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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *Es*.
B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.
C Measurement influenced by, or impossible because of, any non-ionospheric reason.
D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.
E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
F Measurement influenced by, or impossible because of, the presence of spread echoes.
G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
H Measurement influenced by, or impossible because of, the presence of a stratification.
K Presence of particle *E* layer.
L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
N Conditions are such that the measurement cannot be interpreted.
O Measurement refers to the ordinary component.
P Man-made perturbations of the observed parameter; or spur type spread *F* present.
Q Range spread present.
R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
S Measurement influenced by, or impossible because of, interference or atmospherics.
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V Forked trace which may influence the measurement.
W Measurement influenced or impossible because the echo lies outside the height range recorded.
X Measurement refers to the extraordinary component.
Y Lacuna phenomena, severe layer tilt.
Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.
D Greater than.
E Less than.
I Missing value has been replaced by an interpolated value.
J Ordinary component characteristic deduced from the extraordinary component.
M Mode interpretation uncertain.
O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U Uncertain or doubtful numerical value.
Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

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

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.
l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.
c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)
h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)
q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.
r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.
a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.
s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.
d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.
n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.
k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

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

* Measurement impossible because of interference.

B Measurement impossible because of bursts.

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C	artificial accident,
S	propagational accident,
U	inaccurate.

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

N	normal,
U	unstable,
W	disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

Correspondence of solar optical flare, solar radio burst, and geomagnetic crochet to SWF is marked by X, being determined with data from interchange messages of IUWDS and observations at Hiraiso.

In table (a) SWF, *date* indicates the day to which the *start-time* of the event belongs.

b. Sudden Phase Anomaly (SPA) at Inubo

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubo. The transmitting stations are listed in the following table.

Phase advance is shown in unit of degree at its maximum stage. No transmission or no reception during the period is indicated by —, an indistinguishable record is spaced out, and a multi-peak event is marked by *. The most remarkable or distinct phase advance is underlined and listed in the column of *Time*.

In table (b) SPA, *date* indicates the day to which the *start-time* of the event belongs.

The following letters may be attached to the value, if necessary.

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

Transmitting Stations

Name	Location (Geographic Coordinates)		Call Sign	Frequency (kHz)	Radiation Power (kW)	Arc Distance from Inubo (km)
Norway	66°25'N	013°08'E	Ω/N	13.6	10	7820
Liberia	06°18'N	010°40'W	Ω/L	13.6	10	14480
Hawaii	21°24'N	157°50'W	Ω/H	13.6	10	6100
North Dakota	46°22'N	098°20'W	Ω/ND	13.6	10	9140
La Reunion	20°58'S	055°17'E	Ω/LR	13.6	10	10970
Argentina	43°03'S	065°11'W	Ω/AR	13.6	10	17640
Australia	38°29'S	146°56'E	Ω/AU	13.6	10	8270
Japan	34°37'N	129°27'E	Ω/J	13.6	10	1040
North West Cape	21°49'S	114°10'E	NWC	22.3	1000	6990

HOURLY VALUES OF FOF2 AT WAKKANAI

AUG. 1990

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	67	39	64	65	66	75	79	91	84	78	81	83	84	74	81	76	79	81	89	81	N	90	89	74
2	62	63	64	71	58	62	71	80	82	81	80	74	83	77	66	73	A	A	92	84	66	75	77	75
3	66	66	66	63	62	67	89	99	86	87	89	84	79	57	83	84	81	78	83	A	82	84	83	78
4	70	66	70	66	62	A	70	73	74		68	89	72	A	65	71	69	72	76	67	79	80	66	76
5	76	76	62	65	64	73	80	84	86	81	83	73	79	82	81	81	82	73	81	54	84	84	82	85
6	80	83	71	70	68	71	72	66	91	83	74	A	78	81	78	77	71	73	80	65	84	88	74	66
7	68	66	70	64	62	65	80	99	102	A	74	56	74	72	55	72	66	78	80	84	90	84		66
8	75	78	71	68	63	50	84	101	95	90	90	88	85	88	85	82	89	84	83	83	86	90	86	74
9	76	75	74	64	64	74	90	91	88	84	81	87	90	92	80	84	84	83	66	91	90	92	83	79
10	75	74	67	66	66	62	83	100	106	88	78	78	88	89	92	86	84	87	83	72	85	85	82	86
11	76	74	68	62	63	66	87	103	98	92	86	82	85	95	85	77	81	80	82	90	53	87	86	66
12	59	60	61	60	61	64	66	67	66	77	80	75	82	77	78	74	81	86	78	76	78	74	74	72
13	74	74	73	65	65	68	89	86	89	85	82	A	87	86	86	85	87	87	83	86	88	69	67	N
14	66	66	69	66	56	56	64	60	65	56	A	A	A	A	64	65	68	67	59	51	66	68	64	59
15	63	58	56	62	56	57	73	70	70	63	60	68	A	64	76	73	69	73	64	70	66	66	62	58
16	66	61	55	46	30	A	51	62	50			A	52	62	59	61	A	67	64	68	53	66	62	59
17	56	53	53	53	55	62	65	72	80	66	69	64	A	58	63	62	64	65	A	65	64	64	66	64
18	63	56	60	52	52	58	49	74	84	A	84	83	78	86	78	78	77	83	78	81	84	80	68	72
19	61	62	66	64	58	72	86	85	96	91	86	89	91	91	89	85	85	85	80	84	87	83	82	73
20	66	55	64	64	64	73	84	98	102	92	90	91	89	92	86	86	90	90	96	91	80	71	71	62
21	64	58	62	62	53	51	74	74	68	68	84	86	90	81	80	80	80	74	86	84	78	70	61	59
22	54	54	49	53	54	66	73	89	74	87	67		A	A	45	52	60	60	60	62	61	60	58	43
23	54	52	49	33	29	42	52	61	72	86	68	82	74	82	76	76	71	78	78	79	72	64	54	53
24	54	44	34	37	38	38	62		60	57	66	66	75	67	72	81	74	80	73	66	68	65	66	59
25	62	53	54	46	A	A	72	86	90	92	91	86	90	85	A	77	78	79	77	80	77	66	77	66
26	66	66	61	63	58	61	82	96	90	89	92	88	89	88	86	81	80	76	80	91	85	84	67	66
27	62	52	38	38	37	40	42	A								A	56	56	58	53	53	54	55	53
28	49	50	53	51	48	61	67	87	78	78	87	84	77	76	81	82	80	83	77	77	77	74	68	66
29	68	66	62	64	66	66	83	91	92	86	90	89	92	90	88	94	89	87	85	86	88	80	67	76
30	74	70	66	62	57	52	66	78	82	78	83	80	83	93	90	90	91	91	85	80	79	71	66	51
31	58	64	62	50	44	51	64	80	77	81	63	77	77	82	81	67	75	78	110	84	59	73	52	55
	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	28	31	29	30	26	28	25	26	27	29	30	29	30	30	30	30	31	30	30
MED	66	63	62	63	58	62	73	85	84	84	82	83	83	82	80	78	80	78	80	80	78	74	68	66
U Q	74	70	68	65	64	67	83	93	91	88	86	87	89	89	85	84	84	84	83	84	85	84	82	74
L Q	61	54	55	52	53	54	65	72	74	78	71	74	77	74	69	73	70	73	76	67	66	66	64	59

HOURLY VALUES OF FES AT WAKKANAI

AUG. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	29	34	28	G	G	47	58	74	60	46	48	48	78	67	55	46	41	45	56	61	59	38	29
2	28	28	G	G	30	38	45	51	56	44	61	60	G	76	G	51	96	105	116	G	29	32	34	38
3	28	32	27	61	86	42	95	108	92	92	104	G	56	53	67	G	58	96	60	92	42	59	90	80
4	59	60	45	27	34	66	51	58	65	167	126	127	63	76	46	64	80	47	52	77	46	32	33	G
5	G	G	28	G	G	G	40	57	59	60	G	G	G	G	G	46	54	69	108	72	37	27	G	66
6	45	28	25	G	G	G	45	60	55	G	60	75	64	G	G	G	40	40	40	91	34	58	39	31
7	G	G	G	G	G	36	43	56	68	89	62	G	G	G	G	G	53	59	36	54	60	80	178	80
8	49	G	G	G	36	G	40	70	62	61	G	54	60	58	66	70	63	52	51	45	72	57	38	G
9	29	32	34	28	G	G	46	53	62	48	60	G	G	G	G	G	58	96	116	70	96	59	33	57
10	46	34	27	G	G	33	49	63	67	69	54	57	48	G	G	G	58	53	44	G	G	32	39	33
11	35	29	G	G	G	G	G	45	G	G	G	55	G	G	G	43	46	41	68	90	58	92	59	57
12	G	G	G	G	G	G	42	G	G	G	G	G	G	G	G	G	G	G	39	35	51	G	60	G
13	54	G	G	G	30	30	G	G	G	45	59	97	90	G	58	68	46	G	33	G	G	72	71	28
14	G	G	G	G	28	G	37	G	G	46	68	60	72	74	62	50	43	G	56	74	60	34	28	G
15	30	36	33	45	38	41	52	54	60	62	48	47	46	60	G	G	G	41	40	33	39	G	27	32
16	26	G	G	28	26	30	G	G	G	G	G	62	60	G	G	G	66	69	57	60	61	51	37	G
17	G	G	G	G	G	G	G	G	G	G	G	56	72	G	G	G	61	44	68	40	32	54	58	35
18	44	31	29	G	G	36	72	54	G	94	G	G	G	G	G	G	G	45	G	G	G	G	G	G
19	G	G	G	G	G	30	38	G	G	G	G	G	G	G	G	G	G	36	59	57	44	44	54	30
20	38	59	35	28	35	G	G	G	44	60	62	76	79	64	63	G	G	43	33	30	28	G	26	28
21	34	57	37	32	28	G	G	50	60	55	46	46	G	G	G	G	G	G	44	30	30	28	28	24
22	26	G	31	28	33	G	54	45	70	59	G	G	57	58	G	G	48	43	33	24	32	52	26	26
23	28	24	30	30	28	36	38	57	G	G	G	G	G	G	46	54	50	58	51	53	G	G	G	27
24	28	30	28	25	25	32	43	G	G	44	G	G	G	G	G	46	G	34	G	G	46	32	45	59
25	59	30	G	43	60	51	56	42	57	65	67	G	G	48	66	47	G	43	73	57	36	38	51	43
26	36	37	G	34	32	G	G	G	G	G	G	53	G	G	G	G	G	G	G	32	G	G	G	26
27	59	28	24	26	G	32	G	44	G	G		G	G		G	42	G	45	44	58	57	47	66	50
28	43	29	G	G	G	30	G	G	G	53	59	G	G	G	58	58	G	G	G	41	28	39	58	28
29	28	31	28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	32	G	G	31	32	39
30	29	34	33	28	G	G	G	G	G	G	50	60	62	67	92	116	92	96	39	54	58	38	86	69
31	36	33	34	G	36	G	G	G	G	G	G	67	90	61	G	G	73	60	66	60	79	33	29	31
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31
MED	29	29	27	G	25	G	40	45	G	46	46	47	G	G	G	G	46	43	44	53	39	38	38	31
U Q	44	33	33	28	33	36	47	57	62	61	60	60	62	60	58	51	58	59	60	60	58	57	58	50
L Q	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	36	33	30	28	28	28	26

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

AUG. 1990

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	18	18	17	17	17	22	23	34	38	38	41	39	40	46	28	24	20	20	18	16	17	15	20
2	16	15	17	16	17	18	21	27	35	36	35	42	55	38	49	39	33	23	18	20	15	16	17	18
3	20	20	16	15	17	18	21	20	27	34	35	51	45	39	28	26	34	22	17	18	18	17	17	16
4	16	17	18	18	16	17	20	22	24	24	35	40	40	39	42	36	24	24	17	17	17	17	16	15
5	15	16	15	15	16	23	20	21	26	35	44	42	52	52	42	24	23	22	21	16	17	17	16	15
6	16	17	15	16	16	18	21	21	26	39	38	42	40	34	52	26	22	18	20	18	18	17	15	16
7	16	15	15	15	16	17	22	28	26	40	30	50	54	48	40	24	33	21	20	17	17	17	16	17
8	16	17	15	15	17	21	20	23	24	32	33	38	33	40	34	35	22	18	18	17	15	15	15	15
9	15	15	16	17	15	22	18	23	29	33	39	50	54	52	49	27	22	20	17	14	17	15	16	16
10	16	15	15	15	15	16	18	18	23	35	30	48	54	42	27	24	24	20	21	20	16	16	16	15
11	15	15	14	15	15	22	20	20	42	48	40	39	37	48	28	27	23	18	16	17	16	16	15	18
12	15	14	15	17	15	17	22	20	40	35	41	50	58	53	52	28	24	18	17	15	15	16	15	16
13	16	17	14	14	15	17	18	23	38	35	36	39	40	40	33	26	24	22	17	18	16	16	16	15
14	16	15	16	16	16	18	22	32	39	40	39	39	38	40	27	32	24	20	16	15	17	18	20	20
15	17	17	17	16	17	18	23	22	24	38	39		39	38	33	48	26	22	18	16	15	15	16	15
16	15	15	16	17	N	16	20	22	24		38	36	37	40		28	27	18	17	22	17	18	17	18
17	15	15	16	18	16	21	22	26	30	30	39	39	42	40	29	26	23	18	17	15	15	17	16	17
18	16	17	15	15	15	17	18	28	46	34	30	55	47	54	27	43	24	18	23	16	16	14	17	16
19	16	15	15	15	15	16	18	23	47	31	46	49	43	50	40	43	26	23	17	17	16	16	15	17
20	16	16	15	15	17	22	23	24	35	35	42	39	44	35	32	30	26	20	18	17	15	15	16	15
21	15	15	16	16	18	20	23	28	28	26	39	38	44	49	58	43	24	27	20	16	16	18	16	16
22	16	15	15	15	15	16	22	26	33	35	46		42	39	45	43	23	18	16	16	15	15	15	16
23	14	15	15	14	15	16	18	23	24	40	36	48	46	42	29	27	22	28	16	15	16	15	16	16
24	15	15	15	16	16	18	20	23	40	36	49	49		48	46	26	41	23	17	16	15	17	15	15
25	20	16	15	14	15	21	23	30	34	39	42	49	52	37	34	30	27	18	18	17	16	16	14	15
26	16	15	15	15	15	21	29	23	39	41	48	39	54	43	43	38	27	28	21	16	17	16	15	17
27	16	15	15	17	15	16	18	24	26	29					70	34	22	18	18	17	15	16	17	16
28	17	16	15	16	14	16	28	21	26	27	38	40	49	58	34	27	22	27	22	16	16	15	15	15
29	16	16	17	17	16	20	28	26	40	36	59	48	46	45	42	26	22	23	23	15	16	18	17	16
30	17	15	16	16	15	21	18	32	22	38	40	44	38	38	41	28	27	20	18	18	15	16	16	20
31	16	18	15	16	16	18	20	22	26	32	28	40	35	42	28	26	21	17	18	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	31	31	31	30	30	28	29	30	30	31	31	31	31	31	31	31	31	31
MED	16	15	15	16	16	18	21	23	29	35	39	42	44	41	40	28	24	20	18	17	16	16	16	16
U Q	16	17	16	17	16	21	22	26	39	38	42	49	52	48	46	36	27	23	20	18	17	17	16	17
L Q	15	15	15	15	15	17	18	22	26	32	35	39	39	39	29	26	22	18	17	16	15	15	15	15

HOURLY VALUES OF FOF2 AT AKITA

AUG. 1990

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	67	65	70	72	68	73	87	97	80	79	82	A	88	86	88	94	A	84	84	83	83	88	85	86
2	74	67	77	76	54	57	A	88	94	88	86	94	100	102	93	86	86	87	84	A	83	A	73	79
3	74	75	70	63	A	80	92	103	86	84	84	87	91	86	88	92	86	A	A	84	82	84	78	79
4	78	74	66	74	69	68	80	73	A	A	69	67	72	84	83	76	80	A	78	A	A	A	80	78
5	A	80	72	74	68	77	81	90	87	84	98	82		83	84	88	A	A	84	81	84	83	A	83
6	A	83	64	82	73	67	79	A	93	A	A	81	88	90	79	90	86	A	111	A	A	A	A	79
7	77	76	77	66	68	67	84	108	103	86	83	75	80	84	72	76	80	83	84	88	86	84	78	A
8	A	73	76	67	66	63	85	100	97	A	A	88	87	92	93	94	103	91	86	82	86	87	86	86
9	83	78	76	73	66	78	90	90	84	88	A	A	A	A	85	A	A	A		A	A	90	92	82
10	A	74	79	74	67	70	86	117	74	83	85	90	94	96	99	100	94	91	77	85	83	86	81	76
11	78	82	74	72	66	67	88	112	108	98	94	91	85	92	104	87	85	A	A	86	85			
12														C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C					72	A	54	A	A	46	76
15	66	42	64	65	63	63	84	86	71	81	83	77	80	72	79	88	84	82	75	76	69	52	51	54
16	54	62	A	A	41	A	A	68	51	63	A	A	68	A	A	A		74	A	74	72		A	65
17	51	52	63	51	62	67	71	79	90	68	76	77	80	73	71	73	76	76	78	66	A	48	51	55
18	A	67	52	48	51	54	75	79	87	91	A	91	91	89	84	86	80	82	88	86	78	82	72	77
19	75	71	70	70	63	69	83	99	114	91	93	102	103	105	97	94	91	87	86	89	84	A	A	79
20	66	74	74	76	64	72	91	98	86	94	92	98	103	N	102	94	92	107	104	90		73		A
21	52	66	66	52	63	66	79	86	82	81	92	94	92	92	84	87	88	81	86	86	55	75	53	66
22	54	52	53	57	A	72	86	86	105	95	N	A	94	A		51	59	62	67	57	54	54	53	A
23	A	A	53	45	46	43	54	85	96	97	105	91	96	89	83	76	74	86	79	77	81	A	50	52
24	54	58	41	53	52	51	69	80	86	86	90	96	94	91	86	90	86	86	84	72	67	A	A	52
25	A	69	A	52	52	52	74	90	104	97	94	91	86	91	84	84	82	84	79	82	78	75	79	A
26	A	45	75	67	68	65	83	108	99	91	89	91	94	98	94	88	90	85	76	88	86	86	62	83
27	78	53	50	A	53	47	A	44	94		A				A	A	56	51	55	52	51	A	A	63
28	53	51	54	52	53	52	80	86	82	71	84	81	80	76	86	83	85	80	86	86	66	74	79	A
29	64	A	69	67	70	77	86	94	95	87	93	93	85	96	71	98	88	91	86	90	88	79	A	55
30	72	77	72	51	53	N	77	88	86	84	90	91	92	100	75	101	100	100	106	88	80	80	55	52
31	A	A		53	46	53	76	86	82	94	88	87	90	91	91	86	90	86	88	82		66	A	51
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	25	25	26	26	26	25	27	27	24	21	23	25	23	25	25	24	23	24	25	22	19	19	23
MED	67	69	70	66	63	67	83	88	87	86	89	91	90	91	85	88	86	84	84	83	82	80	73	76
U Q	77	75	74	73	68	72	86	99	97	92	93	93	94	96	93	94	90	87	86	87	84	86	80	79
L Q	54	55	58	52	53	54	76	85	82	82	83	81	82	84	81	83	80	80	78	75	69	73	53	55

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

AUG. 1990

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

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	37	38	32	32	31	30	40	70	55	74	64	83	54	74	60	68	93	45	36	45	64	83	58	52
2	53	32	32	G	32	40	48	56	91	107	87	68	62	74	47	G	67	68	81	136	72	103	50	58
3	44	38	33	25	56	82	38	52	50	G	54	52	74	58	55	G	132	136	72	57	G	41	28	32
4	G	27	33	25	46	55	57	53	58	75	51	50	G	G	60	80	92	92	44	69	83	60	86	91
5	82	33	26	31	30	G	G	44	55	53	80	100	G	G	102	70	137	102	78	116	92	84	71	69
6	144	49	53	45	58	84	58	111	94	126	75	72	48	75	73	60	73	79	102	146	142	116	83	57
7	53	38	36	30	42	G	38	48	53	49	49	48	G	G	G	G	G	50	50	40	36	48	44	59
8	53	32	G	27	36	32	50	58	56	92	132	80	56	G	G	G	57	38	92	111	92	127	72	40
9	51	28	32	32	30	36	44	56	87	74	93	116	115	90	73	104	179	170	134	168	141	59	91	115
10	70	51	50	38	30	30	56	61	86	85	80	57	49	51	54	48	G	43	46	34	33	39	41	41
11	34	40	32	29	31	29	37	G	68	60	59	54	54	56	56	58	115	102	88	53	53			
12														C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C					96	95	114	58	54	49	40
15	34	30	33	30	37	30	43	G	47	G	G	48	G	G	62	50	G	42	37	30	33	24	G	31
16	40	G	37	32	34	30	38	49	45	G	61	48	49	61	50	56		51	78	73	94	92	37	28
17	30	G	G	G	25	G	38	55	89	G	G	G	G	G	47	65	52	74	96	58	116	33	31	36
18	39	33	32	G	G	36	35	43	42	G	90	72	G	G	G	G	42	43	50	G	24	24	28	G
19	30	G	G	G	G	G	35	40	G	G	50	G	G	G	G	G	55	61	56	49	43	116	91	45
20	38	33	36	28	G	G	36	G	G	50	G	G	54	G	G	G	G	54	44	59	32	31	30	54
21	G	32	30	24	26	G	G	52	58	58	54	52	G	G	G	G	54	58	40	40	28	34	34	28
22	G	30	G	31	45	34	36	47	48	73	74	50	83	88	G	G	51	54	60	28	33	G	40	36
23	30	51	28	32	34	31	38	46	68	52	G	G	G	G	G	G	52	49	42	43	38	38	G	G
24	24	54	27	27	27	32	38	48	61	66	50	G	51	54	G	G	G	40	32	G	33	51	46	33
25	92	43	50	34	32	37	44	55	51	62	G	62	74	52	G	G	G	41	57	54	48	58	40	80
26	43	30	27	26	23	G	G	43	G	G	50	61	51	65	64	49	42	36	32	72	39	32	25	24
27	G	G	32	40	37	G	36	G	92	G	54		G	G	46	52	47	38	G	G	31	32	43	51
28	31	32	26	30	34	28	G	G	G	G	55	93	G	G	G	G	G	G	32	34	G	28	G	69
29	40	34	29	G	G	G	38	44	G	G	G	51	G	G	G	G	G	G	29	46	83	29	50	31
30	G	41	38	40	37	32	40	G	G	G	G	G	51	54	G	G	49	50	50	29	25	37	48	32
31	73	40	38	31	38	34	35	44	G	74	48	51	50	G	G	G	G	49	38	38	36	115	91	38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	28	28	28	28	28	27	28	28	28	28	27	29	29	29	29	28	28	28
MED	38	33	32	30	32	30	38	48	54	52	54	52	49	G	24	G	51	50	50	49	39	44	44	40
U Q	53	40	36	32	37	35	43	55	68	74	74	72	54	59	58	57	73	76	79	72	83	83	64	57
L Q	30	30	27	25	26	G	35	41	21	G	24	48	G	G	G	G	G	41	37	34	32	32	30	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

AUG. 1990

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	15	15	16	16	18	20	24	22	34	35	34	29	22	21	17	16	15	15	15	15	16
2	15	15	15	15	15	15	18	28	21	24	35	34	35	38		24	23	18	15	15	15	15	15	16
3	15	15	15	17	15	16	16	18	20	26	21	30	34	27	26	23	22	17	16	15	16	17	16	15
4	16	16	15	15	14	15	16	16	17	20	24	27	23	63	22	21	17	16	16	15	15	16	15	15
5	15	15	16	15	16	21	16	17	20	24	27	28	28	22	26	20	18	16	15	15	15	15	15	15
6	15	15	15	15	15	16	16	20	17	23	28	34	36	33	26	22	20	17	16	15	15	16	16	16
7	15	15	15	15	15	20	16	16	21	24	28	28	28	26	26	20	20	18	16	15	15	16	16	15
8	16	16	16	16	15	15	18	18	21	22	27	24	23	55	53	36	20	15	16	15	15	15	16	15
9	16	15	15	16	16	16	17	17	21	28	24	27	27	26	24	23	20	16	15	15	15	15	16	15
10	16	15	15	15	15	15	16	16	17	20	23	24	23	22	22	17	16	15	16	15	15	15	15	15
11	15	15	15	15	15	16	21	17	22	22	28	24	30	35	24	23	17	15	16	15	15			
12														C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C					16	16	18	16	17	16	16
15	16	16	17	17	15	16	17	17	18	21	23	23	26	54	38	24	21	16	16	15	20	16	16	15
16	15	15	16	16	17	16	18	20	20	24	28	35	41	33	26	26		16	15	15	16	16	16	16
17	17	16	16	21	17	18	16	20	21	24	38	36	64	29	27	26	18	16	16	15	15	15	15	15
18	15	15	15	16	15	15	16	16	29	30	24	26	22	N	23		16	17	16	17	17	16	17	16
19	15	17	15	16	15	18	16	16	20	23	24	64	27	26	24	23	18	18	15	15	15	15	16	16
20	16	17	16	16	18	20	17	21	23	35			35	64	56	45	26	18	18	15	16	15	15	16
21	18	15	15	15	17	18	17	18	21	26	38	32	34	35	35	26	20	18	16	15	15	15	16	15
22	15	15	16	14	15	15	16	18	23	35	36	36	28	N		22	21	18	16	15	15	15	15	15
23	15	16	15	15	15	15	18	16	20	22	26	45	34	64	26	21	18	16	16	15	15	15	16	16
24	16	15	15	15	15	16	17	18	22	23	35	64	36	37	27	24	20	16	16	16	15	16	15	16
25	16	18	15	15	16	15	21	23	24	42		38	40	38	38		23	20	18	18	16	16	15	17
26	17	17	15	16	15	20	21	22	23	26	35	36	35	35	29	24	21	16	16	18	16	16	17	16
27	15	15	16	15	15	N	16	17	21	22	24		26		40	22	17	16	23	16	16	16	16	16
28	15	15	16	15	15	15	29	21	21	24	23	26	52			22	20	17	16	15	16	18	16	17
29	16	15	15	15	16	18	16	20	26	24		36	38	64	33	28	20	18	22	16	16	16	16	16
30	17	15	16	15	15	16	16	20	20	23			39	27	N	22	18	18	16	15	16	15	16	16
31	15	15	15	15	15	17	18	16	20	22	24	24	28	23	22	20	21	17	15	15	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	28	28	28	28	27	28	28	28	28	24	25	28	24	24	26	27	29	29	29	29	28	28	28
MED	15	15	15	15	15	16	16	18	21	24	26	32	34	34	26	23	20	17	16	15	15	16	16	16
U Q	16	16	16	16	16	18	18	20	22	26	31	36	36	46	34	24	21	18	16	15	16	16	16	16
L Q	15	15	15	15	15	15	16	16	20	22	24	26	27	26	24	22	18	16	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

AUG. 1990

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	76	74	70	69	67	76	94	94	78	76	83	90	92	98	98	108	100	93	86	80	85	85	81	87
2	75	68	74	80	62	54	A	90	96	91	85	95	110	108	106	97	A	A	A	A	A	80	82	75
3	70	72	72	70	71	79	97	102	90	77	82	87	97	93	96	96	N	91	90	90	88	87	80	84
4	84	83	82	84	77	76	75	71	74	67	76	77	78	86	85	86	86	86	85	83	45	78	79	83
5	75	84	79	78	73	73	86	96	88	85	82	83	A	90	90	93	91	A	98	85	78	83	85	80
6	81	80	80	81	71	70	79	102	91	A	81	86	96	A	A	A	96	85	90	A	A	80	86	85
7	85	80	78	66	68	82	93	107	103	85	90	88	83	89	90	82	90	95	103	101	90	81	80	77
8	77	77	75	67	64	68	90	101	88	88	81	88	101	97	102	110	112	95	86	81	77	84	83	90
9	90	80	77	76	70	74	93	96	82	86	94	91	96	100	96	95	95	95	98	88	81	87	92	88
10	82	78	70	63	66	70	107		88	80	A	104	99	104	106	105	99	88	87	91		83	83	81
11	84	72	76	72	68	68	96	110	104	104	96	94	102	108	111	108	94	95	92	97	88	78	75	73
12	71	52	71	52	52	57	78	102	103	A	84	97	106	103	93	102	95	97	100	86	71	74	80	75
13	78	79	75	70	69	76	87	96	86	85	84	89	105	110	102	96	105	100	101	105	89	A	76	72
14	80	72	75	51	48	57	75	81	71	74	A	72	A	82	85	80	77	82	79	A	72	76	76	78
15	68	67	63	62	59	63	88	84	77	90	90	82	90	86	86	94	92	95	88	84	68	70	72	67
16	66	66	70	51	45	45	70	74	67	72	71	A	73	75	71	A	75	A	69	77	53	67	A	62
17	58	63	61	57	63	65	81	77	97	98	91	89	A	84	82	76	78	81	82	74	67	65	71	74
18	66	66	65	55	50	50	77	86	90	96	94	96	102	101	97	91	90	87	97	97	80	80	82	79
19	80	75	73	75	64	63	84	103	103	96	102	106	111	108	110	105	98	94	95	98	86	86	85	82
20	77	76	74	74	64	73	102	94	86	92	103	108	115	115	114	114	114	118	121	96	74	70	75	74
21	71	71	61	62	64	64	83	90	87	89	105	107	108	102	103	100	94	88	88	88	78	72	72	74
22	68	68	54	63	67	72	84	123	112	85	87	85		54	49	58	67	A	A	53	50	A	64	57
23	55	57	55	54	49	50	67	100	102	105	107	101	106	105	93	84	80	93	93	77	A	70	72	68
24	68	68	50	58	58	56	74	98	95	108	110	110	113	102	100	94	92	97	90	A	67	66	64	65
25	60	54	56	58	54	54	72	90	101	104	106	104	98	98	90	93	91	88	90	A	80	79	82	82
26	80	76	72	68	67	67	86	108	100	92	88	100	105	105	102	99	98	90	85	88	81	84	78	87
27	77	57	55	54	65	55	A	A	A	51	A	A	A	A	A	A	A	63	65	59	50	56	55	58
28	A	58	54	57	53	58	75	85	82	82	90	84	84	88	89	95	93	86	84	82	76	80	86	80
29	82	71	75	74	75	81	91	91	93	92	100	112	115	111	111	106	103	103	103	99	88	84	83	83
30	86	85	79	64	54	62	81	102	105	89	92	97	105	112	113	110	108	110	110	92	76	80	83	81
31	78	77	81	65	54	54	A	101	97	108	112	105	107	106	105	106	100	96	94	85	79	68	67	54
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	28	29	30	29	28	29	26	29	29	28	28	27	29	26	27	29	30	31
MED	77	72	72	65	64	65	84	96	90	89	90	94	102	101	97	96	94	93	90	87	78	80	80	78
U Q	81	78	76	74	68	73	92	102	101	96	101	104	107	107	105	105	99	96	98	96	85	83	83	83
L Q	68	66	61	57	54	56	76	88	86	81	83	86	96	88	89	92	90	87	85	81	68	70	72	72

HOURLY VALUES OF FES AT KOKUBUNJI

AUG. 1990

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	53	40	35	33	29	30	73	62	89	72	74	72	78	78	50	76	55	66	51	32	31	30	92	106
2	69	57	39	32	32	52	67	60	56	61	61	G	49	61	61	70	112	145	142	150	127	60	46	49
3	30	27	G	G	29	33	44	67	72	57	G	51	54	G	G	56	64	72	56	33	49	24	26	32
4	32	32	30	28	40	28	38	64	59	105	61	50	G	52	65	G	62	68	51	47	44	52	59	66
5	69	50	46	33	32	29	G	49	57	G	90	67	107	54	80	106	91	172	100	139	134	59	58	79
6	96	75	52	47	44	35	37	40	75	141	100	121	108	97	104	135	83	61	65	94	116	77	47	60
7	59	48	33	27	26	G	36	40	G	G	49	48	56	G	G	G	56	54	31	45	30	44	28	G
8	G	G	G	30	G	38	44	58	88	61	55	G	G	G	G	G	50	61	93	61	122	108	72	64
9	52	50	34	50	27	44	51	56	61	57	54	62	58	61	79	79	93	83	96	86	55	59	70	40
10	42	35	25	29	G	28	37	61	80	96	105	91	55	G	G	G	G	43	58	28	G	26	38	38
11	38	36	38	29	G	G	G	42	47	56	60	64	72	70	103	91	102	77	53	73	36	86	115	72
12	58	93	52	48	38	28	34	G	69	102	60	92	77	51	68	50	48	54	53	54	58	G	43	40
13	72	26	58	47	35	48	39	40	44	50	54	52	60	59	65	G	74	91	51	62	108	90	30	54
14	50	50	58	51	71	G	G	54	62	59	94	68	104	74	G	59	57	47	47	72	92	57	45	28
15	29	28	28	30	30	25	37	49	51	50	G	G	G	G	49	48	61	38	57	42	29	40	58	29
16	44	32	44	33	23	26	37	45	44	54	79	54	47	62	G	72	56	118	36	58	103	43	48	43
17	40	40	25	G	G	G	G	44	54	60	84	G	109	96	54	44	56	111	34	60	58	59	58	54
18	32	30	G	G	G	26	G	G	45	G	51	74	G	81	G	G	49	52	36	25	28	G	G	24
19	G	G	27	G	G	G	G	39	57	G	G	G	60	60	47	44	58	73	58	46	51	40	44	34
20	59	39	24	G	24	26	G	44	52	54	G	60	58	G	G	G	G	44	45	25	29	59	40	33
21	34	31	27	32	G	G	33	47	51	59	66	58	G	47	G	G	50	48	54	70	43	38	43	30
22	32	G	29	24	G	G	40	43	53	51	G	57	G	G	G	G	G	104	79	50	60	61	26	23
23	33	32	57	40	59	33	44	44	50	52	G	59	52	49	51	63	58	47	37	73	77	33	71	G
24	G	32	50	30	58	30	52	65	72	72	65	95	G	G	46	58	59	55	44	123	72	32	52	33
25	49	47	35	34	52	30	G	46	58	62	60	58	82	96	80	58	83	43	36	70	61	70	72	70
26	58	40	G	G	G	G	G	44	48	58	80	79	73	G	G	52	50	35	49	60	32	77	39	40
27	35	40	29	28	G	41	61	59	60	53	55	47	71	70	53	76	62	50	49	44	30	25	40	51
28	62	69	26	36	27	G	G	38	42	G	51	G	G	G	G	47	41	34	29	G	G	24	30	29
29	37	44	36	31	29	29	G	46	50	53	G	56	47	G	55	49	G	47	40	58	40	58	26	29
30	29	26	G	37	49	60	31	G	46	48	G	G	G	G	G	G	G	40	30	32	33	29	25	23
31	49	37	42	35	28	47	66	47	49	48	60	62	62	G	G	51	53	43	27	28	40	45	26	65
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	42	37	33	31	28	28	37	46	54	56	60	58	56	51	47	50	56	54	51	58	49	45	44	40
U Q	58	48	44	36	38	35	44	58	62	61	74	68	73	70	65	70	64	77	58	72	77	60	58	60
L Q	32	30	25	27	G	G	G	40	48	50	G	47	G	G	G	G	49	44	36	33	31	30	30	29

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

AUG. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	14	14	14	15	17	16	21	23	28	34	34	38	29	24	20	15	15	15	15	16	15	15
2	15	15	14	14	14	15	16	21	24	28	32	33	33	43	41	36	22	17	15	15	15	15	15	15
3	16	15	15	14	14	14	17	18	20	32	30	32	33	32	33	23	17	17	17	15	14	15	15	15
4	15	15	14	14	14	14	17	16	18	24	28	34	33	30	28	24	20	15	18	15	15	15	15	14
5	15	15	14	14	15	15	17	18	17	20	29	27	27	30	30	22	18	16	15	15	15	15	15	15
6	15	15	14	14	14	14	17	17	22	23	27	34	33	26	22	21	20	18	15	14	15	14	15	15
7	15	14	14	15	15	18	17	16	20	22	26	27	26	23	27	21	18	15	16	15	15	15	15	20
8	15	15	15	15	16	14	17	17	20	27	27	29	32	56	54	29	20	16	16	15	15	14	14	15
9	14	14	14	14	14	15	15	17	20	32	28	32	26	27	33	24	18	15	15	16	15	16	15	15
10	15	14	15	15	15	15	16	16	16	20	30	28	24	24	21	18	16	14	14	14	15	15	15	15
11	14	14	14	15	15	18	15	16	18	23	24	26	28	24	24	22	18	16	16	14	16	15	15	15
12	16	15	14	14	15	14	16	17	18	18	22	24	33	26	23	20	18	15	14	14	15	16	15	15
13	15	15	14	14	14	15	15	16	20	22	29	29	32	28	24	20	18	15	16	15	15	15	16	16
14	15	14	15	15	14	20	24	16	20	21	21	23	29	26	24	21	18	15	15	16	15	15	15	15
15	15	15	14	14	14	16	16	16	17	21	26	29	34	40	24	21	21	18	16	15	15	15	14	15
16	16	15	15	14	16	17	16	15	17	21	30	32	33	39	29	24	20	17	17	16	15	15	15	15
17	15	14	16	16	14	17	17	18	20	29	34	34	33	30	24	24	16	16	15	15	16	15	15	14
18	16	15	15	15	14	14	16	17	29	34	24	28	32	32	22	20	16	15	15	16	14	16	16	16
19	15	16	14	16	15	16	16	16	18	20	28	33	29	29	22	22	16	17	16	14	14	15	15	15
20	15	15	15	16	16	14	18	17	21	35	38	38	39	45	44	28	21	20	17	15	14	15	15	16
21	14	14	16	15	14	17	20	18	20	22	35	30	38	34	44	22	18	16	17	15	15	15	14	15
22	15	18	16	14	15	18	17	17	21	28	45	34	36	32		20	18	17	15	15	15	15	15	16
23	14	14	15	14	15	15	15	16	18	21	24	36	35	32	23	21	18	14	16	14	15	14	14	15
24	15	14	14	14	14	14	15	21	20	22	29	36	35	44	33	21	18	17	15	15	15	15	15	15
25	14	15	15	14	16	15	20	20	26	33	39	38	37	35	35	29	20	17	17	16	16	15	15	16
26	16	14	15	15	16	20	18	23	28	26	29	30	34	34	30	23	20	16	15	14	15	15	16	14
27	15	15	14	15	15	14	20	16	21	23	24	32	33	48	28	24	18	17	16	15	15	16	15	15
28	15	14	16	15	16	18	18	20	18	21	27	26	44	45	26	24	18	15	15	15	16	16	15	15
29	15	14	14	14	14	14	27	17	22	26	39	38	38	36	35	27	23	18	15	16	15	16	16	15
30	15	14	14	14	15	14	16	18	18	21	48	52	33	30	45	21	17	17	16	15	15	16	15	16
31	15	14	14	14	15	14	17	17	18	20	21	24	21	23	21	18	16	16	16	14	15	14	14	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	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	15	15	14	14	15	15	17	17	20	23	28	32	33	32	28	22	18	16	16	15	15	15	15	15
U Q	15	15	15	15	15	17	18	18	21	28	32	34	35	39	33	24	20	17	16	15	15	16	15	15
L Q	15	14	14	14	14	14	16	16	18	21	26	28	29	27	24	21	18	15	15	14	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

AUG. 1990

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						80				76	82	87	86	92	102	106	102	99	94	88	80	83	79	79
2	78	78	79	86	66	54	54	94	82	74	84	88	101	110	113	113	102	100	100	101	94	88	A	84
3	86	87	88	88	86	88	85	100	88	80	80	87	94	94	99	95	95	100	103	108	103	90	87	100
4	102	99	83	92	86	78	73	86	80	76	76	78	90	91	93	94	93	101	N	82	70	77	77	77
5	74	82	78	74	70	63	69	76	96	83	75	88	93	102	A	102	95	95	A	A	84	85	84	A
6	87	86	90	85	87	66	77	95	86	82	82	96	107	115	113	110	113	114	104	95	88	86	97	104
7	86	86	80	80	69	74	87	104	90	82	88	95	97	104	104	99	107	110	112		88	86	85	87
8	87	87	86	80	74	75	84	102	87	80	76	96	107	112	109	116	116	107	95	89	84	88	84	84
9	77	86	86	81	82	76	85	84	84	83	94	101	100	102	104	106	102	107	102	86	86	84	86	86
10	88	88	82	72	73	70	97	106	73	75	87	102	97	103	115	116	102	100	110	93	83	76	80	87
11	76	79	79	72	71	66	86	102	95	96	90	94	102	108	117	113	107	104	110	108	94	81	70	72
12	78	86	85	80	66	66	76	104	100	87	86	102	106	102	103	99	101	110	105	88	74	77	82	81
13	82	78	80	81	77	68	80	88	78	82					112	116	116	113	111	124	110	81	81	78
14	82	82	80	64	56	62	76	97	84	91	91	87	97	103	106	103	99	104	101	81	78	86	80	86
15	81	76	70	64	66	66	78	83	74	84	88	80	95	93	94	104	109	111	123	108	84	88	87	87
16	83	87	90	82	72	80	71	84	76	88	84	86	92	88	79	86	94	99	97	90	85	68	74	76
17	72	76	72	66	58	59	52	84	88	96	97	106	110	106	98	95	88	95	89	90	78	75	77	77
18	79	81	79	67	58	58	71	91	87	94	125	119	122	121	123	121	113	110	115	108	104	98	89	88
19	106	86	86	84	69	63	77	104	88	93	95	110	116	112	115	112	107	108	114	110	100	89	85	84
20	77	77	76	73	63	63	82	96	88	91	100	116	124	N	126	126	122	123	126	110	A	77	87	84
21	78	82	76	74	71	66	78	90	88	98	111	114	114	116	N	121	118	107	104	A	88	85	87	88
22	83	82	77	67	77	62	71	110	108	96	116	120	107	110	111	102	97	77	78	68	66	64	66	A
23	59	68	63	55	50	60	57	87	89	91	96	100	110	124	114	105	106	102	98	89	87	78	A	76
24	85	73	56	47	71	63	69	104	102	111	121	128	N	135	132	125	124	117						
25																								
26																								
27																								
28																								
29																								
30											94	110	120	128	128	114		124	123	66				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	23	23	23	24	23	23	23	24	24	24	23	23	23	25	24	25	22	21	22	23	21	21
MED	82	82	80	74	71	66	77	95	88	86	89	98	102	106	111	106	104	107	104	90	86	84	84	84
U Q	86	86	86	82	77	74	84	104	90	93	96	110	110	115	115	116	113	110	112	108	94	88	87	87
L Q	77	78	76	67	66	62	71	86	82	81	83	87	95	102	102	100	98	100	98	87	80	77	78	77

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

AUG. 1990

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						32				54	56	82	56	76	62	78	79	57	84	72	54	40	33	23
2	G	38	91	90	78	29	47	59	58	60	51	G	59	G	48	65	G	G	39	G	40	G	144	58
3	32	52	39	28	36	32	43	57	57	45	G	G	G	G	58	51	61	79	80	72	50	41	39	38
4	44	50	91	88	84	59	39	45	50	65	71	55	G	49	62	56	51	77	49	40	56	85	58	68
5	69	57	54	41	33	23	33	42	50	59	59	55	60	54	115	79	65	73	139	127	146	114	58	115
6	53	40	38	34	35	26	G	G	43	58	69	96	95	88	53	96	53	43	40	31	24	40	72	69
7	39	G	G	G	24	G	29	36	44	57	54	64	50	54	55	49	56	48	45		25	43	32	G
8	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	43	40	41	33	G	G	110	91
9	58	71	58	41	G	30	56	64	60	54	70	92	96	63	66	60	58	45	81	70	56	38	33	25
10	31	27	G	G	23	G	40	46	55	65	92	72	64	77	49	62	57	74	74	72	23	28	30	27
11	40	30	26	25	G	24	G	43	54	78	57	62	70	74	53	61	G	51	116	66	46	34	26	68
12	114	52	68	G	72	49	41	G	43	44	58	82	61	88	G	60	111	53	60	49	29	G	G	G
13	30	40	91	G	G	26	40	G	44	48					48	50	67	59	60	58	33	24	24	40
14	30	58	79	71	56	59	42	52	45	53	56	60	73	56	53	57	63	43	46	62	70	72	80	29
15	29	29	31	29	35	30	31	51	G	45	G	G	G	G	G	G	57	56	59	30	33	40	50	22
16	29	32	G	G	G	24	36	G	49	G	53	56	58	83	68	68	42	G	44	43	30	58	32	92
17	50	29	26	25	32	G	G	37	50	59	60	62	67	G	G	54	56	48	42	33	30	29	77	88
18	91	68	49	32	32	31	28	38	43	55	55	48	53	G	G	68	76	52	54	41	79	38	45	G
19	G	G	G	G	G	G	28	38	46	51	51	48	G	G	55	52	G	39	53	59	68	83	68	54
20	30	G	G	G	36	G	34	45	46	51	62	60	G	52	G	G	50	51	56	152	82	32	24	32
21	G	G	G	G	G	G	G	G	51	46	56	60	51	G	G	69	58	72	83	96	81	73	52	G
22	40	69	49	27	31	G	G	38	49	61	G	56	G	G	G	G	G	39	G	28	25	29	G	84
23	G	G	G	23	26	32	42	52	62	50	G	G	G	49	60	51	55	48	45	44	25	32	44	40
24	43	24	24	29	68	41	31	52	53	45	G	G	58	48	G	G	64	59						
25																								
26																								
27																								
28																								
29																								
30											G	G	60	G	G	G		54	36	54				G
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	23	23	23	24	23	23	23	24	24	24	24	24	25	25	24	25	24	23	23	23	23	24
MED	32	32	31	25	32	26	33	42	49	54	56	56	57	49	49	56	56	51	54	54	40	38	44	39
U Q	50	52	58	34	36	32	41	52	54	59	59	63	62	68	59	66	63	59	77	72	68	58	68	68
L Q	29	G	G	G	G	G	G	G	44	45	G	G	G	G	G	25	46	43	43	33	25	29	30	22

