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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 and X-ray flares, and solar radio burst 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

JUL. 1991

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	79	76	73	73	72	74	114	94	A			B				A	62	63	A	61	70	82	69	78
2	82	81	76	72	74	83	87	82	70		A	A	A	A	A	A		62	59	A	A	69	73	A
3	A	65	66	71	51	57	60	51	A	A	A	A	A	B		A	A	61	69	69	64	68	70	68
4	74	73	74	67	60	65	82	73	67	A	A	A	64	A	71	69	A	54	A	56	73	75	79	81
5	76	76	73	68	69	84	86	80	A	66		A	A	A	A		60	63	A	A	68	72	65	75
6	76	77	71	73	65	83	96	90	84	86	A	68	71	75	73	A	90	83	77	74	74	83	80	N
7	81	81	73	70	70	87	102	86	74	86	A	B		A	A	A	70	71	68	59	62	73	A	79
8	78	72	70	67	71	77	86	100	88	83	A	A	A	60	A	72	70	87	92	81	80	87	82	82
9	75	84	73	58		59	59	A	A	A	A	A	A	A	A	47	62	67	84	73	91	77	76	49
10	44	A			40	35	48			51			B	A	39		A	56	A	58	61	63	73	65
11	68	59	56	48	43	35	57	A	A		A	A	A			A	61	64	A	76	A	61	64	A
12	67	68	68	57	51	68	76	79	A		A	A	63	56	66	70	66	63	73	77	72	80	82	74
13	64	65	70	59	56	A	A	66	A	A	A	A	B		A	A	A	A	59	67	86	70	74	45
14	48	45	36	30	41	A													49	54	50	63	68	64
15	60	57	51	A	56	52	A	A	105	A				71	A	62	A	66	67	64	78	79	79	74
16	74	67	70	63	60	60	70	67	69	77	83	81	84	74	73	83	77	84	68	A	77	82	79	86
17	70	89	78	71	67	57	81	74	76	A	67	A	72	60	73	80	80	84	83	78	65	74	75	73
18	63	70	62	56	54	60	63	62	62	67	63	72	68	73	72	75	70	74	78	90	83	70	71	77
19	76	73	72	62	65	79	A	89		A	A	A	81	92	71	73	83	76	A	92	90	66	86	87
20	79	68	69	66	57	62	66	72	73	92	90	B	A	72	62	91	75	87	87	93	91	A	84	77
21	74	69	73	67	58	A	89	83	67	75	67	67	76	73	72	86	79	78	81	77	80	74	73	64
22	74	73	63	69	68	72	71	87	71	84	82	60	65	74	84	80	72	90	A	A	A	76	84	54
23	74	75	63	65	57	60	78	A	A	A	A		70	69	70	70	66	72	58	74	69	70	58	73
24	71	65	66	57	56	55	72	78	78	A	A	A	73	A	A	63	84	84	69	71	70	80	N	70
25	45	64	67	76	74	74	92	91	103	68	84	70	96	A	88	81	80	89	99	87	91	86	97	91
26	88	74	68	71	70	70	80	61	A	A	63	A	A	73	75	70	A	A	88	81	83	105	93	82
27	73	71	65	65	72	90	95	95	100	96	91	89	92	90	92	83	80	A	91	85	97	68	94	93
28	82	81	78	68	67	80	85	97	112	92	87	86	83	83	84	84	80	103	A	72	90	65	90	87
29	74	74	71	72	70	86	112	127	103	96	87	85	91	59	84	87	83	87	58	85	71	86	81	68
30	82	80	77	67	67	73	85	99	A	A	C	C	C	A	A	67	A	A	A	73	A	71	68	90
31	73	70	71	68	73	72	86	99	102	95		91	73	91	A	84	86	93	96	92	84	89	88	88
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	30	28	27	25	18	15	11	10	16	17	17	21	22	26	22	27	27	30	29	28
MED	74	72	70	67	65	71	82	83	77	84	83	76	73	73	73	75	76	75	75	74	77	74	79	76
U Q	78	76	73	71	70	79	89	94	102	92	87	86	83	79	84	83	80	87	87	85	86	82	84	84
L Q	68	67	66	60	56	59	70	72	70	68	67	68	69	64	70	69	66	63	67	67	69	69	70	68

HOURLY VALUES OF FES AT WAKKANAI

JUL. 1991

LAT. 45.4N LON. 141.7E 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	32	G	G	G	G	G	73	85	98	111	138	B	G	G	G	56	41	52	106	38	48	G	G	G
2	G	G	G	37	47	46	60	85	59	G	61	62	78	52	93	78	142	59	73	73	81	92	41	72
3	70	54	G	G	G	39	44	40	59	64	123	95	62	B		54	49	48	37	51	G	53	38	38
4	32	G	G	G	G	42	51	66	61	56	72	92	62	63	50	G	94	43	72	72	29	58	G	58
5	26	27	25	G	G	G	46	65	54	58		65	58	62	62	G	G	G	68	61	38	33	60	59
6	39	G	32	31	G	G	G	42	53	48	92	66	61	65	66	108	69	49	61	28	42	72	46	93
7	77	66	66	59	55	55	G	56	44	71	72	B	G	78	50	85	43	G	33	G	46	68	102	59
8	34	36	60	43	48	53	41	58	71	74	78	84	68	64	78	61	57	56	70	69	104	69	49	30
9	72	28	26	G		G	G	60	65	122	59	57	56	47	50	G	G	59	G	G	G	G	31	27
10	39	33			29	33	G	G	G	G	G	G	B	50	61	G	57	48	44	46	42	G	G	33
11	29	G	54	29	G	G	G	58	61	G	60	74	73		G	44	G	56	137	94	84	58	40	65
12	31	27	30	36	G	44	61	106	73	131	63	67	60	G	G	G	G	44	55	54	77	60	32	34
13	36	G	G	G	G	81	84	53	64	59	57	53	B	G	45	46	63	70	G	G	G	G	G	44
14	41	31	28	G	30	34	G		G	G							G	G	G	G	G	30	32	31
15	51	46	28	60	42	30	46	45	G	55		G	G	50	72	44	74	59	59	56	56	65	60	38
16	37	32	G	G	G	34	G	G	52	56	84	62	49	G	47	45	53	66	73	73	57	41	49	72
17	87	90	49	46	34	48	49	56	66	69	66	57	87	G	G	G	G	37	69	54	45	25	31	31
18	G	59	35	27	29	32	46	G	G	G	G	G	50	46	62	56	48	61	44	97	63	84	67	58
19	58	58	61	55	46	92	69	104	125	135	79	102	75	G	G	64	95	106	138	147	122	90	70	58
20	67	54	30	32	34	46	92	G	53	45	57	B	92	61	54	60	80	65	59	92	170	115	46	38
21	40	93	34	70	51	88	59	59	68	56	86	70	59	60	G	G	G	47	50	65	57	27	33	G
22	G	G	G	G	G	G	40	55	60	48	G	50	84	90	G	G	47	59	97	113	103	92	58	G
23	G	32	32	G	35	30	42	73	90	84	67	G	G	G	G	42	42	60	165	40	71	59	45	48
24	50	30	26	34	34	31	46	46	60	79	79	48	G	116	128	62	48	39	46	59	61	30	94	30
25	28	G	G	28	44	G	44	60	66	58	53	G	51	67	61	G	68	148	98	67	94	91	49	47
26	58	45	G	G	33	36	50	66	64	71	G	58	70	G	G	57	72	93	72	65	132	115	37	29
27	33	40	G	G	26	G	45	52	60	56	64	59	G	G	G	G	48	73	58	59	31	72	59	37
28	G	34	59	58	41	64	60	50	88	55	G	G	53	G	G	43	56	67	97	80	48	108	60	60
29	60	42	34	28	28	50	72	72	85	72	64	61	57	55	G	103	48	80	108	59	72	54	58	44
30	37	45	68	59	66	62	50	73	78	75	C	C	C	78	72	G	77	131	166	105	62	59	32	G
31	G	23	G	G	25	G	41	G	G	G	G	G	56	87	98	93	46	44	52	41	49	60	59	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	31	31	30	30	30	31	31	30	31	31	27	26	27	28	29	30	31	31	31	31	31	31	31	31
MED	37	32	28	28	30	34	46	57	61	58	64	58	58	51	50	44	48	59	68	59	57	59	46	38
U Q	58	46	35	43	42	50	60	66	71	74	79	67	70	64	64	61	69	67	97	73	81	84	59	58
L Q	28	G	G	G	G	G	40	45	53	48	53	G	49	G	G	G	41	44	46	41	42	30	32	30

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	18	17	17	16	20	23	21	23	40	38	42	B	71	91	36	29	27	21	18	17	15	18	17	16
2	17	15	15	15	17	20	18	26	33		43	41	39	43	41	39	27	23	20	18	18	14	14	17
3	18	14	14	17	20	23	21	C	39	40	44	43	42	B		30	28	23	18	18	17	14	16	17
4	20	16	20	16	21	21	23	23	30	39	42	43	46	44	42	40	24	24	23	17	17	16	16	15
5	15	15	16	15	20	18	18	26	26	41		40	81	38	39	33	27	26	28	17	16	16	16	16
6	14	15	15	15	23	18	21	24	38	41	40	42	40	40	37	29	26	23	18	22	18	17	17	17
7	17	17	15	15	18	18	21	21	28	39	40	B	91	53	81	41	33	28	21	24	14	14	16	15
8	16	14	15	16	17	17	18	22	33	39	39	40	36	38	35	26	26	18	18	18	16	18	15	16
9	17	17	17	15		18	20	22	24	36	32	38	40	34	34	42	24	22	17	21	17	15	15	15
10	14	15			16	18	17	28		40		81	B	41	42	27	26	21	21	17	14	16	16	16
11	15	16	15	15	18	26	35	32	36		39	39	36			36	42	23	20	18	17	18	17	17
12	16	18	16	15	18	17	20	27	39	37	38	38	34	32	30	39	24	20	17	17	16	18	17	16
13	16	16	15	16	17	18	18	21	36	39	39	39	B	71	37	30	24	20	17	21	18	15	14	15
14	15	14	15	66	15	17	23												28	26	16	15	16	16
15	16	17	18	15	15	18	17	22	26	36		81	91	59	39	36	34	18	20	17	18	16	16	17
16	16	17	15	15	18	18	22	28	28	40	36	44	30	52	39	28	35	21	17	21	17	17	16	15
17	15	16	15	17	17	18	18	22	27	39	40	39	40	34		38	50	24	18	17	14	17	17	20
18	18	16	17	15	16	17	18	36	44	45	40	43	39	50	34	29	26	22	20	18	16	15	14	15
19	17	14	16	15	17	20	20	22	35	40	35	39	42	57	48	39	26	24	17	17	14	15	14	15
20	14	16	14	14	15	18	18	20	34	34	42	B	46	42	46	40	28	20	22	16	16	14	14	16
21	17	17	17	17	15	18	20	23	35	33	36	32	39	40	91	36	27	29	24	17	15	15	16	16
22	17	20	15	18	20	18	21	28	34	39	43	42	46	40	42	41	28	23	16	23	20	16	16	20
23	15	20	17	15	16	20	17	24	38	38	39		42	42	52	26	26	24	16	21	16	16	16	17
24	16	16	16	16	16	20	21	24	33	37	39	43	43	39	37	29	28	24	20	17	17	15	17	15
25	20	15	17	16	16	18	23	24	30	38	42	52	34	40	32	24	23	21	20	18	15	14	14	15
26	16	16	18	15	16	17	20	24	26	38		40	38		44	36	33	26	17	17	16	16	16	15
27	17	17	15	15	18	18	17	23	30	28	36	33	48	43	46	29	23	24	17	18	16	14	16	16
28	16	16	17	17	16	18	21	22	27	34	32	33	29	27	26	27	24	20	18	22	18	18	17	18
29	17	16	17	16	15	17	18	24	26	27	30	33	35	29	28	26	26	21	17	17	15	15	15	18
30	17	15	15	14	16	17	18	20	33	31	C	C	C	46	40		36	18	17	16	17	15	17	16
31	17	16	16	14	16	20	28	36	39	84	101	49	30	35	28	33	24	20	20	17	17	17	17	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	30	31	31	29	29	28	25	25	27	27	27	29	30	30	31	31	31	31	31	31
MED	16	16	16	15	17	18	20	24	33	38	39	40	40	41	39	33	26	22	18	18	16	16	16	16
U Q	17	17	17	16	18	20	21	26	37	40	42	43	46	50	44	39	28	24	20	21	17	17	17	17
L Q	15	15	15	15	16	18	18	22	27	36	36	38	36	38	34	28	24	20	17	17	15	15	15	15

HOURLY VALUES OF FOF2 AT AKITA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	86	75	81	76	82	87	87	71	A	A	B	A	A			A	A	A	103	A	A	80	80
2	80	74	75	53	60	78	86	77	A	A	A	A	A	A	A	A	A	A	A	86	A	A	A	46
3	70	54	73	55	54	54		A	A	A	A	A	A	B	A	A		A	64	54	A	A	34	69
4	56	54	70	52	52	54	A	81	A	A	A	A	A	84	83	77	77	78	76	75	55	53	65	A
5	52	85	54	63	54	80	86	A	A	A	A	A	A	A	A		65	71	65	54	A	A	A	A
6	49	72	54	70	54	81	87	90	89	87	A	86	90	88	A		86	86	79	55	A	81	86	48
7	A	51	A	70	74	86	90	91	A	A	A	B	B	B			66	A	63	54	72	71	A	A
8	A	A	68	70	65	76	84	96	86	A	83	85	85	A	85	85	78	80	86	A	A	A	87	85
9	87	83	76	47	45	30	A	A	A	A	A			A		A	66	53	71	87	70	89	A	A
10	44	A	A	A	32	52	A	A	A		A	A	B	A	A		A		47	A	A	44	54	48
11	51	52	A	51	A	44	46	A	A	A	A	A	A	A	A		68		79	82	34	51	35	A
12	A	68	53	54	61	45	81	78	A	A	A	A	86	A	A	73	A	A		A	79	A	A	86
13	A	A	55	52	53	A	A	A	119	A	A	A	A	A			A	A	43	N	62	53	35	52
14	A	A	A	54	51	A	A	A	A									47	A	54	A	35	52	52
15	A	A	51	54	A	A	A	A	A	A	77	78	86	90	82	81	A	68	A	A	A	84	A	78
16	75	75	70	58	53	72	70	80	A	87	90	86	87	88	82	87	90	88	87	34	71	79	80	77
17	A	74	66	54	53	31	A	A	A	A	98	107		A		90	91	90	86	72	54	A	80	34
18	78	44	50	54	51	A	51	70	A	A		73	77	A	A	A	A	96	86	87	A	77	79	78
19	81	78	77	48	53	42	45	A	A	78	A	77	82	93	91	81	A	A	A		36	82	N	83
20	82	80	52	49	68	68	46	86	A	106	91	B	101	74	A	90	87	A	86	87	87	82	A	78
21	78	75	77	70	52	42	78	88	87	93	86	86	85	87	75	87	87	88	91	86	78	67	70	A
22	78	80	68	74	56	75	78	84	84	78	80	77	79	84	87	87	A	88	93	86	69	A	80	A
23	81	79	55	44	66	54	A			A	111	N	78	76	A	80	A	79	104	119	A	A	A	A
24	43	70	71	A	50	A	78	84	80	83		A	110	86	A	85	90	88	105		A	A	80	78
25	A	36	78	78	A	A	97	88	A	86	88	N	A	102	95	93	A	90	90	90	85	89	87	86
26	A	80	53	30	65	68	79	73	A	A	A	A	A	A	90	A	A	A	85	90	85	79	86	81
27	86	86	83	A	74	74	90	92	91	91	90	94	89	97	88	91	90	90	94	89	88		90	86
28	86	83	81	75	46	75	90	106	A	92	86	86	86	90	86	91	90	86	A	A	A	A	88	87
29	A	80	44	70	58	A	110	108	100	90	94	A	90	87	91	88	94	87	90	87	A	85	85	86
30	83	79	79	68	70	75	87	97	91	90	85		85	91	91	86	86	86	A	A	A	87	83	81
31	79	79	75	71	76	81	86	97	97	88	B	88	85	92	86	87	83	82	88	86	A	90	86	87
	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	26	27	28	28	24	22	20	11	13	13	12	17	16	14	18	17	20	23	22	15	19	22	23
MED	78	76	70	54	54	70	85	88	89	88	88	86	86	88	86	87	86	86	86	86	71	79	80	78
U Q	81	80	76	70	65	77	87	94	97	91	92	87	89	91	91	90	90	88	90	87	85	85	86	86
L Q	54	68	54	52	52	48	78	80	84	84	84	77	83	85	83	81	72	78	71	55	55	53	65	52

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT AKITA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	106	45	27	28	53	G	57	61	57	51	70	B	131	148	132	106	86	47	47	93	116	55	71	G
2	G	G	G	26	24	42	62	57	91	91	51	83	91	55	51	61	64	126	94	77	92	92	75	44
3	43	38	50	34	G	37	G	65	42	62	50	56	74	B	49	46	G	41	38	G	40	33	40	45
4	27	30	24	G	G	40	45	50	71	54	69	72	56	52	55	47	47	48	44	G	30	27	30	33
5	30	34	34	36	41	G	40	73	58	66	48	55	74	51	92	G	47	47	48	45	41	52	93	52
6	31	G	27	G	G	G	G	49	52	50	52	81	104	51	184	162	109	114	48	38	41	35	26	32
7	48	51	44	46	41	33	G	G	52	67	77	B	B	B	G	G	G	47	G	G	29	25	83	85
8	92	84	94	48	31	34	G	40	61	84	51	78	51	122	75	48	57	55	48	58	137	84	54	74
9	41	44	33	40	36	G	50	61	125	95	84		G	46	G	74	G	G	G	G	G	G	32	37
10	32	35	33	27	36	32	36	84	50	G	50	48	B	61	51	G	42	G	42	51	50	31	28	24
11	24	51	43	37	32	G	G	48	56	114	117	126	85	51	56	G	G	G	40	30	G	31	31	58
12	78	51	41	G	G	34	G	51	60	137	58	106	80	93	60	62	74	116	120	118	162	135	83	72
13	82	51	42	48	26	51	52	94	72	58	58	46	57	74	G	G	47	44	G	G	G	G	G	G
14	34	50	30	G	24	36	38	44	45	G	G	G	G		G	G	G	G	50	31	33	33	G	G
15	37	43	31	28	57	57	51	56	50	51	G	G	G	G	69	72	61	52	79	110	85	32	58	51
16	40	41	37	26	G	32	40	44	51	44	51	G	G	G	62	77	61	57	50	51	32	41	52	50
17	55	30	33	G	37	36	70	82	72	85	75	116	98	127	85	76	77	44	34	28	24	44	57	48
18	38	26	30	45	44	42	36	40	43	74	G	51	47	82	126	114	85	91	51	59	57	50	36	44
19	43	40	43	47	30	33	51	86	104	103	51	84	51	G	G	58	92	180	96	117	42	51	55	58
20	58	48	41	25	31	37	50	84	168	47	G	B	G	G	51	45	82	113	116	116	92	50	84	44
21	44	43	37	45	38	46	50	50	58	83	69	52	G	G	G	G	50	37	G	44	56	37	36	50
22	41	28	G	30	27	G	G	G	73	G	G	G	G	56	61	G	74	74	50	33	45	52	93	83
23	72	53	52	36	G	43	117	91	146	180	107	98	85	57	75	51	128	74	93	145	90	140	73	41
24	G	40	38	44	30	35	58	57	77	73	G	75	102	51	137	G	G	50	125	137	134	92	43	33
25	52	49	32	37	60	56	73	61	82	86	78	134	95	51	G	G	55	51	52	50	38	93	82	84
26	134	81	49	37	G	34	48	48	54	66	54	54	82	75	46	84	116	85	50	49	34	55	56	55
27	25	51	51	58	51	30	45	92	57	124	52	55	51	52	58	46	41	51	51	40	50	38	32	32
28	36	41	30	31	G	32	50	57	137	51	48	53	47	62	54	87	66	51	137	180	175	142	84	57
29	55	41	31	32	38	51	54	57	51	96	83	104	92	51	G	51	74	50	54	52	47	54	34	G
30	28	57	49	33	G	45	36	47	58	76	91	G	51	G	50	50	50	50	50	57	92	54	91	46
31	31	G	30	32	28	28	40	53	50	83	B	51	G	54	59	G	53	59	57	51	60	93	72	91
	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	27	29	28	31	31	31	31	31	31	31	31	31	31
MED	41	43	34	33	30	34	45	57	58	73	52	55	56	52	55	48	57	51	50	51	47	50	55	46
U Q	55	51	43	44	38	42	52	73	77	91	75	84	88	68	75	74	77	74	79	93	92	84	82	58
L Q	31	34	30	26	G	30	36	48	51	51	48	48	G	48	G	G	42	44	42	31	33	33	32	33

HOURLY VALUES OF FMIN AT AKITA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	17	15	15	17	17	20	29	30	43	B	69	45	34	29	26	20	18	16	16	16	16	16
2	16	17	18	15	16	18	20	20	21	28	40	40	39	35	35	44	22	21	20	15	16	16	16	16
3	16	16	15	16	17	18	20	28	29	40	36	46	44	B	30		21	17	17	21	16	16	15	17
4	16	16	16	17	16	18	18	20	23	27	42	46	36	35	29	39	34	20	16	23	16	16	17	16
5	15	16	16	16	16	18	17	18	22	35	28	38	38	36	35	26	26	20	24	15	16	15	16	15
6	15	16	16	16	18	17	18	17	28	39	45	38	37	42	33	34	24	16	17	16	16	16	16	16
7	16	16	16	15	16	16	33	18	22	39	40	B	B	B	91	101	101	26	29	24	16	16	16	16
8	16	16	16	16	16	17	18	20	26	26	39	35	36	29	35	26	20	17	16	15	16	16	17	16
9	16	16	16	17	16	18	20	18	22	28	29		35	39	28	36	18	18	16	22	17	16	16	15
10	16	16	16	16	16	17	18	20	20	27	32	39	B	30	35	27	27	18	18	16	16	16	16	17
11	18	16	15	16	16	24	20	24	28	33	33	33	29	30	29	29	26	21	17	16	16	16	16	16
12	17	16	15	16	29	18	17	24	26	27	35	38	28	28	26	26	20	17	17	16	16	17	15	16
13	17	16	17	16	20	16	18	22	26	26	37	38	37	33	36	66	21	22	16	23	16	16	17	17
14	16	15	16		17	17	18	21	20	26	26	36	35		29	26	23	21	17	16	17	18	16	18
15	17	16	17	17	16	16	16	20	27	23	29	66	66	68	38	36	23	20	17	16	17	16	16	15
16	16	16	17	17	16	16	18	22	24	35	28	66	29	67	29	30	26	17	16	16	16	16	16	16
17	16	16	16	18	16	20	18	17	22	22	35	36	28	33	28	24	35	20	16	26	17	16	18	16
18	16	17	17	16	18	16	18	28	26	38	51	39	39	36	33	29	22	18	16	16	15	14	16	16
19	16	16	16	16	16	18	17	18	22	24	29	39	35	68	71	28	36	18	16	20	16	17	17	17
20	16	16	16	18	18	17	17	20	23	26	67	B	68	66	39	23	36	18	17	16	16	16	16	16
21	16	16	16	16	16	17	17	18	24	28	34	41	66	46	91	65	36	29	20	16	16	17	16	16
22	16	16	17	16	16	24	18	23	29					42	43		35	21	17	16	16	15	18	16
23	16	16	16	17	14	16	18	20	20	24	23	29	36	37	30	39	28	21	16	16	16	16	15	16
24	16	16	16	16	18	18	18	20	22	23	46	35	38	45	40	39	40	23	18	16	16	16	16	16
25	16	16	15	16	16	17	17	26	18	29	36	34	33	34		33	21	18	17	17	18	17	16	15
26	16	15	14	14	16	17	17	20	22	33	41	39	30	36	39	36	18	18	17	16	17	16	17	15
27	17	15	16	15	15	16	18	18	26	18	33	35	34	35	29	27	22	17	16	16	16	16	16	18
28	17	17	16	16	16	17	17	17	18	26	28	30	27	27	29	20	18	17	17	20	16	17	18	17
29	16	17	16	16	17	16	17	17	22	24	34	33	30	28	28	26	24	17	16	16	16	16	17	20
30	18	15	15	15	15	16	17	18	26	23	28	33	35		28	21	20	18	16	16	15	17	16	16
31	16	15	15	15	16	16	18	17	21	24	B	35	33	34	27	24	18	17	18	18	21	17	17	18
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	31	31	30	29	26	28	27	30	29	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	17	18	20	23	27	35	38	36	36	33	29	24	18	17	16	16	16	16	16
U Q	16	16	16	16	17	18	18	22	26	33	40	39	38	45	38	37	34	21	18	20	16	17	17	17
L Q	16	16	16	16	16	16	17	18	22	24	29	35	31	33	29	26	21	17	16	16	16	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

JUL. 1991

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	82	90	80	80	80	87	89	92	68	A	A	A	A	A	A	64	86	94	A	A	74	70	76	82
2	82	75	81	72	68	72	84	83	56	76		A	A		A	A	A	96	93	93	A	72	A	51
3	80	73	70	64	58	A	68	52	A	A	A	B	A	A	A		49	A	48	58	70	69	70	73
4	70	73	75	57	58	71	80	77	53	77	A	71	59	86	90	87	81	A	86	80	78	82	78	75
5	80	81	80	61	61	72	92	91	A	91	A	A	A	A	74	62	76	70	A	67	68	A	81	82
6	82	80	75	71	70	74	82	90	94	90	A	87	A	97		92	89	92	80	69	77	A	92	88
7	92	93	74	70	75	92	92	92	88	86	A	72	B	B	75	70	72	71	68	71	72	76	81	80
8	74	70	70	73	71	77	91	97	85	84	86	92	91	96	91	91	91	90	85	92	81	A	92	98
9	93	94	80	70	A	50	46	A	67	A	N	A	69	A	74	70	78	72	82	92	82	93	79	83
10	57	50	48	41	A	42	58	49	58	A		A	A	B	B	A	A	57	59	62	70	62	62	60
11	66	70	55	57	51	53	62	62	58	48	66	70	72	77	56	66	78	78	92	86	67	70	80	82
12	82	81	73	N	58	74	94	86	66	72	A	87	93	88	86	82	81	93		100	A	73	75	85
13	A	58	68	70	71	75	74	70	95	99	A	A	A	A	N	57	A	48	53	68	80	71	67	70
14	A	51	A	40	58	50	49	59	49	A	A	A			C	A	48	45	A	A	68	74	A	58
15	73	54	60	74	62	51	A	60	56	78	85	85	92	97	97	A	77	90	76	82	82	81	83	83
16	85	85	71	69	72	75	76	87	91	95	90	88	91	98	96	97	98	93	93	84	84	83	81	80
17	78	82	71	62	68	76	70	92	80	98	A	87	96	89	87	97	106	104	92	91	80	73	82	81
18	82	81	70	72	69	63	75	73	74	71	75	A	84	A	93	97	83	90	91	93	84	80	80	76
19	82	80	70	73	70	66	77	92	100	88	82	79	88	97	98	93	A	92	86	84	80	76	87	93
20	92	94	70	70	80	73	58	91	102	102	92	101	103	101	86	98	A	94	83	94	97	84	71	74
21	74	80	92	70	58	60	76	93	91	96	91	88	88	97	96	100	97	92	95	93	71	82	74	75
22	80	81	80	77	74	70	81	92	93	73	82	77	88	94	96	104	91	96	100	86	78	76	82	82
23	79	81	71	70	70	72	76	82	79	76	A	106	99		77	86	92	88	79	A	A	77	82	81
24	A	79	80	71	58	58	80	98	83	83	83	77	86	88	88	100	104	113	96	78	75	95	A	91
25	81	A	80	72	77	81	104	105	96	94	88	97	108	112	106	102	92	100	97	87	87	97	92	92
26	92	93	87	86	93	86	84	78	76	77	78	N	91	94	A	97	88	97	96	90	87	93	92	92
27	93	94	84	76	72	72	91	100	92	93	91	A	104	96	98	104	101	104	A	105	91	96	100	95
28	100	92	86	92	81	82	99	109	94	106	94	88	95	101	97	89	A	90	98	92	83	86	82	92
29	94	93	84	77	77	81	113	117	100	89	98	98	98	N	98	104	103	102	100	97	93	92	92	93
30	92	97	94	A	73	71	92	105	101	A	96	98	A	A	98	92	90	86	79	79	82	85	88	81
31	93	84	82	76	72	93	101	101	100	100	B	94	106	N	97	89	85	93	A	82	81	82	94	93
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	30	29	29	30	30	30	29	25	16	20	21	17	23	26	25	29	25	28	28	28	28	31
MED	82	81	75	71	70	72	80	91	85	88	87	88	91	96	93	92	88	92	86	86	80	80	82	82
U Q	92	92	81	75	74	77	92	97	94	95	91	95	98	97	97	98	94	96	95	92	83	85	90	92
L Q	78	73	70	66	59	63	74	77	66	76	82	78	87	88	86	82	78	82	79	78	73	73	77	75

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	76	60	61	54	54	48	52	72	69	98	82	88	94	103	72	51	69	57	96	90	58	73	63	50
2	36	73	55	41	32	34	52	60	59	60	67	77	81	G	60	67	70	96	95	91	98	72	126	61
3	50	59	46	28	44	106	86	51	59	120	50	B	48	56	70	G	48	60	51	49	33	33	44	59
4	G	G	G	G	G	G	G	40	47	66	58	59	60	79	62	46	59	102	58	37	32	34	37	38
5	31	34	33	28	25	G	G	52	64	63	91	61	94	72	52	58	58	51	84	57	72	93	96	92
6	49	48	58	38	32	33	45	54	54	67	83	75	103	67	157	152	101	58	54	43	59	59	G	32
7	58	55	56	59	44	33	G	53	49	56	107	G	B	B	G	54	G	G	G	G	26	26	23	72
8	99	50	46	42	27	G	G	G	43	G	51	56	58	G	G	54	54	58	44	32	60	94	69	59
9	44	40	33	38	50	G	43	66	58	70	60	57	G	53	58	G	G	G	G	G	G	31	48	44
10	52	32	36	41	57	32	38	47	53	51	G	53	55	B	B	56	72	49	56	54	31	60	95	40
11	26	26	G	28	34	G	G	43	49	52	58	G	52	G	G	G	44	G	G	G	24	G	G	G
12	30	G .	G	G	G	G	G	G	52	52	128	78	60	60	61	57	66	96	178	148	146	56	61	104
13	138	76	62	32	G	35	42	61	91	88	105	48	79	59	G	G	62	50	41	26	30	32	27	G
14	52	34	41	G	54	34	39	45	48	52	58	54	G		G	43	G	G	61	102	38	50	48	31
15	59	44	34	31	30	38	63	G	55	44	56	50	70	G	59	143	58	75	60	75	55	57	55	77
16	48	51	40	36	29	G	G	44	54	54	59	74	80	103	48	54	73	56	56	32	58	58	50	39
17	25	G	G	G	G	G	45	56	57	94	115	52	54	59	54	68	60	54	59	58	44	23	50	73
18	40	35	99	G	G	G	G	45	51	58	G	64	74	98	55	124	47	45	38	44	39	54	34	50
19	33	32	28	37	G	35	50	65	79	49	82	62	55	52	62	G	109	93	61	65	54	93	104	71
20	60	34	58	50	28	34	49	54	63	54	G	G	G	50	46	54	122	109	59	49	59	58	62	45
21	28	28	24	25	30	G	44	58	41	G	G	G	G	81	G	G	G	G	G	G	46	60	41	54
22	44	34	31	31	37	41	G	G	46	50	52	G	G	59	58	G	70	70	64	60	44	40	48	57
23	64	59	71	47	44	43	42	58	74	44	91	104	77	144	62	57	92	106	94	108	128	88	60	73
24	72	51	41	42	G	G	39	44	57	59	61	97	47	57	46	54	G	50	61	38	76	123	103	76
25	60	85	57	50	35	40	62	56	69	59	61	62	72	52	G	G	51	44	72	53	58	48	58	58
26	61	78	58	58	37	G	G	57	55	63	73	81	91	63	110	62	91	120	73	99	108	68	59	59
27	43	30	37	32	32	G	60	84	74	79	62	110	95	62	77	62	57	92	108	105	92	59	56	52
28	44	48	G	G	G	G	38	50	49	61	69	55	87	69	52	62	128	95	67	43	29	24	58	83
29	51	50	39	G	31	38	50	53	52	58	50	55	61	62	53	52	94	55	44	54	34	73	57	88
30	73	60	61	74	G	G	52	62	59	115	56	60	91	112	62	84	56	50	48	46	105	76	73	54
31	61	G	58	G	24	G	G	48	46	58	B	58	G	62	60	57	49	56	99	58	49	61	72	59
	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	30	30	28	30	31	31	31	31	31	31	31	31	31
MED	50	44	41	32	30	G	42	53	55	58	60	58	60	61	56	54	59	56	59	53	54	58	57	58
U Q	61	59	58	42	37	35	50	58	63	67	82	75	81	75	62	62	73	93	73	75	72	73	69	73
L Q	36	32	31	G	G	G	G	44	49	52	52	52	48	52	46	G	48	49	44	37	33	34	44	44

HOURLY VALUES OF FMIN AT KOKUBUNJI

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	15	14	14	16	18	20	30	40	34	52	62	44	38	33	22	18	18	18	16	15	15	15
2	14	14	16	14	14	18	21	20	21	32	38	34	43	46	42	33	34	20	21	15	15	14	14	15
3	15	14	14	14	16	17	21	26	33	35	38	B	81	36	42	71	21	18	17	15	14	16	15	15
4	15	15	16	16	16	32	21	18	26	32	33	34	43	43	42	28	27	21	18	15	15	15	15	15
5	15	15	15	14	16	16	18	18	23	26	35	38	35	38	34	32	22	18	29	15	16	15	14	14
6	15	15	14	14	14	16	18	18	29	40	38	43	44	43	34	32	21	15	16	16	15	16	16	14
7	15	14	14	15	14	14	21	21	23	35	32	64	B	B	81	39	27	20	23	21	16	17	15	15
8	15	14	15	15	14	24	18	21	20	27	35	35	39	38		26	21	20	17	15	16	15	15	15
9	15	14	15	15	15	18	18	21	22	32	33	36	37	32	30	28	20	18	17	18	15	15	15	14
10	15	14	14	14	14	15	18	20	21	24	28	34	41	B	B	36	21	17	16	15	14	14	15	15
11	14	14	14	16	14	24	18	21	33	35	32	43	38	44	34	39	29	21	18	20	15	15	15	18
12	15	15	15	16	14	22	17	20	27	24	33	38	39	34	33	30	22	16	17	15	15	15	15	14
13	15	15	15	15	15	16	18	20	23	32	33	37	36	34	33	27	21	18	17	14	14	14	16	15
14	15	14	15		14	15	16	18	20	22	27	34	35		34	21	20	18	17	14	14	15	15	15
15	15	15	15	15	14	16	22	18	21	34	29	35	34	33	29	26	20	18	20	15	15	15	14	15
16	16	14	15	14	15	16	18	17	20	33	34	33	35	36	39	24	21	21	18	15	16	15	15	15
17	15	14	16	14	15	22	16	18	21	24	33	34	35	38	32	23	35	17	15	15	15	16	15	15
18	14	15	15	15	14	22	17	26	29	29	49	40	39	37	34	30	22	17	18	15	15	14	15	15
19	15	16	15	14	16	17	17	17	30	39	30	33	33	44	41	49	23	18	17	18	16	15	15	14
20	15	15	14	14	14	15	16	17	21	22	43	86	50	45	42	39	22	17	17	15	16	14	15	14
21	15	15	15	14	17	23	20	16	18	30	52	34	35	34	42	27	21	22	22	18	15	14	14	15
22	15	15	15	15	14	16	20	20	28	34	34	33	34	41	34	42	21	18	20	15	15	14	14	15
23	15	15	14	14	14	17	18	20	27	33	33	38	35	35	33	32	22	21	21	16	15	15	14	15
24	16	14	15	15	14	16	18	18	23	27	38	39	42	42	50	36	24	18	17	15	16	16	16	15
25	15	14	14	14	15	16	18	21	24	26	35	34	34	33	22	20	18	18	18	15	16	15	15	14
26	15	14	15	14	15	21	18	18	23	26	36	38	36	39	34	32	22	16	16	15	16	15	15	15
27	14	15	15	14	15	17	18	22	26	34	35	33	36	34	33	28	21	17	20	16	15	15	15	15
28	15	14	15	16	15	23	16	20	20	24	27	30	28	33	33	29	20	16	16	15	15	16	15	16
29	15	15	14	15	14	15	17	20	24	26	32	34	34	39	34	33	23	17	17	15	15	15	14	15
30	16	16	16	14	14	21	18	22	26	23	33	39	35	34	29	22	21	16	15	14	15	15	15	14
31	16	15	15	14	14	21	20	20	21	30	B	33	35	35	29	28	18	17	21	16	15	16	17	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	31	31	31	30	30	30	28	29	31	31	31	31	31	31	31	31	31
MED	15	15	15	14	14	17	18	20	23	30	34	35	36	38	34	30	21	18	17	15	15	15	15	15
U Q	15	15	15	15	15	22	20	21	27	34	36	39	41	42	41	36	23	20	20	16	16	15	15	15
L Q	15	14	14	14	14	16	17	18	21	26	32	34	35	34	33	27	21	17	17	15	15	15	15	14

HOURLY VALUES OF FOF2 AT YAMAGAWA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	78	85	88	101	96	87	87	105	88	A	A	A	A	96	95	A	A	97	97	86	78	76	80	76
2	86	87	84	77	78	76	86	86	79	75	A	A	A	83	A	85	80	79	79	80	81	67	72	74
3	A	78	66	66	60	62	65	A	A	A	A	A	A	A	A	A	106	70	69	64	62	A	42	72
4	66	66	62	59	60	62	80	82	72	71	A	55	62	A	A	87	87	A		78	73	77	78	84
5	75	85	88	68	71	75	87	94	81	76	77	81	86	88	87	90	87	86	85	82	71	69	A	86
6	89	87	83	80	77	76	82	97	84	81	A	87	A		A	96	92	87	86	86	80	83	88	86
7	99	86	92	86	83	84	85	90	86	85	A	A		97	95	96	90	92	86	82	72	77	82	77
8	77	81	78	78	76	77	87	87	77	80	85	85	86	86	92	94	91	98	103	101	85	81	86	84
9	86	85	87	76	66	46	34	A	A	A	A	67	61	77	79	86	88	85	85	91	88	N	85	87
10	75	76	65	70	53	41	54	48	51	52			A	A	45		A	56	64	63	61	A	66	64
11	65	65	66	60	61	64	72	78	74	67	73	84	88	88	85	85	90	94	103	101	78	78	81	86
12	80	85	85	79	77	83	86	77	73	75	84	91	95	90	86	97	103	106	95	85	75	66	66	79
13	76	77	73	76	68	68	83	68	68	50					A	70	67	64	A	63	76	70	64	80
14	51	58	60	53	66	51	54	55	47	A	A	A	A	B	67	61	51	56	61	64	72	N	55	60
15	A	54	65	68	68	52	52	60	49	56	81	80	80	91	91	82	86	91	81	86	82	74	A	78
16	87	84	80	80	73	76	66	77	90	90	85	90	95	112	115	111	112	106	106	108	97	85	90	87
17	85	86	84	77	68	65	73	101	77	A	77	85	106	104	93									
18										80	78	76	82	90	95	97	97	103	A	96	A	73	79	78
19	84	87	86	82	71	74	86	86	88	80	75	77	87	95	108	95	100	105	105	92	78	77	79	82
20	86	81	75	78	78	67	60	72	107	94	101	B	94	102	102	98	112	102	105	A	101	79	76	82
21	77	77	54	86	64	55	66	80	87	90	91	91	94	108	111	111	112	108	112	110	87	80	80	82
22	85	86	86	82	72	76	76	86	88	78	73	84	94	101	105	108	105	99	104	97	90	78	86	86
23	82	82	84	81	78	76	78	85	88	87	88	A	88	102	100	103	101	92	86	82	75	75	85	82
24	86	90	92	78	74	66	73	87	82	91	88	86	90	95	101	113	126	114	103	90	87	86	83	86
25	86	86	85	85	86	84	85	96	87	85	86	94	106	111	110	109	108	104	104	90	90	90	88	87
26	87	87	A	84	85	78	86	85	A	A	A	89	104	102	115	111	108	109	111	105	84	80	86	87
27	85	88	85	86	66	65	78	90	86	86	A	93	A	A	115	112	110	110	111	105	91	87	87	87
28	101	98	87	81	77	84	102	102	96	97	93	98	106	111	101	102	105	107	107	87	82	86	89	88
29	85	86	78	80	79	84	98	110	90	N	A	100	94	118	105	105	103	114	108	101	90	85	90	100
30	86	87	97	86	86	81	88	111	88	95	97	97	102	110	107	107	95	92	91	84	80	77	89	85
31	83	84	87	78	77	82	85	92	100	93	80	92	102	100	100	101	107	105	96	87	87	89	87	102
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	29	30	30	30	30	28	27	24	18	22	22	24	26	27	28	29	27	29	29	26	28	30
MED	85	85	84	78	74	76	81	86	86	80	84	86	94	98	100	97	100	98	97	87	81	78	82	84
U Q	86	87	87	82	78	81	86	95	88	90	88	92	102	106	107	108	107	106	105	99	87	85	87	87
L Q	77	78	69	76	66	64	66	77	74	75	77	81	86	90	91	87	89	86	85	82	75	75	77	78

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	24	39	24	G	G	73	82	87	96	148	G	G	99	112	72	54	79	58	32	36	150
2	92	74	25	31	26	27	G	77	70	84	77	86	88	84	97	63	60	68	53	43	94	G	G	91
3	91	30	40	37	44	36	65	73	94	84	84	85	91	127	96	71	120	55	58	67	58	48	28	38
4	72	24	27	G	G	G	G	G	G	62	72	61	66	97	101	63	48	149	160	111	82	33	32	24
5	G	G	G	G	27	34	G	48	61	70	58	G	G	52	G	64	99	G	68	32	58	G	84	34
6	91	26	34	48	44	56	58	60	82	75	163	84	107	155	114	91	94	112	52	G	57	81	40	41
7	69	52	58	70	70	28	G	G	48	77	107	86	G	G	60	G	58	G	54	61	52	39	G	G
8	G	45	31	26	24	G	G	G	43	G	50	G	G	65	G	G	62	52	44	44	25	G	G	G
9	57	59	34	37	G	29	G	50	89	112	147	58	58	G	G	G	G	G	G	G	G	G	G	30
10	66	79	40	70	38	31	34	42	41	50	G		67	58	54	G	51	46	46	44	56	44	46	57
11	41	28	29	G	24	G	G	G	48	58	57	62	G	G	48	G	G	73	72	58	72	32	32	30
12	58	45	29	G	G	G	G	G	G	50	83	65	55	92	76	G	64	52	62	54	54	85	39	40
13	G	G	G	G	G	G	32	40	G	G	G	G			53	G	G	60	78	29	G	G	G	24
14	28	142	59	30	G	34	32	44	56	66	63	55	47	B	G	G	52	45	54	45	39	65	38	44
15	44	57	29	G	41	28	35	45	45	G	G	G	50	52	G	46	G	74	105	31	68	38	40	57
16	35	59	50	40	32	28	32	42	50	65	67	67	69	94	G	G	G	56	78	50	53	G	32	28
17	26	G	G	G	24	G	G	40	G	74	68	75	79	66	62									
18										51	56	77	64	89	87	133	52	94	124	88	92	70	49	44
19	25	35	27	28	G	G	32	36	60	66	G	G	48	52	G	56	56	71	56	40	28	68	90	72
20	58	92	71	71	91	35	31	38	G	G	G	B	G	G	49	G	55	G	58	92	65	28	29	30
21	G	G	G	G	G	28	39	G	46	62	85	94	89	74	54	63	G	67	67	50	58	31	38	92
22	44	40	36	32	46	36	56	92	60	71	62	60	G	G	G	G	61	56	60	54	39	33	40	69
23	58	38	94	83	63	57	35	58	58	63	71	147	60	51	73	49	93	62	62	58	G	40	38	37
24	124	84	71	32	G	G	G	46	46	43	G	G	G	75	74	G	53	86	80	38	34	28	30	29
25	34	60	G	G	48	G	G	41	46	G	G	G	G	49	48	G	G	G	34	34	G	32	36	G
26	G	G	94	59	51	48	40	54	92	92	112	97	104	77	61	95	70	77	68	44	G	28	40	33
27	24	31	30	G	40	G	G	51	66	72	123	79	106	118	82	86	53	59	46	39	30	32	G	G
28	G	G	G	G	36	24	G	35	45	44	G	G	G	G	G	53	55	42	84	84	48	G	G	31
29	26	28	32	31	29	23	36	62	92	126	116	70	64	93	74	G	G	56	92	50	52	65	61	57
30	72	38	35	31	33	58	59	79	47	70	49	67	62	54	47	50	61	52	48	40	37	27	162	54
31	46	40	40	29	G	G	40	41	40	45	G	55	76	G	62	85	76	50	45	60	32	32	55	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	30	30	30	30	30	30	30	30	30	31	31	29	30	29	31	30	30	30	30	30	30	30	30	30
MED	42	38	32	30	30	28	32	42	48	65	63	65	61	58	54	48	55	56	59	48	52	32	37	38
U Q	66	59	40	37	44	34	36	54	66	75	85	84	79	90	74	64	64	72	78	60	58	44	40	57
L Q	24	24	25	G	G	G	G	35	43	45	G	G	G	G	G	G	G	46	52	39	30	27	28	29

