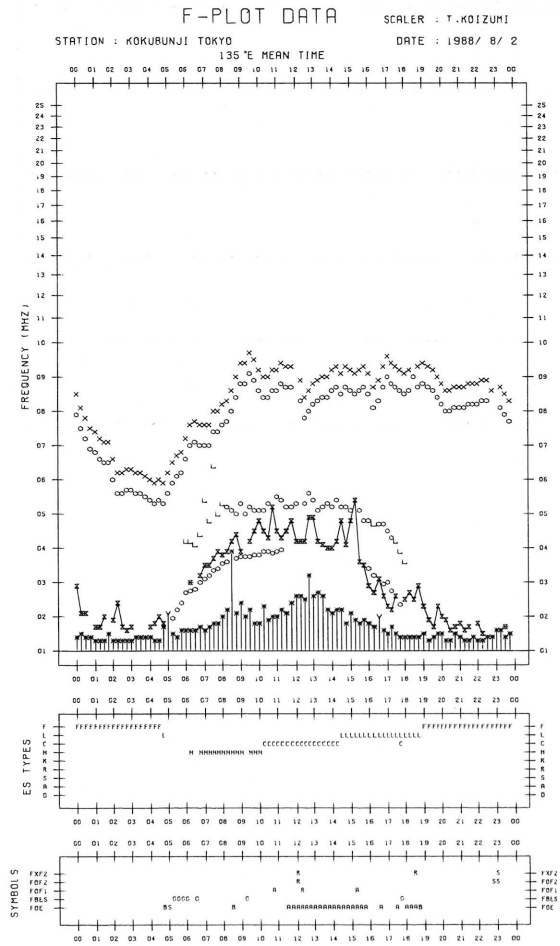
AUG. 1988 | TYPES OF ES

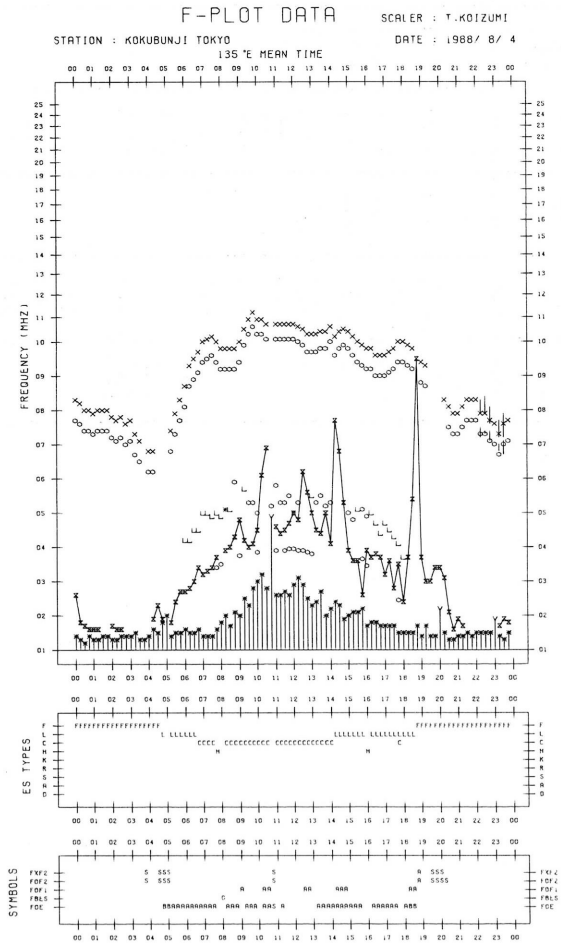
f-PLOTS OF IONOSPHERIC DATA

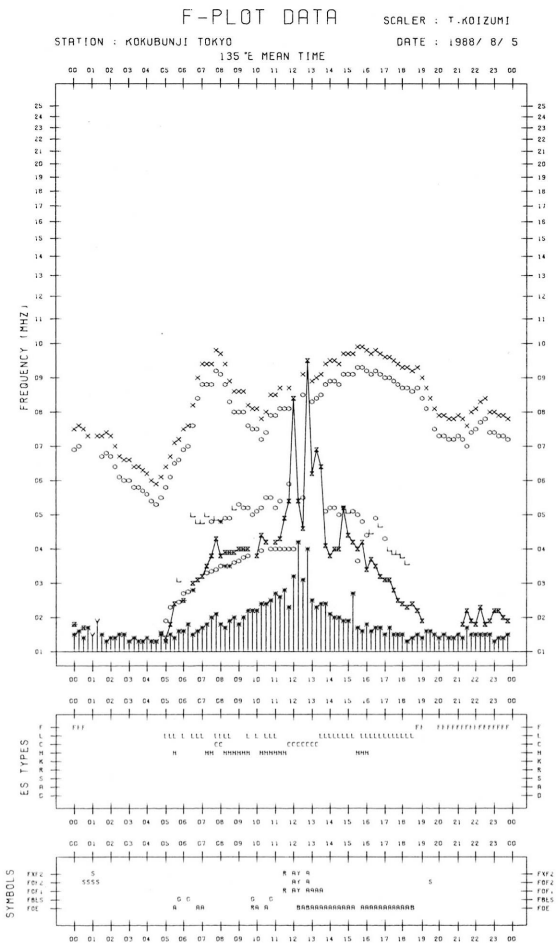
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2,FOF1,FOE
×	FXF2
✳	DOUBTFUL FOF2,FOF1,FOE
⧖	FBES
⌊	ESTIMATED FOF1
*↑,Y	FMIN
∧	GREATER THAN
∨	LESS THAN