HOURLY VALUES OF FMIN AT YAMAGAWA

AUG. 1990

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

COMMUNICATIONS RESEARCH LABORATORY. JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

AUG. 1990

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	103	124	80	97	85	85	85	80	80	85	84	86	95	97	111	111	112	102	106	84	86	86	79	82
2	80	67	75	84	A	A	59	88	77	77	87	90	96	107	122	122	120	116	121	119	138	111	83	N
3	140	143	146	138	125	108	88	90	90	85	90	97	104	106	108	102	104	106	110	122	104	103	142	146
4	164	140	121	108	93	79	81	88	88	81	85	88	98	103	105	95	106	108	103	87	79	77	69	63
5	76	77	79	75	74	50	51	72	89	80	76	92	110	119	118	102	104	107	87	88	82	77	78	78
6		85	86	93	A	A	75	90	77	83	87	95	108	122	128	133	145	144	134	121	115	N	108	89
7	109	90	87	91	76	77	84	103	79	78	92	109	122	130	133	130	136	141	134	110	108	A	122	130
8	138	138	122	86	84	79	84	96	92	76	80	100	123	136	134	128	126	118	105	98	87	90	86	83
9	83	86	84	92	87	75	74	78	79	82	96	112	A	118	117	114	112	110	104	90	87	88	92	108
10	109	110	108	85	88	83	90	95	70	82	102	106	108	122	129	118	120	128	108	103	85	74	85	79
11	83	83	85	80	76	67	78	104	92	91	85	88	118	118	141	135	121	120	122	119	102	88	85	87
12	84	79	90	88	76	66	69	95	94	85	90	95	107	120	121	115	120	119	108	90	90	80	85	87
13	86	86	84	78	80	73	80	86	82	78	83	92	111	56	140	143	142	145	146	164	146	108	86	88
14	90	119	83	60	66	66	73	90	88	91	90	96	114	108	119	122	121	122	122	87	88	88	102	103
15	86	86	86	78	84	84	79	75	78	91	87	87	98	101	92	102	120	121	145	145	104	145	142	144
16	126	126	107	110	84	85	84	86	78	95	96	86	103	104	99	111	119	126	140	122	104	88	100	84
17	86	84	85	78	66	51	60	82	91	105	102	121	127	130	131	122	118	107	105	104	90	88	86	79
18	98	79	109	88	63	60	71	97	92	92	111	129	137	144	148	119	146	154	146	139	146	145	147	156
19	165	163	146	110	97	80	83	94	89	102	104	93	117	120	122	122	106	119	140	122	106	106	103	111
20	111	110	99	88	80	65	78	97	88	91	101	121	141	146	155	154	156	154	153	109	126	108	134	139
21	110	106	102	100	94	87	79	88	94	101	108	120	119	138	146	144	143	141	136	N	143	143	131	142
22	145	146	112	90	N	88	85	119	118	104	129	125	119	122	142	131	119	106	94	97	84	84	76	77
23	76	70	67	56	47	38	61	86	86	88	95	98	116	143	109	133	145	143	143	111	108	108	87	102
24	88	97	72	54	65	61	66	85	100	106	108	140	148	153	160	146	151	143	140	104	111	90	78	109
25	87	85	86	78	76	66	65	85	105	109	107	105	120	123	110	146	147	156	164	161	146	104	168	146
26	109	88	90	85	83	78	86	108	105	86	94	106	120	118	147	145	146	145	124	110	105	88	87	88
27	91	89	66	57	54	56	54	66	67	80	77	88	86	83	84	88	92	105	104	93	102	90	86	90
28	90	86	N	85	80	76	80	82	83	98	91	103	98	112	118	122	116	119	116	111	110	119	83	122
29	85	108	102	87	78	63	75	88	87	95	110	121	137	144	145	160	171	177	182	176	164	146	145	152
30	146	142	110	84	68	73	76	88	90	88	94	117	131	144	145	119	141	145	160	146	137	144	146	146
31	146	126	87	108	82	78	88	90	105	109	131	142	145	144	151	164	157	146	162	164	145	154	146	128
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	28	29	31	31	31	31	31	31	30	31	31	31	31	31	31	30	31	29	31	30
MED	94	90	87	86	80	75	78	88	88	88	94	100	116	120	128	122	121	122	124	110	105	90	87	102
U Q	126	126	108	93	84	81	84	95	92	98	104	120	123	138	145	143	145	145	145	122	137	115	134	139
L Q	86	85	84	78	71	64	69	85	79	82	87	92	104	107	111	114	116	110	106	97	88	88	85	84

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

AUG. 1990

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	39	34	30	25	G	34	39	54	72	81	66	50	59	56	61	62	66	G	60	58	40	34	25	28
2	28	G	G	37	72	92	68	36	45	52	49	G	G	G	G	G	71	46	58	29	32	G	G	G
3	144	32	G	G	G	84	33	48	43	52	51	58	64	58	64	65	70	69	60	50	46	40	44	50
4	79	70	92	109	59	28	43	G	46	G	G	G	57	G	G	54	58	72	90	72	38	33	41	57
5	68	48	44	34	44	35	G	46	48	68	56	G	58	58	65	66	98	72	85	72	68	33	48	32
6	179	59	50	66	84	84	88	42	43	44	54	60	58	82	66	76	68	74	39	44	28	34	36	G
7	G	G	G	G	G	23	G	36	56	86	49	48	85	63	57	63	57	70	62	65	81	34	40	32
8	G	G	G	G	G	G	G	44	G	G	G	G	G	49	56	52	52	50	37	40	38	36	24	40
9	39	38	G	31	39	27	39	36	67	85	67	78	144	57	55	59	58	64	82	59	30	29	G	28
10	G	G	G	G	G	G	G	36	44	54	82	77	96	77	79	78	77	48	50	46	87	46	40	34
11	34	33	29	32	30	28	28	37	49	63	91	82	57	G	G	G	72	41	40	G	G	58	G	G
12	34	58	92	59	58	39	89	41	90	55	50	53	63	81	56	95	56	62	66	62	55	32	25	G
13	G	33	44	42	69	48	48	43	69	79	83	57	48	56	74	57	62	61	62	53	58	48	31	33
14	32	24	38	60	42	49	40	34	46	60	71	55	56	64	61	64	63	49	52	36	32	34	28	29
15	34	30	41	33	G	G	44	44	52	49	46	48	G	G	G	G	G	42	34	31	36	27	G	33
16	34	32	43	31	31	38	43	40	G	G	G	G	63	56	72	64	63	50	41	37	58	58	45	66
17	31	65	50	38	32	G	24	36	45	54	62	54	G	G	G	62	59	58	40	G	G	G	24	G
18	G	57	G	G	G	23	31	36	40	50	57	50	60	67	G	G	58	64	48	37	33	40	42	32
19	G	G	G	G	G	G	G	39	42	G	G	G	G	G	G	56	G	59	75	33	41	31	32	G
20	G	85	36	39	50	40	G	43	51	64	81	79	51	G	52	G	70	70	61	82	55	54	59	31
21	30	38	29	29	36	32	G	40	41	49	52	G	G	60	55	G	G	G	41	26	36	G	G	34
22	G	G	G	G	G	G	36	33	55	G	66	58	G	51	G	G	G	G	G	G	G	25	G	11
23	57	58	26	G	34	32	28	54	46	68	55	G	G	G	G	G	G	39	G	40	G	G	38	11
24	G	32	32	37	37	61	40	49	85	70	55	G	52	68	60	49	59	52	41	46	45	40	40	26
25	29	66	40	42	G	G	G	33	41	G	G	G	G	G	65	68	58	65	77	47	36	38	23	G
26	25	G	G	G	G	G	G	38	G	G	G	G	G	G	56	50	G	48	42	37	42	38	28	29
27	58	59	38	32	G	G	G	36	G	55	G	G	G	G	G	G	50	56	78	47	66	40	33	38
28	29	G	G	G	G	G	G	G	G	G	G	G	G	G	59	56	54	G	41	40	35	30	G	G
29	G	G	G	G	G	G	G	34	45	54	53	56	64	55	53	55	50	40	37	40	24	32	38	G
30	G	G	G	G	G	32	G	39	40	48	69	50	61	G	73	59	62	61	62	82	24	G	G	32
31	24	34	G	G	26	24	25	37	47	50	55	57	49	G	G	G	55	110	44	30	G	32	38	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	29	33	29	31	26	28	28	38	45	52	54	50	52	51	56	56	58	56	50	40	36	34	31	29
U Q	39	58	41	38	42	39	40	43	52	64	66	57	61	60	64	64	66	65	62	58	55	40	40	34
L Q	G	G	G	G	G	G	G	36	41	G	G	G	G	G	G	G	50	42	40	33	28	29	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

AUG. 1990

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	15	15	15	15	16	20	26	28	30	29	43	33	27	27	26	14	15	15	14	15	14
2	14	15	15	14	14	15	14	17	24	27	28	55	59	62	29	59	28	24	14	14	15	15	15	15
3	15	15	15	15	15	15	14	15	22	22	26	27	29	30	28	27	23	16	14	15	15	15	15	15
4	15	15	16	15	15	14	15	14	15	26	27	28	28	32	32	28	26	16	16	15	15	14	15	15
5	15	15	15	16	18	16	17	15	17	21	27	30	45	44	28	28	28	23	15	14	14	15	16	14
6	15	15	15	15	14	15	14	15	18	23	36	29	32	30	29	28	23	22	15	14	14	15	15	15
7	16	15	15	15	15	15	16	14	18	26	28	30	29	29	27	26	22	16	15	15	15	15	15	15
8	15	15	15	14	15	15	17	17	18	24	29	29	46	29	28	27	27	24	15	15	15	15	16	15
9	15	15	20	15	14	15	14	17	21	28	27	29	33	32	28	27	27	23	14	15	14	15	15	17
10	15	15	15	15	15	15	17	15	15	22	27	30	28	29	24	22	23	18	14	15	15	15	15	15
11	15	15	15	14	14	14	15	15	20	24	27	29	29	52	27	28	23	17	16	20	15	15	16	15
12	15	14	15	15	15	15	15	15	15	23	26	29	28	27	28	24	18	16	14	15	15	15	15	15
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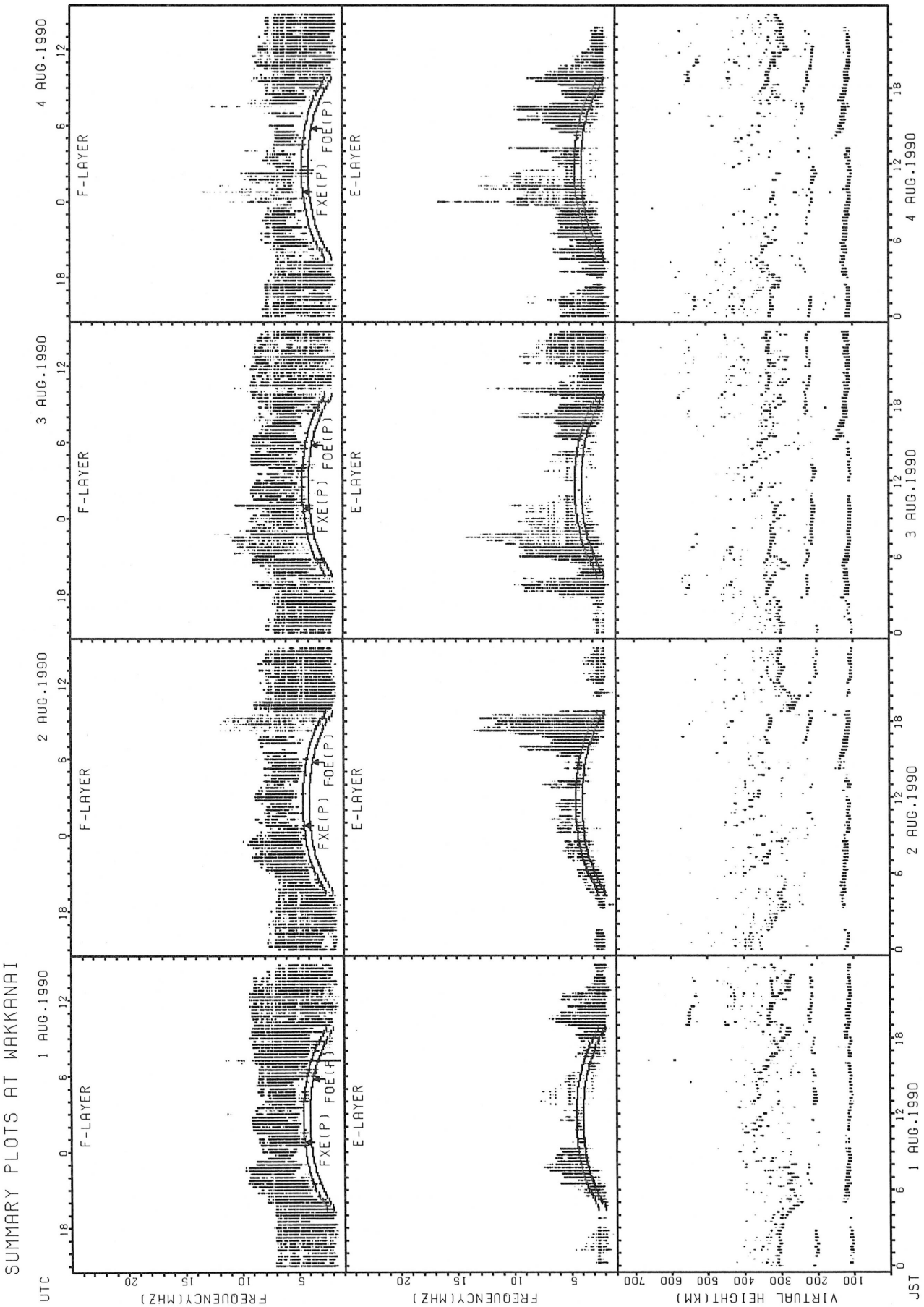
COMMUNICATIONS RESEARCH LABORATORY, JAPAN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VIRTUAL HEIGHT(KM)
JST
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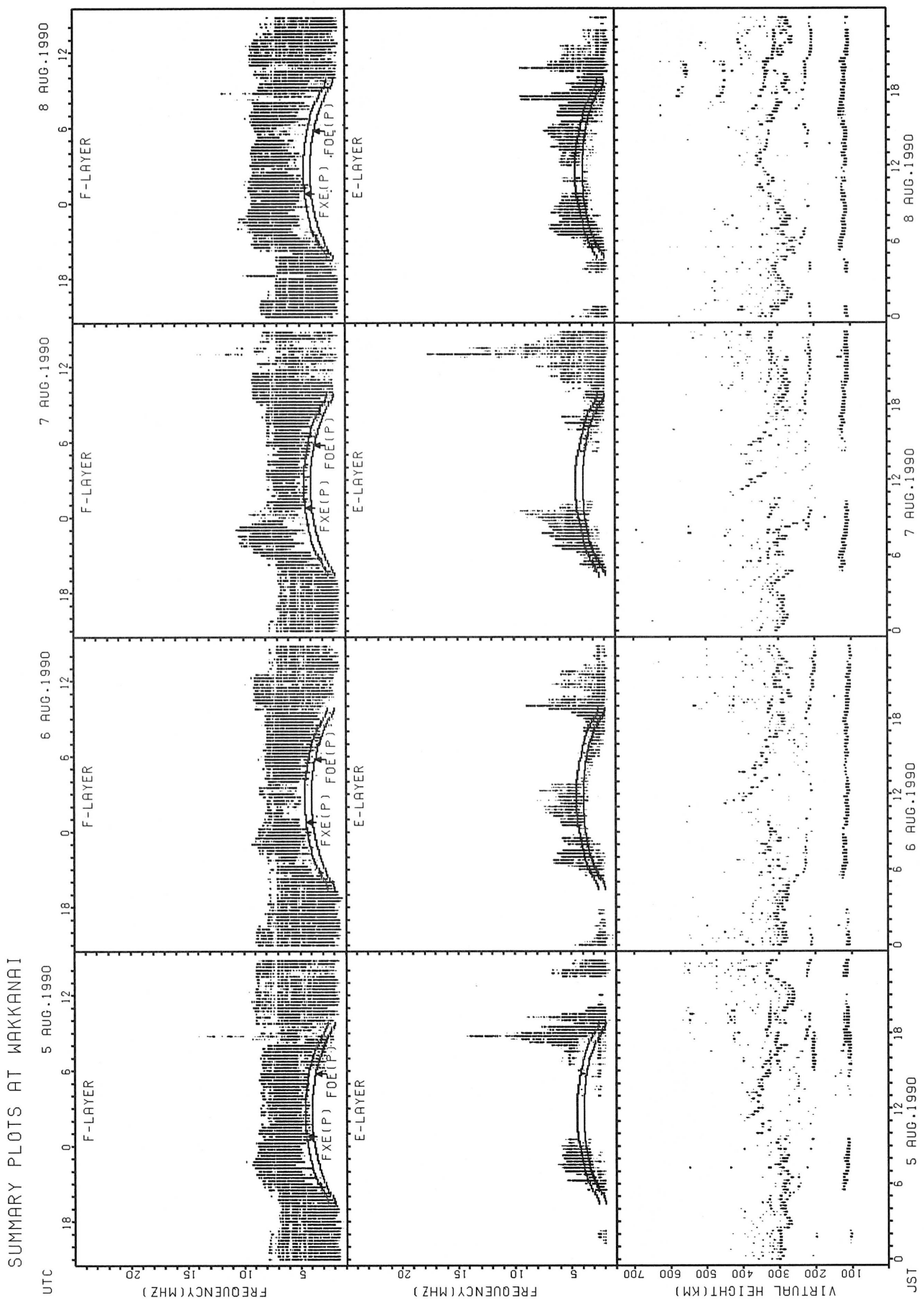
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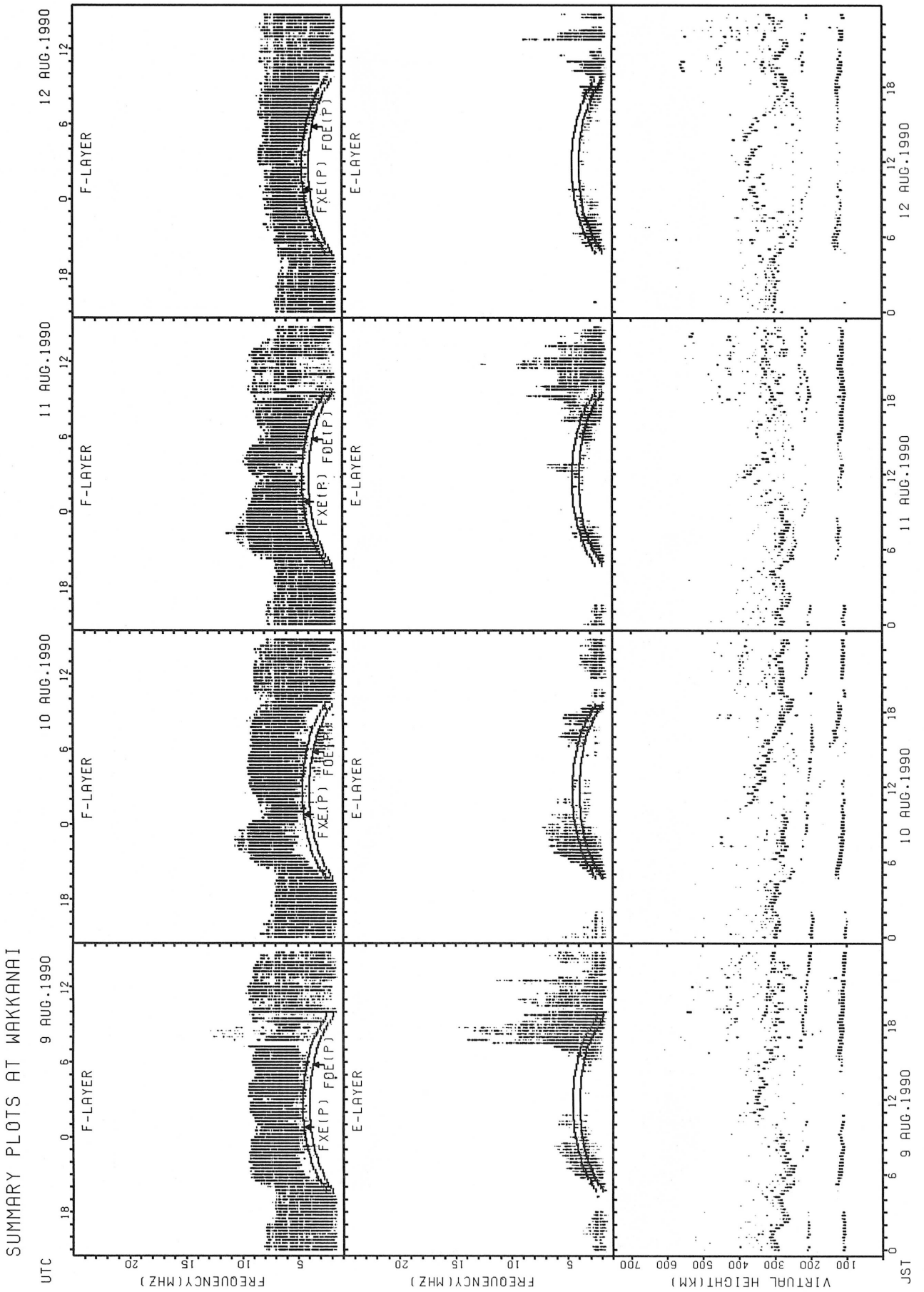
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FOE(P)
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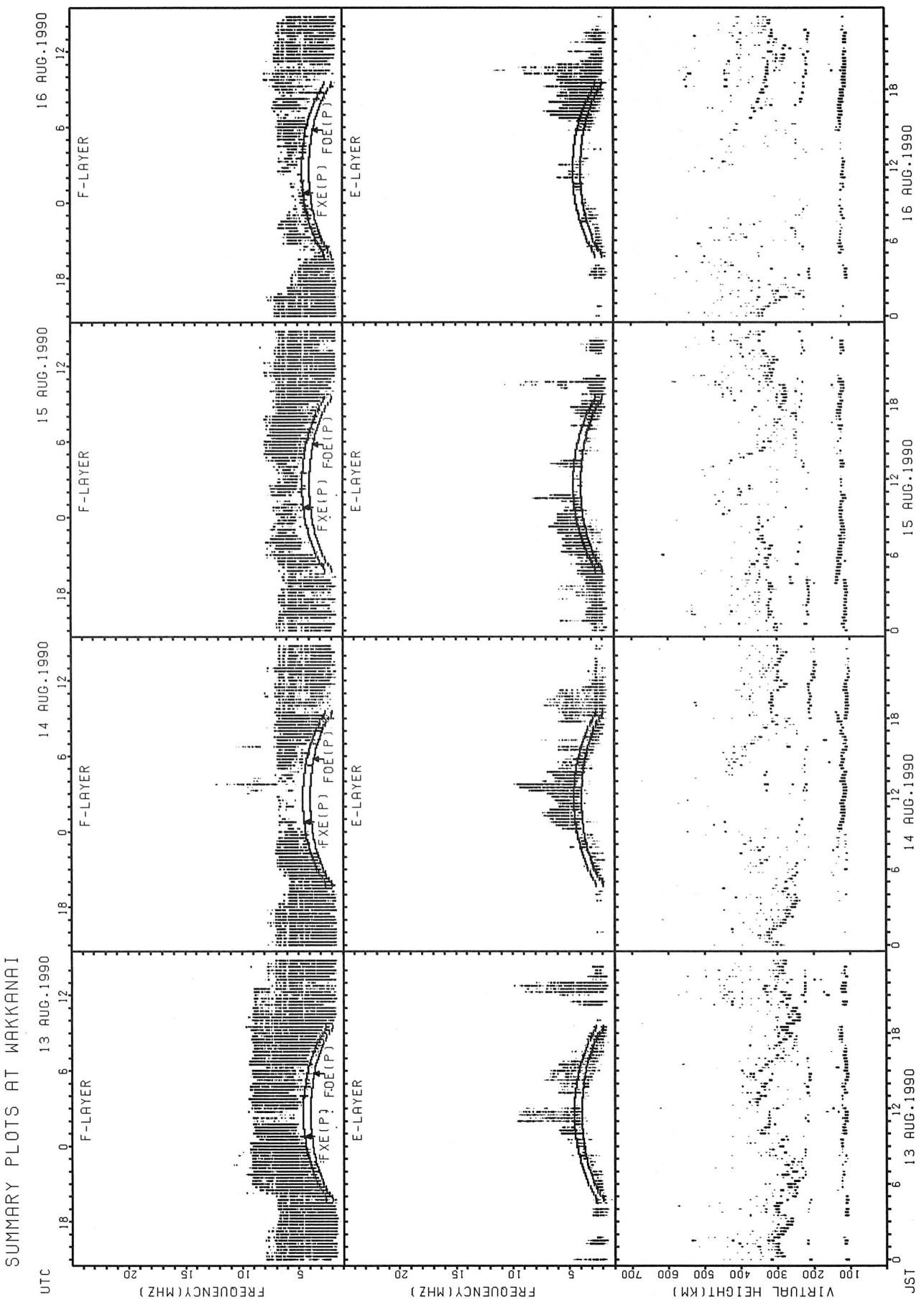
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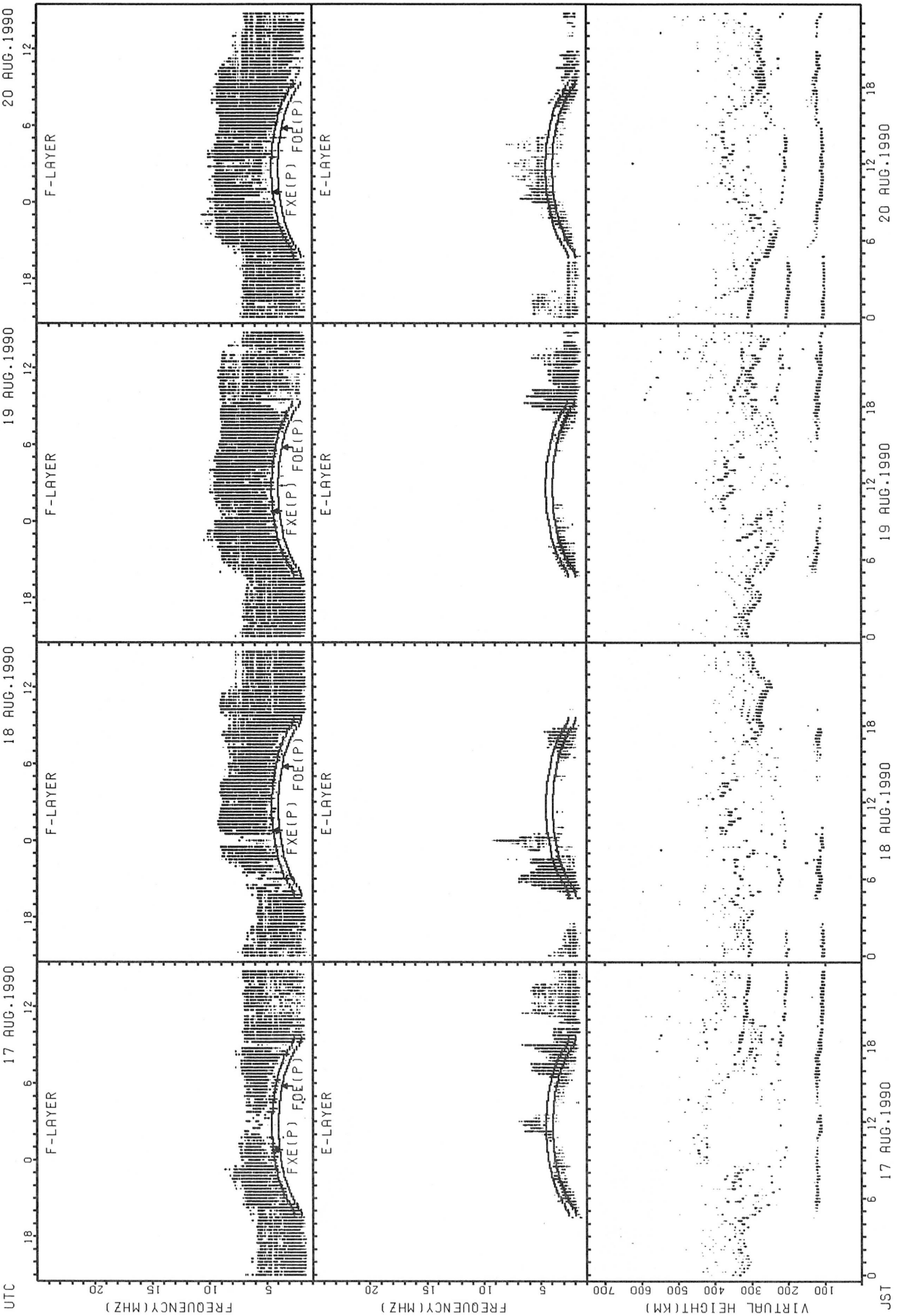
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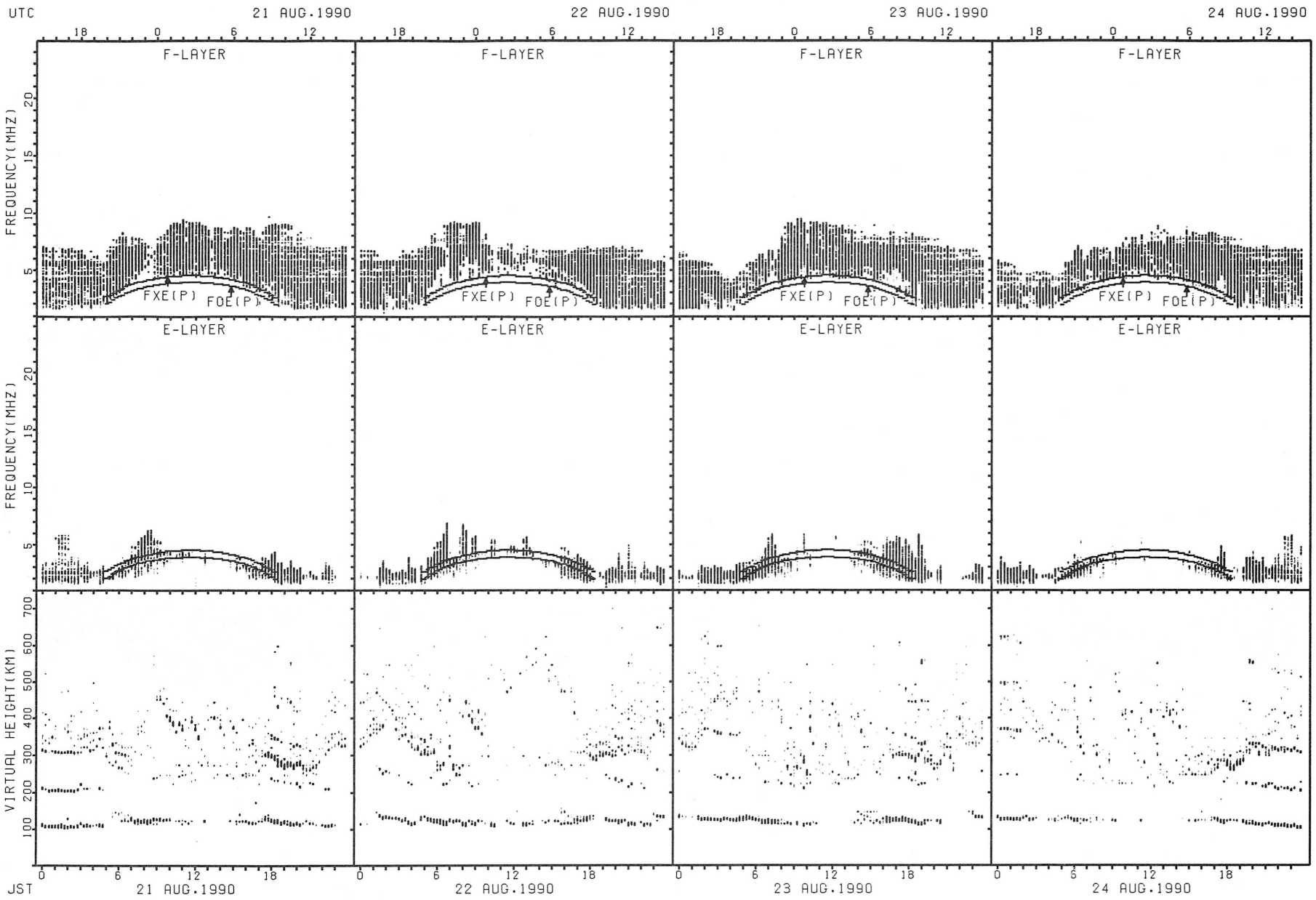
SUMMARY PLOTS AT WAKKANAI



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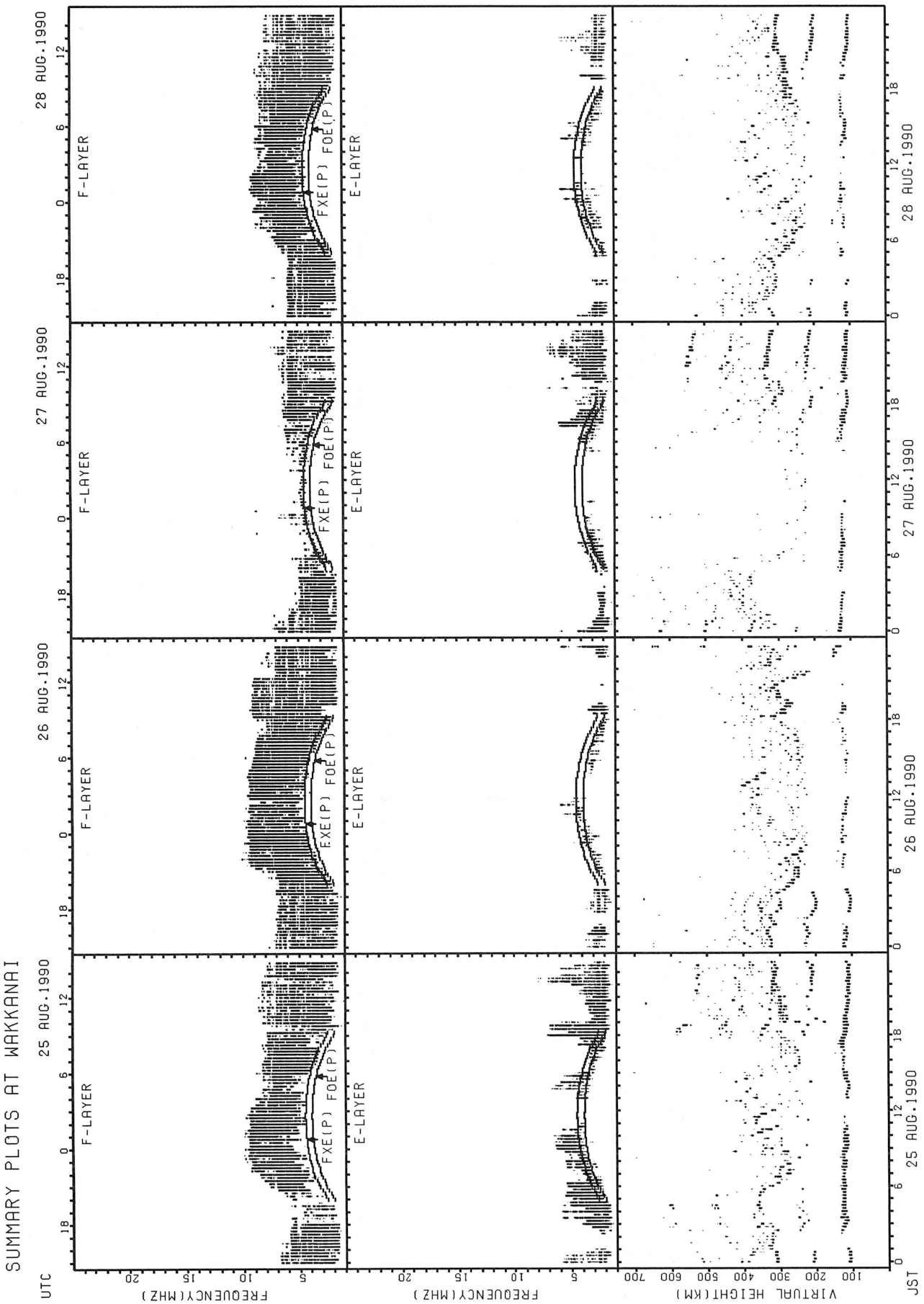
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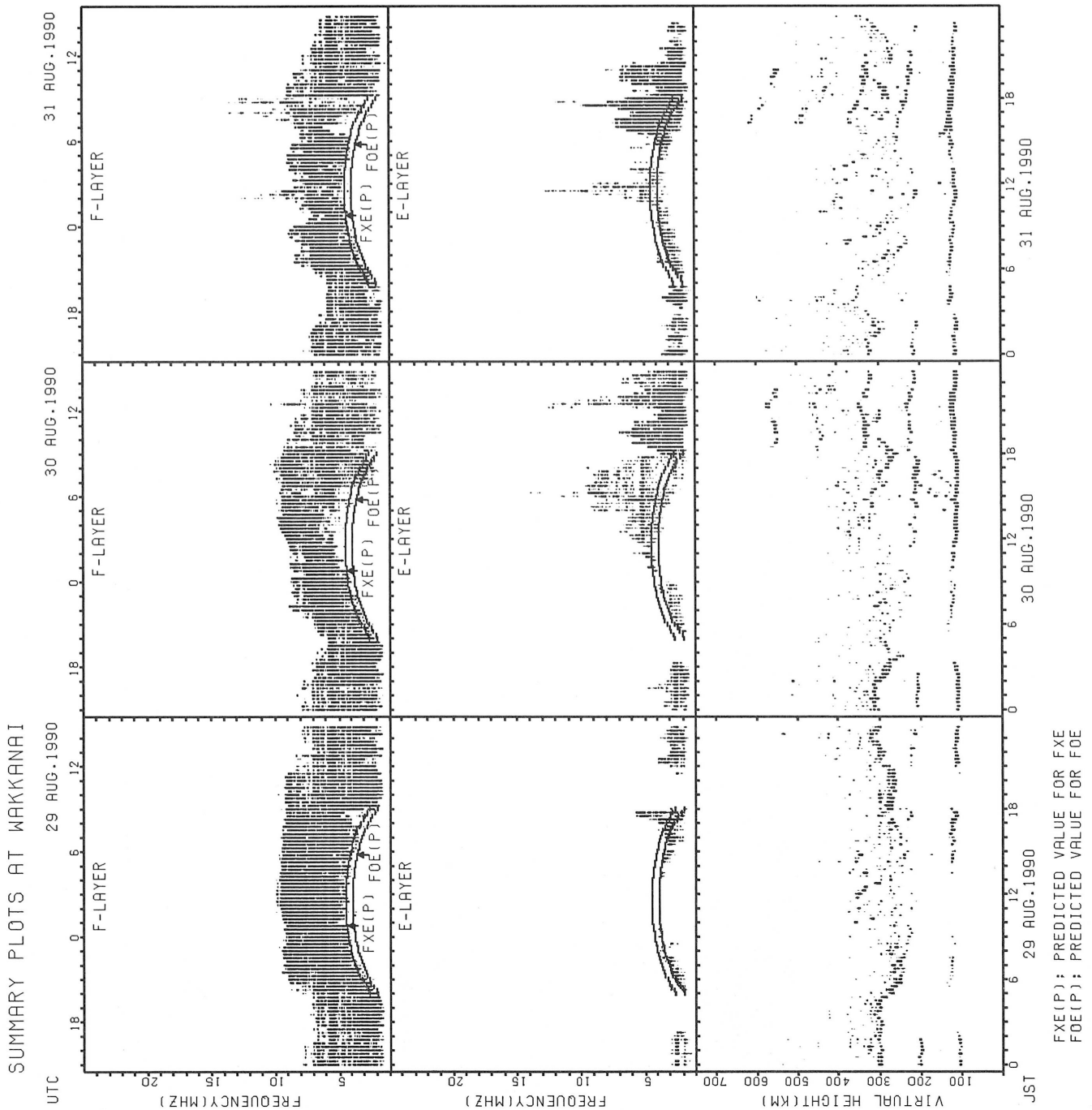
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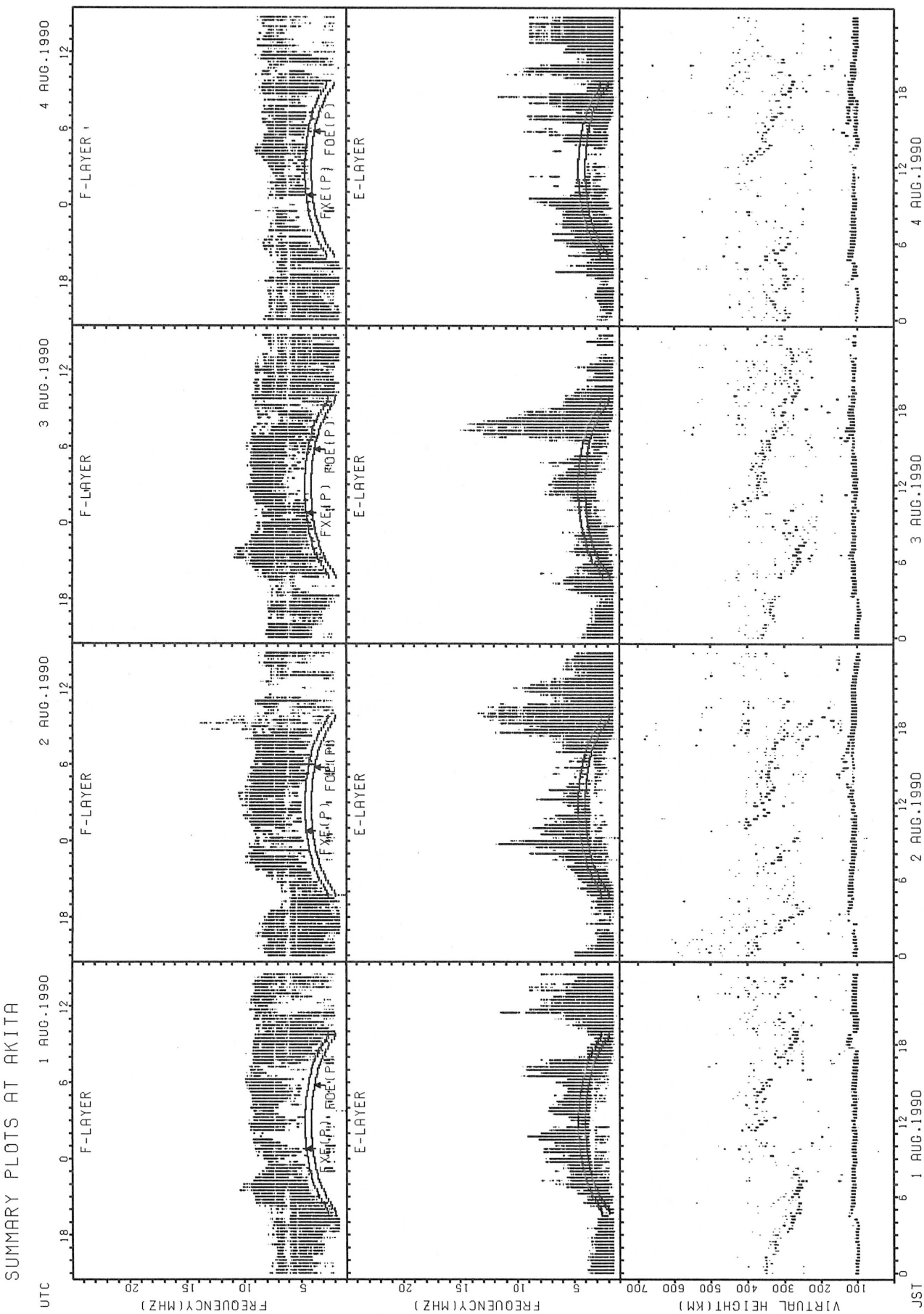
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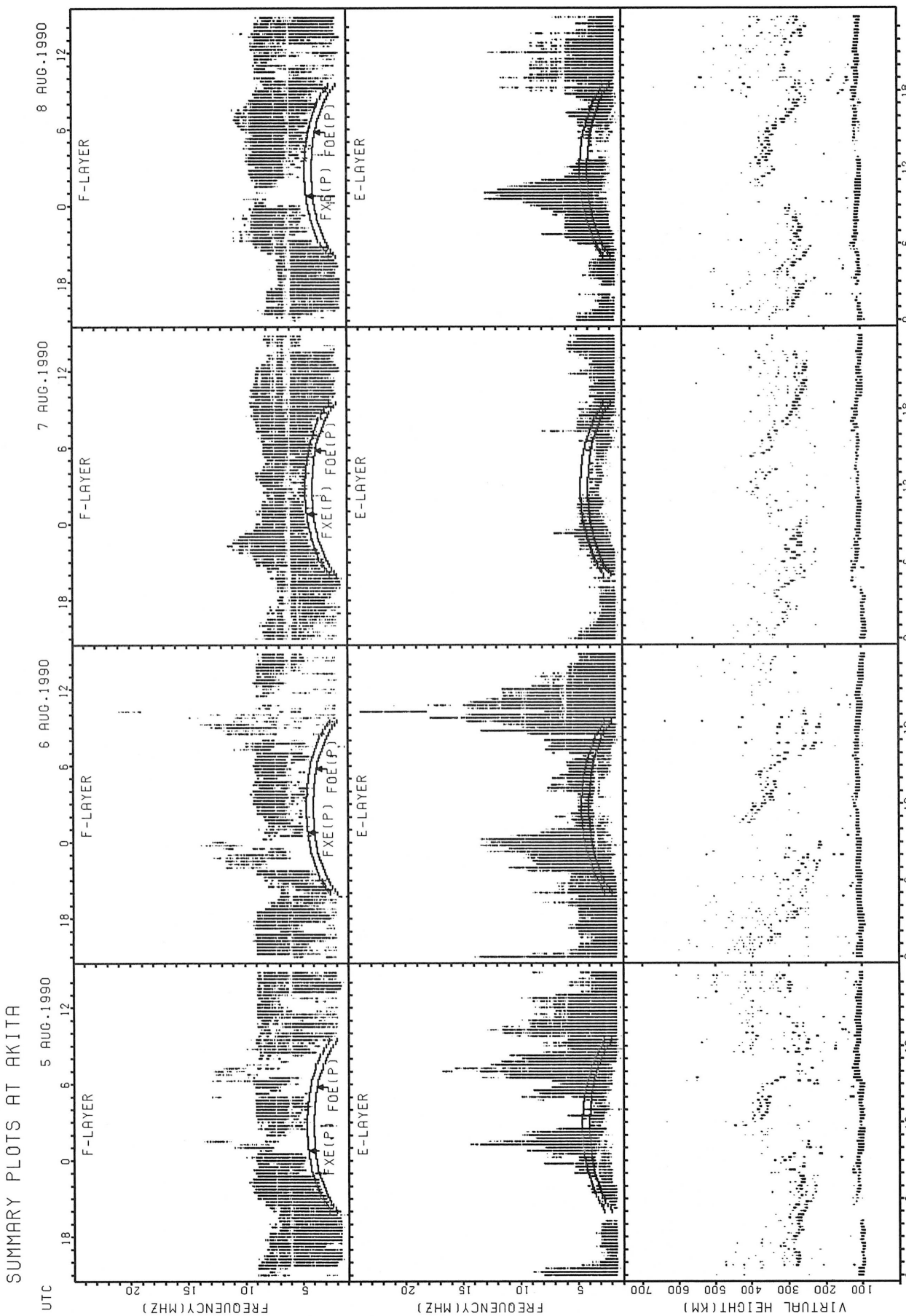
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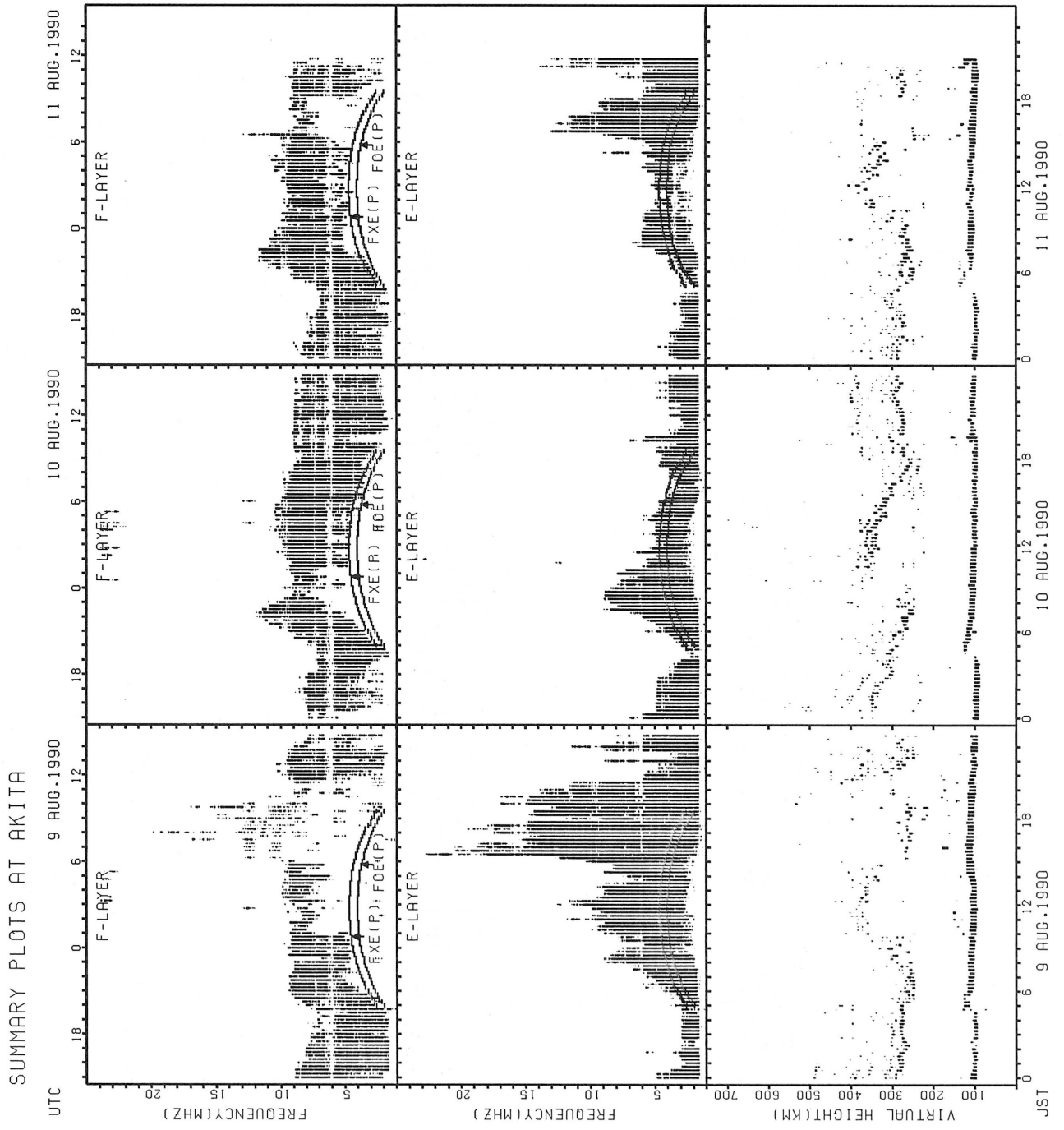
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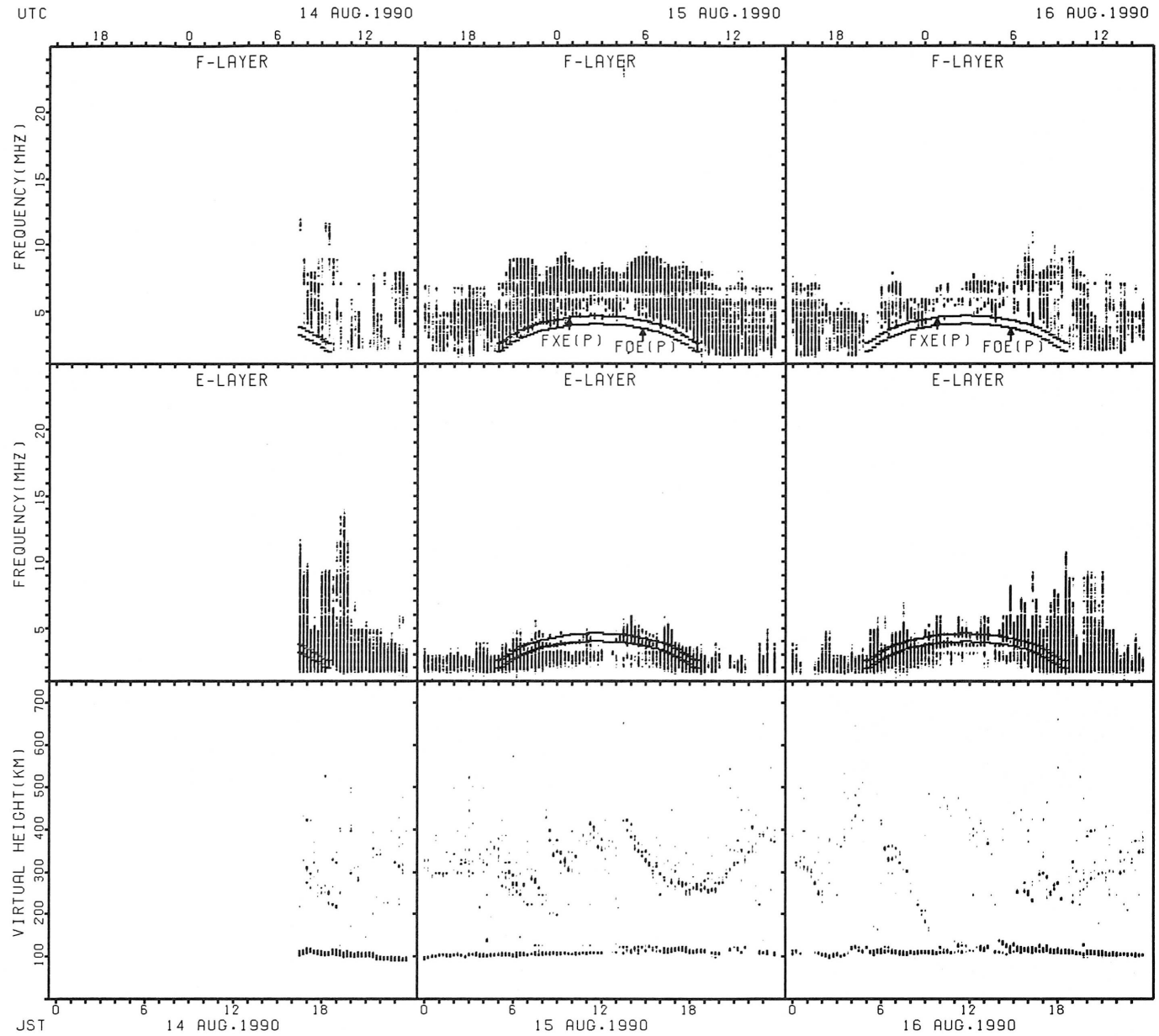
SUMMARY PLOTS AT AKITA



