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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

AUG. 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	92	86	93	83	82	A	91	122	94	90	90	A	87	97	87	74	84	90	96	83	77	82	84	78
2	71	77	63	51	49	58	67	66	96	A			A			51	61	64	95	76	65	A	62	60
3	58	60	57	69	51	54	68	A	A	A	A					39	A	A	58	67	68	69	73	53
4	57	58	57	48	50	54	58	A		57	A		A	A	71		56	61	71	63	60	69	60	57
5	57	53	57	52	40	48	A	A	A	65	A	A	A	A	A	A	A	70	A	58	63	61	61	61
6	60	60	50	57	50	58	84	A	62	72	65	76	77	83	70	70	61	84	71	68	76	80	74	65
7	69	69	45	50	56	60	66	106	129	A	A	A	A	A	A	A	60	61	60	63	56	55	60	57
8	57	58	54	37	50	45	50	A	A	A	A	A		A	A	59	67	A	A	63	54	A	A	62
9	61	56	60	58	48	A	A	82	A	A	A		74	81	74	90	88	84	91	78	74	76	63	67
10	64	55	61	60	48	56	68	56	A	A	A	A	A	A	A			55	89	53	99	70	72	68
11	66	58	56	A	46	A	A	74	84	72	81	76	70	70	66	80	70	84	100	84	73	80	72	71
12	64	57	61	58	60	68	73	63	85	86	88	49	83	90	77	92	86	86	91	96	89	80	79	67
13	54	51	54	55	56	56	A	A	A	A	A			A	A	A	62	57	69	62	62	67	62	68
14	74	65	64	54	57	63	85	80	76	70	63	71	A	73	A	A	A	72	104	82	73	74	74	73
15	72	68	74	69	61	64	74	85	86	82	A	A	84	85	85	60	83	84	92	81	72	71	70	66
16	68	70	60	60	56	56	43	A	A	A	A	60	70	A	A	84	82	81	92	64	77	76	81	82
17	73	69	64	63	52	59	104	90	114	97	88	106	89	88	A	79	A	89	91	84	85	84	72	88
18	87	87	74	67	76	73	58	94	82	70	A	61	80	81	76	66	A	84	100	78	A	77	76	76
19	69	68	61	55	60	68	86	93	106	88	85	70	86	84	91	77	83	79	94	78	79	65	78	56
20	A	57	79	A	52	A	65	56					74	70	76	71	81	88	74	68	72	76	66	66
21	64	66	56	57	48	58	84	86	69	55		64	51	74	67	74	78	72	96	65	73	60	55	58
22	57	57	55	54	54	60	74	77	60	62	64	65		74	74	71	72	77	82	A	66	68	73	64
23	58	63	60	58	69	78	112	112	105		107	110	112	101	103	89	90	88	89	88	68	78	71	72
24	66	66	72	68	62	66	89	95	103	91	95	95	90	91	92	83	84	82	86	85	83	84	92	78
25	73	73	68	69	68	78	105	115	112	103	B		100	106	102	96	90	87	91	87	94	86	79	78
26	73	70	69	64	65	76	98	97	A	92	85	85	91	88	90	88	91	91	A	142	141	63	74	83
27	80	77	73	76	68	82	106	110	105	101	90	96	97	101	92	95	101	92	91	85	90	92	83	80
28	80	73	73	54	29	53	62	51	A	72	71	74	74	72	62	76	74	A	A	70	66	66	68	66
29	69	57	56	55	47	A	58	58	58	74	60		61	71	72	70	74	73	82	77	72	71	66	74
30	56	62	58	60	64	64	100	90	87	87	106	112	102	98	91	86	90	91	97	97	92	82	66	58
31	50	58	58	A	37	A	A	C	A	A	A	B	56	61	68	71	71	70	76	67	68	64	58	58
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	28	31	25	26	23	19	20	15	16	21	22	21	25	25	28	27	30	30	29	30	31
MED	66	63	60	58	54	60	74	86	87	78	85	75	83	84	76	76	81	83	91	78	73	74	72	67
U Q	73	70	69	65	62	68	91	97	105	90	90	95	90	91	91	87	87	87	95	84	83	80	76	76
L Q	58	57	56	54	48	56	65	66	76	70	65	64	72	73	70	70	68	71	76	65	66	66	66	60