HOURLY VALUES OF FMIN AT YAMAGAWA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	15	15	15	15	15	18	16	36	41	44	54	59	101	N	39	34	22	16	15	15	15	16	15
2	15	15	15	15	15	16	16	24	23	34	44	44	44	44	44	45	39	24	20	16	15	16	16	16
3	15	15	15	15	15	15	18	23	35	42	45	45	48	49	46	44	39	23	16	16	15	15	16	15
4	15	16	16	16	15	15	16	17	35	35	39	45	45	48	45	44	39	30	17	15	15	15	15	16
5	16	16	15	15	15	15	16	16	23	38	36	48			50	47	42	46	36	15	15	16	15	15
6	15	15	15	15	16	15	16	18	28	42	43	44	45	45	44	52	38	23	17	17	15	15	15	15
7	15	15	15	15	15	15	16	18	27	39	42	62	111	101	49	71	44	36	21	15	15	15	16	16
8	15	15	15	16	15	15	16	20	23	34	46		54	42			39	34	17	15	15	15	15	15
9	15	15	15	15	16	15	17	18	24	34	35		39			47	44	21	18	15	15	15	15	15
10	15	15	15	15	15	15	16	17	23	35			45	43	43	43	37	24	17	15	15	15	15	15
11	15	15	15	15	15	15	26	22	35	36	42	42	58	59	44	55	44	34	28	15	15	15	15	15
12	16	15	16	15	15	15	26	33	45	35	38	38	43	38	35	61	38	23	16	15	15	15	15	15
13	15	15	16	15	15	15	16	21	26						38		32	24	20	15	16	15		15
14	15	15	15	15	15	16	15	16	26	36	38	38	40	B	91	66	38	27	15	15	15	15	15	15
15	15	16	15	15	15	15	16	16	32	38	49	58	44	43	56	46	39	33	20	15	15	15	15	15
16	15	15	15	16	15	15	16	17	33	35	36	38	40	38	54	43	40	26	17	15	15	16	15	15
17	16	17	16	17	15	15	23	20	36	33	38	36	36	38	38									
18										42	42	34	41	42	45	35	36	22	17	15	15	15	15	16
19	15	15	15	15	16	15	16	17	32	32	47	53	38	36	58	40	38	22	16	15	17	15	15	15
20	15	15	15	15	15	15	15	20	26	39	36	B	54	55	51	54	36	23	20	16	15	15	15	15
21	15	15	16	15	15	15	16	17	23	27	40	40	43	39	44	42	45	23	20	15	15	15	15	15
22	15	15	15	15	16	16	17	20	24	36	36	38	57	38	54	46	39	34	20	18	15	15	15	15
23	15	15	15	15	16	15	16	22	24	37	38	38	39	38	38	35	38	24	26	15	16	16	15	16
24	15	15	15	16	15	15	16	17	23	34	45	48		46	44	46	38	23	16	16	15	16	15	16
25	16	16	15	15	15	15	23	23	24	41	34		35	34	32	43	39	16	16	15	16	15	16	15
26	15	18	15	15	15	15	16	17	22	38	36	42	44	44	44	41	36	24	17	15	15	15	15	15
27	15	16	16	16	15	15	16	17	34	33	39	39	44	50	38	38	33	24	16	15	15	15	15	15
28	15	15	15	15	15	15	15	17	24	30	35	44	63	62	45	35	36	23	16	15	15	15	15	16
29	16	15	15	15	15	15	16	17	23	29	34	35	40	42	36	45	44	24	16	16	15	15	15	15
30	15	15	15	15	15	15	16	17	23	30	34	39	39	39	35	32	26	20	15	15	15	15	15	15
31	15	15	15	15	15	15	16	21	23	34	N	38	41	50	43	44	39	34	24	16	15	15	15	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	30	30	30	30	30	30	30	30	30	30	28	25	28	27	28	28	30	30	30	30	30	30	29	30
MED	15	15	15	15	15	15	16	18	25	35	38	42	44	43	44	44	38	24	17	15	15	15	15	15
U Q	15	15	15	15	15	15	17	21	33	38	43	46	51	50	49	47	39	30	20	16	15	15	15	16
L Q	15	15	15	15	15	15	16	17	23	34	36	38	40	38	38	40	36	23	16	15	15	15	15	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

JUL. 1991

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

DAY \ HR	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	84	125	110	110	111	109	110	108	90	77	71	94	99	106	112	106	110	127	111	108	91	77	85	81
2	85	86	80	85	81	66	84	87	78	80	A	88	95	A	91	89	101	101	89	87	87	78	75	77
3	A	A	A	67	59	60	62	66	A	A	A	A	A	A	A	N	81	85	84	64	66	34	62	A
4	68	62	63	52	63	62	76	81	75	85	87	80	72	95	102	104	136	101	89	85	84	85	101	85
5	86	86	110	87	78	73	86	90	81	79	77	72	101	101	94	100	90	105	105	87	81	86	86	87
6	87	90	84	80	76	72	83	90	81	78	80	89	102	104	105	105	104	107	111	105	88	102	109	90
7	145	142	110	86	86	86	88	88	81	73	86	90	92	104	105	106	105	118	110	86	82	77	84	81
8	84	79	76	76	74	77	86	84	76	80	85	87	90	88	96	95	95	111	106	103	87	87	90	88
9	86	87	86	76	54	32	A	42	A	58	58	A	A	85	95	98	105	104	85	105	104	86	90	86
10	86	82	76	66	72	A	A	51	A	60	A	A	46	53	57	64	56	74	77	73	62	35	A	39
11	A	53	A	60	60	54	62	76	75	77	84	90	101	106	101	108	112	112	110	108	90	84	87	87
12	88	108	79	86	85	78	74	73	74	82	90	95	94	A	106	112	128	122	103	86	87	A	62	74
13	77	62	71	75	54	66	66	72	74	71	52	A	A	51	61	80	75	65	62	65	78	70	62	64
14	67	A	55	23	42	32	54	76	48	67	58		61	A	82	86	72	70	77	87	A		51	54
15	56	62	A	63	66	43	55	56	52	66	78	81	84	90	91	95	103	95	102	82	29	65	77	77
16	71	74	64	72	67	18	55	76	87	77	81	85	106	126	147	142	146	144	147	146	131	124	144	127
17	130	127	108	87	82	74	80	100	70	72	76	87	111	109	106	118	146	128	110	107	105	87	77	78
18	78	80	78	66	67	67	80	90	85	82	81	A	90	103	101	105	120	111	108	87	87	86	90	85
19	87	87	87	86	86	85	86	88	88	85	76	84	91	102	105	111	111	112	104	88	81	68	77	74
20	78	81	65	67	73	62	61	66	105	83	91	92	106	100	111	113	120	122	111	121	110	82	80	77
21	79	80	85	85	35	54	66	78	87	88	88	91	108	123	129	125	123	118	110	120	66	86	85	86
22	87	87	94	88	75	73	80	90	86	82	A	97	105	112	120	119	122	111	111	111	104	106	85	89
23	85	80	87	86	79	69	73	78	86	90		95	106	122	127	121	111	105	111	105	87	86	86	86
24	86	109	86	87	74	67	66	66	88	82	102	102	96	101	112	126	138	128	121	105	92	104	89	104
25	88	89	103	103	86	84	84	87	96	85	88	101	117	123	126	129	137	130	138	127	123	110	94	104
26	110	125	104	87	86	86	82	87	86	78	81	95	111	115	121	129	126	133	136	105	85	87	84	88
27	105	124	110	87	86	80	85	105	88	A	91	104	103	120	138	139	141	128	131					
28																								
29																								
30																								
31																				87	88	87	115	N
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	24	27	27	26	25	27	24	25	22	21	24	23	26	26	27	27	27	27	26	25	26	25
MED	86	86	86	85	74	68	80	81	83	79	81	90	100	104	105	107	111	111	110	103	87	86	85	85
U Q	87	108	103	87	85	78	84	90	87	82	88	95	106	115	120	121	128	127	111	108	92	87	90	88
L Q	78	79	76	67	63	60	64	72	75	72	76	86	90	95	95	98	101	101	89	86	81	77	77	77

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	40	41	51	52	G	G	G	G	57	50	49	105	145	92	38	24	G
2	G	90	58	30	31	26	G	40	48	53	84	86	90	98	69	75	44	70	37	32	G	G	G	33
3	114	92	116	58	G	G	34	69	85	74	84	89	132	115	88	90	72	56	51	44	58	58	33	81
4	39	40	34	33	25	G	G	39	49	79	65	56	G	64	91	82	148	89	38	32	28	33	32	G
5	G	G	G	G	G	G	33	36	43	48	55	63	65	74	61	G	54	55	41	58	39	32	29	G
6	82	33	58	25	40	24	32	44	58	80	82	66	G	56	88	G	52	60	43	39	40	32	29	58
7	38	30	25	24	G	24	30	38	68	83	67	84	G	G	86	76	72	52	49	60	32	34	34	23
8	G	G	G	G	G	G	G	40	N	47	61	57	G	48	G	56	56	51	47	40	45	48	48	39
9	39	24	38	30	G	28	48	39	48	58	65	182	125	78	52	G	60	G	G	G	G	G	G	34
10	24	34	29	44	45	58	58	44	76	53	55	56	55	54	54	58	54	48	48	43	41	26	60	38
11	58	40	70	51	40	38	G	39	48	78	67	72	63	G	G	G	G	46	43	60	G	26	29	30
12	33	33	26	G	G	G	33	G	G	G	G	83	86	137	G	48	50	54	58	40	31	40	25	34
13	37	24	G	G	G	G	G	40	60	70	64	50	66	G	51	G	47	48	42	38	57	38	30	38
14	33	60	49	33	34	G	32	59	45	G	G	G	66	72	62	46	G	G	107	86	80	152	58	34
15	49	45	71	85	24	G	32	39	G	G	51	54	58	51	61	56	43	65	50	88	31	59	59	29
16	26	G	G	G	G	24	29	42	44	67	64	62	57	53	G	60	125	72	51	66	26	29	32	34
17	23	G	G	G	G	G	G	G	G	42	51	58	82	59	55	46	58	69	81	71	40	34	34	31
18	G	34	84	51	42	49	34	47	48	60	78	80	125	61	70	81	G	G	38	36	39	31	32	28
19	G	G	G	G	G	G	31	42	G	G	58	47	56	64	61	63	59	110	61	58	36	34	33	28
20	72	86	59	59	57	44	34	50	44	46	47	G	G	66	52	G	44	53	48	61	44	33	G	36
21	38	35	47	54	39	36	30	40	43	G	G	G	G	G	G	G	44	85	136	60	80	58	42	69
22	41	34	34	G	G	G	G	58	43	67	93	81	G	56	60	58	44	48	53	61	41	36	37	41
23	49	33	41	30	37	44	49	37	61	59		85	64	54	G	53	58	61	61	51	38	38	40	30
24	G	G	G	43	69	24	32	68	126	108	111	63	57	59	G	G	50	51	50	40	92	65	41	39
25	30	25	G	G	G	G	30	G	G	43	46	89	G	50	52	52	G	52	58	47	38	G	28	G
26	G	G	G	G	G	G	29	40	47	G	92	91	101	77	71	90	96	57	61	162	84	49	32	32
27	26	G	G	G	G	G	34	50	65	87	86	55	61	88	77	54	58	43	G					
28																								
29																								
30																								
31																				58	68	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	27	27	27	27	27	27	26	27	26	27	27	27	27	27	27	27	27	27	27	27	27	27
MED	33	33	29	25	G	G	31	40	48	53	64	63	58	59	55	54	52	53	50	58	40	34	32	33
U Q	41	40	58	44	39	28	34	47	60	74	82	84	82	74	70	63	59	65	61	61	58	48	40	38
L Q	G	G	G	G	G	G	G	39	43	42	51	54	G	50	G	G	44	48	42	40	31	29	28	28

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

JUL. 1991

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	15	15	15	15	23	15	26	24	35	101	72	70	52	33	29	18	16	18	14	15	16	15
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30																								
31																				21	15	15	15	17
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U Q	16	15	15	15	15	15	20	18	23	28	30	36	44	46	42	33	29	24	18	17	15	15	15	16
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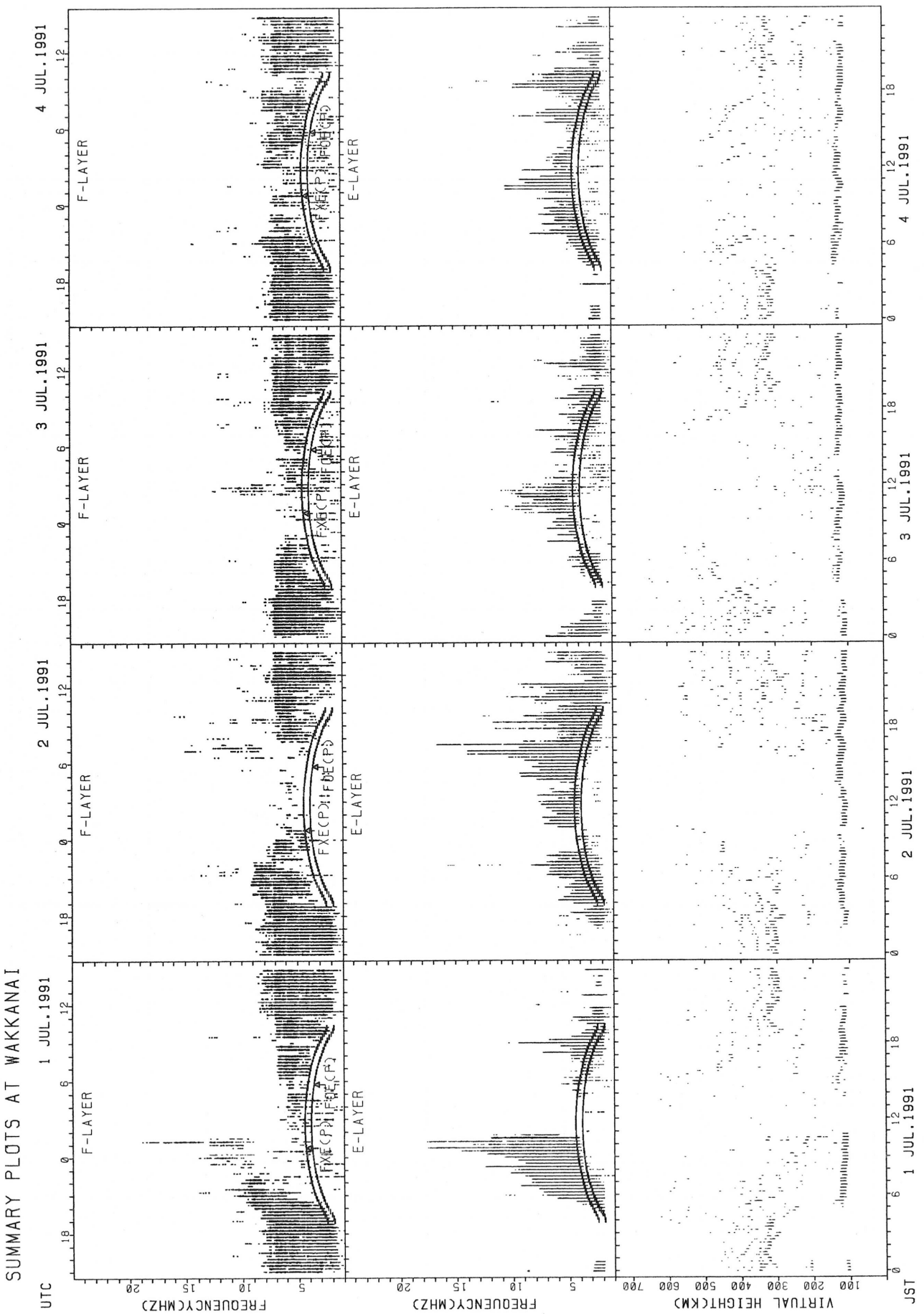
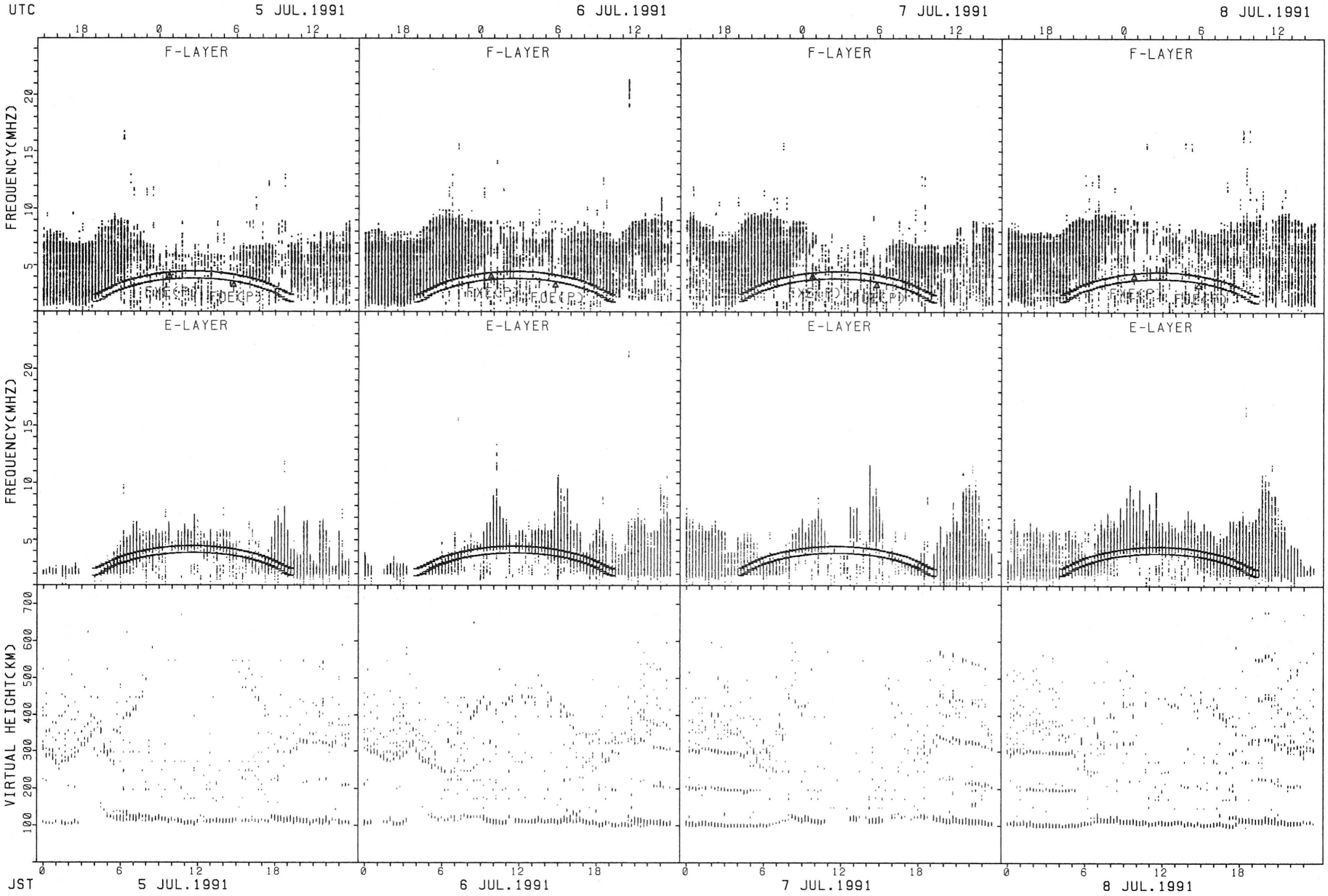

SUMMARY PLOTS AT WAKKANAI
1 JUL.1991
2 JUL.1991
3 JUL.1991
4 JUL.1991
UTC
JST
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