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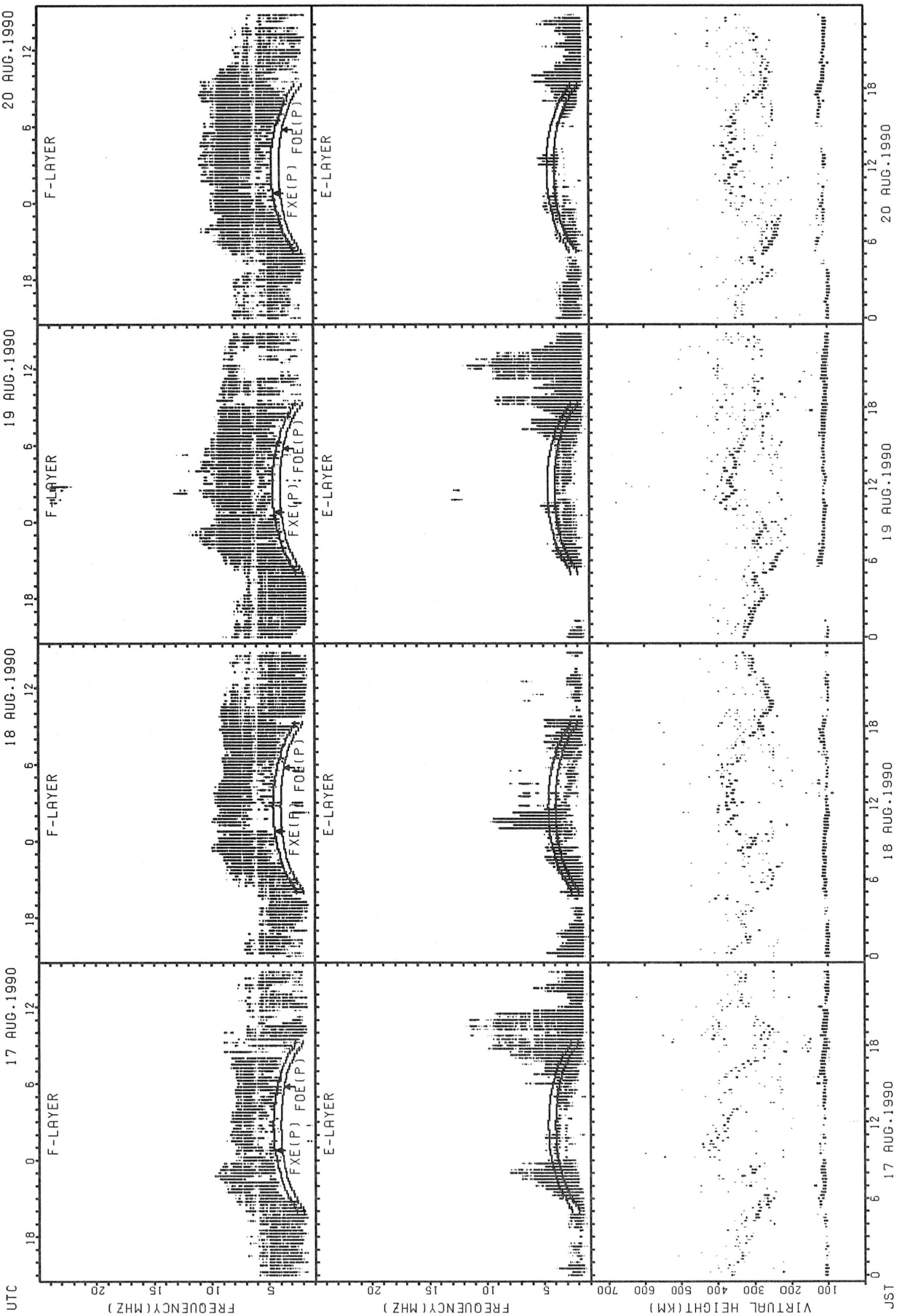
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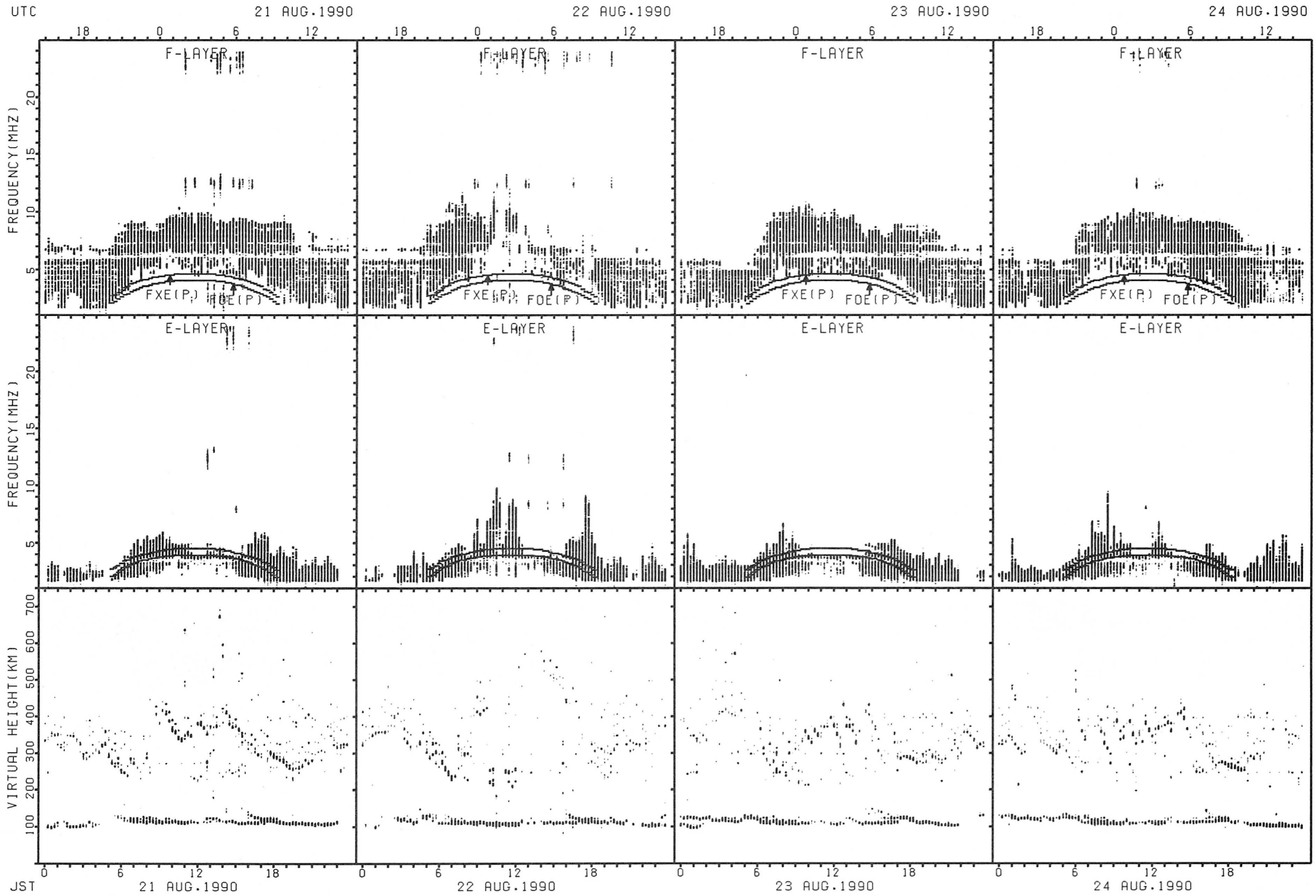
SUMMARY PLOTS AT AKITA



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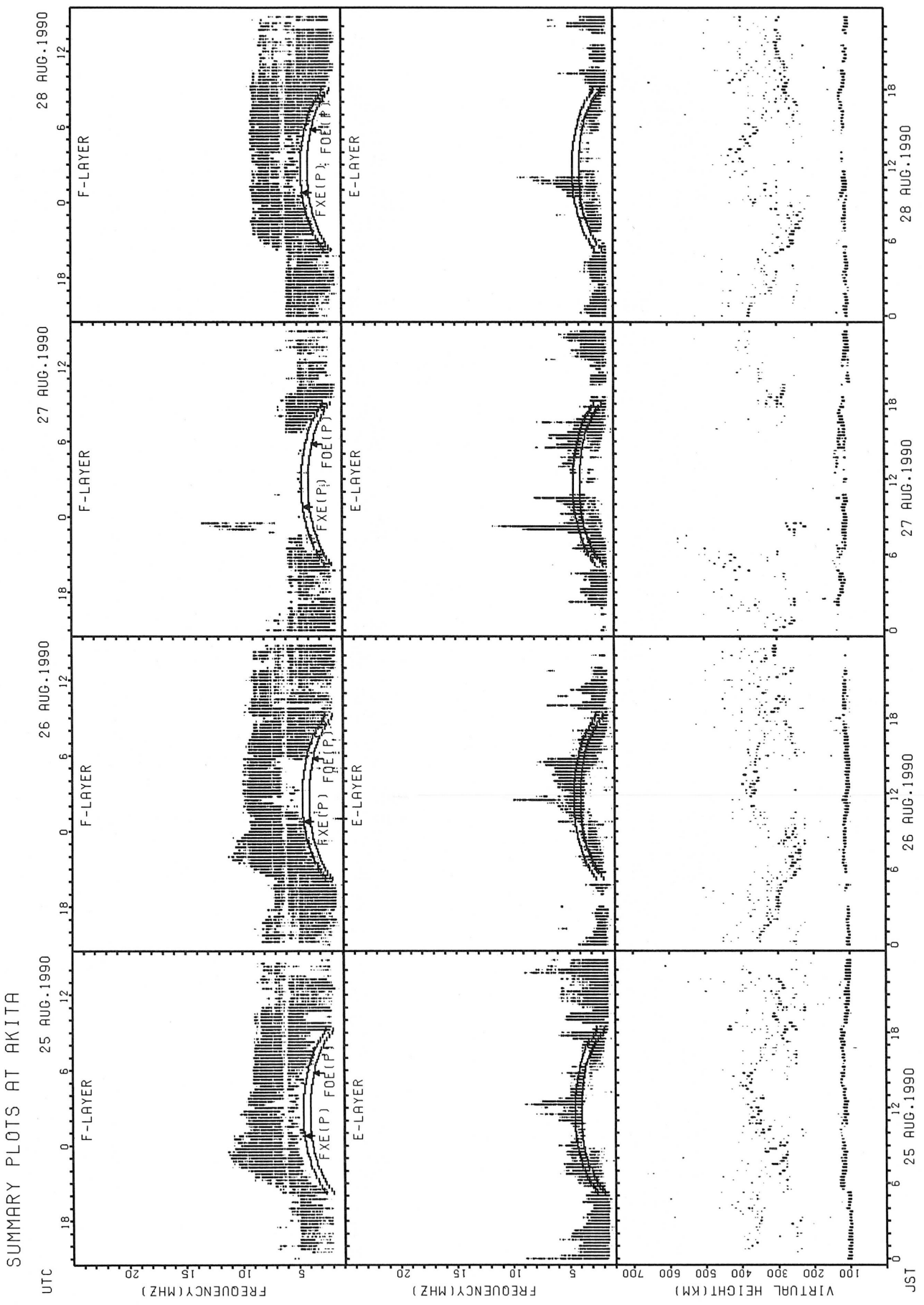
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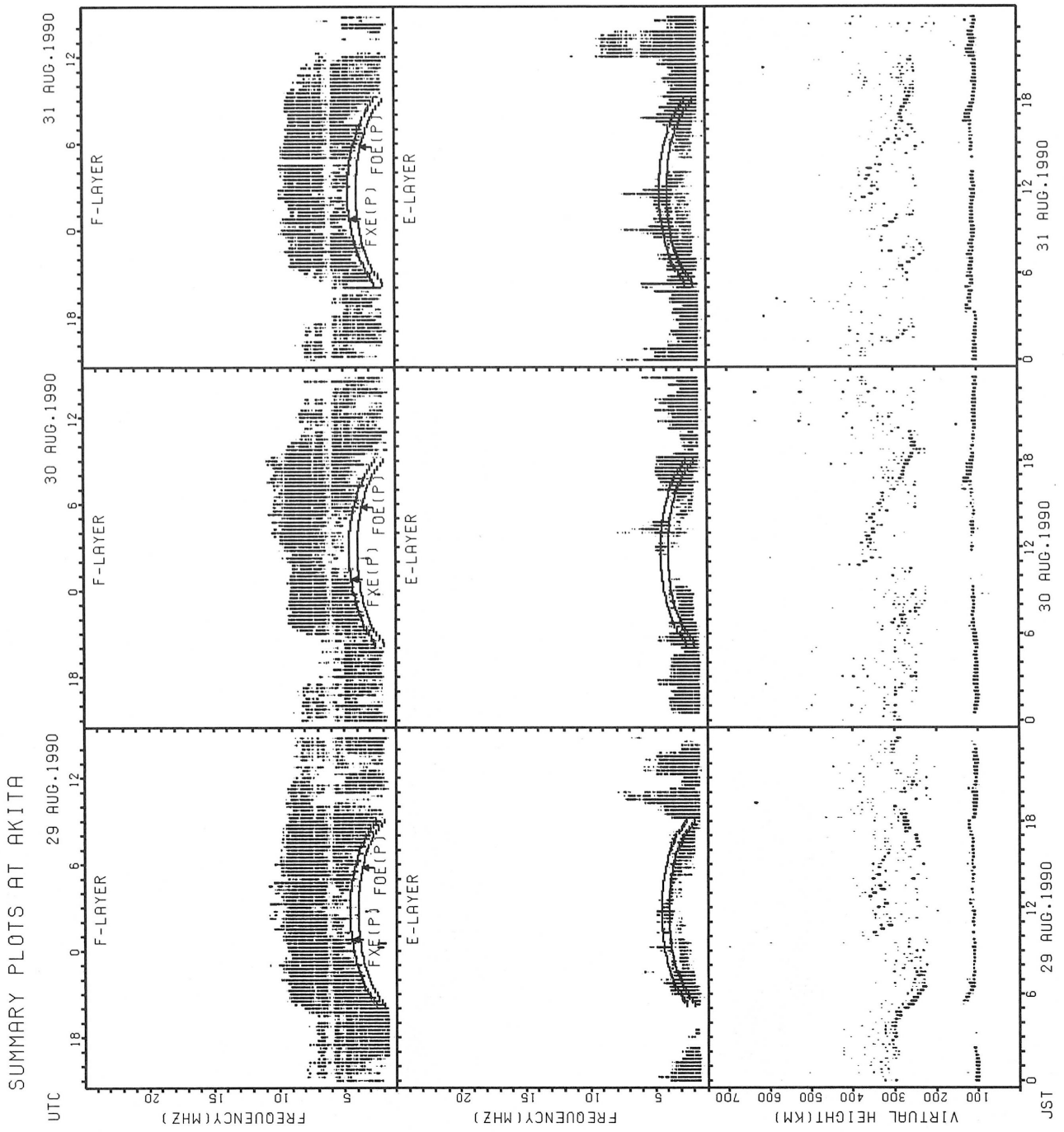
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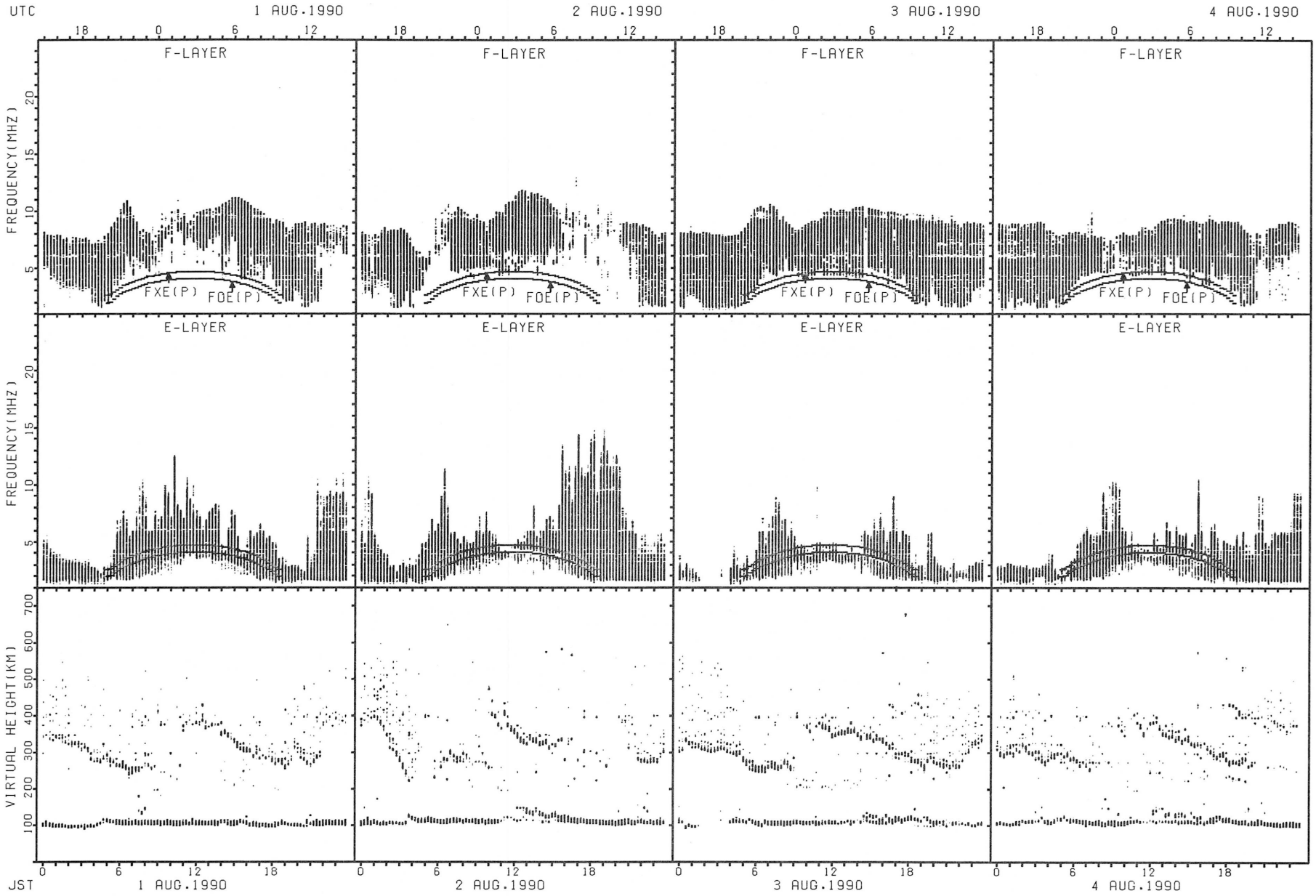
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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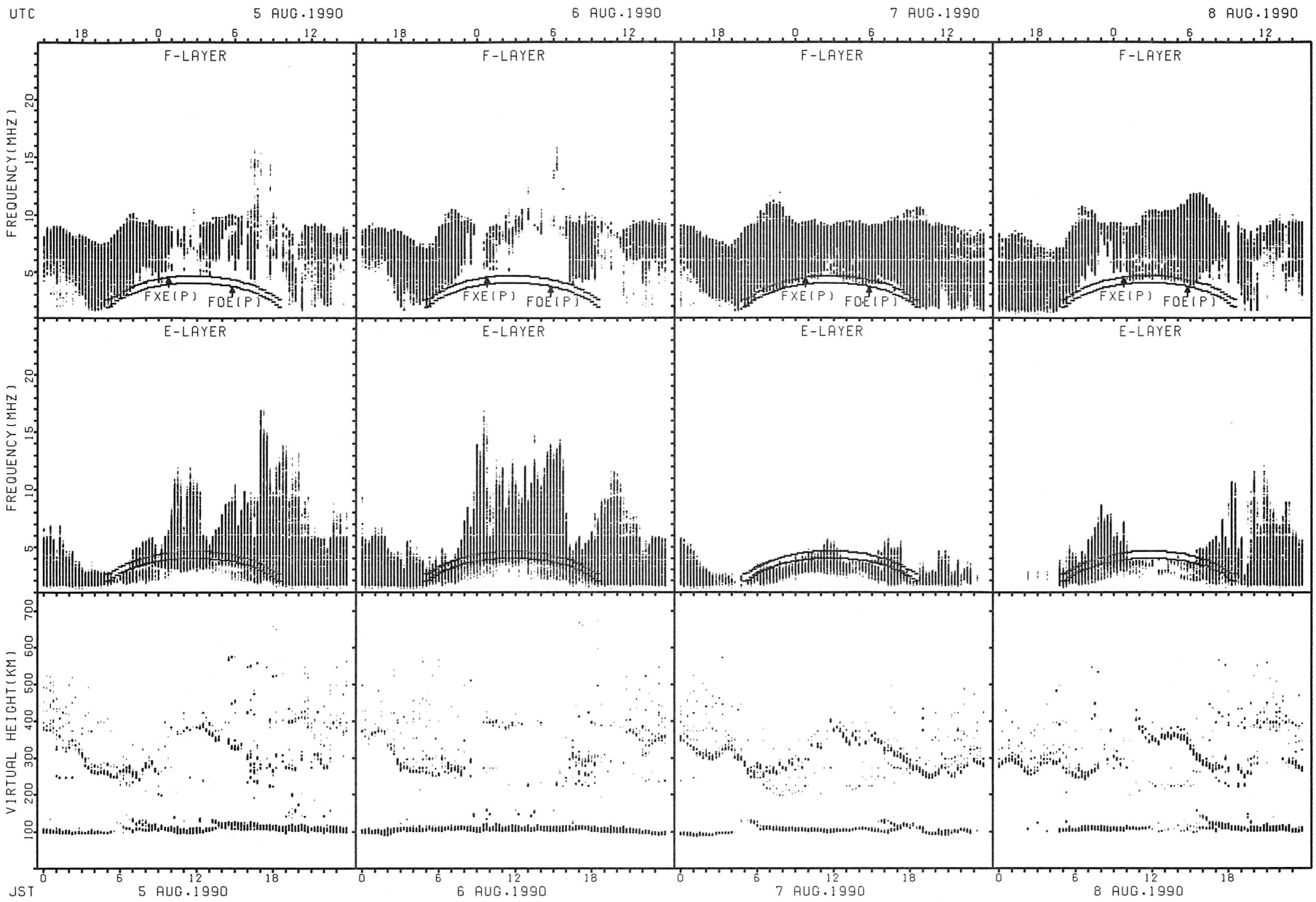
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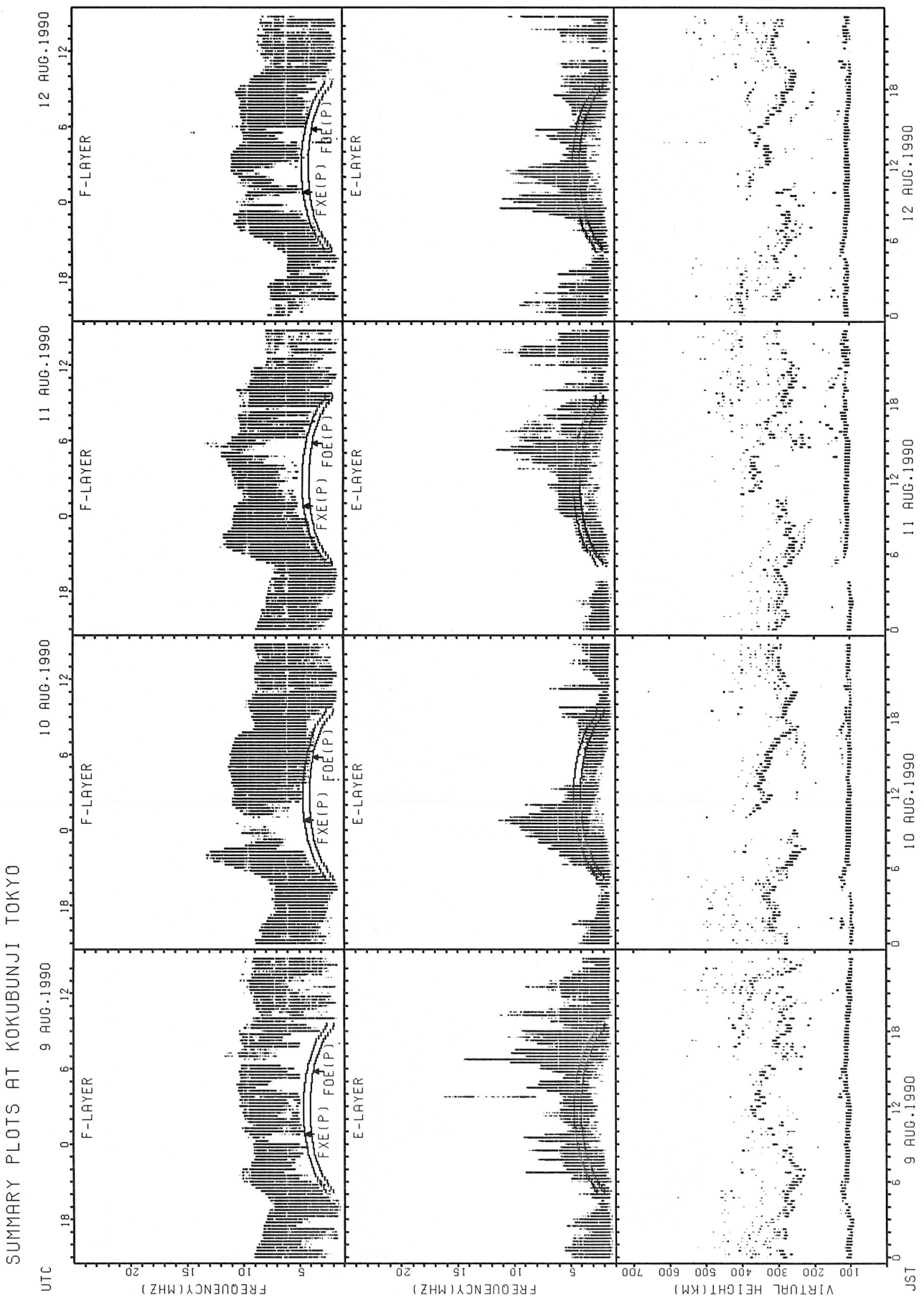
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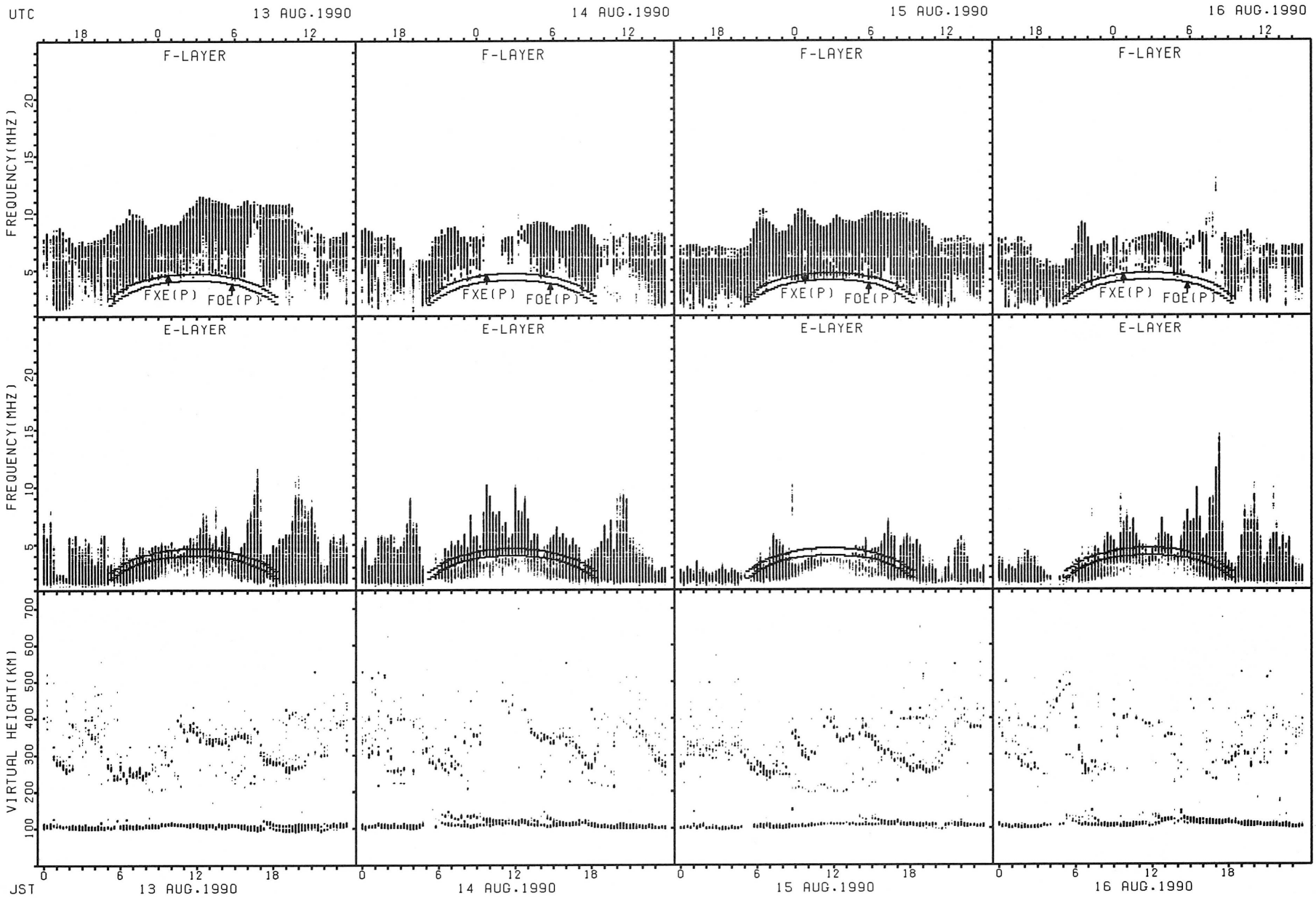
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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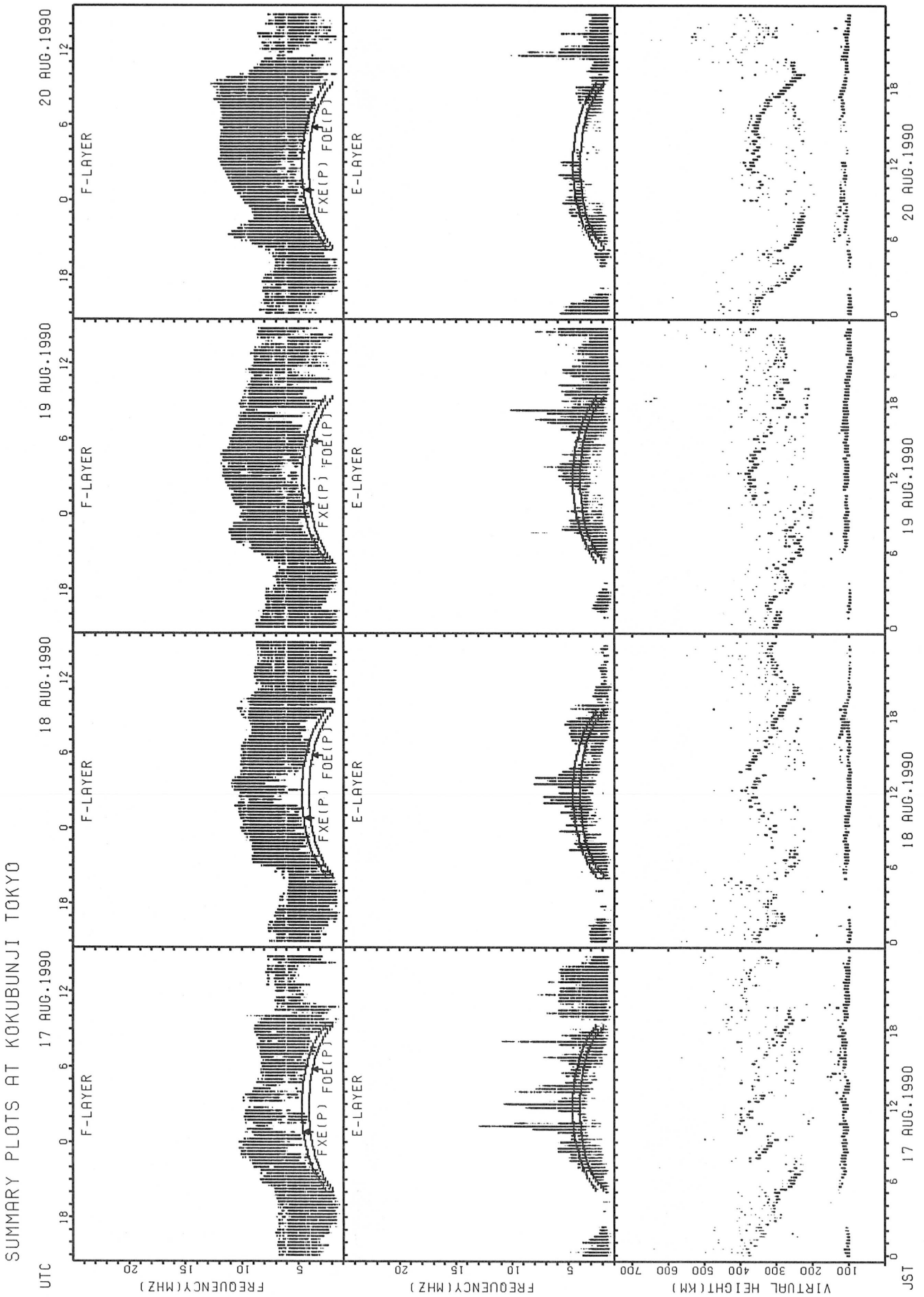
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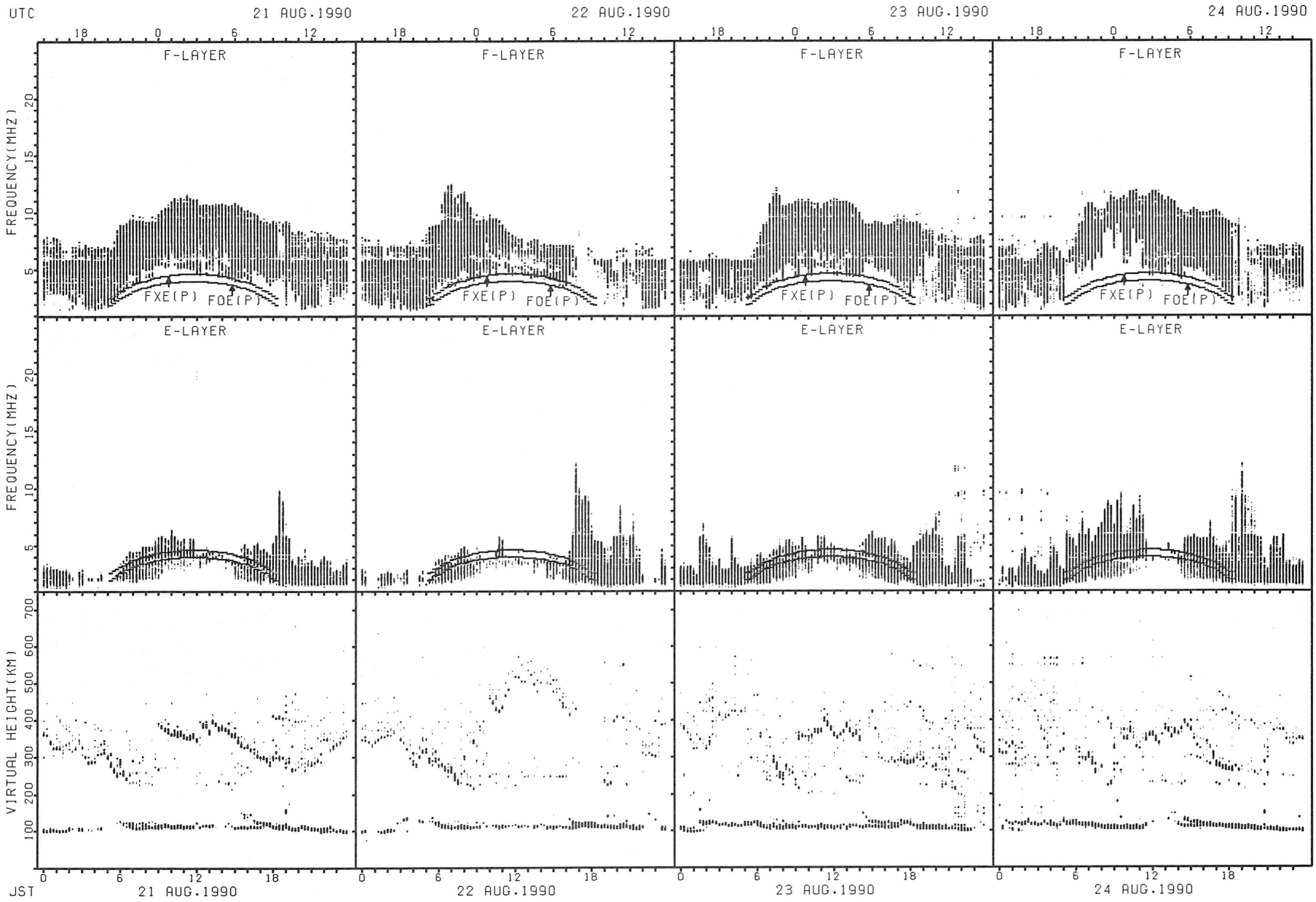
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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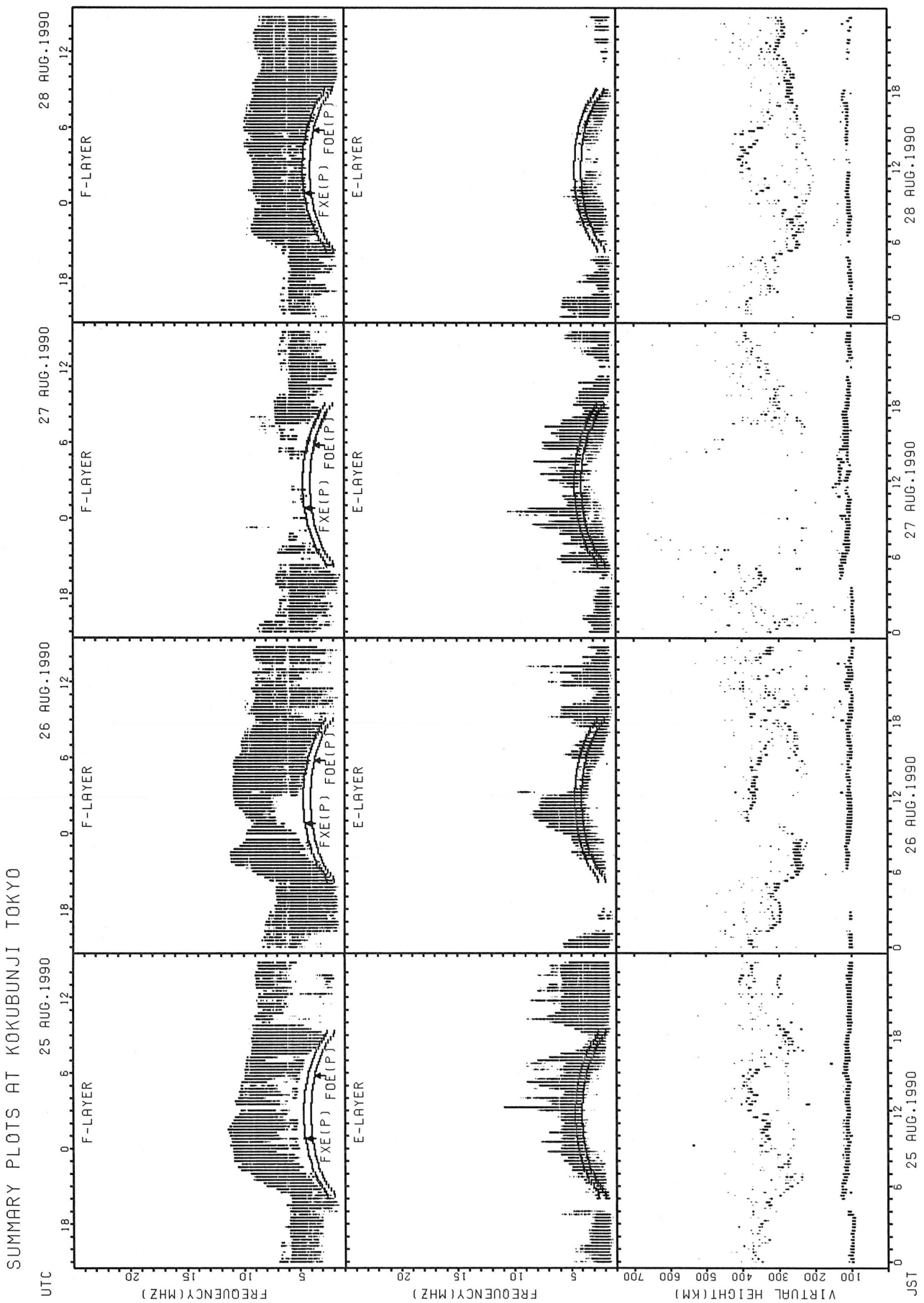
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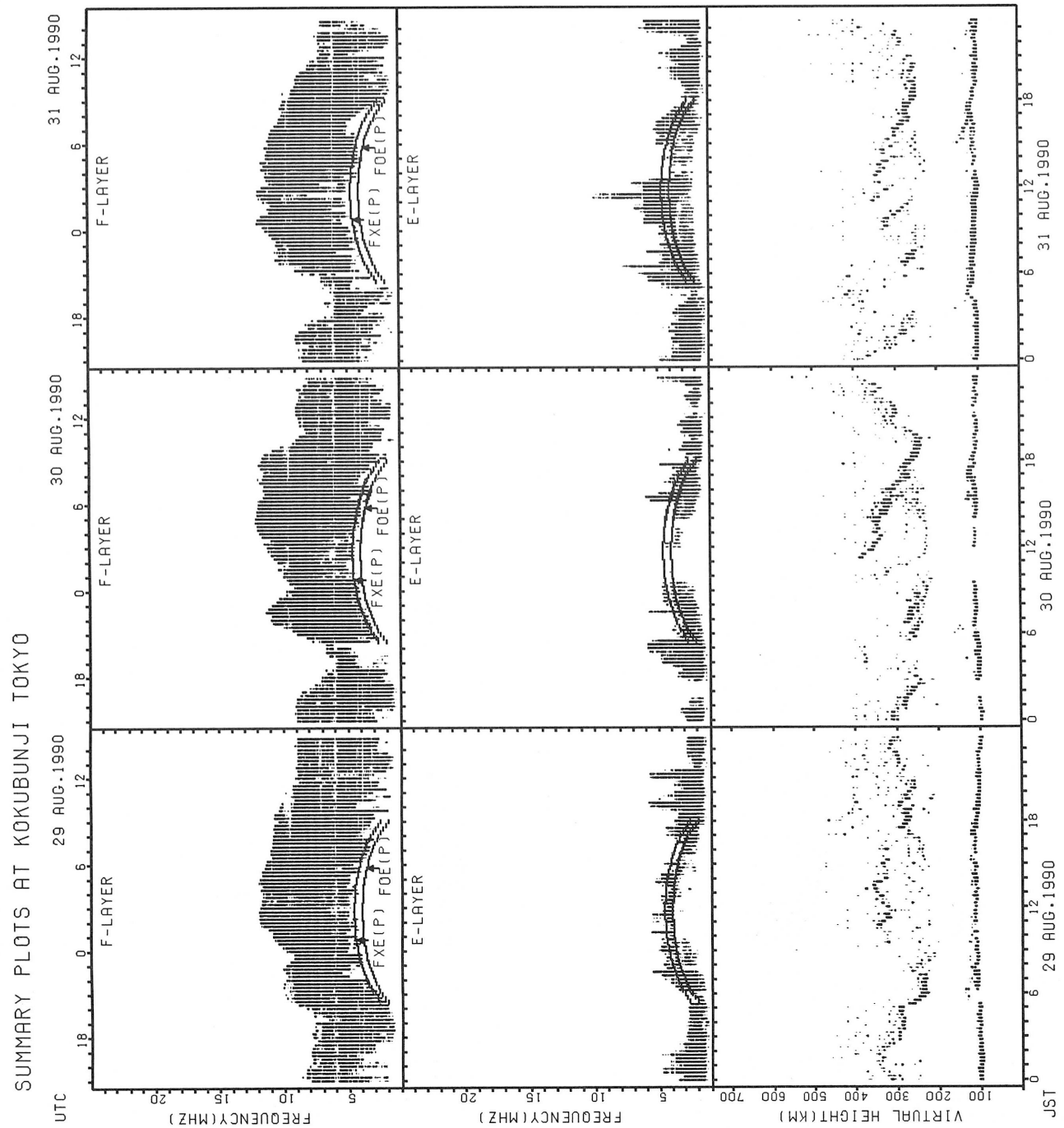
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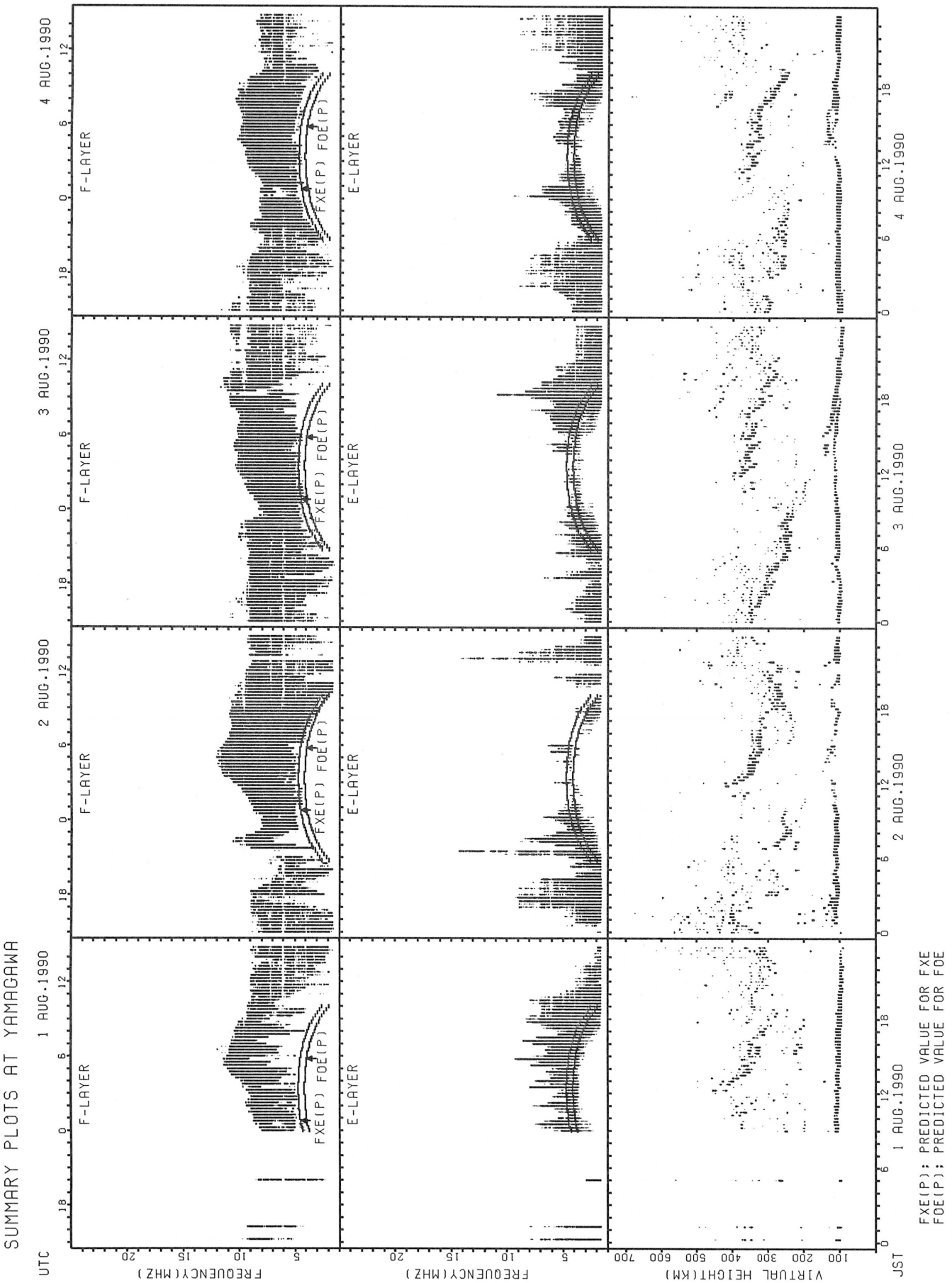
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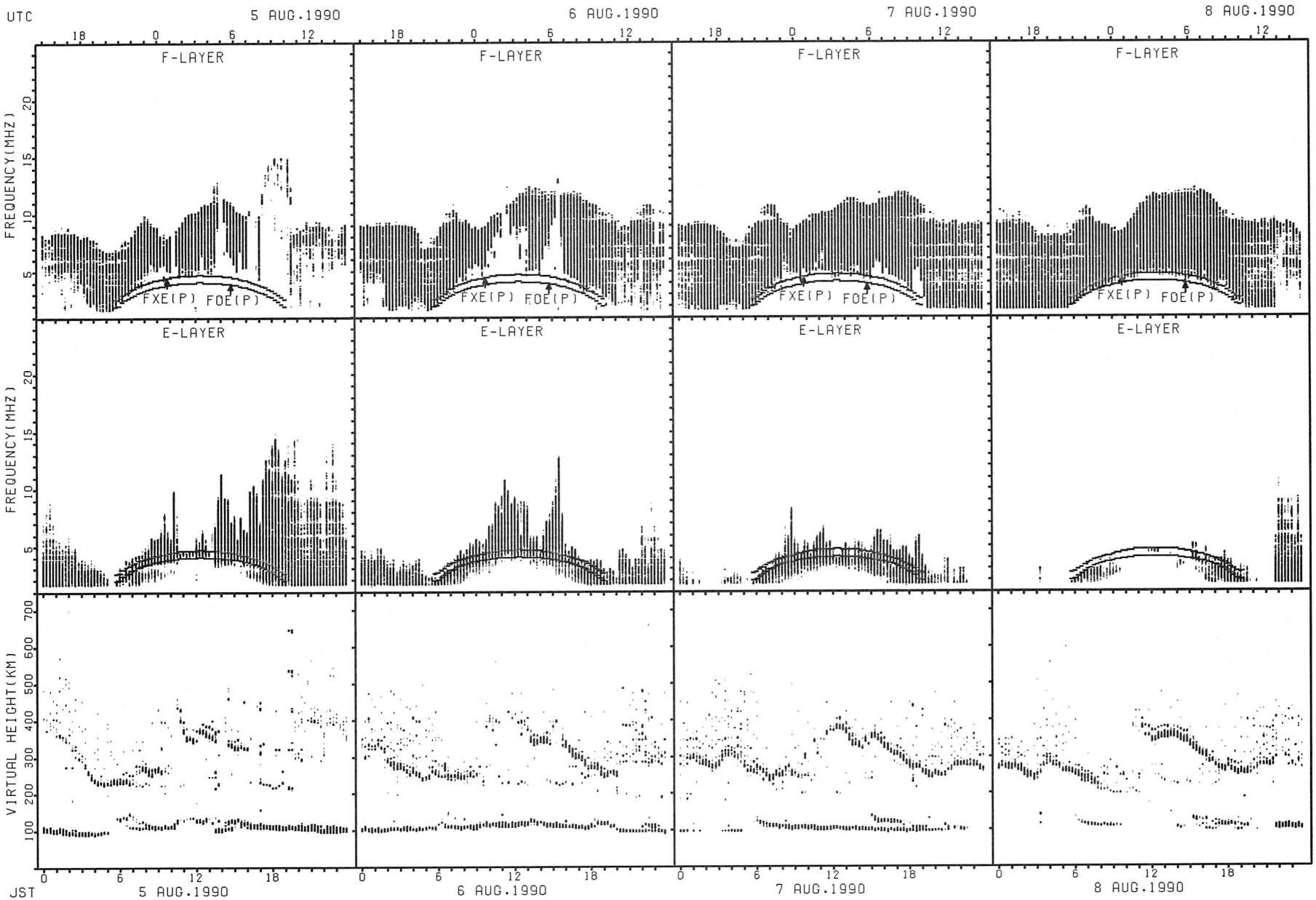
SUMMARY PLOTS AT YAMAGAWA