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMLS
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMLS
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMLS
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMLS
FOE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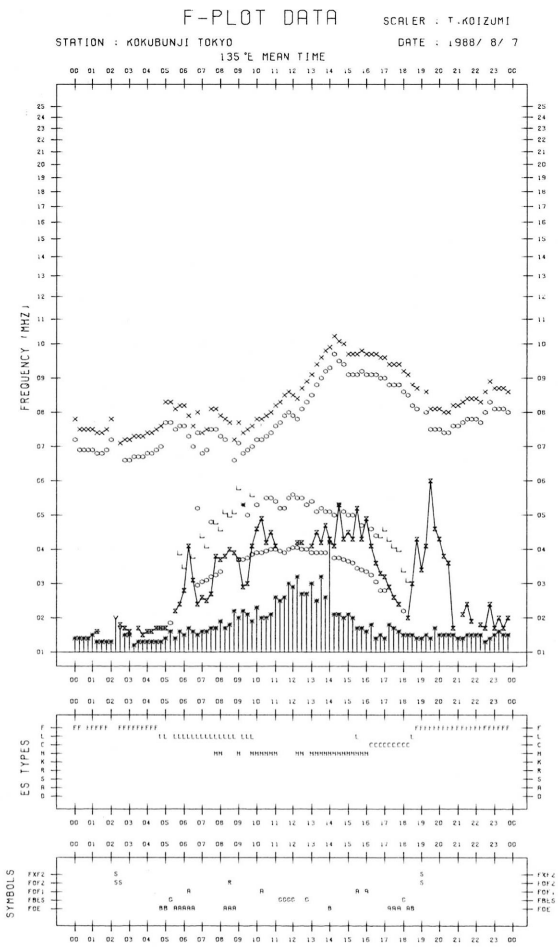
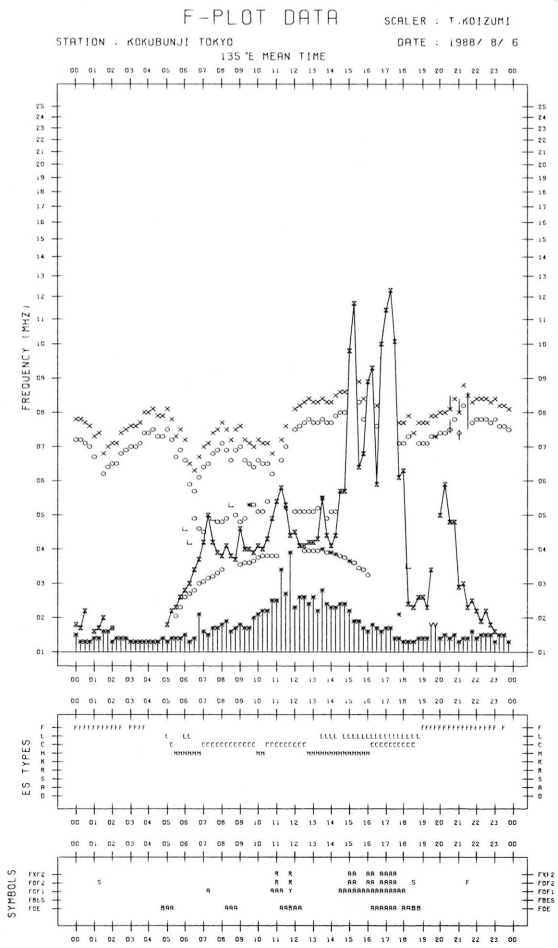
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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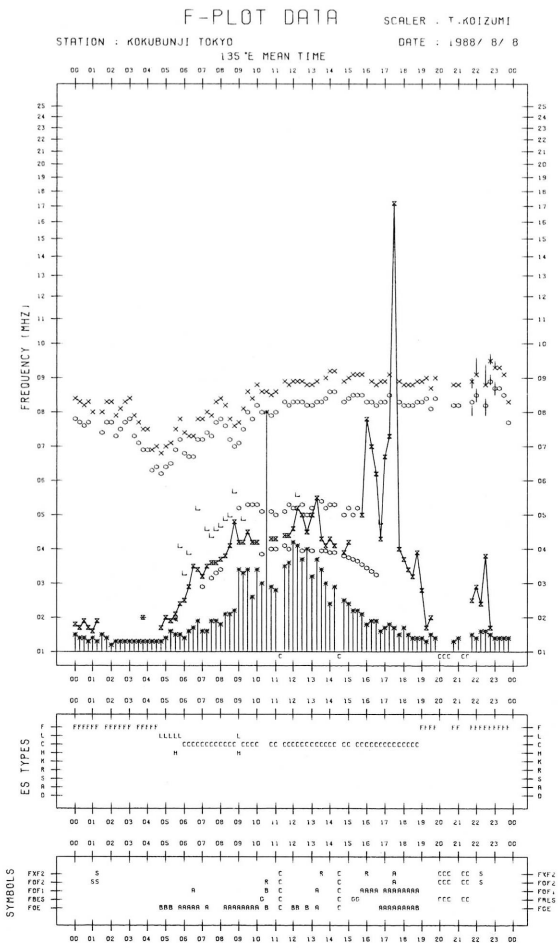
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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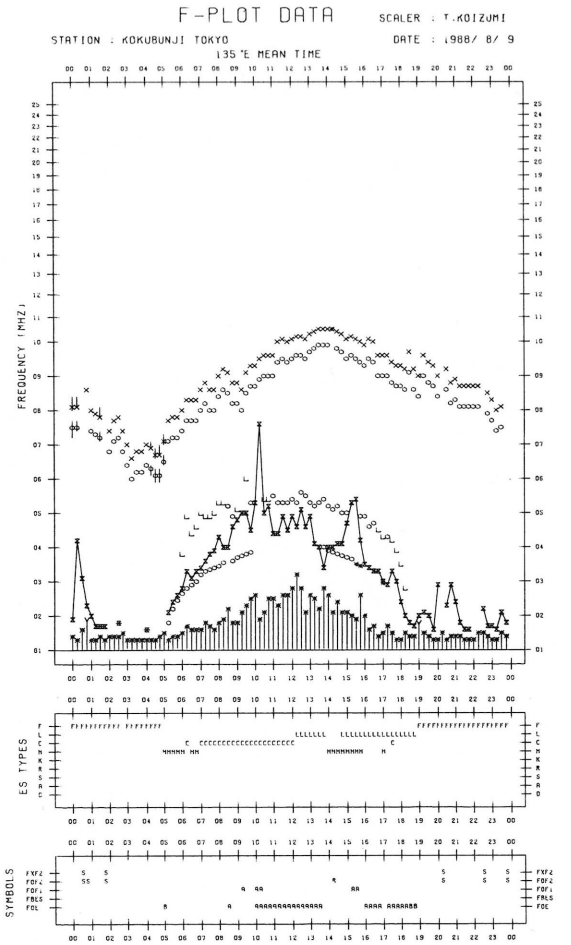
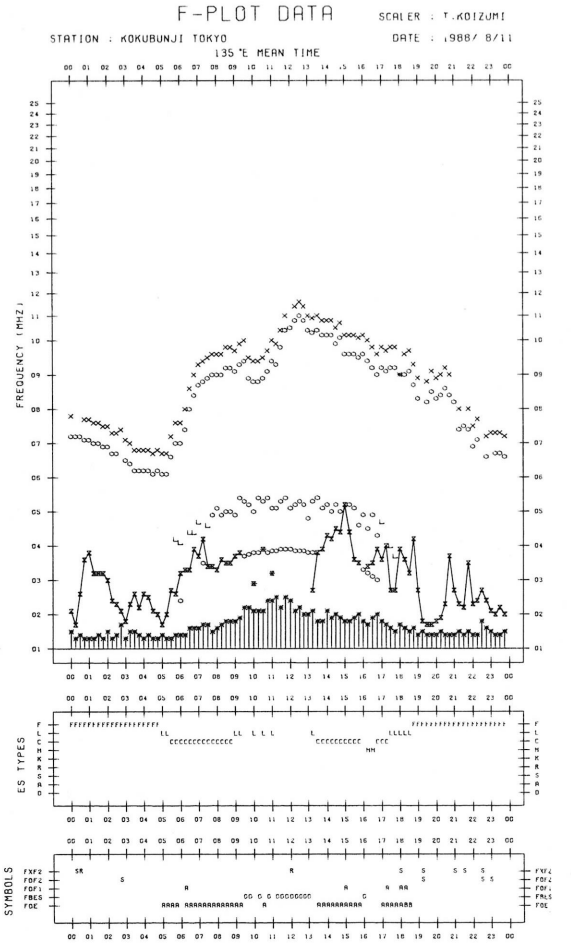
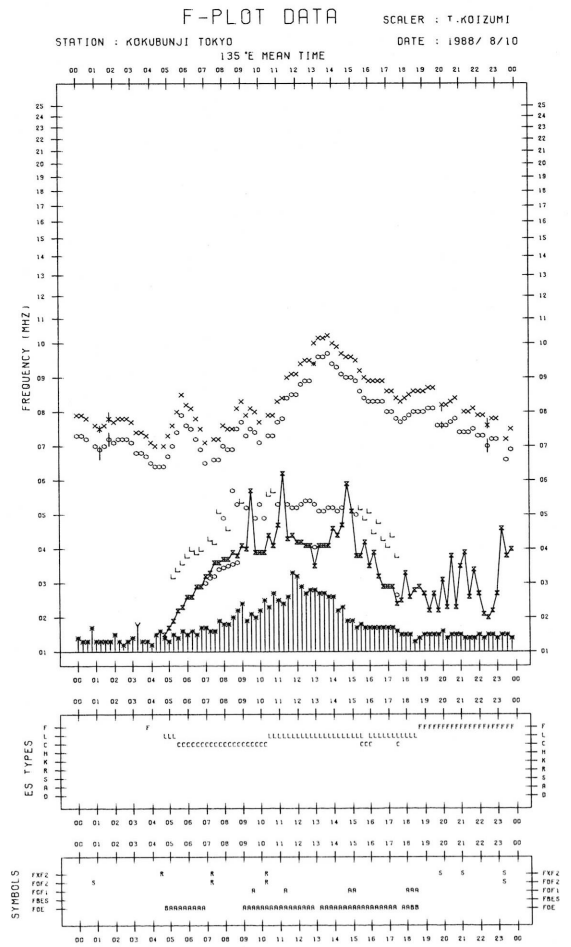
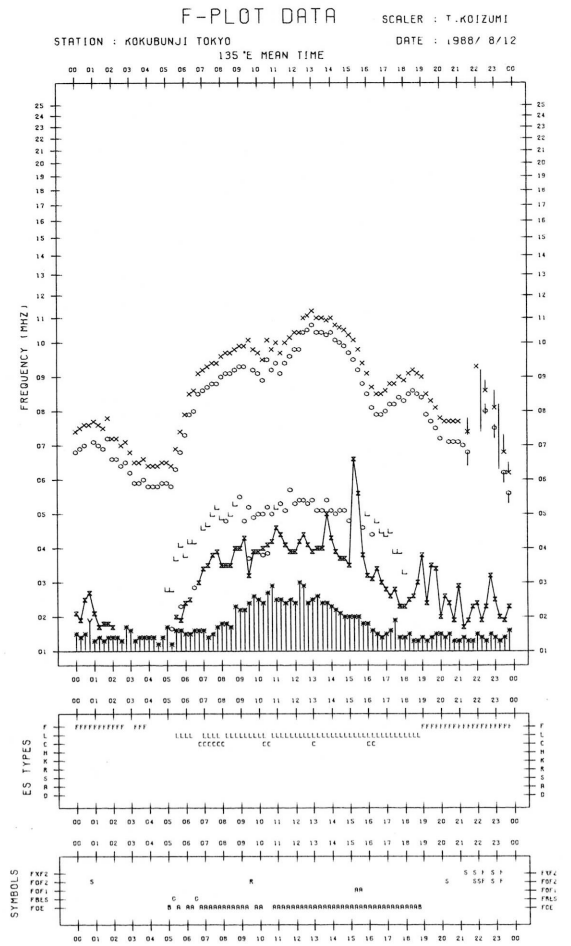
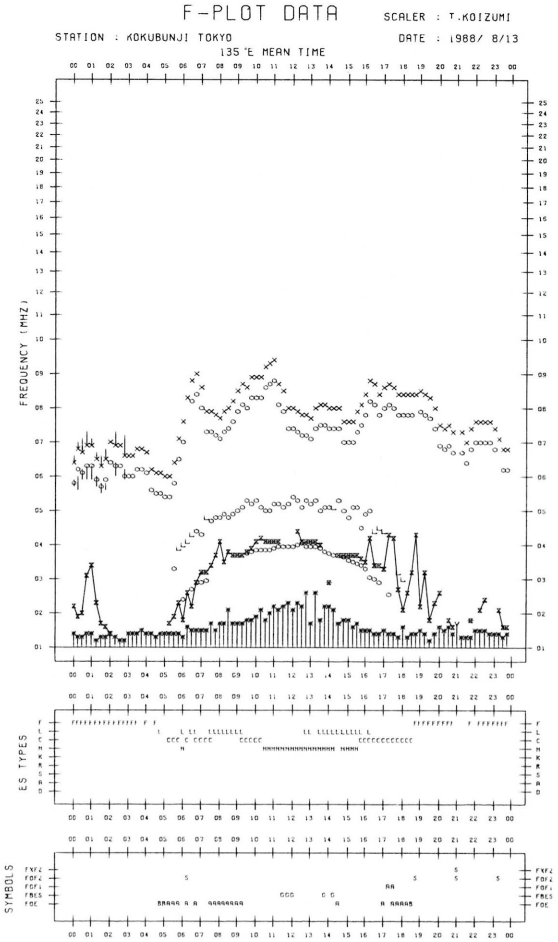
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