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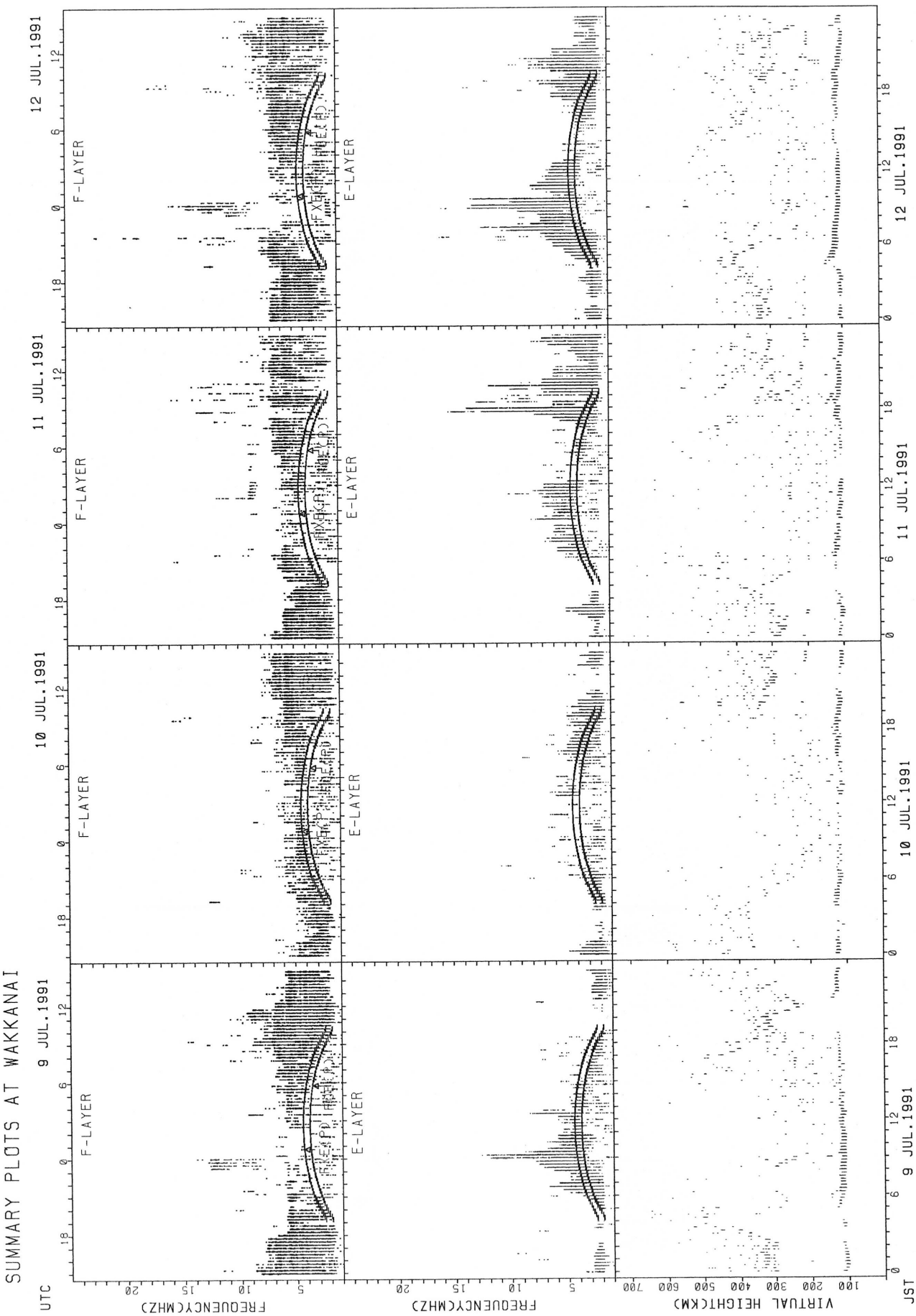
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
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F-LAYER
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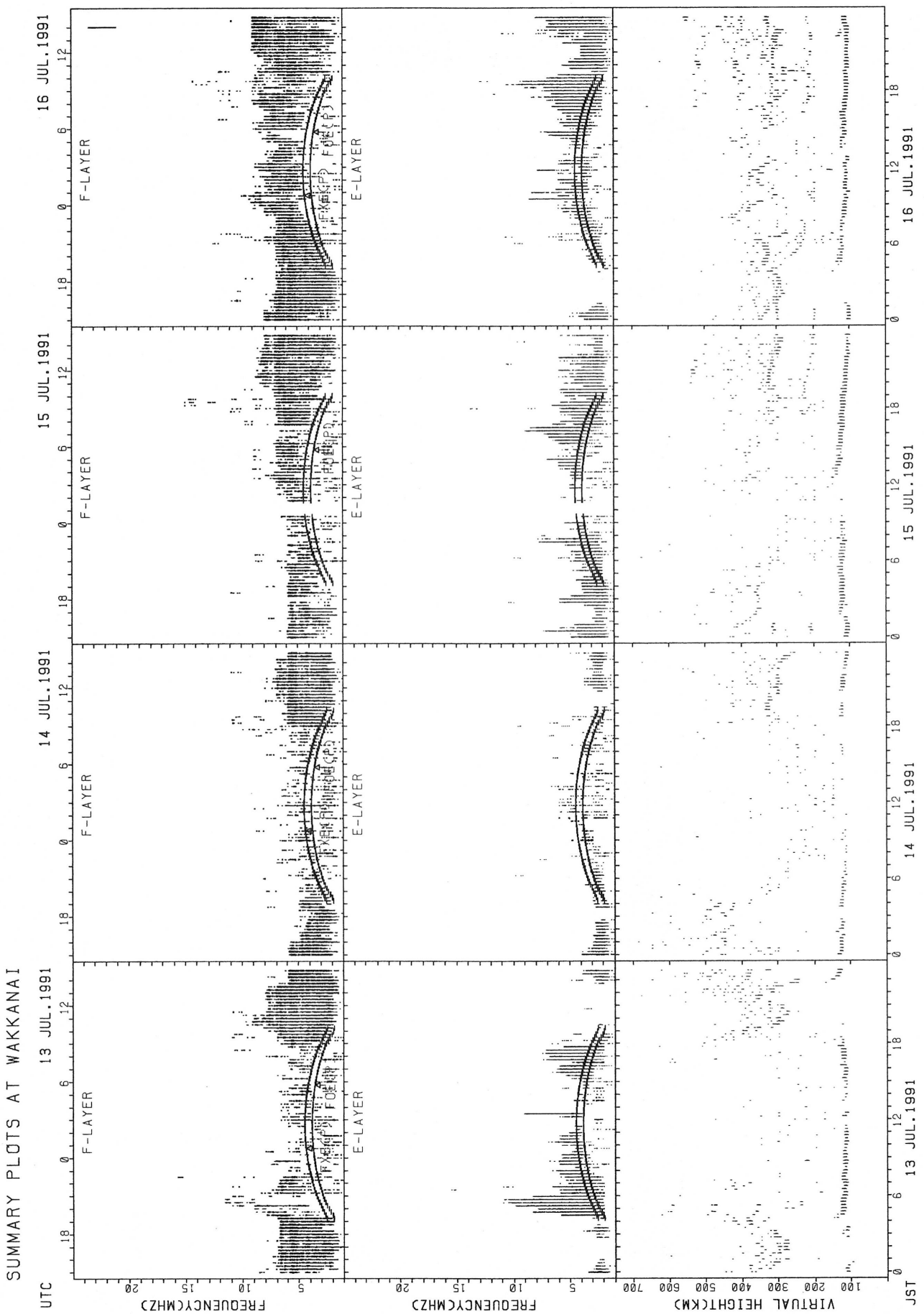
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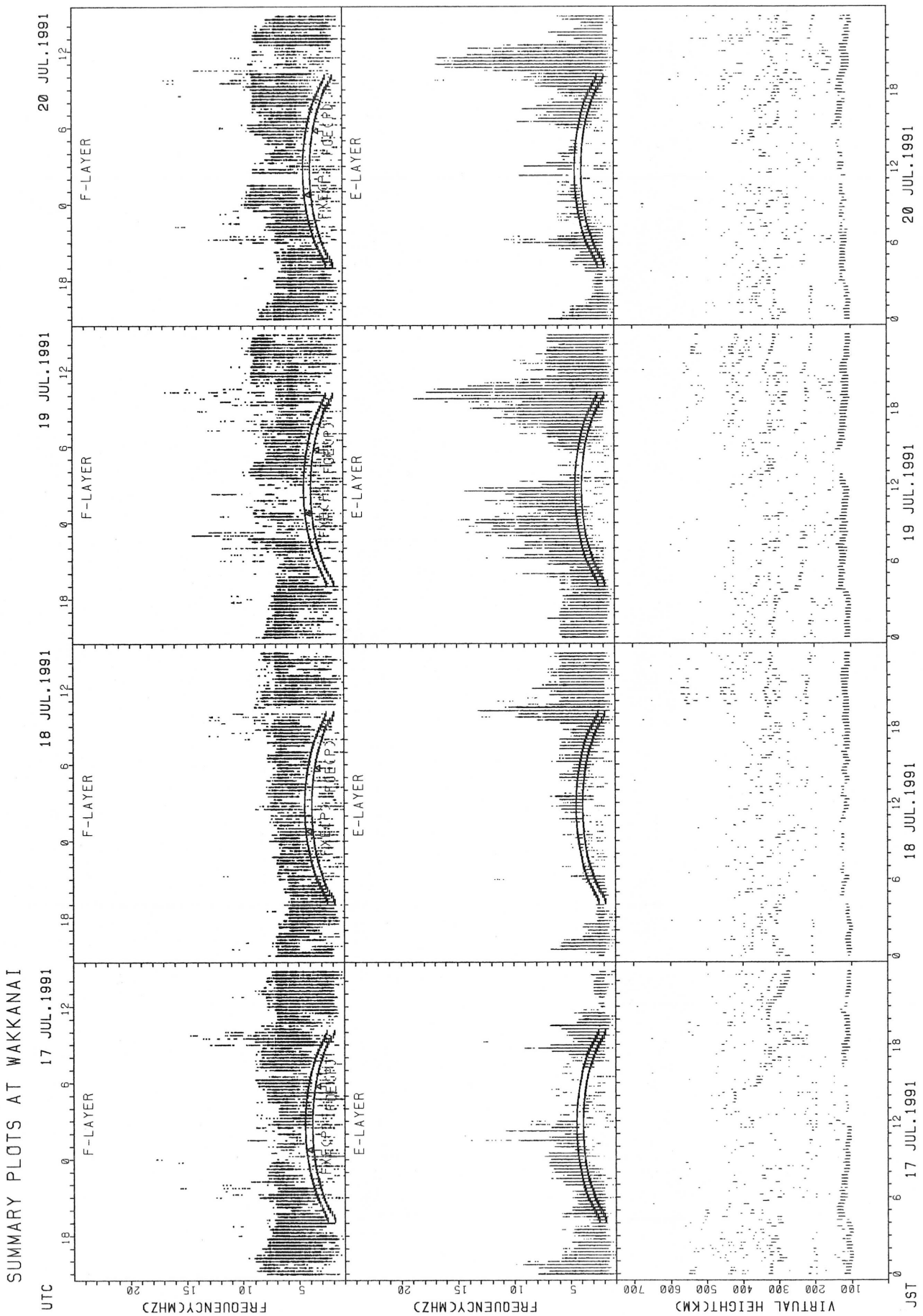
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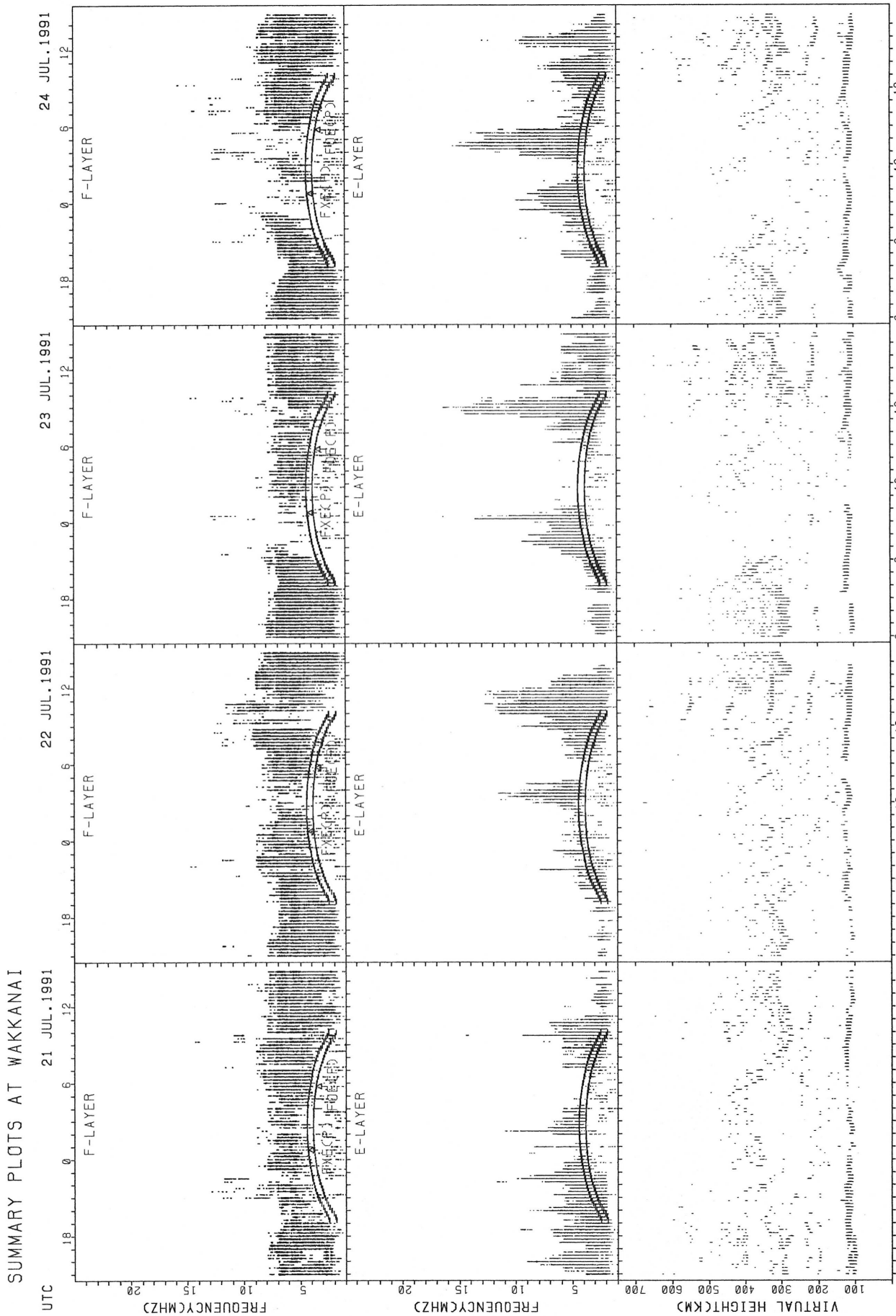
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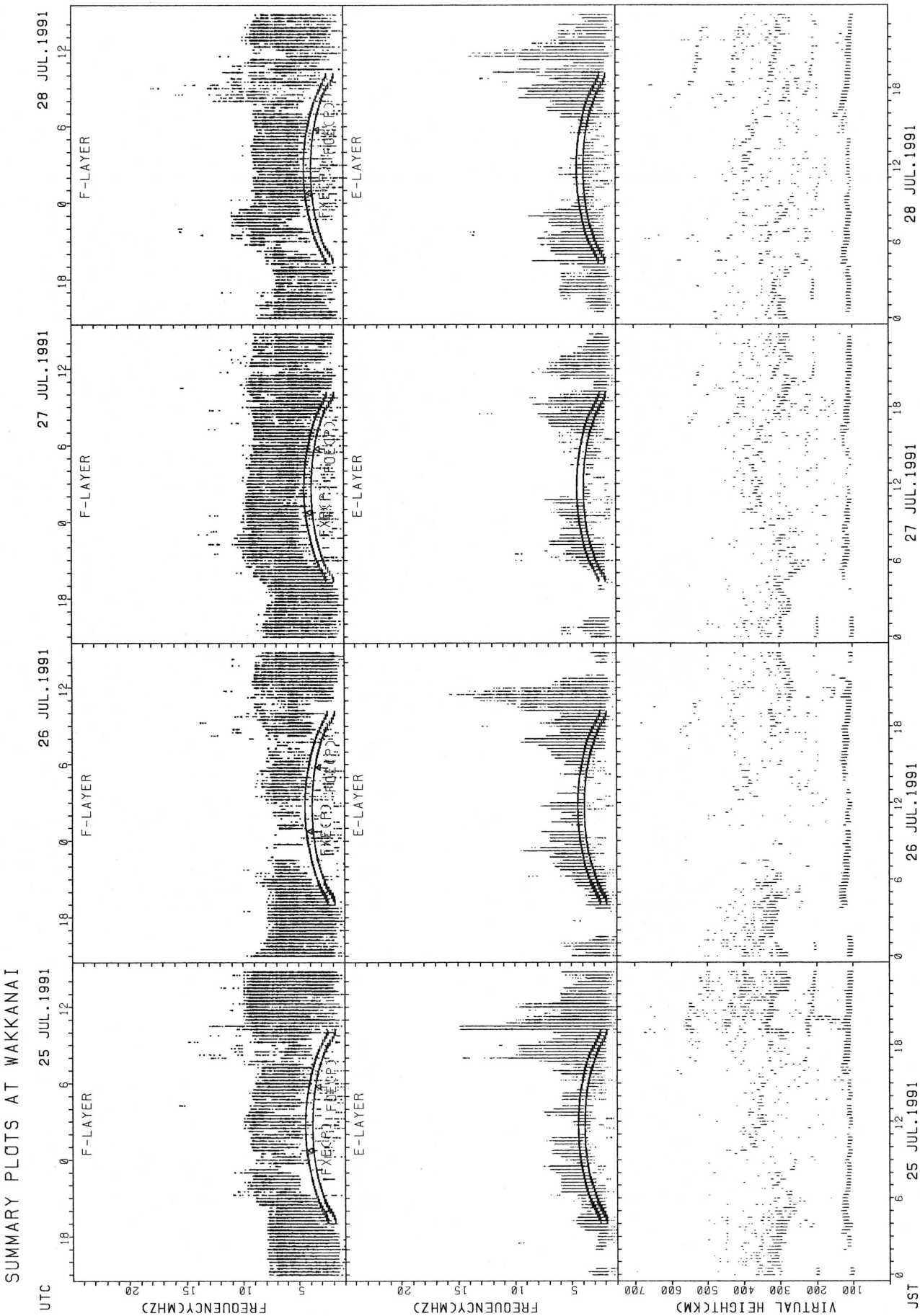
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VIRTUAL HEIGHT(KM)
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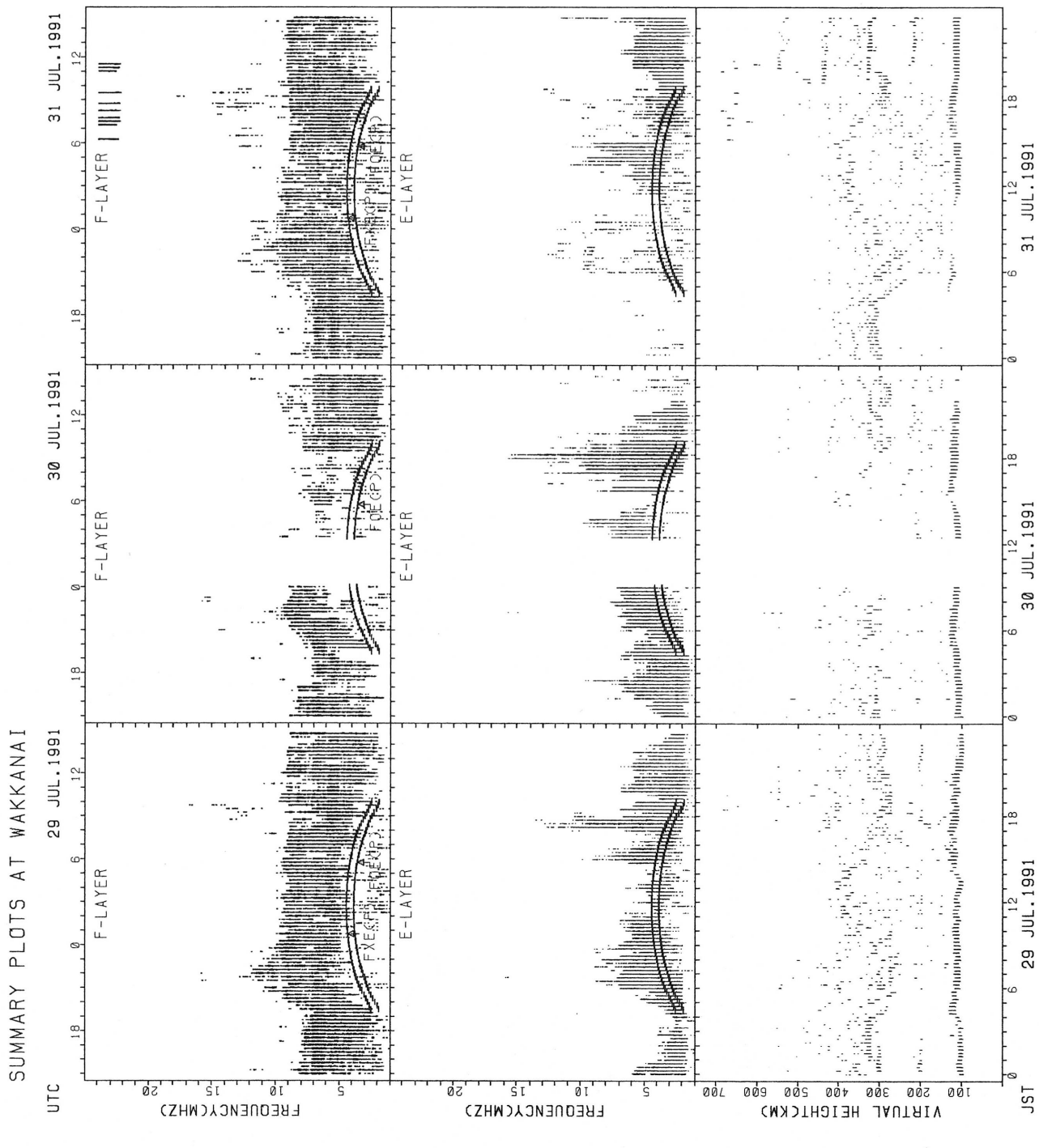
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FOE(P)
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VIRTUAL HEIGHT(KM)
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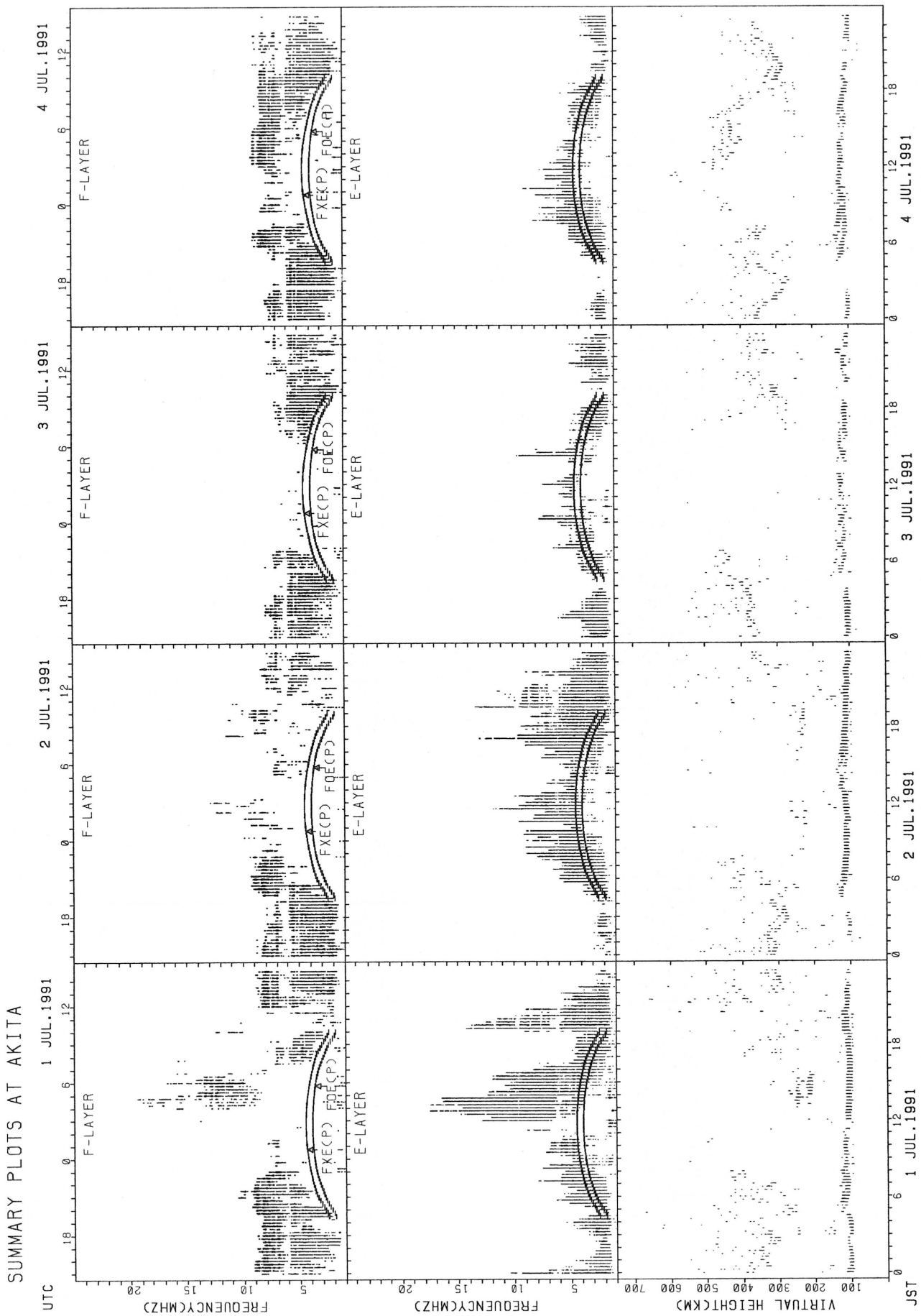
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F-LAYER
E-LAYER
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FOE(P)
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VIRTUAL HEIGHT(KM)
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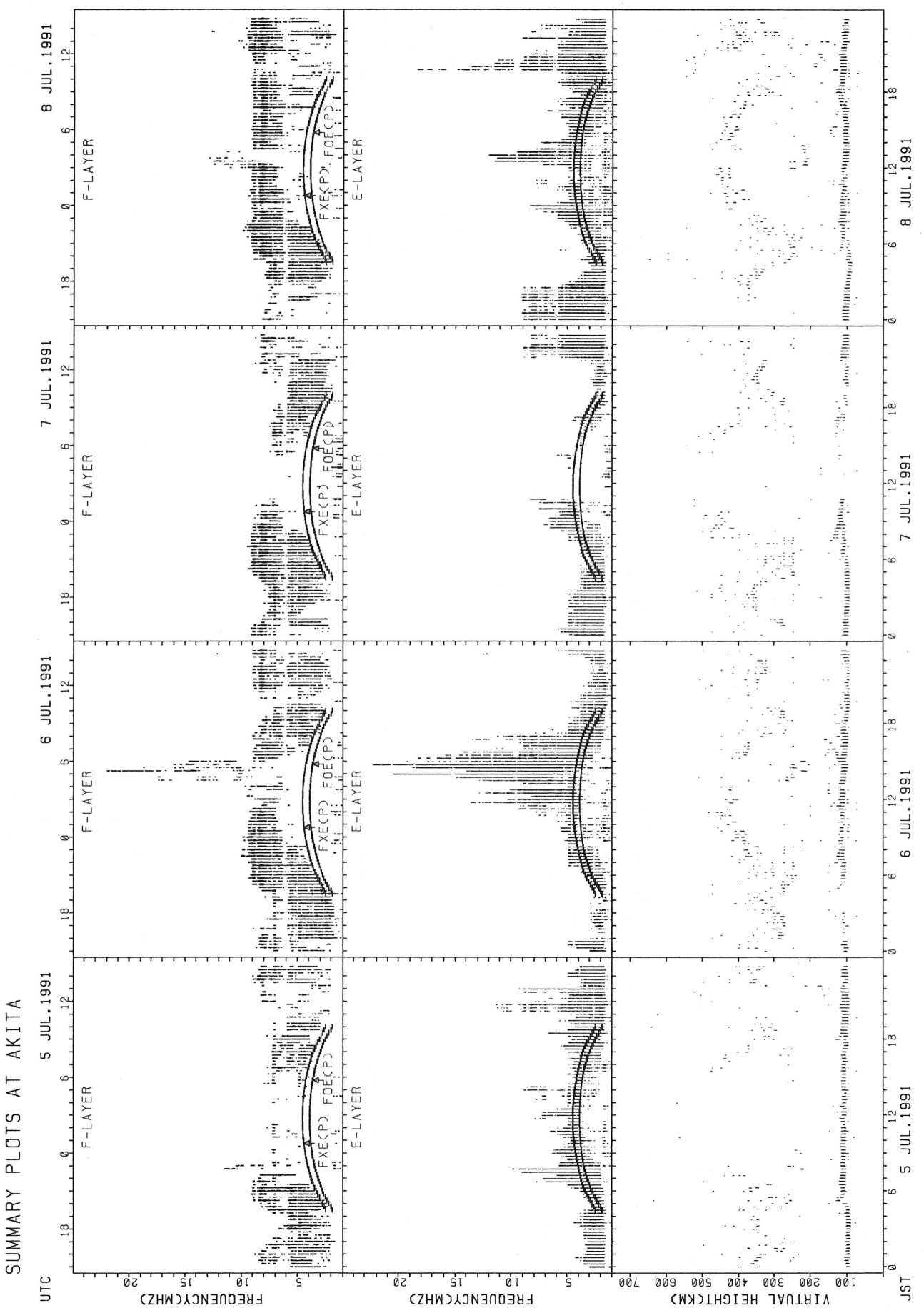
SUMMARY PLOTS AT AKITA
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VIRTUAL HEIGHT(KM)
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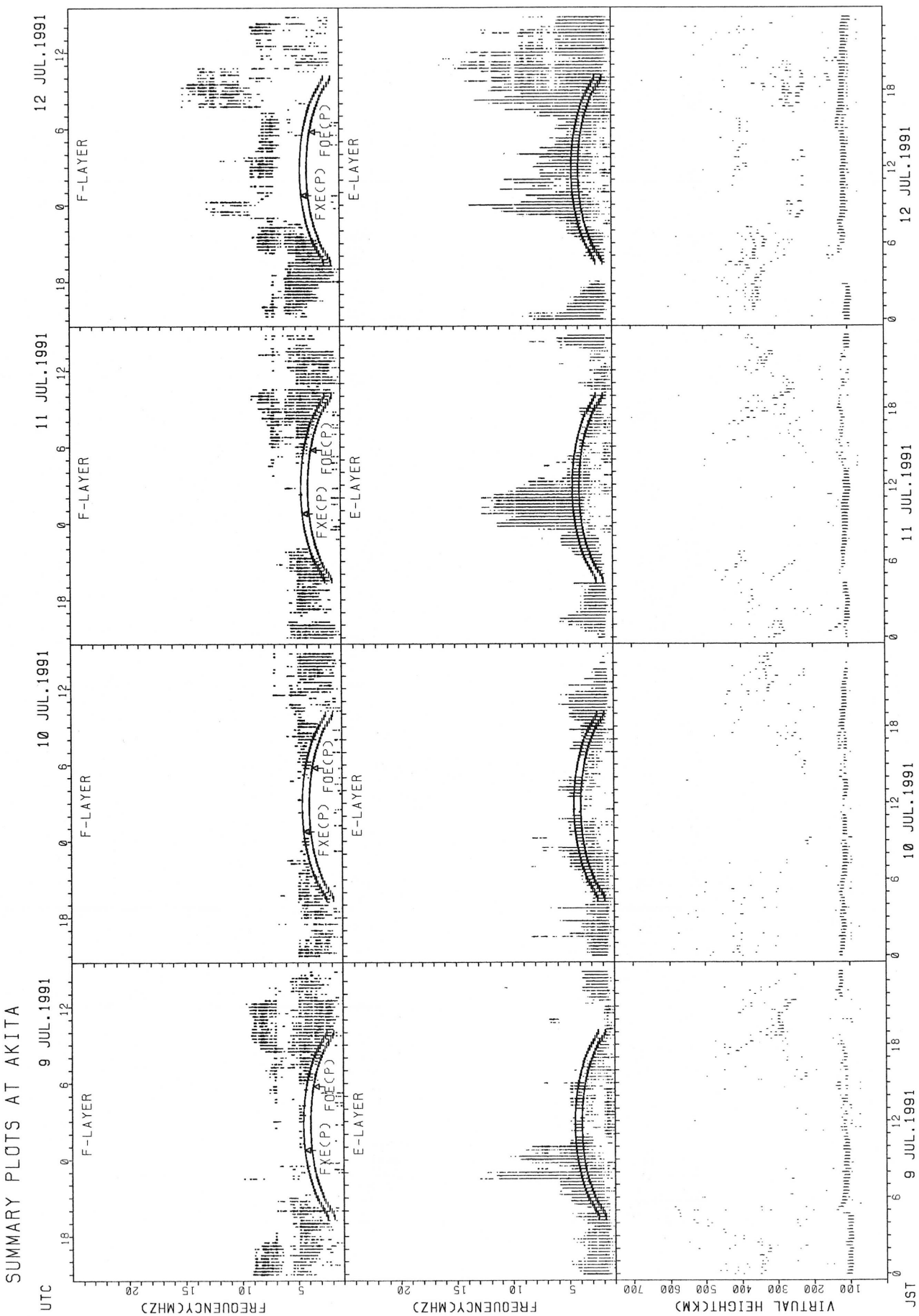
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VIRTUAL HEIGHT(KM)
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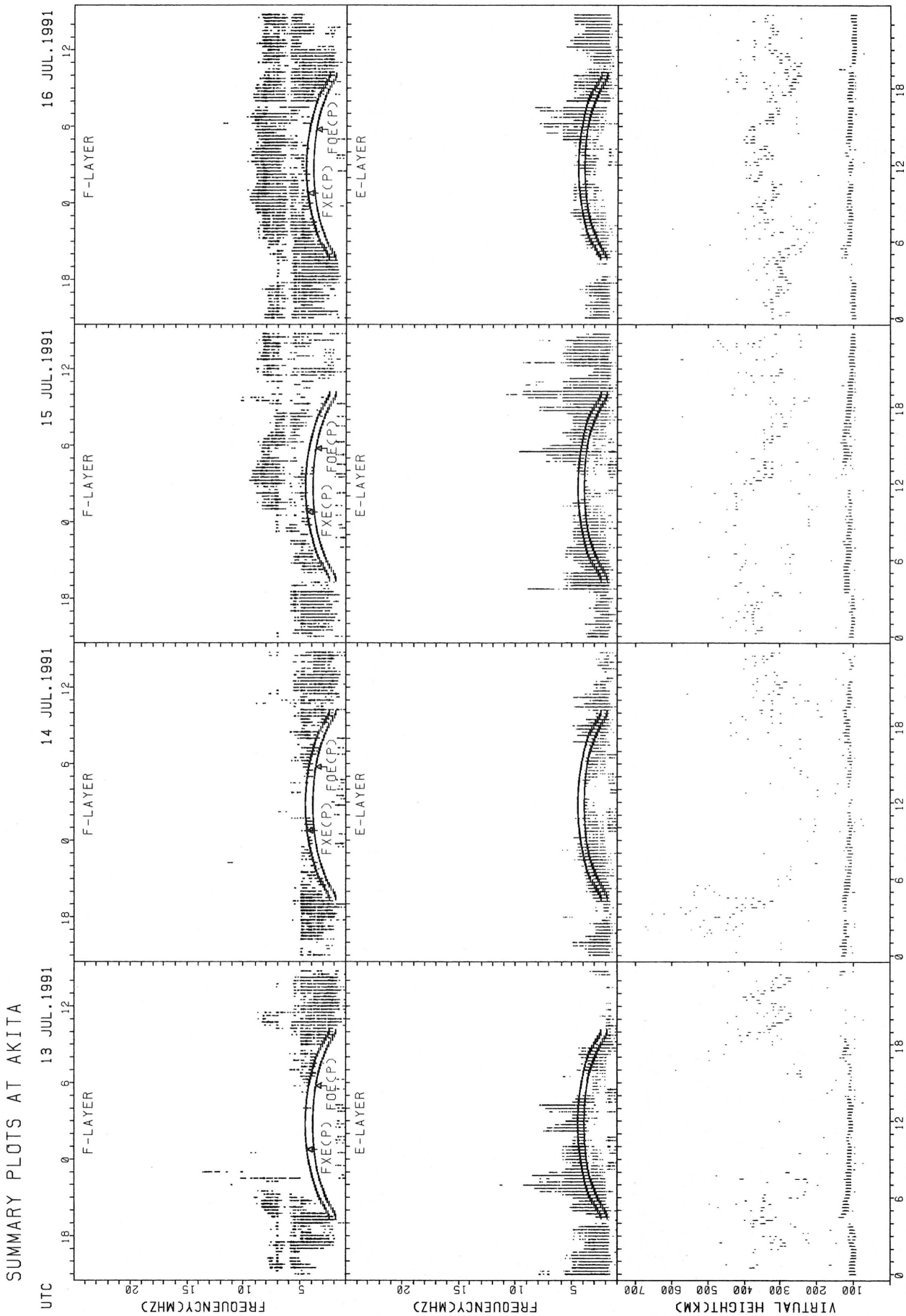
FOE(P); PREDICTED VALUE FOR FOE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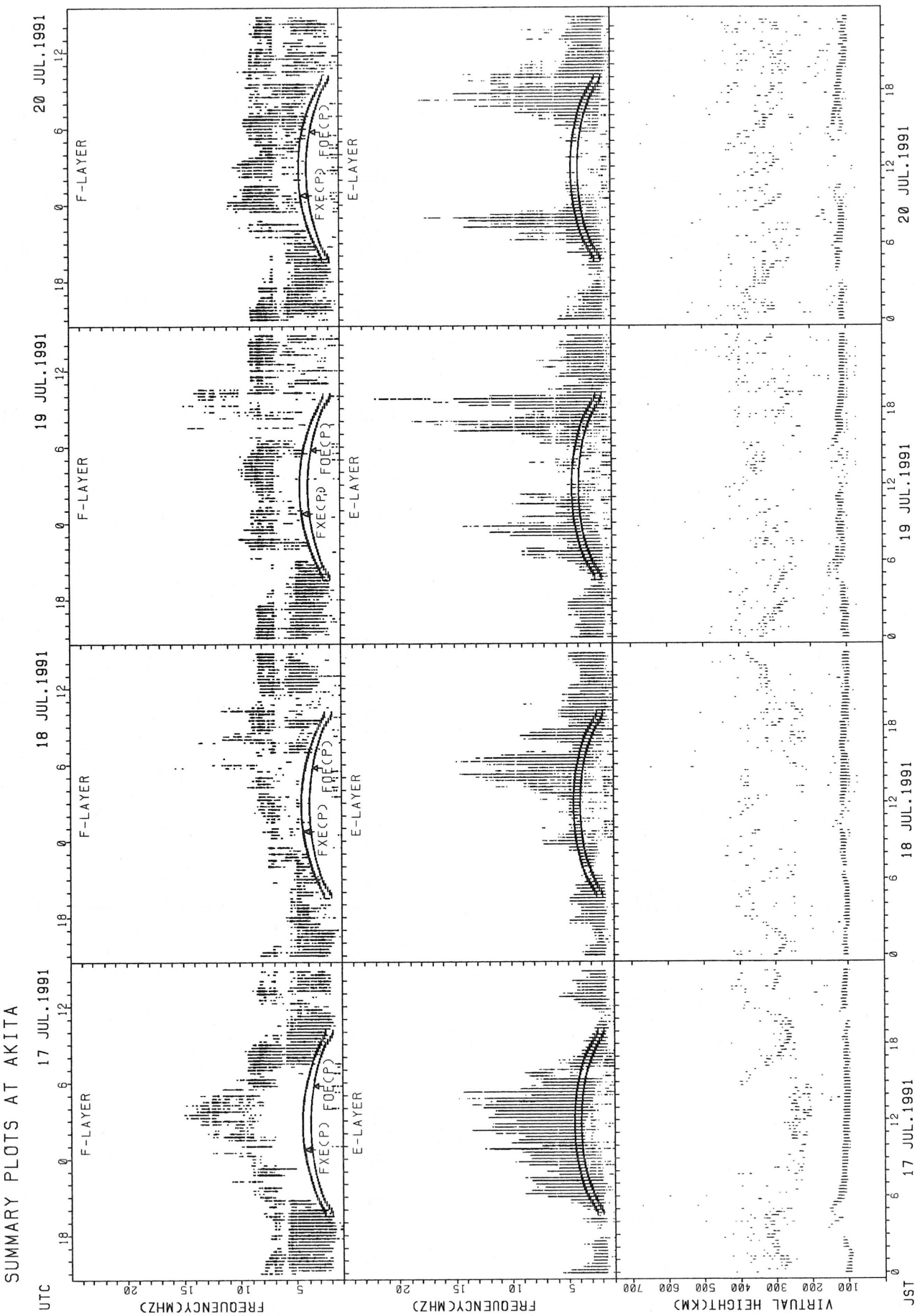
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FOE(P)
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VIRTUAL HEIGHT(KM)
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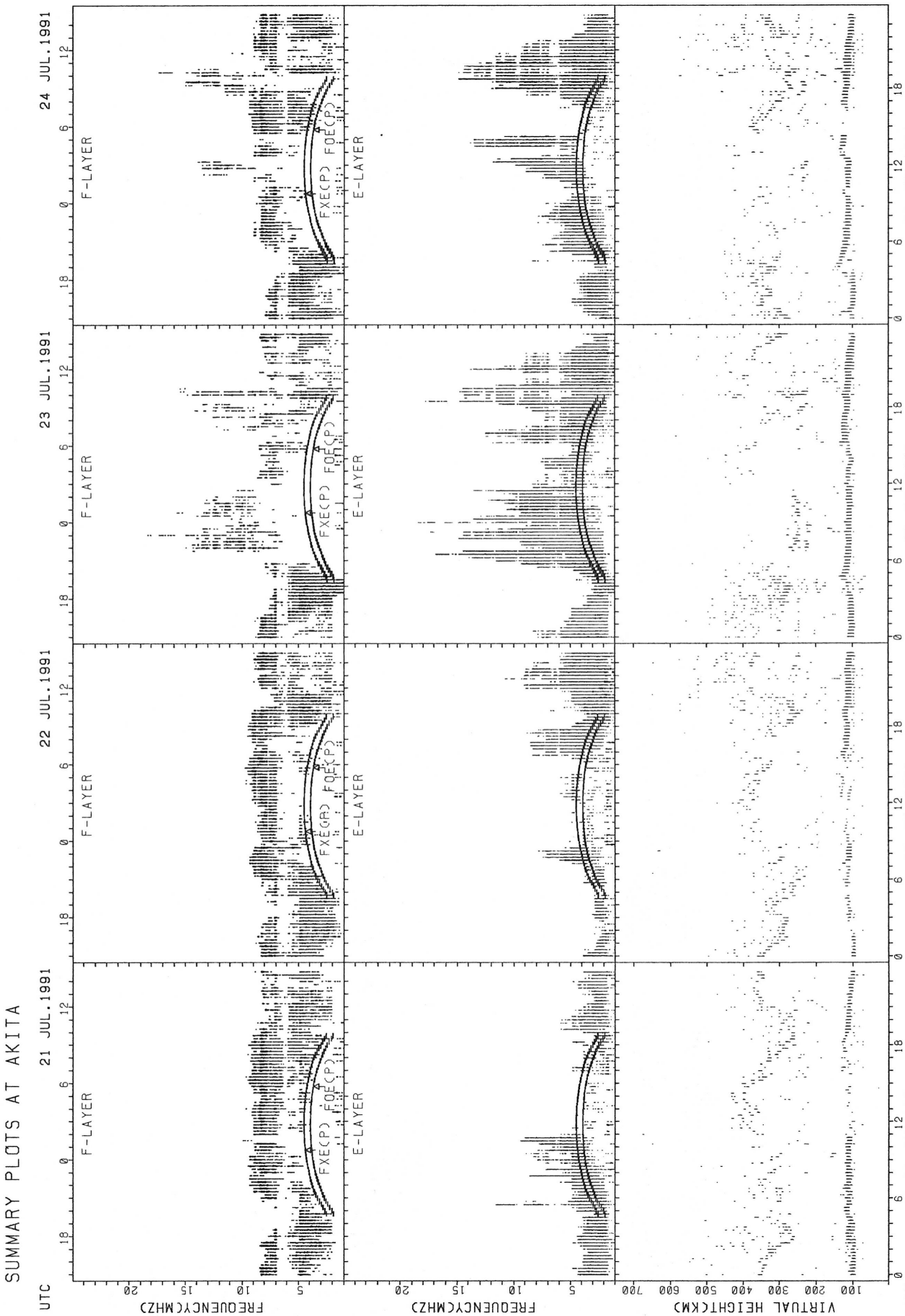
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VIRTUAL HEIGHT(KM)
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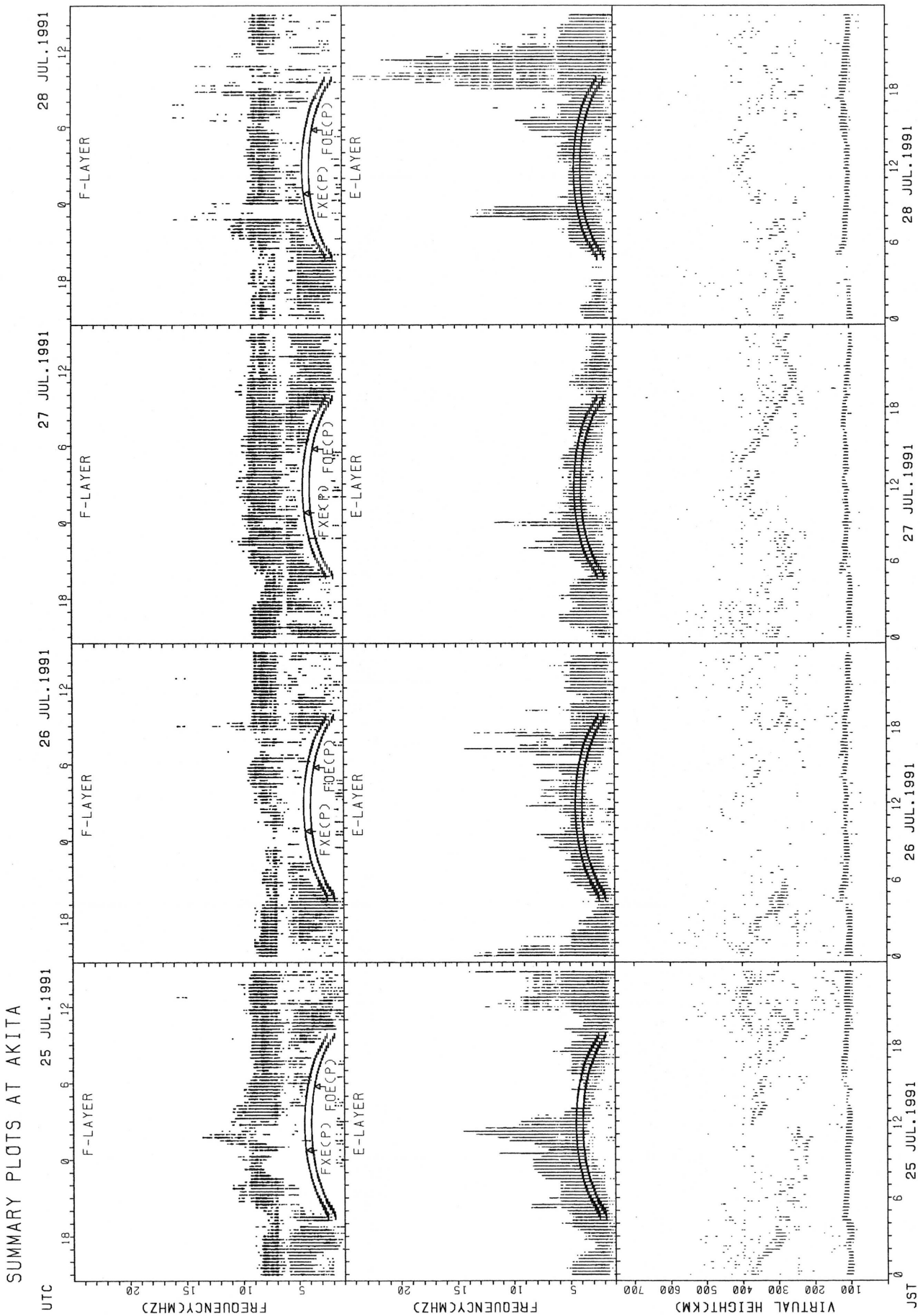
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FOE(P)
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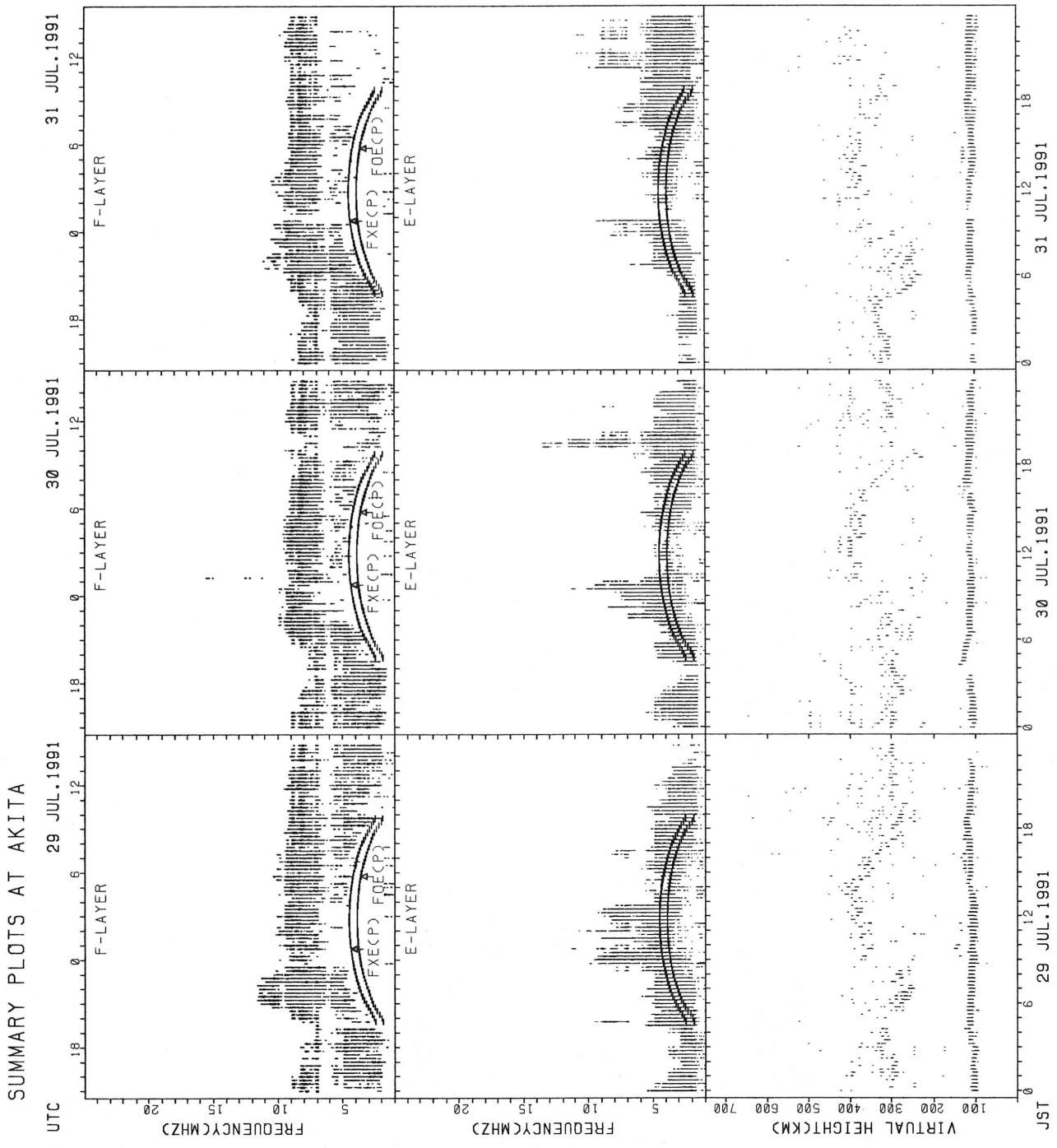
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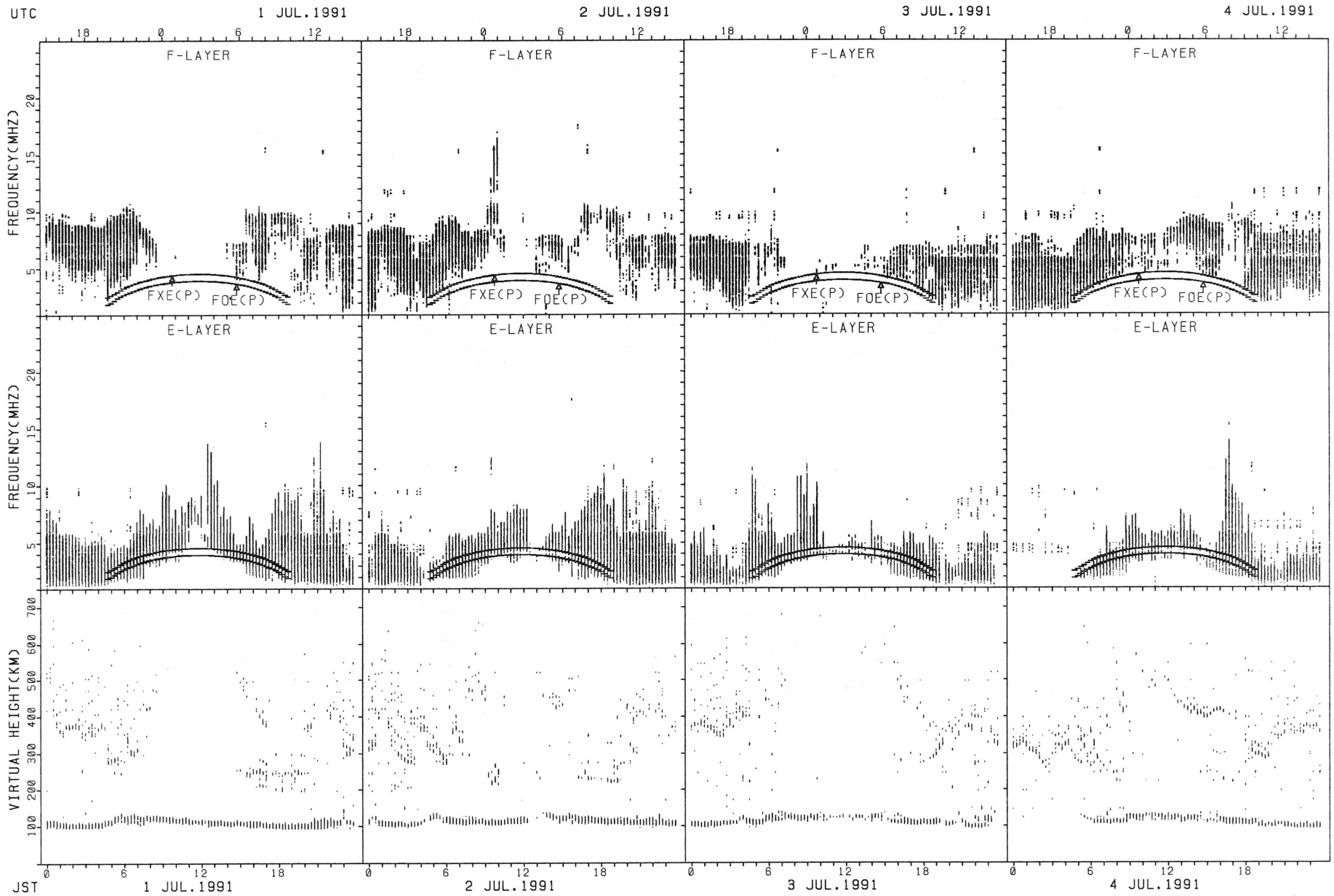
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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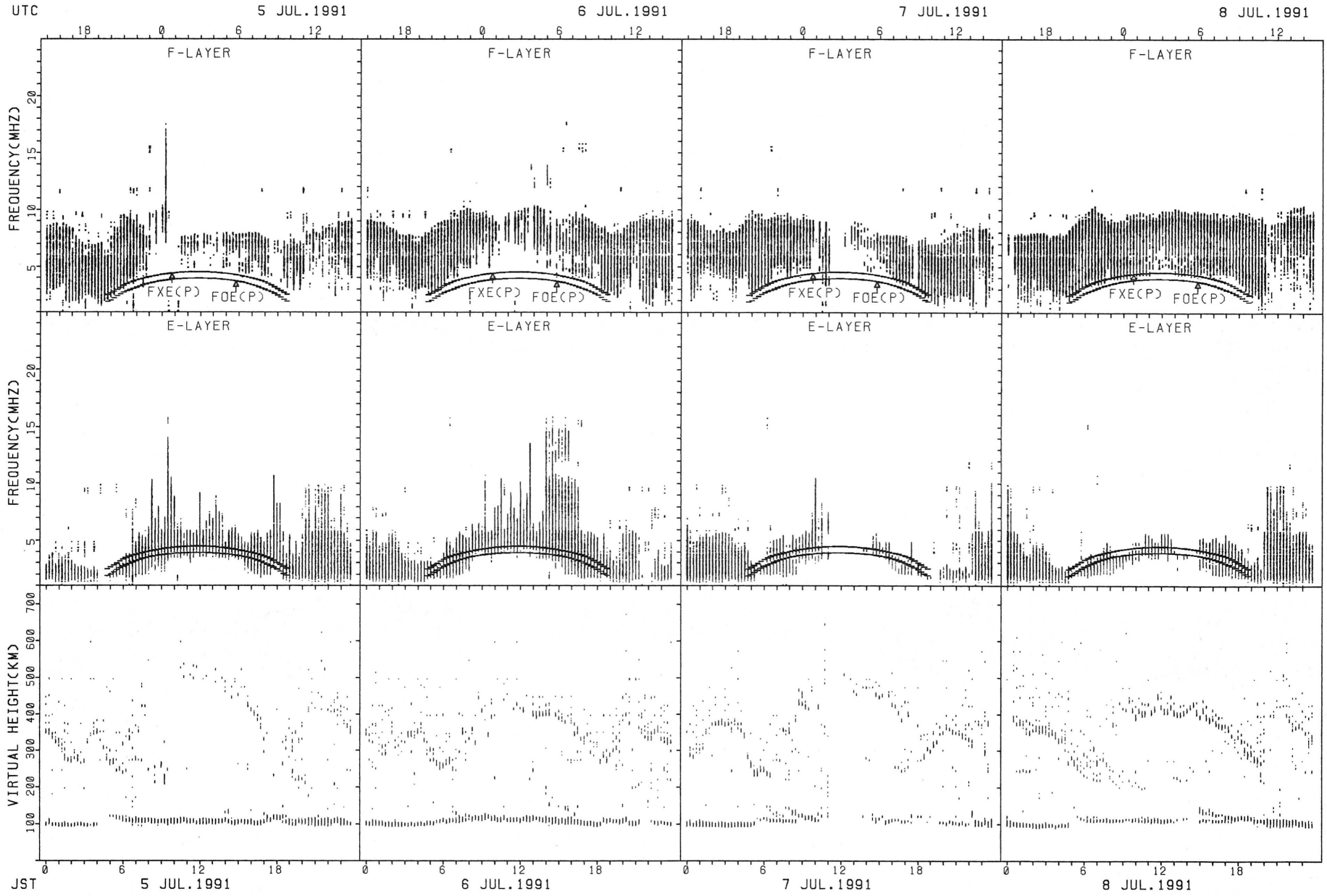
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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E-LAYER
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FOE(P)
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VIRTUAL HEIGHT(KM)
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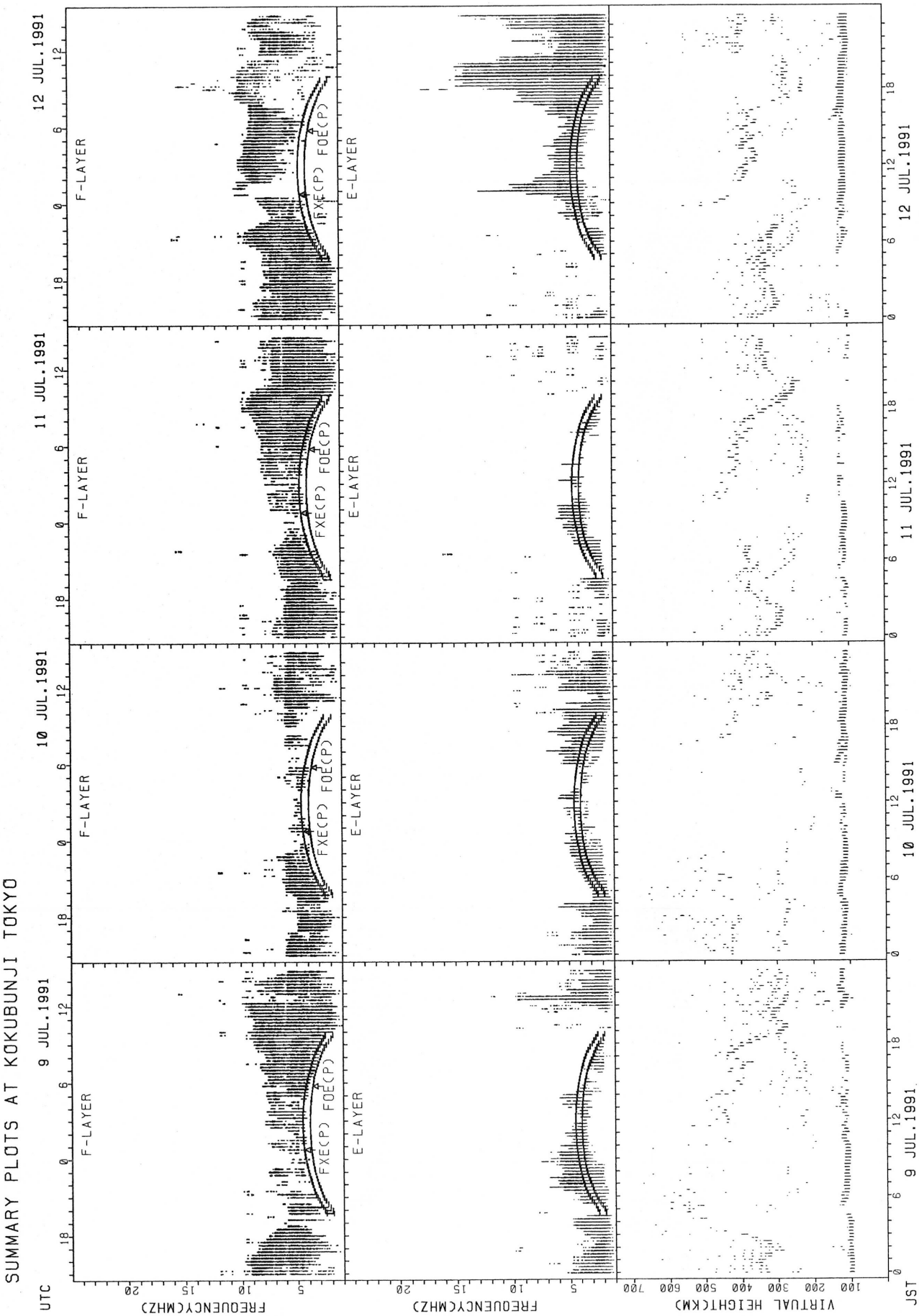
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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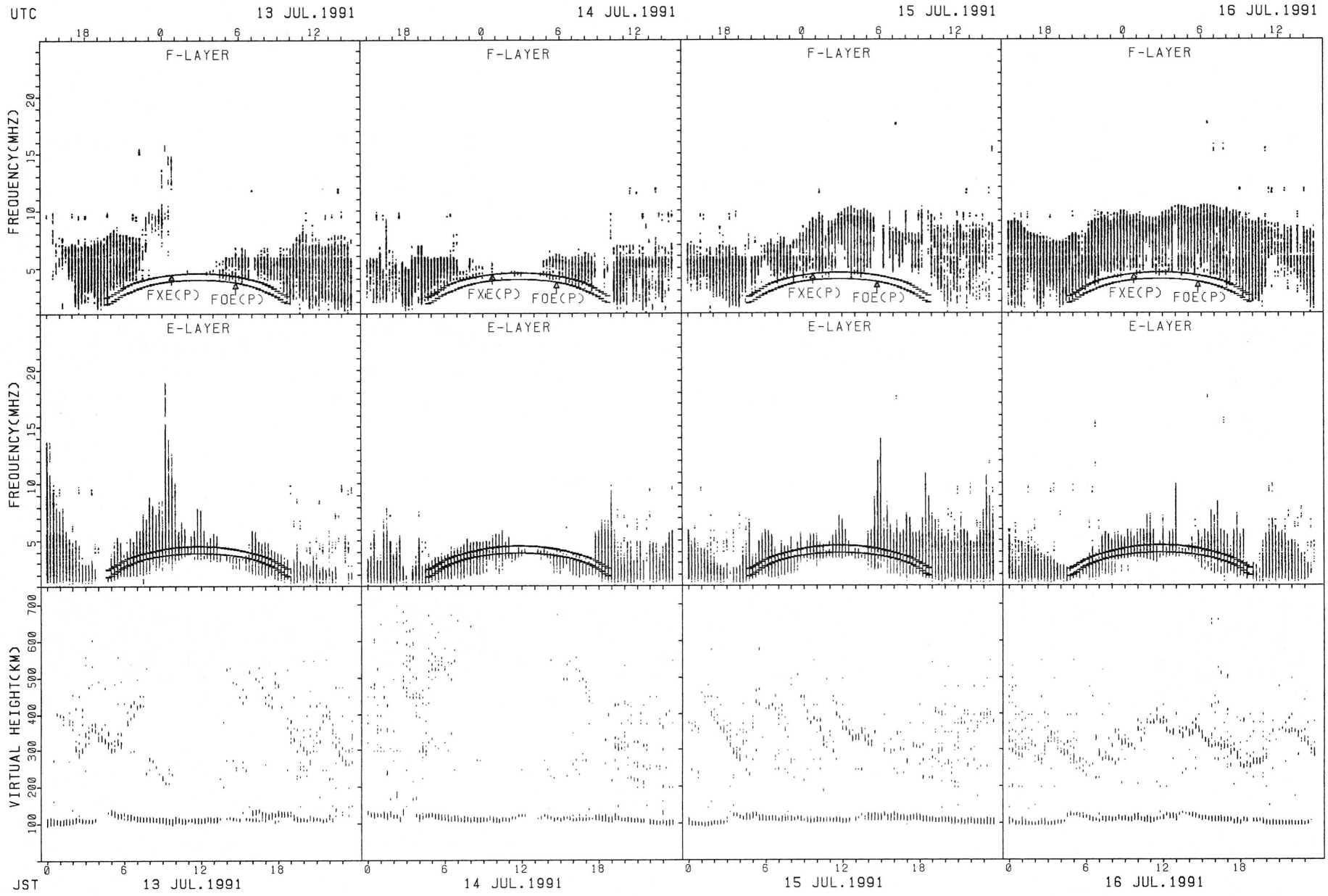
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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F-LAYER
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FOE(P)
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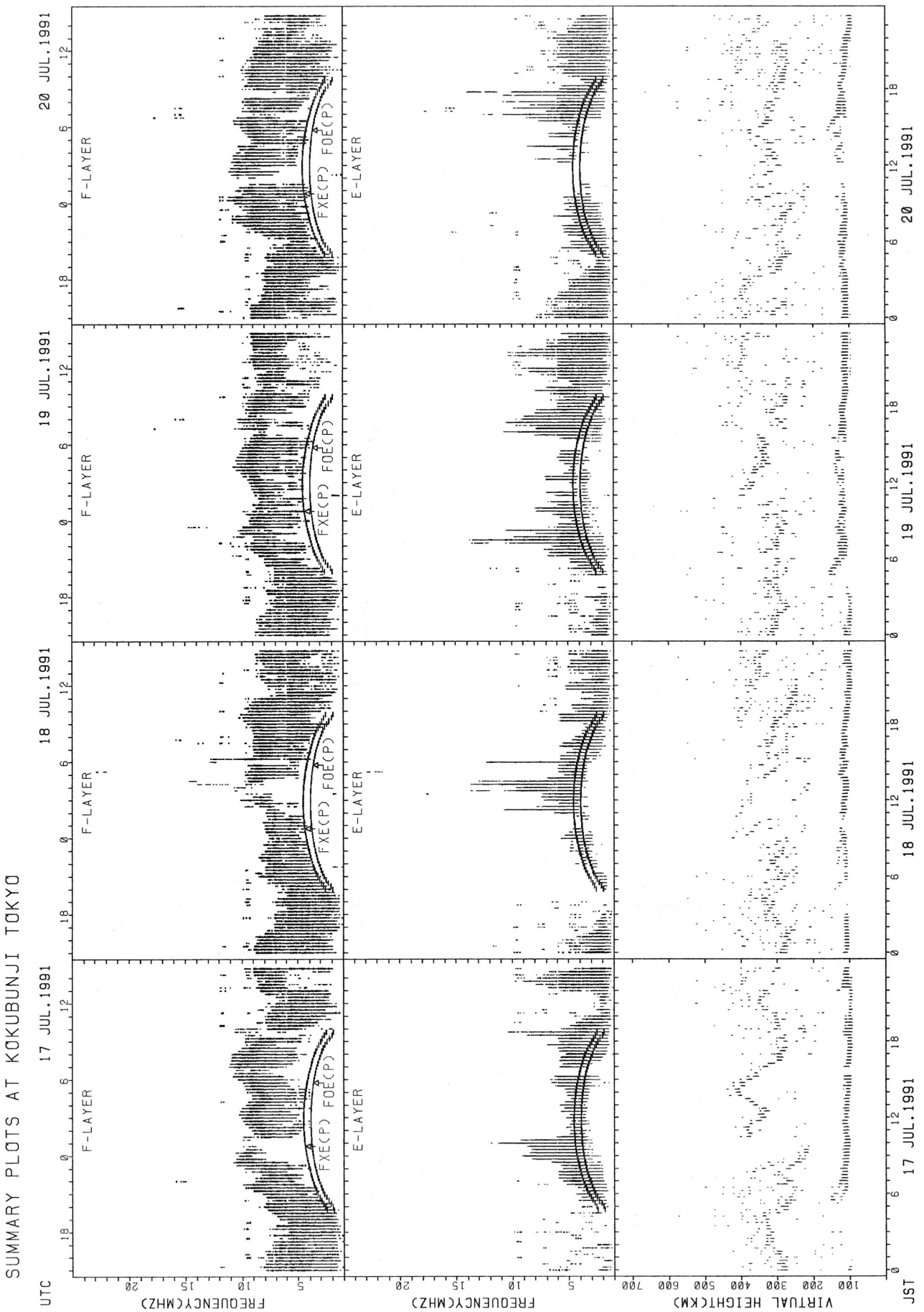
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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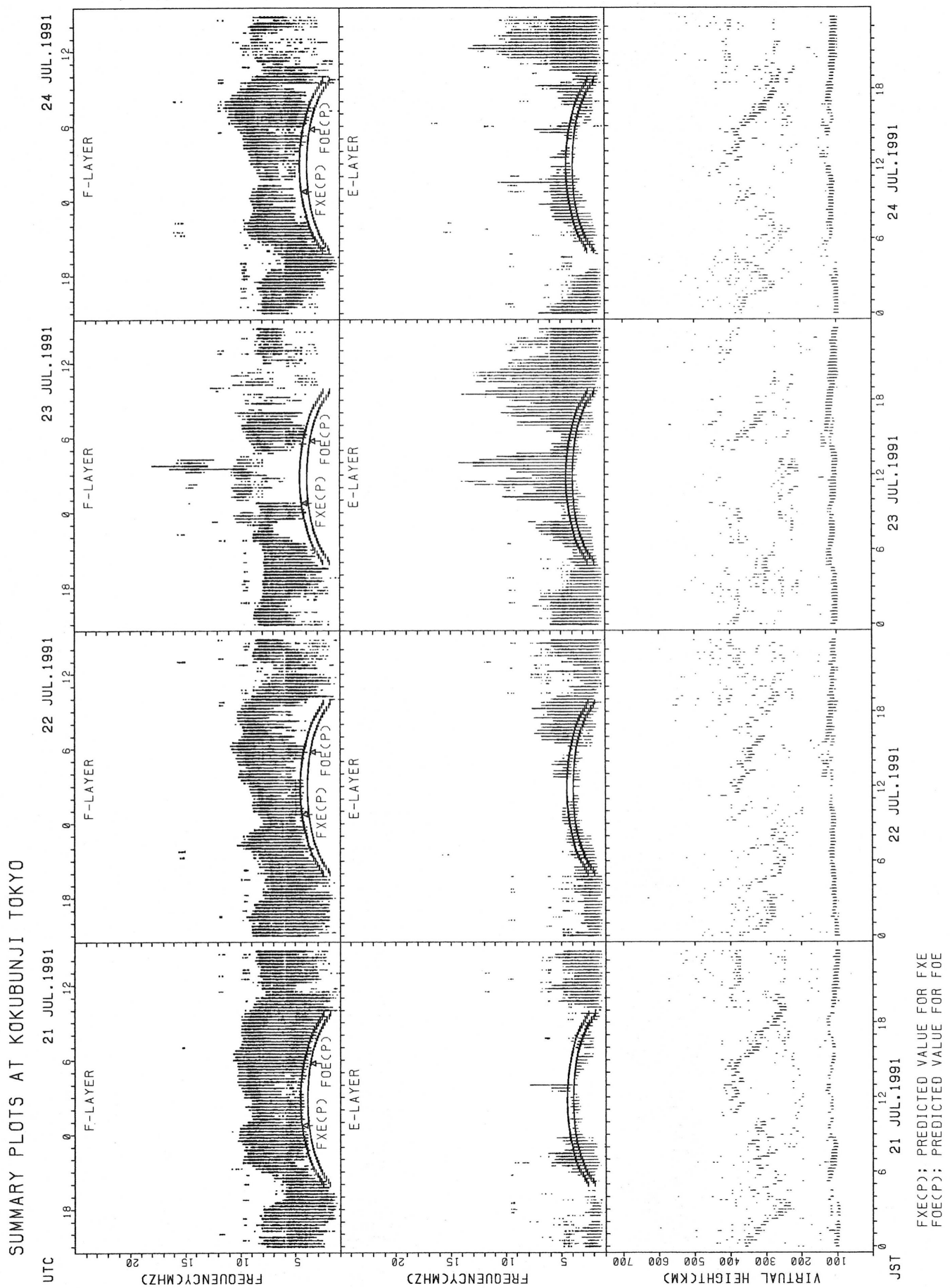
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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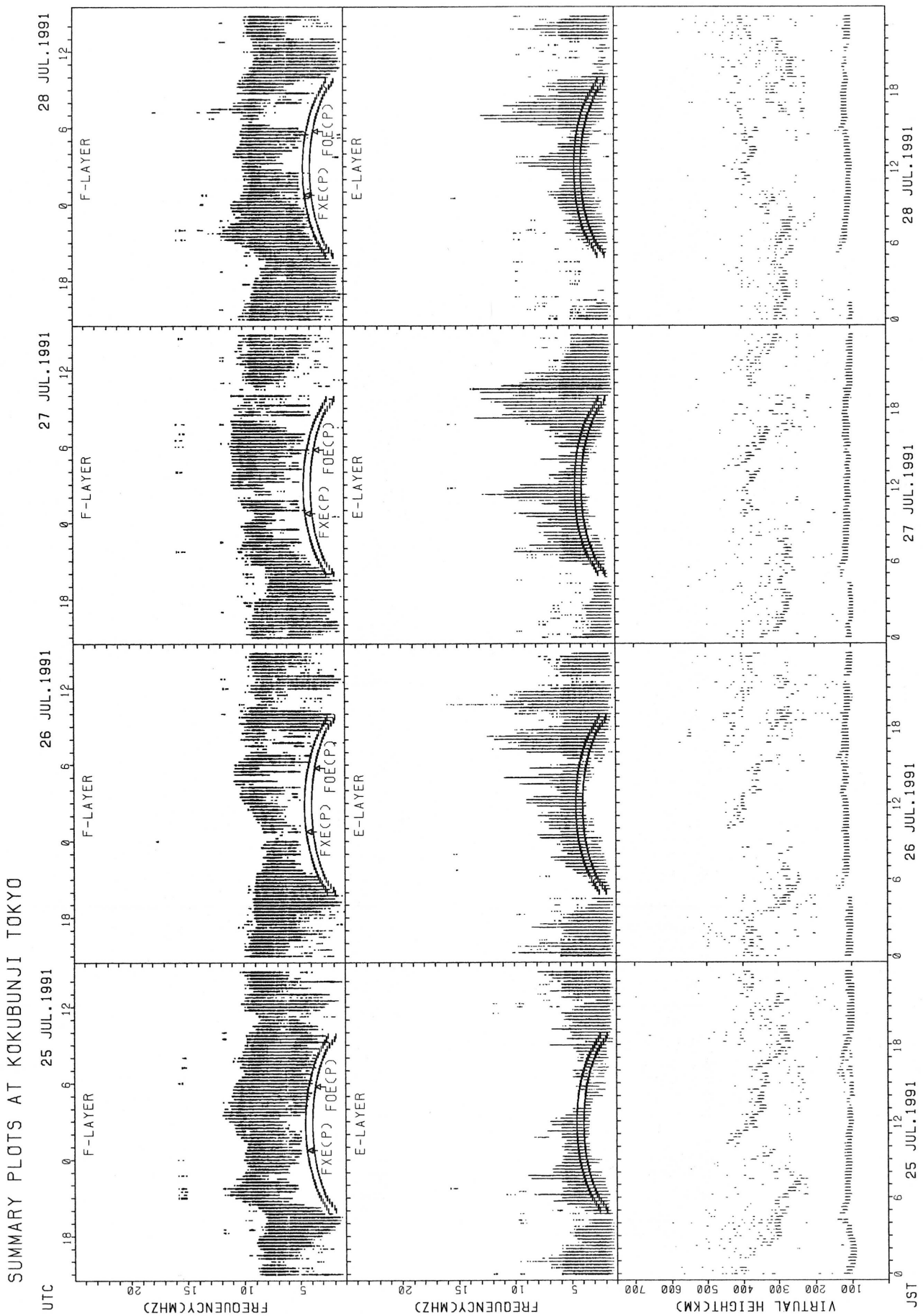
SUMMARY PLOTS AT KOKUBUNJI TOKYO
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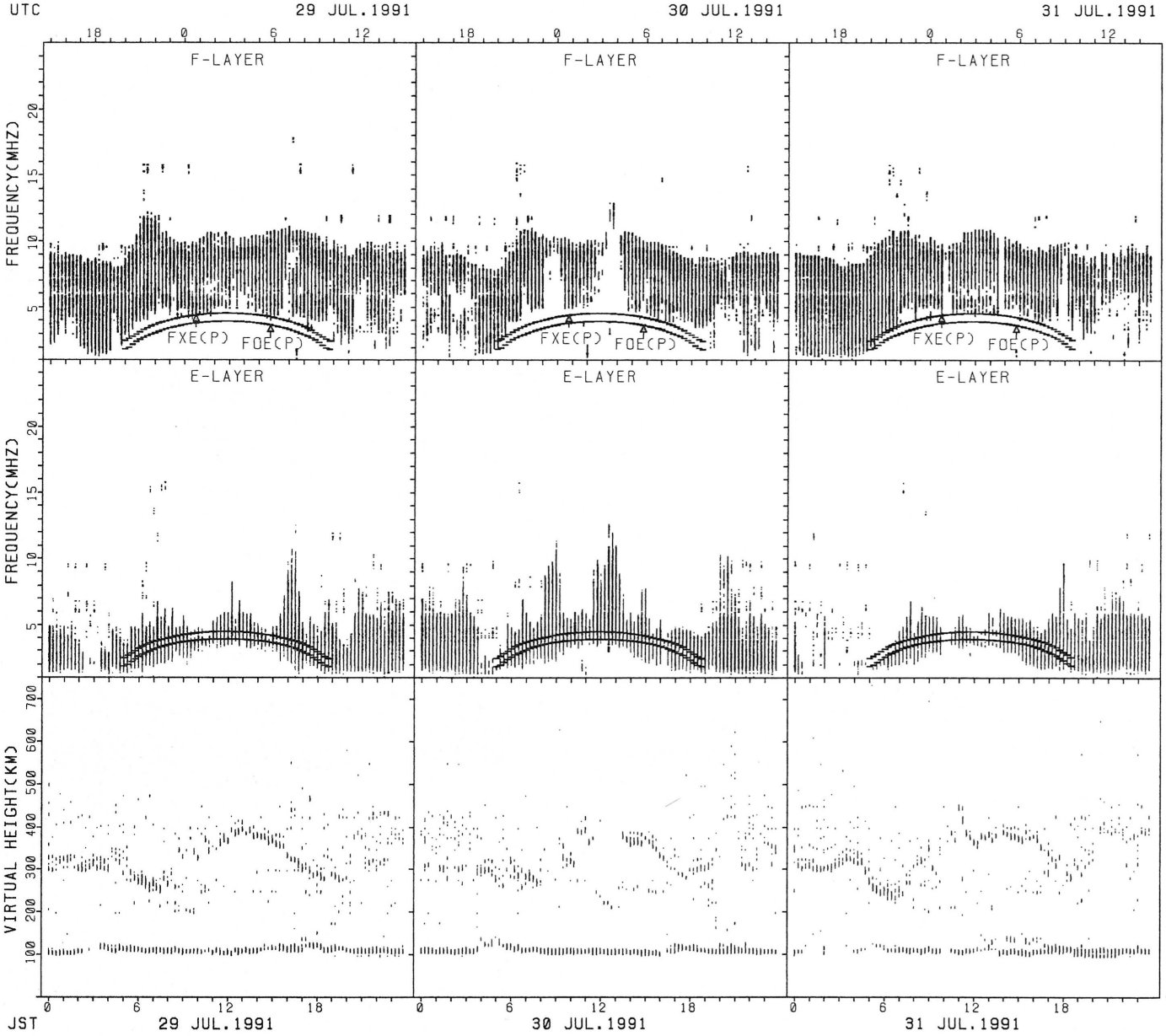
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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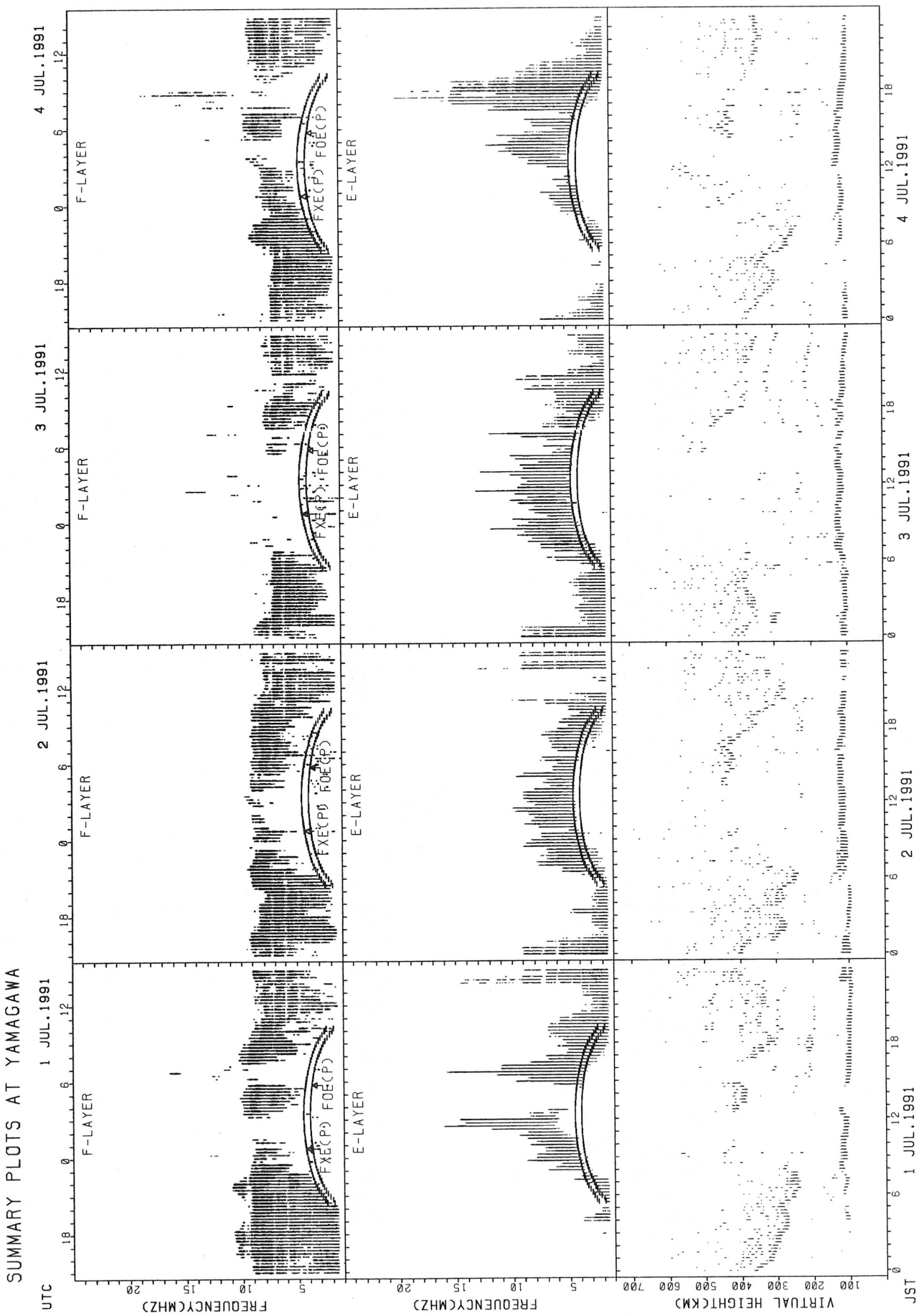
SUMMARY PLOTS AT YAMAGAWA
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E-LAYER
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FOE(P)
FREQUENCY(MHZ)
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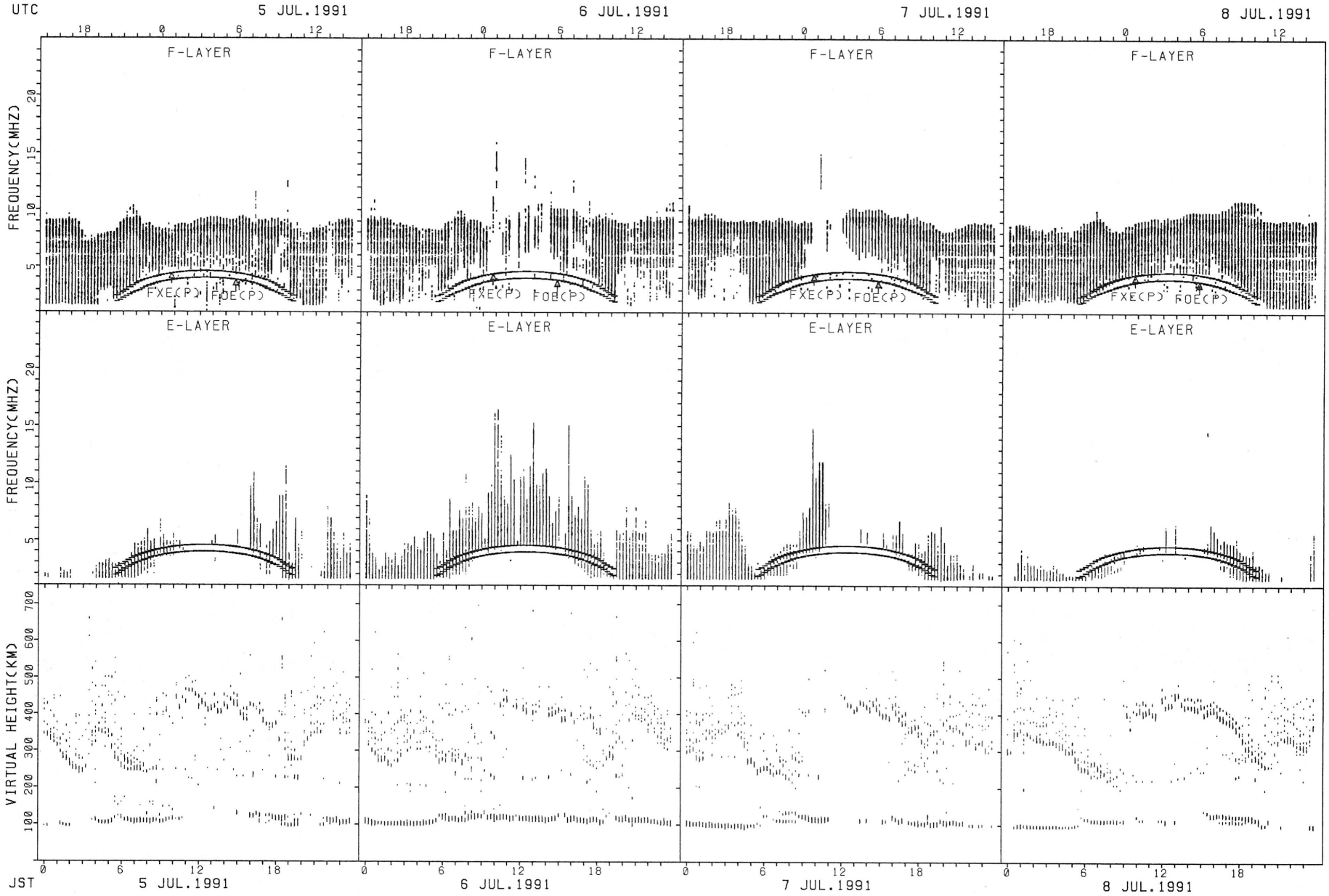
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