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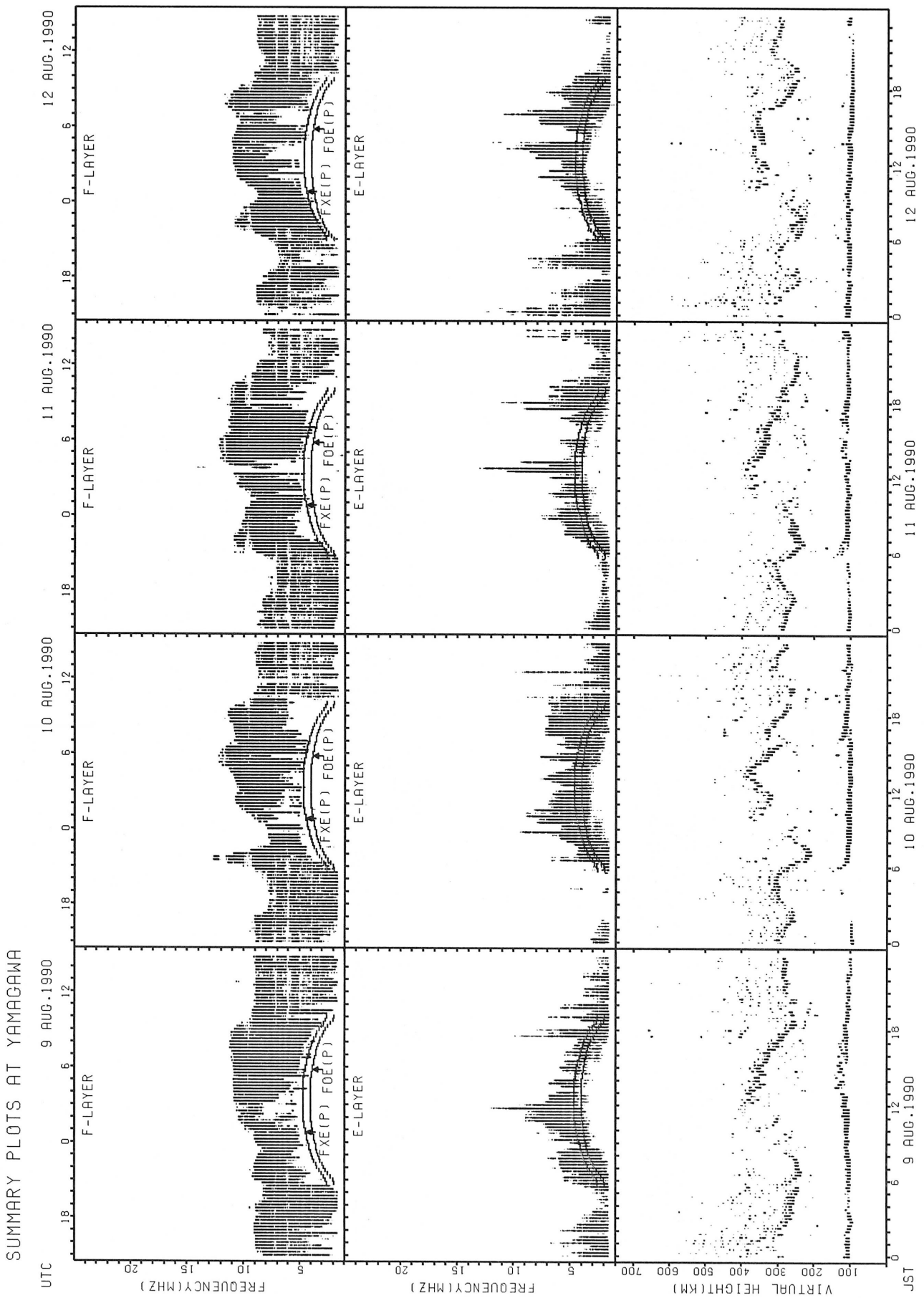
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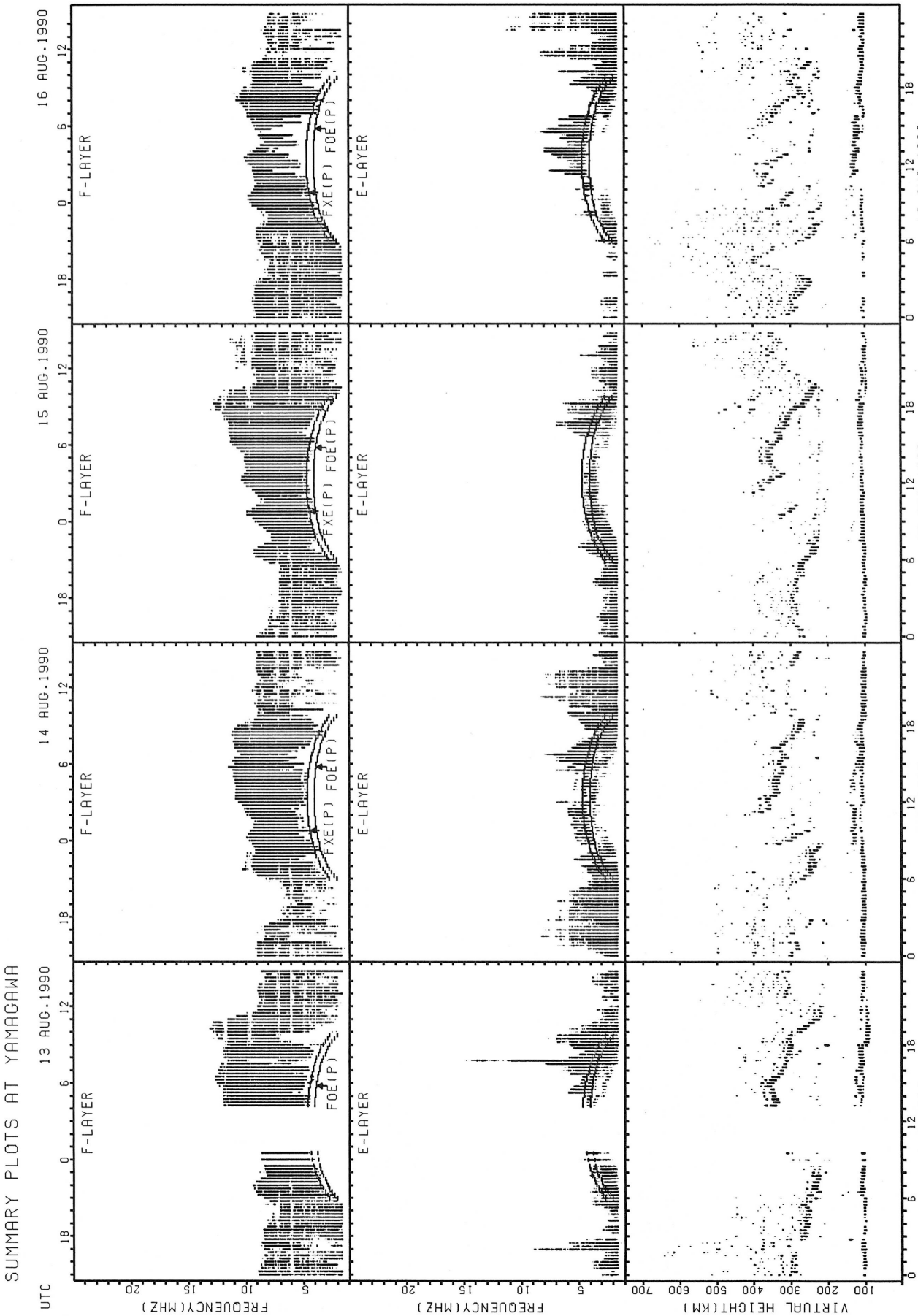
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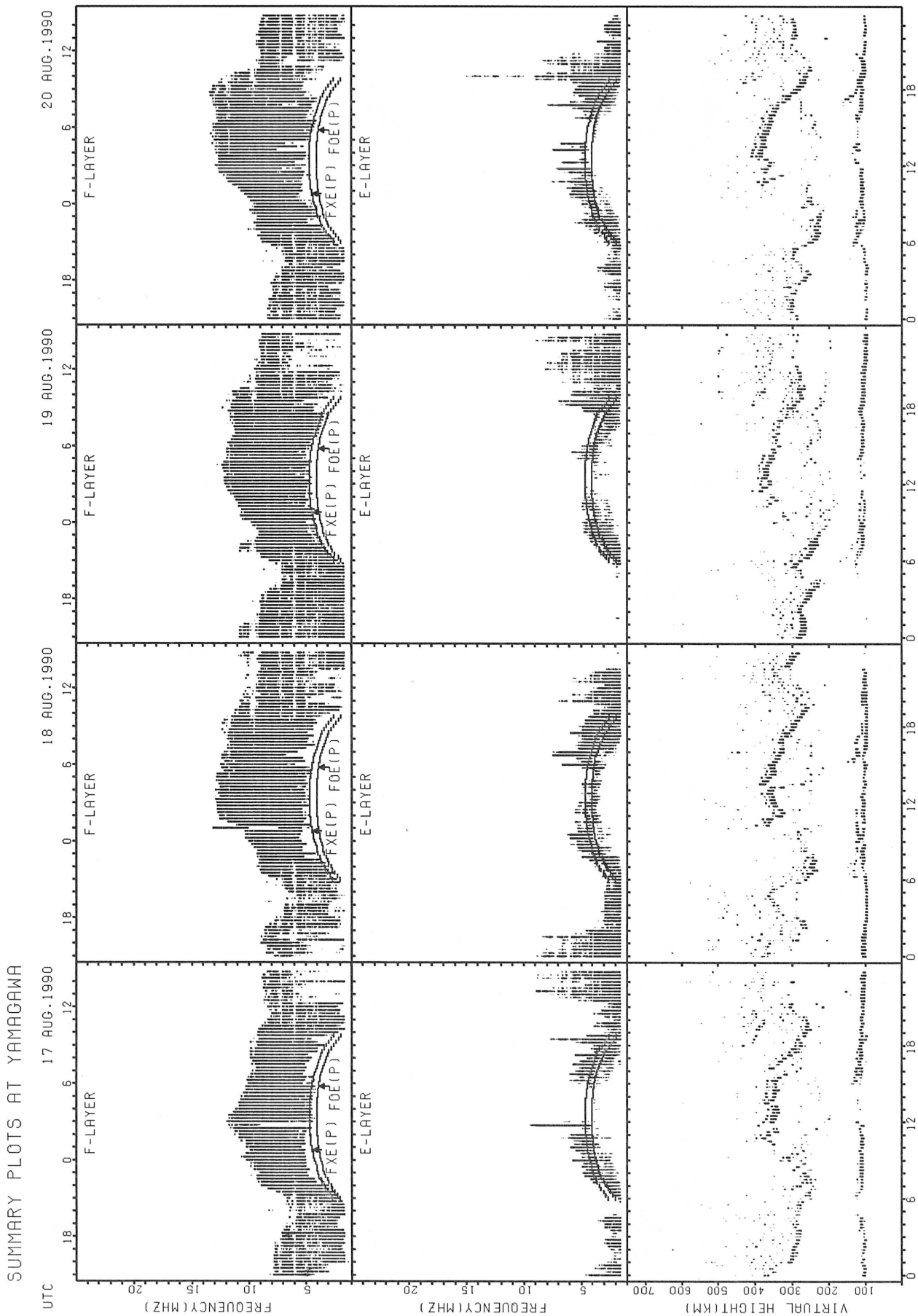
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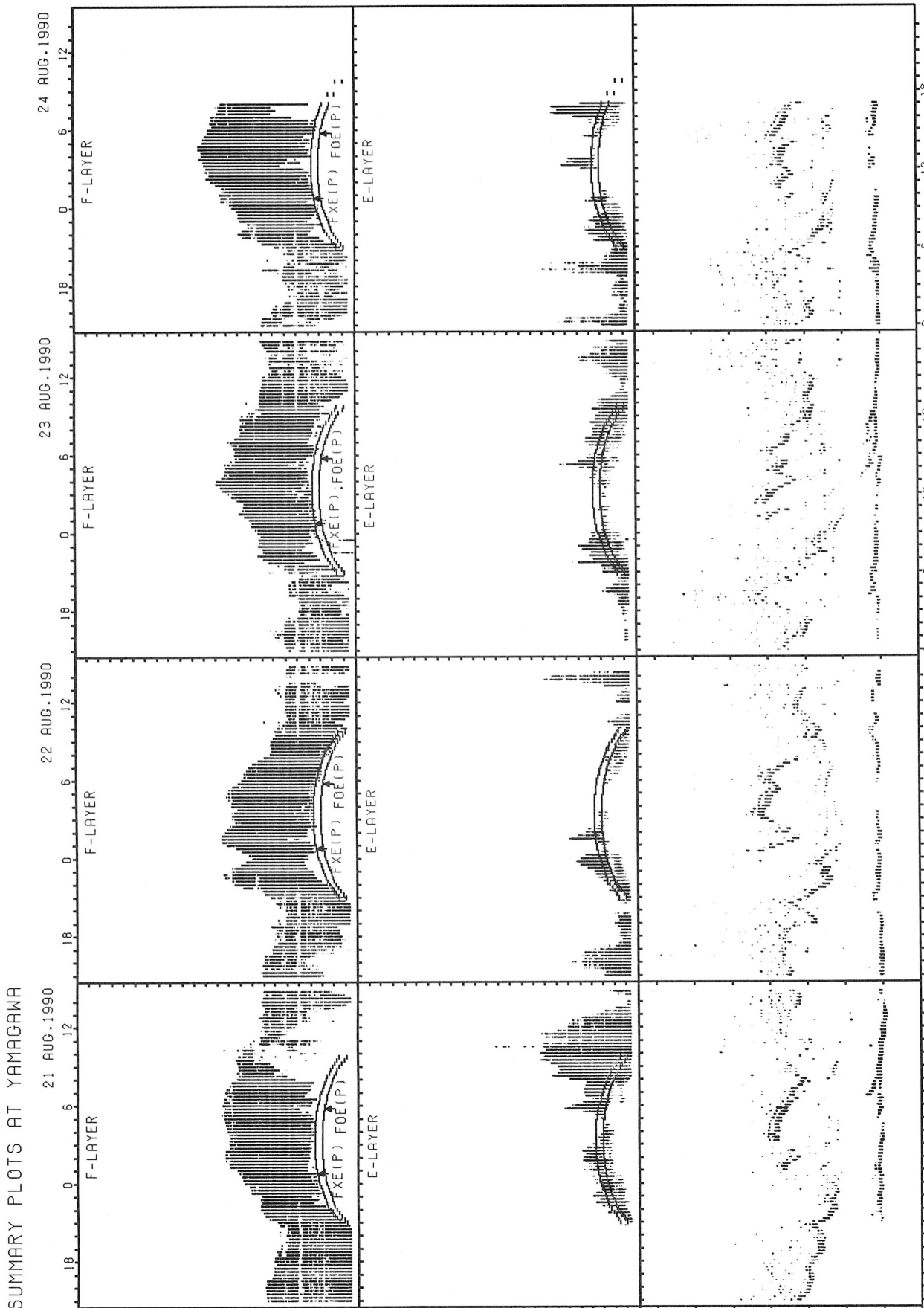
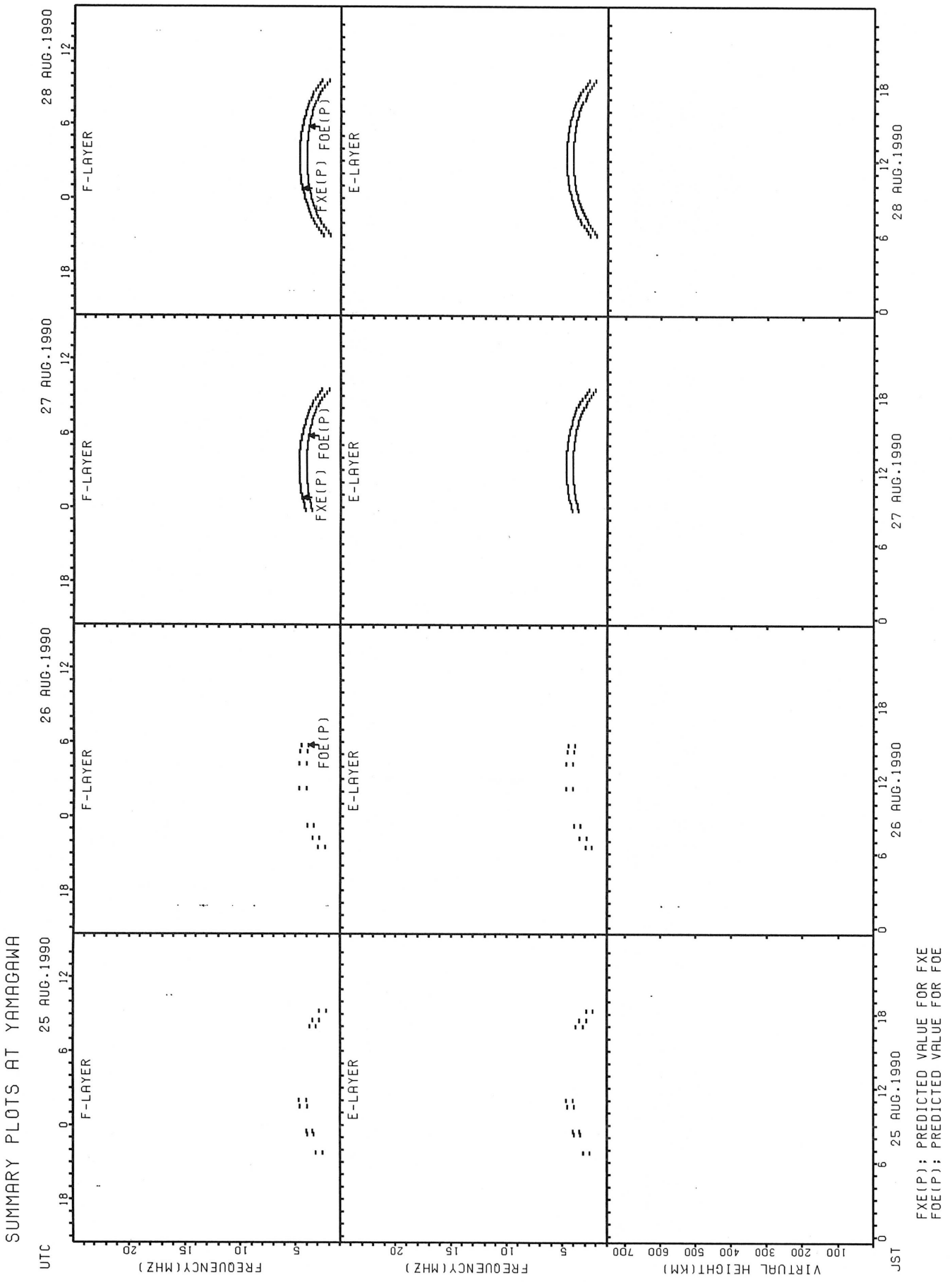
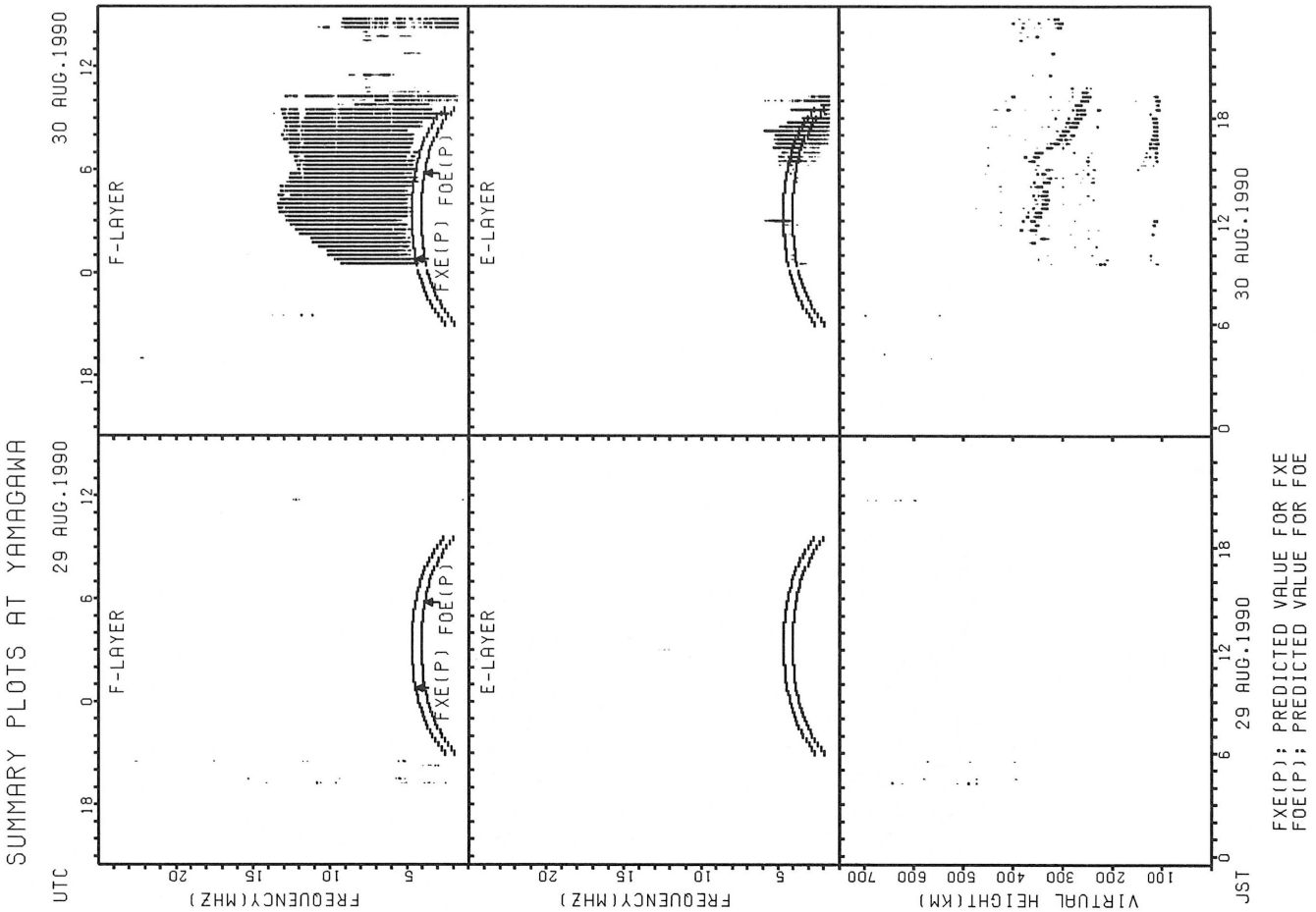
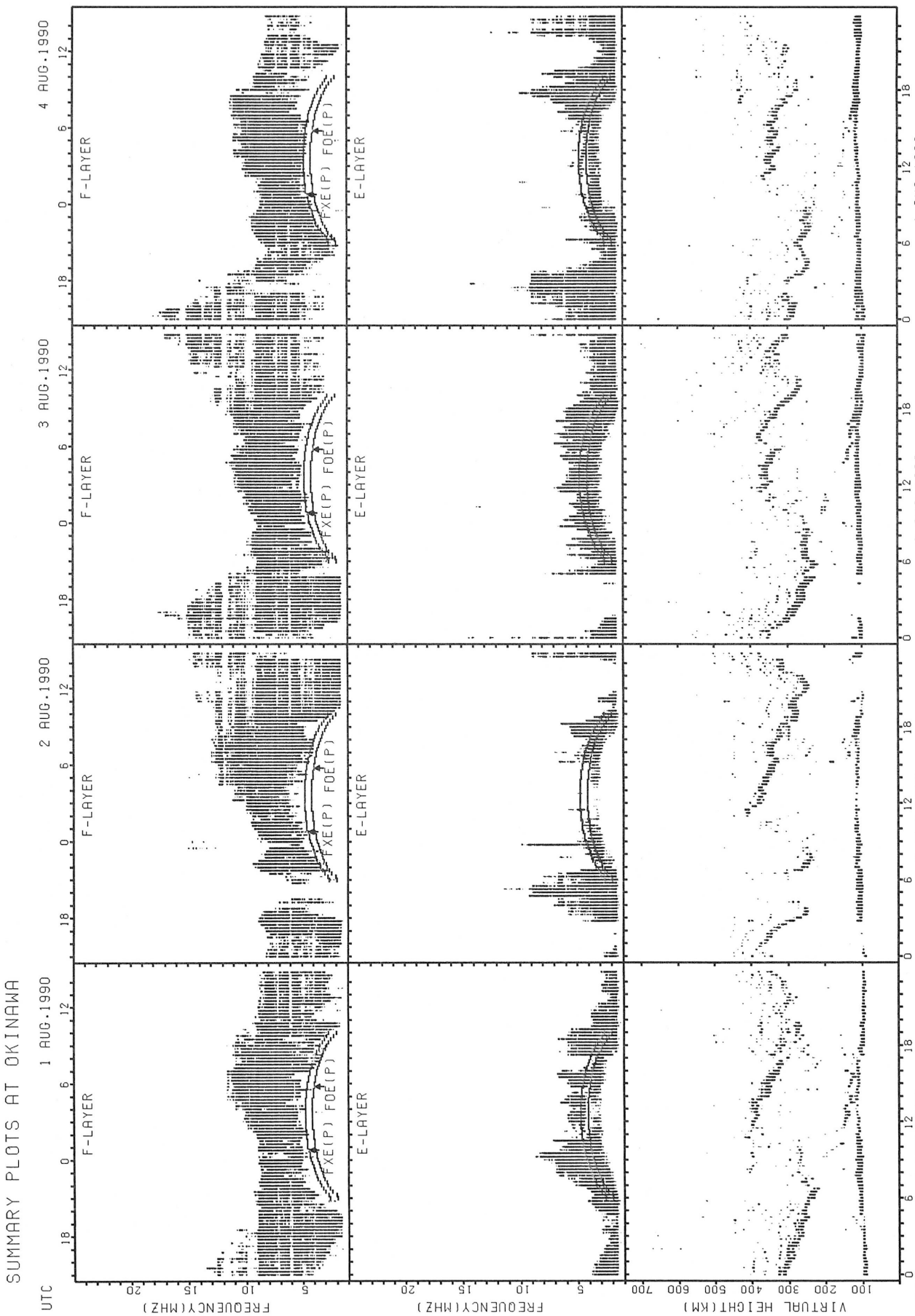
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