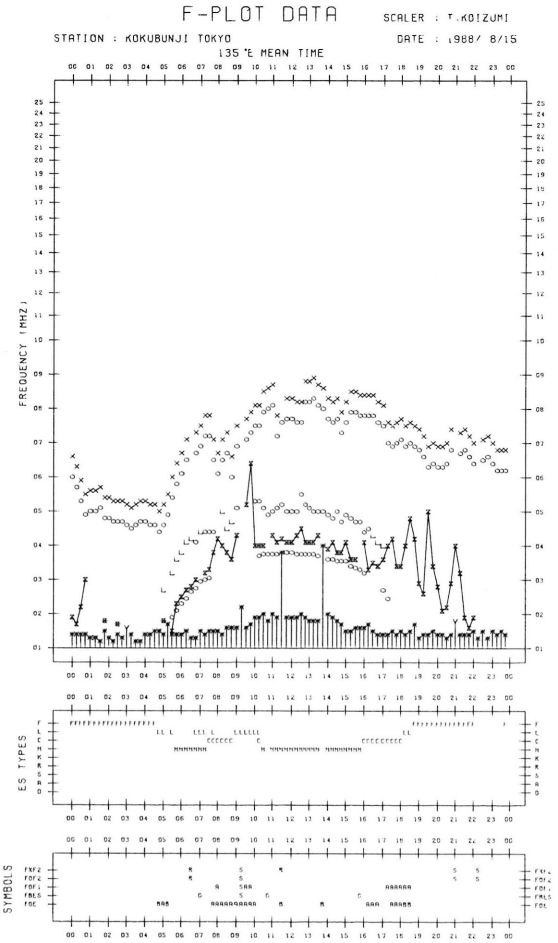

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

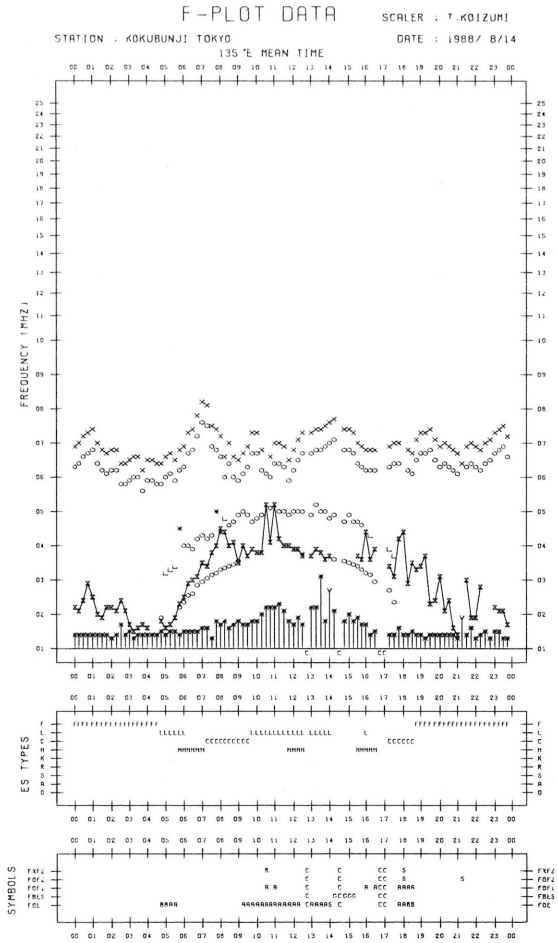

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

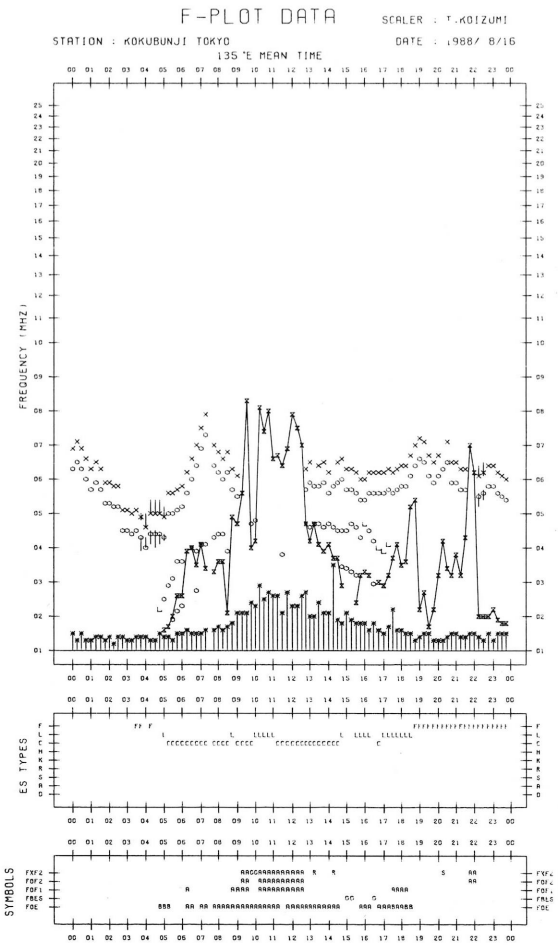

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

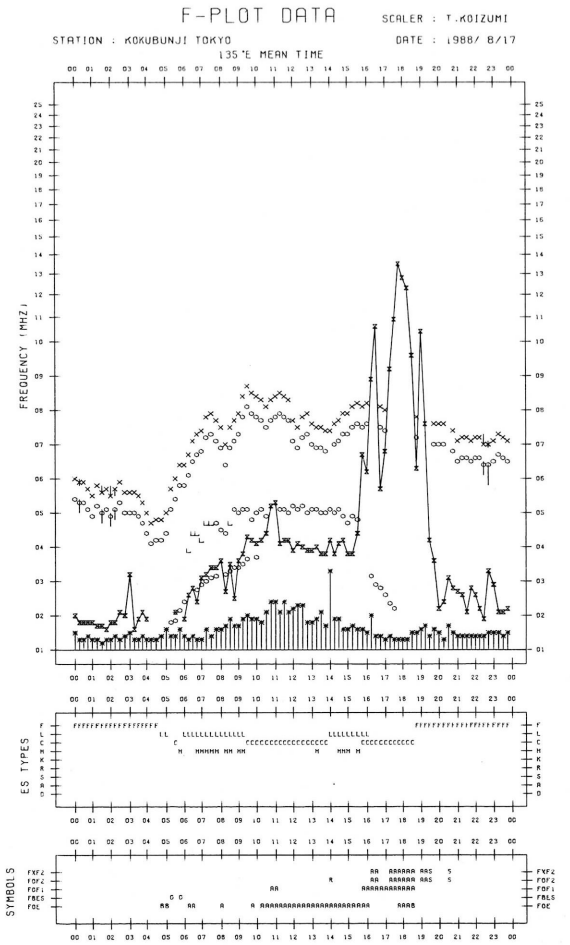

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

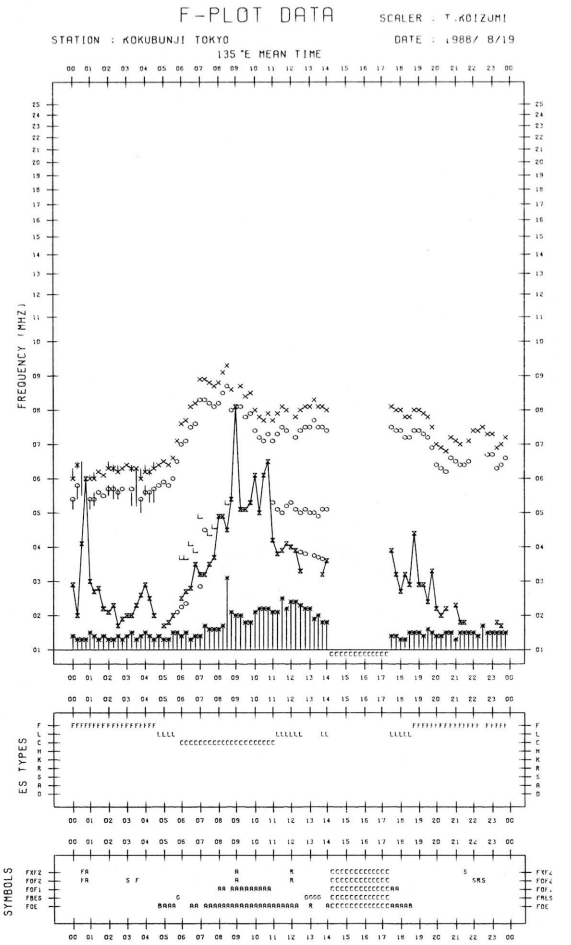

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

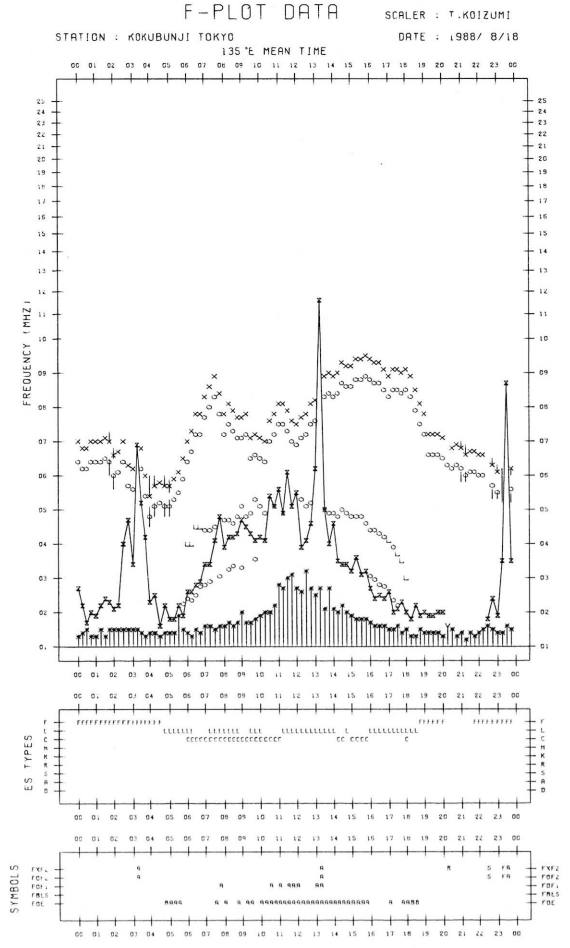

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

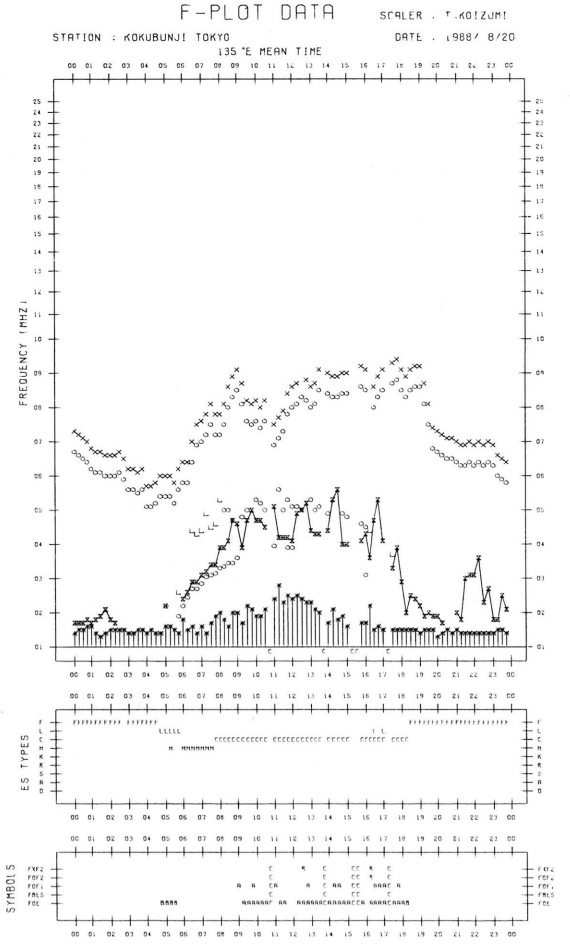

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

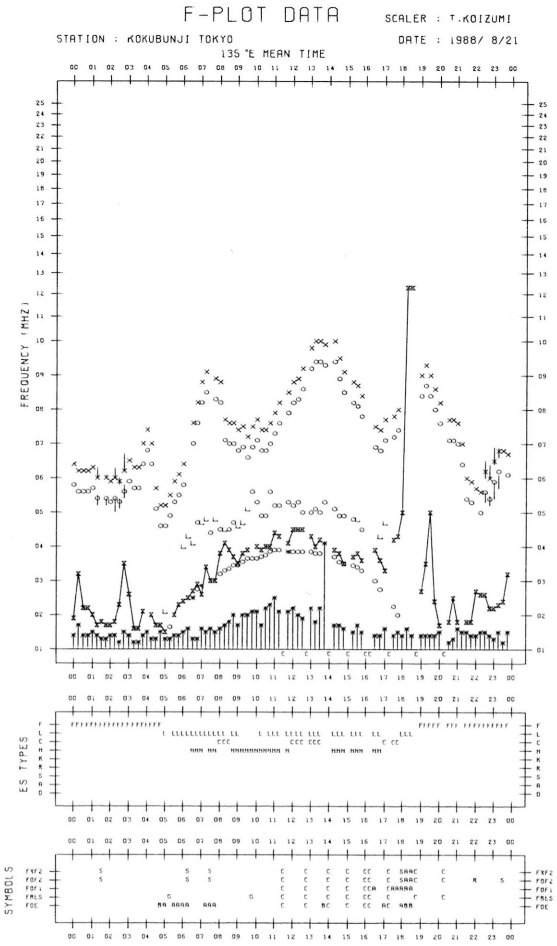

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

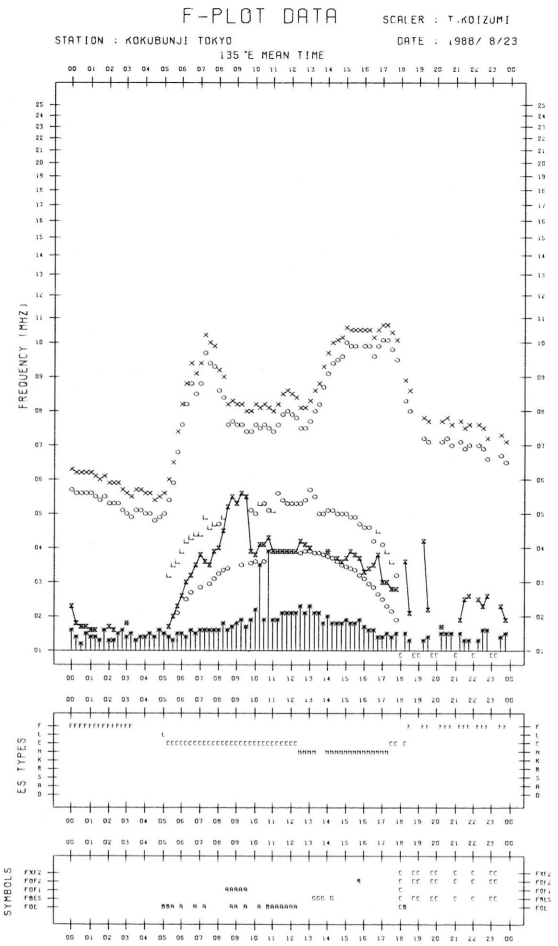

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