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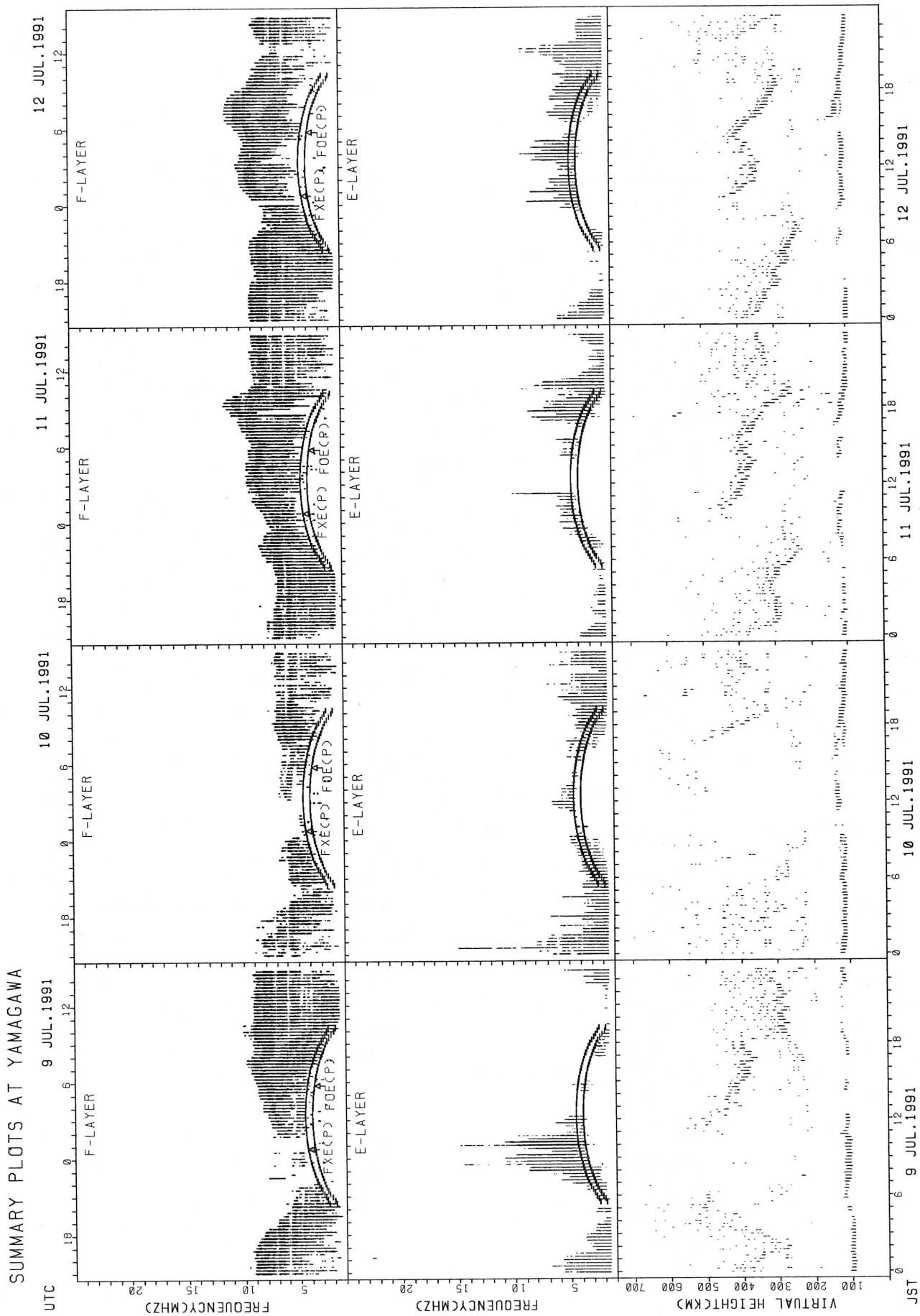
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E-LAYER
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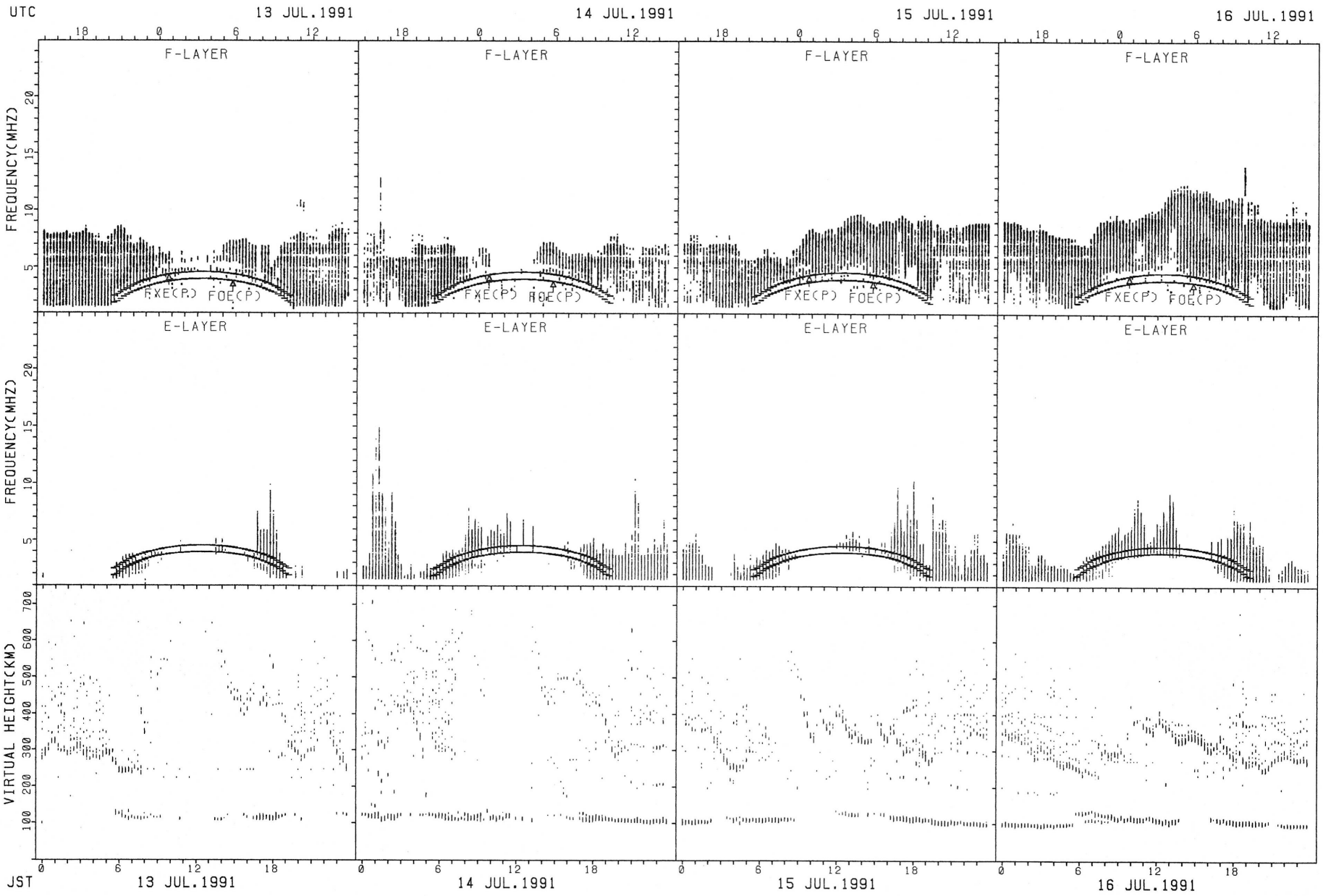
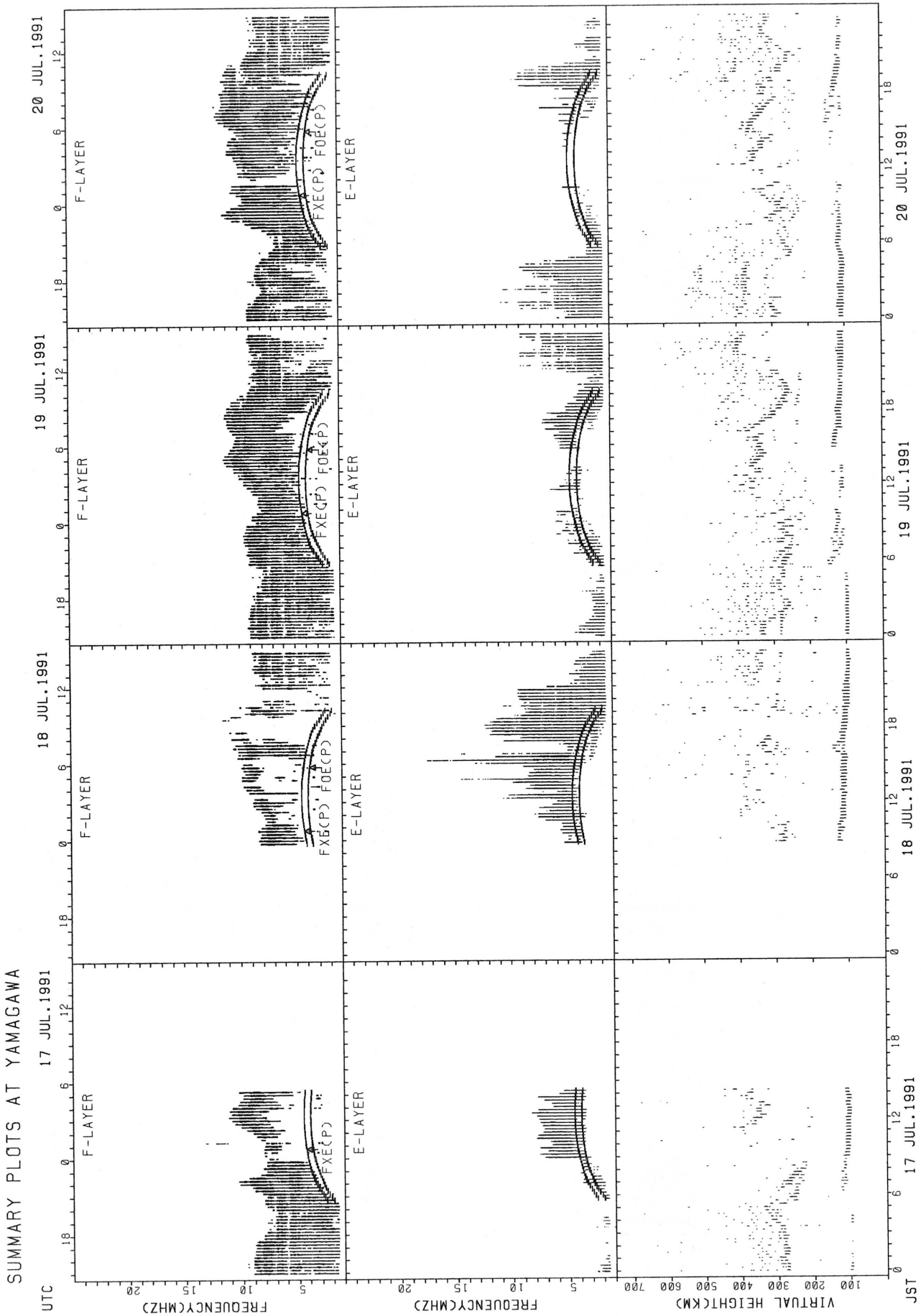
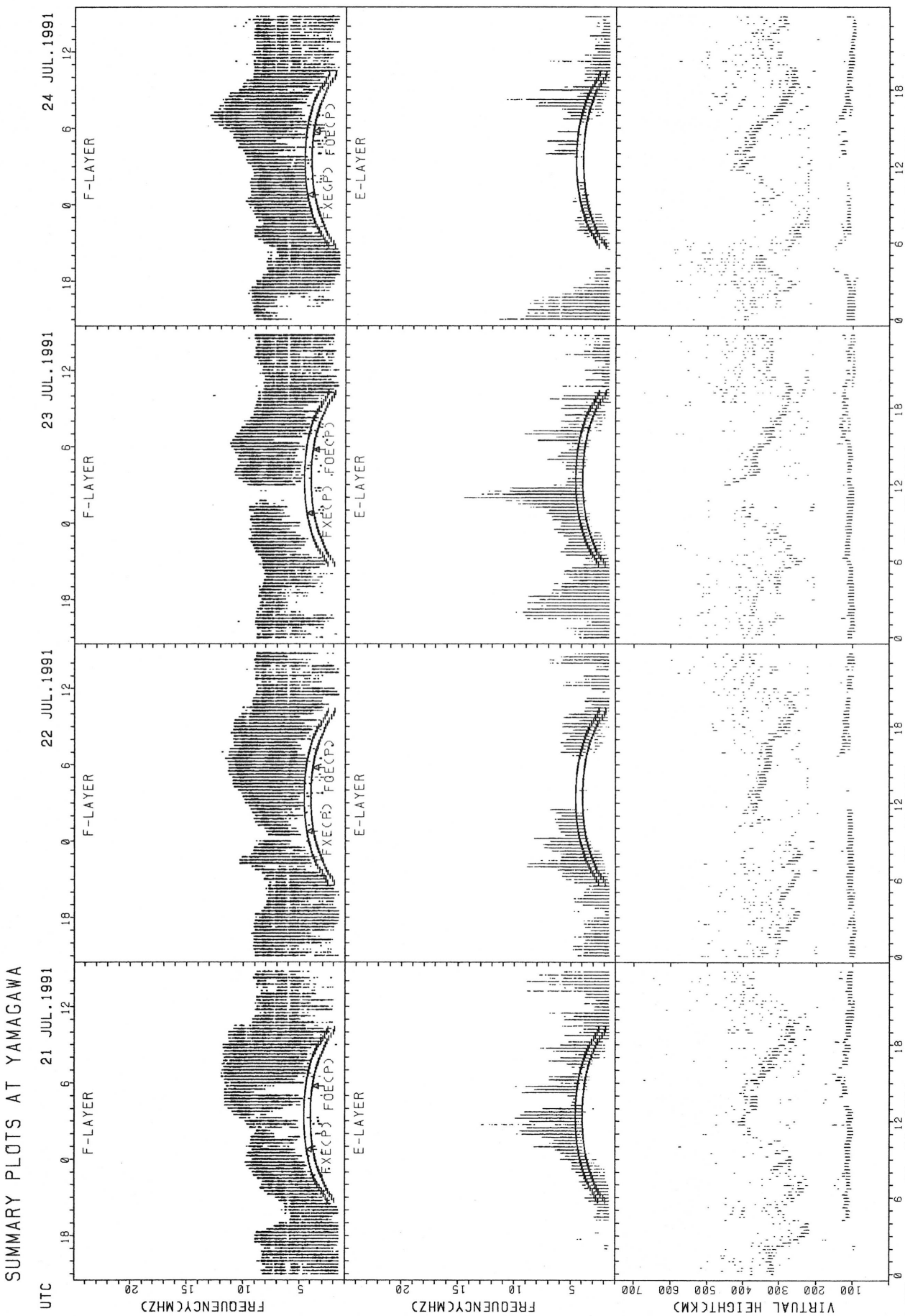
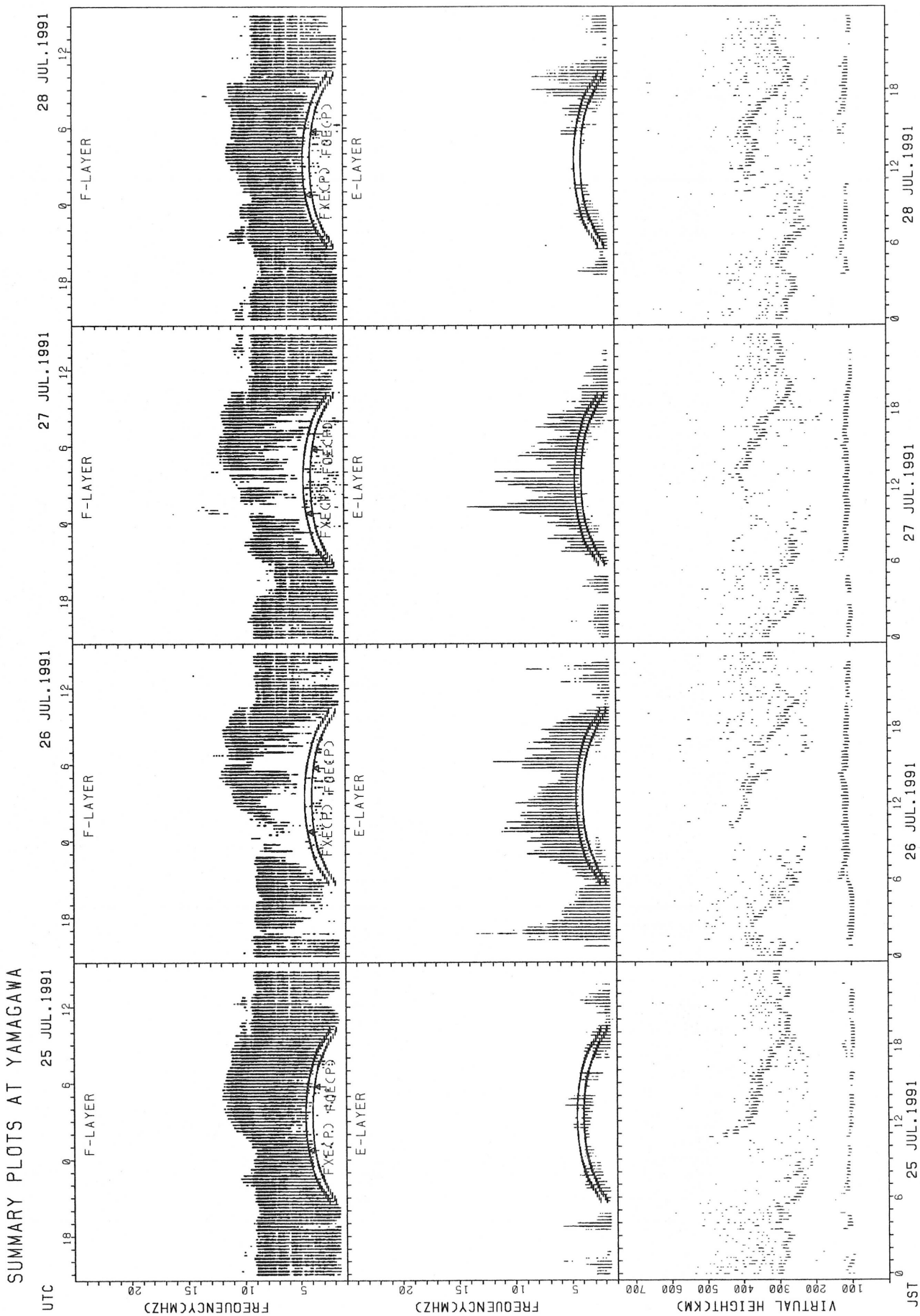
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE



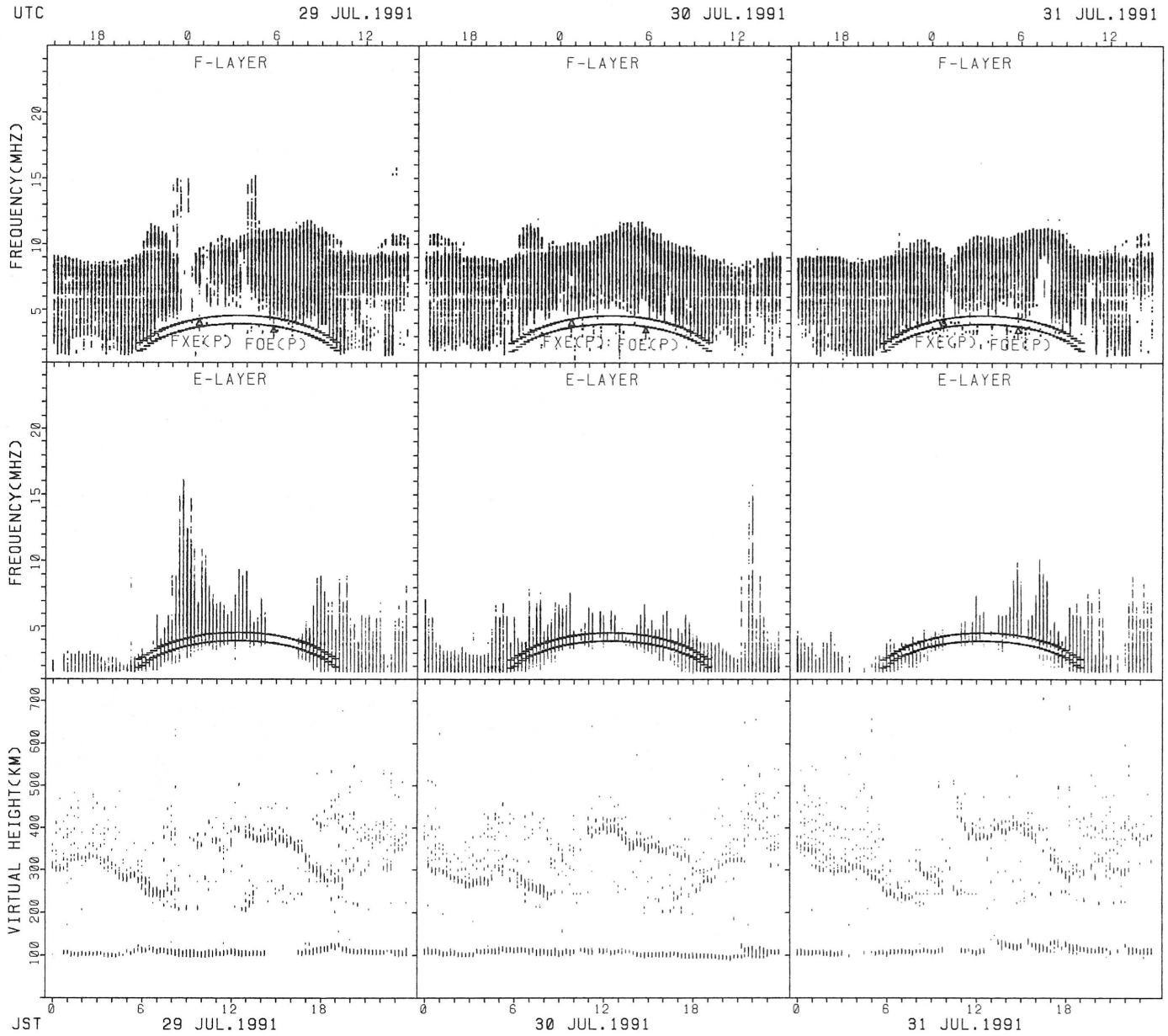
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