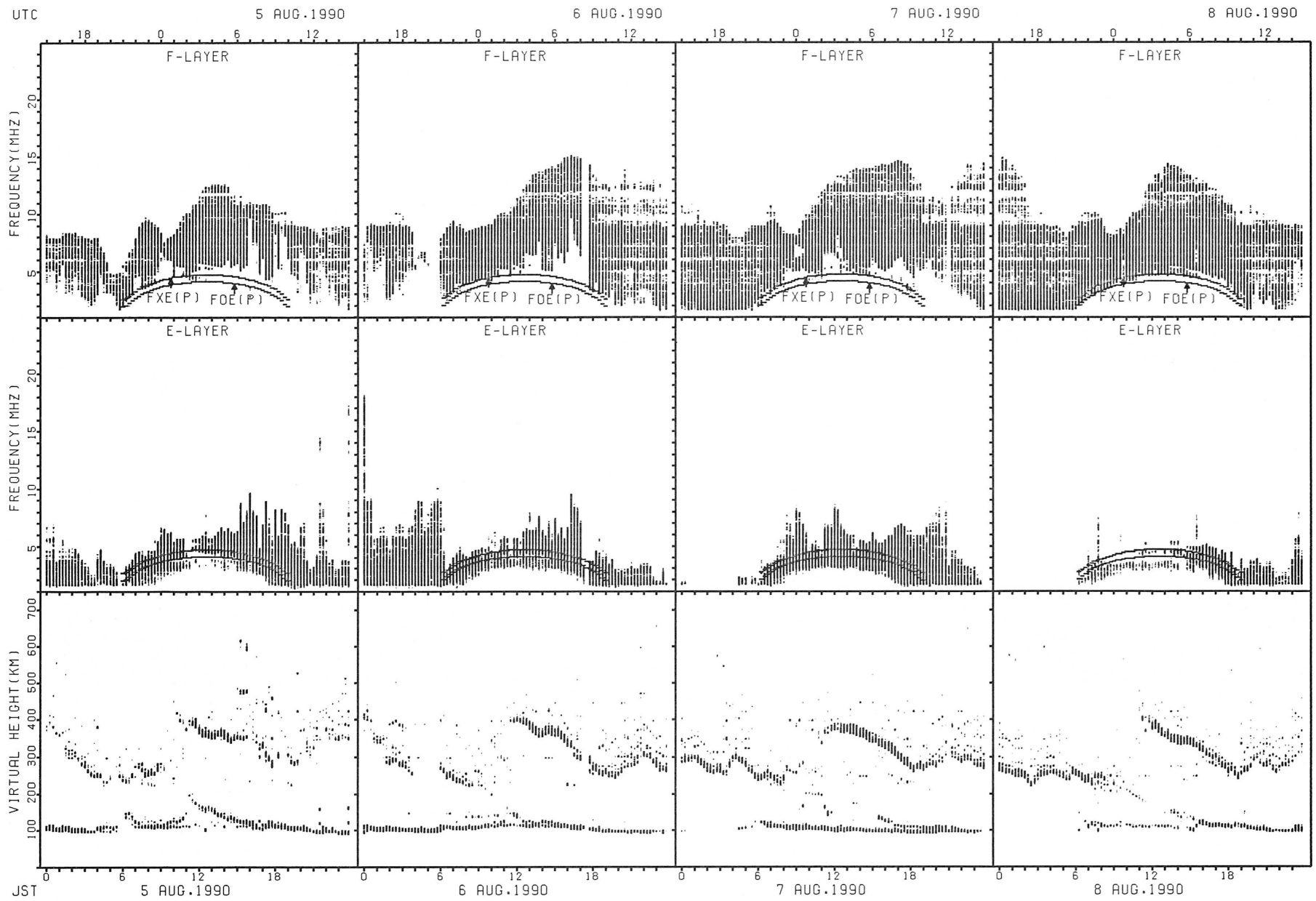

SUMMARY PLOTS AT YAMAGAWA
UTC
21 AUG.1990
22 AUG.1990
23 AUG.1990
24 AUG.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 AUG.1990
26 AUG.1990
27 AUG.1990
28 AUG.1990
F-LAYER
E-LAYER
FOE(P)
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

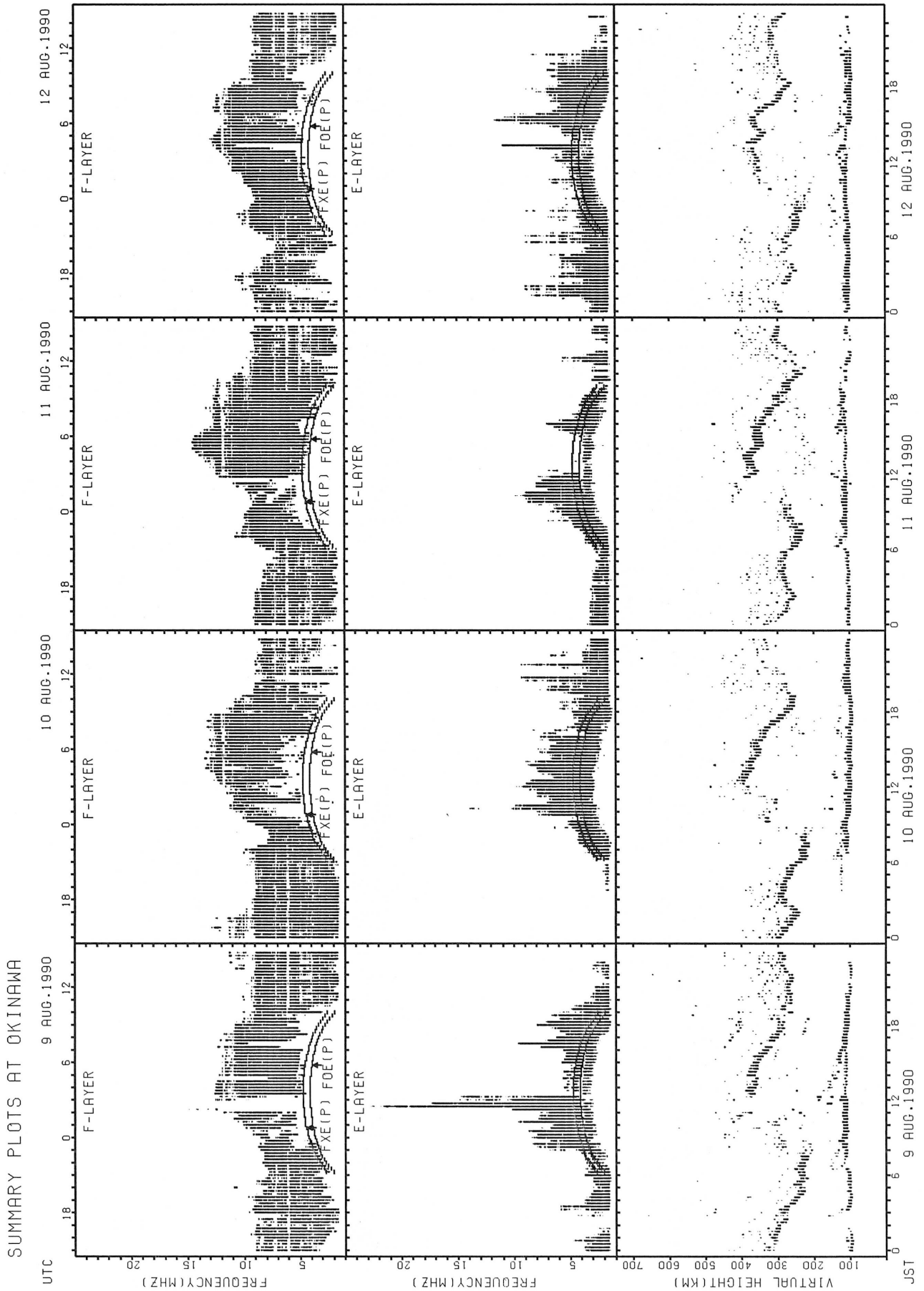

SUMMARY PLOTS AT YAMAGAWA
UTC
29 AUG.1990
30 AUG.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
1 AUG.1990
2 AUG.1990
3 AUG.1990
4 AUG.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

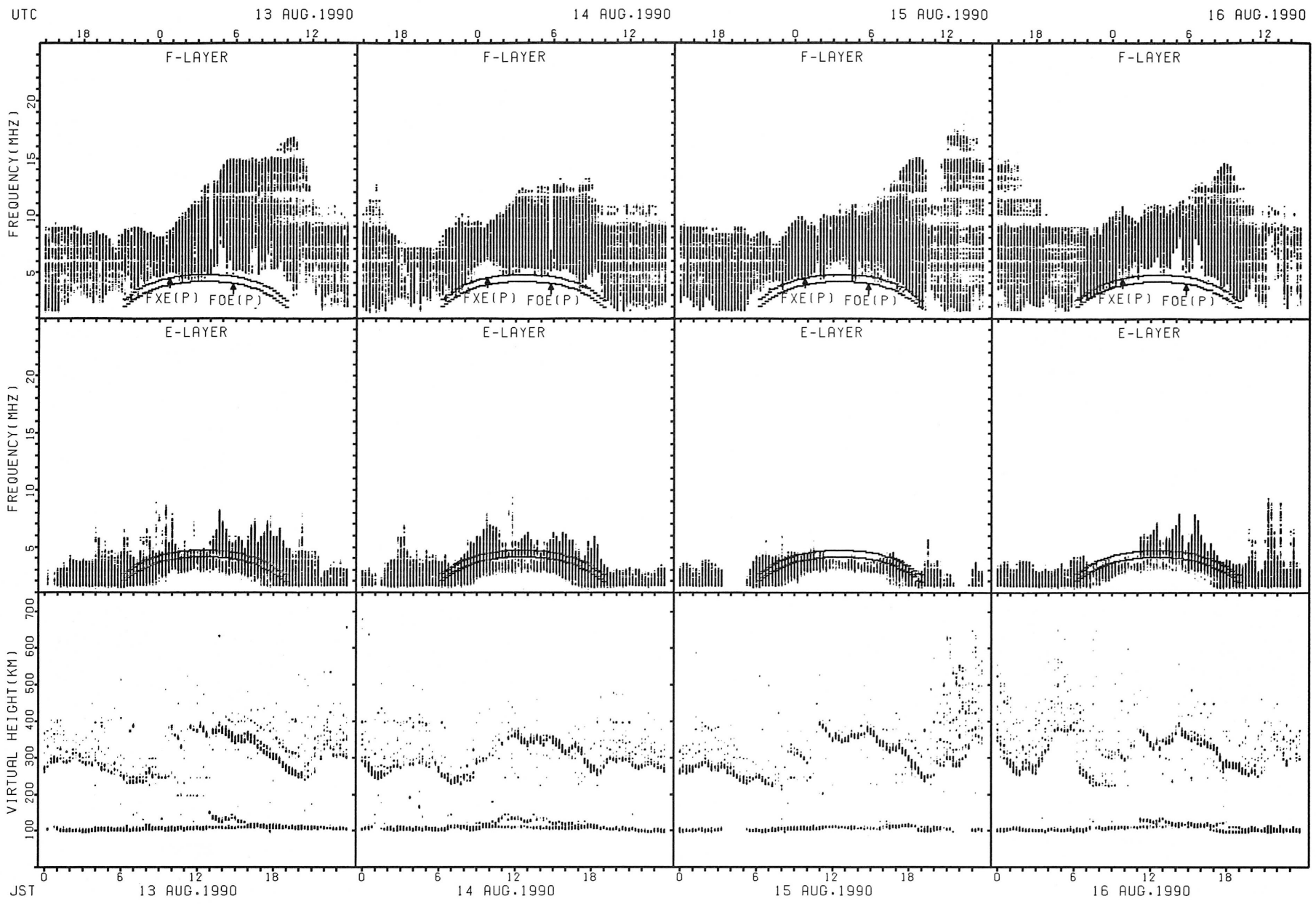
SUMMARY PLOTS AT OKINAWA



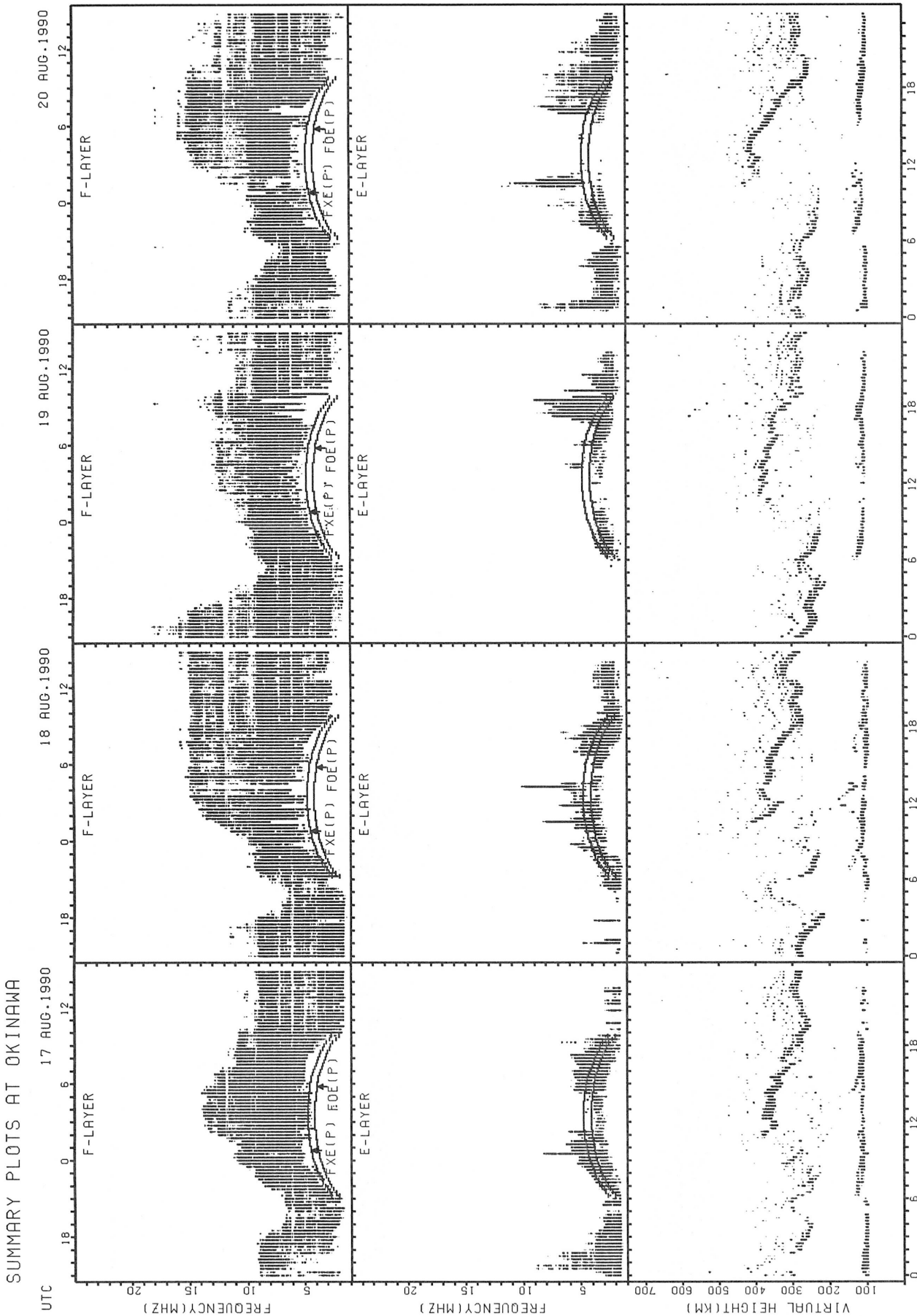
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

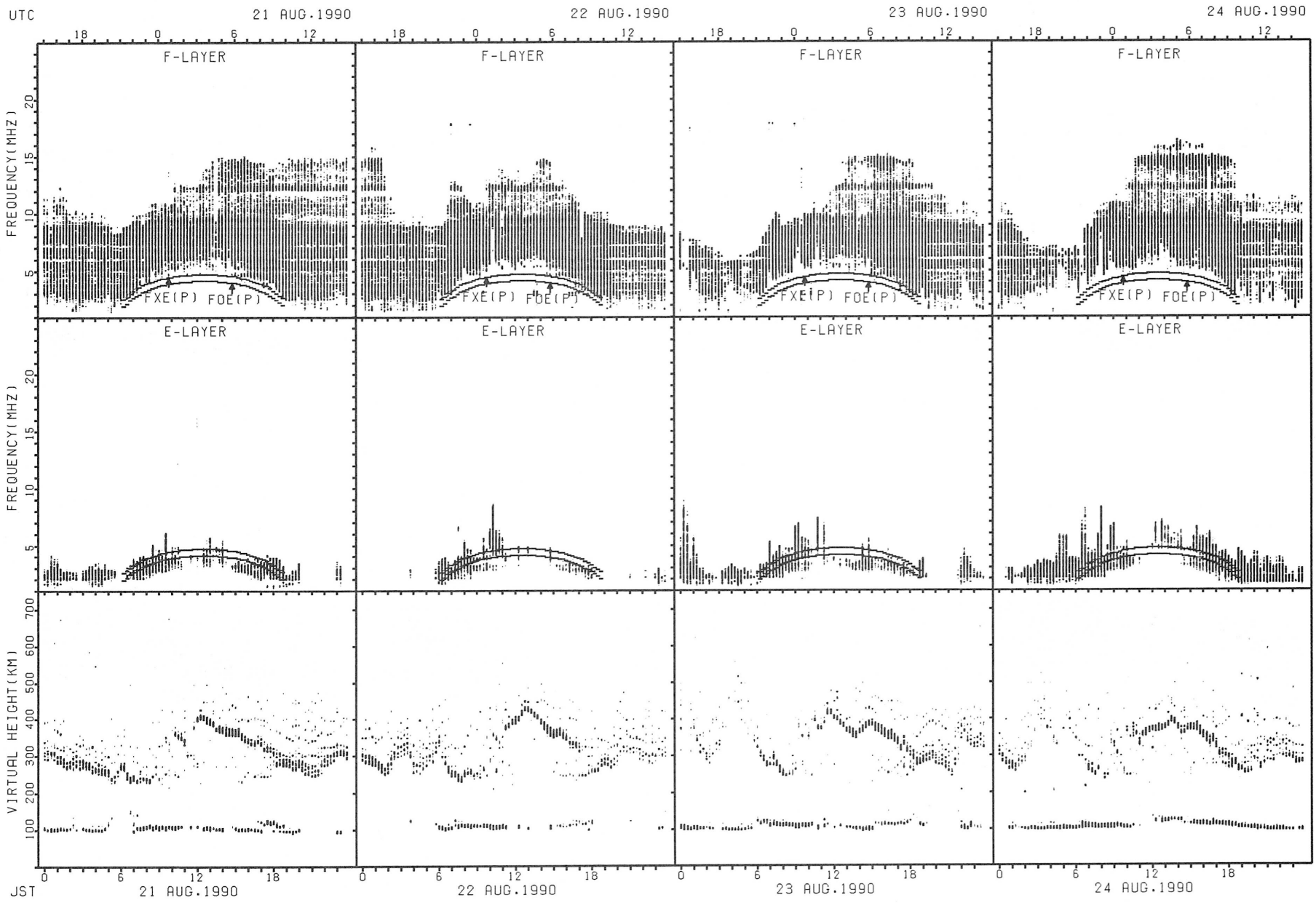

SUMMARY PLOTS AT OKINAWA
9 AUG.1990
10 AUG.1990
11 AUG.1990
12 AUG.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA

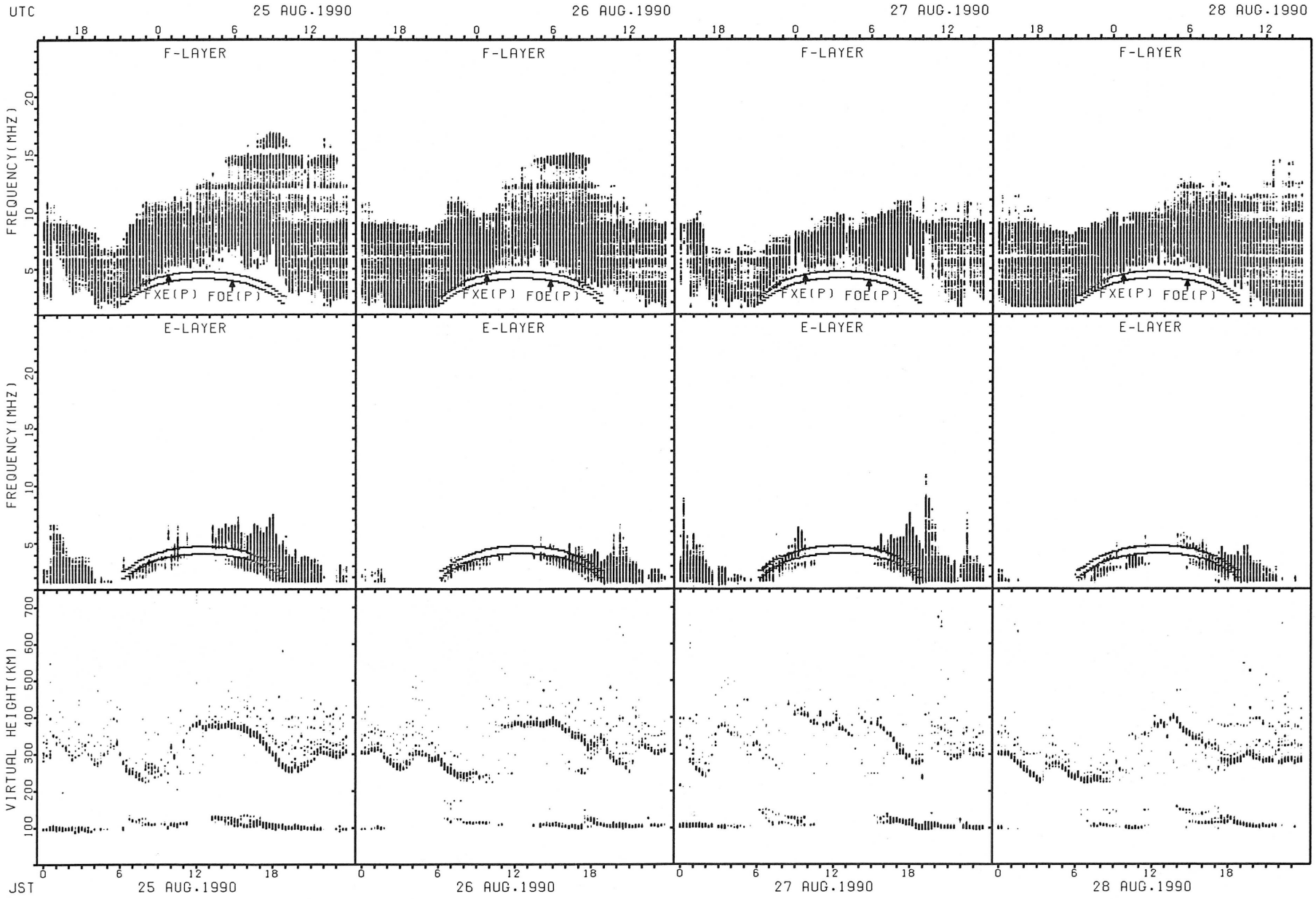


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
17 AUG.1990
18 AUG.1990
19 AUG.1990
20 AUG.1990
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

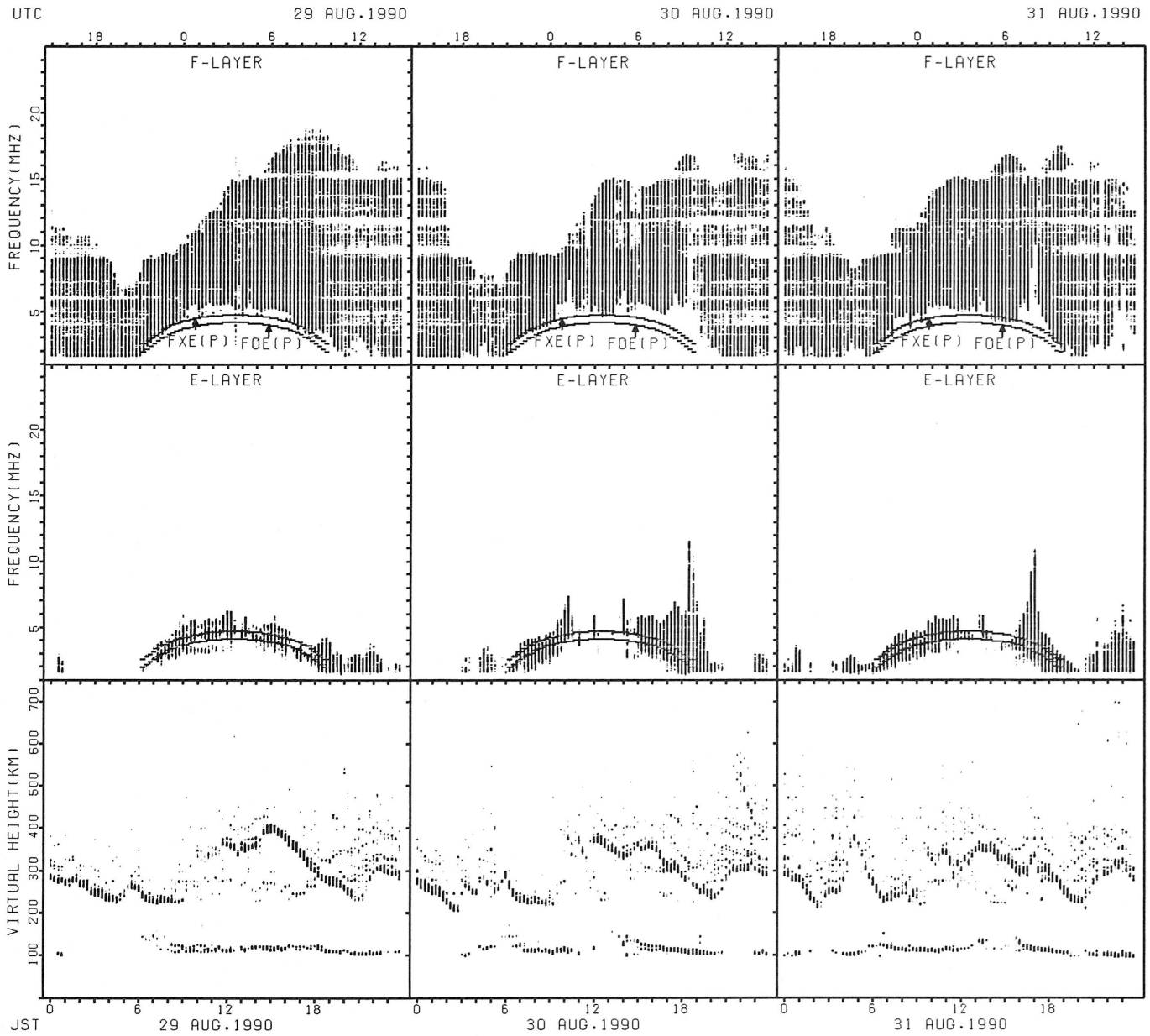

SUMMARY PLOTS AT OKINAWA
UTC
21 AUG.1990
22 AUG.1990
23 AUG.1990
24 AUG.1990
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF H'F AND H'ES

AUG.1990 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							14	21	11								15	17	18	18	10	12		
MED							294	286	302								326	302	304	309	327	321		
U Q							304	300	346								366	315	316	320	346	336		
L Q							270	268	294								310	286	286	296	314	314		

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	21	18	15	16	15	19	18	15	19	16	17	15	12	11	14	19	25	27	25	25	25	27	25
MED	112	111	111	115	119	125	121	120	117	117	116	117	117	115	115	128	125	125	121	119	117	117	115	115
U Q	122	117	115	121	127	127	125	123	121	123	121	119	123	117	143	139	131	131	125	125	120	118	117	121
L Q	110	109	109	111	112	121	119	115	115	115	115	113	113	112	111	117	115	121	117	116	113	113	111	111

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							19	24	21								23	18	18	14				
MED							286	274	284								328	311	294	303				
U Q							314	294	298								350	320	302	314				
L Q							272	260	265								302	278	240	286				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	24	23	24	19	26	25	24	17	21	21	16	13	14	12	22	27	28	26	27	27	25	26
MED	105	103	102	105	109	119	117	115	115	111	111	111	108	111	110	122	121	119	115	113	111	109	107	107
U Q	107	105	107	111	115	125	121	121	119	114	114	114	115	117	133	139	131	121	119	115	115	113	110	111
L Q	101	100	100	99	105	109	113	113	112	107	106	105	106	107	107	110	117	115	113	109	107	107	105	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	11	10	14	10			21	27	28								26	26	27	22	12	12	10	11
MED	358	370	360	373			284	262	278								322	302	300	289	350	357	358	358
U Q	376	390	392	384			300	270	296								330	312	312	312	377	374	362	376
L Q	348	346	350	346			267	246	260								302	264	280	278	309	329	346	338

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	26	25	21	22	20	28	30	26	23	24	22	18	17	21	26	31	31	30	29	29	30	29
MED	103	103	104	105	107	115	118	113	111	111	107	111	110	112	117	121	120	117	113	109	109	107	107	105
U Q	109	107	107	111	111	121	121	119	119	115	113	114	115	119	131	125	125	119	115	111	111	111	111	109
L Q	101	99	99	98	102	107	108	108	109	107	105	105	105	107	111	108	113	113	111	107	105	104	105	102

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

MONTHLY MEDIANS OF H'F AND H'ES
AUG.1990 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	16	19	16	13	12		18	26	21	18							26	25	24	25	19	15	13	15
MED	330	340	321	322	314		283	242	248	255							325	306	278	280	290	334	336	348
U Q	358	356	335	342	351		294	266	262	282							336	323	286	304	334	354	371	354
L Q	224	304	217	305	204		270	234	234	216							278	295	266	254	246	121	115	286

H'ES

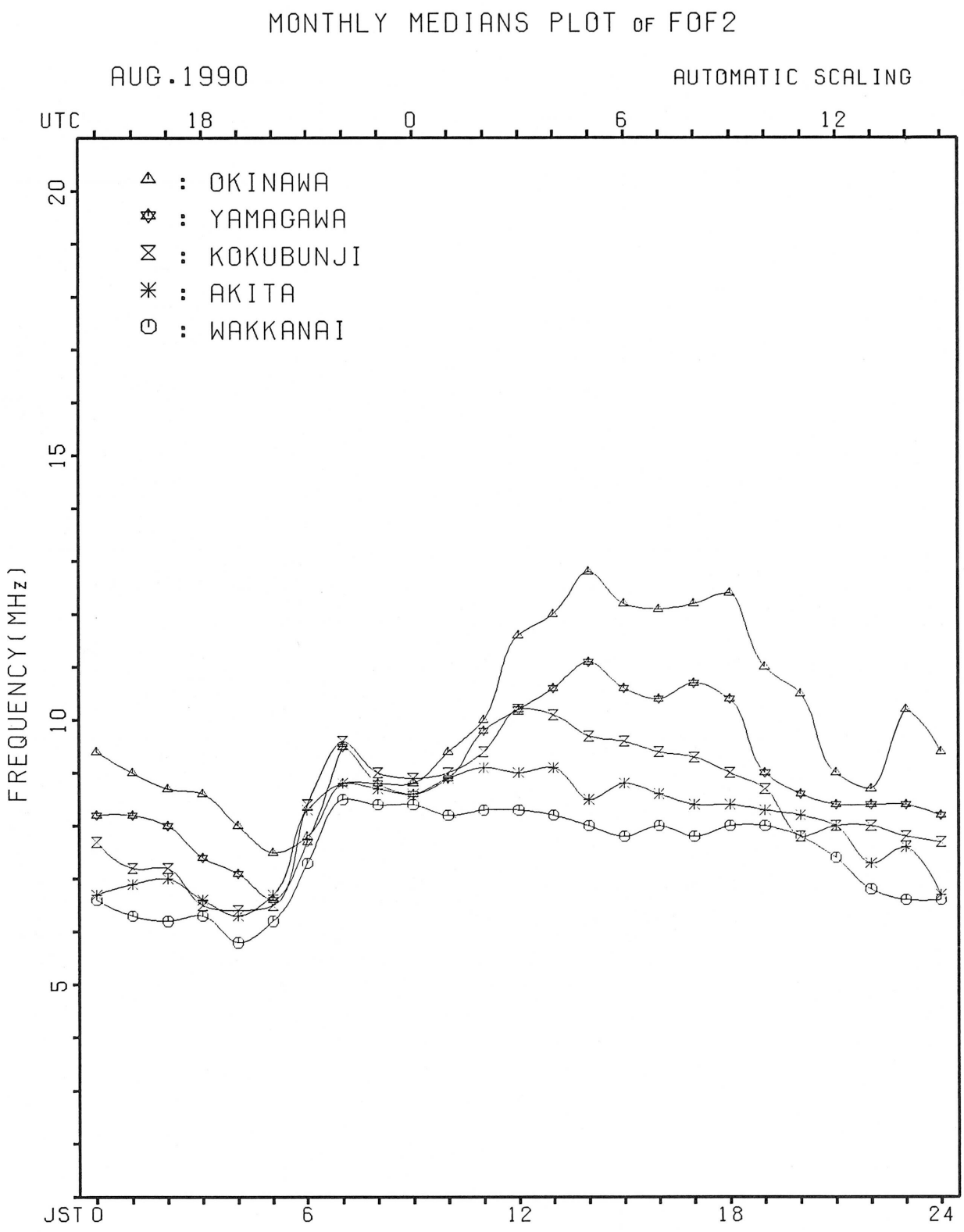
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	20	19	16	19	18	21	21	25	25	18	18	17	15	16	20	24	25	27	27	26	24	25	22
MED	107	107	107	107	111	109	115	117	113	113	111	111	113	119	121	121	121	117	113	111	109	107	109	110
U Q	115	113	151	114	117	113	144	131	119	118	117	125	124	131	132	135	127	124	119	121	117	117	116	117
L Q	105	103	103	102	101	107	106	108	109	109	109	107	108	103	113	114	113	113	111	107	107	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	25	26	25	27	20	13	19	29	24	22							28	31	30	31	27	26	22	25
MED	320	307	310	306	309	310	288	252	250	283							339	322	294	284	300	320	327	330
U Q	341	334	322	328	350	335	304	270	259	314							351	334	304	298	326	346	350	350
L Q	308	290	281	290	278	285	258	243	242	268							330	310	280	266	278	300	320	318

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	21	17	18	16	20	18	29	26	23	23	18	19	17	20	21	25	27	29	28	26	26	23	20
MED	102	105	105	104	103	107	105	119	118	117	113	114	123	123	125	127	121	115	113	109	107	105	103	104
U Q	111	109	107	107	106	107	115	129	125	125	117	117	139	149	135	133	127	119	116	111	113	109	109	107
L Q	98	103	101	101	103	103	103	108	111	109	107	107	109	112	120	114	117	113	111	104	105	101	99	98


MONTHLY MEDIANS PLOT OF FOF2
AUG.1990
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. 1990 | 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 84	81	79	X 78	X 75															X 89	X 92	X 92	X 91	95
2	83	82	86	87	X 70	65												A	A	A	A	X 91	X 88	X 81
3	84	X 83	84	82	X 79															X 100	X 98	X 96	X 92	X 94
4	X 94	X 92	X 92	X 92	X 86															X 89	X 77	X 86	X 90	X 93
5	X 84	93	86	84	X 77													A		X 93	X 88	92	91	87
6	89	X 90	X 88	X 87	X 78	76				A										0 X 101	X 93	X 91	97	99
7	94	90	85	79	X 77															X 107	X 97	X 92	X 88	X 87
8	X 86	X 85	X 84	X 75	X 71															X 90	X 88	94	98	101
9	94	89	86	X 83	X 75	83														X 96	X 91	X 95	105	X 98
10	91	88	X 80	75	77															X 101	X 90	X 92	X 92	X 89
11	X 90	X 86	X 83	X 80	X 76															X 106	X 96	X 85	X 83	81
12	X 77	76	X 76	64	63	66														X 91	X 82	X 87	X 88	X 86
13	X 85	X 87	X 81	X 77	X 78															X 112	X 97	X 89	X 85	X 80
14	X 88	X 83	X 83	X 71	X 60						A									X 77	X 79	X 85	X 82	X 85
15	X 76	X 75	X 73	X 71	X 68															X 92	X 78	X 79	X 80	X 76
16	X 79	X 76	X 79	X 61	X 57													A		X 85	X 80	X 76	X 75	X 74
17	X 68	X 70	X 70	X 69	X 68								A							X 82	X 75	X 77	X 81	X 81
18	X 77	78	X 75	X 68	X 62															X 103	X 89	X 90	X 88	X 88
19	X 89	X 86	X 81	X 81	X 73															X 103	X 97	X 99	X 93	X 88
20	X 85	X 83	X 84	X 82	X 73															X 105	X 86	X 84	X 88	X 81
21	X 80	X 81	X 74	X 77	X 73															X 96	X 86	X 86	X 83	X 81
22	X 80	X 77	X 75	X 74	X 76															X 64	X 71	0 X 70	X 71	X 68
23	X 66	X 67	X 62	X 65	X 61															X 87	0 X 86	X 78	X 81	X 80
24	X 79	X 73	X 61	X 69	X 71															A	X 76	X 77	X 75	X 75
25	X 71	X 69	X 66	X 69	X 65															X 95	X 89	X 89	X 92	X 92
26	X 89	X 84	X 83	X 77	X 75															X 101	X 94	X 93	X 89	X 95
27	X 88	X 77	X 69	X 67	X 75		A	55					A	A						X 68	X 64	X 69	X 71	X 69
28	X 66	X 67	X 68	X 65	X 62															X 91	X 88	X 90	X 93	X 90
29	X 87	X 83	X 81	X 80	X 78															X 105	X 101	X 94	X 94	X 92
30	X 94	X 92	X 87	X 73	X 67															X 104	X 87	X 91	X 92	X 90
31	X 86	X 87	X 88	X 75	X 68															X 93	X 88	X 78	X 75	X 69
	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	4		1												29	30	31	31	31
MED	X 85	X 83	X 81	X 75	X 73	71		65												X 95	X 88	X 89	X 88	X 87
UQ	X 89	X 87	X 84	X 80	X 76	80														X 103	X 93	X 92	X 92	X 92
LQ	X 79	X 76	X 74	X 69	X 68	66														X 89	X 80	X 82	X 82	X 80

AUG. 1990 | FXI (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1990 | 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	78	F 73	F 71	F 72	69	77	96	94	81	79	85	93	R 95	98	103	108	103	96	89	83	86	86	85	F 84
2	F 75	U F 74	F 77	F 80	64	F 58	68	93	97	93	90	98	111	111	109	100	93	I A 93	I A 90	I A 89	I A 86	85	82	75
3	76	77	F 74	F 72	72	80	S 99	102	92	H 80	85	91	98	97	101	98	R 97	93	93	94	92	91	86	88
4	88	86	86	86	80	75	79	74	73	70	75	79	80	89	90	89	86	87	88	84	S 73	80	84	87
5	78	F 84	78	F 75	71	73	85	98	91	85	85	87	88	91	94	96	91	I A 87	U A 88	88	82	F 84	F 83	F 79
6	F 81	84	82	81	72	68	82	100	93	A	84	92	99	103	100	97	91	88	91	U S 95	87	85	F 87	F 89
7	Z 85	F 82	F 74	F 70	71	83	95	107	103	90	90	89	85	91	89	85	89	94	101	101	91	86	82	81
8	80	79	78	69	65	71	94	101	91	90	85	93	101	100	102	113	112	98	88	84	82	J F 88	U F 86	F 94
9	F 85	F 82	F 78	77	69	75	96	V 95	86	90	96	95	100	100	99	97	95	97	99	90	85	89	F 91	U S 92
10	F 81	F 77	74	F 65	F 67	73	104	129	89	84	92	106	104	107	110	107	103	89	89	95	84	86	86	83
11	84	80	77	74	70	72	S 99	111	108	104	99	99	103	109	114	110	96	98	97	100	90	80	77	U F 73
12	71	J F 70	70	F 55	F 55	F 58	80	100	103	J R 93	86	100	106	104	96	96	97	97	99	85	77	81	82	80
13	Z 79	81	75	71	72	77	88	96	86	87	86	95	109	R 109	106	101	107	105	103	106	91	83	79	74
14	82	77	77	65	54	59	76	83	75	76	I A 71	73	77	84	86	82	80	84	78	71	73	79	76	79
15	70	69	67	65	62	65	89	88	79	93	93	84	90	89	88	95	95	94	91	86	72	73	74	70
16	73	70	73	55	51	52	73	Z 76	67	72	71	73	76	77	71	72	77	A	72	79	73	69	69	68
17	62	64	64	63	62	V 67	80	84	98	97	94	95	I A 94	88	81	79	80	82	85	76	69	71	75	75
18	71	F 71	69	62	56	59	79	86	93	99	99	99	102	101	98	95	93	89	96	97	83	84	82	82
19	83	80	76	74	67	69	86	105	108	98	104	108	112	113	112	108	100	96	98	98	92	93	88	82
20	79	77	78	76	67	75	104	98	87	96	106	110	116	118	116	115	115	120	124	S 99	80	78	82	75
21	S 74	75	68	71	67	67	86	93	92	94	107	112	108	103	104	104	98	91	88	90	80	80	S 77	75
22	74	71	69	68	70	S 75	94	H 122	114	95	95	89	78	71	70	69	69	U R 64	65	58	65	U S 64	65	62
23	60	60	56	59	56	54	70	103	102	105	108	102	110	105	96	86	85	89	86	81	80	72	75	74
24	S 73	67	55	63	65	59	80	103	100	109	R 110	114	112	108	100	97	96	96	89	I A 78	70	71	69	69
25	65	63	60	62	59	59	77	95	104	108	108	107	100	101	99	96	93	90	90	89	83	83	86	86
26	83	78	77	71	69	71	91	108	100	95	92	100	106	106	103	103	R 98	94	86	96	88	87	83	89
27	82	U S 71	S 63	61	69	65	I A 62	F 57	56	E G 51	57	56	I A 58	A	61	63	63	67	69	62	58	S 64	65	63
28	60	61	62	59	56	59	76	88	85	83	91	88	88	91	92	95	94	91	89	85	82	84	87	84
29	81	77	75	74	72	81	93	94	95	94	104	115	114	R 112	115	110	106	105	101	99	95	88	88	86
30	88	86	81	67	61	63	85	104	104	93	95	R 100	109	113	117	115	110	110	113	98	81	85	86	84
31	80	81	82	69	62	64	80	99	100	108	112	109	110	109	108	107	103	96	94	87	83	72	69	63
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	31	31	31	30	31	31	31	30	31	31	31	31	31	31
MED	79	77	74	69	67	68	85	98	93	93	92	95	101	102	100	97	95	94	90	89	82	83	82	80
UQ	82	80	78	74	70	75	94	103	101	97	102	104	109	109	107	107	102	97	98	96	86	86	86	85
LQ	73	70	68	63	62	59	79	90	86	84	85	89	89	91	91	92	90	89	88	84	75	76	76	74

AUG. 1990 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1990 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						L	L	L	L 560	R 590	A	U A 600	L 610	A	550	A	U L 530	A	A					
2						A	A	L	L	L	700	620	580	L	570	L	A	A	A					
3							L	L	L	L	600	L 610	560	590	570	550	520	L	L					
4						L	L		U L 530	L	560	570	590	590	U A 570	550	U L 560	L	A					
5							L	L	L	L	L	L	L	560	A	540	A	A	A					
6							L	L	L	A	590	570	A	A	A	A	A	L	A					
7						L	L	L	L	L	L	580	560	570	L 570	L 560	L 490	L	L					
8									A	L	L	590	610	590	560	540	U L 500	A						
9							L		L	L 550	L	L 610	570	580	A	A	A	A						
10						L	L	L	A	A	A	580	L 600	570	550	L 560	U L 520	L						
11							L	L	L	U L 560	L	600	L 610	L 630	A	A	L 560	L						
12							L	L	L	A	L	U L 610	560	560	A	L 560	U L 530							
13							L	L	L	L	L	570	L 610	580	560	L 580	A	A	A					
14							L	L 440	520	520	A	A	A	A	550	520	L	L						
15							L	L	L	590	L 540	L	570	U L 580	U L 600	550	L	L						
16						290	400	U L 450	U L 520	550	570	580	L	550	L	A	L	A						
17							L		L 570	L	600	580	A	L 540	580	U L 570	U L 520							
18						L		L	L	L	L 600	L 620	620	A	610	U L 600	U L 550	L	L					
19							L		L	L	L	U L 680	L 660	L 630	610	620	L	A						
20								L	L	U L 660	U L 670	L	L 650	L 630	L 600	610	L 580	L						
21							L	L	L	U L 670	L	U L 630	U L 600	640	610	L 590	L 560	L						
22								L	L	L	670	Z 610	R 560	R 550	550	530	530	A	A					
23						L	U L 490	L	L	L	U Z 640	L 600	U L 630	L 670	L 580	620	L	L						
24							A	A		U L 660	U L 620	L	640	650	U L 650	L 600	L							
25									L	L	A	U L 600	L	L 620	L 620	L 570	L	L						
26								L	L	L	A	A	U L 670	L 640	U L 640	U L 630	U L 580	L	L					
27							A	440	480	R 510	510	520	A	A	540	A	A	L						
28								L	L	U L 640	L 610	L	640	600	U L 610	L 560	L							
29									L	L	L	L 630	U L 620	U L 680	U L 590	U L 610	L							
30								L	L	L	L	L	L 620	U L 670	L 620	L	L	L						
31						L	A		L	L	L	U L 690	L	U L 630	L	L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	3	6	11	14	23	23	25	24	22	14							
MED						290	445	L 440	L 525	L 590	600	600	610	590	580	L 565	U L 530							
UQ								L 445	L 560	U L 650	640	L 615	L 625	L 630	L 610	L 600	U L 560							
LQ								440	520	550	570	580	575	570	560	550	U L 520							