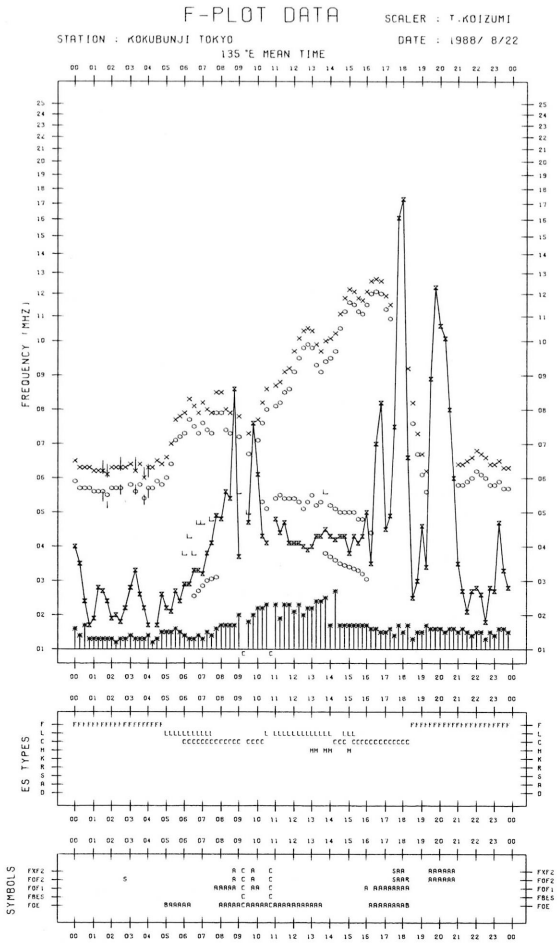

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

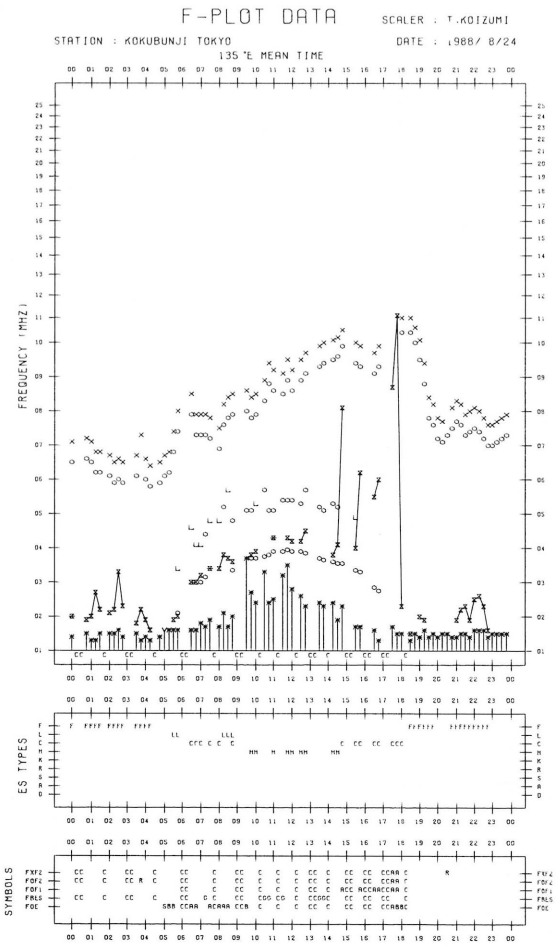

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

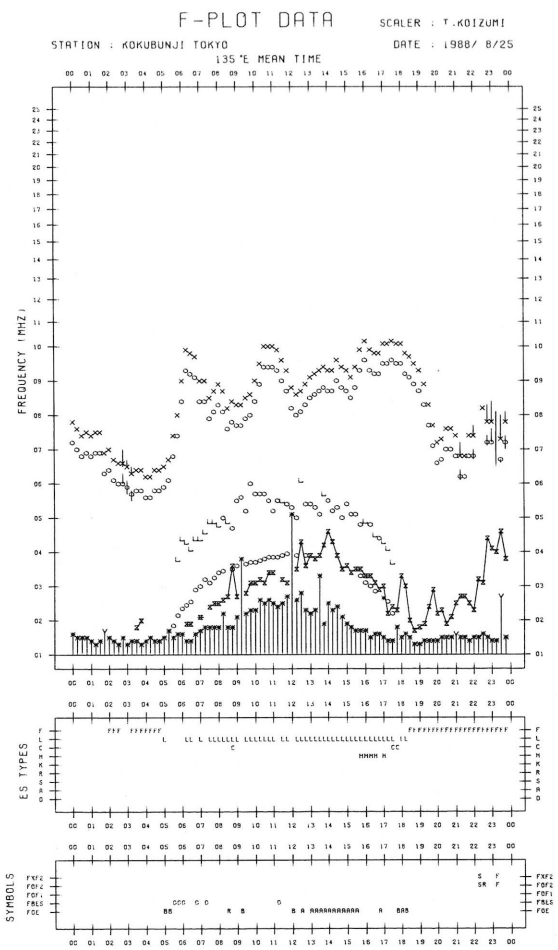

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

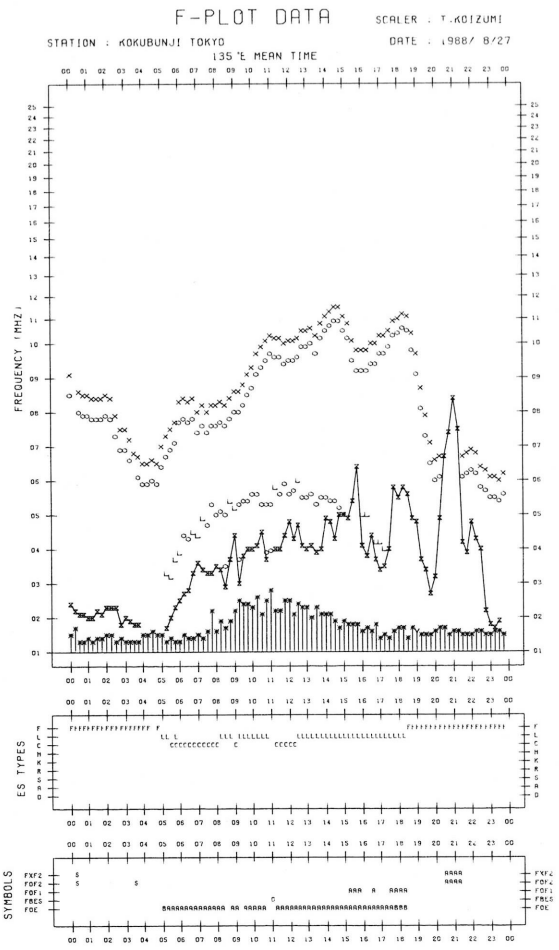

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

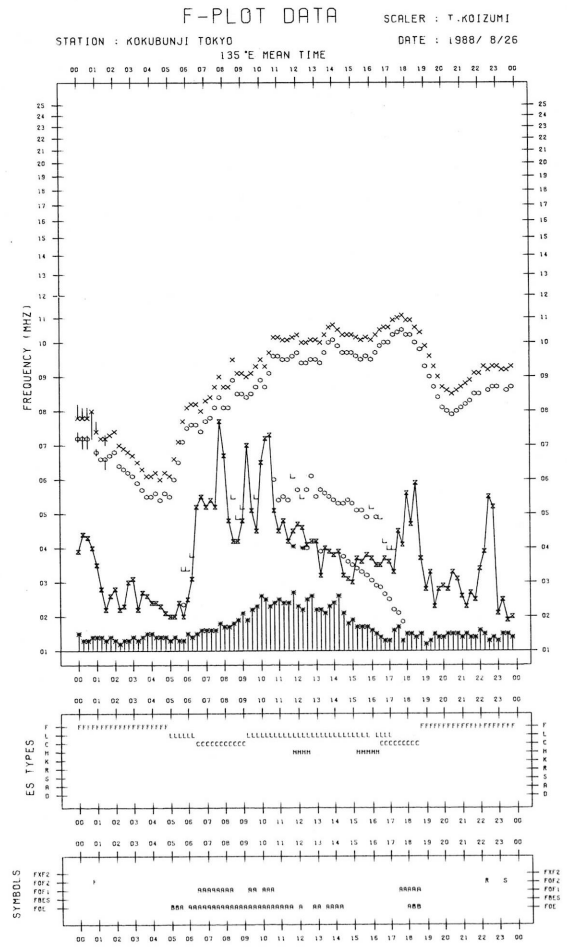

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

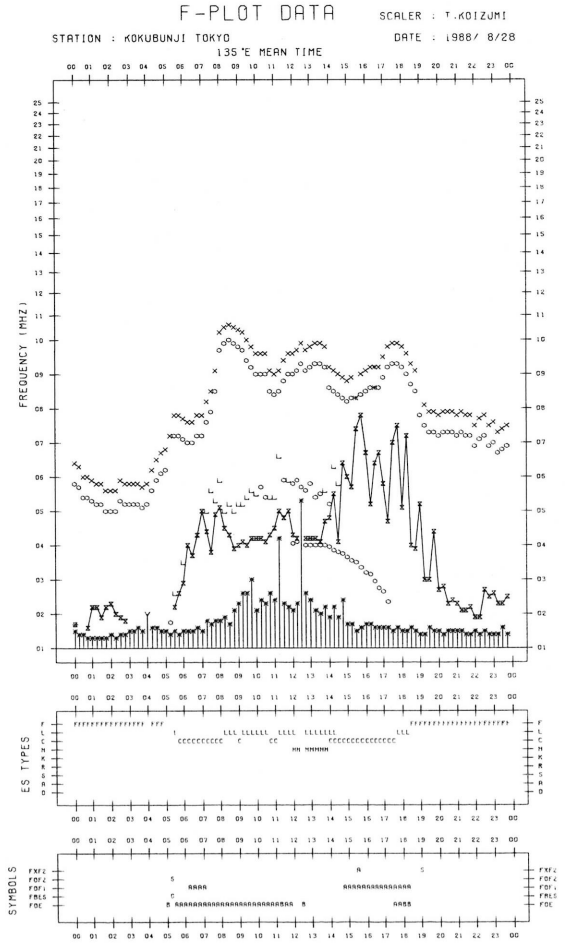

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

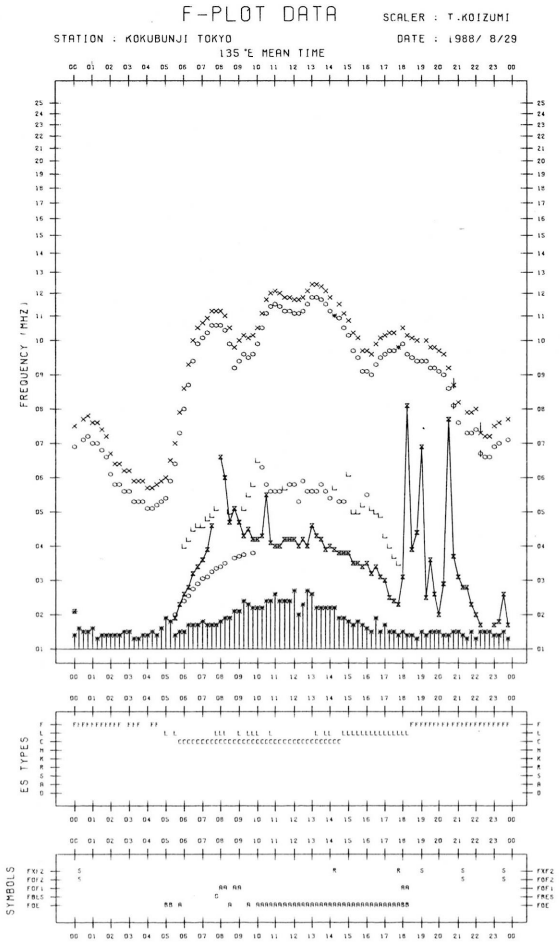

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

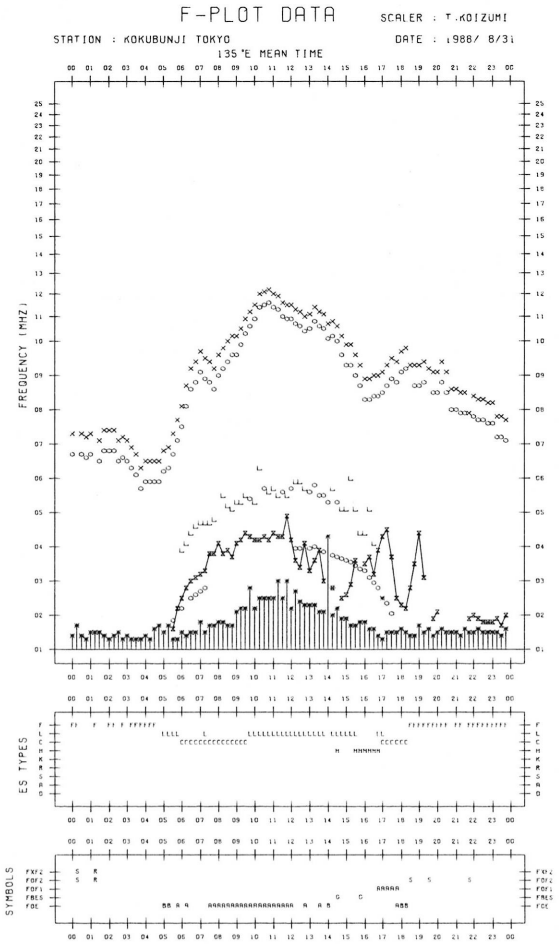

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

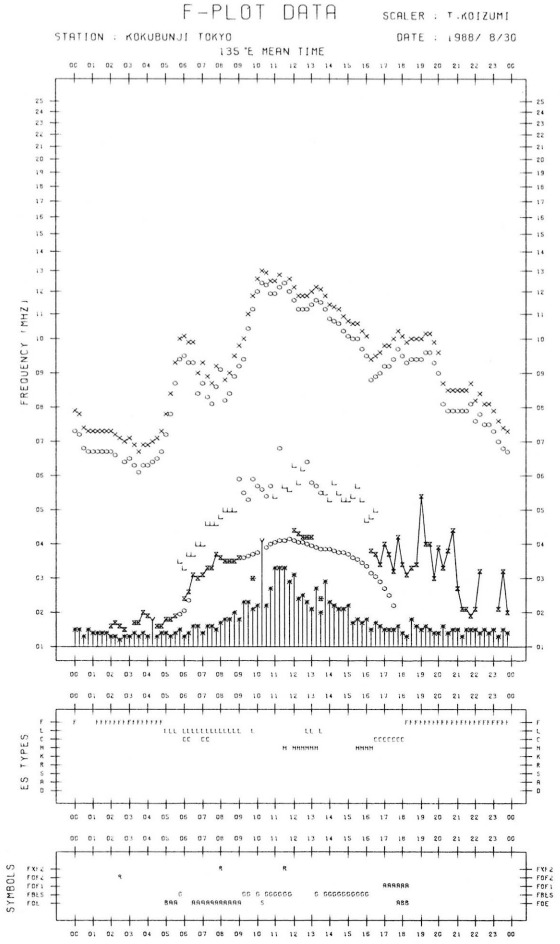

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 8/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso Agust 1988

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

Notes: No observations during the following periods.

none

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso Agust 1988

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	45	47	46	47	46
2	47	45	44	47	46
3	47	45	44	-	46
4	45	45	41	41	44
5	43	42	40	39	41
6	41	40	38	40	40
7	43	43	40	41	41
8	42	43	44	42	43
9	44	44	45	42	44
10	44	44	44	43	43
11	44	43	44	44	44
12	45	44	42	42	44
13	43	43	(42)	-	42
14	-	-	-	-	-
15	41	40	39	39	40
16	41	39	38	40	39
17	40	39	37	39	39
18	40	40	38	40	39
19	40	39	38	40	39
20	41	40	39	41	40
21	-	-	-	-	-
22	39	39	39	38	39
23	38	39	40	41	39
24	41	41	41	41	41
25	41	41	42	42	41
26	41	41	41	42	41
27	42	42	45	43	43
28	43	43	44	-	43
29	45	45	45	49	45
30	47	48	47	48	48
31	47	46	45	50	46