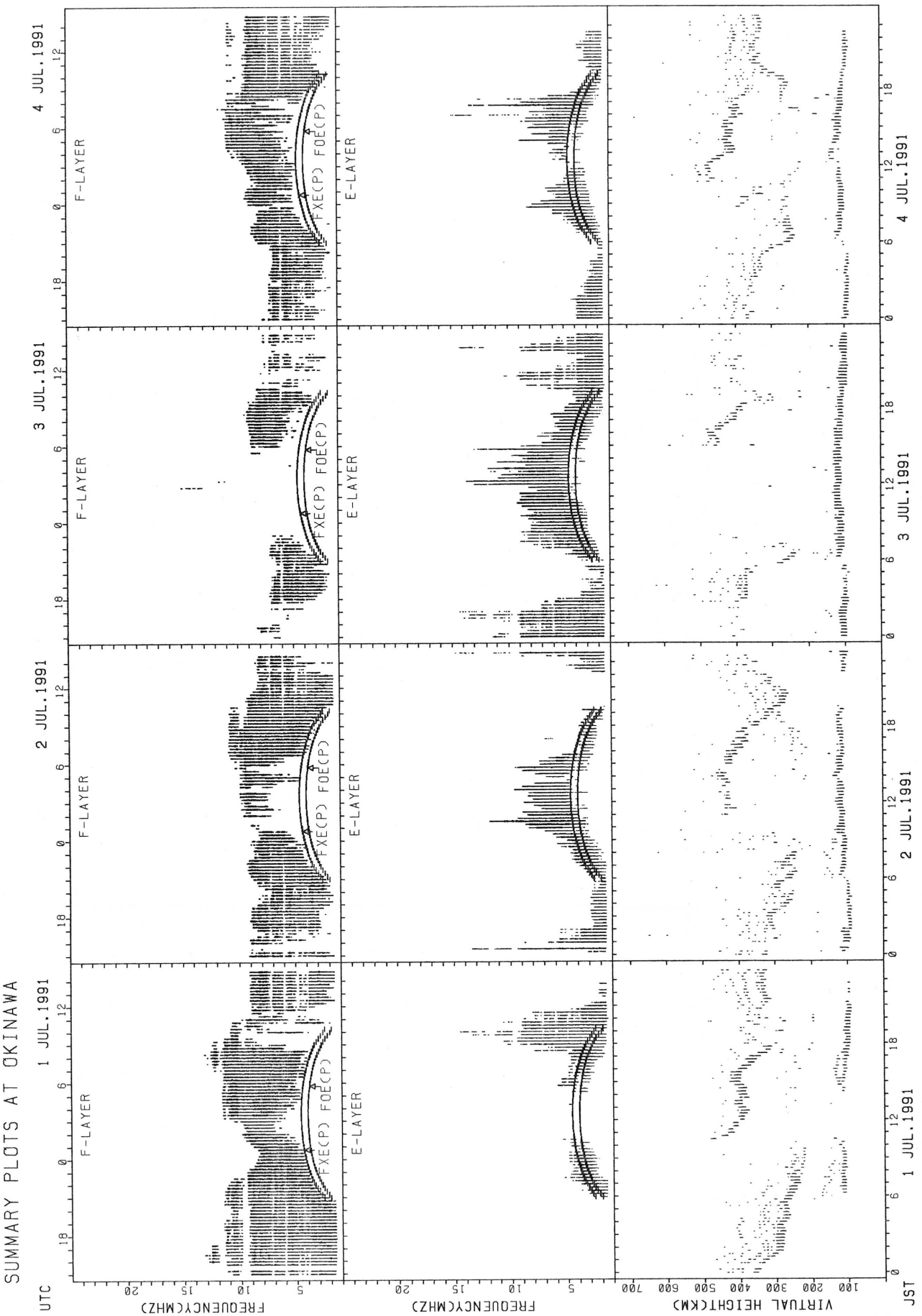

SUMMARY PLOTS AT YAMAGAWA
UTC
21 JUL.1991
22 JUL.1991
23 JUL.1991
24 JUL.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

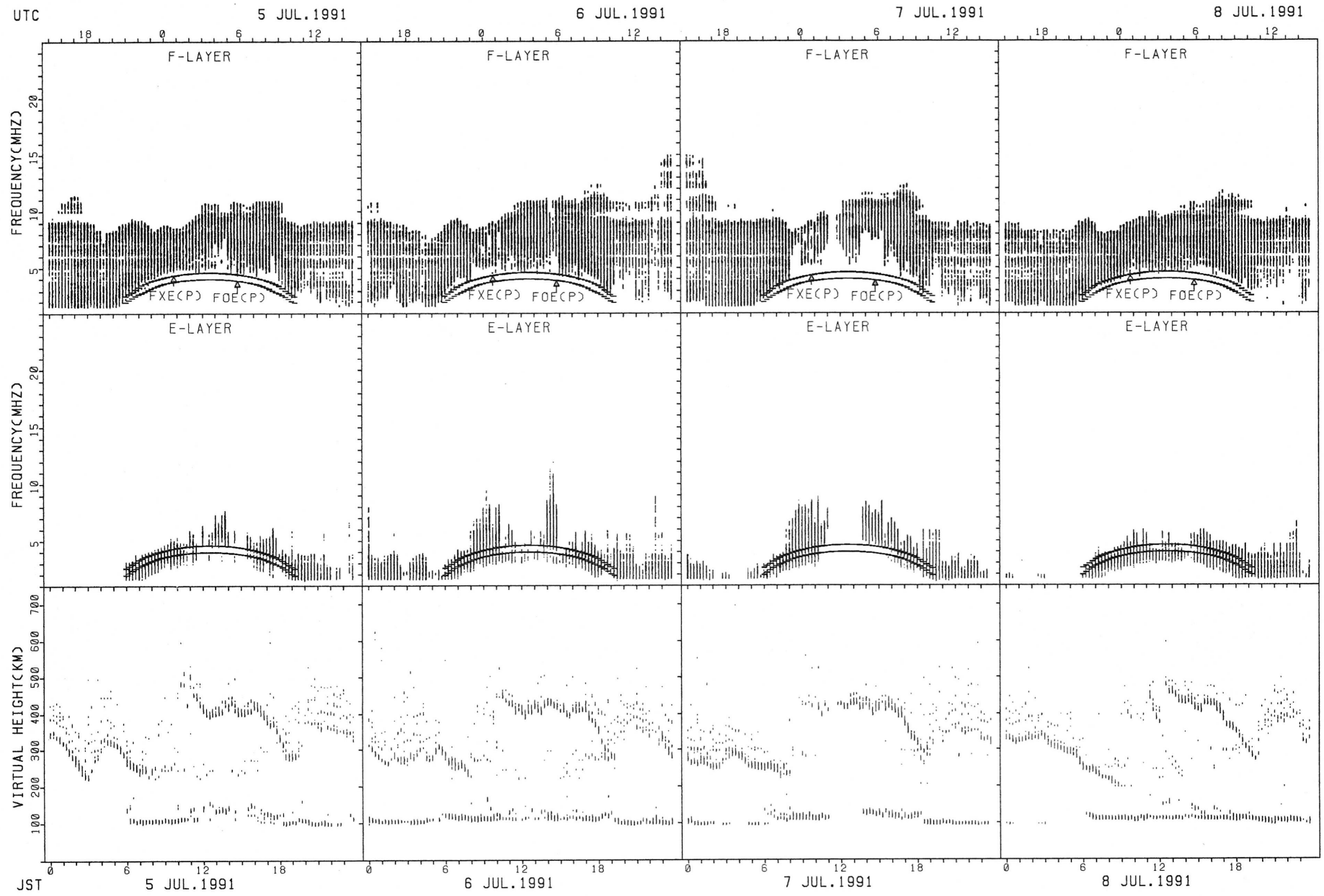

SUMMARY PLOTS AT YAMAGAWA
UTC
25 JUL.1991
26 JUL.1991
27 JUL.1991
28 JUL.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA

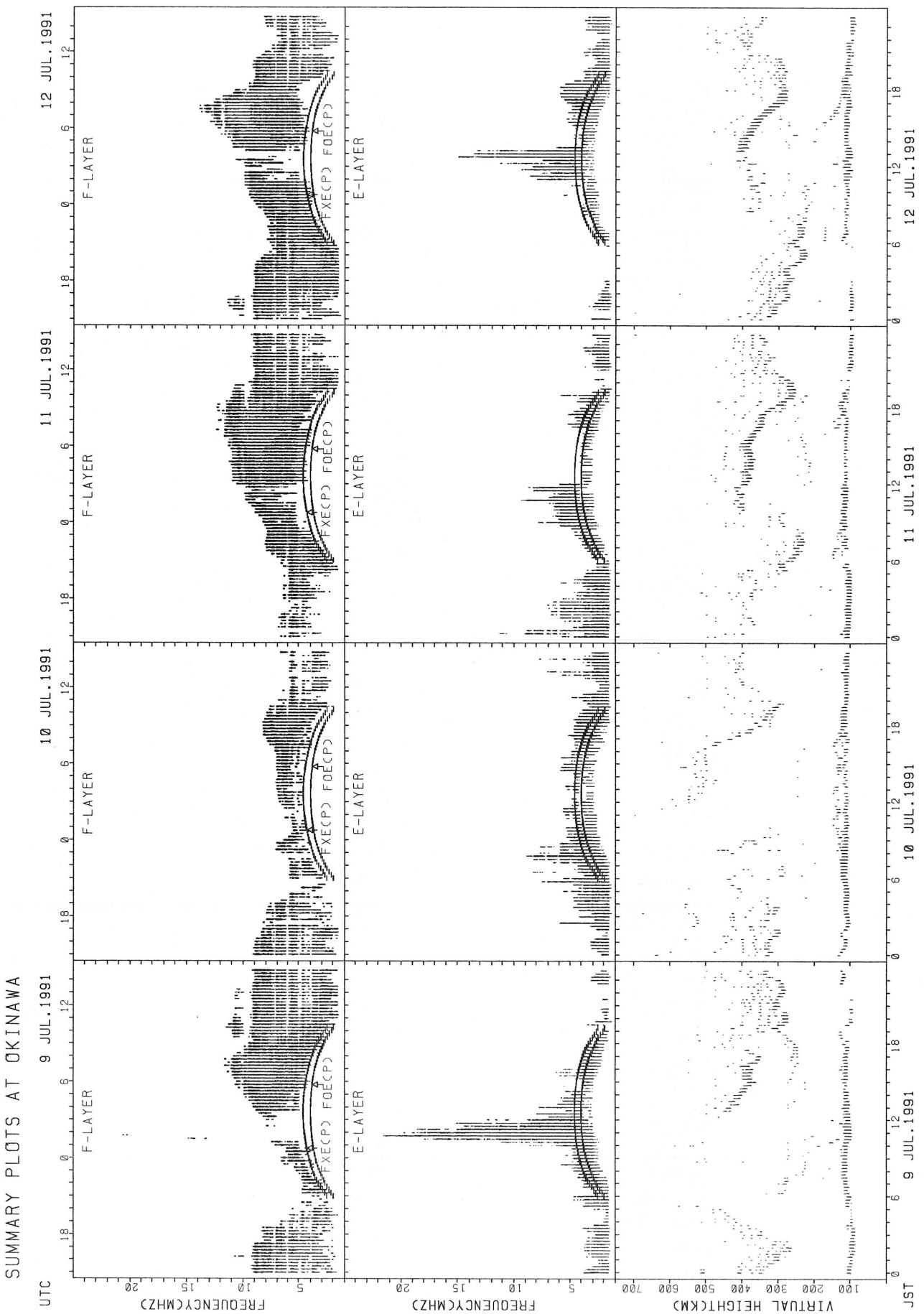


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

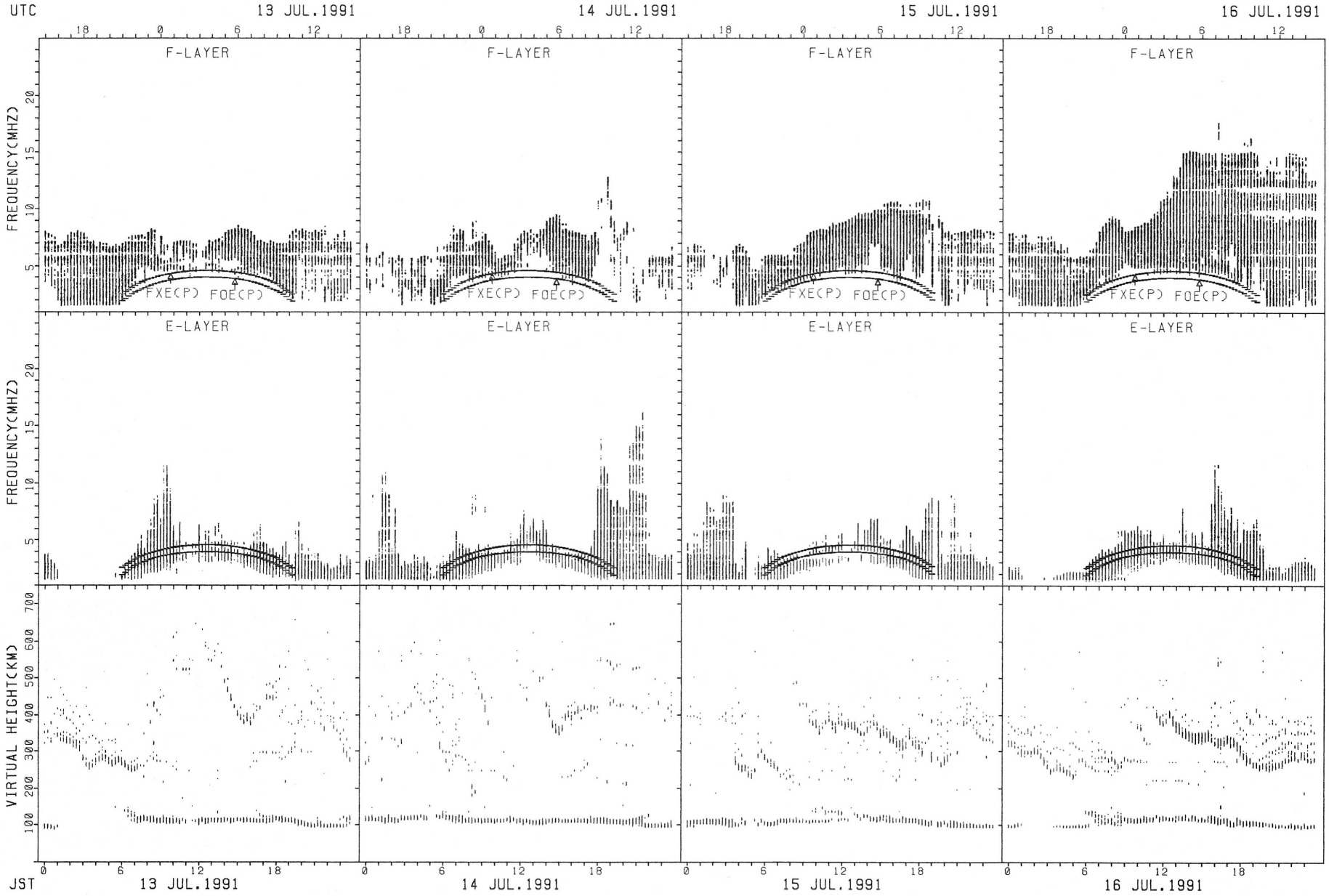

SUMMARY PLOTS AT OKINAWA
UTC
1 JUL.1991
2 JUL.1991
3 JUL.1991
4 JUL.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE



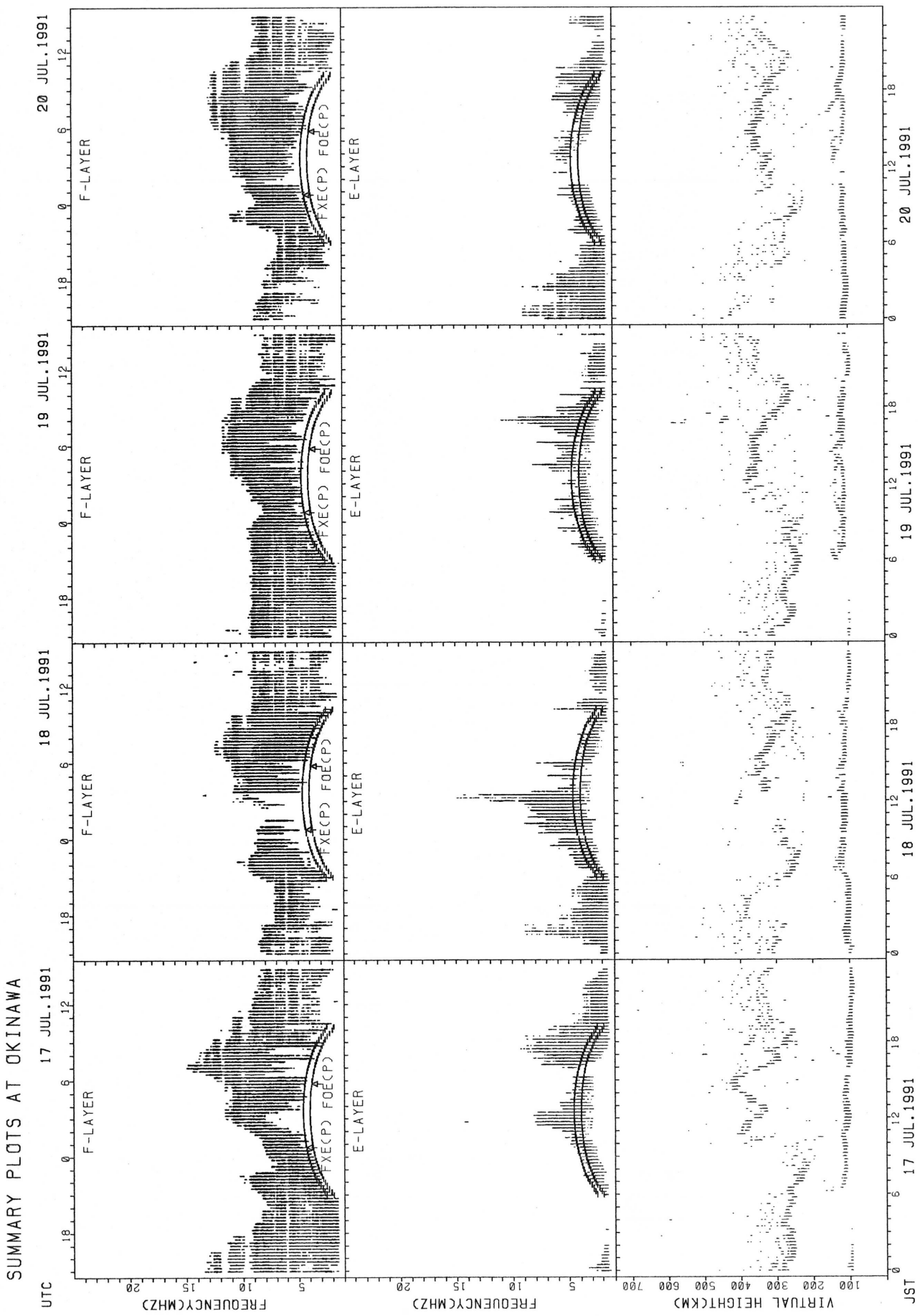
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

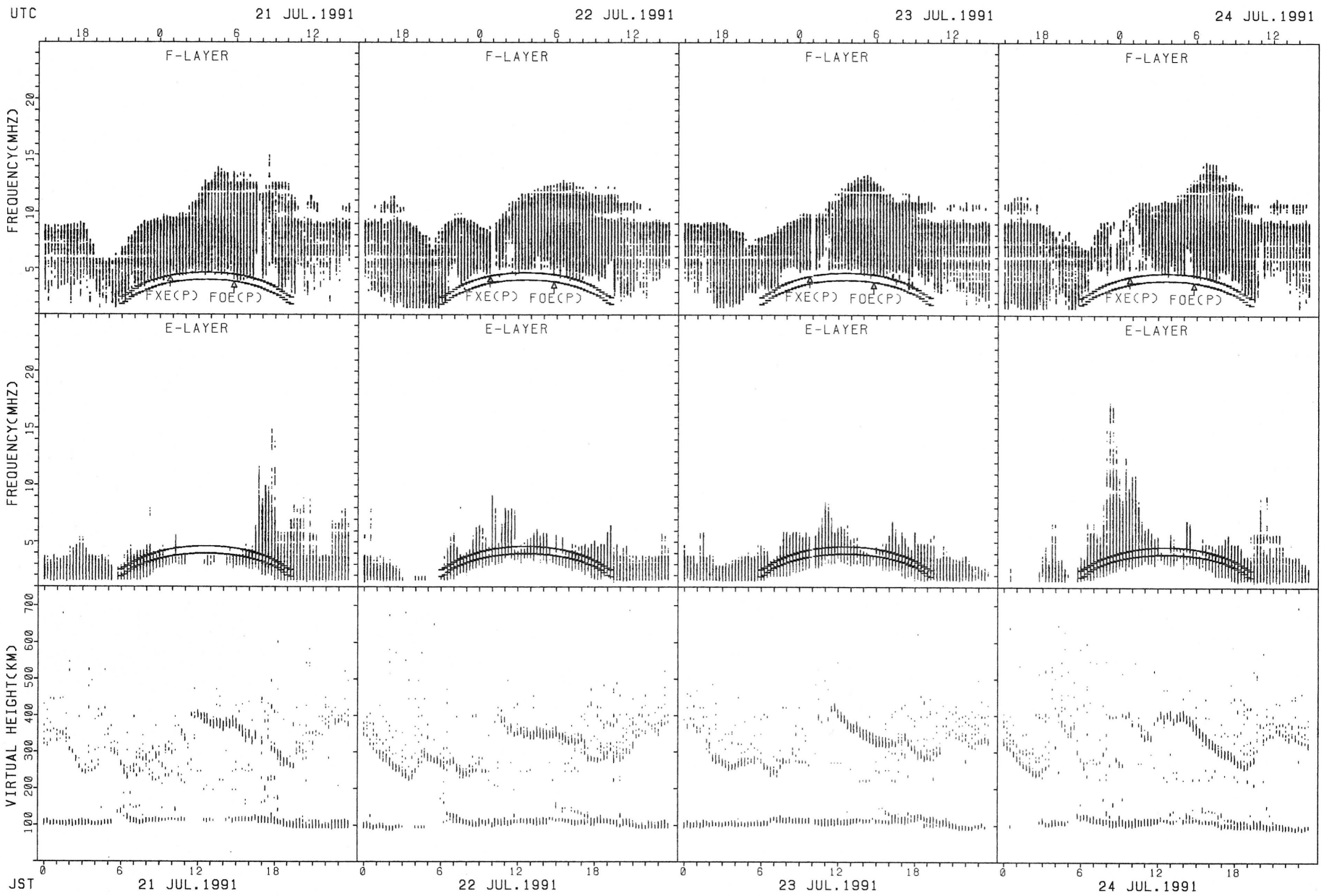
SUMMARY PLOTS AT OKINAWA



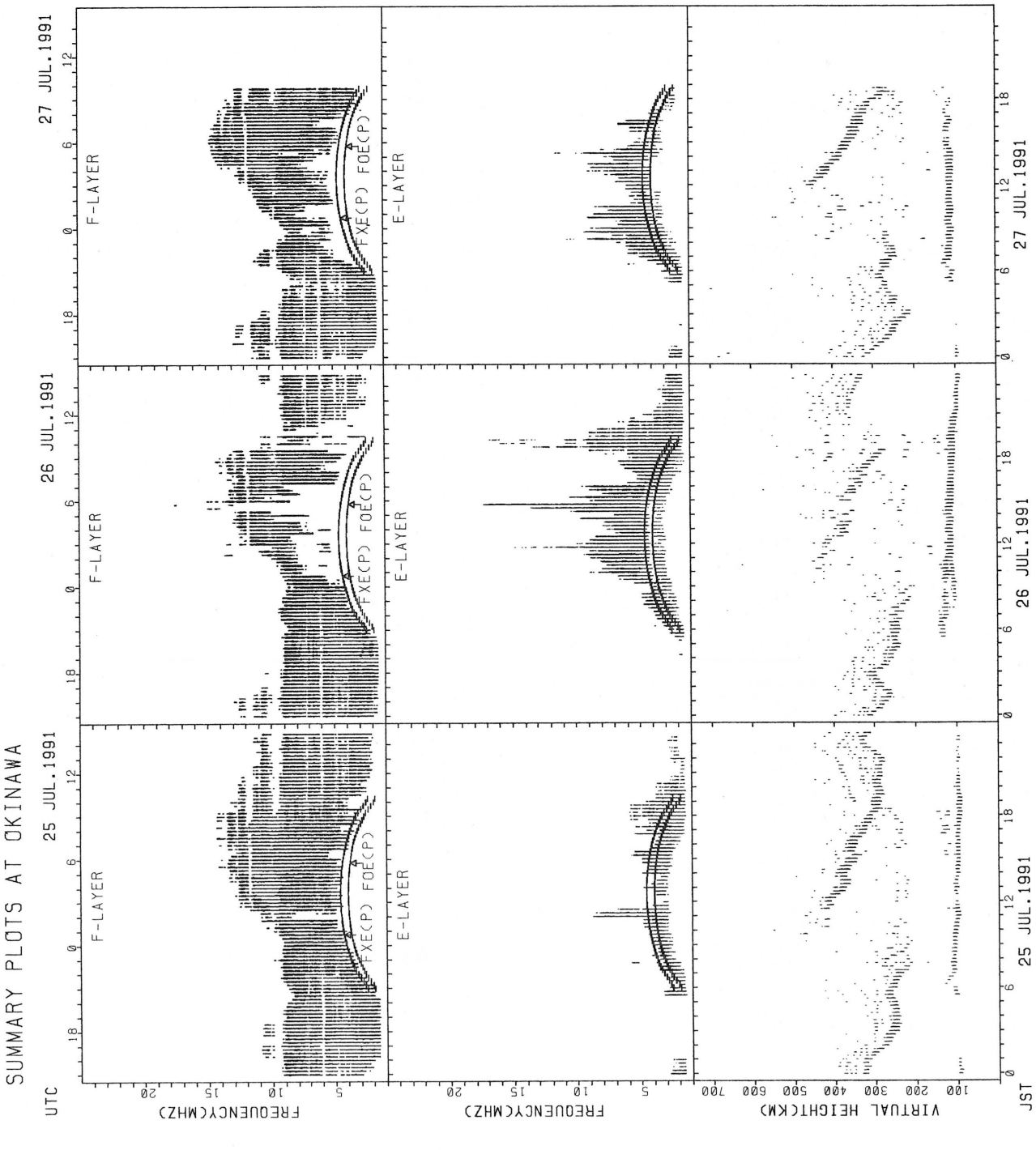
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

SUMMARY PLOTS AT OKINAWA



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


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

MONTHLY MEDIANS OF H'F AND H'ES
JUL. 1991 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							13	13										11		15			12	10
MED							314	312										318		310			352	346
U Q							329	345										350		328			369	360
L Q							264	248										306		294			338	332

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	23	19	17	20	22	24	24	26	25	22	19	21	18	17	19	24	28	28	27	27	27	27	27
MED	111	109	109	113	121	124	121	119	117	115	115	113	113	118	115	119	123	123	119	117	115	117	113	111
U Q	114	115	119	119	127	127	124	121	121	121	117	117	119	121	125	131	125	127	123	119	117	123	121	115
L Q	107	107	107	109	113	121	119	115	115	113	111	109	110	113	111	115	117	119	117	115	113	113	111	107

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								14										11	10	10				
MED								312										330	316	265				
U Q								320										340	326	336				
L Q								262										300	268	232				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	26	22	25	24	29	31	28	24	22	21	22	23	20	25	27	27	26	28	29	29	27
MED	107	104	105	105	111	121	118	115	113	114	114	113	111	109	113	116	121	119	115	115	113	111	113	107
U Q	109	109	107	109	121	125	121	119	119	117	119	117	118	121	121	127	129	123	117	119	117	117	115	111
L Q	105	101	102	101	101	112	115	113	111	110	111	109	107	107	109	108	113	117	113	111	109	105	108	103

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	18	13				17	21	18								12	21	19	19	11			
MED	357	358	352				302	292	295								328	298	304	292	358			
U Q	388	368	391				325	334	314								332	312	338	304	376			
L Q	344	346	327				289	265	278								314	270	278	252	340			

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	30	27	26	23	22	15	20	27	31	29	26	25	24	24	23	23	26	26	27	27	30	30	29	29
MED	107	105	104	107	109	117	121	117	113	113	111	111	111	111	121	119	121	117	115	113	112	111	109	109
U Q	111	109	109	111	117	123	124	119	119	119	115	115	118	120	125	131	123	121	117	115	113	113	113	111
L Q	103	101	99	101	103	111	116	113	111	109	107	108	107	107	107	109	117	113	113	109	107	103	106	105

MONTHLY MEDIANS OF H'F AND H'ES

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		16	19	17	12	15	20	18	18								18	20	24	23	17			
MED		358	342	342	346	348	288	259	276								327	320	293	286	322			
U Q		368	360	362	376	362	305	282	312								330	332	313	322	361			
L Q		329	300	310	324	314	272	242	250								246	312	281	272	293			

H'ES

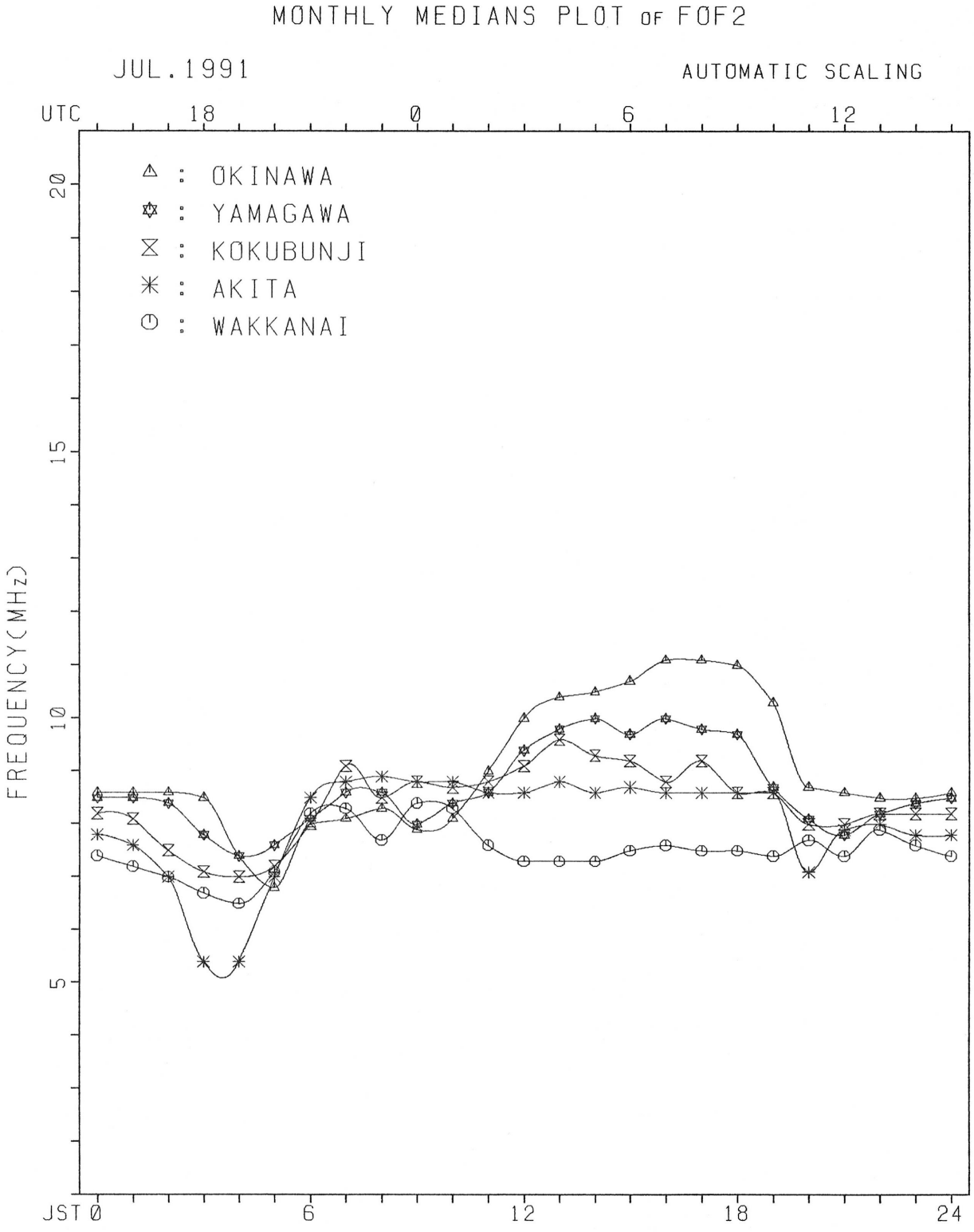
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	24	20	21	20	17	24	26	26	22	21	21	21	21	16	23	26	30	29	26	23	23	26
MED	109	107	105	104	107	110	117	117	115	113	115	113	111	113	117	121	125	117	115	113	111	107	109	106
U Q	111	113	107	108	109	115	129	120	121	121	119	115	117	120	124	127	133	123	119	117	115	111	113	113
L Q	101	103	101	99	99	104	111	111	111	109	107	109	109	107	108	113	117	113	109	107	107	101	101	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	14	17	20	19	15	11	16	24	22	14							22	22	26	27	17	11	12	11
MED	350	312	308	312	322	296	274	260	268	267							329	322	300	304	316	312	344	348
U Q	366	350	337	352	348	308	299	279	280	292							344	336	330	350	348	366	355	390
L Q	125	284	280	258	115	177	257	243	250	129							318	298	276	262	206	115	117	121

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	22	20	19	16	16	23	28	25	25	27	27	22	26	23	23	27	28	29	30	28	27	27	26
MED	109	106	111	109	108	108	133	119	127	119	119	117	118	125	119	123	125	120	119	113	109	107	99	107
U Q	133	115	128	119	233	208	143	131	153	128	123	121	129	137	131	129	153	133	124	119	113	115	109	111
L Q	99	101	104	105	104	104	111	113	118	112	109	113	113	113	113	115	119	118	112	109	104	99	97	99


MONTHLY MEDIANS PLOT OF FOF2
JUL.1991
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 STATION KOKUBUNJI

JUL. 1991 FXI (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	X 90	X 97	X 88	X 88	87					A	A	A	A	A					A	A	X 77	80	86	X 90
2	87	86	88	81	X 73								A						A	A	X 82	X 81	X 80	X 83
3	X 78	X 77	77	X 74	X 72					A											X 73	X 76	X 78	X 80
4	X 77	X 77	X 77	X 69	X 67													A			X 83	X 87	X 87	X 85
5	X 87	X 89	X 84	X 71	X 71																X 78	X 85	X 89	X 92
6	X 92	X 90	X 84	78	X 77																X 88	X 94	X 96	X 97
7	X 96	X 92	X 83	X 83	85																X 76	X 85	X 86	X 84
8	81	80	80	80	78	86															X 93	X 93	X 104	105
9	X 100	X 95	X 87	X 78	X 62																X 94	X 101	X 87	X 88
10	X 66	59	55	48	43	57											A				X 69	X 71	73	X 69
11	X 72	X 71	X 64	X 59	X 58																X 76	X 80	X 84	X 83
12	X 85	X 86	X 78	X 75	X 77						A								A	A	A	81	81	X 91
13	X 73	X 75	X 74	X 71	72				A	A			A								X 85	X 81	X 78	X 81
14	X 63	X 58	54	53	X 70	59	62	59											A		X 72	X 70	X 64	X 70
15	X 75	X 68	X 69	X 71	X 66											A					X 87	X 90	X 88	X 85
16	X 90	89	79	X 75	X 74																X 90	X 86	X 85	X 85
17	X 84	X 80	X 76	X 74	X 68					A	A										X 82	X 81	X 86	X 86
18	X 88	X 85	X 75	X 72	X 72											A					X 90	X 80	X 86	X 88
19	X 86	X 85	X 82	X 77	X 74																X 88	90	95	93
20	X 92	X 92	X 82	X 82	X 80																X 96	X 92	X 81	X 82
21	X 81	S	X 82	X 81	X 63																X 82	X 82	X 83	86
22	X 89	X 92	X 89	X 83	X 77																X 85	X 83	X 86	X 88
23	X 86	X 87	X 83	X 79	X 78									A						A	A	X 81	X 85	X 86
24	X 81	81	85	X 76	64																X 82	X 87	88	92
25	85	X 87	85	86	83																X 93	X 104	100	X 98
26	102	99	94	X 92	X 92													A			94	X 97	X 95	X 94
27	X 97	X 96	X 92	X 83	78																X 102	X 103	X 106	X 106
28	X 104	X 100	X 94	X 92	X 85															X 101	X 91	X 94	X 93	98
29	X 96	X 93	X 89	X 88	X 84															X 103	X 95	X 100	X 98	X 96
30	X 96	X 97	X 91	X 86	X 83									A						X 90	X 86	X 94	X 94	X 93
31	X 92	X 90	X 89	X 84	X 84															X 91	X 91	X 0 X 94	X 0 X 99	X 97
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	3	1	1												4	29	31	31	31
MED	X 87	X 87	X 83	X 78	X 74	59	62	59												X 96	X 86	X 86	X 86	X 88
U Q	X 92	X 92	X 88	X 83	X 83	86														X 102	X 92	X 94	X 95	X 94
L Q	X 81	X 80	X 77	X 72	X 68	57														X 90	X 80	X 81	X 83	X 84

JUL. 1991 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 FOF2 (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	84	91	82	82	F 79	90	96	91	79	A	A	A	A	A	71	69	71	73	A	A	71	F 73	79	84
2	F 80	F 76	U F 76	73	67	77	85	85	76	78	J R 79	73	I A 72	72	77	73	71	71	A	A	76	75	74	77
3	73	71	F 68	68	66	68	70	63	56	I A 57	59	E G 54	58	U R 58	64	61	65	66	67	62	67	70	72	74
4	S 71	71	72	63	61	70	80	78	75	77	75	76	80	89	91	88	84	I A 84	90	82	77	81	81	79
5	81	83	78	65	65	R 72	90	87	72	69	69	73	J R 72	74	75	74	76	72	70	71	71	79	83	86
6	86	84	78	F 71	71	78	88	93	97	94	91	93	97	100	96	95	94	90	80	76	82	88	91	91
7	90	86	78	77	77	93	91	91	91	90	88	84	B	85	81	76	74	71	69	67	71	79	80	79
8	F 73	F 71	F 73	F 73	F 69	F 78	92	94	89	88	94	95	96	99	95	94	93	91	93	93	87	88	F 97	F 97
9	94	89	81	73	57	59	J R 63	67	73	59	70	J R 68	74	71	74	76	78	74	84	91	88	95	81	83
10	60	F 50	F 44	F 37	F 34	F 48	61	59	59	E G 50	55	53	U R 55	W	61	57	I A 56	59	59	60	63	65	F 65	63
11	66	65	58	53	52	57	62	64	57	60	R 68	71	72	77	77	76	78	81	92	86	70	74	78	77
12	79	80	72	69	71	74	88	85	67	77	I A 84	90	96	92	89	86	83	U A 84	A	A	A	F 74	F 74	85
13	68	69	68	65	F 64	77	76	74	I A 68	A	55	E G 51	I A 56	57	60	R 64	57	62	59	68	79	75	72	75
14	57	53	J F 46	J F 47	64	F 48	F 55	F 53	54	U R 51	54	E G 49	E G 50	E G 50	57	58	54	57	I A 57	U A 61	66	64	58	64
15	69	62	63	65	60	58	67	68	66	80	90	86	93	98	95	I A 84	77	75	76	R 82	81	84	R 82	79
16	84	82	F 73	69	68	73	77	87	90	96	91	89	94	99	98	100	99	94	89	86	85	80	79	79
17	R 78	74	70	68	62	75	77	84	80	A	A	87	97	93	89	100	108	103	90	75	76	75	80	80
18	82	79	69	66	66	64	78	73	74	V 71	75	75	84	U R 85	92	I A 88	85	84	90	95	84	75	80	82
19	80	79	76	71	R 68	67	75	90	98	V 90	85	83	91	101	100	91	85	87	91	85	82	F 84	85	F 86
20	86	86	76	76	75	S 72	62	87	101	106	V 100	104	104	R 101	91	98	U R 88	93	90	93	90	V 86	76	U S 76
21	76	I S 78	76	75	57	61	79	94	92	98	90	91	92	98	97	101	97	96	95	87	76	76	77	78
22	V 83	86	83	77	71	76	80	93	91	77	83	82	90	97	99	104	93	96	99	88	79	77	80	82
23	80	81	77	73	72	73	77	83	83	78	78	78	84	I A 85	82	90	94	87	82	A	A	Z 75	79	80
24	S 76	F 73	F 77	70	F 55	64	84	89	83	86	82	77	85	90	91	99	107	109	94	80	76	S 77	F 79	F 84
25	F 76	81	F 77	F 79	F 75	77	103	100	94	96	93	103	R 109	112	106	102	96	99	96	93	R 87	S 98	F 92	92
26	F 93	F 93	F 85	86	86	83	83	V 79	78	77	78	85	95	R 99	104	102	89	I A 90	94	V 95	F 89	91	89	88
27	91	90	86	77	F 71	72	92	96	94	94	95	101	105	103	104	108	105	104	106	105	96	Z 97	100	100
28	98	94	88	86	79	81	103	112	101	105	96	94	98	102	98	95	96	94	98	95	86	88	87	88
29	90	87	83	82	V 78	81	R 109	116	100	95	100	103	99	100	101	104	106	105	102	97	89	94	92	90
30	90	91	85	80	77	76	93	105	100	U A 96	97	98	97	I A 100	103	97	93	87	83	84	81	88	88	87
31	86	84	83	78	78	86	99	V 103	101	100	94	98	107	105	100	94	89	94	90	85	85	R 88	R 93	91
	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	28	29	30	29	29	31	31	31	31	28	27	29	31	31	31
MED	80	81	76	73	68	73	80	87	83	83	84	84	92	97	91	91	88	87	90	85	81	79	80	82
U Q	86	86	82	77	75	78	92	94	94	96	94	94	97	100	99	100	96	94	94	93	86	88	88	88
L Q	73	71	70	66	62	64	75	74	72	74	72	73	73	81	77	76	76	73	78	75	74	75	77	78