AUG. 1990 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

AUG. 1990 | 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						A	A	A	A	A	A	A	A	A	A	A	340	A	A					
2						A	260	U A 325	U A 355	A	U A 380	A	425	410	405	380	360	300	A					
3						A	A	A	A	A	A	A	A	A	390	365	335	295	A					
4						A	A 235	A	A	A	A	A 410	410	405	395	380	340	295	A					
5						A	250	305	340	380	A	A	A	A	400	370	340	290	A					
6						B	A	335	A	A	A	A	A	A	A	A	A	295	A					
7						B	240	A	345	A	A	A	A	390	380	365	330	A 285	A					
8						A	A	A	A	A	A	A	390	R 385	400	385	340	290	A					
9						A	235	295	A 320	A	A	A	A	A	400	380	340	A 275	A					
10						A	255	A	A	A	A	A	A	395	390	375	340	285	A 195					
11						B	245	300	335	A	U A 385	A	A	A	A	A	A	290	A					
12						A	A	A	A	A	A	A	A	A	A	A	340	A	A					
13						A	250	A	345	375	A	A	A	A	A	U A 365	A	295	A					
14						170	255	305	345	380	400	400	400	395	385	370	A 325	U A 270	A					
15						B	A	A	A	A	395	A	A	395	370	355	330	A	A					
16						A 145	240	300	U A 335	A	A	A	A 410	400	400	365	340	280	A					
17						B	235	310	340	A	A	405	A	A	400	380	340	U A 280	A					
18						A	255	310	A	R	A	A	A	A	395	375	340	285	A					
19						B	265	325	A	375	400	A	A	A	A	375	A	A	A					
20						A	250	325	365	385	395	U A 390	A	410	R 400	380	350	300	A					
21						B	240	310	355	390	U A 405	A	A	A	405	385	345	295	A					
22						140	245	305	U A 345	390	400	A	R 420	390	395	380	345	280	A					
23						A	250	315	360	385	A	A	A	A	405	375	350	275	180					
24						B	250	320	365	375	A	A	410	B	A	395	345	A 280	A					
25						160	260	315	355	U A 390	B	U A 390	A	A	A	A	A	A	B					
26						B	R 245	A	370	A	A	A	A	A	385	A	A	285	A					
27						A	220	305	A	355	A	410	A 420	B	400	370	335	270	A					
28						B	R	R	345	380	A	R	410	410	400	375	340	280	A					
29						A	260	305	345	U A 365	U A 390	A	A	A	A	A	340	275	A					
30						B	265	320	350	370	U A 385	R 410	U R 415	410	395	365	330	265	A					
31						A	210	285	U A 320	345	A	A	A	395	390	355	325	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						4	24	20	20	15	10	7	10	13	22	24	25	26	2					
MED						152	250	310	345	380	395	405	410	395	398	375	340	285	188					
UQ						165	255	320	355	385	400	410	420	410	400	380	340	295						
LQ						142	240	305	340	372	U A 385	395	410	395	390	365	335	275						

AUG. 1990 | FOE (0.01 MHZ)

IONOSPHERIC DATA

AUG. 1990 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A 47	J A 35	J A 28	J A 26	J A 23	J A 26	J A 65	J A 55	J A 70	J A 66	J A 67	J A 65	J A 71	77	J A 47	75	J A 51	J A 60	J A 47	J A 25	J A 24	J A 33	J A 84	J A 101
2	J A 60	J A 51	J A 34	J A 25	J A 25	J A 46	J A 60	J A 53	J A 50	J A 55	J A 55	42	48	54	55	J A 66	J A 107	J A 139	J A 136	J A 145	J A 130	J A 54	J A 43	J A 37
3	J A 26	J A 21	E B 12	21	J A 22	J A 27	J A 37	J A 59	J A 65	J A 51	43	50	J A 48	41	G	J A 51	J A 57	J A 64	J A 50	J A 26	J A 36	J A 22	J A 20	J A 25
4	J A 25	J A 27	J A 24	J A 26	J A 32	J A 23	32	J A 59	J A 53	J A 99	J A 55	44	44	51	J A 61	G	J A 60	J A 61	50	46	J A 38	J A 47	J A 53	J A 60
5	J A 62	J A 44	J A 40	J A 28	J A 25	J A 23	G	41	J A 51	G 38	J A 83	J A 67	J A 102	J A 47	J A 75	J A 101	J A 86	J A 165	J A 93	J A 140	J A 128	J A 51	J A 52	J A 72
6	59	J A 62	J A 48	J A 41	J A 37	J A 31	J A 33	G	J A 69	140	J A 56	J A 116	J A 106	J A 92	97	J A 131	J A 77	J A 54	J A 59	J A 89	J A 111	J A 63	J A 41	J A 56
7	J A 51	J A 42	J A 26	J A 21	J A 20	18	29	34	G	43	J A 43	J A 43	J A 50	G	G	40	J A 49	J A 50	25	J A 31	J A 22	J A 37	J A 23	J A 27
8	E B 13	E B 13	E B 13	J A 24	E B 13	33	J A 39	J A 52	J A 82	J A 61	J A 52	40	41	G 30	44	G	44	J A 55	J A 93	J A 55	J A 112	J A 132	J A 65	J A 57
9	J A 47	J A 47	J A 28	J A 44	J A 23	J A 38	31	J A 49	J A 56	J A 51	J A 49	J A 59	J A 52	J A 55	J A 72	J A 72	92	J A 76	J A 89	J A 71	J A 47	J A 52	J A 54	J A 35
10	J A 35	J A 29	27	J A 21	J A 18	20	32	J A 55	J A 73	J A 91	J A 99	J A 85	J A 50	G 34	G 39	G 31	37	36	J A 52	J A 21	21	26	J A 32	J A 34
11	J A 31	J A 31	J A 32	J A 22	E B 13	E B 14	29	36	40	J A 50	J A 55	J A 58	J A 65	J A 63	J A 98	J A 85	58	J A 72	J A 49	69	J A 28	J A 79	109	65
12	J A 53	J A 103	J A 45	32	J A 29	20	J A 28	36	J A 62	102	J A 54	J A 87	J A 70	50	J A 63	J A 45	40	53	J A 47	J A 47	J A 53	15	J A 32	J A 35
13	J A 65	J A 19	J A 52	J A 39	32	J A 28	J A 35	J A 34	J A 41	J A 44	47	45	J A 54	J A 54	J A 58	39	73	J A 67	50	J A 56	J A 102	85	J A 31	J A 46
14	J A 43	J A 37	J A 51	J A 45	J A 64	G	29	J A 47	60	J A 53	J A 88	J A 61	J A 97	73	43	J A 53	J A 50	J A 36	J A 41	67	J A 87	J A 52	J A 42	J A 23
15	28	J A 23	26	J A 23	J A 23	22	34	J A 42	J A 44	J A 43	G	41	40	42	42	40	J A 55	32	J A 52	J A 36	J A 22	J A 34	J A 52	J A 23
16	J A 37	J A 25	J A 37	31	22	18	30	J A 43	37	54	J A 75	49	47	56	44	J A 66	J A 51	117	J A 30	J A 51	J A 98	J A 38	J A 52	J A 36
17	J A 34	J A 33	23	J A 16	E B 13	19	26	38	J A 51	58	83	G	108	J A 91	47	45	J A 50	J A 106	J A 28	J A 54	J A 52	J A 52	J A 52	J A 47
18	J A 27	J A 26	J A 17	E B 14	E B 13	J A 20	G 20	J A 35	38	G 38	J A 45	J A 67	45	80	G 36	G 32	40	J A 45	J A 30	19	J A 21	22	J A 16	22
19	E B 13	J A 16	J A 21	21	E B 13	E B 15	G	G	J A 51	38	G 36	45	J A 55	J A 53	J A 42	G 38	J A 51	72	J A 51	J A 42	J A 45	J A 36	J A 38	J A 27
20	J A 52	J A 34	J A 16	E B 13	J A 18	J A 19	29	37	45	48	45	J A 54	J A 53	45	G	G	G	37	J A 40	17	J A 22	J A 53	J A 35	32
21	J A 29	J A 26	J A 21	J A 26	E B 13	E B 16	28	39	45	53	J A 59	51	45	41	43	G	42	42	J A 47	J A 54	J A 37	J A 33	J A 36	J A 23
22	J A 25	22	J A 22	J A 18	E B 13	17	32	36	J A 46	43	G	J A 50	G	G	43	42	38	J A 99	J A 76	49	60	J A 54	25	J A 15
23	J A 26	J A 24	J A 49	J A 34	J A 52	J A 26	J A 37	37	43	46	44	J A 53	J A 45	43	45	J A 57	J A 52	J A 41	30	J A 54	77	J A 26	J A 51	20
24	J A 14	J A 26	J A 42	J A 22	J A 45	23	J A 46	J A 58	J A 65	J A 66	J A 60	J A 90	G	E B 42	J A 42	J A 52	J A 52	J A 50	J A 38	J A 122	J A 67	J A 24	J A 43	J A 28
25	J A 25	J A 42	J A 28	J A 28	J A 48	22	29	39	J A 52	J A 55	59	51	J A 76	J A 92	J A 73	J A 53	J A 77	J A 35	J A 30	70	59	J A 62	J A 66	J A 63
26	J A 51	J A 34	E B 13	16	E B 13	E B 18	27	J A 38	J A 41	J A 51	J A 73	J A 72	J A 72	42	36	G J A 45	J A 43	G 28	J A 44	J A 54	J A 22	J A 71	J A 33	J A 34
27	J A 28	J A 34	J A 23	J A 23	E B 13	J A 35	61	J A 53	J A 55	J A 47	J A 50	47	J A 64	J A 67	46	J A 69	J A 57	J A 44	J A 42	44	J A 24	J A 19	36	J A 47
28	J A 57	J A 53	23	J A 30	J A 22	J A 17	G 26	G 30	38	41	45	G 40	44	45	43	41	G	G	22	E B 13	E B 13	J A 17	J A 25	J A 22
29	J A 30	J A 31	J A 30	J A 26	J A 22	J A 23	G	37	43	47	44	49	46	45	J A 48	42	G	J A 42	J A 35	J A 52	J A 35	J A 52	J A 21	J A 23
30	J A 22	J A 21	E B 13	J A 31	J A 42	J A 53	30	G	39	41	42	G	45	G	G	39	G	34	25	J A 25	J A 26	J A 23	J A 19	J A 16
31	J A 43	33	J A 36	J A 30	J A 23	J A 36	J A 60	J A 41	42	42	J A 52	J A 60	J A 58	G 30	42	42	J A 47	J A 37	22	27	J A 34	J A 42	J A 20	J A 58
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A 34	J A 31	J A 27	J A 26	J A 22	J A 22	30	J A 39	J A 50	51	J A 52	J A 51	J A 50	47	44	45	J A 51	J A 50	J A 47	J A 51	J A 38	J A 42	J A 38	J A 34
UQ	J A 51	J A 40	J A 36	J A 30	J A 30	J A 28	J A 36	J A 50	J A 58	J A 56	J A 60	J A 63	J A 68	J A 60	J A 56	J A 62	J A 58	J A 70	J A 52	J A 62	J A 72	J A 54	J A 52	J A 52
LQ	J A 26	J A 24	22	J A 21	E B 13	18	28	36	42	43	44	44	45	42	42	39	41	J A 37	J A 30	J A 29	J A 24	J A 26	J A 28	J A 23

AUG. 1990 | FOES (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1990 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	23	23	20	19	19	32	41	41	44	53	60	51	71	42	66	39	53	37	20	17	18	40	49
2	21	24	20	15	13	39	49	46	46	46	46	42	47	52	52	43	71	AA 139	AA 136	AA 145	AA 130	36	17	16
3	EB 13	15	EB 12	EB 13	16	17	34	34	44	41	41	43	42	41	G	47	41	33	24	20	25	16	EB 13	19
4	22	24	17	EB 13	21	18	30	41	41	40	41	43	43	44	57	G	35	33	44	20	19	35	36	31
5	41	29	26	19	17	18	G	35	41	G 34	47	45	55	43	68	50	51	AA 165	UA 37	33	38	35	20	22
6	42	37	26	17	19	18	27	G	55	AA 140	45	46	79	81	69	70	68	43	54	57	61	47	22	41
7	42	35	21	17	16	17	27	32	G	41	40	42	42	G	G	40	38	G	23	17	18	20	16	20
8	EB 13	EB 13	EB 13	EB 13	EB 13	21	32	47	81	43	42	UY 40	41	UY 30	42	G	41	43	35	27	20	42	52	43
9	27	21	17	23	EB 13	21	29	43	44	43	42	45	43	51	65	55	65	49	30	18	21	44	42	23
10	27	18	18	17	EB 13	18	28	40	62	72	65	46	41	G 32	G 33	G 30	36	34	40	18	EB 13	EB 14	18	22
11	22	20	21	17	EB 13	EB 14	28	35	37	42	47	53	48	49	61	76	40	38	22	39	EB 14	29	EB 13	33
12	25	43	18	18	21	18	25	33	41	91	41	51	53	46	61	43	38	43	33	23	18	EB 13	18	EB 13
13	47	EB 14	17	23	18	21	G 16	31	G 29	41	44	44	44	43	44	39	66	44	41	30	41	75	20	20
14	22	22	40	28	28	G	28	41	49	42	AA 88	61	72	66	41	46	47	G	31	59	32	32	31	19
15	18	EB 13	EB 12	18	18	EB 16	26	34	37	38	G	40	UY 40	41	42	39	48	30	25	32	17	EB 14	20	17
16	15	16	20	20	17	17	29	38	37	45	44	47	45	51	43	64	45	AA 117	25	45	34	17	36	24
17	21	19	EB 13	EB 14	EB 13	18	26	36	42	51	55	G	AA 108	42	45	40	38	33	22	22	28	24	27	17
18	EB 16	17	EB 13	EB 14	EB 13	16	G 19	G 28	37	UG 38	43	52	43	68	G 35	G 30	39	43	28	17	17	EB 13	EB 13	EB 13
19	EB 13	EB 12	16	EB 14	EB 13	EB 15	G	G	40	G 34	G 35	43	47	41	41	G 34	40	61	24	32	35	20	31	20
20	32	17	EB 13	EB 13	EB 13	18	27	35	43	45	44	52	50	43	G	G	G	34	36	16	20	32	EB 14	30
21	20	25	19	18	EB 13	EB 16	27	38	42	51	57	49	44	UY 41	43	G	42	39	38	20	28	17	20	18
22	21	EB 18	20	EB 13	EB 13	16	32	35	41	42	G	48	G	G	42	41	36	48	48	40	30	33	EB 13	EB 13
23	17	16	16	30	19	23	29	34	40	42	42	44	43	42	43	55	40	33	27	35	75	23	29	EB 12
24	EB 14	16	16	17	31	20	44	57	55	57	53	53	G	EB 42	41	47	46	37	26	AA 122	19	19	31	20
25	19	33	21	24	17	20	29	37	48	48	UY 59	50	61	48	51	41	44	34	27	69	56	29	22	20
26	39	22	EB 13	14	EB 13	EB 18	27	36	G 34	49	66	70	50	UY 42	G 36	42	34	G 25	27	33	18	31	30	27
27	24	29	20	EB 13	EB 13	28	AA 61	36	40	42	46	45	AA 64	AA 67	45	61	53	39	39	33	19	18	27	27
28	31	25	EB 13	23	15	EB 14	UY 26	UY 30	37	41	43	G 40	43	44	41	41	G	G	20	EB 13	EB 13	EB 12	21	15
29	18	20	15	15	16	16	G	34	40	44	43	44	45	42	43	39	G	34	32	46	31	33	15	20
30	18	EB 13	EB 13	22	37	34	29	G	38	40	UY 41	G	44	G	G	39	G	30	24	21	22	16	EB 15	EB 14
31	28	27	31	18	16	17	57	37	38	40	46	42	47	G 30	41	40	39	31	21	17	19	19	16	19
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	21	20	17	17	16	18	28	35	41	42	44	45	45	43	42	41	40	37	30	30	21	23	20	20
UQ	28	25	20	20	18	20	31	39	44	47	50	50	50	50	48	49	46	44	38	40	33	33	30	26
LQ	18	16	EB 13	EB 14	EB 13	16	26	34	38	41	42	42	43	41	41	39	37	33	24	20	18	17	16	17

AUG. 1990 | FBES (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1990 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	13	13	13	13	13	13	16	16	20	22	22	31	31	36	24	21	20	15	14	13	14	14	13	14
2	13	12	13	13	12	13	17	21	22	26	27	33	33	30	31	29	21	17	14	13	14	13	13	13
3	13	13	12	13	13	13	16	19	19	32	27	31	32	31	33	22	17	17	16	14	13	13	13	13
4	14	14	13	13	13	13	15	15	18	21	27	31	33	31	26	22	19	13	17	13	13	13	13	13
5	14	13	13	13	13	13	17	18	17	20	26	27	26	30	26	20	18	14	14	13	13	14	13	13
6	14	13	13	13	13	13	15	17	21	22	22	26	25	24	21	21	20	18	13	13	13	13	15	13
7	14	12	14	13	13	13	16	16	20	21	26	27	24	23	24	20	18	14	14	14	14	14	13	16
8	13	13	13	13	13	13	17	16	19	25	23	22	32	25	27	20	21	15	14	14	13	13	13	14
9	13	13	13	14	13	14	14	17	17	26	22	31	25	25	33	24	18	15	13	14	14	15	13	14
10	15	14	13	15	13	14	16	15	16	18	20	24	22	24	26	19	17	13	13	13	13	14	14	14
11	14	14	13	13	13	14	15	16	19	22	22	25	27	21	21	22	18	14	14	13	14	14	13	13
12	15	13	13	13	13	13	15	16	18	18	20	22	30	21	25	19	17	14	13	13	14	13	14	13
13	14	14	13	13	12	13	13	14	20	21	23	23	31	23	21	18	18	15	12	14	14	13	13	14
14	14	15	14	13	13	16	16	16	20	21	20	22	27	24	21	18	18	14	14	16	15	14	14	13
15	13	13	12	13	13	16	14	16	17	20	24	29	34	28	21	20	20	15	15	13	13	14	13	13
16	13	13	13	14	13	12	16	14	18	20	25	27	33	30	25	25	20	16	15	13	13	13	13	13
17	13	13	13	14	13	14	15	18	18	28	32	34	32	30	23	21	16	16	14	14	15	13	15	13
18	16	14	13	14	13	13	15	16	27	32	24	23	28	28	22	20	16	13	13	13	13	13	13	13
19	13	12	13	14	13	15	15	16	18	21	24	32	25	24	21	21	17	16	16	14	13	13	15	13
20	14	14	13	13	13	12	15	17	20	21	35	33	34	24	33	21	20	19	17	13	13	13	14	14
21	13	13	15	15	13	16	17	17	20	21	26	26	34	33	34	20	17	16	15	13	13	13	13	13
22	14	18	15	13	13	13	16	17	19	22	27	33	34	32	33	20	18	18	13	12	12	12	13	13
23	12	13	12	12	12	12	13	15	18	20	24	34	34	32	21	22	17	15	14	13	15	13	14	12
24	14	12	12	13	13	14	14	20	20	21	27	27	26	42	30	20	18	17	13	15	13	13	14	15
25	13	16	14	15	14	13	18	19	21	32	41	35	36	34	34	25	20	18	17	16	14	13	15	16
26	14	13	13	12	13	18	18	21	28	25	28	26	33	33	28	22	20	15	13	13	13	15	15	13
27	14	12	13	13	13	13	16	17	20	20	22	28	28	45	25	21	19	17	15	14	13	13	14	15
28	14	13	13	14	13	14	17	17	18	20	24	23	31	31	24	21	17	15	14	13	13	12	14	12
29	13	13	13	13	13	12	16	16	21	20	33	35	39	33	32	21	18	18	15	15	13	14	13	13
30	14	13	13	13	14	14	14	18	19	21	34	34	31	27	27	21	16	16	14	14	14	14	15	14
31	14	13	13	13	12	13	17	17	17	18	20	22	21	20	20	19	16	16	13	13	13	13	13	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	14	13	13	13	13	13	16	17	19	21	24	27	31	30	25	21	18	15	14	13	13	13	13	13
UQ	14	14	13	14	13	14	16	18	20	24	27	32	33	32	30	22	20	17	15	14	14	14	14	14
LQ	13	13	13	13	13	13	15	16	18	20	22	24	26	24	22	20	17	14	13	13	13	13	13	13

AUG. 1990 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

AUG. 1990 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270	F 265	F 280	270	270	285	300	335	300	265	275	275	R 265	265	265	285	290	285	285	270	265	275	265	F 275
2	F 255	U F 250	F 260	F 280	280	F 260	275	285	290	270	240	250	270	275	280	290	280	A	A	A	A	260	275	275
3	255	265	F 265	F 265	270	280	S 315	305	305	H 290	275	265	280	270	275	280	R 280	285	285	280	280	270	255	260
4	270	270	260	275	265	275	295	280	295	270	290	280	275	285	290	290	295	300	300	295	S 265	255	260	270
5	250	F 265	270	F 275	295	295	305	320	300	290	275	270	265	275	275	290	300	A	A	285	260	F 265	F 285	F 275
6	F 270	265	270	280	280	275	270	305	285	A	265	275	275	280	270	280	290	295	290	U S 305	275	265	F 275	F 280
7	Z 280	F 275	F 285	F 275	265	295	300	305	310	285	280	280	270	280	285	275	285	285	290	300	280	275	270	270
8	275	275	285	275	270	275	295	305	A 290	295	290	260	270	270	270	280	295	305	295	290	255	J F 265	U F 270	F 295
9	F 295	F 270	F 275	285	285	300	325	V 325	305	290	270	270	270	270	280	280	280	290	295	285	270	280	F 265	U S 300
10	F 290	F 280	270	F 280	F 270	265	295	335	305	270	255	275	270	275	275	275	290	310	285	290	285	270	270	270
11	280	270	280	280	270	265	S 290	305	310	290	285	265	265	265	275	280	275	280	285	295	280	290	280	U F 280
12	280	J F 260	290	F 300	F 280	F 275	290	305	315	A	300	270	285	280	275	285	295	295	305	300	250	255	265	260
13	Z 255	280	285	275	265	285	330	320	315	280	280	260	270	R 275	270	270	275	280	285	295	285	A	270	255
14	270	260	285	315	250	275	305	315	295	290	A	260	A	285	285	290	280	295	295	A 265	255	255	260	275
15	280	265	270	265	265	265	300	315	295	280	290	275	280	285	275	285	285	290	305	300	275	255	245	245
16	245	255	275	250	235	230	265	Z 310	290	270	275	265	280	290	285	270	280	A	285	270	280	260	255	255
17	255	255	255	260	260	V 280	325	265	270	290	265	265	A	290	295	290	290	285	300	290	250	255	260	265
18	255	F 260	265	255	250	245	280	300	270	275	270	275	265	275	265	270	280	280	285	290	265	260	260	260
19	270	270	260	275	265	260	270	295	285	275	265	255	260	260	270	270	280	280	285	275	265	270	270	260
20	265	260	260	275	265	275	310	325	275	275	260	260	255	260	255	260	265	275	290	S 305	265	250	260	255
21	S 245	260	250	265	250	260	310	295	275	260	260	265	270	260	260	275	280	280	280	280	255	260	S 255	255
22	245	245	240	240	265	S 255	255	H 310	285	255	235	245	225	235	245	250	255	U R 270	275	255	240	U S 260	255	255
23	235	260	260	235	225	240	245	280	305	260	270	260	270	265	280	260	270	280	280	270	A	245	245	245
24	S 260	245	230	230	250	255	255	285	280	280	R 265	270	270	265	265	270	265	295	295	A	265	255	255	260
25	250	255	255	260	260	255	275	270	280	270	275	275	260	270	265	270	280	285	290	280	270	265	260	260
26	255	245	260	260	250	260	300	315	305	290	260	270	265	265	265	270	R 270	270	255	285	250	240	255	250
27	255	U S 275	S 230	230	240	235	I A 235	F 235	230	G	220	215	A	A	240	A	260	265	280	270	250	S 240	245	255
28	260	255	260	265	255	275	300	315	300	280	280	270	265	270	275	280	280	290	290	280	260	255	265	265
29	270	265	260	270	270	280	325	320	305	270	275	275	270	R 265	270	270	265	265	285	280	275	265	265	265
30	275	280	285	265	255	270	295	305	305	305	280	R 265	270	270	265	270	275	285	300	300	260	255	250	245
31	245	265	285	255	230	245	270	300	285	270	290	270	275	275	285	280	295	295	300	285	280	260	270	255
	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	29	30	31	28	30	31	30	31	28	29	29	29	30	31	31
MED	260	265	265	270	265	270	295	305	295	275	275	270	270	270	275	278	280	285	290	285	265	260	260	260
UQ	272	270	280	275	270	278	305	315	305	290	280	275	272	280	280	285	290	295	295	295	275	265	270	272
LQ	255	258	260	260	250	258	272	295	285	270	265	260	265	265	265	270	275	280	285	280	255	255	255	255

AUG. 1990 | M(3000)F2 (0.01)

IONOSPHERIC DATA

AUG. 1990 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						L	L	L	L 355	R 385	A	A	L 335	A	360	A	U L 340	A	A					
2						A	A	L	L	L	325	H 350	340	L	A	L	A	A	A					
3							L	L	L	L	350	L 335	365	350	350	345	340	L	L					
4						L	L		U L 345	L	360	365	340	335	A	335	U L 335	L	A					
5							L	L	L	L	L	L	L	350	A	A	A	A	A					
6							L	L	L	A	355	350	A	A	A	A	A	L	A					
7						L	L	L	L	L	L	360	365	345	L 340	L 330	L 360	L	L					
8									A	L	L	345	335	335	345	325	L	A						
9							L		L	L 365	L	L 340	360	A 330	A	A	A	A						
10						L	L	L	A	A	A	345	L 335	345	355	L 340	U L 335	L						
11							L	L	L	U L 355	L	345	L 330	L 325	A	A	L 340	L						
12							L	L	L	A	L	U L 330	A	360	A	L 325	U L 340							
13							L	L	L	L	L	365	L 320	345	335	L 315	A	A	A					
14							L	A	A	365	A	A	A	A	330	A 340	L	L						
15							L	L	L	335	L 370	L	370	U L 360	U L 320	350	L	L						
16						285	310	U L 370	U L 340	360	340	310	L	A	L	A	L	A						
17							L		L 330	L	A 320	365	A	L 365	345	U L 335	U L 350							
18						L		L	L	L	L 340	L 330	340	A	H 335	U L 320	U L 340	L	L					
19							L		L	L	L	U L 320	L 320	L 325	335	330	L	A						
20								L	L	U L 330	U L 325	L	L 325	L 335	L 335	325	L 315	L						
21							L	L	L	U L 330	L	U L 325	U L 345	330	345	L 315	L 330	L						
22								L	L	L	325	350	R 365	R 345	340	335	310	A	A					
23						L	U L 290	L	L	L	U Z 345	L 350	U L 335	L 330	L 345	A 335	L	L						
24							A	A		A	U L 340	L	330	335	U L 315	L 320	L							
25									L	L	A	U L 345	L	L 330	L 325	L 345	L	L						
26								L	L	L	A	A	U L 325	L 320	U L 325	U L 330	U L 330	L	L					
27							A	335	355	R 350	A 335	375	A	A	340	A	A	L						
28								L	L	U L 330	L 340	L	H 335	350	U L 325	L 345	L							
29									L	L	L	L 335	U L 350	U L 320	U L 330	U L 340	L							
30								L	L	L	L	L	L 340	U L 320	L 320	L	L	L						
31						L	A		L	L	L	U L 330	L	U L 330	L	L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	2	5	10	14	22	22	24	22	21	13							
MED						285	300	352	L 345	352	340	345	338	335	335	L 335	U L 340							
UQ									L 355	365	350	350	350	348	345	340	U L 340							
LQ									U L 340	U L 330	325	L 330	L 330	L 330	L 325	L 325	U L 330							

AUG. 1990 | M(3000)F1 (0.01)

IONOSPHERIC DATA

AUG. 1990 | 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						300	260	250	300	410	300	360	385	360 A	355	330	305	280 A	280					
2						A	E 345 A	305	300	325 L	480	370	360	325	325	320	360	A	A					
3							255	275	275 H	290 L	370	385	350	355	350	350	330	305	300					
4						305	290		325	370 L	340	385	385	355	340	335	320	300	280 A					
5							270	260	280	265 H	335	385	385	365	365	325	300	A	A					
6							260	270	355 L	A	400	370	375 A	370 A	360	345 A	330	305	290 A					
7						285	280	265	275	275	315 H	335	375	350	340	365	325	310	285					
8									A	310	290 L	385	355	355	360	330	290	265						
9							255		295	310	350 L	350	355	355	355	315	330 A	305						
10						350	290	250	265	A	390 A	340	350	340	330	330	305	255						
11							280 L	255	265	290	290	370	370	370	345	325 A	335	310						
12							270	275	280	A	280	360	320	320	350	345	315							
13							270	255	260	325	290	365	360	335	340	355	335 A	305	275					
14							290	275	335	355	A	450	A	370	340	335	335	310						
15							280	245	315	350	290	365 L	375	355	360	340	305	290						
16						480	375	260	340	410	405	435	370	350	375 L	A	350	A						
17							260		350	315	380	370	A	315	355	350	325							
18						425		255	310	320	340	350	390	340	380	350	335	315	295					
19							255		260	310 L	355	380	375	360	350	355	320	315						
20								240	L	360	355	360	370	360	350	355	340	325						
21							290	305	265 L	405	365	360	350	370	380	360	335	305						
22								265	305	310	465	440	520	540	505	435	440	405	335 A					
23						425	455	345 L	250	375 L	350	375	360	385	350	425	L	325 L						
24							320	295		325	355	315	360	375	365	375	355							
25									325 L	325 L	335	330	390 L	360	380	370	345	305						
26								255	250	305 L	A	375	370	370	370	355	340	335 L	345					
27							A	540	585	G	655	705	A	A	565	A	E A 440	360						
28								265	255	355	350	325	410	385	360	350	320							
29									255	360	305 H	340	325	355	335	340	325							
30								265	250	255	345	305 H	355	355	350	335	320	275						
31						405	E A 300		300	330	305	355	310	340	300	300	300	275						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						8	21	23	28	28	29	31	28	30	31	29	30	23	9					
MED						378	275	265	288	325	350	365	370	355	355	345	329	305	290					
UQ						425	290	275	320	360	370	382	380	370	365	355	338	315	300					
LQ						302	260	255	262	310	305	350	355	350	342	330	320	295	280					

AUG. 1990 | H'F2 (KM)

IONOSPHERIC DATA

AUG. 1990 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	300	325	310	300	280	280	235	A	205	235	A	A	E A 275	A	240	A	240	A	A	260	300	260	A 320	E A 340
2	350	390	A 325	280	235	A	A	A	E A 260	E A 255	245	H 195	255	A	A	A	A	A	A	A	A	A 315	275	280
3	305	305	310	310	305	280	E A 255	230	235	220	210	220	205	225	215	A 260	255	260	260	265	275	265	265	310
4	310	300	315	285	280	275	255	A 255	235	225	215	200	245	240	A	220	235	250	A	265	260	A 355	A 350	315
5	E A 380	A 310	A 315	300	265	260	225	230	210	205	A 235	A 255	A	240	A	A	A	A	A	A 260	A 340	E A 345	270	320
6	E A 335	A 335	315	270	255	260	A 250	240	E A 260	A	215	230	A	A	A	A	A	A	A	A	E A 320	A	A 290	330
7	A 335	A 315	300	300	310	280	250	220	205	210	215	205	205	215	220	220	235	240	265	260	255	260	265	295
8	280	295	265	270	295	275	255	A 250	A	A 230	210	215	H 190	215	230	220	A 280	A	265	260	285	E A 330	A	A 290
9	280	315	280	295	260	275	245	240	215	220	H 205	235	220	A	A	A	A	A	A 270	260	265	A 300	E A 340	255
10	275	300	300	290	320	285	255	A	A	A	A	235	215	230	220	225	230	A 245	A 280	270	255	290	305	305
11	300	270	A 290	275	290	275	250	230	230	205	A 240	A 280	A 250	E A 280	A	A	A 250	E A 255	270	A 275	250	250	275	A 335
12	315	A	285	235	A 320	290	250	240	230	A	H 195	E A 265	A	A 240	A	E A 260	250	E A 270	260	255	290	315	310	285
13	A	275	265	300	320	270	235	230	220	H 210	225	215	235	235	A 245	225	A	A	A	260	A 260	A	290	350
14	310	325	A 315	245	A 355	315	255	A	A	220	A	A	A	A	240	A	A	250	265	A	A 340	340	A 335	285
15	270	305	300	305	295	300	240	230	210	210	205	220	205	205	230	220	A	245	250	A 260	250	310	360	360
16	340	310	270	265	410	315	270	A 250	240	250	A 235	A 285	A 240	A	255	A	A	A	270	A 325	A 300	265	A 350	330
17	355	360	330	290	310	300	250	240	A 240	A	A	200	A	230	255	235	240	A 255	280	255	E A 325	A 350	345	305
18	320	315	285	315	320	300	250	225	220	220	H 220	E A 275	215	A	H 210	230	250	A	A	260	240	285	300	315
19	305	295	305	270	270	280	240	240	A 240	210	220	H 200	240	H 215	220	H 225	A 240	A	270	A 285	A 305	285	285	285
20	340	320	305	260	285	295	245	235	230	220	H 200	A 260	240	225	230	240	H 230	270	270	225	250	E A 350	305	A 330
21	350	A 320	320	310	290	300	260	235	235	A 255	A	A 255	235	250	225	235	A 250	E A 275	E A 295	260	275	280	325	315
22	345	340	350	350	285	320	270	260	240	225	250	240	H 220	H 255	250	255	250	A	A	A	E A 400	E A 375	310	300
23	375	310	325	A 405	415	A 380	250	235	220	H 225	205	205	H 205	245	230	A	A 255	A 265	285	A 295	A	A 305	A 335	350
24	315	330	310	380	A 330	320	A	A	A 260	A	E A 270	A	230	235	230	E A 280	E A 280	A 265	265	A	305	300	A 360	315
25	325	A 370	315	330	315	325	265	A 245	A 255	A 255	A	A 245	A	225	E A 270	235	E A 280	A 255	280	A	E A 340	A 305	305	310
26	A 350	345	295	300	315	305	250	240	225	A 245	A	A	E A 260	230	245	H 235	240	255	E A 305	A 285	310	A 360	290	335
27	310	270	350	390	340	380	A	A 260	A 255	E A 265	A	250	A	A	E A 270	A	A	A	E A 305	A 305	305	335	A 355	360
28	A 365	355	305	310	305	295	245	230	230	215	215	205	H 215	225	225	225	245	260	270	260	280	310	305	285
29	295	295	310	300	290	290	230	235	225	H 225	225	215	245	H 210	230	245	240	A 250	275	E A 300	270	A 290	295	305
30	290	285	260	250	E A 360	A	260	245	235	220	220	Y 250	225	230	235	H 250	240	260	260	240	265	305	310	330
31	A 370	300	275	260	380	320	A	A 250	230	225	A 260	230	A 235	230	235	240	A 270	A 250	255	250	250	255	285	A 350
	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	31	31	29	27	26	28	26	23	27	24	23	24	21	22	19	23	25	29	29	30	31
MED	315	312	305	300	305	295	250	240	230	221	218	225	227	230	230	232	244	A 252	268	260	272	298	305	315
UQ	348	330	315	310	320	315	255	245	239	230	232	A 250	241	239	242	242	A 252	A 261	275	A 272	A 302	A 322	A 335	331
LQ	300	300	288	270	285	280	245	230	220	215	210	210	215	225	225	225	240	250	265	260	260	285	290	298

AUG. 1990 | H'F (KM)

IONOSPHERIC DATA

AUG. 1990 | 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						A	A	110	110	A	115	A	A	A	A	A	E A 130	A	A					
2						A	115	115	120	115	115	A	125	120	120	120	120	115	A					
3						A	A	A	A	A	A	A	A	A	120	115	110	115	A					
4						A	A	A	A	A	A	A	115	115	115	115	110	115	125					
5						A	120	115	110	A 125	A	A	A	A	120	115	110	115	A					
6						B	A	115	115	115	115	115	A	115	115	115	110	115	A					
7						B	120	110	115	A	A	A	A	115	115	110	A 115	115	A					
8						A	A	A	110	A	A	A	A	A 120	115	110	115	115	A					
9						A	110	110	110	115	A	A	A	A	A	120	115	115	A					
10						A	120	110	110	110	A	A	A	A 120	A 120	E A 120	A 115	A 120	A					
11						B	115	110	110	A	A	110	110	110	A	A	A	120	A					
12						A	A	110	110	A	110	110	A	A	A	A	A	A	A					
13						A	A 125	A	E A 130	A 125	115	115	A	110	A	A	A	E A 130	A					
14						B	120	A 130	A	110	110	115	115	115	115	110	110	115	A					
15						B	A	A	A	A	110	A	A	115	110	110	110	A	A					
16						A	120	110	110	110	A	A	A	120	120	115	115	115	A					
17						B	120	115	115	B 120	A	115	A	A	A 125	115	115	115	A					
18						A	A 120	E A 140	A	A	A	A	A	A	E A 120	A 120	A 115	A 115	A					
19						B	120	115	110	A 130	E A 125	A	A	A	A	E A 130	110	A	A					
20						A	E A 135	115	110	115	B 125	120	120	115	125	115	120	120	A					
21						B	130	115	110	110	115	115	120	A	125	110	115	115	A					
22						135	120	110	110	115	115	120	120	120	125	115	115	110	A					
23						120	115	110	110	110	110	A	A	A	115	110	110	110	B 130					
24						B	115	110	110	110	A	110	110	B	A	115	115	110	A					
25						B 130	130	110	110	B 120	B	B 125	B 125	A	B 125	A	115	A	B					
26						B	120	A	A 125	110	A	A	A	A	E A 125	A	A	A 125	A					
27						A	120	110	110	110	A	115	A	B	120	115	110	115	A					
28						B	A	A	E A 130	A 125	A	A	115	115	115	115	110	115	A					
29						A	125	115	115	110	B 130	A	A	120	A	A	115	115	A					
30						B	A	115	110	110	120	120	115	115	120	110	110	120	A					
31						A	B 120	115	110	110	110	A	A	A 120	120	110	115	115	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						3	22	24	26	22	15	13	11	17	23	24	27	26	2					
MED						130	120	111	110	112	115	115	115	115	120	115	115	115	128					
UQ						132	120	115	112	120	116	120	120	120	121	115	115	115						
LQ						125	120	110	110	110	110	115	115	115	115	110	110	115						

AUG. 1990 | H'E (KM)

IONOSPHERIC DATA

AUG. 1990 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	105	100	100	100	100	115	110	110	110	110	110	105	110	110	115	105	120	100	100	110	105	130	110	110
2	105	110	110	110	120	115	110	110	110	115	110	115	E G 160	140	135	130	130	115	110	110	110	110	115	110
3	115	100	B	120	115	115	110	110	110	110	110	110	110	110	G	130	120	120	120	115	110	120	110	105
4	110	105	115	135	110	120	120	110	110	125	110	E G 155	E G 170	150	130	G	130	120	120	110	110	110	105	105
5	105	100	100	100	100	100	G	130	120	110	110	105	100	110	120	120	115	110	110	110	110	110	110	110
6	105	100	110	110	110	110	110	G	110	105	110	105	115	110	110	110	110	115	110	105	105	105	100	95
7	100	95	95	100	100	130	125	120	G	110	110	110	105	G	G	145	130	120	120	110	100	110	110	110
8	B	B	B	125	B	110	110	115	110	110	110	110	125	110	150	G	135	120	115	110	110	120	110	110
9	110	110	100	100	110	120	120	115	110	110	110	105	105	130	120	120	120	115	110	110	110	100	105	100
10	100	100	95	100	105	120	120	110	105	105	105	100	105	110	105	105	E G 150	125	115	100	105	110	105	105
11	105	100	100	100	B	B	135	125	120	115	115	110	110	110	105	105	110	120	115	110	130	105	115	110
12	110	110	110	110	110	120	120	120	110	105	110	105	105	110	110	110	130	100	95	100	115	105	125	110
13	110	110	105	105	105	110	105	105	110	120	115	115	110	110	110	E G 155	105	105	110	110	110	110	115	110
14	110	110	110	110	105	G	E G 160	135	125	135	125	125	115	120	E G 170	120	115	120	110	110	125	105	105	105
15	105	110	105	105	105	115	105	105	105	115	G	110	115	E G 150	125	125	110	115	110	110	110	110	110	110
16	115	105	105	105	110	135	130	125	120	110	105	140	140	120	E G 170	130	120	115	115	110	110	110	105	105
17	105	105	110	130	B	130	135	120	120	110	110	G	115	105	150	145	125	115	120	110	115	105	105	105
18	105	105	110	B	B	110	110	110	110	115	105	105	105	100	105	100	140	120	115	115	105	105	105	105
19	B	110	100	100	B	B	G	G	105	110	110	115	110	110	110	110	115	110	110	110	105	100	100	105
20	100	100	105	B	105	105	145	140	120	120	120	110	115	135	G	G	G	135	120	115	110	110	110	105
21	105	105	110	110	B	B	130	120	120	120	110	110	120	115	135	G	140	125	115	125	110	110	110	110
22	100	105	105	125	B	135	120	120	115	120	G	115	G	G	E G 170	E G 155	E G 150	115	115	110	110	105	110	125
23	110	110	120	115	115	115	120	135	120	115	115	110	110	105	150	125	120	120	120	110	110	110	110	110
24	135	120	120	115	115	125	120	115	110	110	110	125	G	B	120	125	120	110	110	105	105	105	100	105
25	100	100	95	95	110	120	125	120	115	110	110	115	110	110	110	120	110	110	110	100	105	105	105	105
26	100	105	B	105	B	B	E G 205	110	115	105	105	105	105	110	105	100	105	110	125	100	100	110	110	110
27	95	95	95	100	B	120	115	120	110	115	110	145	130	130	140	120	115	115	110	105	110	100	105	105
28	105	105	105	105	110	110	110	105	130	135	110	110	E G 160	E G 150	E G 140	130	G	G	115	B	B	110	110	105
29	100	105	100	105	105	105	G	120	120	115	120	115	115	115	110	115	G	115	110	105	105	105	110	105
30	100	100	B	100	100	105	155	G	130	120	125	G	125	G	G	E G 165	G	120	120	110	110	110	110	110
31	110	105	105	105	130	120	110	115	115	115	110	110	105	110	E G 160	145	130	120	115	110	105	105	110	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	29	30	27	29	22	26	28	28	30	31	29	29	29	27	27	27	27	30	31	30	30	31	31	31
MED	105	105	105	105	110	115	120	118	112	115	110	110	110	110	115	120	120	115	115	110	110	110	110	105
UQ	110	110	110	110	110	120	128	120	120	118	110	115	118	122	U 136	129	130	120	118	110	110	110	110	110
LQ	100	100	100	100	105	110	110	110	110	110	110	105	105	110	110	110	115	110	110	105	105	105	105	105

AUG. 1990 | H'ES (KM)

IONOSPHERIC DATA

AUG. 1990 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

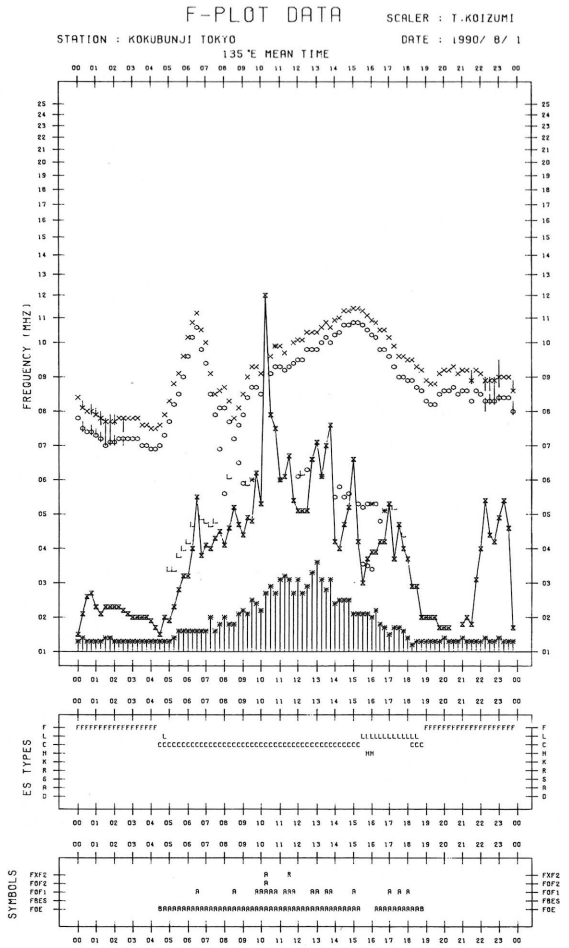
Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