Note: No observations during the following periods:

3nd 2000 - 2330
13th 0600 - 14th 2339
21th 0000 - 2330
28th 2000 - 2335

B. Solar Radio Emission

B2 . Outstanding Occurrences at Hiraiso

Hiraiso August 1988

Single-frequency observations

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

AUG 1988	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	100	46 C	0338.1	0338.9	2.0	940	-	-
	200	8 S	0338.3	0338.9	0.6	310	-	WR
	100	42 SER	0618.5	-	8.6	1000D	-	-
	200	44 NS	2000E	2205	820D	47	28	MR
	100	44 NS	2000E	0630	820D	210	87	-
2	200	44 NS	2000E	2100	820D	75	43	MR
	100	44 NS	2000E	2317	820D	260	140	-
	200	42 SER	2123.8	2124.9	1.5	190	-	0
	500	46 C	2202.5	2204.3	13.0	265	40	MR
	200	46 C	2202.6	2207.9	6.7	1130	74	0
				2205.3		450		ML
	100	46 C	2202.6	-	4.8	1000D	230D	-
3	100	44 NS	2000E	2136	820D	180	105	-
	200	44 NS	2000E	0725	820D	22	9	MR
4	100	44 NS	2000E	2135	820D	160	85	-
	200	44 NS	2000E	0808	820D	13	6	WR
6	100	42 SER	0510.6	-	15.8	1000D	-	-
	200	42 SER	0511.2	0521.1	15.8	1100	-	WL
	200	43 NS	2230	0325	660D	6	3	WR
7	200	44 NS	2000E	2330	820D	10	5	MR
8	200	44 NS	2000E	2350	820D	44	16	0
9	200	44 NS	2000E	2225	240D	5	3	WR
	500	41 F	2234.5	2235.2	1.2	56	-	0
10	200	44 NS	2000E	0817	800D	7	4	WL
11	100	42 SER	2145.5	2145.5	4.0	760	-	-
	200	42 SER	2145.5	2145.6	4.0	74	-	WL
15	200	43 NS	0000	0103	180	18	4	WR
	500	22 GRF	0000	0109	105	13	5	WR
	500	41 F	0224	0238	35	9	-	WR
	200	42 SER	0558.7	0636.0	67	17	-	0
17	200	43 NS	2206	0640	660D	38	7	MR
18	500	27 RF	0500	0557	95	6	3	WR
23	200	8 S	0605.3	0605.3	0.3	205	-	0
	200	44 NS	2000E	0228	790D	7	2	WL
26	200	27 RF	0505	0528	75	6	2	0
27	200	8 S	2310.0	2310.3	0.7	2300	-	0
28	200	44 NS	2000E	0636	790D	36	12	MR
	100	44 NS	2000E	0713	790D	140	85	-
	200	46 C	2312.3	2314.3	3.3	85	18	0
	200	8 S	2336.3	2337.0	0.8	305	-	0
29	100	44 NS	2010E	2230	790D	46	14	-
	200	44 NS	2010E	2354	790D	68	37	MR
30	500	20 GRF	0347	0415	110	5	3	0
	200	44 NS	2010E	0729	790D	36U	22U	MR
	100	44 NS	2010E	0745	790D	280	120	-
31	500	41 F	0134.7	0135.0	1.6	840	-	0
	500	42 SER	0457.1	0459.0	2.1	25	-	0
	200	44 NS	2010E	2300	790D	37	14U	0

C. RADIO PROPAGATION

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

AUG 1988 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	-4	-6	-3	-4	0	9	ES -12	-4	ES -5	ES -5	ES -6	0	-5	9	19	9	1	9	-1	2	-6	-1	-1	-9
2	ES -23	ES -11	-11	-11	-11	-5	-2	ES -3	ES -8	ES -3	ES -5	ES -3	ES -23	5	3	-5	ES -5	3	1	-2	-2	-11	ES -11	-2
3	ES -11	ES -5	3	-2	8	9	7	3	0	0	0	-3	-5	17	17	6	6	10	5	ES -4	0	-3	0	4
4	-15	-3	-3	-2	-2	7	14	10	0	5	5	5	-2	11	6	17	6	6	14	-3	3	-2	ES -5	-11
5	ES -11	ES -5	ES -11	ES -11	-3	6	7	8	14	5	ES 2	ES -11	-2	7	9	-3	-2	7	-2	-2	0	-3	-3	ES -22
6	-2	-7	5	-9	8	8	5	8	1	ES -3	ES -3	-3	-3	13	11	14	9	8	-9	-2	0	-3	ES -22	-9
7	-9	-8	-2	-1	5	12	9	13	6	-2	ES -2	ES -2	-1	19	8	16	17	2	5	7	4	-2	-2	-2
8	-2	-3	-9	-5	3	7	7	-3	ES -22	ES -22	ES -22	-2	0	24	20	22	5	-3	-3	ES -9	-3	-1	-9	ES -22
9	ES -23	-4	-4	-4	1	7	17	16	5	-2	-4	-1	9	23	17	0	4	2	5	-3	12	-2	-3	ES -9
10	-9	3	-1	-9	0	10	11	8	12	5	-9	ES -9	ES -7	12	3	2	10	12	8	-3	-3	-3	2	2
11	-1	2	-3	11	5	13	ES -9	ES -9	ES -7	ES -3	ES 0	ES -9	2	5	12	10	16	7	ES -2	0	-2	-7	-3	-3
12	-3	2	4	4	8	5	ES -22	ES -9	ES -7	ES -2	ES -3	ES 7	ES -3	ES 2	ES -3	ES -3	ES -9	1	-3	-3	-3	-8	-4	-1
13	-1	-7	1	-7	1	3	-9	-9	-1	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	-3	ES -22	ES -22	ES -22	ES -22	ES -22	0	-5	ES -22
14	C	ES -22	ES -22	-5	-4	-4	-9	ES -22	ES -5	ES -22	ES -22	ES -22	ES 0	0	ES -22	ES -1	-3	ES -22	ES -22	ES -22	-9	11	ES -22	-5
15	-3	-1	ES -9	-1	12	0	ES -9	ES -22	ES 2	ES -22	ES -3	ES 2	ES -9	ES -3	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -9	ES -10	ES -23	-4
16	ES -23	ES -23	ES -23	ES -23	-5	-11	ES -23	ES -23	ES -23	ES -22	ES -9	ES -9	ES -11	ES -11	ES -23	ES -22	ES -9	ES -9	ES -22	ES -22	ES -22	ES -22	-3	-3
17	-11	-5	-2	-1	5	6	14	ES -5	ES -5	ES -11	ES -4	ES -5	ES -11	-5	6	-1	0	ES -5	-5	-5	-2	-2	-5	-8
18	-2	-1	-1	3	7	0	2	ES -3	ES -5	ES -5	ES -11	ES -23	ES -23	-5	-11	ES -5	-11	-5	ES -11	ES -23	ES -3	ES -23	ES -11	ES -23
19	-4	-6	-4	-4	1	-2	-5	ES -23	ES -5	ES -8	ES -14	ES -8	ES -23	ES -23	-8	0	ES -23	ES -23	ES -23	ES -14	-8	-14	-8	-8
20	-8	-4	0	-2	10	-2	-4	10	-2	-2	ES -5	ES -5	ES -22	ES -4	ES -4	-3	1	-1	-1	1	ES -22	ES -10	ES -4	ES -22
21	2	-3	-2	-3	12	4	5	-1	ES -3	ES -3	ES -9	ES -9	ES -10	ES -22	-5	-4	-5	-4	-11	2	0	2	0	-3
22	0	-1	-2	-5	3	2	-1	ES -3	0	3	ES -22	ES -9	ES -9	ES -22	ES -9	-9	-2	-3	5	ES -2	3	5	1	2
23	-3	-3	-6	-3	9	5	-5	ES -3	0	ES -1	ES -22	ES -3	ES -22	-3	11	2	-3	-3	1	-9	4	ES -22	-9	-3
24	-5	-5	-11	-4	3	-1	2	ES -3	8	2	-1	0	ES -22	-3	5	4	-3	4	-2	-3	0	-1	ES -22	ES -22
25	-9	-3	-1	3	-1	12	5	ES -9	4	ES -9	ES -22	ES -22	ES -22	ES -22	-1	9	ES -22	ES -4	ES -22	ES -22	0	-1	0	ES -22
26	-5	ES -11	5	-2	4	3	3	5	ES -3	ES -22	ES -1	ES -3	ES -9	5	-3	ES -9	ES -22	3	ES -9	ES -22	2	-3	0	-1
27	-9	ES -22	ES -22	11	11	12	ES -9	ES -9	ES -9	-2	-2	ES -22	ES -2	0	ES -2	ES 7	ES -22	ES -22	ES -22	3	5	2	ES -22	-3
28	-9	ES -3	-3	-2	6	1	-1	7	ES -3	ES -3	ES -3	ES -9	ES -22	-1	ES -22	ES -22	7	3	2	ES -22	-1	-3	-2	-9
29	-2	ES -3	-3	2	4	11	ES -9	-9	ES -3	-2	-3	5	7	2	ES -3	ES -9	ES -3	ES -3	ES -9	ES -22	-1	2	2	2
30	ES -22	-3	ES -9	7	12	7	ES -22	ES -22	ES -1	1	2	ES -1	ES -22	-1	ES -9	ES -22	ES -22	ES -3	ES -3	ES -9	ES -9	ES -22	ES -9	-4
31	ES -3	ES -3	0	2	0	15	5	4	7	2	ES -9	ES -9	7	ES 1	5	ES -12	16	ES -12	ES -12	9	12	8	10	8
CNT	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	US -5	ES -4	-3	-2	4	6	-1	ES -3	US -2	ES -3	ES -4	ES -5	ES -9	US 0	-1	US -1	-3	-3	US -3	US -3	-1	-3	-4	-4
UD	-1	2	4	7	12	12	14	10	8	5	ES 2	ES 5	ES 7	19	17	16	16	9	5	3	5	5	2	2
LD	ES -23	ES -22	ES -22	-11	-4	-4	ES -22	ES -22	ES -9	ES -22	ES -22	ES -22	ES -23	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22