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 FOF1 (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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							U L 560		565							525		L						
2							L	500	545	U A 535	U A 560			560	U R 550	530								
3								485	U A 510		540	535	U R 545	535		535	500	485	U L 460					
4						L	L 510	L	530	550	610	R 565	580		R 605	550	550		L					
5						L	U L 480	U L 590				U A 555		565	555	545	535	470						
6									L	U A 640	565	U A 600		U A 620	H 600	580	575	U L 500						
7								L	U L 610	560					R 550	515	505	U L 525	U L 455					
8							L	U L 505	L	610	585	620	610	565	600	L 575	U L 570	L	L					
9						330	410	U A 450	515	540	550	575	560	605	570	575	540	515	430					
10						L	430	460	490	500	515	480	505	R 515	540	520		470						
11						U L 365	L 435	470	530	515	550	570	560	580	580	555	L 540	480	L					
12						L	U L 470	490	L	530			570	L	550	560								
13							L	440			510	R 505		510	495	500		430	385	L				
14						335	405	430	460	475	485	490	500	R 500	515	495	470	440						
15						L		470	R 535	560	L 625	L 550	U A 555	L 580	530		L							
16							L	L 500	U L 545	555	585	600	560		545	505	L 525	U L 475	L					
17							L	L	520			U L 590	H 535	L 610	545			L						
18							L	L 470	L 515	L	590	570			L 560		L	U L 510	L					
19								L		L	L	L	565	565		515								
20								U L 535	U L 530	L	L		L	580	L	520		L	L					
21								L 500	U L 560	L	550	570	570	555	550	535	525	U L 505	L					
22							L	L 590	U L 550		550	L	585	565	550	555								
23								L		535					555	H 550	495	U L 475						
24							L	L	L	575	L	625	605	575	L	560	L 520	L						
25										620		620		550	600	580	U L 620	L 515						
26								L	U L 530	L	500			580		L 645			L					
27								L			600			R 565		L 575	U L 555							
28							L	L	U L 520	U L 500	U L 620	620			610	U L 575	L 535	L						
29							L	L	L	L	U L 625	L 565	L	600	620	590	575	520	L					
30								L		L		L	615			595	L 610	L 550	L					
31									L	L	590		H 675	H 595	620	635	595	U L 600	L 525					
	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	8	17	18	18	18	20	17	22	24	28	19	15	4					
MED						335	L 452	490	530	558	555	572	565	565	555	552	535	L 485	442					
U O						U L 365	U L 495	U L 512	U L 545	U 610	585	618	590	580	598	L 575	U L 555	L 515	U L 458					
L O						330	420	465	515	535	540	552	550	555	548	522	520	470	408					

JUL. 1991 FOF1 (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 FOE (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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						A	285	350	385	405	420	B	B	B	380	A	A	A	A	B				
2						A	305	A 350	375	400	A 400	415	U A 425	425	420	405	370	330	A 255	B				
3						A	A 320	360	410	425	435	435	440	430	420	400	355	A	A	B				
4					205	280	340	380	405	425	430	430	435	420	400	365	U A 300	A	B					
5					210	285	A 340	A 375	U A 395	A	A	A	A	A	A	A	A	335	B	B				
6						A	305	355	375	410	420	420	425	420	400	A	A	A	A	B				
7					220	295	340	380	405	405	B	B	B	435	395	375	325	245	B					
8					200	280	340	380	390	U A 390	A	A	A	R 405	385	345	310	245	B					
9					200	270	325	A	A	A	A	410	410	400	390	345	295	250	B					
10						A	A 315	345	380	380	390	405	415	385	375	350	305	240	B					
11					190	R 270	335	A 365	A	A	405	415	400	395	390	A 365	310	235	B					
12					195	270	325	365	390	U A 400	A	A	A	A 400	U A 380	A	340	310	A	B				
13					200	275	320	350	A 365	A	A	A	A	380	350	345	310	240	170					
14						A	A 270	325	340	370	A 370	A	A	425	A	365	340	290	U A 225	B				
15					190	260	310	350	A	A	A	A	A	A 415	400	380	345	300	U A 240	B				
16						A	255	300	330	A	A	A	A	400	405	390	A	A	A	B				
17					190	270	320	350	365	A	A	A	A	A	A	A	A	A	A	B				
18					200	255	R 330	370	375	390	410	405	U A 395	A	U A 365	345	A	A	A	B				
19					180	270	330	365	390	390	420	415	425	400	375	345	305	240	B					
20						A	260	320	345	385	R 405	B	U R 415	420	410	385	345	315	A	B				
21					180	260	310	360	390	R	R 420	425	415	395	370	340	315	220	B					
22						A	A	A	A	A	A	R	U R 415	410	405	375	345	305	235	B				
23						A	270	325	360	395	A	A	A	A	A	380	345	305	A 225	B				
24						B	270	330	360	385	390	A 405	415	410	400	375	355	315	225	B				
25						A	260	315	U A 355	A	A	A	A	A	380	385	360	315	U A 225	B				
26						A	265	320	355	375	A 395	A	A	420	405	390	360	300	A	B				
27						A	U A 290	315	345	A	A	A	A	A	A	A	350	U A 300	A	B				
28					180	260	A	A	A	A	A	A	A	A	A	385	U A 360	320	A					
29						A	A	A	A	A	A	A	A	A	A	395	350	310	235					
30					200	270	A	A	A	A	A	A	A	A	A	A	A	310	U A 240					
31						B	265	U A 325	360	A	B	A	A	A 430	A	A 410	375	320	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						15	28	27	26	20	15	10	13	19	21	24	25	25	17	1				
MED						200	270	325	360	390	400	418	415	415	400	385	350	310	240	170				
U Q						200	282	340	375	402	420	420	425	425	408	392	360	315	242					
L Q						190	262	320	350	378	390	405	412	410	390	375	345	302	A 225					

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 FOES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	JA 74	JA 55	JA 54	JA 50	JA 47	JA 41	JA 44	JA 65	JA 63	98	81	JA 82	JA 87	102	JA 66	44	JA 63	56	97	JA 85	JA 51	JA 65	JA 52	JA 42
2	JA 28	JA 65	46	JA 37	JA 26	28	JA 43	JA 54	JA 53	54	60	JA 71	80	47	JA 54	60	JA 63	JA 91	94	91	JA 99	61	JA 120	JA 54
3	JA 43	JA 54	JA 42	JA 21	JA 30	JA 101	JA 79	46	53	JA 115	49	47	48	50	JA 63	42	39	JA 54	JA 48	JA 43	JA 27	JA 26	JA 36	JA 53
4	EB 14	EB 15	19	18	JA 16	23	G	40	JA 39	JA 60	52	52	53	JA 72	JA 56	45	JA 54	102	JA 52	JA 32	30	JA 28	35	33
5	JA 26	JA 27	JA 27	JA 22	JA 19	23	31	45	JA 59	61	90	JA 56	JA 87	JA 68	50	JA 52	JA 51	JA 47	JA 80	JA 50	46	JA 86	JA 91	JA 86
6	JA 43	JA 41	JA 51	32	JA 25	24	JA 40	JA 48	48	67	JA 78	JA 68	JA 97	66	JA 143	JA 145	JA 96	JA 53	JA 49	JA 36	JA 54	58	EB 14	JA 24
7	JA 51	JA 47	JA 49	JA 52	JA 36	JA 26	G	45	42	50	JA 100	EB 63	B	EB 63	46	JA 49	G	G	30	20	JA 21	26	22	JA 61
8	JA 89	JA 44	JA 40	33	27	22	30	G	43	G	44	JA 50	JA 52	43	G	47	47	JA 50	JA 38	25	60	JA 88	59	JA 53
9	JA 43	JA 33	27	JA 32	JA 44	22	37	JA 62	JA 51	JA 66	JA 54	JA 51	G	46	JA 52	G	G	G	G	EB 18	EB 13	JA 23	JA 35	JA 37
10	JA 32	JA 26	JA 29	JA 31	JA 51	25	32	JA 41	JA 46	JA 49	43	46	47	45	G	48	JA 65	42	JA 49	JA 48	JA 24	JA 53	JA 87	JA 33
11	JA 19	JA 19	EB 13	JA 21	JA 27	G	G	G	42	45	JA 52	G	47	G	41	G	42	G	26	JA 19	JA 17	EB 14	JA 19	JA 15
12	JA 23	EB 13	EB 14	EB 14	EB 14	G 17	G	G 24	46	46	127	JA 71	55	53	55	JA 50	JA 59	96	JA 174	JA 144	JA 151	JA 51	JA 54	JA 99
13	JA 138	JA 66	JA 44	JA 24	EB 15	30	33	JA 54	91	89	JA 98	47	JA 74	JA 53	G	G	JA 54	JA 44	JA 35	20	JA 23	JA 26	JA 21	EB 13
14	JA 28	JA 27	JA 35	20	JA 47	JA 27	33	38	41	44	JA 51	JA 49	43	G	42	G	G	31	60	JA 97	33	42	43	28
15	JA 54	JA 37	JA 29	JA 24	JA 23	29	JA 55	36	48	39	JA 50	43	JA 64	44	57	JA 137	JA 51	JA 68	JA 54	75	53	40	JA 48	JA 65
16	JA 41	JA 42	JA 33	JA 28	JA 23	22	28	36	JA 47	48	JA 52	JA 67	JA 71	JA 96	46	47	JA 67	JA 50	JA 51	JA 25	JA 51	JA 51	JA 43	30
17	JA 18	EB 14	ES 16	EB 14	EB 15	G	39	JA 49	JA 51	92	114	53	47	JA 53	46	JA 62	59	53	JA 51	JA 52	32	23	JA 42	JA 66
18	JA 33	33	25	22	EB 14	G	29	39	45	JA 52	42	JA 58	JA 67	97	48	123	JA 42	JA 39	38	43	38	JA 47	JA 27	JA 44
19	A 34	JA 26	27	26	20	28	JA 43	JA 59	JA 73	48	JA 75	JA 57	JA 50	49	57	43	JA 103	92	JA 55	JA 58	JA 47	JA 86	JA 98	JA 65
20	JA 53	34	JA 49	JA 43	JA 22	27	JA 43	JA 48	JA 57	JA 50	G	EB 85	G	49	45	47	108	JA 103	JA 52	JA 45	35	JA 51	JA 60	JA 41
21	JA 22	JA 21	23	25	JA 24	G	36	JA 51	40	42	G 40	G	G	JA 75	G	G	39	34	28	JA 22	JA 40	JA 53	JA 33	JA 47
22	JA 33	JA 27	JA 24	JA 26	JA 27	JA 35	27	33	JA 42	42	44	G	G	53	53	43	JA 64	JA 63	JA 58	JA 53	43	JA 34	38	JA 51
23	JA 54	JA 52	JA 64	41	42	JA 37	34	JA 52	73	G	JA 85	JA 69	77	143	JA 55	51	JA 84	JA 102	JA 88	106	JA 123	JA 78	JA 54	JA 66
24	JA 65	JA 44	JA 35	JA 30	JA 43	22	32	38	50	51	JA 55	JA 54	47	51	45	49	41	43	JA 54	31	JA 71	JA 102	96	59
25	JA 55	JA 88	JA 51	JA 43	JA 28	JA 33	62	JA 49	JA 61	JA 53	57	JA 58	JA 64	47	G 35	41	44	37	JA 66	JA 46	JA 52	JA 38	JA 52	JA 52
26	JA 54	JA 65	JA 52	JA 51	JA 30	20	31	JA 50	48	JA 56	JA 66	JA 78	JA 91	JA 57	JA 104	JA 55	JA 85	JA 114	JA 67	JA 54	JA 102	JA 58	JA 51	JA 52
27	37	JA 24	JA 31	JA 25	31	23	54	JA 78	73	81	60	JA 104	94	JA 54	JA 70	JA 54	JA 51	90	JA 101	JA 98	JA 86	57	JA 49	JA 46
28	JA 33	33	EB 14	20	EB 14	20	32	JA 46	JA 43	JA 55	JA 66	55	JA 80	68	45	JA 55	JA 130	95	JA 61	JA 36	27	24	JA 52	JA 75
29	JA 37	JA 43	JA 33	JA 17	JA 23	JA 33	JA 43	JA 47	JA 46	JA 51	43	JA 49	JA 54	JA 55	JA 47	46	JA 86	JA 51	40	JA 47	JA 27	JA 70	JA 50	JA 65
30	JA 70	JA 54	JA 54	JA 67	JA 17	G	JA 46	JA 55	57	JA 110	JA 51	JA 53	91	112	JA 56	JA 78	55	42	JA 42	46	JA 116	JA 72	JA 66	JA 48
31	JA 37	EB 14	JA 51	EB 14	23	EB 20	G	40	39	JA 51	EB 78	JA 52	44	JA 55	JA 54	JA 50	43	JA 49	JA 92	JA 53	JA 41	JA 53	JA 66	JA 52
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	JA 37	JA 34	JA 33	JA 26	JA 25	23	33	JA 46	48	51	54	JA 54	54	53	50	48	JA 54	51	JA 52	JA 46	JA 43	JA 51	JA 50	JA 52
U Q	JA 54	JA 52	JA 49	JA 37	JA 31	JA 29	JA 43	JA 52	JA 57	66	78	JA 68	JA 80	68	JA 56	JA 55	JA 67	91	JA 67	JA 58	JA 60	JA 65	JA 60	JA 65
L Q	JA 28	26	25	21	EB 19	G 20	G 29	38	43	46	49	49	47	47	G 45	G 43	42	42	40	31	JA 27	28	JA 35	37

JUL. 1991 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 FBES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	42	33	30	25	34	40	55	54	A A 98	A A 81	A A 82	A A 87	A A 102	63	43	61	47	A A 97	A A 85	40	29	29	E B 13
2	E B 13	31	36	26	17	26	36	41	43	54	56	69	A A 80	47	51	46	62	67	A A 94	A A 91	31	24	21	25
3	26	25	22	16	17	44	55	43	51	A A 115	47	45	U Y 48	48	62	42	38	36	27	21	20	17	21	17
4	E B 14	E B 15	E B 15	E B 14	E B 14	23	G 36		G 34	48	50	50	51	70	54	44	45	A A 102	30	22	20	20	25	23
5	16	19	19	16	17	G 18	G 40		55	61	67	56	68	52	47	43	40	39	58	43	32	20	24	34
6	23	27	35	23	20	21	G 29	40	44	64	52	60	71	62	43	52	39	33	40	24	19	43	E B 14	14
7	35	28	37	31	23	G 20	G 42		40	45	77	E B 63	B	E B 63	45	48	G	G	28	U Y 20	18	18	E B 14	17
8	26	33	28	20	19	22	U Y 29	G	G	G	43	43	48	43	G	45	42	40	35	23	27	33	34	41
9	27	24	14	26	28	G 20	32	45	41	43	45	44	G	45	41	G	G	G	G	E B 18	E B 13	16	34	32
10	30	22	19	21	29	23	31	34	41	42	41	44	45	44	G	46	A A 65	40	47	42	17	44	16	E B 14
11	E B 13	E B 13	E B 13	17	20	G	G	G	40	44	42	G	46	G	41	G	G 37	G	U Y 26	17	15	E B 14	E B 13	E B 13
12	17	E B 13	E B 14	E B 14	E B 14	G 16	G	G 23	43	43	A A 127	68	51	50	48	48	57	U A 66	A A 174	A A 144	A A 151	39	28	20
13	45	40	19	17	E B 15	27	30	38	A A 91	A A 89	43	46	A A 74	47	G	G	48	37	35	19	20	16	16	E B 13
14	26	22	21	E B 13	35	22	30	34	39	43	47	42	42	G	41	G	G	30	A A 60	40	19	35	43	18
15	25	33	18	E B 14	16	28	45	35	40	38	41	43	56	43	50	A A 137	45	66	47	44	45	29	25	33
16	18	16	21	21	18	21	28	34	44	42	43	53	46	73	44	41	43	33	32	19	31	44	35	18
17	E B 14	E B 14	E S 16	E B 14	E B 15	G	35	44	43	A A 92	A A 114	48	47	52	44	54	58	44	49	46	25	E B 15	18	40
18	17	20	16	E B 13	E B 14	G	U Y 29	38	41	47	42	54	65	67	47	A A 123	40	36	30	29	32	40	17	34
19	22	17	18	E B 15	E B 14	26	36	38	55	41	51	55	45	45	57	42	72	78	43	55	37	47	45	22
20	20	17	18	17	E B 13	21	31	41	41	42	G	E B 85	G	49	G	44	73	43	28	22	29	19	34	27
21	15	18	16	E B 14	20	G	33	39	G	40	U G 40	G	G	45	G	G	37	33	27	19	22	20	20	31
22	26	23	20	17	17	25	U Y 27	33	37	41	43	G	G	51	52	42	51	61	54	43	34	22	33	33
23	27	31	49	30	31	32	31	50	62	G	69	65	70	A A 143	49	41	40	42	61	A A 106	A A 123	37	25	47
24	43	31	23	23	E B 12	21	31	36	47	46	51	45	46	46	43	43	40	40	50	28	41	44	65	37
25	E B 13	50	32	30	23	30	57	44	61	49	57	45	60	45	G 34	40	41	36	45	44	38	24	23	E B 14
26	18	43	24	17	18	20	30	47	45	51	53	68	64	55	94	54	68	A A 114	30	20	56	23	17	24
27	29	16	22	19	27	20	48	43	66	65	43	71	70	47	68	50	43	85	79	46	45	34	41	29
28	28	19	E B 14	E B 16	E B 14	U Y 19	30	38	39	45	48	46	79	63	45	48	51	46	59	24	16	E B 16	18	61
29	22	31	20	15	18	27	34	39	44	44	42	48	48	51	46	42	42	34	40	44	26	44	33	45
30	44	40	36	39	E B 13	G	33	53	49	U A 80	49	52	85	A A 112	48	42	46	41	39	36	33	39	22	19
31	21	E B 14	E B 16	E B 14	E B 14	E B 20	G	38	39	41	E B 78	45	44	47	44	G 41	40	41	86	45	24	21	29	27
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	23	23	20	17	17	21	31	39	43	45	48	47	50	48	45	43	43	40	43	36	29	24	25	25
U Q	28	31	28	23	23	26	35	43	51	A 61	57	63	70	63	51	48	57	61	59	45	38	39	34	34
L Q	E B 17	E B 17	E B 16	E B 14	E B 14	G	G	35	40	42	43	44	45	45	G 41	G 41	40	34	30	21	20	19	18	E B 17

JUL. 1991 FBES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 FMIN (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	13	12	14	14	13	15	18	20	26	32	34	50	52	43	35	26	20	17	18	17	13	14	13	13
2	13	14	15	14	13	18	18	18	20	25	33	33	33	33	34	28	22	18	18	14	14	14	14	13
3	13	13	14	13	13	16	19	24	33	34	36	35	34	34	31	27	20	16	17	13	13	13	13	14
4	14	15	15	14	14	15	21	17	20	27	33	33	34	37	34	26	23	20	18	13	13	13	15	14
5	13	13	13	13	14	15	17	17	19	21	33	34	23	35	32	30	21	17	27	13	14	14	13	13
6	14	12	13	14	14	15	16	17	26	33	33	36	35	35	31	28	19	13	15	14	14	14	14	13
7	14	13	13	13	13	13	18	20	18	27	28	63	B	63	40	34	22	20	18	14	12	13	14	14
8	15	14	15	14	13	16	18	18	18	24	33	34	37	37	32	25	20	19	17	15	15	14	13	14
9	14	14	13	15	14	16	18	18	21	24	26	35	34	30	24	26	20	17	17	18	13	13	13	14
10	13	13	13	13	13	15	18	20	18	22	22	31	31	33	30	24	18	17	15	14	13	13	15	14
11	13	13	13	13	13	17	18	21	26	34	32	31	35	35	32	34	23	20	18	16	13	14	13	13
12	13	13	14	14	14	15	17	18	26	22	23	33	33	33	27	22	18	16	16	14	14	14	13	13
13	14	15	14	13	15	15	18	20	22	23	29	32	32	33	29	25	17	18	15	13	13	13	13	13
14	13	13	14	13	12	13	16	17	18	22	21	34	33	40	33	20	18	16	16	13	12	13	13	14
15	16	16	15	14	13	15	20	18	22	26	27	36	34	34	23	25	19	17	19	15	13	15	15	15
16	16	14	14	14	14	15	16	17	19	22	31	33	36	34	36	24	21	21	18	16	16	15	15	15
17	14	14	E S 16	14	15	16	16	18	18	22	31	32	35	36	33	22	35	18	15	15	14	15	15	15
18	14	15	13	13	14	17	17	24	28	28	37	35	31	33	35	30	21	18	18	15	14	14	15	15
19	13	13	14	15	14	15	17	17	20	25	22	34	32	26	32	26	19	15	17	14	15	14	14	13
20	15	14	13	13	13	13	16	17	21	21	33	85	41	32	33	27	21	17	15	13	15	13	15	13
21	14	13	14	14	13	15	17	16	17	24	31	34	34	34	26	21	20	22	20	16	14	13	13	15
22	14	13	13	13	13	16	18	18	22	30	33	33	31	34	34	24	20	18	16	16	15	14	15	15
23	14	14	13	14	13	16	18	20	25	30	33	34	32	36	27	28	18	20	17	17	13	15	13	14
24	14	14	15	13	12	17	17	17	22	25	32	33	35	33	34	23	19	19	18	13	16	14	15	13
25	13	13	13	13	13	15	18	20	24	23	33	33	34	33	21	20	20	17	17	14	14	15	16	14
26	13	13	13	13	13	16	17	18	21	23	27	31	36	35	32	27	21	16	15	13	16	13	14	14
27	13	14	13	13	15	17	17	20	24	23	28	33	33	27	25	25	21	17	19	14	14	13	14	14
28	15	13	14	16	14	14	16	18	18	23	26	30	27	27	24	23	18	16	17	14	13	16	14	17
29	14	14	13	13	12	14	16	16	23	22	24	28	31	34	28	30	20	16	18	14	13	14	15	15
30	15	14	15	13	13	14	19	18	24	22	31	33	33	33	26	21	21	15	14	13	14	13	14	14
31	15	14	16	14	14	20	19	20	21	26	78	33	35	35	31	28	19	18	18	16	15	16	17	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	14	14	14	13	13	15	18	18	21	24	31	33	34	34	32	26	20	17	17	14	14	14	14	14
U Q	14	14	15	14	14	16	18	20	24	27	33	35	35	35	34	28	21	19	18	16	15	14	15	15
L Q	13	13	13	13	13	15	17	17	19	22	27	33	32	33	27	23	19	16	16	13	13	13	13	13

JUL. 1991 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	240	265	250	255	F 250	260	265	280	250	A	A	A	A	A	A 250	250	255	270	A	A	260	F 250	235	260
2	F 255	F 255	U F 285	280	250	260	295	280	235	245	J R 255	A 255	A	240	255	255	A 255	A	A	A	260	245	235	255
3	265	250	F 255	235	235	245	255	245	215	I A 215	215	G	210	U R 215	235	235	245	245	260	260	240	235	240	245
4	S 255	255	265	255	250	260	280	255	245	285	240	240	235	250	260	260	255	I A 260	270	265	245	240	240	240
5	250	265	265	260	245	R 280	265	270	240	230	A	245	J R 240	250	250	255	265	270	275	265	245	235	245	245
6	265	265	275	F 255	250	265	265	250	275	250	250	240	255	255	255	265	265	275	270	265	240	240	240	250
7	270	275	250	255	245	310	285	265	275	250	A 245	245	B	250	240	250	255	260	265	250	240	245	255	265
8	F 245	F 250	F 255	F 265	F 260	F 280	280	295	250	245	250	250	250	255	250	250	255	260	260	270	260	245	F 250	F 260
9	255	260	260	230	210	215	J R 220	215	245	215	245	J R 225	260	260	260	265	265	245	255	265	235	260	250	265
10	235	F 255	F 230	F 260	F 255	F 240	255	240	265	G	220	290	U R 200	W	250	230	I A 240	255	260	260	260	250	F 260	250
11	250	270	270	250	255	270	270	280	220	245	R 260	255	265	270	265	265	270	270	275	290	245	245	250	255
12	255	270	255	250	260	275	280	305	305	245	I A 255	265	270	275	275	275	275	A	A	A	A	F 250	F 245	270
13	250	250	260	265	F 265	255	255	250	A	A	210	G	A	225	245	R 265	250	260	230	245	250	240	235	265
14	235	245	J F 235	J F 220	260	F 235	F 230	F 220	225	U R 210	230	G	G	G	235	245	250	250	I A 250	U A 245	255	255	255	245
15	265	245	245	255	280	255	260	260	240	250	260	275	275	285	295	I A 290	290	285	285	R 280	265	255	R 270	260
16	265	275	F 285	270	270	295	270	285	280	285	275	A 220	275	280	280	280	285	285	300	280	275	265	265	265
17	R 275	270	265	265	255	300	260	325	290	A	A	265	280	275	260	260	280	290	295	280	265	250	255	270
18	285	285	260	255	260	265	280	300	300	V 305	290	280	285	U R 305	295	I A 290	280	275	285	300	290	265	260	260
19	270	270	285	270	R 265	270	290	300	300	V 285	255	270	275	270	275	280	260	A 280	290	290	260	F 245	260	F 260
20	260	285	250	250	265	S 290	275	270	300	265	V 260	285	280	R 285	275	285	U R 310	285	270	270	270	V 270	255	U S 275
21	245	S	280	305	270	260	265	300	275	270	295	260	270	260	260	260	280	275	295	295	280	250	240	250
22	V 245	270	275	275	250	260	295	285	310	275	280	260	270	280	280	275	275	275	290	280	260	255	245	255
23	250	270	260	265	275	275	260	270	275	270	A 260	250	255	I A 260	265	275	290	300	300	A	A	Z 250	245	265
24	S 260	F 275	F 285	260	F 275	245	270	300	295	275	295	255	270	270	270	275	285	290	300	285	250	S 250	F 260	F 275
25	F 265	260	F 270	F 280	F 275	270	295	320	295	265	250	250	R 260	270	270	275	270	285	290	275	R 270	S 265	F 275	265
26	F 265	F 260	F 260	260	270	265	290	V 275	280	280	260	265	265	R 275	A 275	265	270	I A 275	280	V 285	F 255	265	265	250
27	260	265	285	285	F 260	260	275	295	280	280	260	255	265	260	255	265	275	275	290	285	270	Z 255	265	270
28	280	280	275	280	260	270	285	300	265	280	265	260	250	265	265	260	270	275	290	285	280	255	260	250
29	270	270	270	260	V 260	260	F 290	305	295	275	265	265	265	260	255	260	275	280	280	280	255	265	265	260
30	265	270	265	270	270	260	275	285	295	A	280	270	A 260	I A 265	270	270	280	280	275	270	245	245	260	255
31	260	260	265	255	260	275	295	V 280	280	280	270	245	265	260	260	265	265	275	A	270	255	R 265	R 275	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	30	31	31	31	31	31	31	30	27	28	30	27	30	31	31	31	29	27	27	29	31	31	31
MED	260	265	265	260	260	265	275	280	275	265	260	255	265	260	260	265	270	275	280	275	260	250	255	260
U Q	265	270	275	270	270	275	285	300	295	280	268	265	270	275	275	275	280	282	290	285	268	260	260	265
L Q	250	255	255	255	250	260	260	260	245	245	248	245	250	250	250	255	255	260	265	265	245	245	245	250

JUL. 1991 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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							UL 320	A	A	A	A	A	A	A	A	365	A	L	A	A				
2							L	A 325	355	A	A	A	A	370	UR 335	380	A	A	A	A				
3						A	A	A 350	A	A	380	375	R	360	A	350	340	310	UL 285					
4						L	L 310	L	360	350	345	R 375	365	A	R 300	350	330	A	L					
5						L	UL 330	UL 320	A	A	A	A	A	A 325	370	350	350	A 345	A					
6									L	A	A 325	A	A	A	H 340	A 295	320	UL 340						
7								L	UL 305	355	A	B	B	B	R 350	A	330	UL 305	UL 295					
8							L	UL 340	L	H 330	355	335	330	360	325	L 325	UL 300	L	L					
9						285	325	A	355	355	390	360	350	325	345	320	335	290	290					
10						L	300	330	350	370	395	415	370	R 380	345	A 350	A	A 320	A	A				
11						UL 310	L 330	345	360	390	H 365	H 365	365	H 355	350	345	L 325	330	L					
12						L	UL 320	340	L	385	A	A	A 330	L	350	345	A	A	A	A				
13							L	345	A	A	395	R 385	A	A 350	365	345	A	340	A	L				
14						290	330	350	340	390	A	390	365	R 360	345	360	350	335	A	A				
15						L	A	H 360	R 340	345	L 310	L 370	A	L 325	A	A	L	A	A					
16						L	L	L 340	UL 340	345	H 355	A 330	375	A	355	370	L 345	UL 340	L					
17						L	L	L	365	A	A	UL 305	H 355	L 310	345	A	A	L	A	A				
18						L	L	360	L 345	L	325	A	A	A	L 335	A	L	UL 305	L					
19							L	L	A	L	L	L	365	355	A	H 370	A	A	A	A				
20								UL 320	UL 355	L	L	B	L	365	L	385	A	L	L					
21							L	L 340	UL 335	L	360	370	375	360	345	350	330	UL 335	L					
22						L		L 330	UL 375		375	L	355	A	A	340	A	A	A					
23							L	A	A	370	A	A	A	A	A 320	H 355	350	A	A	A				
24						L	L	L	L	345	L	330	340	345	L	H 345	L 335	L	A					
25							A	A	A	360	A	340	A	360	320	325	UL 310	L 340	A					
26							L		UL 360	L	A 340	A	A	A	A	L 320	A	A	L					
27							L		A	A	345	A	A	R 340	A	A	UL 330	A	A					
28						L	L	UL 360	UL 385	UL 330		340	A	A	330	UL 320	A	L	A					
29						L	L	L	L	UL 340	L 370	L	355	325	335	340	330	L						
30							L	A	L	A	L	350	A	A	335	L 315	L 335	L						
31								L	L	355	B	H 320	H 365	H 340	320	335	UL 305	L 320	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						3	8	16	16	16	16	17	15	19	22	26	18	14	3					
MED						290	L 322	340	355	355	358	360	365	355	342	345	330	332	UL 290					
U Q						UL 310	L 330	350	UL 360	370	378	375	365	360	350	355	340	L 340	UL 295					
L Q						285	L 315	L 330	UL 340	345	342	332	350	325	330	L 325	UL 325	310	UL 285					

JUL. 1991 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 H'F2 (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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							355	310	425	A	A	A	A	A	A	490	A 460	380	A	A				
2							275	335	475	455	435	A	A	515	455	435	E A 460	A	A	A				
3						A 410	A 425	485	715	A	665	G	740	695	A	600	500	455	400					
4						375	365	H 330	470	365	520	485	495	A 440	420	400	420	A	330					
5						310	320	370	E A 375	A	A	515	E A 560	490	465	455	415	335	E A 380					
6									335	410	380	450	A 415	400	400	385	375	325						
7								L 350	350	425	A	470	B	465	475	450	430	415	365					
8							300	265	L 405	420	390	430	425	405	415	400	390	360	360					
9						535	570	555	460	670	500	Y 545	440	465	445	410	405	445	375					
10						L 475	430	510	450	G	650	415	760	W	Y 540	620	A	455	A 415	375				
11						370	375	375	680	515	470	470	445	415	420	410	380	360	315					
12						325	335	295	305	460	A	380	375	355	360	375	370	A	A	A				
13							L 400	420	A	A	725	G	A	645	530	460	510	435	480	355				
14						520	525	605	605	R 715	615	G	G	G	585	530	510	460	A	A				
15						365	375	390	Y 480	420	385	345	355	335	315	A	335	A	305					
16						280	L 380	285	310	320	355	365	365	360	340	335	315	310	255					
17						285	L 340	270	335	A	A	385	335	360	405	375	330	300	A 275	E A 300				
18						355	285	310	285	275	360	375	355	A 350	330	A	L 340	305	305					
19							305	305	285	285	L 410	395	370	360	335	330	A	A	290	A 290				
20								360	280	H 260	L 380	E B 375	300	310	340	340	335	320	315					
21							L 320	325	330	305	310	H 370	390	385	385	375	330	320	280					
22						410		340	280		365	L 420	390	350	350	340	310	350	290					
23							340	355	375	375	A	E A 460	E A 435	A	390	370	330	310	A 315	A				
24						420	335	280	300	360	340	460	420	390	375	355	320	295	280					
25							285	245	310	370	A 300	410	370	340	350	340	370	310	300					
26							280		300	315	445	415	400	355	A	360	A	A	310					
27							320		A 335	325	360	A 390	365	360	385	360	330	A	A					
28						310	290	270	H 270	335		390	A	370	385	360	340	325	310					
29						L 325	280	270	275	330	330	330	365	395	380	365	335	305						
30							320	280	295	A	325	390	A	A	360	365	330	330						
31								L 270	315	345	E B 410	440	365	380	390	370	375	340	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						16	26	28	30	24	24	29	25	28	28	29	28	24	22	4				
MED						368	335	328	334	368	385	415	382	388	388	375	362	332	311	328				
U Q						415	375	372	450	440	485	470	442	465	432	442	418	398	365	365				
L Q						318	300	280	300	322	358	382	365	358	355	360	330	310	290	A 295				

JUL. 1991 H'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 H'F (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	A 420	340	350	325	325	280	A 250	A	A	A	A	A	A	A	A	230	A	A	A	A	A 345	365	380	290
2	310	365	A 325	280	345	310	270	E A 275	235	A	A	A	A	250	A	235	A	A	A	A	320	A 340	365	345
3	330	360	320	365	405	A	A	E A 275	A	A	240	230	A	A 260	A	250	250	260	275	295	350	370	360	350
4	315	320	285	295	325	280	H 265	235	225	A 260	A 260	250	A 255	A	A	230	E A 270	A	270	300	300	335	350	365
5	340	305	275	270	350	265	240	240	A	A	A	A	A	A	240	220	230	E A 270	A	E A 335	A 350	360	360	A 365
6	330	305	310	315	340	275	255	250	H 230	A	A	A	A	A	H 215	A	230	235	290	290	340	A 390	330	320
7	A 320	295	A 360	355	340	255	245	A 250	215	240	A	B	B	B	280	A	250	255	260	300	345	335	315	315
8	360	375	340	330	320	280	235	215	H 205	H 205	215	200	245	235	H 220	A 255	A 270	E A 300	E A 290	290	290	360	375	335
9	325	325	295	A 400	490	310	275	A	240	240	205	210	H 220	235	H 215	225	H 230	245	280	285	310	290	305	290
10	A 405	390	A 365	A 360	A	310	275	245	A 260	230	210	225	260	235	240	E A 275	A	A	A	A	320	E A 410	310	340
11	330	285	280	320	340	300	245	240	225	215	H 230	H 210	230	H 225	220	225	225	240	275	260	H 235	320	315	330
12	325	295	300	325	315	300	250	235	235	205	A	A	A	A	E A 265	E A 270	A	A	A	A	A	A 390		305
13	A 400	A 365	325	315	335	295	260	255	A	A	220	250	A	E A 290	H 205	235	A	A 285	A	325	305	H 295	375	275
14	A 370	365	A 450	440	A 365	335	275	A 255	A 265	235	A	215	235	E B 285	240	235	235	250	A	A	325	A 350	A	360
15	335	A 385	365	325	275	A 325	A	H 240	H 220	215	210	210	A	H 240	A	A	E A 285	A	A	A 285	E A 330	A 320	300	375
16	305	280	285	305	290	265	225	220	A 260	210	H 210	A	200	A	A 240	230	A 265	250	A	265	280	A 335	A 330	310
17	280	275	315	315	330	270	260	250	235	A	A	E A 290	A	A	245	A	A	E A 285	A	A	305	335	325	A 355
18	280	265	260	310	315	290	255	245	A 255	A	220	A	A	A	E A 275	A	245	250	275	255	260	A 355	320	A 335
19	315	300	280	290	305	270	275	A 275	A	225	A	A	H 215	235	A	H 215	A	A	A	A	A 320	E A 390	A 360	335
20	330	280	350	340	300	265	260	A 275	240	240	H 220	B	H 215	240	H 200	225	A	E A 300	275	280	270	285	A 335	315
21	335	320	305	235	290	280	250	245	215	H 215	220	210	205	230	230	230	235	240	250	250	270	330	365	370
22	360	300	285	275	320	265	250	230	230	H 220	H 205	H 210	210	A	A	250	A	A	A	A 280	A 305	340	A 360	355
23	355	325	E A 360	310	310	A 300	235	A	A	215	A	A	A	A	A	245	240	A	A	A	A	A	360	A 360
24	345	340	285	300	345	290	255	235	A 270	A 245	A 275	220	220	240	H 235	H 245	245	E A 265	A	260	E A 340	A	A	A 330
25	320	E A 385	340	305	305	290	A	A	A	235	A	205	A	250	230	H 235	250	260	A	A 285	A 320	310	295	300
26	A 320	E A 350	340	330	285	270	245	A 260	A 260	E A 270	E A 280	A	A	A	A	E A 295	A	A	A 275	270	E A 355	290	290	345
27	340	290	280	270	305	280	E A 280	265	A	A	200	A	A	250	A	A	A 285	A	A	A 290	A 310	330	335	305
28	A 290	290	270	280	285	270	260	240	205	225	E A 280	225	A	A	245	A	A	A	A	260	265	285	310	A
29	305	305	305	315	300	290	260	245	A 250	225	H 180	240	245	E A 280	A 280	230	A 265	H 245	290	285	285	A 340	A 305	A 345
30	A 345	A 320	315	A 315	285	275	255	A	A 255	A	A 250	A 240	A	A	A 275	235	E A 275	260	A	A 300	A 340	E A 385	320	320
31	315	305	300	310	315	270	245	230	H 215	200	B	H 205	H 205	H 225	215	225	245	A 275	A	A	325	320	A 325	315
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	30	28	26	23	21	19	18	14	17	21	24	20	19	12	22	29	28	29	30
MED	330	312	308	315	318	280	255	244	235	225	218	215	220	238	235	232	245	252	275	285	312	334	330	335
U Q	A 345	360	340	330	340	300	262	A 255	A 255	240	A 250	240	245	E A 255	A 255	A 248	A 268	E A 275	285	295	A 340	360	360	355
L Q	315	295	285	295	300	270	245	235	220	215	210	210	210	235	H 218	228	235	245	272	265	288	320	312	315

JUL. 1991 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 H'E (KM) 135° E MEAN TIME (G.M.T. + 9H)

LAT.35° 42.4'N LON.139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						A 130	120	115	120	115	115	B	B	B	B 120	A 120	A	A	A	B				
2						130	115	110	110	110	115	115	120	120	125	120	110	110	120	B				
3						A 135	A 120	115 110	120 110	120 115	120 120	120 120	120 115	120 120	115 120	115 115	110 115	110 110	A 120	B				
4						135	120	110	110	115	120	120	115	120	120	115	115	110	A 120	B				
5						130	120	110	110	110	A 115		A	A	A	A	A	A 130	B	B				
6						A 130	A 115	110 110	110 110	120 110	115 115	120 B	120 B	120 B	115 125	A E A 125	A 110	A 110	A 120	B				
7						A 125	115	110	110	110	115	A	A	A	A 120	A 125	110	110	115	B				
8						B 135	115	115	110	110	A 110	A 115	110	115	115	110	110	115	120	B				
9						125	115	110	110	110	110	115	115	120	120	115	110	110	115	B				
10						E B 150	115	115	115	A 110	A 110	110	120	120	120	130	110	115	120	B				
11						E A 135	115	115	115	115	115	B 120	115	115	115	115	115	110	120	B				
12						135	115	115	115	110	A 115	A 120	A 115	A 115	115 115	115 115	110 110	110 110	A 120	130				
13						A 135	115	115	110	110	110	A 115	A 120	130 120	A 120	110 120	110 110	110 110	120 120	B				
14						B 130	120	110	110	A 110	A 110	A 110	A 115	A 115	110 110	110 110	110 110	110 110	120 120	B				
15						A 130	120	105	110	110	120	A 120	A 120	B 125	B 125	115 115	110 110	A 110	A 120	B				
16						135	120	110	110	110	115	115	A 120	A 120	A 120	A 120	A 115	A 115	A 120	B				
17						135	A 120	A	A 125	115	E B 135	120	120	B 120	A	B 125	115	110	A 120	B				
18						E B 150	115	115	110	110	115	115	115	120	120	120	115	120	120	B				
19						A 130	115	110	110	110	120	B 120	125	115	120	120	115	115	A 120	B				
20						B 135	120	110	105	115	A 120		120	120	120	115	115	120	B 130	B				
21						A 135	A 120	A 115	A 115	A 120	A 120	120	115	120	120	120	115	120	A 125	B				
22						A 135	120	115	115	120	120	A 120	A 120	A 120	A 120	E A 140	115	115	B 130	B				
23						B 135	A 130	115	115	115	120	120	120	120	125	120	115	115	B 125	B				
24						A 135	120	120	110	110	A 110	A 120	A 120	A 120	A 125	A 125	E A 140	125	A 120	B				
25						A 135	120	110	115	115	115	115	A 120	130	120	120	115	110	120	B				
26						A 135	120	115	115	120	115	A 120	A 120	A 120	A 120	A 120	A 125	115	A 120	B				
27						135	A 115	115	A 115	A 120	A 120	A 120	A 120	A 120	A 120	A 115	110	115	A 120	B				
28						A 135	A 115	A 115	110	A 110	A 110	A 110	A 120	A 120	A 120	A 115	A 115	110	115	B				
29						A 135	A 115	A 110	115 110	A 110	A 110	A 110	A 120	A 120	A 120	A 115	A 115	110	120	130				
30						B 135	115	110	110	A 110	A 110	B 110	A 120	A 120	A 120	A 115	E A 130	110	E A 130					
	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	27	28	29	24	19	15	14	17	21	24	26	27	20	1				
MED						135	115	110	110	110	115	120	120	120	120	116	112	110	120	130				
U Q						B 135	120	115	115	115	120	120	120	B 120	122	A 122	115	115	122					
L Q						130	115	110	110	110	115	115	115	120	115	115	110	110	120					

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 H'ES (KM) 135°E MEAN TIME (G.M.T. + 9H)

LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL 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	105	105	100	100	100	110	120	125	120	120	115	115	110	110	110	110	100	100	100	95	95	100	115	140
2	110	110	105	105	110	125	120	120	120	110	110	110	115	150	130	120	120	115	115	110	110	110	115	110
3	105	105	105	110	120	110	125	130	125	115	135	140	135	125	120	135	125	110	115	110	105	115	120	115
4	B	B	100	105	110	180	G	150	110	120	125	125	125	115	120	150	120	110	110	100	100	100	100	95
5	105	100	100	100	100	125	115	115	110	110	110	110	105	105	135	105	105	125	120	110	110	110	105	105
6	105	100	100	100	95	105	110	130	125	115	115	110	110	120	110	125	120	120	100	110	110	100	B	105
7	100	110	100	95	95	95	G	130	150	125	115	B	B	B	140	115	G	G	120	120	105	105	105	105
8	120	100	95	95	95	150	145	G	125	G	115	110	110	110	G	140	135	120	120	120	110	110	105	105
9	120	100	105	105	105	135	120	110	110	110	105	110	G	130	130	G	G	G	G	B	B	120	120	125
10	125	120	115	115	110	120	120	120	115	115	120	115	135	145	G	130	120	115	115	115	110	110	115	110
11	110	110	B	110	105	G	G	G	115	110	110	G	120	G	E G 145	G	125	G	150	120	105	B	105	105
12	100	B	B	B	B	125	G	105	115	120	110	110	110	110	110	110	120	115	120	110	110	105	115	105
13	105	105	105	110	B	130	125	115	110	110	110	110	110	110	G	G	130	130	125	135	110	115	115	B
14	130	120	120	150	120	120	125	120	115	115	110	110	120	G	120	G	G	140	115	110	110	110	105	105
15	110	100	100	105	120	120	110	125	115	110	110	105	105	150	125	115	125	110	115	110	105	105	110	105
16	100	110	95	100	105	120	120	120	115	110	110	115	115	110	120	115	110	105	100	110	100	100	100	95
17	105	B	S	B	B	G	135	115	120	105	105	110	110	110	105	100	120	105	100	110	115	100	125	110
18	110	105	110	110	B	G	145	125	130	115	135	115	110	110	125	110	115	110	115	110	105	100	100	110
19	115	110	100	120	110	150	135	130	125	130	120	120	130	135	125	E G 205	120	120	120	110	115	110	110	110
20	110	110	110	110	120	120	125	120	120	120	G	B	G	140	150	160	125	120	120	120	110	110	110	100
21	105	105	100	125	120	G	120	115	130	140	120	G	G	125	G	G	150	140	125	120	110	110	105	100
22	105	105	110	110	110	110	115	120	110	110	110	G	G	130	130	165	125	120	115	115	115	115	110	115
23	110	105	105	105	105	120	120	115	110	G	110	110	110	105	110	140	125	120	115	115	115	115	110	110
24	100	100	100	120	105	130	135	130	120	115	115	115	135	140	145	130	150	125	120	115	110	110	110	110
25	120	110	110	110	120	120	115	115	110	110	110	110	105	110	95	155	130	125	110	110	110	110	110	110
26	110	105	105	115	110	145	140	120	120	115	115	115	115	120	115	120	120	115	115	115	110	110	110	105
27	105	110	100	100	100	120	115	115	110	110	115	105	110	110	105	105	120	115	110	125	105	105	100	100
28	100	100	B	110	B	140	125	120	110	110	105	105	100	105	110	120	115	115	115	110	115	115	110	105
29	110	105	110	115	120	115	115	115	110	110	110	105	105	110	110	130	115	135	120	115	115	110	110	110
30	110	110	105	110	135	G	120	110	110	105	105	110	110	105	105	105	100	125	115	110	120	110	110	110
31	105	B	110	B	110	B	G	110	115	115	B	105	110	125	105	105	130	120	115	110	115	110	110	115
	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	27	27	28	26	25	26	29	31	29	29	26	26	28	27	26	28	28	30	30	30	30	30	30
MED	108	105	105	110	110	120	120	120	115	115	110	110	110	112	120	120	120	120	115	110	110	110	110	108
U Q	110	110	110	112	120	132	125	125	120	118	115	115	120	130	130	140	125	125	120	115	115	110	115	110
L Q	105	100	100	102	105	118	115	115	110	110	110	110	110	110	110	110	118	112	115	110	105	105	105	105