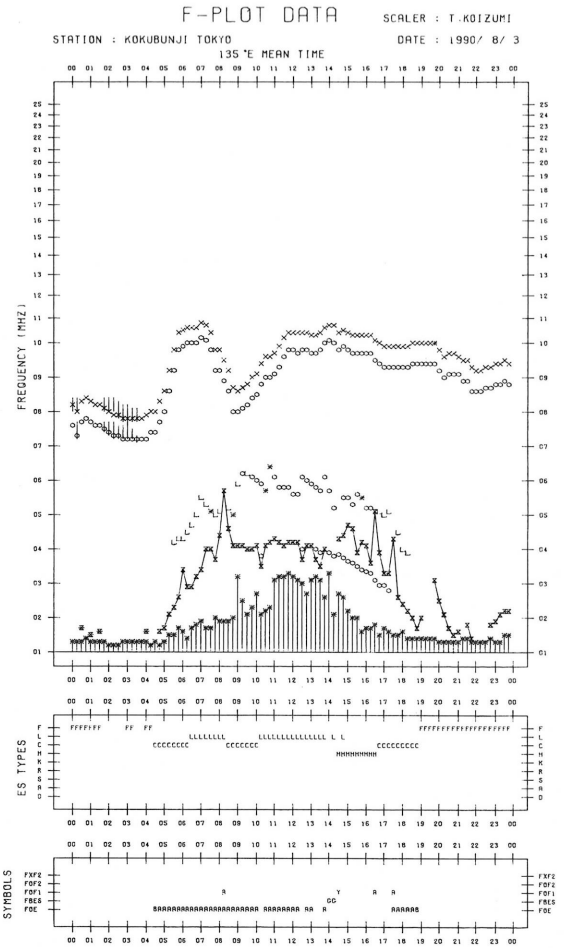
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F2	F4	F2	F2	F2	C1	C2	C3	C2	C2	C2	C2	C2	C2	C1	C3	HL21	L4	L3	F2	F2	FF22	F3	F4
2	F3	F3	F3	F3	F1	C4	C4	C2	C2	C2	C2	L1	H1	H1	H1	H2	H2	C3	C4	F5	F5	F4	F2	F2
3	F2	F1		F1	F3	C2	C2	L2	L3	C2	C1	L1	L1	L1		H2	H2	C2	C2	F3	F6	FF21	F2	F2
4	F2	F2	F2	FF22	F3	C1	CL22	C3	C2	CL22	LH11	HL11	H1	H1	H1		H2	C2	C4	F4	F4	F4	F5	F3
5	F4	F5	F4	F2	F2	L1		HL21	H2	L1	L2	L2	L2	LH21	H2	H3	C3	C4	C3	F3	F3	F4	FF12	F2
6	F3	F4	FF32	F2	F2	L2	L2		C3	C3	C2	C2	CL22	C3	C3	C3	C3	C4	C3	F4	F4	F5	F4	F5
7	F5	F5	F3	F1	F1	C1	C2	C2		L1	L1	L1	L1			H1	HL22	C2	C2	F2	F2	FF32	F1	F1
8				F1		L2	L2	CL22	C4	L2	L1	L1	CL11	L1	H1		H2	HL31	C4	F4	F3	FF14	F5	F5
9	F5	F4	F2	F2	F1	C4	C2	C3	C3	C1	C1	L2	L2	HL22	CL32	H3	C3	C4	C4	F3	F4	F4	F5	F3
10	F4	F2	F2	F2	F1	C2	C2	C3	C3	C3	C3	L2	L2	L1	L1	L2	HL12	HL22	CL22	F3	F2	FF21	F2	F3
11	F2	F2	F3	F1			C1	H2	C1	CL11	CL21	CL21	C2	C2	C2	L3	L3	C2	C2	F4	FF21	F2	F2	F3
12	F3	F5	F2	F3	F4	C2	C2	C1	C2	C3	C1	L2	L2	L2	L2	L2	HL12	L4	L4	F3	FF21	F1	FFF12	F2
13	F5	F1	F3	F4	F4	L2	L2	L2	LH11	CL11	C1	C2	C1	C1	L2	HL11	L3	LC33	CL42	FF54	FF35	FF52	FF22	F3
14	F4	F3	F5	F6	F4		H1	HL32	HL21	H2	H2	H2	C2	C2	H1	H3	C3	C1	C3	F5	FF15	F4	F4	F2
15	F3	F2	F2	F2	F2	L1	L3	L3	L2	L1		L1	L1	H1	H1	H1	C3	C2	C2	F3	F2	F2	F3	F2
16	F2	F2	F3	F3	F2	HL11	H2	H2	C2	C2	L2	CL12	HL11	H2	H1	H2	C3	C4	C2	F3	F4	F3	F3	F4
17	F4	F4	F2	F1		C2	C1	H1	C2	C2	C2		CL22	L2	HL21	H1	C2	C2	C2	F3	FF24	F4	F3	F2
18	F2	F3	F1			C1	L1	L2	L1	L1	L2	L3	L2	L3	L2	L2	HL22	CL32	C3	F2	F2	F1	F2	F2
19		F1	F2	F1					C3	L1	L1	L1	L2	L1	L1	L1	C2	C4	C3	F5	F3	F2	F3	F2
20	F3	F2	F1		F1	L1	HL11	H1	H2	C1	C1	C1	C1	H1				H2	C2	F2	F3	F4	F3	F5
21	F3	F4	F3	F1			C1	C2	C2	C2	C2	C2	C1	C1	H1		H2	H3	C4	FF22	F4	F2	F2	F2
22	F2	F1	F1	F1		C1	C1	C2	C2	C1		C2			H1	H1	H1	H4	C4	F6	F4	F4	F2	F1
23	F4	FF23	F2	F4	F3	C4	C2	H2	H2	C1	C1	C2	L1	L1	H1	H2	H2	C3	C2	F5	F4	F3	FF24	F2
24	F1	F3	F3	F5	F5	C4	C4	C3	C3	C3	C2	HC12			C1	H2	H3	C3	C3	F6	F3	F2	F4	F2
25	F3	F3	F2	F2	F1	C2	C1	C2	C3	C2	C1	C2	C2	C2	C2	C1	C3	C2	C2	F4	F5	F3	F3	F3
26	F4	F3		F1			H1	L2	L1	L2	L3	L2	L2	L1	L1	L2	L2	L2	CL22	F2	F2	F3	FF32	FF33
27	F3	F4	F2	F2		C5	C3	H2	C2	H2	C2	H1	HL21	H1	H1	H2	H4	C3	C3	F5	F2	F1	F4	F3
28	F4	F3	F1	F4	F1	C1	L1	L2	HL12	HL11	L2	L1	H1	H1	H1	H1			C2			F2	F2	F2
29	F3	F3	F2	F2	F2	L2		C1	C1	C1	C1	C1	C1	C1	C2	L1		C2	C3	F5	F6	F5	F2	F2
30	F2	F2		F5	F6	L3	HL22		H1	H1	C1		H1			H1		C2	C2	F4	F5	F2	F2	F2
31	F5	F4	F5	F4	FF22	C2	C3	C2	C2	C1	C2	C1	L1	L1	HL11	H1	H2	C3	C2	F2	F2	F3	F2	F3
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

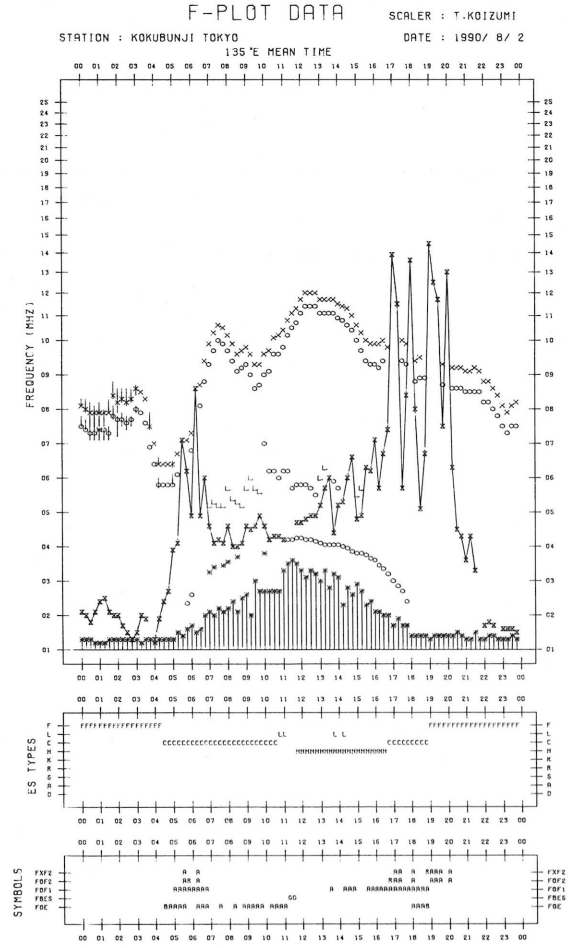
AUG. 1990 | TYPES OF ES

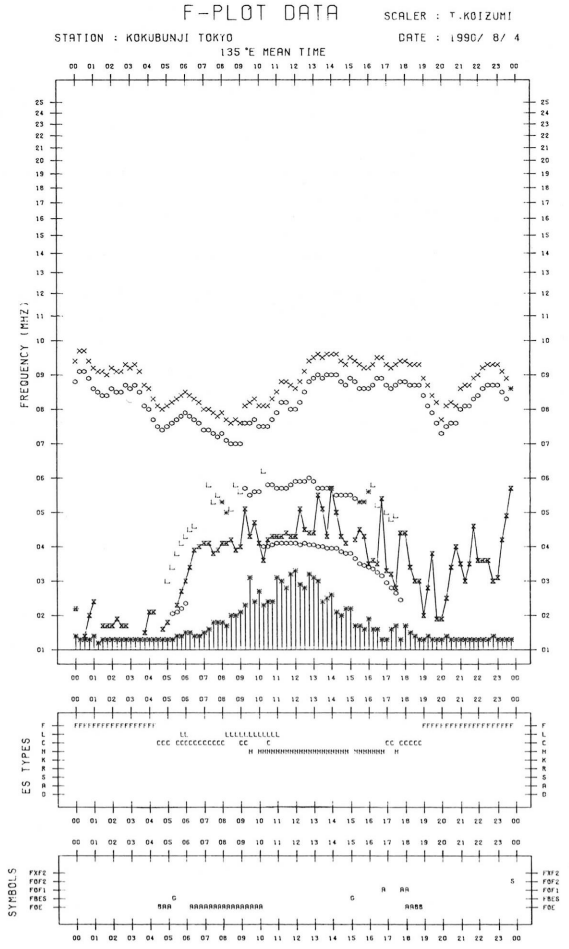
f-PLOTS OF IONOSPHERIC DATA

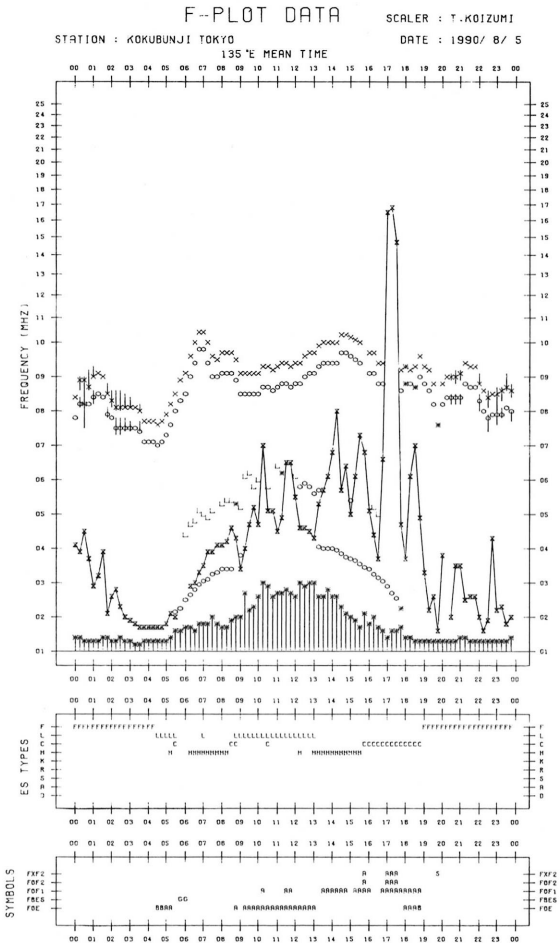
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, ↓	FMIN
∧	GREATER THAN
∨	LESS THAN


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 5
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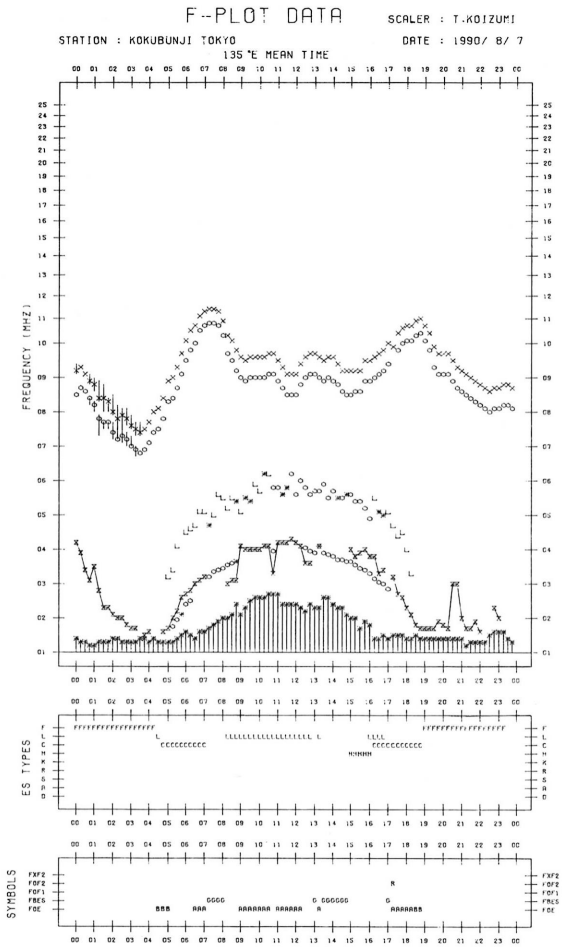
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE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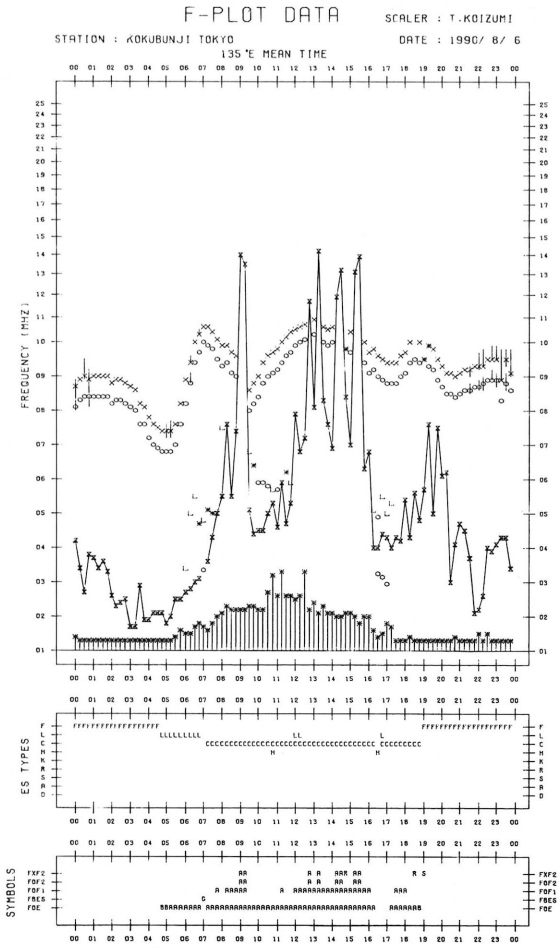
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 7
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE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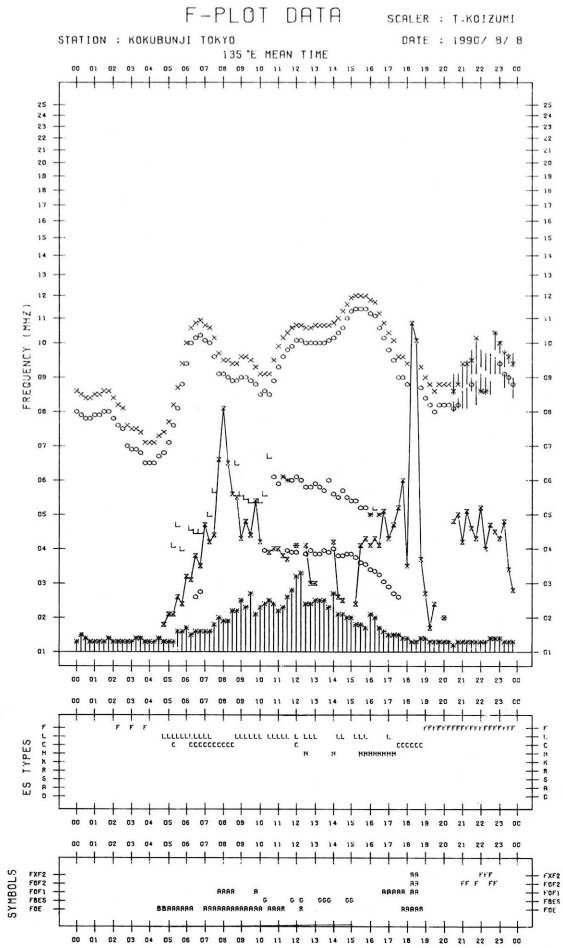
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 6
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE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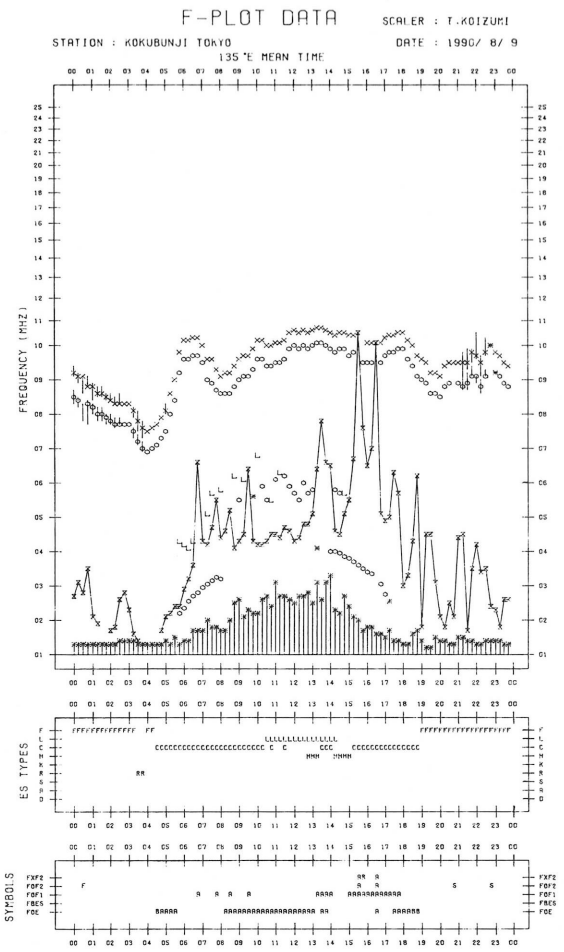
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 8
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FMES
FOE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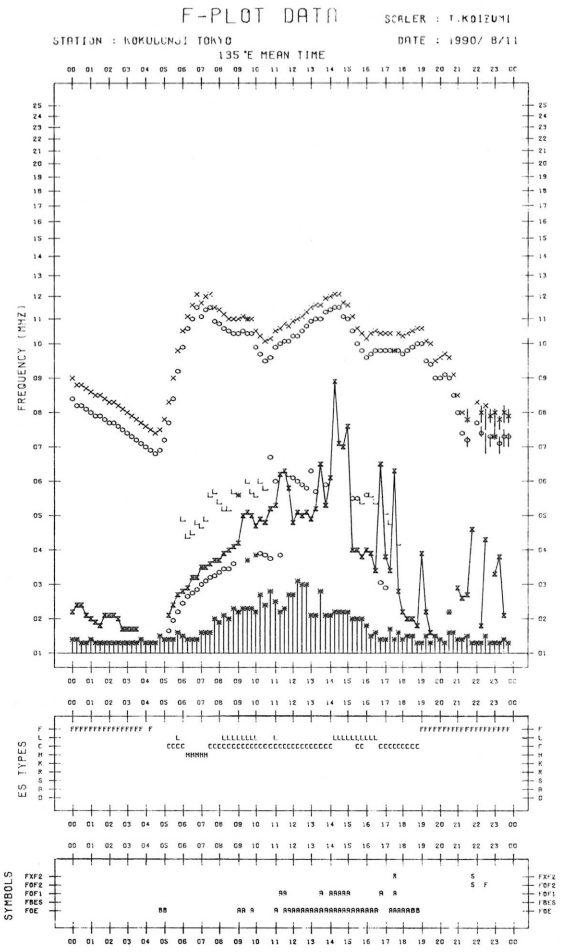
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/ 9
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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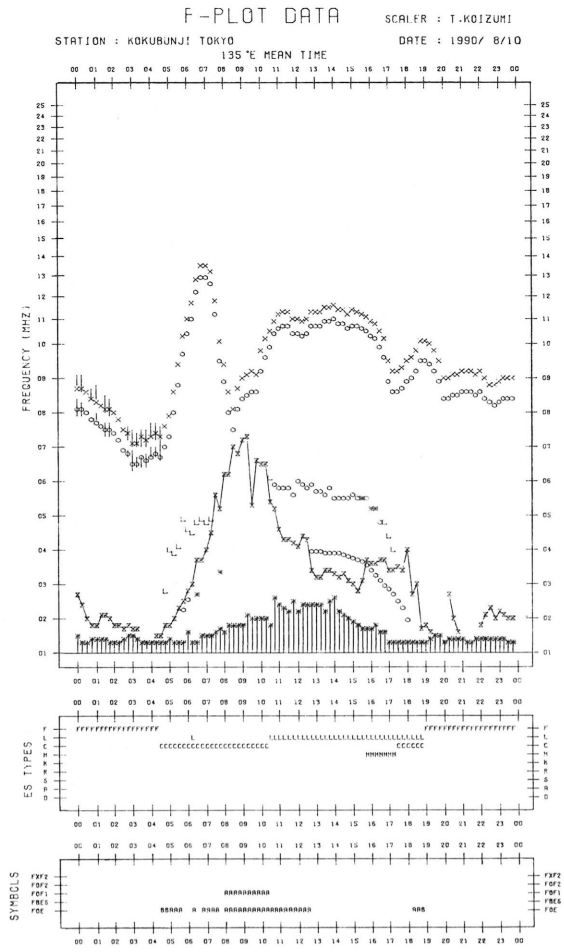
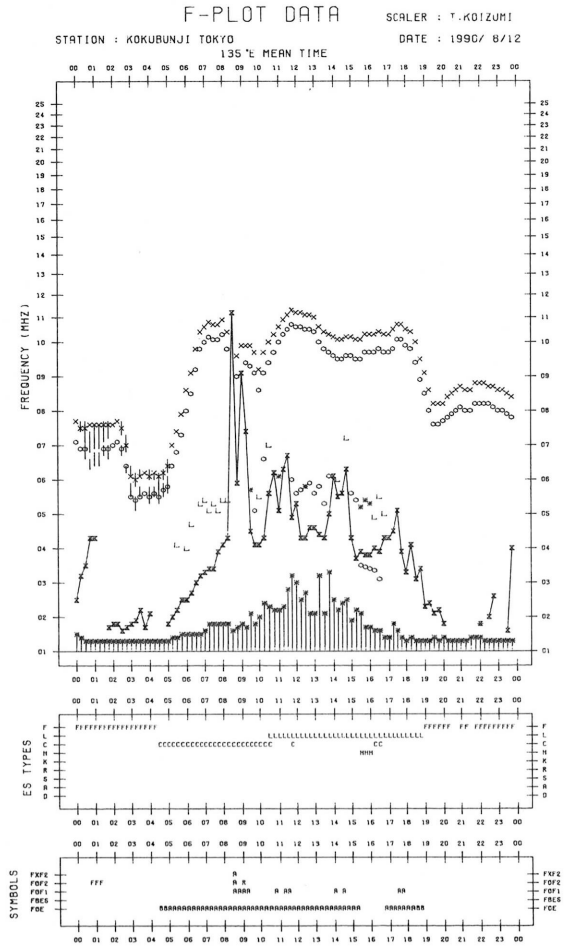
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/11
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/10
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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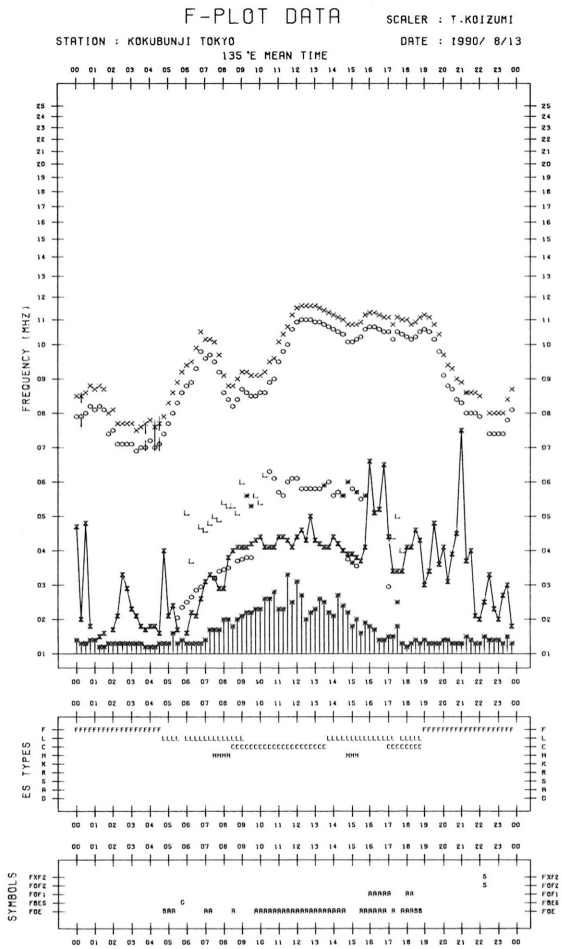
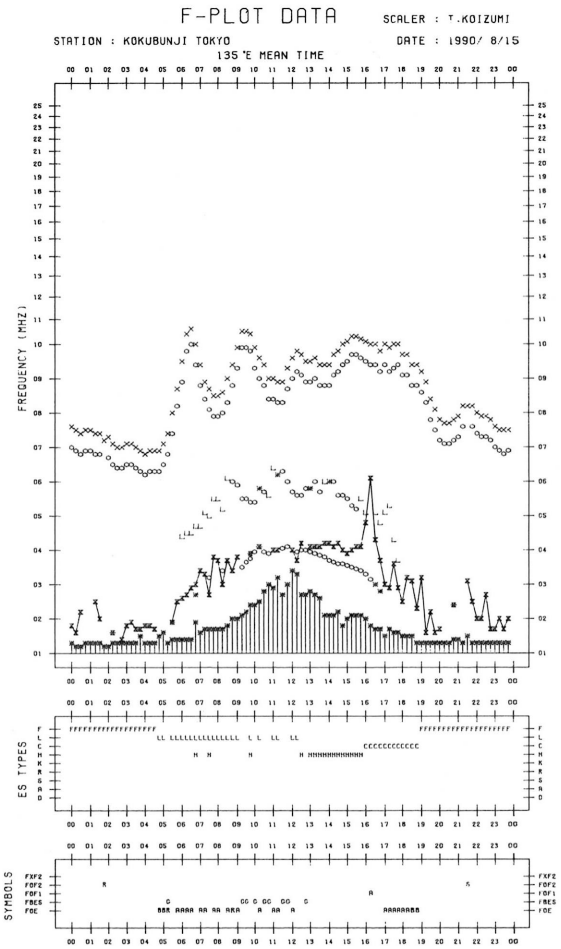
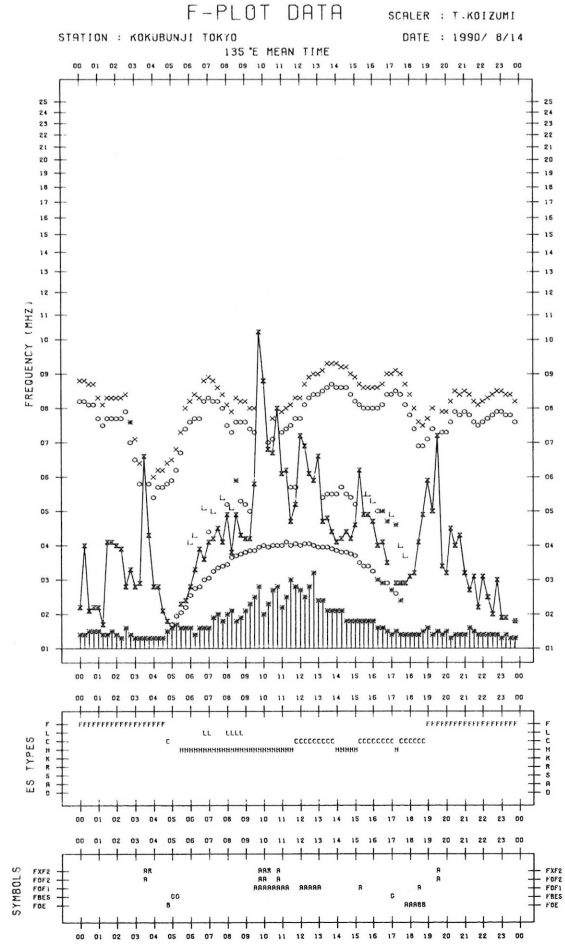
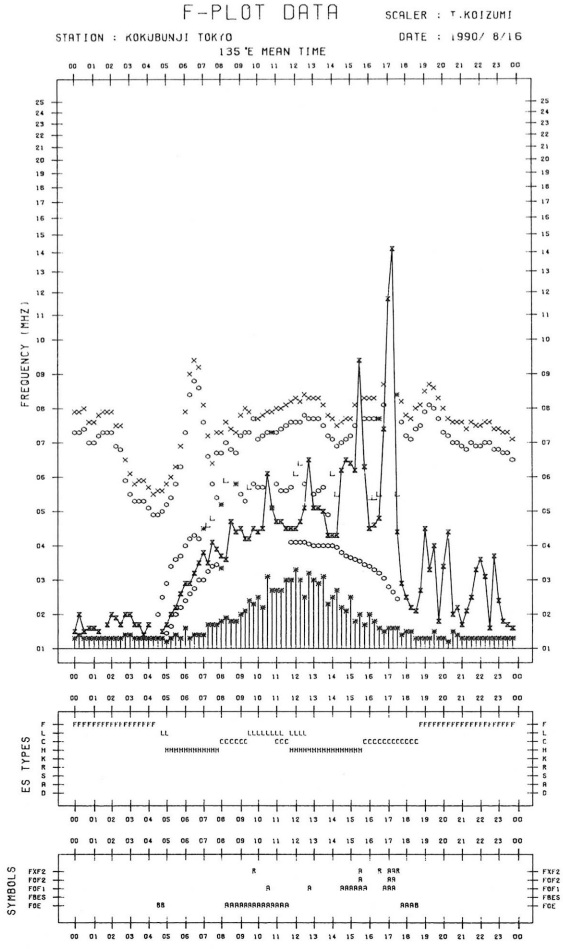
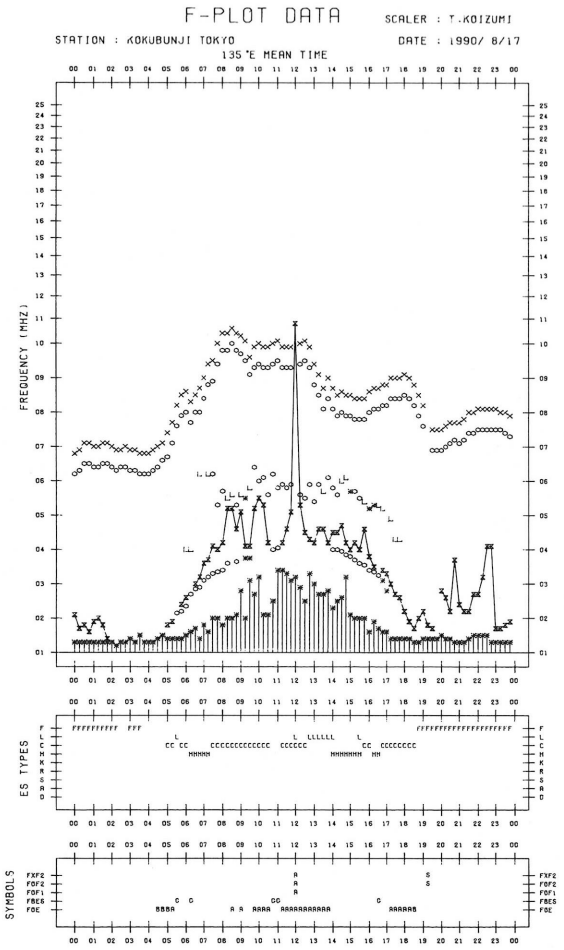
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/12
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