C. RADIO PROPAGATION

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

AUG 1988 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	4	4	7	8	18	13	22	29	27	37	27	28	33	32	19	19	17	13	0	24	1	10	14	2
2	4	1	8	12	20	22	22	32	30	31	31	23	24	29	22	20	18	13	16	6	15	9	10	6
3	8	5	8	12	17	20	27	27	28	26	26	30	28	26	25	24	25	30	15	18	11	15	15	5
4	3	3	3	9	14	20	25	27	27	26	29	19	25	22	14	7	19	20	15	15	18	6	10	7
5	3	1	6	13	15	22	23	34	34	30	23	25	25	20	25	30	31	22	26	17	5	7	8	6
6	14	1	8	17	16	21	25	24	27	26	25	28	26	20	27	24	15	17	18	18	19	12	12	12
7	-2	5	9	12	15	25	31	24	33	32	24	30	29	22	24	22	22	17	20	22	21	12	8	6
8	3	7	3	8	20	21	23	30	28	30	25	26	29	22	24	22	24	14	17	15	10	11	2	4
9	1	4	7	11	15	20	21	27	27	26	26	31	25	27	25	21	23	25	10	13	19	7	8	7
10	3	0	3	10	19	22	25	31	27	29	26	22	32	28	18	17	15	22	5	15	10	15	10	6
11	2	5	8	10	17	24	25	28	29	30	31	27	19	27	14	22	19	22	12	24	18	17	10	6
12	5	3	10	13	18	23	25	33	30	33	25	30	31	26	11	-3	4	24	22	-2	14	8	11	14
13	14	13	13	14	17	17	19	16	16	24	21	21	9	17	ES -9	ES -22	7	14	ES -22	11	16	17	10	6
14	C	4	10	13	18	22	24	24	25	24	24	12	20	12	13	-13	ES -22	ES -22	ES -22	3	12	10	12	8
15	1	10	7	11	22	24	24	27	31	24	19	24	25	17	12	-9	ES -22	ES -22	ES -22	-3	7	17	11	11
16	0	-4	-4	4	16	21	14	20	22	19	11	20	12	19	ES -23	ES -22	ES -9	-2	ES -22	17	14	17	11	5
17	0	4	6	10	15	20	22	31	18	19	24	15	22	19	9	-8	5	18	-11	14	15	13	6	6
18	4	8	9	10	20	24	23	29	23	28	23	23	18	22	18	ES -23	ES -23	ES -23	ES -23	5	10	17	5	1
19	1	0	3	6	13	20	24	21	23	15	16	2	11	18	8	ES -23	ES -23	-14	ES -23	10	7	6	7	3
20	9	5	6	12	18	24	21	26	20	19	20	32	23	22	14	ES -4	ES -22	21	16	14	10	10	6	2
21	-2	8	4	17	20	22	28	25	25	24	30	24	24	25	18	13	-4	10	1	8	17	8	5	8
22	2	2	7	15	16	22	27	30	21	10	22	19	18	26	20	20	8	18	-2	18	17	15	11	5
23	5	5	6	12	19	25	24	27	31	19	15	19	26	19	13	1	0	24	16	11	11	5	8	2
24	-3	0	3	9	15	23	24	24	25	26	26	20	23	13	15	7	15	21	7	17	12	8	-2	-2
25	3	-1	7	10	21	24	28	27	30	32	24	17	17	22	0	22	11	17	ES -22	17	15	3	5	1
26	4	0	6	10	18	24	24	30	30	28	29	24	26	18	-1	-3	-3	22	ES -22	16	12	6	2	1
27	3	3	7	8	17	25	30	24	29	24	25	27	24	13	ES -2	15	ES -22	5	-9	12	14	10	3	1
28	-2	-1	3	6	15	18	24	29	30	18	16	17	13	13	14	5	13	21	-1	11	11	6	1	-3
29	-2	3	5	7	20	22	26	30	36	28	29	30	24	26	23	20	23	25	7	17	14	7	0	-2
30	ES -22	-3	2	13	18	25	30	31	32	24	26	28	32	22	2	-2	2	18	ES -3	16	13	3	0	1
31	5	-1	3	8	17	24	25	25	29	31	27	26	41	38	40	34	34	24	ES -12	23	24	21	15	12
CNT	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	3	3	6	10	17	22	24	27	28	26	25	24	24	22	14	13	11	18	1	15	14	10	8	5
UD	9	8	10	15	20	25	30	32	33	32	30	30	32	29	25	24	25	25	20	23	19	17	14	12
LD	-2	-1	3	6	15	18	21	21	20	18	16	15	12	13	ES -2	ES -22	ES -22	ES -22	ES -22	3	7	6	0	-2

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

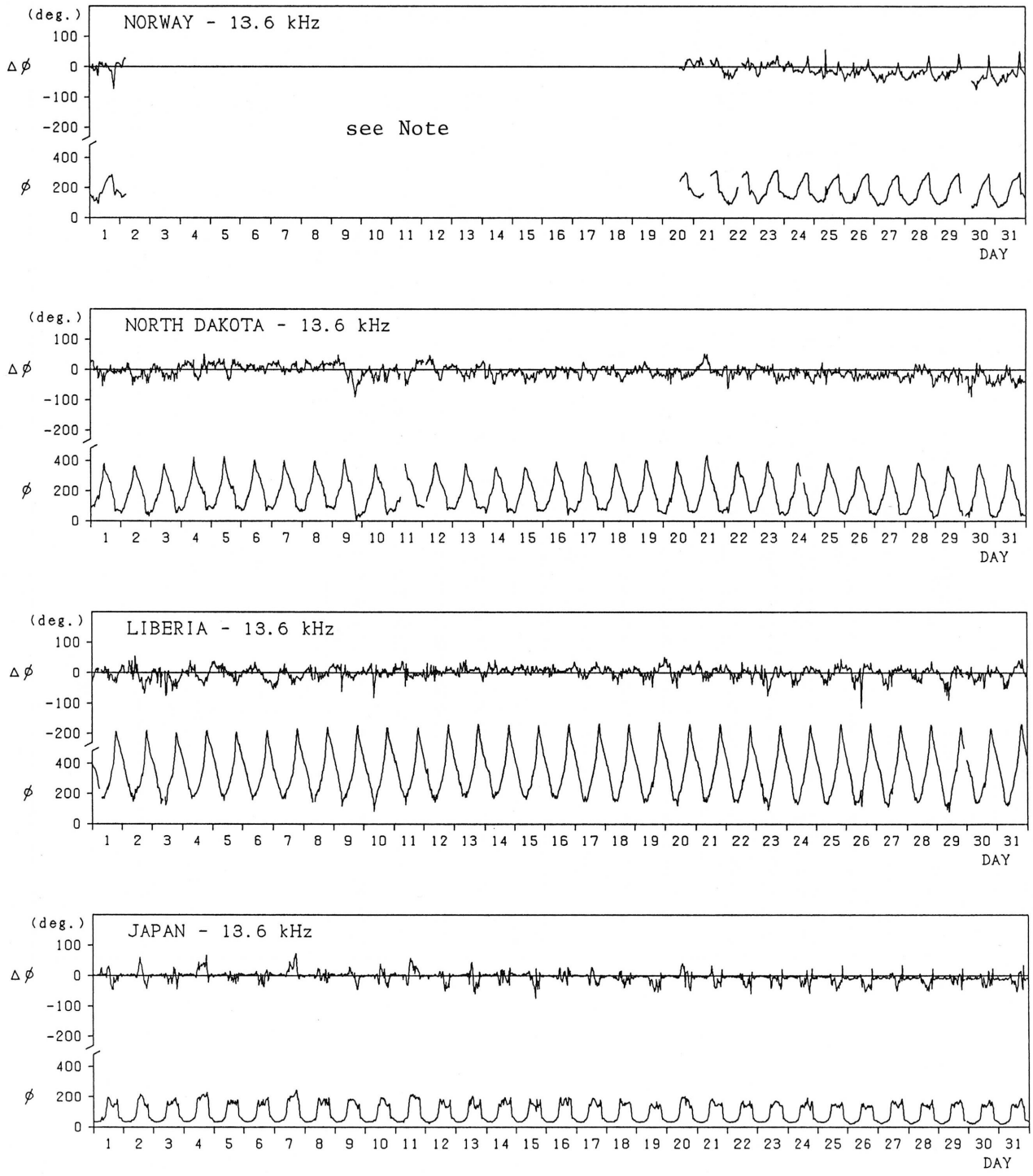
Time in U.T.

Aug.	Whole	W W V				W W V H				Conditions				Principal		
	Day	00	06	12	18	00	06	12	18	00	06	12	18	Geomagnetic Storms		
1988	Figure	06	12	18	24	06	12	18	24	06	12	18	24	Start	End	Range
1	4o	4	4U	5	3	4	4	4	4	N	N	N	N			
2	4o	3	4U	4	4	4	4	5	4	N	N	N	N			
3	4+	4	4U	5	4	4	4	5	4	N	N	N	N			
4	4+	4	5U	5	4	4	4	4	4	N	N	N	N			
5	4o	4U	5U	4	4	4	4	4	4	N	N	N	N			
6	4o	4	4U	5	3	4	4	4	4	N	N	N	N			
7	4+	4	5U	5	4	4	4	4	4	N	N	N	N			
8	4o	4	4U	5	3	4	4	4	4	N	N	N	N			
9	4+	4	5U	5	4	4	4	5	4	N	N	N	N			
10	4+	4	5U	5	4	4	4	4	4	N	N	N	N			
11	4o	4	3U	5	4	4	4	4	4	N	N	N	N			
12	4o	4	3U	4U	4	4	4	4	4	N	N	N	N			
13	3+	4	3U	2U	3U	4	3	3	4	N	N	N	N			
14	3+	3	3U	3U	3	4	4	2	4	U	U	U	U			
15	3+	4	3U	2U	3U	4	4	2	4	U	U	U	U			
16	3-	2U	2U	2U	3U	3	3	2U	4	U	U	U	U			
17	4o	4	4U	4	4	4	4	3	4	U	U	U	U			
18	3+	4	4U	3	3U	4	4	2	4	N	N	N	N			
19	3o	4	3U	2U	3	4	3	2	4	N	N	N	N			
20	4-	4	4U	4	3U	4	4	3	4	N	N	N	N			
21	4o	4	4U	3	4	4	4	4	4	N	N	N	N	2229	---	99
22	4-	4	4U	3	4	4	3	4	4	N	N	N	N	---	22.0	
23	4o	4	4U	4	3	4	4	4	4	N	N	N	N			
24	4o	4	4U	4	3	4	4	4	4	N	N	N	N			
25	4-	4	4U	3U	3	4	4	4	4	N	N	N	N			
26	4o	4	4U	4	4	4	4	3	4	N	N	N	N			
27	4-	4	3U	3U	4	4	4	3	4	N	N	N	N			
28	4o	4	4U	4	4	4	3	4	4	N	N	N	N			
29	4o	4	4U	4U	4	4	4	5	3	N	N	N	N			
30	4-	4	3U	3U	3U	4	4	4	4	N	N	N	N			
31	4+	4	5U	3U	5	4	4	5	5	N	N	N	N			