JUL. 1991 H'ES (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

JUL. 1991 TYPES OF ES 135°E MEAN TIME (G.M.T. + 9H)

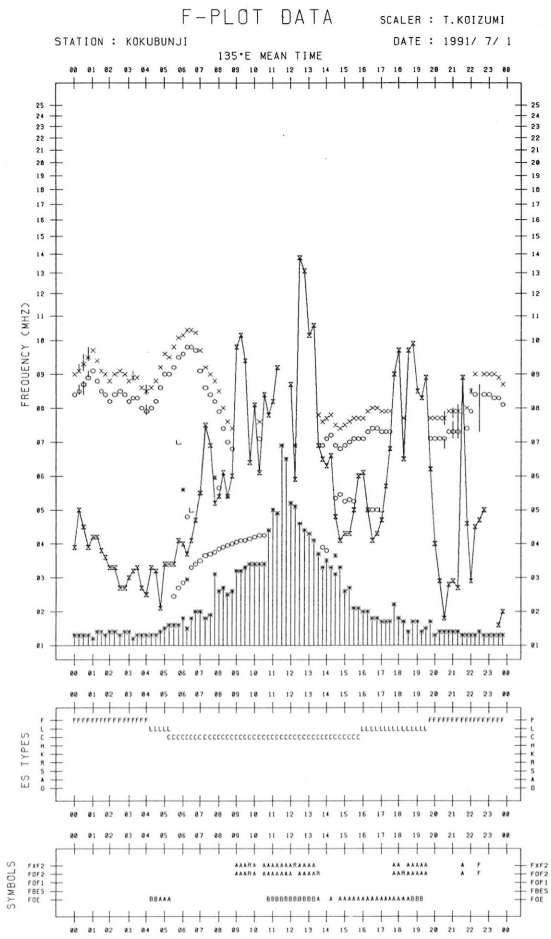
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

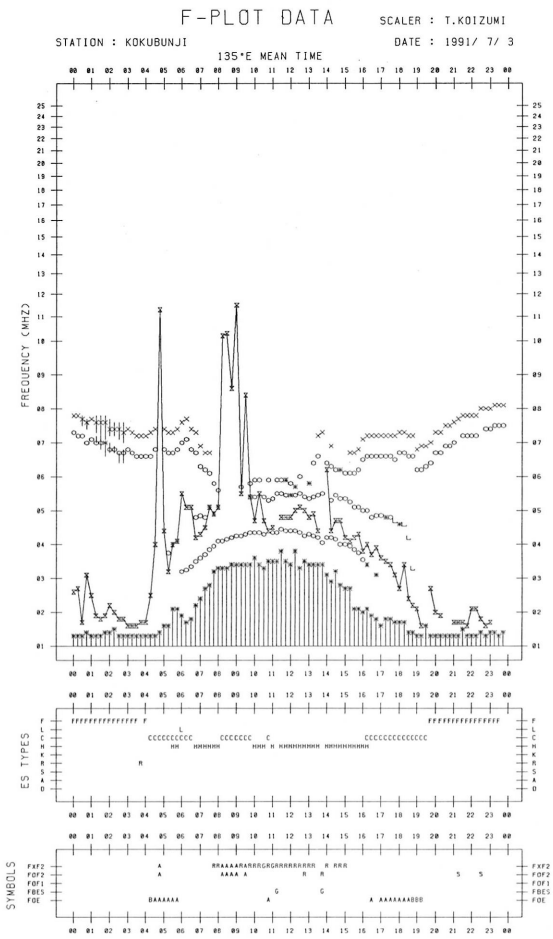
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 4	F 4	F 3	F 4	F 4	L 2	C 2	C 3	C 2	C 2	C 2	C 1	C 1	C 2	C 2	C 2	L 3	L 3	L 4	L 5	F 5	F 3	FF 53	FF 11
2	F 2	F 4	F 6	F 4	F 2	C 1	C 2	C 2	C 2	C 2	C 2	C 2	C 2	H 1	H 2	C 1	C 3	C 4	C 3	C 4	F 4	F 3	FF 13	F 3
3	F 4	F 3	F 2	F 2	F 2	C 4	CL 31	H 2	H 1	C 2	H 1	H 1	H 1	H 1	H 1	H 1	H 2	C 2	C 2	C 2	F 2	F 2	FF 33	FF 32
4			F 1	F 1	F 1	H 1		H 1	LH 11	H 2	H 1	H 1	C 2	C 2	C 1	H 2	C 2	C 3	C 2	L 2	F 2	F 2	F 3	F 3
5	F 2	F 2	F 2	F 2	F 1	L 1	C 1	C 2	C 3	C 2	C 2	C 2	C 2	L 2	HL 11	L 2	LH 21	HL 21	C 2	CL 31	F 5	FF 12	F 4	F 4
6	F 3	F 3	F 3	F 4	F 3	LH 31	L 1	H 2	H 2	C 2	C 2	C 2	C 2	C 2	C 2	HL 12	CL 22	CL 22	L 2	L 2	FF 22	F 4		F 5
7	F 4	FF 23	F 5	F 4	F 3	L 2		H 2	H 1	H 1	H 2				H 1	CL 11			C 2	CL 11	F 3	F 2	F 2	F 3
8	FF 13	F 3	F 5	F 2	F 3	HL 11	H 1		C 1		C 1	C 1	C 1	L 1		HL 11	H 2	H 2	C 2	C 2	F 3	F 4	F 3	F 4
9	FF 24	F 3	FR 21	F 3	FF 21	L 1	C 1	C 3	C 2	C 2	C 2	C 1		H 1	H 1							F 2	F 3	F 5
10	F 6	F 4	F 4	F 6	F 7	C 2	C 1	C 1	C 2	C 1	C 1	C 1	H 1	H 1		H 2	H 2	H 3	C 3	C 4	F 2	F 5	FF 12	F 2
11	F 2	F 2		F 2	F 3				C 1	C 1	C 1		C 1		H 1		C 1		H 1	L 1	F 2		F 1	F 1
12	F 2					L 1		L 1	C 1	C 1	C 3	C 2	C 2	C 2	C 2	C 2	H 2	C 4	CC 23	C 5	F 4	F 4	FF 22	F 3
13	F 4	F 5	F 2	F 2		C 3	C 1	C 2	C 2	C 3	C 2	C 1	C 2	C 1			H 2	H 2	CL 21	C 1	F 4	F 2	F 2	
14	F 3	F 6	F 5	F 2	F 5	C 2	C 1	C 1	C 2	C 2	C 2	C 1	C 1		C 1			H 1	C 3	C 3	F 3	F 4	F 4	F 4
15	FF 13	F 3	F 2	F 1	F 2	C 2	C 3	H 1	C 1	C 1	C 1	C 1	L 2	HL 11	H 2	C 2	C 2	C 4	C 3	C 3	F 5	F 3	FF 23	F 4
16	FF 22	FF 12	F 2	F 3	F 2	C 1	C 1	C 1	C 2	C 1	C 1	CL 11	C 1	C 2	C 1	C 1	C 2	C 2	L 2	L 2	F 3	F 4	F 3	F 2
17	F 1						H 1	H 2	C 2	C 3	C 3	C 2	C 1	C 2	L 2	L 3	CL 11	L 3	L 4	CL 24	FF 32	F 1	FF 22	F 3
18	F 2	F 3	F 2	F 1			HL 11	HL 11	HL 11	C 2	H 1	C 2	C 2	C 2	C 1	C 3	C 2	C 2	C 3	C 3	F 4	F 4	F 2	F 4
19	FF 32	FF 22	F 2	FF 11	F 1	H 2	H 3	H 3	C 2	H 1	C 2	H 2	H 1	H 1	H 2	H 1	H 2	C 3	C 3	F 4	F 5	F 5	F 3	F 3
20	F 2	F 2	F 3	F 3	F 1	C 2	C 1	C 2	C 2	H 1				H 1	H 1	H 1	H 2	H 3	C 2	C 3	F 3	F 3	F 3	F 2
21	F 2	F 1	F 2	FF 12	FF 11		C 2	H 2	H 1	H 1	L 1			C 1			H 1	H 1	C 1	C 1	F 3	F 3	F 5	F 4
22	FF 23	F 5	F 3	F 2	F 2	L 2	L 1	C 1	C 1	L 1	L 1			H 1	H 2	H 1	H 2	C 4	CL 41	C 4	F 4	F 2	F 6	F 6
23	F 5	F 4	F 5	F 4	F 6	C 3	C 1	C 3	C 3		C 2	C 2	C 2	L 3	L 2	HL 11	H 2	C 3	C 4	C 4	FF 52	FF 32	FF 41	F 3
24	F 4	F 3	F 2	FF 42	F 1	C 2	HL 11	H 1	C 2	C 2	C 2	C 1	C 1	H 1	H 1	H 1	H 1	C 2	C 2	C 2	F 3	F 5	F 5	F 4
25	F 2	FF 13	FF 23	F 3	F 3	C 2	C 3	C 3	C 3	C 2	C 2	C 1	L 2	L 2	L 1	HL 11	CL 11	CL 21	CL 21	CL 42	FF 23	FF 22	FF 21	F 4
26	F 3	F 4	F 4	FF 14	F 4	C 1	H 1	C 3	C 2	C 2	C 2	C 2	L 1	C 2	C 3	C 2	C 3	C 5	C 2	C 2	F 5	F 4	F 2	F 3
27	F 5	F 2	F 2	F 2	F 1	C 1	C 2	C 3	C 3	C 2	C 2	L 2	L 2	L 2	L 2	L 2	CL 21	CL 42	L 3	LL 24	FF 14	F 5	F 4	F 3
28	F 4	F 2		F 1		C 1	C 2	C 2	L 2	L 2	L 2	L 2	L 2	L 2	L 2	H 2	C 2	C 3	C 4	F 3	F 2	F 1	F 3	F 5
29	F 2	F 4	F 2	F 1	F 2	C 2	C 2	C 2	C 2	C 2	C 1	L 2	L 2	L 2	L 2	H 1	C 2	H 1	C 2	FF 23	F 3	F 4	F 4	F 4
30	F 4	F 4	F 4	F 4	F 1		C 2	C 4	C 3	C 3	L 2	L 2	L 2	L 3	L 2	L 2	L 3	H 2	C 3	C 5	FF 13	F 3	F 3	F 2
31	F 3		FF 11		F 1			C 2	C 1	C 1		C 1	C 1	HL 11	LH 11	LH 11	HL 11	C 3	CL 31	CL 31	FF 22	FF 22	F 2	F 2
	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																								
U Q																								
L Q																								

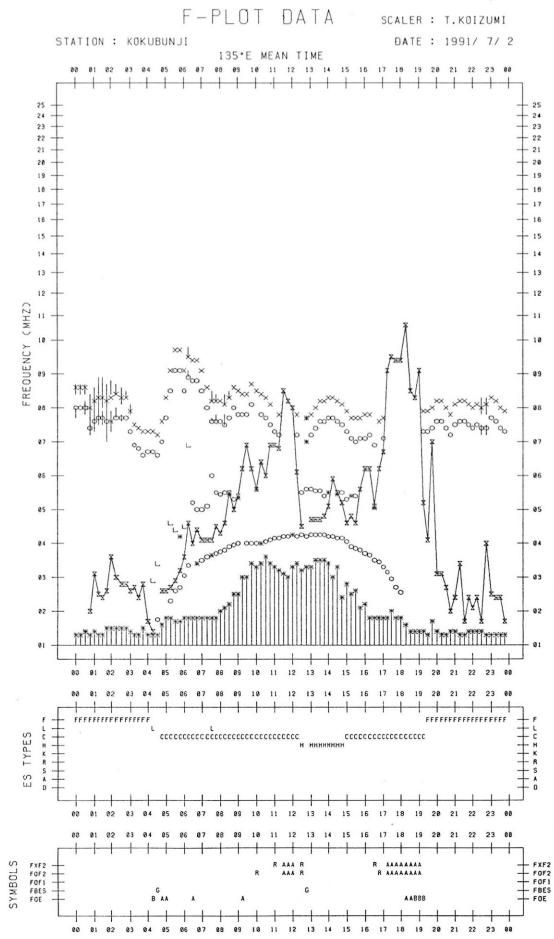
JUL. 1991 TYPES OF ES COMMUNICATIONS RESEARCH LABORATORY, JAPAN

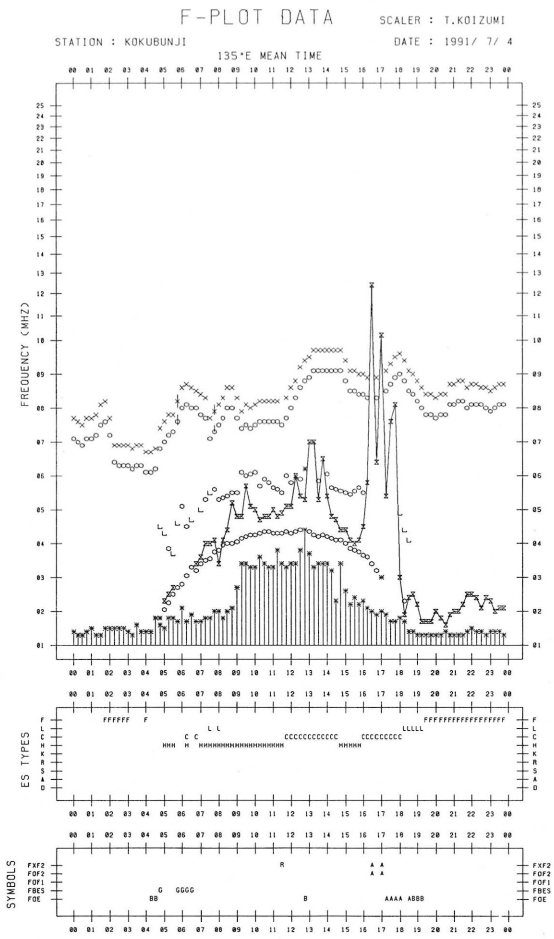
f-PLOTS OF IONOSPHERIC DATA

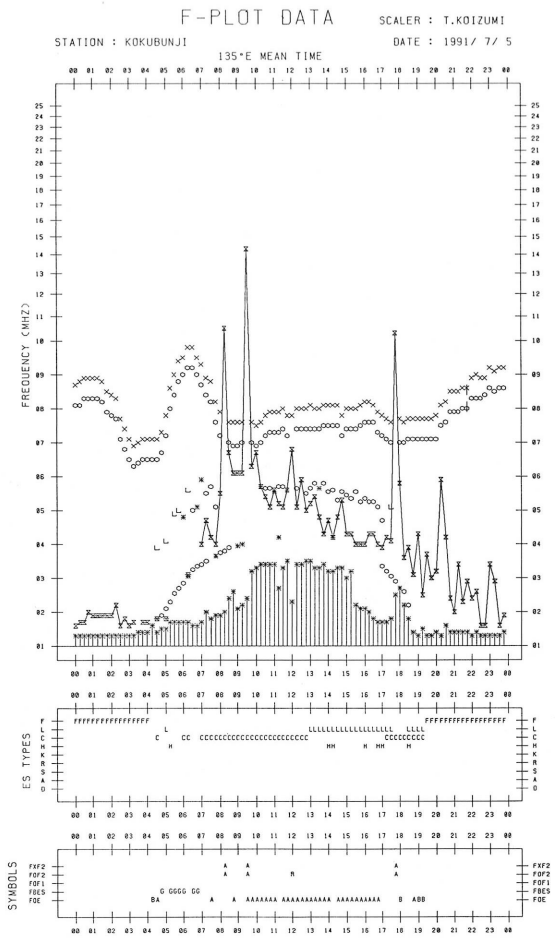
KEY OF F-PLOT	
|	SPREAD
⬡	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
⍑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN

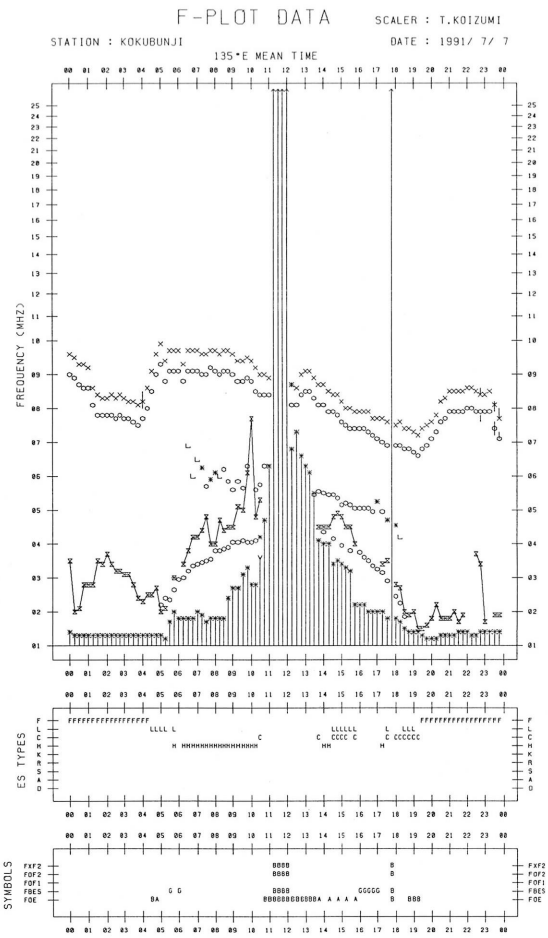

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/ 4
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1991/ 7/ 7
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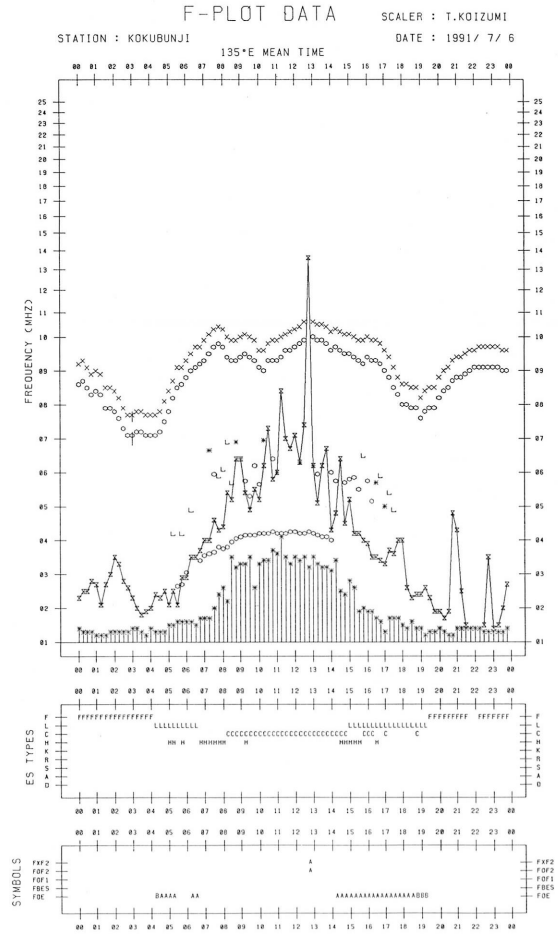
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1991/ 7/ 6
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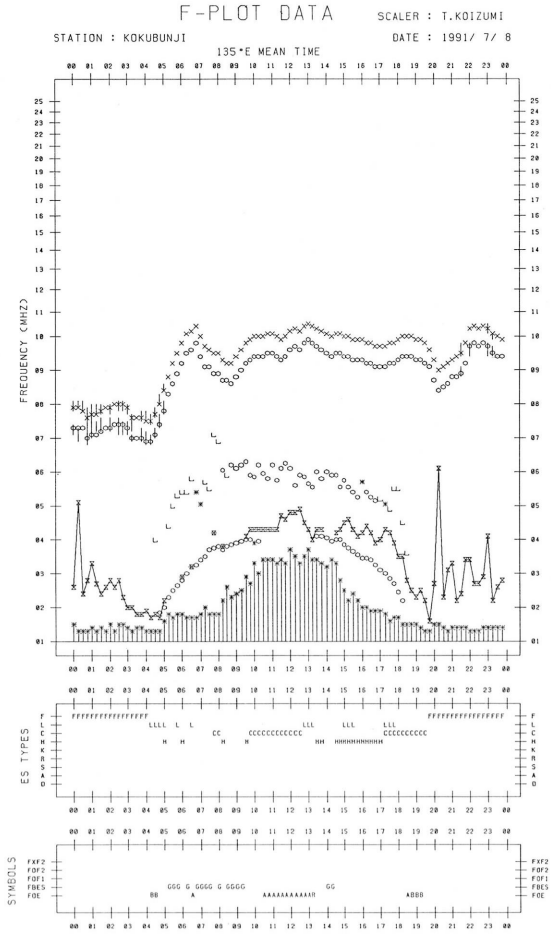
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
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STATION : KOKUBUNJI
DATE : 1991/ 7/ 8
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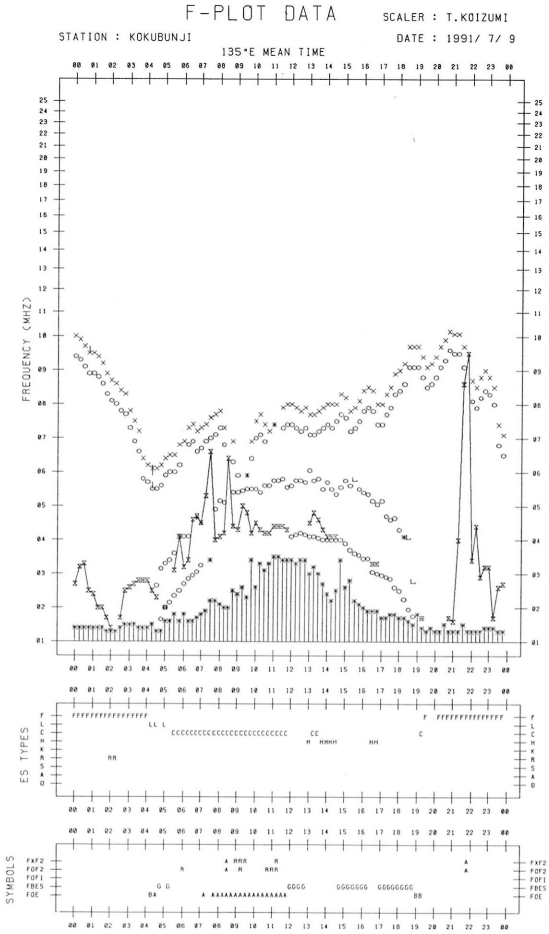
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
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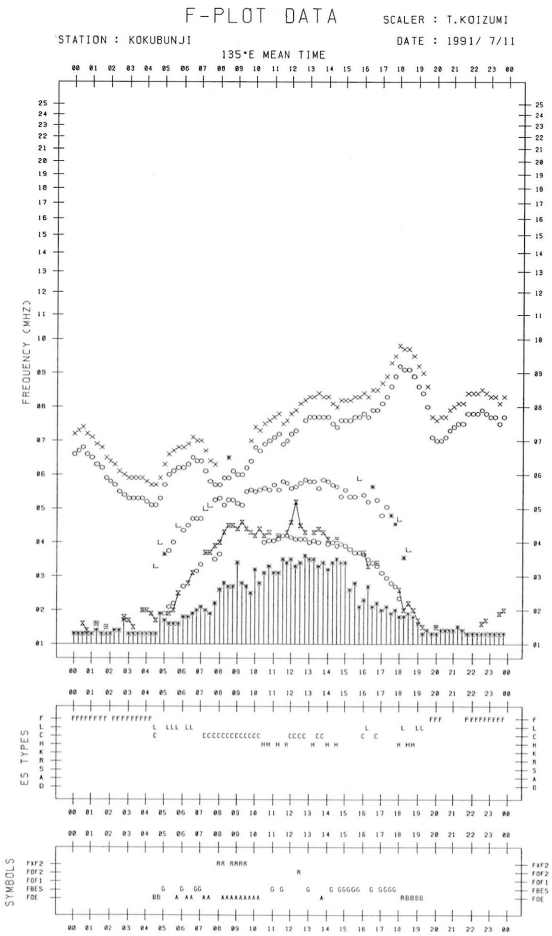
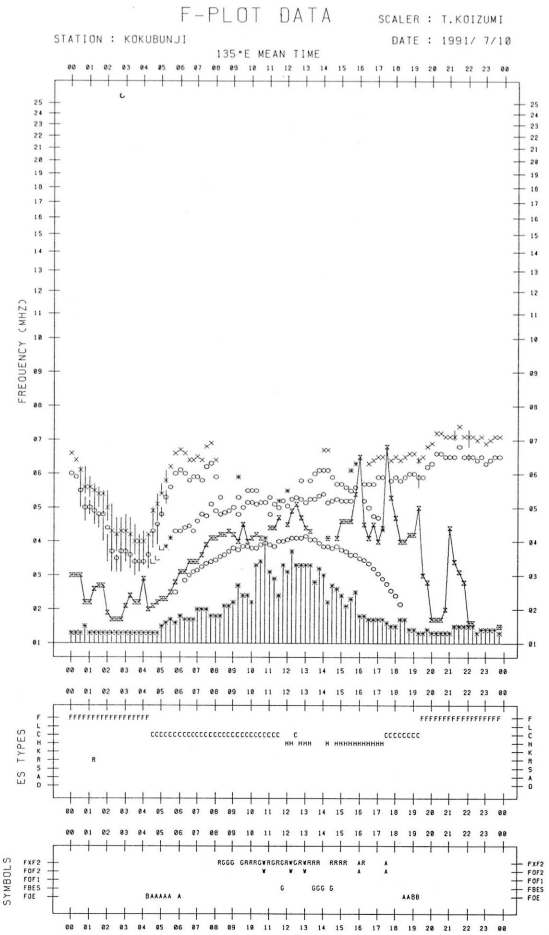
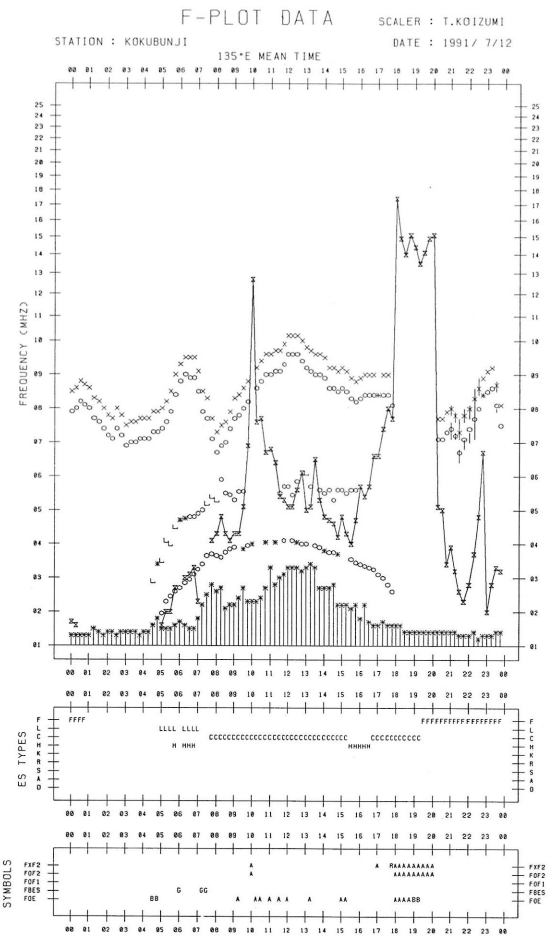
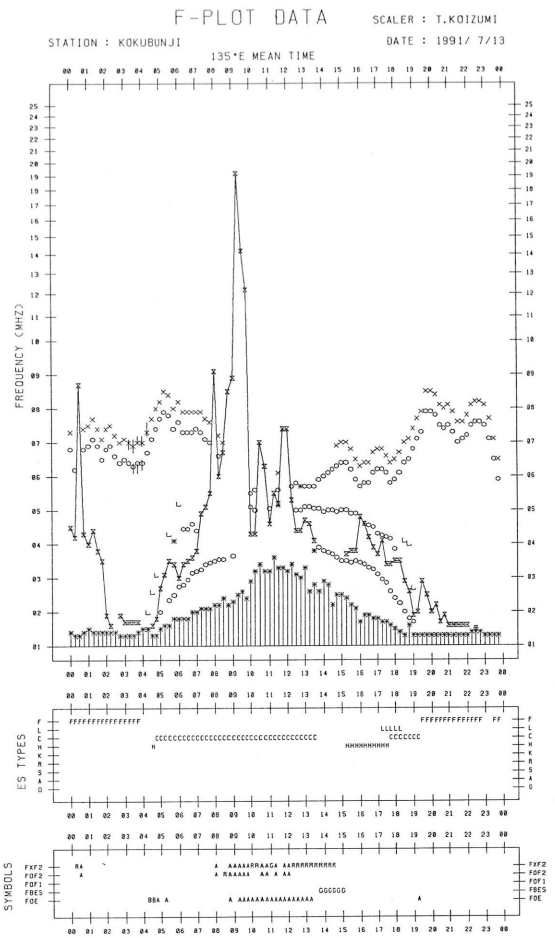
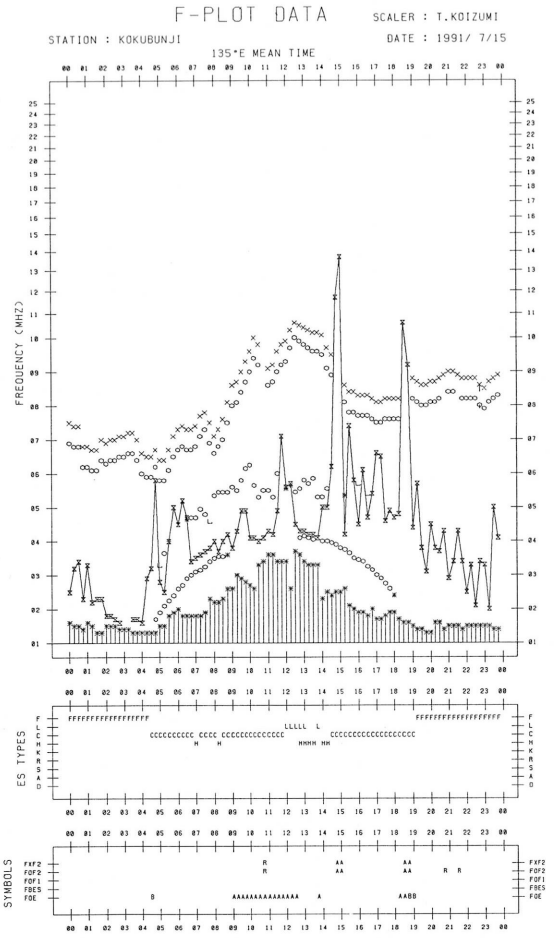
STATION : KOKUBUNJI
DATE : 1991/ 7/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

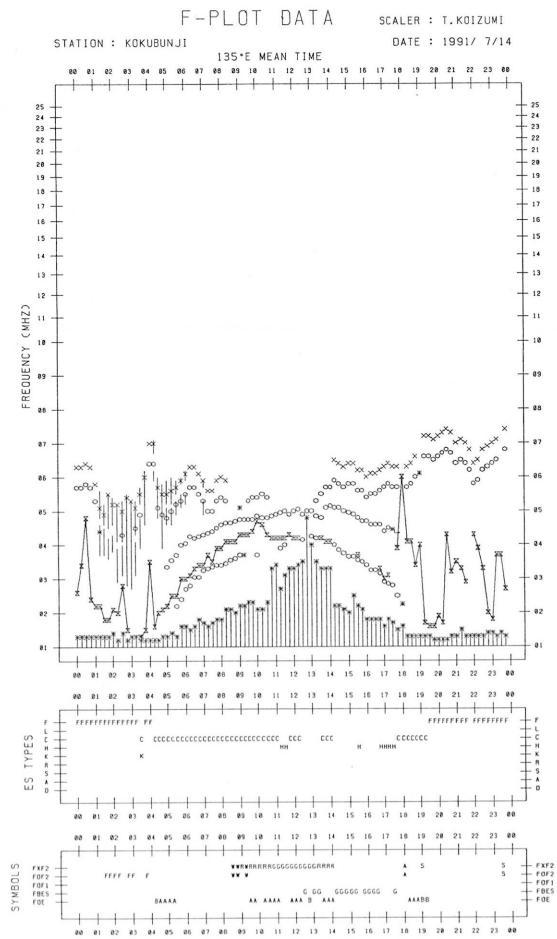

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

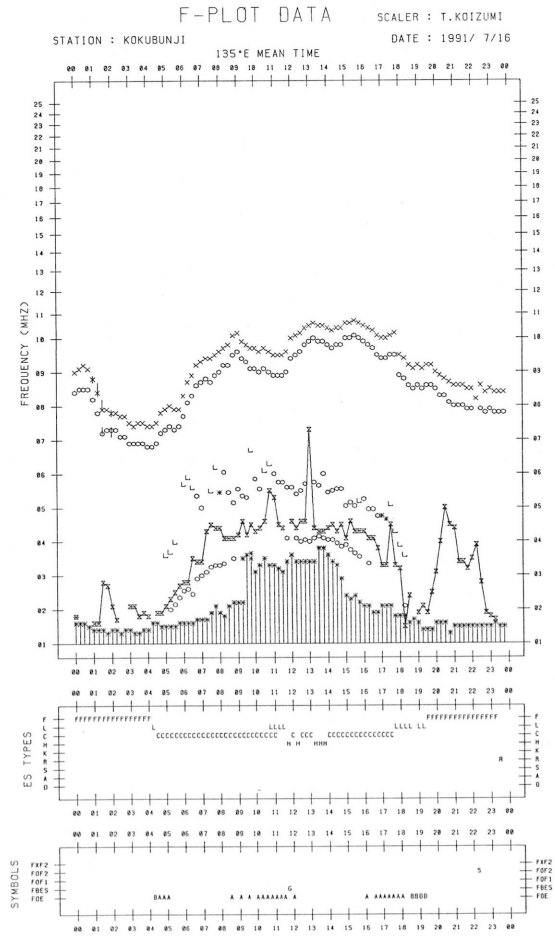

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

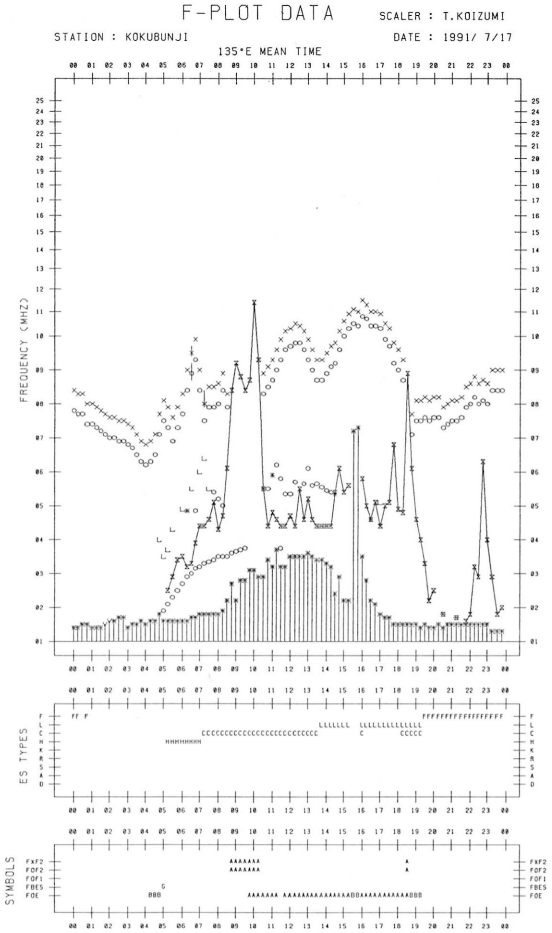

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

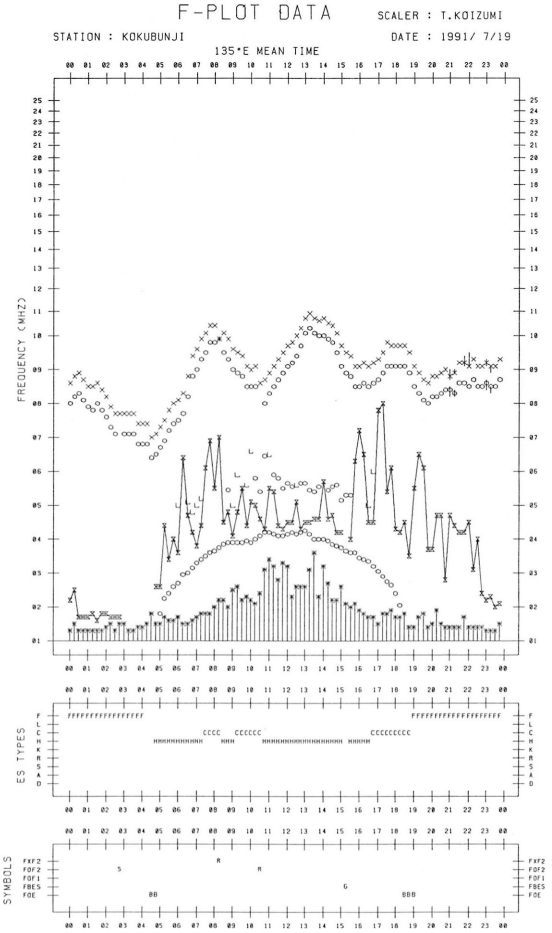

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

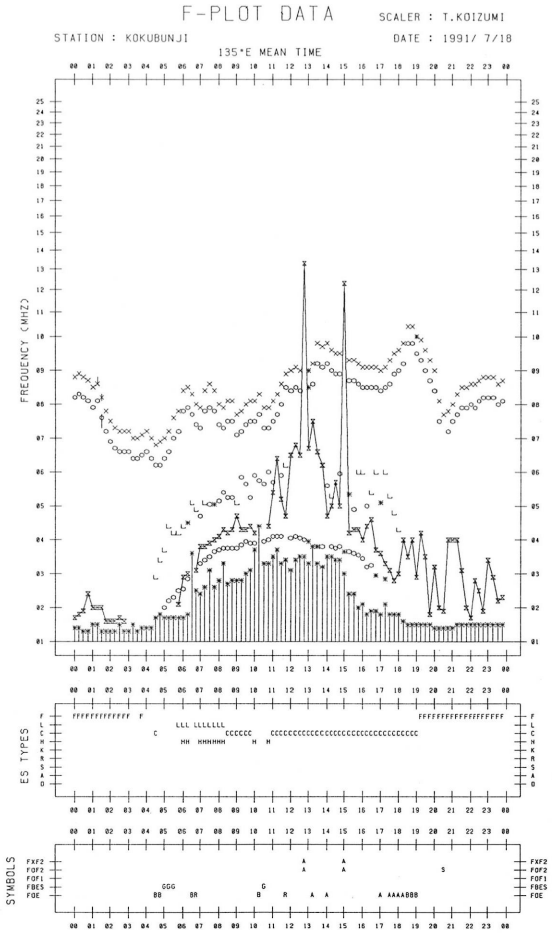

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

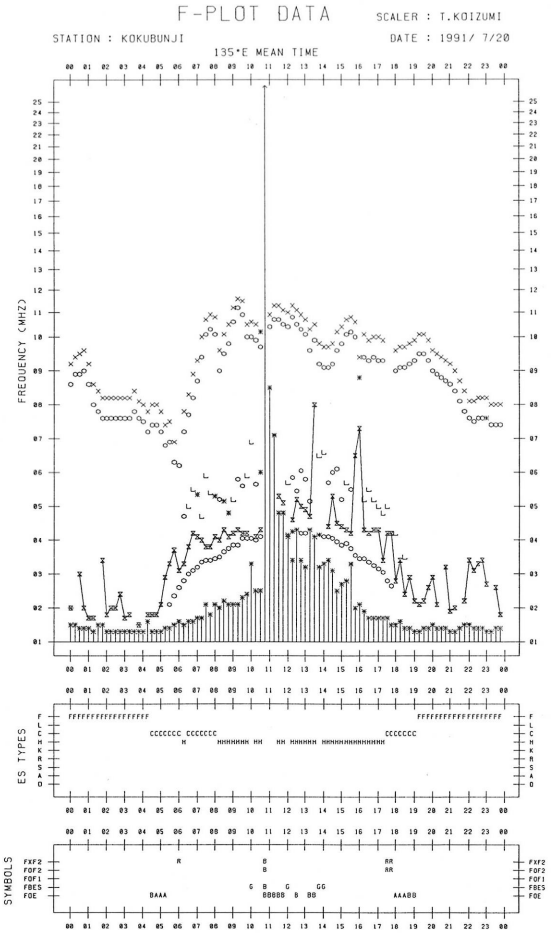

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

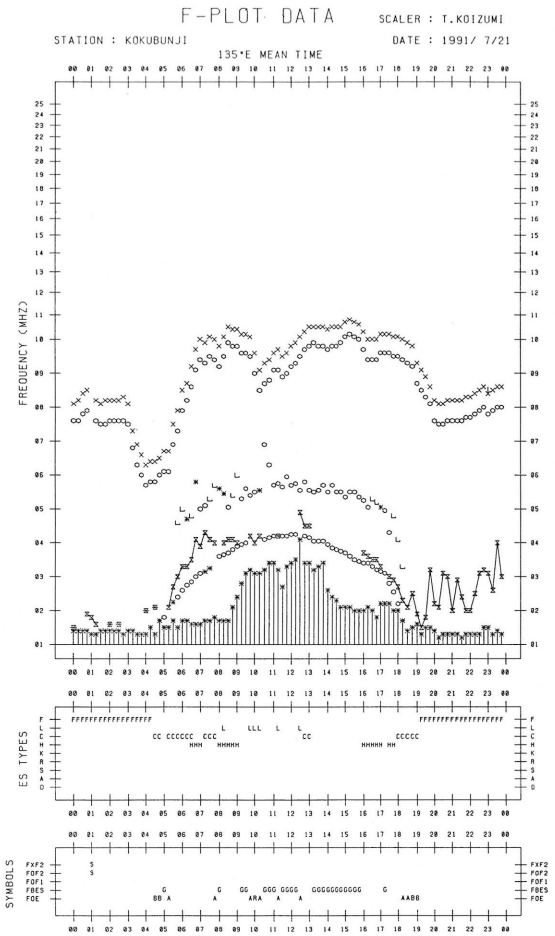

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

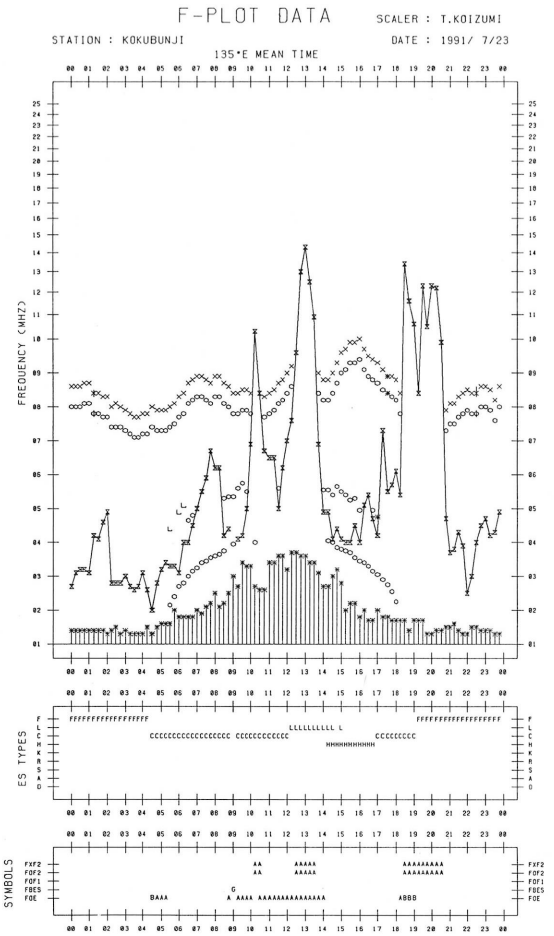

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

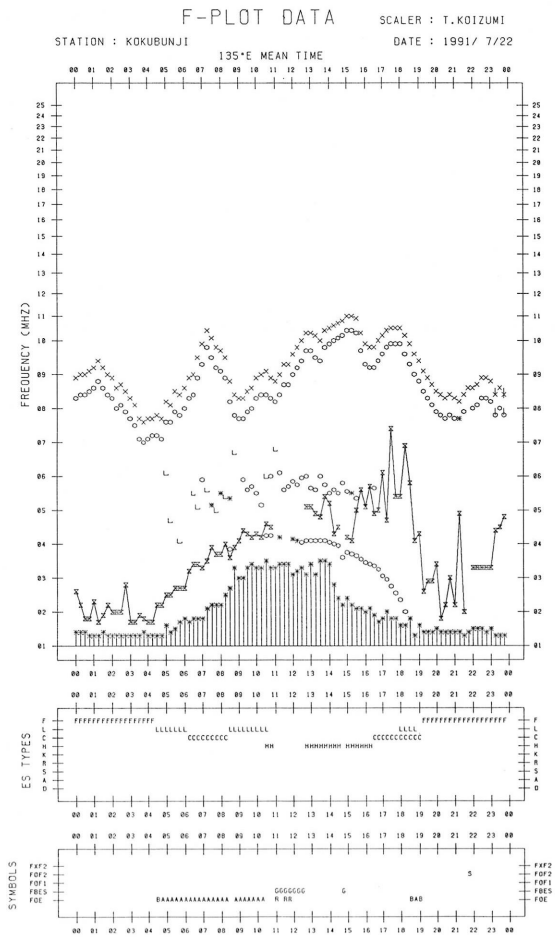

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

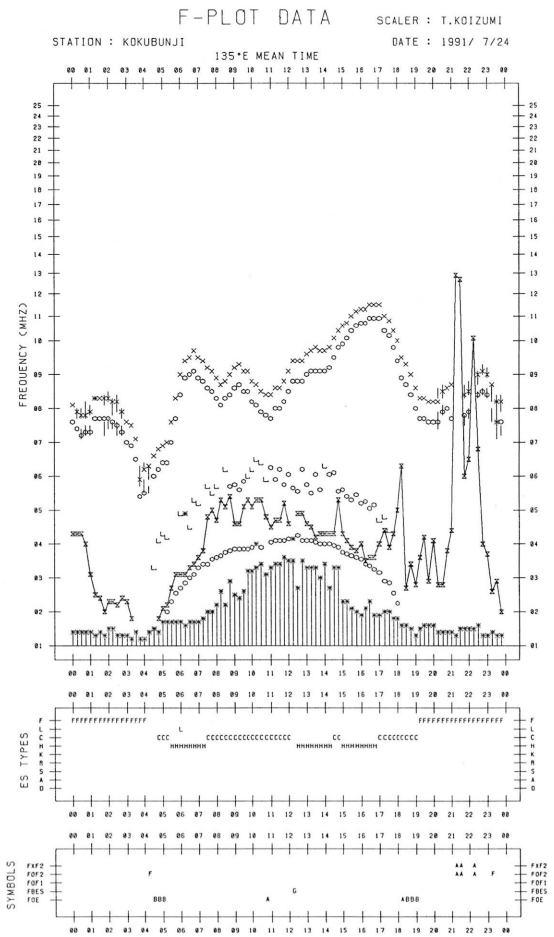

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

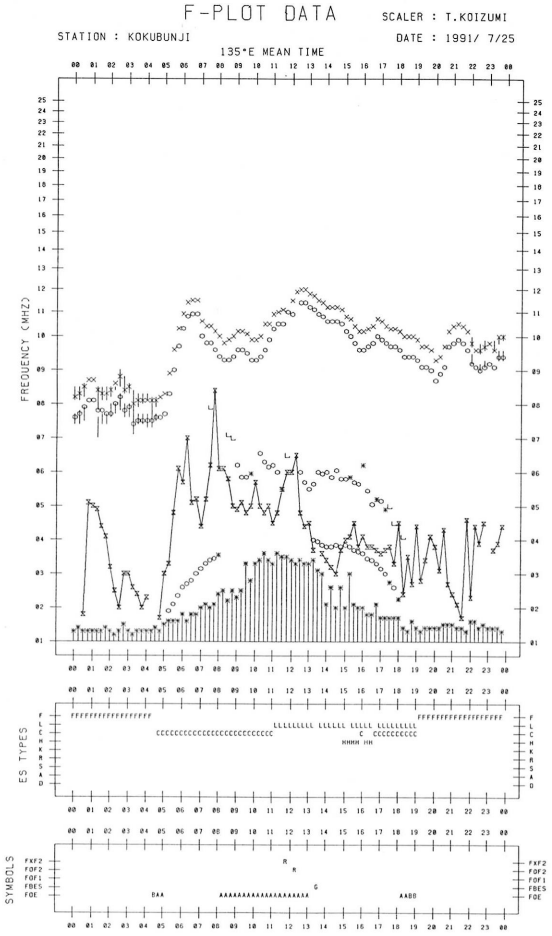

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/20
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