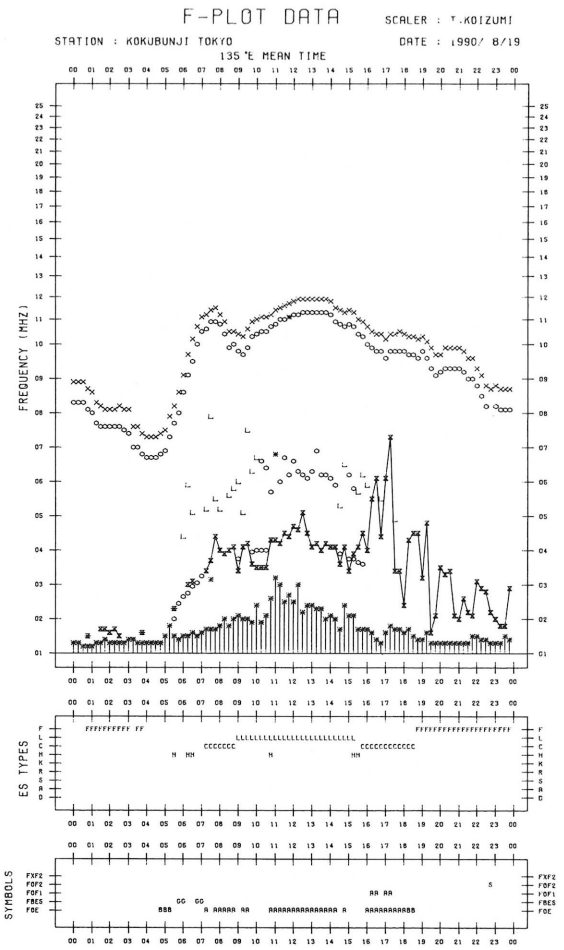

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

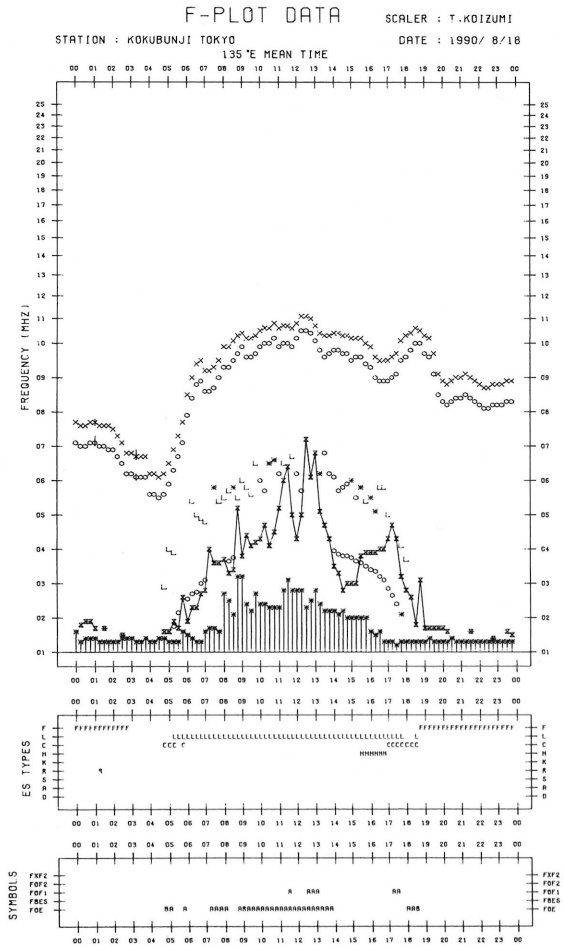

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

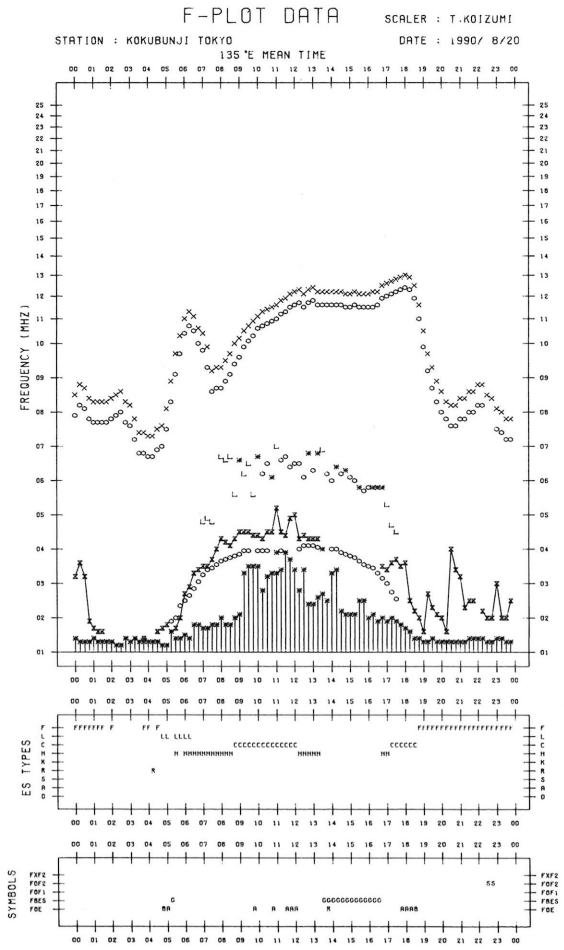

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

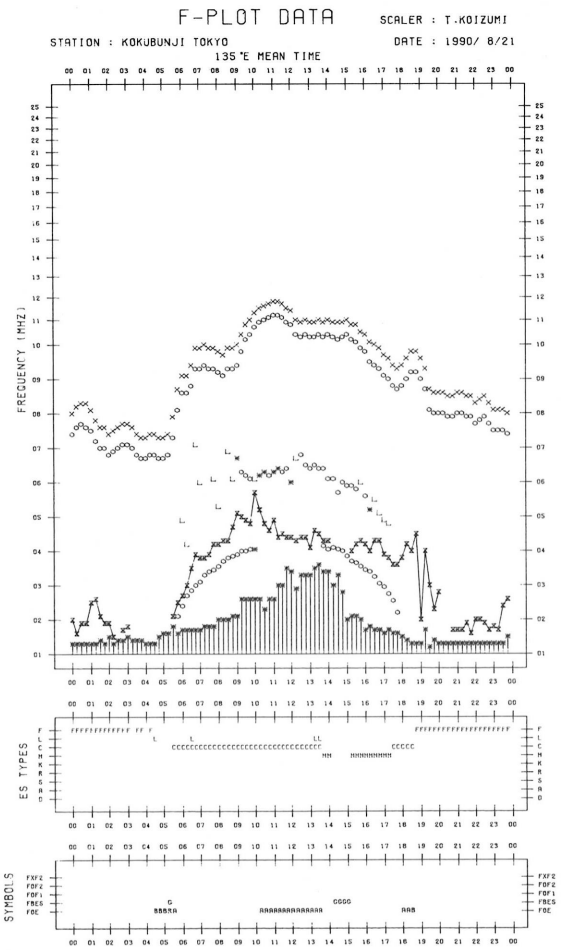

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

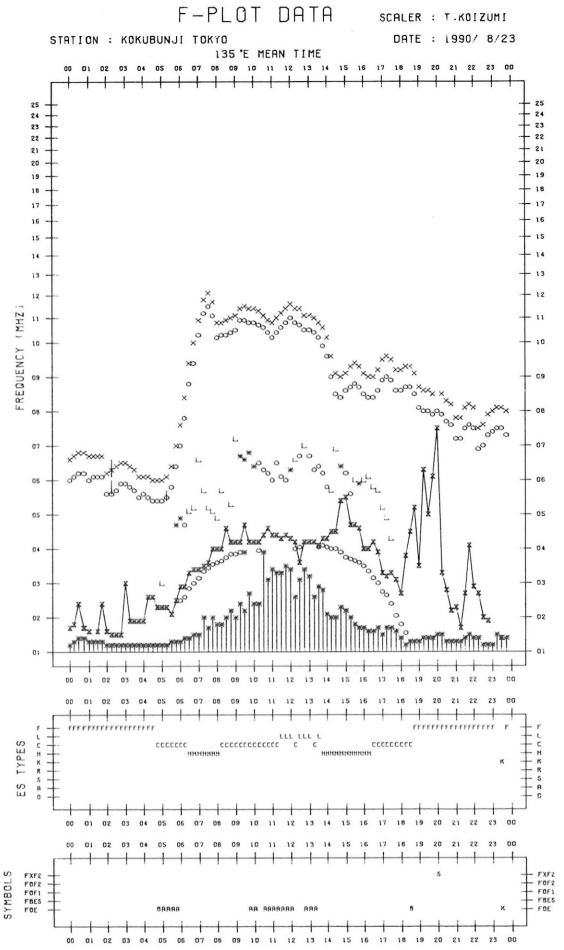

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE

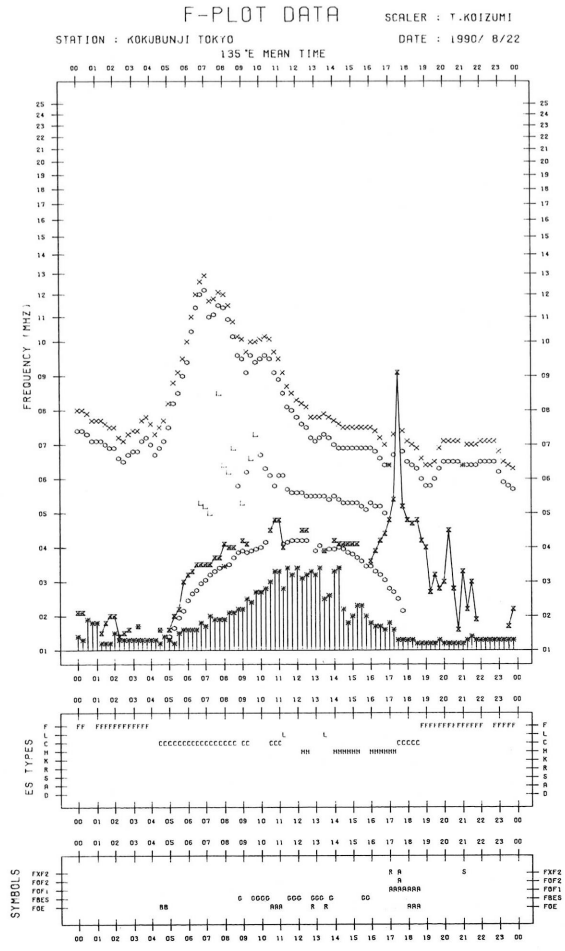

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE

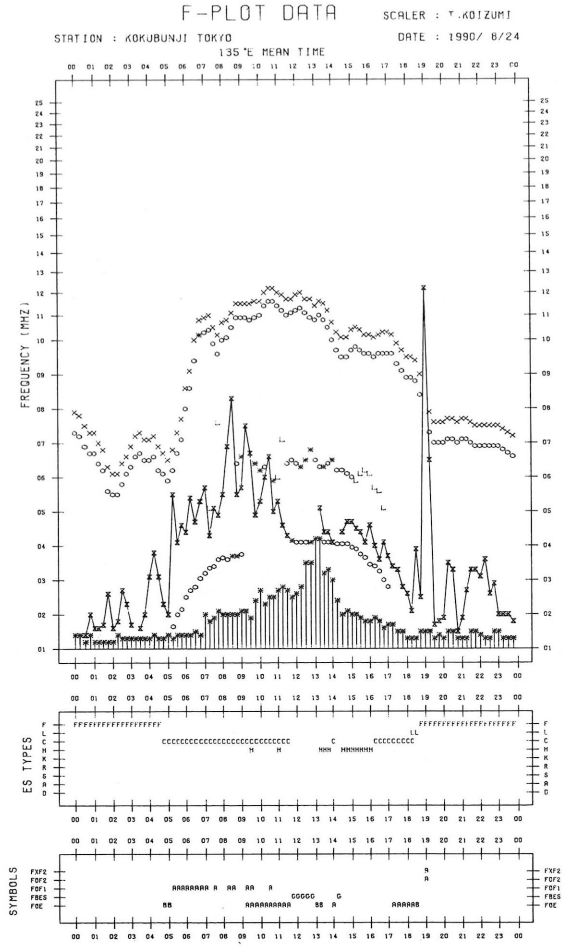

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE

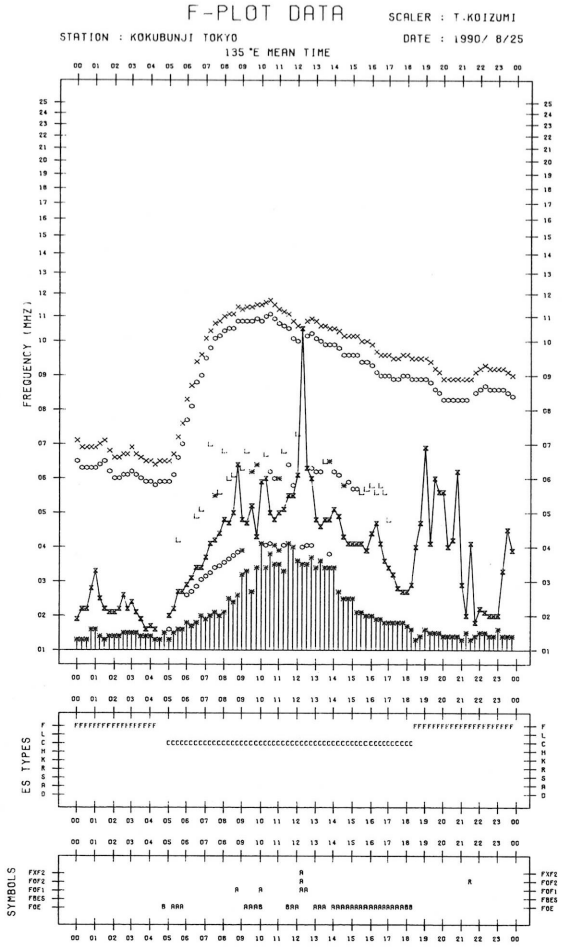

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FDE

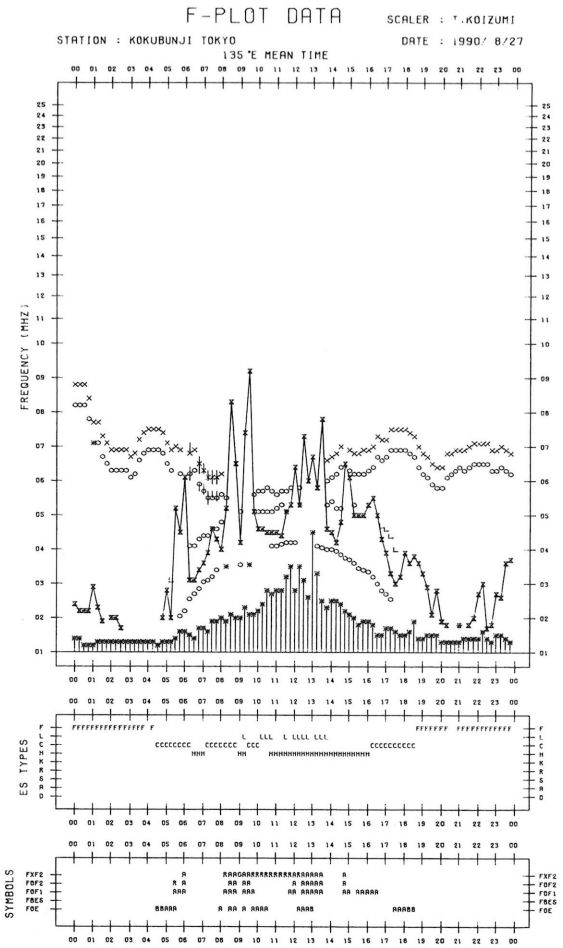

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXFZ
FDFZ
FDF1
FBES
FDE

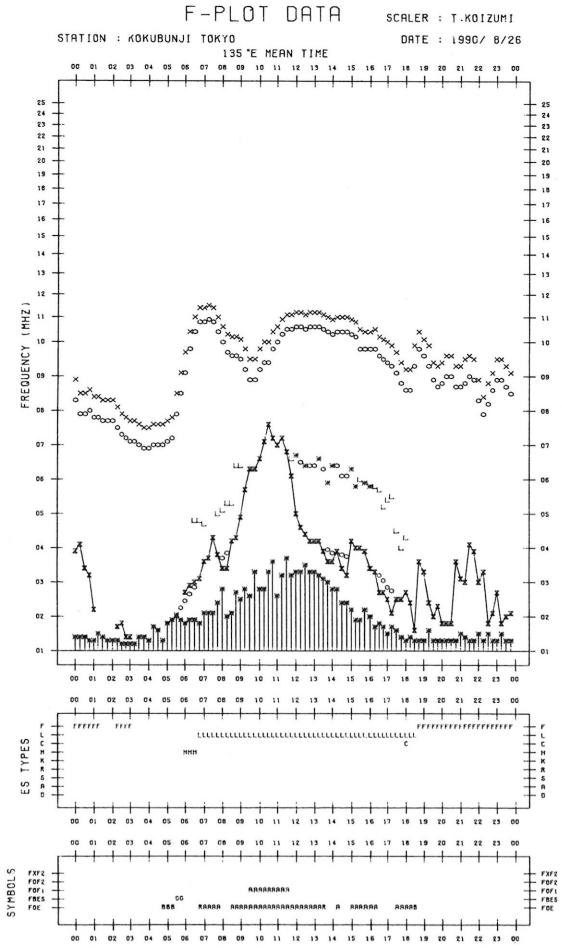

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXFZ
FDFZ
FDF1
FBES
FDE

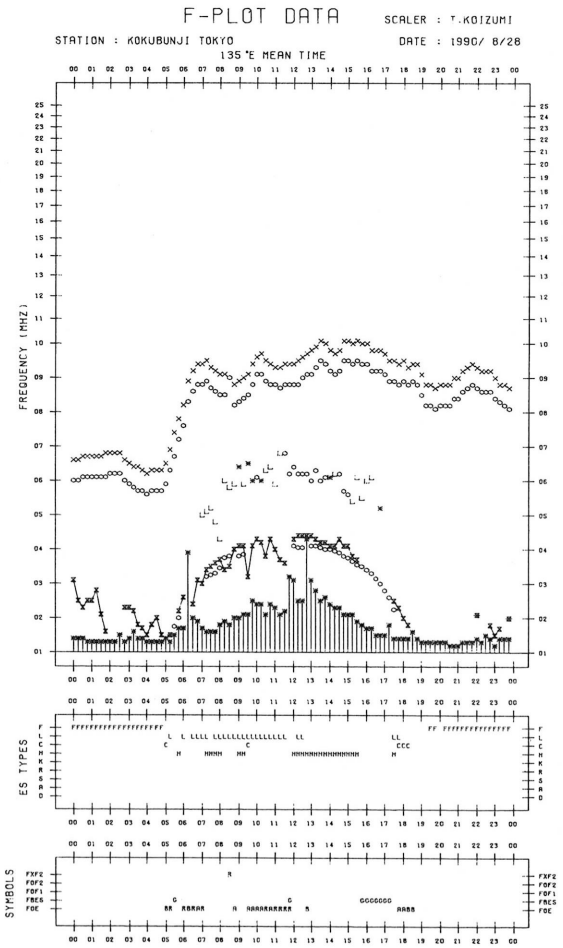

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXFZ
FDFZ
FDF1
FBES
FDE

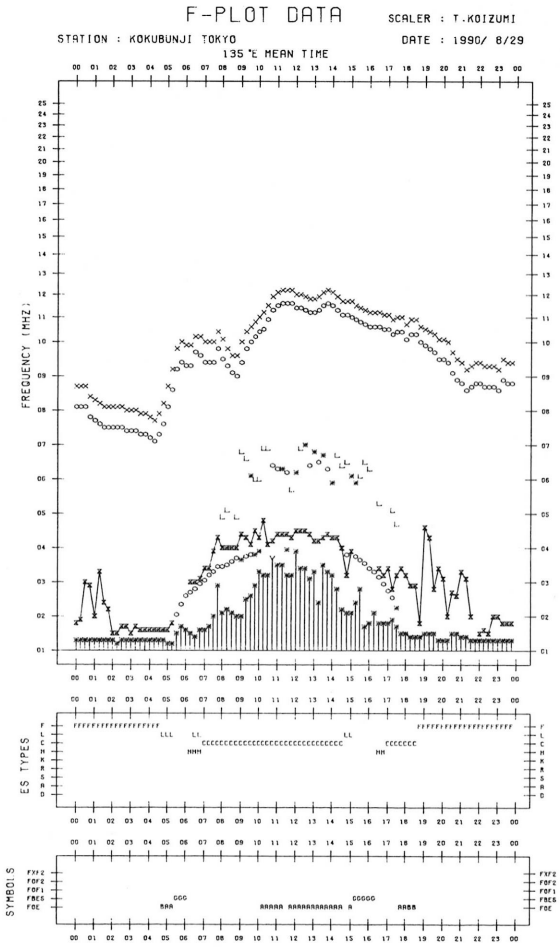

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXFZ
FDFZ
FDF1
FBES
FDE

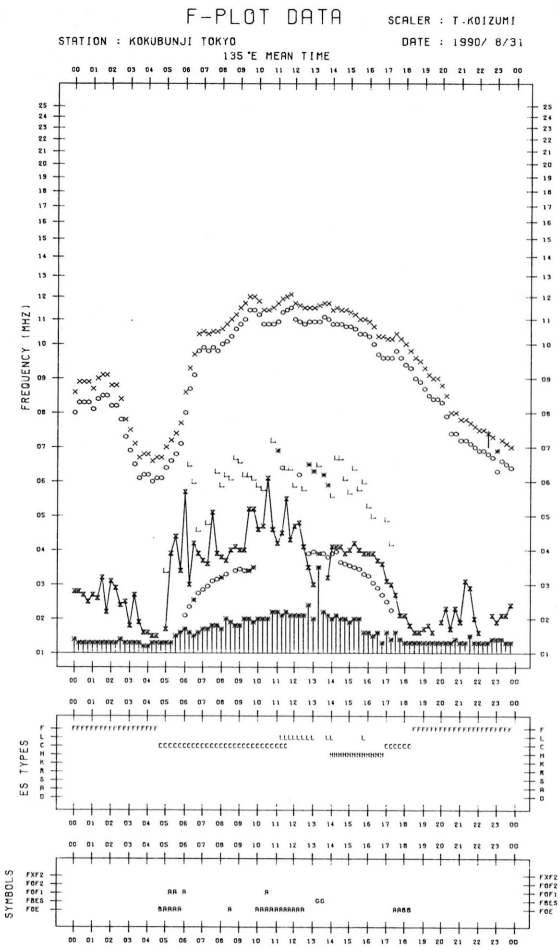

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

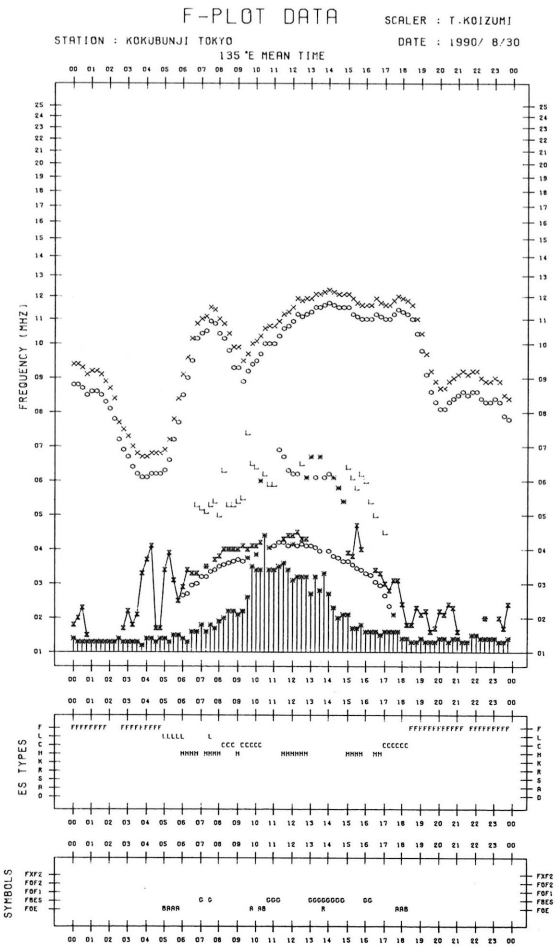

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/29
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/31
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1990/ 8/30
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B.Solar Radio Emission

B1.Daily Data at Hiraiso

200 MHz

Hiraiso August 1990

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

Note: No observations during the following periods.

10th 0129 - 0846

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso August 1990

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	51	51	48	-	50
2	51	50	50	51	51
3	50	49	49	-	50
4	49	50	49	-	50
5	48	49	49	48	49
6	48	48	47	-	48
7	48	49	49	-	48
8	53	50	49	48	51
9	48	48	48	50	48
10	48	-	-	-	49
11	47	46	-	-	46
12	44	44	45	45	44
13	47	47	47	44	46
14	45	45	-	47	45
15	47	(47)	-	48	47
16	49	49	49	52	49
17	52	53	54	B	52
18	B	54	53	-	B
19	-	-	-	-	-
20	59	59	59	58	59
21	61	64	63	B	62
22	B	B	B	B	B
23	B	-	-	-	B
24	61	62	(62)	63	62
25	62	61	59	61	61
26	63	61	58	60	61
27	58	56	53	-	57
28	B	54	52	-	57
29	55	54	52	56	54
30	B	55	54	-	56
31	51	50	51	49	51

Note: No observations during the following periods:

1st 1940 - 2345.
3rd 1940 - 2345
4th 1940 - 2345.
6th 1945 - 2345
7th 1945 - 2340.
10th 0130 - 11th 0015
11th 0400 - 12th 0025.
14th 0530 - 0855
15th 0310 - 0930.
18th 1955 - 19th 2350
23rd 0250 - 2345.
27th 2000 - 2345
28th 2000 - 2340.
30th 2000 - 2350

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso August 1990

Single-frequency observations

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

AUG 1990	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	200	43 NS	0036	0211	500	22	3	0
	200	42 SER	0508.6	0601.0	86	160	-	0
	200	41 F	0720.0	0727.0	16.5	130	-	0
	200	41 F	0742.2	0743.0	28.6	110	-	0
2	200	8 S	0525.0	0525.1	0.7	820	-	0
3	200	42 SER	0056.3	0056.8	2.4	46	-	0
4	200	46 C	2131.7	2131.8	2.4	690	-	0
	100	41 F	2132.3	2133.0	2.1	1000D	-	-
5	200	8 S	0244.0	0244.2	0.8	380	-	0
	200	46 C	0801.3	0801.7	1.1	200	-	0
7	200	42 SER	0433.7	0443.7	19.8	43	-	0
8	200	43 NS	0040	0341	218	25	3	WR
	200	42 SER	0134.3	0134.7	19.1	82	-	0
9	200	44 NS	1950E	2043	190D	6	3	0
11	200	43 NS	0100	0723	440	16	4	WR
	200	42 SER	0125.4	0211.2	63	215	-	WR
12	200	43 NS	2150	0000	610	13	5	WR
13	200	46 C	0256.8	0257.6	2.0	250	-	0
	100	46 C	0256.8	0258.0	2.2	260	-	-
	100	46 C	0633.0	0634.3	2.6	1000D	-	-
	200	44 NS	1952E	2100	160D	18	4	WL
14	200	41 F	0234.3	0235.0	3.0	93	-	ML
	200	43 NS	2350	0015	198	4	3	WL
	200	8 S	2205.1	2205.7	0.9	95	-	0
15	200	44 NS	1955E	0000	305D	9	3	0
16	500	41 F	0402.0	0404.7	6.0	157	-	0
	200	43 NS	0525	0700	240D	15	4	WR
	200	44 NS	1955E	0826	810D	17	6	MR
17	200	8 S	0004.0	0004.0	0.3	125	-	MR
	200	46 C	0335.0	0335.0	1.1	74	-	0
	200	8 S	0403.5	0404.2	0.8	76	-	0
	500	8 S	0404.0	0404.4	0.7	37	-	WR
	200	44 NS	1955E	0020	810D	55	18	MR
	500	42 SER	2031.5	2038.0	60.0	43	-	WR
	500	41 F	2140.0	2140.2	2.0	184	-	0
17	500	27 RF	2339	0012	65	14	4	WR
18	200	8 S	0352.1	0352.8	0.9	630	-	0
	500	41 F	0711.3	0712.3	1.0	19	-	0
19	200	8 S	0304.6	0304.8	0.9	357	-	0
	200	44 NS	2000E	0321	800D	84	27	WR
	200	41 F	2055.3	2056.1	4.6	232	-	0
	100	41 F	2154.1	2158.2U	5.9	1000D	-	-
	200	42 SER	2158.7	2201.5	2.8	270	-	0
20	100	42 SER	0655.4	0657.9	10.0	770	-	-
	200	42 SER	0656.1	0705.1	9.9	496	-	0
	200	46 C	0738.6	0739.6	2.0	270	-	WL
	100	42 SER	0738.7	0748.7	14.5	860	-	-
	500	46 C	0739.8	0740.5	1.8	1040	-	SL
	200	44 NS	2000E	0300	800D	35	10	0
	100	44 NS	2000E	0517	800D	90	14	-
	200	46 C	2130.2	2130.4	1.1	255	-	0
	200	8 S	2226.7	2227.4	0.9	43	-	0
21	500	42 SER	0108.4	0112.5	5.5	29	-	0
	100	41 F	0108.6	0112.8	5.2	1000D	-	-
	500	46 C	0404.8	0408.5	22.5	18	-	0
	200	41 F	0414.8	0420.5	10.6	1500	-	0
	100	41 F	0415.2	0420.5	11.6	1000	-	-
	100	46 C	0547.5	-	2.0	1000D	-	-
	200	46 C	0548.2	0548.2	1.3	345	-	0
	200	46 C	0716.6	0717.8	1.7	510	-	0

AUG 1990	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
	200	46 C	0752.3	0752.8	1.8	187	-	WL
	100	46 C	0752.3	0753.1	2.1	1000	-	-
	500	46 C	0752.5	0753.4	3.0	84	-	ML
	500	24 R	2000E	2129	480D	58	23	ML
	100	44 NS	2000E	2149	800D	215	38	-
	200	44 NS	2000E	0617	800D	42	16	ML
	500	42 SER	2146	2152.5	8.0	230	-	SL
22	500	8 S	0041.3	0041.5	0.6	530	-	SL
	200	46 C	0051.9	0052.4	1.1	240	-	0
	200	46 C	0133.3	0133.7	1.3	280	-	0
	200	42 SER	0246	0343	102	85	-	SL
	100	46 C	0340.6	-	4.3	1000D	-	-
	500	46 C	0340.9	0343.3	3.5	230	-	SL
	200	41 F	0729.7	0735.0	6.1	670	-	0
	200	8 S	0820.7	0821.1	0.5	145	-	0
	500	46 C	0826.5	0827.4	3.5	540	-	SL
	200	44 NS	2000E	-	800D	-	-	-
	100	44 NS	2000E	-	800D	-	-	-
	500	46 C	2046.5	2047.5	1.8	45	-	ML
	500	21 GRF	2128	0019	280	20	4	WL
23	200	44 NS	2000E	0011	800D	124	49	MR
	100	44 NS	2000E	0455	800D	320	205	-
24	200	44 NS	2000E	0320	800D	73	34	SL
	100	44 NS	2000E	0735	800D	210	42	
	200	41 F	2355.4	0001.3	13.2	485	-	ML
25	100	44 NS	2000E	2246	800D	210	98	-
	200	44 NS	2000E	0510	800D	63	33	ML
26	100	41 F	0039.5	0040.3	3.0	640	-	-
	200	42 SER	0117.8	0143.0	54.0	140	-	SL
	100	42 SER	0127.7	0209.2	47.5	1000D	-	-
	200	46 C	0352.1	0352.8	1.5	590	-	0
	100	46 C	0352.1	-	2.0	1000D	-	-
	500	46 C	0353.2	0353.8	3.8	48	-	WL
	200	42 SER	0528.0	0601.3	35.0	230	-	SL
	200	8 S	0732.5	0732.6	0.8	1100	-	0
	200	24 R	2000E	2220	800D	25	10	ML
27	200	41 F	0148.2	0150.5	4.6	145	-	0
	200	24 R	2000E	2348	800D	12	5	WL
	200	48 C	2055.9	2057.2	16.8	985	87	0
	100	48 C	2056.8	-	12.5	1000D	-	-
	200	42 SER	2127.7	2128.4	94	74	-	WR
	500	46 C	2345E	0002.5	30D	33	12	WR
28	500	41 F	0028	0111	60	36	-	MR
	500	46 C	0139.5	0148.5	27	393	32	SR
				0155.3		153		SR
	500	42 SER	0253.8	0305.5	14.5	146	-	SR
	500	41 F	0325	0342.3	21.5	1950	-	SR
	100	41 F	0336.7	0338.9	8.6	970	-	-
	200	42 SER	0339.6	0400.0	34	780	-	MR
	500	42 SER	0658.8	0659.0	5.0	48	-	MR
	100	44 NS	2000E	0618	800D	52	17	-
	200	44 NS	2000E	0750	800D	17	10	MR
29	500	46 C	0133.2	0134.4	2.0	445	-	SR
	500	42 SER	0230	0318	62	145	-	MR
	100	44 NS	2000E	2048	790D	110	33	-
	200	44 NS	2000E	0223	790D	76	40	MR
	100	42 SER	2208.0	2238.7	33	630	-	-
	500	23 GRF	2319	0029	110	30	7	0
30	100	48 C	0155.4	0156.8	3.3	11000	-	WR
	200	46 C	0156.1	0156.2	3.3	540	-	MR
	500	46 C	0156.5	0156.8	3.6	990	-	SR
	200	46 C	0431.2	0431.5	1.3	180	-	SR
	100	44 NS	2000E	2100	200D	230	80	-
	200	44 NS	2000E	2113	790D	86	23	SR
31	500	41 F	0206.0	0209.5	7.5	15	-	WR
	200	46 C	0233.7	0234.1	2.8	1200	-	MR
	100	41 F	0233.7	0234.3	4.4	2600	-	WR
	500	41 F	0234.5	0237.7	6.0	159	-	MR
	500	46 C	0329.0	0329.4	2.0	98	-	MR
	200	46 C	0331.0	0331.7	1.2	58	-	SR
	100	46 C	0507.4	0508.3	2.2	740	-	-
	500	41 F	0512.9	0514.0	2.4	55	-	MR
	200	27 RF	2000E	2100	300D	7	4	WR

C. RADIO PROPAGATION

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

AUG 1990 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

AUG 1990 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M
1	-14	-8	-11	5	13	12	21	23	24	22	21	24	22	21	20	5	15	10	8	4	5	-8	-10	-8
2	-11	-11	5	7	12	16	20	21	21	21	22	19	21	15	12	17	21	18	13	13	3	-8	1	-11
3	-10	2	-2	5	11	17	20	23	25	25	23	24	21	22	20	23	5	20	17	6	11	4	-8	ES -23
4	ES -23	-11	5	4	10	15	17	23	22	26	23	22	21	19	27	15	31	6	17	7	6	4	-2	-11
5	-2	ES -23	3	4	9	20	22	22	25	25	21	21	17	18	11	14	13	20	11	13	4	4	-11	ES -23
6	ES -23	-11	-11	1	11	17	23	22	22	27	24	23	22	21	27	18	19	21	ES -23	10	5	US -2	-8	-8
7	ES -23	-10	-10	8	10	14	17	22	25	21	23	21	21	16	14	12	22	14	4	10	7	2	-6	1
8	ES -23	-10	-14	5	10	17	21	29	22	22	22	27	25	25	26	20	17	12	12	8	7	5	-5	ES -23
9	-5	-10	-10	5	10	17	17	25	25	25	22	24	24	22	22	10	7	12	6	2	6	6	-10	-10
10	-10	-10	-2	9	13	20	24	21	22	27	30	20	27	26	18	20	21	18	6	6	7	-3	7	-11
11	-5	-8	4	7	12	18	25	26	27	26	22	27	20	15	20	17	22	24	7	7	9	4	4	-8
12	-6	5	-5	7	13	19	23	25	24	28	24	27	19	17	25	14	24	28	11	17	5	5	-8	-10
13	ES -23	-10	5	4	10	20	22	20	33	30	28	23	29	24	23	25	18	26	15	5	-5	4	ES -23	-11
14	-8	ES -23	-3	-1	12	17	17	19	23	20	21	22	27	17	12	19	11	18	5	13	0	2	2	-11
15	-3	-10	-11	12	13	23	23	26	28	27	25	17	9	8	-1	-11	20	10	ES -23	-8	-3	2	-3	-8
16	ES -23	ES -23	-2	3	4	17	15	19	23	18	18	20	19	23	23	ES -23	ES -23	20	8	-8	-2	9	-8	-11
17	-11	-8	-1	4	17	18	15	20	22	24	22	25	16	14	17	16	11	-11	ES -23	ES -23	-8	ES -23	0	ES -23
18	3	-8	-8	8	16	19	23	24	29	27	27	31	22	27	24	22	-4	14	6	8	1	ES -23	-11	-14
19	ES -23	-11	-11	3	11	19	18	20	21	24	24	28	23	19	11	17	17	19	11	16	-11	-11	ES -23	ES -23
20	ES -23	ES -23	ES -23	0	15	12	18	19	24	23	24	22	18	29	4	19	9	27	7	1	-2	-8	ES -23	ES -23
21	ES -23	ES -23	-10	-5	3	8	14	20	15	25	18	11	27	7	17	-11	-11	-8	ES -23	6	-1	-8	-5	ES -23
22	ES -23	ES -23	ES -23	-8	-10	10	4	14	10	12	7	-4	-4	5	-5	2	-8	-14	ES -23	-11	-4	ES -23	ES -23	ES -23
23	-8	ES -23	-11	-8	12	7	13	14	18	20	13	19	14	7	7	-11	-4	ES -23	3	-8	-11	ES -23	ES -23	ES -23
24	ES -23	ES -23	-11	6	6	22	10	25	22	23	25	27	7	10	-10	-10	-10	5	-11	-11	-1	ES -23	ES -23	ES -23
25	ES -23	ES -23	ES -23	4	19	17	19	21	23	24	25	25	26	22	19	3	6	16	18	9	4	-2	ES -23	ES -23
26	ES -23	ES -23	-5	1	10	15	16	23	27	21	25	22	21	ES -23	ES -23	1	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
27	ES -23	ES -23	-5	-11	1	11	10	12	17	17	17	18	9	8	-2	-8	3	22	ES -23	-11	3	ES -23	-11	ES -23
28	ES -23	-8	-2	-2	7	19	19	29	27	25	18	26	22	22	24	16	24	23	7	8	-2	-11	ES -23	ES -23
29	ES -23	ES -23	-8	3	5	17	29	29	27	28	32	24	13	25	24	12	23	27	5	5	ES -23	-2	ES -23	ES -23
30	ES -23	ES -23	-2	UC 5	13	21	22	25	26	26	22	23	27	8	-3	17	24	12	ES -23	7	6	6	-11	-11
31	-2	-11	3	0	15	17	21	24	24	24	27	23	21	22	22	10	9	20	20	10	0	-2	-11	ES -23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	US -23	-11	-5	4	11	17	19	22	24	24	23	23	21	19	18	14	13	18	6	6	1	-2	-10	US -23
UD	-2	-8	5	8	16	21	24	29	28	28	28	27	27	26	26	22	24	27	17	13	7	6	2	-8
LD	ES -23	ES -23	ES -23	-8	3	10	10	14	17	18	17	17	9	7	-5	-11	-11	-14	ES -23	-11	-11	ES -23	ES -23	ES -23

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

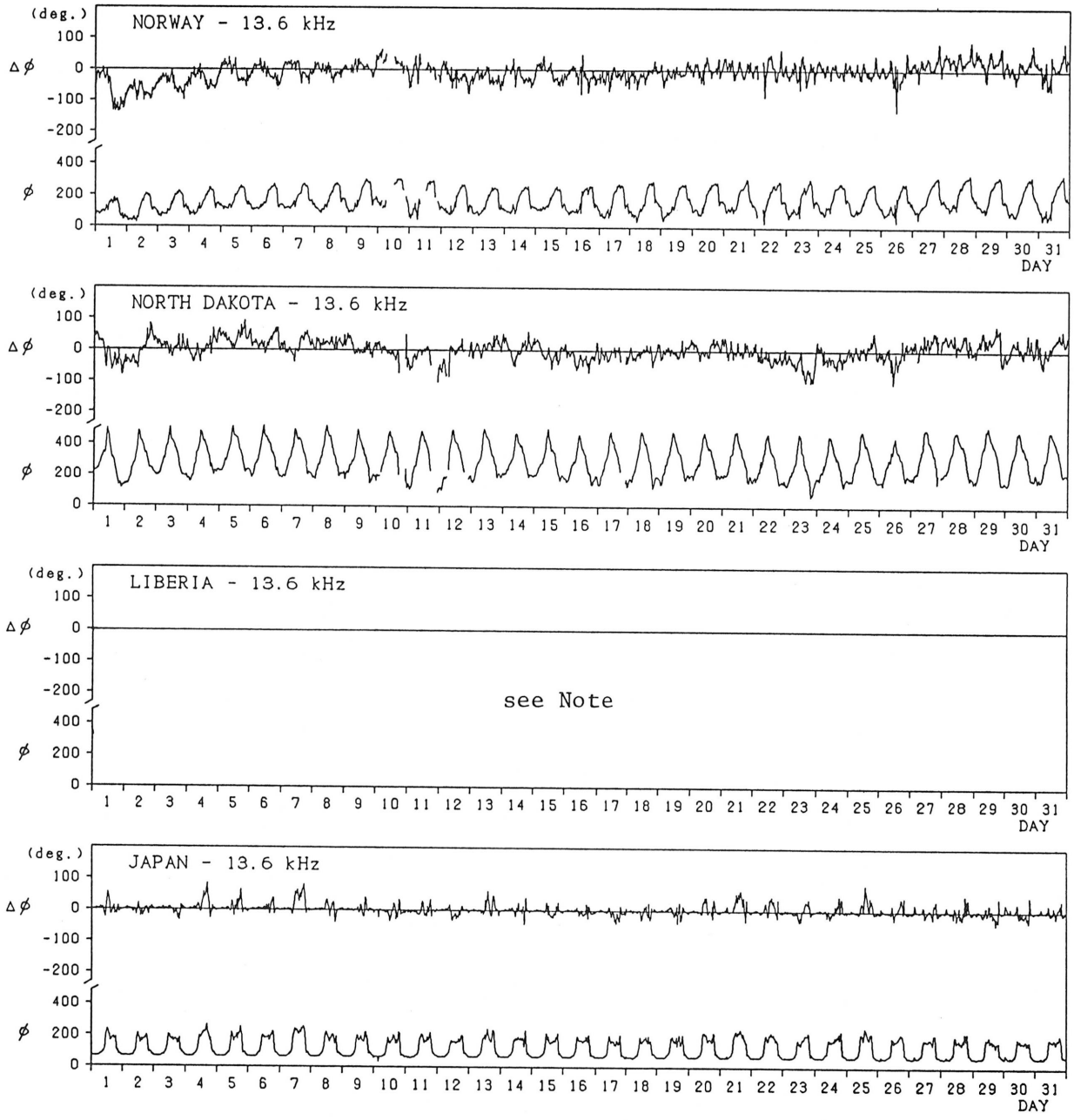
Hiraiso — Time in U.T

Aug. 1990	Whole Day Figure	W W V 00|06 06|12 12|18 18|24	W W V H 00|06 06|12 12|18 18|24	Conditions 00|06 06|12 12|18 18|24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4+	4U 5 4 5U	4 4 4 4	N N N N	0741	---	85
2	4o	3U 4 4 S	4 4 4 5	N N N N	---	09	
3	4+	4 5 4 5U	4 4 4 4	N N N N			
4	4+	4U 4U 5 5U	4 4 4 5	N N N N			
5	4+	4 5U 4 5U	4 4 4 4	N N N N			
6	4+	4U 5 4U 5U	4 4 4 4	N N N N			
7	4+	4 5U 5 5U	4 4 4 4	N N N N			
8	4+	4U 5 5 5U	4 4 4 5	N N N N			
9	4o	4 4 3U S	4 4 4 4	N N N N			
10	4+	5 5 4 S	4 4 4 5	N N N N			
11	5-	5 5U 5 5U	4 4 4 5	N N N N			
12	4o	5 4U 4 S	4 4 4 4	N N N N			
13	4+	4U 4U 5 5U	4 4 4 4	N N N N			
14	4+	4 4U 5 5U	4 4 4 5	N N N N			
15	4o	5 4U 3 S	4 4 3 4	N N N N			
16	4o	4 4 4U S	4 4 3 4	N N N N			
17	4o	5 5 3U 5U	4 4 3 3U	N N N N			
18	4-	3U 3U 3U S	4 4 4 4	N N N N			
19	4o	4 4 3 5U	4 4 4 4	N N N N			
20	3+	3U 2U 4 S	3 4 4 4	N N N N			
21	3o	4 3U 2U S	3 4 3 3	N N N N	05.6	---	130
22	3-	3U 2U 1U 5U	3 2 2 3U	N N N N	---	---	
23	3-	3U 3U 1U S	3 3 2 3U	U U U U	---	---	
24	3o	2U 3U 2U S	4 4 2 3U	U U U U	---	18	
25	4o	4U 3U 3 5U	4 4 4 4	N N N N			
26	3o	4U 3U 1U S	4 4 2U 2U	N N N N	0543	---	164
27	3o	2U 2U 4 S	3 3 3 3U	U U U U	---	24	
28	4o	4U 5 4 S	4 4 4 4	N N N N			
29	4+	4U 5 5 5U	4 4 4 4U	N N N N			
30	4+	5U 5 4 5U	4 4 3 4	N N N N			
31	4-	4U 2U 4 S	4 4 4 4	N N N N			

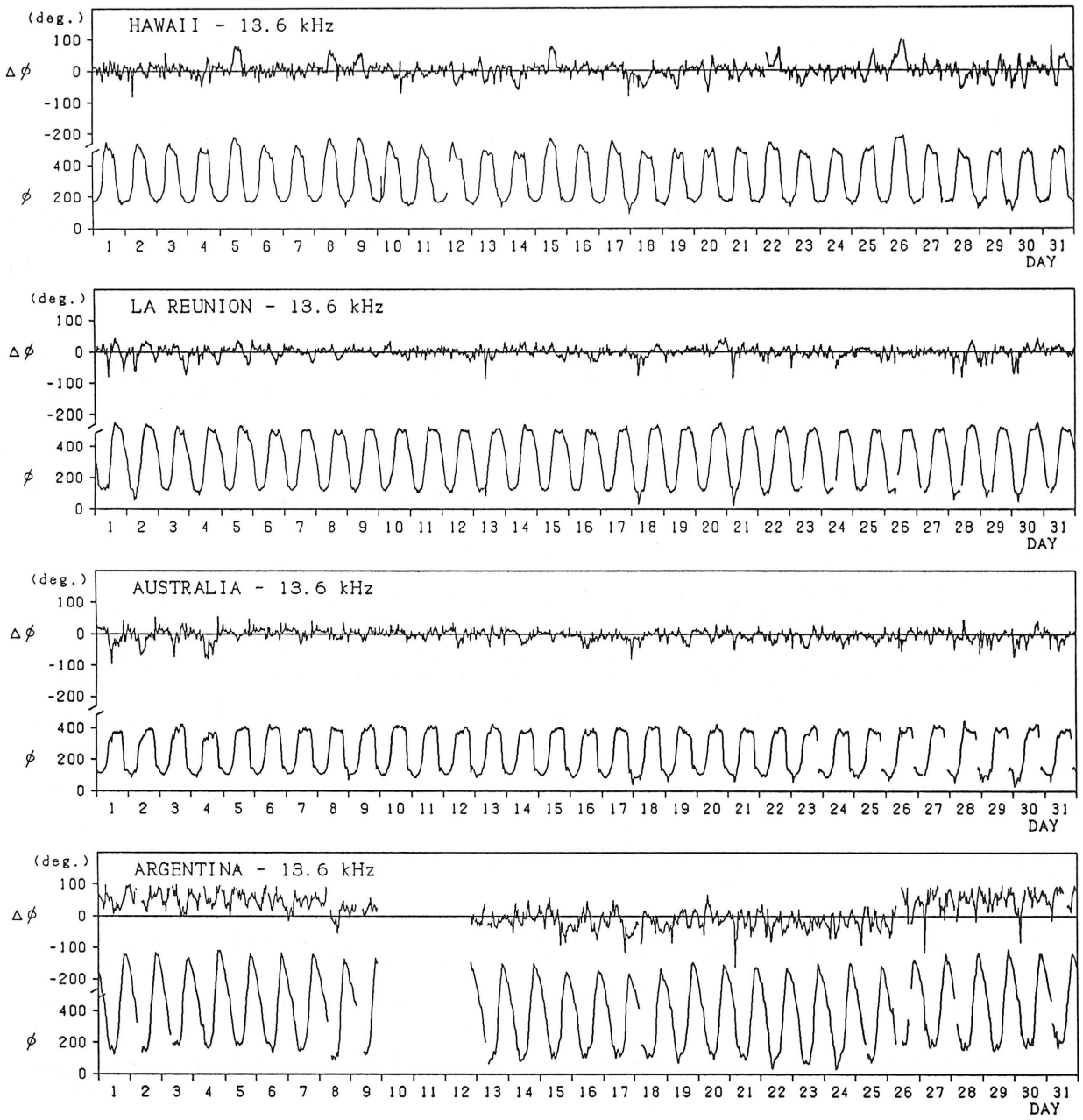
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo August 1990



Inubo August 1990



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

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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Aug.11/2140	Aug.15/0600	Aug.13/1518	57.6
Aug.25/0930	Aug.27/0700	Aug.26/1357	72.0

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Aug. 1990	S W F									Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
1				x	13	0923	23	SL	1		
8					15	1354	32	SL	1	x	
8		20	24			2340	30	SL	2	x	
13				x	21	1319	46	SL	1+	x	
13		20	9			2224	27	SL	1-	x	
17		x	18	20	6	2337	27	SL	1+	x	
18			7		x	0510	27	SL	1-	x	
21			10	x		0409	44	SL	1-	x	
21			5	x	5	0512	25	SL	1-	x	
23	x	x	10			0125	17	SL	1-	x	
25			8		x	0000	9	S	1-		
26			7			0212	35	SL	1-	x	
27			20	x		0350	35	SL	2-	x	x
27		24	16		18	2100	33	SL	1+	x	x
28		25	10			0245	25	S	1-		
28		39	13			0340	25	SL	1-	x	
28				15	24	0900	40	SL	2-	x	
28					11	1014	24	SL	1-	x	
28					31	1247	45	SL	2	x	
28			23	38	8	2230	36	SL	2-	x	
29	25	40	23	x	7	0428	22	S	2-	x	
29				x	9	0705	21	SL	1-	x	
29				x	6	0726	22	SL	1-		
29				x	9	0808	30	G	1-	x	
30			20		10	0030	130	G	2-		
30		x			14	1310	16	SL	1	x	
30		x			3	1326	25	SL	1-		
31	34	35	20	x		0407	20	S	2-	x	

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Aug. 1990	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1		—		6	4		0103	0125	0110
1		—		6	4		0206	0222	0212
1		—	106	12			0925	1026	0936
1		—			47	42	1956	2045	2006
1		—			38	29	2124	2252	2137
2		—		4	4		0049	0102	0053
2		—		16	9	7	0104	0134	0108
2		—		24	7		0237	0327D	0303
2		—	13	19	6		0327E	0408	0332
2		—	13	8			0525	0544D	0535
2		—	45	24			0544E	0559D	0554
2		—	72*	50			0559E	0713D	0622
2		—	67	21			0713E	0844	0730
3		—	15	14	7		0232	0308	0238
3		—	9				0358	0412	0401
3		—	12				0733	0746	0740
4		—	26	19	7	16	0339	0410	0348
4		—	7	8			0543	0600	0547
4		—	47	39	12		0648	0732	0654
4		—	16				0954	1010	0959
6		—	39	12			0900	0951	0915
7		—		10		8	0001	0022	0006
7		—	9	7	5		0402	0420	0407
7		—	10	8			0427	0500	0437
8		—	13	8			0434	0509	0445

Inubo

Aug.	S			P			A		
1990	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/lr	NWC	Ω/H	Ω/ND	Start	End	Maximum
8		—		10	18	21	2228	2304	2235
8	39	—	36	58	51	48*	2342	0038	2348
9		—	28	10			0741	0812	0751
9	30	—			20	23*	2028	2125	2051
10		—	35	10			0712	0830	0719
10		—		—	12	—	2311	0015	2340
13		—		—	16		0034	0052D	0042
13		—		—	19		0052E	0149	0105
13		—	12	—			0406	0426D	0411
13	31	—	30	—			0426E	0512	0431
13	28	—	102	21			0921	1028	0930
13	20	—	18	21	47	49	2225	2343	2232
14		—	26	9			0907	0951	0913
15		—		11	5		0132	0200	0145
15		—		7	7		2300	2327	2309
16		—		—	6		0144	0208	0150
16		—	15	—			0401	0448	0408
16		—	13	6			0724	0807	0732
17		—			19		2138	2232	2151
17	45	—	37	50	67	54	2250	2337D	2303
17	45	—	42	66	71	55	2337E	0112	2346
18	41	—	89	56	27	23	0511	0723	0527
18		—	46	6			0847	0911D	0856
18		—	49				0911E	1007	0919
18		—			6*		2307	2335	2317
19	30	—	35	48	28	22	0149	0312	0203
19		—	8				0524	0541	0530
19		—			12		2158	2248	2209
19		—			9		2339	0051	0002
20		—		—	2		0136	0202	0145
20		—	31				1119	1154	1125
21		—		8	5		0109	0130	0116
21		—	6	9	3	11	0323	0351	0331
21	22	—	83	35	26	24	0405	0509D	0431
21	37	—	102	70	35	7	0509E	0730	0526
21		—	58				0929	1048	0934
22		—		37	21		0138	0231	0144
22	—	—	10	9	5		0355	0408D	0402
22	—	—	54	43	14		0408E	0454D	0415
22	—	—	47	34	10		0454E	0528D	0501
22	—	—	23	10			0528E	0639	0532
22	29	—	49	17			0750	0844	0801
22		—	18				0902	0915	0910
22		—			19	15	2202	2304	2212
23	23	—	32	—	33	23	0125	0222	0132
23		—	8	—			0505	0544	0509
23		—	38	13			0732	0855D	0748
23		—	71	22			0855E	0955	0913
23		—	17				1126	1156	1133
23		—			14		2037	2115	2050

Inubo

Aug. 1990	S			P		A		
	Phase Advance (degrees)					Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
23		—			17		2150	2240	2207
23		—		7	9		2249	2319	2259
24		—		19	12	10	0132	0207D	0143
24		—		14	4		0207E	0245	0220
24		—	23	21	9		0310	0345	0321
24		—	19	18			0350	0437D	0420
24		—	40	31	9		0437E	0532	0446
24		—	109				0851	1108	0924
24	31	—	39	63	56	41	2354	0102	0005
25		—	26	26	16	11	0239	0349	0257
25		—			20	18	2006	2100	2017
25		—			18		2150	2330	2230
26	25	—	46	41	21	33	0210	0314	0226
26	20	—	38	24	11	19	0324	0356D	0338
26	15	—	44	27	10		0356E	0455	0406
26		—	72	24			0732	0839D	0743
26		—	88	26			0839E	1012	0912
26		—		18	29	22	2216	2355	2248
27		—		—	11	18	0002	0043	0022
27	62	—	174	—	70	56	0348	0530	0401
27		—	10				0710	0800	0719
27		—	8				1030	1108	1033
27		—			67	92	1906	2039	1928
27	62	—	17		186	219	2056	2236	2112
27		—			5		2335	2357	2343
28		—	15	—	8	10	0240	0317	0252
28	28	—	82	—	27	24	0337	0421D	0350
28	14	—	44	—	13		0421E	0500D	0425
28	15	—	31	—			0500E	0542D	0515
28	12	—	12	—			0542E	0607	0553
28		—	30	7			0816	0856D	0828
28	82	—	221	52			0856E	1010D	0913
28	35	—	89				1010E	1136	1020
28	25	—	22				1248	1338	1256
28		—			42		1818	1930D	1834
28	9	—			19	15	2147	2231D	2203
28	29	—	25	42	72	46	2231E	0023	2242
29	25	—	23	47	29	19	0053	0153	0058
29	15	—	20	16	5		0413	0425D	0418
29	54	—	130	83	41	35	0425E	0541	0433
29	42	—	126	60			0702	0808D	0723
29	45	—	130	29			0808E	0947	0820
29		—			54	35	2036	2239	2043
30		—	60	64	61	29	0000	0155D	0112
30		—	71	49	41		0155E	0211D	0158
30		—	64	43	37		0211E	0300D	0215
30		—	24	14			0300E	0333	0304
30		—	15	8		12	0345E	0419D	0353
30		—	76	43	25		0419E	0612D	0441
30		—	25	13			0612E	0709	0622
30		—		10	15	13	2209	2252	2227

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