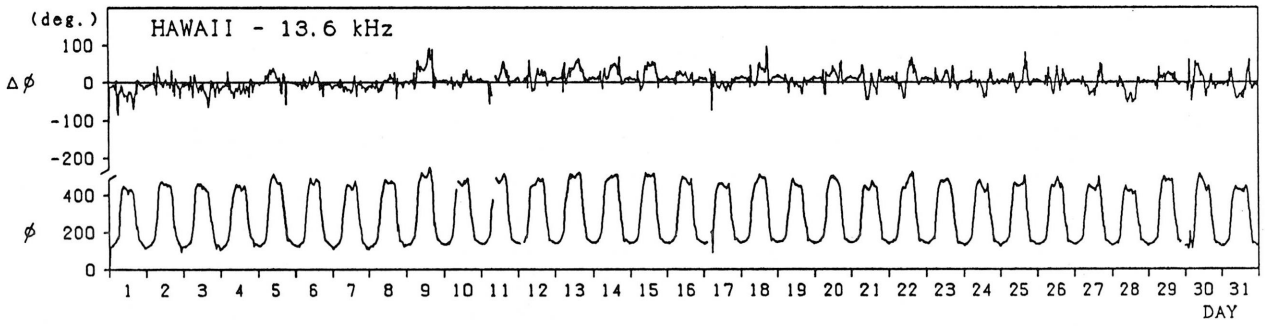
C. Radio Propagation

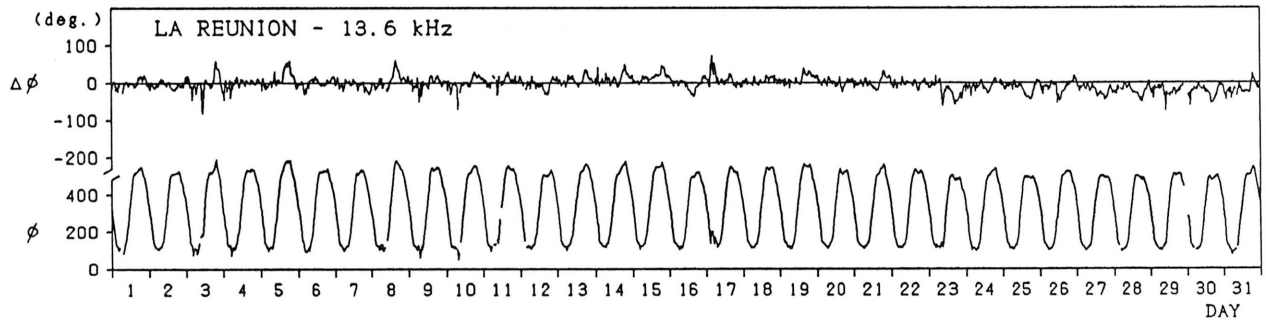
C3. Phase Variations in OMEGA in Radio Waves at Inubo

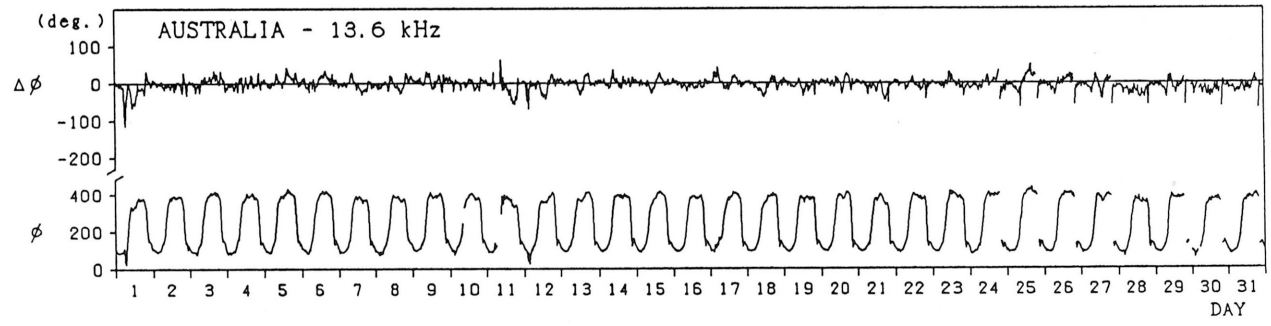
Inubo August 1988

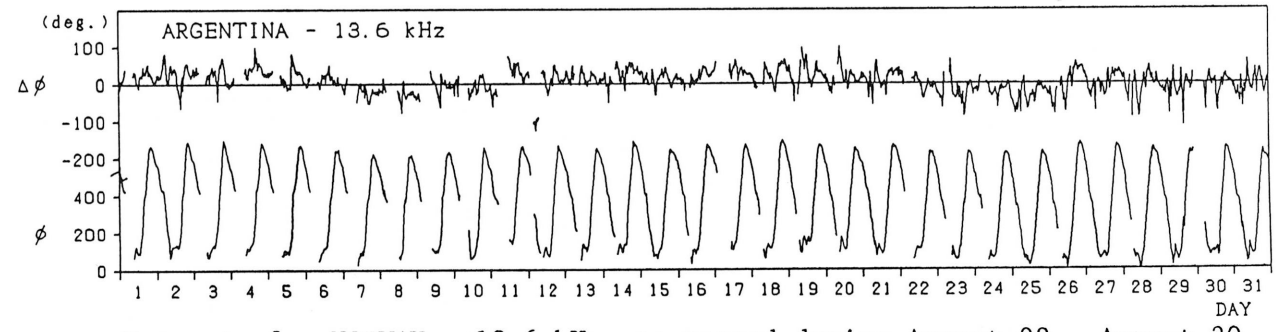


Inubo August 1988









Note: As for NORWAY - 13.6 kHz, no record during August 02 - August 20, due to the maintenance of transmitter.

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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Aug.25/0604	Aug.29/2100	Aug.26/0204	56.3

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Aug. 1988	S W F								Correspondence		
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
	CO	HA	1)	2)	3)							
1			20	x	x	0539	66	SL	2-	0533		
8			10	10	x	0800	50	SL	1-	0810	x	

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

(b). Sudden Phase Anomaly (SPA) at Inubo

Inubo

Aug. 1988	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			23	—	11		0402	0456	0412
1	26		139	—	35	32	0532	0613D	0549
1	39		193	—	47	39	0613E	0807	0633
2	—		14				0811	0856	0820
2	—	39					1555	1648	1607
2	—				18		2046	2141	2054
2	—		20		48	32	2205	2310	2217
3	—			4			0302	0324	0308
3	—			6			0343	0412	0350
3	—	27	41	27	16	18	0420	0505	0431
3	—			6			0557	0618	0602
3	—	71	45	30			0634	0755	0656
3	—	96	107	35			0826	0957	0856
3	—	62	77*				1006	1115	1033
3	—	32					1553	1637	1603
3	—				50	39	2027	2129	2039
3	—			10	22	24	2305	2357D	2324
3	—				19		2357E	0113	0016
4	—		20	14	12		0215	0300	0234
4	—	20	39	20	20		0449	0537	0459
4	—		30	6			0655	0746	0714
4	—				31	31	2051	2135	2101
5	—			8	4		0113	0143	0117
5	—			12*			0336	0412	0342
5	—			6			0602	0625	0608
5	—			8			0709	0815	0753
5	—				12		2302	2344	2315
6	—		20	14	12		0340	0407D	0353
6	—		20	22			0407E	0453	0423
6	—		18	11			0519	0558	0529
6	—		27	10			0714	0759	0730
7	—			16	14		0003	0050	0011
7	—			10	14		2220	2253	2229
7	—			—	13		2354	0041	0003

Inubo

Aug.	S			P		A			
1988	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
8	—		24	—	9		0227	0256	0233
8	—		21	—			0531	0602	0540
8	—	17	30	—			0708	0752	0730
8	—	24	148	72			0802	1007	0812
8	—				10		2139	2217	2153
8	—				12		2224	2302	2229
9	—			16	9		0225	0253	0232
9	—		35	20	22		0428	0516	0437
9	—			10			0533	0615	0537
9	—	52	69	43		27	0634	0732	0649
9	—		19	8			0820	0852	0826
10	—	33	49	40	22		0230	0255D	0235
10	—	20	26	28	20		0255E	0341	0259
10	—	70	95	44			0722	0912D	0803
10	—	17	76				0912E	1047	0919
16	—			8			0431	0500	0438
16	—		16	6			0546	0604	0550
17	—			—	9		0008	0100	0015
19	—	55					1342	1439	1402
23		61	34				0856	1055	0928
23					25		2004	2045	2011
24			18	10			0615	0655	0628
24				10	19	18	2311	2345	2315
25			13	6			0444	0525	0450
26			14	14			0454	0542	0510
26		66	37				1115	1220	1123
27		34					1201	1254	1210
27					6		2300	2336	2305
28					7		0005	0040	0017
28	17	20	52	43	19	16	0335	0431	0346
28				7	7		2329	0012	2337
29			23				0851	0918	0857
29		28	49				0948	1024	0953
29		41					1550	1627	1607
30				—	19		0137	0233D	0152
30			9	6			0701	0725	0709
31	18	19	32*	32*	17	23	0509	0606	0517
31			15				0713	0751	0716
31		43	32	—			0819	0934	0826

IONOSPHERIC DATA IN JAPAN FOR AUGUST 1988

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