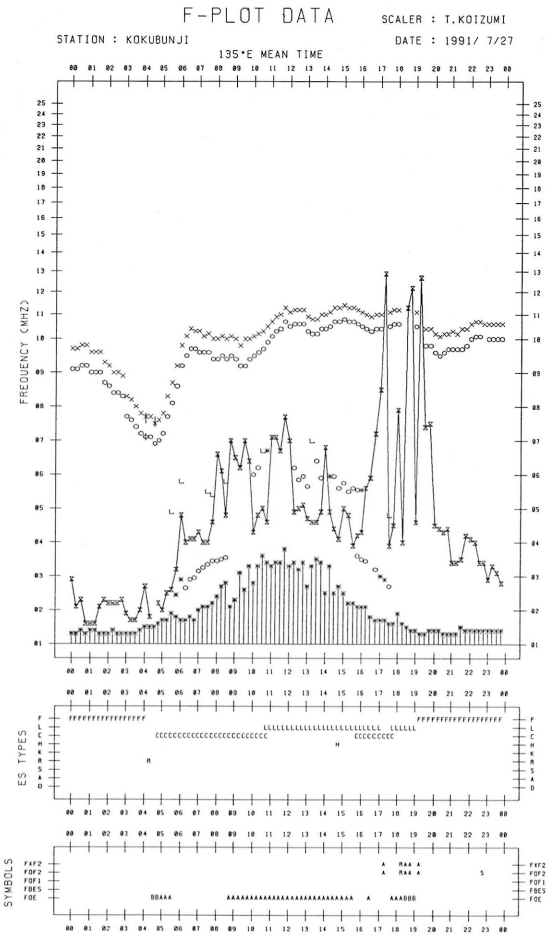

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

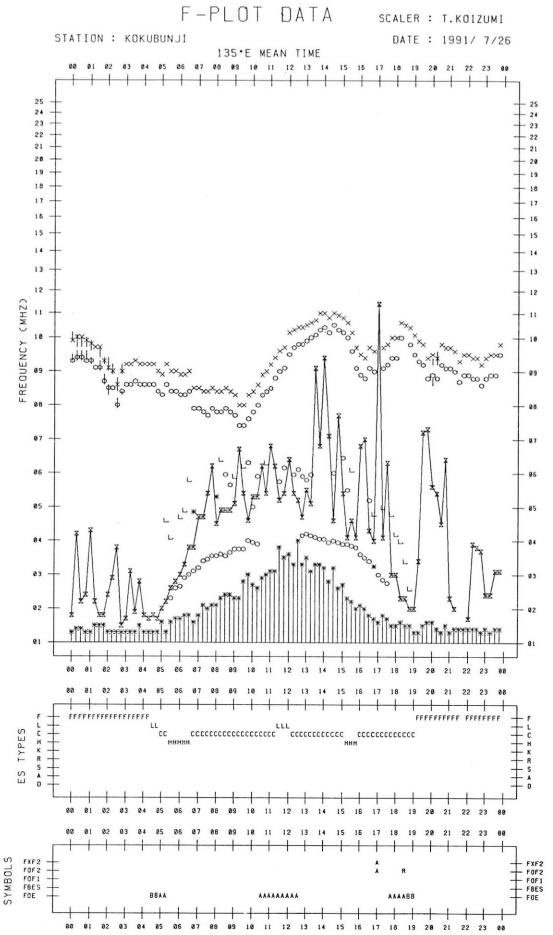

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/23
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

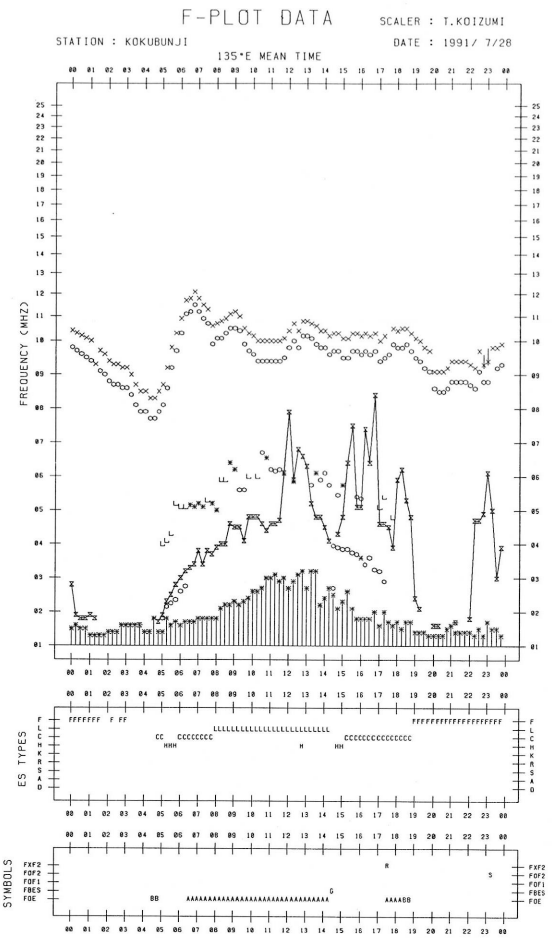

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/22
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

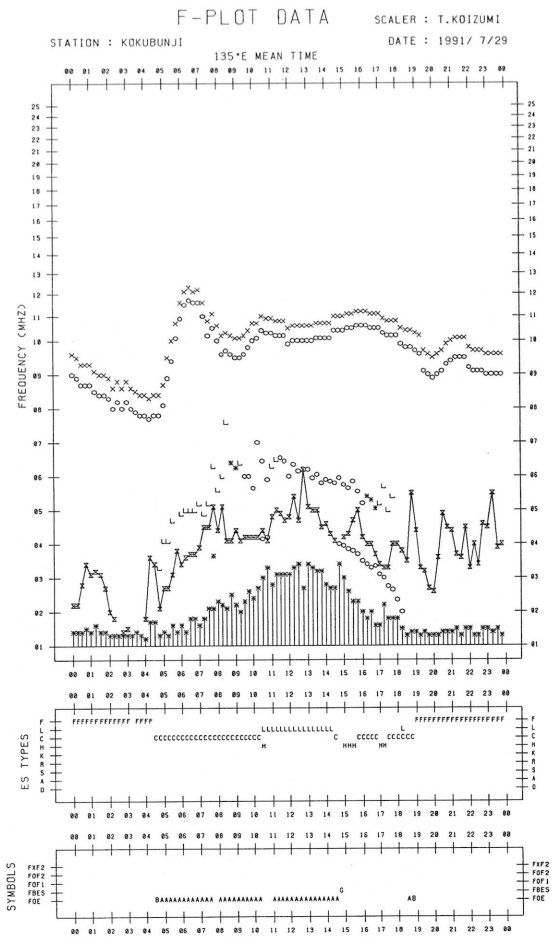

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

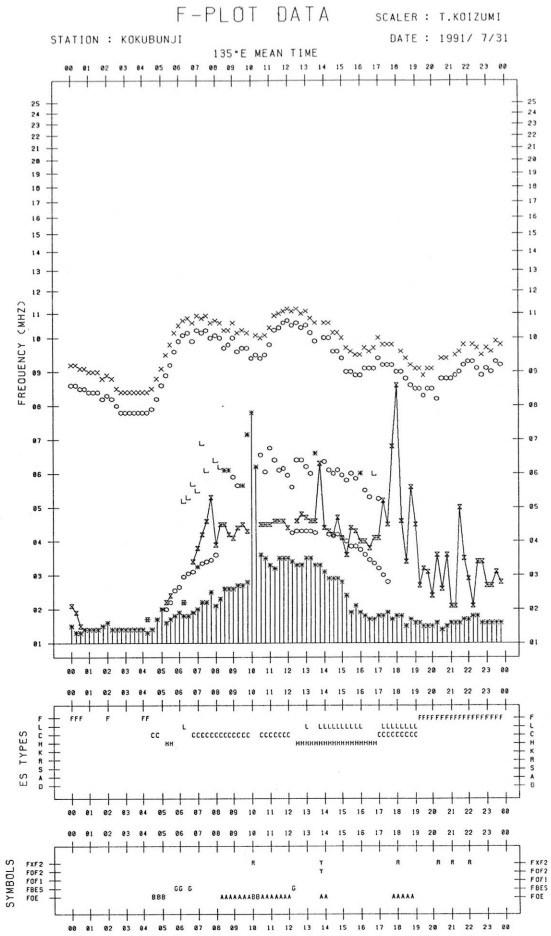

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

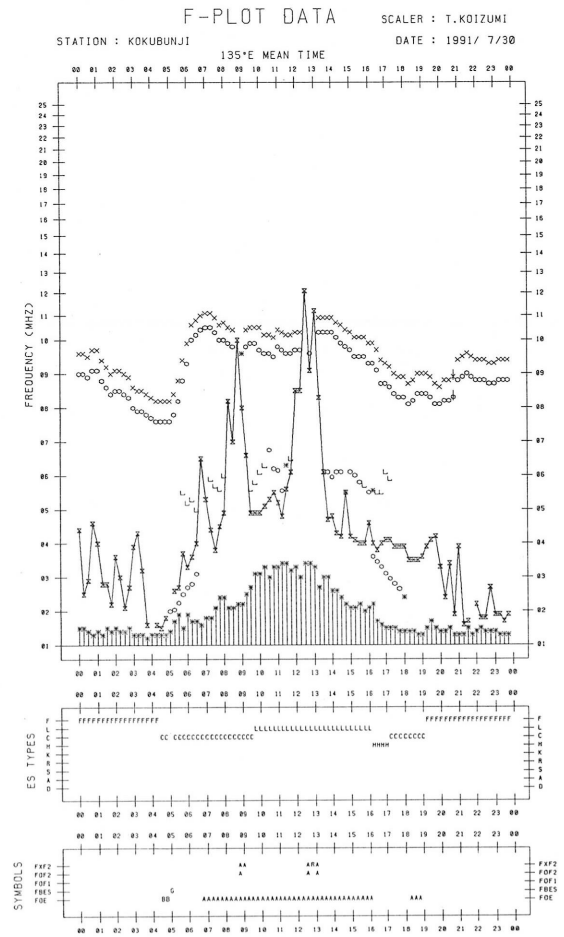

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 7/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

Hiraiso July 1991

Single-frequency total flux observations at 200 MHz

	Flux density: $10^{-22}Wm^{-2}Hz^{-1}$					Variability: 0 to 3				
UT Date	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
1	*	*	*	-	*	*	*	*	-	*
2	*	*	*	14	*	*	*	*	1	*
3	12	12	11	12	12	0	0	0	0	0
4	12	12	12	12	12	0	0	0	0	0
5	12	*	*	12	12	0	*	*	0	0
6	12	14	13	13	13	0	1	0	0	0
7	B	16	13	*	28	1	0	0	*	0
8	*	*	*	12	*	*	*	*	0	*
9	12	*	*	*	12	0	*	*	*	0
10	*	*	-	-	*	*	*	-	-	*
11	-	B	B	B	B	-	1	1	3	1
12	B	B	*	-	B	3	2	*	-	3
13	*	*	*	*	*	*	*	*	*	*
14	14	*	*	14	*	0	*	*	0	*
15	16	19	17	20	17	0	1	1	0	1
16	16	*	*	*	16	1	*	*	*	1
17	*	*	*	*	*	*	*	*	*	*
18	14	13	18	17	15	0	0	0	0	0
19	14	12	*	18	14	0	0	*	0	0
20	19	14	16	20	17	0	0	0	0	0
21	15	14	16	-	16	0	0	0	-	0
22	13	12	15	-	14	0	0	0	-	0
23	B	B	B	-	B	2	2	2	-	2
24	B	B	B	B	B	2	2	2	2	2
25	B	B	B	B	B	2	2	3	2	2
26	B	B	*	22	B	2	2	*	0	2
27	19	16	20	B	19	0	0	1	2	0
28	B	B	B	B	B	2	2	2	2	2
29	B	B	B	15	B	2	2	2	0	2
30	11	10	13	13	12	0	0	0	0	0
31	12	12	15	-	13	0	0	0	-	0

Note: No observations during the following periods.

1st 2030 - 2400
10th 0432 - 0950
10th 2030 - 11th 0436
12th 2030 - 2335
21st 2030 - 2340
22nd 2030 - 2335
23rd 2030 - 2335
31st 2030 - 2342

B. Solar Radio Emission

B1. Daily Data at Hiraiso

500 MHz

Hiraiso July 1991

Single-frequency total flux observations at 500 MHz

Flux density: 10^{-22} Wm^{-2}Hz^{-1}

UT Date	00-03	03-06	06-09	21-24	Day
1	55	58	56	-	56
2	56	57	57	64	57
3	60	58	57	58	59
4	58	57	55	56	57
5	56	57	58	57	57
6	58	57	57	57	57
7	B	58	55	58	B
8	60	58	-	54	59
9	54	54	52	-	53
10	53	55	58	52	55
11	52	51	50	-	51
12	-	-	-	-	-
13	-	-	-	-	-
14	-	-	-	-	-
15	-	-	-	-	-
16	-	-	-	-	-
17	-	-	-	-	-
18	-	-	-	-	-
19	-	-	-	-	-
20	-	-	-	-	-
21	-	-	-	-	-
22	-	-	-	-	-
23	-	-	-	-	-
24	-	-	-	-	-
25	-	-	-	-	-
26	-	-	-	-	-
27	-	-	-	-	-
28	-	-	-	-	-
29	-	-	-	-	-
30	-	-	-	-	-
31	-	-	-	-	-

Note: No observations during the following periods.

1st 2030 - 2nd 0008 8th 0525 - 0829 9th 2030 - 2335
11th 2030 - 31st 2400

No observation from 12 July due to equipment failure by lightning.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso July 1991

Single-frequency observations

Normal observing period: 2300 - 0940 U.T.

JUN	FREQ.	TYPE	START TIME	TIME OF MAXIMUM	DUR.	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1})		POLARIZATION
1991	(MHz)		(U.T.)	(U.T.)	(MIN.)	PEAK	MEAN	REMARKS
1	500	20 GRF	0142	0417	285	5	3	WR
	200	6 S	0352.0	0352.0	1.3	2100	80	-
4	500	46 C	0736.5	0737.9	5.0	70	25	0
5	500	42 SER	0605.1	0609.7	10.5	13	-	0
7	500	48 C	0120.2	0207.1	92	1600	200	SL
	200	48 C	0146.0	0208.8	50	500	100	ML
	100	48 C	0150.5	0207.8	45	940	150	WL
	500	6 S	0722.8	0723.6	1.2	40	20	0
11	200	44 NS	0437E	0558	300D	40	30	MR
	200	44 NS	2330E	0045	600D	100	60	SR
12	200	46 C	0158.1	0159.8	2.0	1000	100	WL
	200	46 C	0816.6	0817.0	1.6	2300	250	WR
14	200	46 C	0732.6	0732.8	1.6	13000	2000	-
	100	46 C	0733.2	0733.7	2.0	13800	6000	-
17	200	48 C	0625.3	0625.3	50	3400	200	-
	100	48 C	0625.4	0626.0	13	14100	4000	-
20	200	46 C	0140.0	0140.1	1.0	600	100	0
	200	46 C	0146.0	0155.3	33	80	30	0
	100	46 C	0153.2	0153.7	4.0	850	450	WL
22	200	44 NS	2335E	0607	600D	300	80	SR
23	200	44 NS	2335E	0757	600D	400	130	SR
24	200	44 NS	2330E	0000	600D	300	150	SR
25	200	44 NS	2325E	0119	600D	130	50	SR
27	200	44 NS	2300E	2352	600D	20	10	ML
28	200	44 NS	2330E	0350	600D	30	15	SL
31	200	42 SER	0000.8	0010.2	11	100	-	WL
	200	46 C	0048.5	0049.5	21	650	65	WL
	200	46 C	0206.0	0212.0	13	26	6	WL

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

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

MEASURED AT HIRAISO

UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M
1	ES 2	ES 2	ES 2	ES 2	9	14	26	28	26	24	26	22	27	26	27	26	21	31	23	14	16	14	12	6
2	ES -24	ES -24	5	21	20	21	34	32	27	37	39	33	34	28	31	14	17	6	11	13	2	ES -24	ES -24	ES -24
3	ES -24	ES -24	ES -24	2	12	22	24	27	25	24	24	26	25	26	27	25	26	26	27	14	14	14	14	14
4	17	10	-3	11	17	19	31	25	25	25	26	25	30	19	21	27	24	29	22	27	21	12	12	-3
5	ES -24	7	4	12	20	22	19	27	25	24	20	22	25	23	19	25	23	22	14	17	14	15	16	2
6	-11	3	12	12	17	22	24	30	32	37	34	33	33	30	33	30	30	32	13	24	14	12	10	10
7	3	ES -24	ES -24	ES -24	7	19	21	24	32	31	31	31	29	25	34	32	28	24	17	12	21	ES -24	5	2
8	12	7	15	16	18	21	25	26	26	30	30	27	26	25	30	31	34	24	ES -24	16	14	14	14	9
9	13	15	11	12	15	19	11	19	27	19	22	25	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	20	7	9	ES -24	21	ES -24
10	ES -24	ES -24	4	12	20	20	19	18	23	27	28	27	27	24	35	15	12	ES -24	12	18	18	18	16	7
11	7	9	17	15	19	23	22	29	27	25	30	26	24	26	19	26	13	21	25	25	20	16	9	8
12	9	9	10	14	15	20	24	24	25	29	27	24	24	7	24	22	20	20	9	10	9	9	7	2
13	ES -24	ES -24	ES -24	ES -24	12	19	19	14	22	27	24	22	10	9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
14	6	ES -24	9	ES -24	12	16	20	19	25	21	26	C	C	20	22	14	12	28	12	14	15	12	12	9
15	2	8	10	10	18	16	20	18	21	26	26	24	22	21	21	18	29	21	20	12	12	9	4	10
16	17	10	15	12	17	22	22	25	28	27	25	24	24	25	21	22	21	25	12	20	24	19	15	13
17	14	19	15	15	21	25	12	29	27	30	29	29	27	27	26	27	29	20	14	15	18	ES -24	4	9
18	9	8	12	18	22	22	26	29	22	32	26	24	22	19	19	24	24	20	20	19	15	16	10	9
19	9	4	19	15	17	17	26	25	27	32	27	25	27	25	25	25	9	19	24	23	15	15	17	16
20	10	ES -24	7	14	12	22	25	29	27	22	27	25	24	32	26	29	22	22	16	9	15	9	14	9
21	7	12	7	16	19	21	26	22	32	27	27	22	22	22	25	27	27	19	15	21	16	15	12	2
22	14	14	14	20	21	22	26	22	32	30	26	27	29	31	26	24	25	27	17	20	19	15	14	12
23	12	12	10	19	22	21	25	27	27	30	31	26	29	27	27	26	20	26	25	14	16	16	12	7
24	8	10	14	14	18	25	26	28	27	30	26	24	24	26	25	25	27	26	20	20	17	14	12	7
25	12	7	9	17	19	25	28	30	30	29	26	27	26	27	28	22	25	14	20	12	15	14	10	9
26	14	14	16	16	17	21	27	29	29	29	28	25	28	32	27	28	25	24	21	15	19	15	9	10
27	7	9	14	15	19	24	26	28	27	27	27	25	26	26	27	24	26	24	22	14	19	14	12	10
28	9	12	10	17	20	24	30	28	29	31	27	26	29	30	26	25	28	16	20	19	19	15	12	12
29	9	14	14	15	20	21	26	29	32	27	30	22	25	26	27	16	25	28	22	22	16	16	14	9
30	10	9	12	15	17	20	25	26	28	27	30	26	33	24	30	21	25	18	30	21	14	12	12	12
31	ES -24	ES -24	10	14	19	19	25	27	26	29	26	25	26	25	22	25	29	24	19	24	14	ES -24	8	8
CNT	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	9	8	10	14	18	21	25	27	27	27	27	25	26	25	26	25	25	22	20	16	15	14	12	9
UD	14	14	16	19	21	25	30	30	32	32	31	31	33	31	33	30	29	29	25	24	21	16	16	13
LD	ES -24	ES -24	ES -24	ES -24	12	16	19	18	22	22	24	22	22	9	19	14	9	ES -24	9	9	9	ES -24	4	ES -24

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

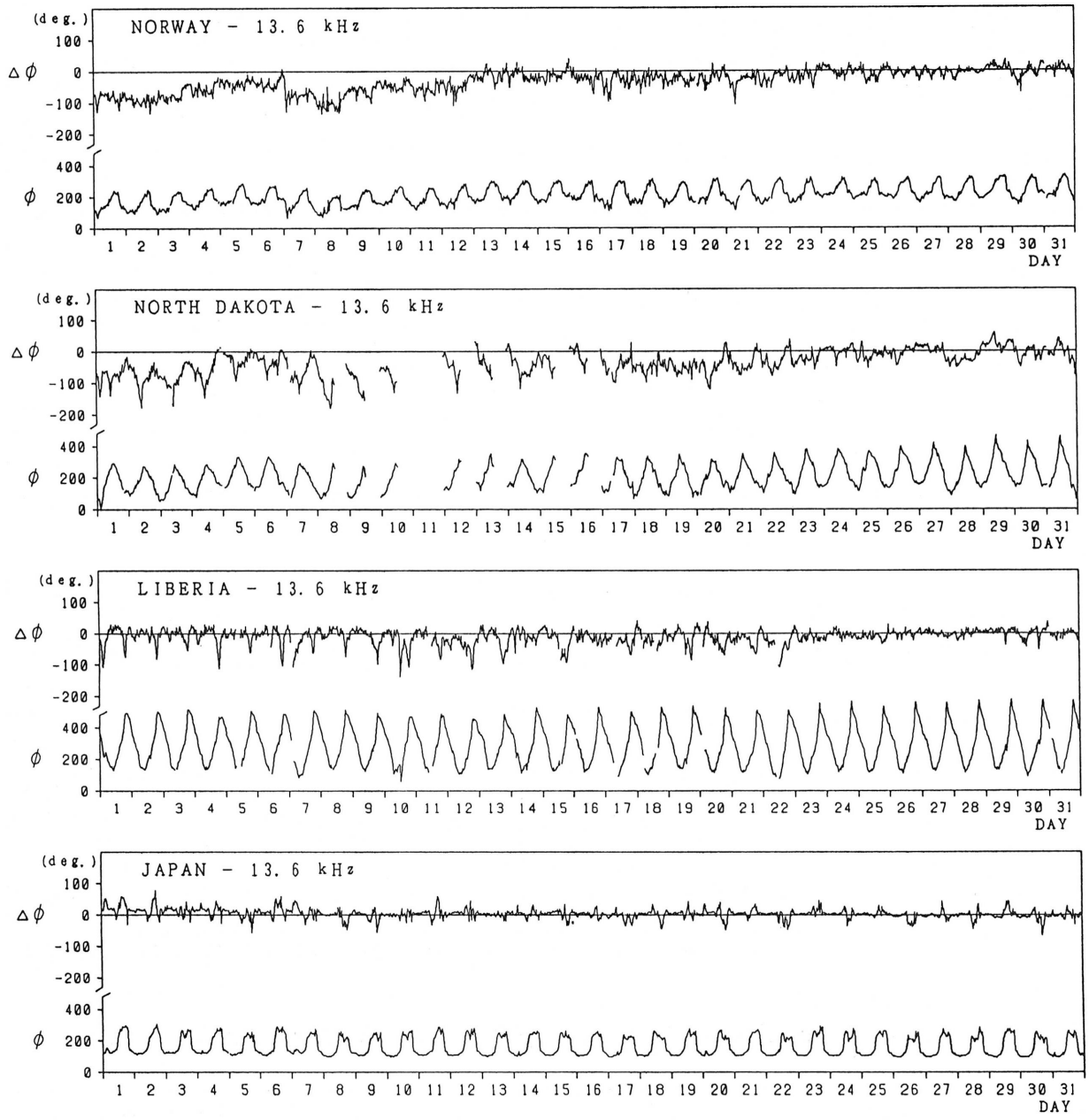
Hiraiso — Time in U.T.

Jul.	Whole Day	W W V				W W V H				Conditions				Principal Geomagnetic Storms		
		00	06	12	18	00	06	12	18	00	06	12	18	Start	End	Range
1991	Figure	06	12	18	24	06	12	18	24	06	12	18	24	h m	h	nT
1	4o	4	4	4	5	3	4	4	4	N	N	N	N			
2	3+	4	4	3	3	3	5	4	2	N	N	N	N			
3	4-	3	4	4	5	2	4	4	4	N	N	N	N			
4	4+	5	4	4	5	4	4	4	4	N	N	N	N			
5	4o	4	4	4	4	4	4	4	3	N	N	N	N			
6	4o	4	4	4	4	4	5	4	4	N	N	N	N			
7	4-	3	4	4	3	2	4	4	3	N	N	N	N			
8	4-	5	2	4	2	4	4	4	4	N	N	N	N	16.36	---	
9	3o	2	1	1	1	4	3	1	3	U	U	U	U	---	---	
10	2+	2	1	2	1	3	4	3	4	U	U	U	U	---	14	340
11	3-	4	3	3	3	4	4	4	4	U	U	U	U			
12	3+	3	4	4	3	4	4	3	3	N	N	N	N			
13	3-	2	2	1	1	2	3	1	1	N	N	N	N	00.5	---	
14	2+	2	1	1	1	3	3	3	4	U	U	U	U	---	---	
15	3-	2	1	2	1	4	4	4	4	U	U	U	U	---	06	194
16	4o	4	4	4	5	4	4	4	4	N	N	N	N			
17	3o	3	2	1	2	4	4	4	3	N	N	N	N			
18	3o	2	4	3	2	4	4	4	4	N	N	N	N			
19	3o	2	2	2	2	4	4	4	4	N	N	N	N			
20	4-	4	3	3	3	4	4	4	4	N	N	N	N			
21	4-	4	3	3	4	4	4	4	4	N	N	N	N			
22	4o	3	3	4	5	4	4	4	4	N	N	N	N			
23	4+	4	5	4	5	4	4	4	4	N	N	N	N			
24	4o	5	5	4	3	4	4	4	4	N	N	N	N			
25	4+	4	5	4	5	4	4	4	4	N	N	N	N			
26	4+	4	5	4	5	4	4	4	4	N	N	N	N			
27	4+	5	4	5	4	4	4	4	4	N	N	N	N			
28	4+	5	4	4	5	4	4	4	4	N	N	N	N			
29	4+	5	4	4	5	4	4	4	4	N	N	N	N			
30	4+	5	4	4	4	4	4	4	4	N	N	N	N			
31	4o	4	4	4	4	3	4	4	4	N	N	N	N			

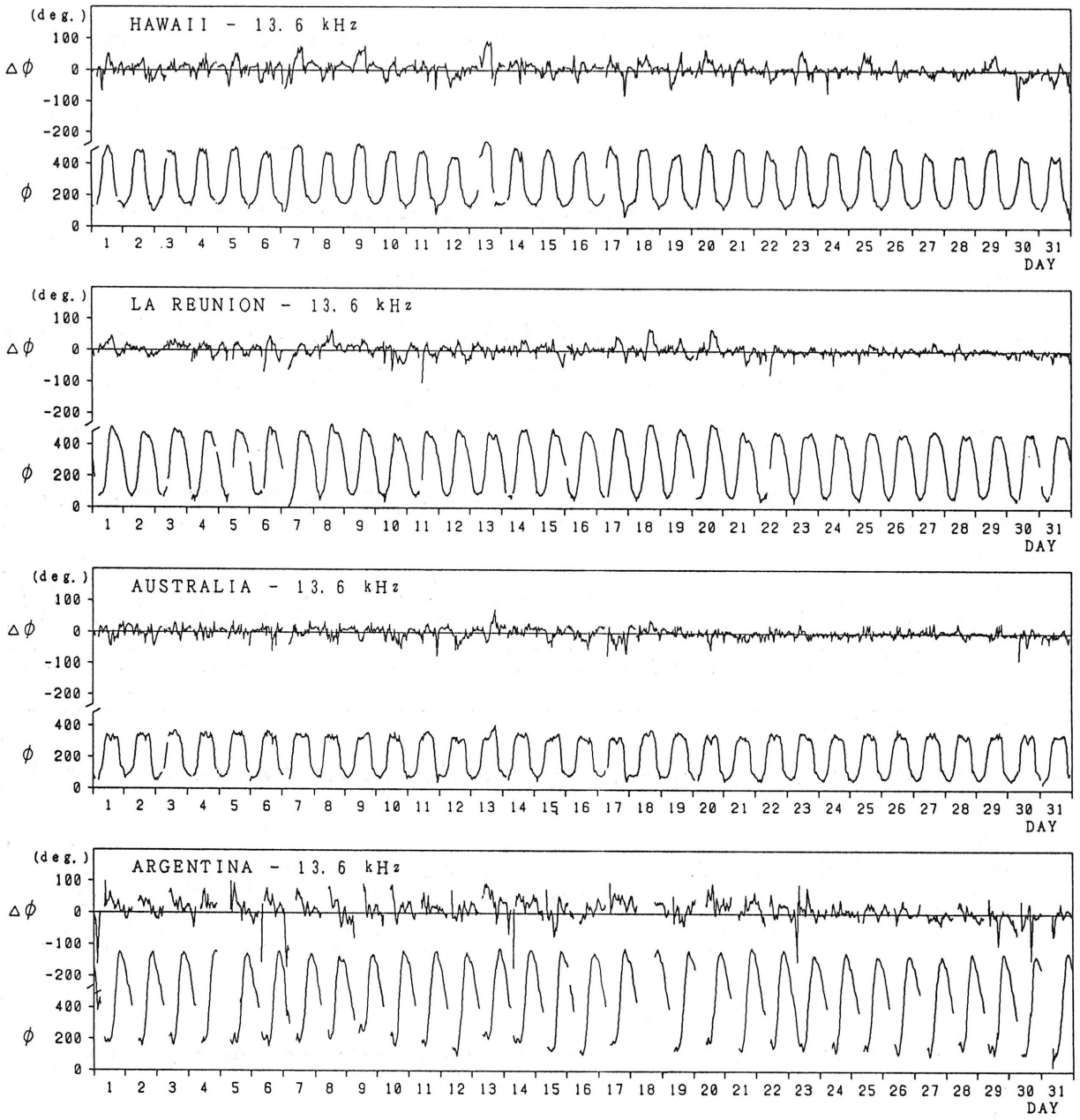
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo July 1991



Inubo July 1991



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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Jul.01/0744E	Jul.07/0330D	Jul.02/0920	118.8
Jul.07/0330E	Jul.10/2239D	Jul.08/1659	147.6
Jul.10/2239E	Jul.13/2000	Jul.11/0450	92.5

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Jul. 1991	S W F								Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	1)	2)	3)						
1					18	0132	170	3	1+	x	
6					15	0915	35	3	1	x	
7			25			0123	19	2	2	x	x
7			>30			0142	89	3	2+	x	
7			7		14	1209	39	3	1	x	
11			17			0929	xx	3	1+		
11					16	1005	67	3	1	x	
14		x	20			0305	64	3	2-	x	x
15		5	10			0222	16	2	1-	x	
17		14	47		>20	0625	57	2	3+	x	x
18				x	34	1428	67	2	2+	x	
20	>18	>22	>37	x		0137	43	2	3	x	x
22					35	0948	24	2	2+	x	
24			15		13	2303	9	1	1	x	
27			5		5	0428	12	1	1-	x	
30	8	5	36	10	31	0707	25	1	3	x	
31		>20	>35	>16		0048	42	2	3-	x	x
31		>18	23			2250	20	2	2	x	

NOTE CO:Colorado(WWV) HA:Hawaii(WWVH) 1):Australia 2):Moscow 3):London
* Optical and X-ray Flares

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jul. 1991	S P A								
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1	51	81	164	—	81	87	0132	0538	0244
1			9	—			0703	0750	0718
1			11				0911	0946	0922
1					58	43	1945	2104	2001
2	23			33	29*	26*	0017	0143	0028
2				8			0456	0518	0502
2		28	27	18			0558	0645	0606
2					24		1842	1918	1853
2					60	72	1933	2019D	1941
2					19		2019E	2100	2033
2					22		2132	2158D	2145
2					32		2158E	2356D	2230
2					20		2356E	0135D	0020
3	18	21	23	—	32	22	0135E	0248	0143
3	27	38	85	63	27	31	0525	0647	0534
3		27	15				1005	1032	1014
3		27					1436	1501	1445
3					10		2124	2202	2136
4			17	14	5		0229	0313	0248
4	38	42	71	60	40	34	0320	0456	0336
4	45		64	45	20	18	0543	0643D	0548
4	31	22	29	18			0643E	0756	0719
4		25					1543	1645	1556
5				9	7		0149	0209	0154
5			26	18	13	25	0445	0555	0516

Inubo

Jul.	S				P		A		
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
5		—	103	60	29	24	0602	0735	0614
5		64	92	50			0754	0838D	0806
5	62	—	211	96	14		0838E	1017D	0854
5		110	107				1017E	1124	1026
5		51					1250	1348	1312
5		37					1632	1701D	1646
5		30					1701E	1736	1708
5					19	32	1848	1938	1900
5					20	17	2038	2136	2055
5	12				18	12	2225	2320D	2234
5	36	35	33	51	60	56	2320	2357	2332
6			19	30	17		0133	0200	0135
6			21	12			0727	0808	0738
6		18	22				0844	0913D	0856
6	54	165	165	52			0913E	1135	0937
6		26					1659	1741D	1705
6		56			21	48	1741E	1851	1754
7	47	61	102	100	78	64	0120	0147D	0138
7	55	154	248	187	151	143	0147E	1014	0218
8	38		52	—	14		0450	0642	0509
9		15		14	6		0200	0241	0212
9		63				—	1458	1613	1515
9					7	—	2052	2147	2111
10			7	10	5		0304	0331	0308
10		11	13	13	6	10	0407	0434	0412
10	30	59	69	52	21	17	0638	0757	0650
10		119	57				1207	1419	1227
10					19	—	1916	1956	1920
10	16		18	39	40	—	2249	0025	2319
11			36	—		—	0602	0729	0625
11		33				—	0625	0713	0643
11	18		42			—	0852	0930D	0907
11	32	—	98			—	0930E	1001D	0942
11	27	—	195			—	1001E	1240	1027
11	37		32		76	—	2150	0007	2223
12			21				0938	1022	0941
12		26				—	1227	1251	1239
12		23				—	1407	1447	1415
12					23	—	2002	2100	2023
12					11	—	2242	2322	2252
13	27*			20*	16*	17	0050	0200	0111
13		18					0918	0949	0925
13	29	19				—	1336	1440	1352
13	39	43				—	1619	1707	1633
13					96	—	1832	2008D	1854
13					17	—	2008E	2034	2019
13					14	—	2043	2127	2100
13	29				16	—	2145	2222	2148
14	42	61	71	62	39	24	0302	0343D	0337
14	63	94	133	92	64	39	0343E	0519	0354

Inubo

Jul.	S			P		A			
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
14			46	33	36		0637	0731D	0643
14		43	61	29			0731E	0840	0738
14		54	8				1141	1308	1201
14	41						1402	1522	1432
14		24					1457	1543	1508
14				9	11		2257	2328	2305
15	21		44	—	23	20	0220	0320	0230
15			17	—			0417	0450	0423
15		23	19				1032	1056	1045
15		31					1147	1242	1201
15		65	14			—	1248	1318D	1303
15	15	125				—	1318E	1506	1347
15		32				—	1540	1632	1552
16		23	36	27	7	25	0436	0534	0447
16		32	42*				0627	0820	0701
16		40				—	1426	1511	1441
16	21			5	9		2335	0004	2344
17	119	—	278	78	89	65	0621	1011	0639
17	42				78	—	2108	2341D	2130
17				8	18		2341E	0020	2347
18	31	53	86	66	33	16	0512	0618	0524
18					12		2227	2257	2233
18			19	16	26		2303	0000	2322
19			10	8	4		0327	0350	0329
19			18	14	6		0455	0544	0502
19		38					1300	1333D	1322
19		57					1333E	1435D	1350
19		37					1435E	1515	1442
19		49					1555	1717	1611
19	23	41					1721	1830	1732
19	44				9		2011	2115	2036
19					11		2135	2201D	2149
19					17		2201E	2228	2208
19				8	9		2254	2320	2258
20				12	11		0022	0103	0033
20	95	127	196	177	144	118	0134	0522	0151
20		34					1447	1602	1459
21				31	27	33	0000	0124	0035
21	19		17	18	9	30	0232	0307	0239
21			17	7			0619	0648	0634
21		27					1152	1224	1214
21		18	8		28		2159	2300	2211
22		17		—	4		0137	0157	0143
22			19	—	12		0215E	0252	0221
22			51	—	19		0408	0554	0438
22			27	11			0820	0911	0830
22			17				0920	0946D	0932
22	92	—	255				0946E	1233	1004
22					18		2210	2321D	2220
22				10	15		2321E	0018	2328

Inubo

Jul.	S				P		A		
1991	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
23	19		9	—	7		0312	0345	0324
23		27	47	42	14		0539	0643	0551
23					40	24	2020	2119	2028
23				10	8		2328	2354	2341
24				7	3		0254	0310	0259
24			17	14	7		0352	0435	0359
24			12	8			0621	0707	0628
24			19				0912	1000	0918
24	24	44*	35				1140	1214	1146
24		30				32	1723	1818	1737
24	22	29	22	37	50	38	2303	0040	2307
25			25	24	12	12	0213	0253	0222
25	15		20	16			0528	0617	0539
25		30	44	26			0726	0814	0733
25					27		2044	2211	2108
26	30		24	35	25	19	0027	0130	0036
26			16	12	17		0521	0602D	0532
26			18				0602E	0638	0609
26		20	32				0939	1024	0947
26		36	14				1232	1334	1241
26					32	24	2010	2103	2015
26	18			16	24	21	2242	2323	2244
27	25		52	43	18	25	0427	0535	0435
28			14	14	9		0239	0306	0245
28			12	7			0631	0651	0634
28			39	19			0732	0836	0741
28					6		2131	2204	2145
29				—	5		0035	0125	0051
29		52					1516	1627	1527
29			6		10	14	2225	2243	2228
30				6	4		0047	0101	0050
30				10	7		0121	0156	0137
30	13		22	14	12		0226	0303	0233
30		37	32	22	14		0605	0706D	0626
30	102	—	255	155	42	28	0706E	0837D	0711
30			31				0837	0923	0846
30		87					1617	1812	1638
30					15		1910	1948	1917
30					12		2103	2141	2110
30					8		2203	2242	2217
31	143	130	202	—	181		0047	0205	0055
31	14	23	18	10	11		0508	0553D	0521
31	30		63	43	24		0553E	0728	0606
31	39	—	72	29			0818	0906D	0825
31			20				0906E	0942	0922
31		44	19				1008	1130	1028
31		30					1228	1257D	1238
31		22					1257E	1328	1303
31		17					1435	1502	1440
31					18	19	2038	2105	2043
31	15		9		44	22	2110	2227	2135
31	37	32	32	54	68	53	2243	0034	2259

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