HOURLY VALUES OF FES AT WAKKANAI

AUG. 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	107	92	46	45	68	84	50	103	78	46	G	86	64	54	50	58	41	44	46	40	27	67	60	27
2	34	25	G	G	G	34	41	39	42	82			70			G	G	73	G	29	27	73	40	G
3	G	G	24	24	33	32	40	44	60	60	88				G	G	100	153	37	64	58	28	G	G
4	G	G	G	G	26	34	G	59	G	G	67	G	62	77	64	G	G	G	42	53	40	26	39	39
5	69	59	36	28	32	34	48	46	46	44	45	47	58	52	60	74	72	53	126	94	81	91	29	G
6	G	G	G	40	50	59	70	71	62	G	G	G	G	G	G	G	46	41	G	36	58	60	40	G
7	24	G	G	G	34	54	60	116	138	62	60	75	66	60	56	45	45	39	36	30	G	34	41	53
8	G	G	G	G	G	G	40	60	66	70	74	45	G	60	54	G	50	67	69	52	69	108	90	67
9	36	35	31	35	42	72	73	94	96	72	106	G	G	58	G	55	50	G	39	34	30	32	46	59
10	34	27	44	G	51	57	50	58	58	49	56	64	60	75	94	G	G	47	48	44	114	59	69	32
11	34	34	40	38	33	59	53	50	60	61	66	G	G	G	G	50	42	48	44	59	46	59	50	70
12	G	G	G	G	G	31	43	47	56	58	62	G	G	G	52	52	50	46	48	102	124	165	93	49
13	30	23	G	39	32	34	42	50	61	61	84		G	57	93	63	G	47	47	72	49	34	58	11
14	38	28	27	46	31	G	G	48	G	54	58	78	107	76	123	96	93	62	55	41	46	36	112	60
15	36	73	69	68	33	G	57	72	63	62	70	82	59	62	G	G	45	G	G	46	58	31	G	G
16	G	G	G	G	G	30	51	65	101	56	60	59	60	73	90	68	65	58	61	30	G	32	34	28
17	45	46	35	32	G	38	G	39	52	60	63	75	69	70	94	78	153	96	60	27	38	59	58	85
18	60	32	65	54	30	34	49	61	G	60	70	60	56	56	G	G	70	72	56	39	66	47	38	27
19	30	33	G	G	G	G	G	51	60	54	60	61	47	63	G	G	G	35	G	28	G	40	33	35
20	60	53	100	81	84	106	40	46	G		G	G	G	G	G	G	47	48	69	32	G	G	G	G
21	G	23	G	40	30	34	36	44	51	G	G	G	G	G	G	G	40	46	35	36	31	G	G	65
22	45	33	38	26	31	38	49	58	65	G	G	48	G	G	G	G	42	47	56	68	55	30	32	G
23	G	G	G	G	32	30	39	48	72		116	G	G	63	G	68	64	64	96	77	64	27	G	28
24	35	G	G	G	29	32	46	51	65	61	54	G	G	G	G	56	G	58	31	27	36	34	G	35
25	26	G	G	G	G	32	45	53	46	G	B	G	G	G	G	G	G	44	38	60	40	G	G	G
26	26	G	G	G	G	G	32	48	96	64	61	62	66	60	45	G	69	93	157	154	152	126	71	G
27	25	G	G	G	G	G	51	74	68	64	61	64	63	65	65	G	40	44	42	28	G	58	G	G
28	G	G	G	G	G	G	49	49	47	G	G	G	G	G	43	60	62	136	94	70	60	91	38	G
29	G	G	G	G	27	41	52	45	60	55	61	G	58	G	53	G	52	74	51	94	50	53	40	36
30	24	37	34	G	G	G	43	54	G	G	G	G	G	53	G	43	G	46	40	33	36	38	28	32
31	G	G	G	43	27	124	38	G	54	69	44	B	48	G	G	50	G	G	49	47	42	32	32	33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	29	29	27	30	29	30	31	31	31	31	31	31	31	31	31
MED	26	23	G	G	30	34	45	51	60	58	60	45	48	56	22	G	45	47	47	44	46	38	38	28
U Q	36	34	36	40	33	54	51	61	66	62	68	64	62	63	60	58	64	67	60	68	60	60	58	49
L Q	G	G	G	G	G	G	39	46	46	22	22	G	G	G	G	G	G	44	37	32	30	31	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

AUG. 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	18	15	15	15	18	17	24	40	38	49	38	43	40	34	39	27	22	17	17	17	15	17	15
2	16	18	18	16		17	18	51	33	40			43				38	18	17	20	18	14	16	17
3	15	15	16	18	14	17	18	23	27	36	38						27	33	18	15	17	16	15	18
4	15	23	16	15	18	17	20	22		42	34		33	32	28	27	23	21	17	16	15	17	14	14
5	17	17	14	14	14	18	21	21	33	35	38	39	38	35	35	28	23	26	18	18	15	14	14	16
6	17	15	18	15	15	18	21	22	27	52	38			52	42	29	24	20	18	16	15	14	16	17
7	16	17	22	17	15	17	18	22	34	32	28	34	35	34	30	24	22	20	17	15	18	17	16	15
8	15	15	15	20	18	17	18	22	24	30	38	38		38	35	28	26	18	18	16	14	16	16	16
9	17	17	18	16	17	16	18	20	24	36	30		50	33	30	22	21	17	18	16	18	16	16	17
10	17	18	15	15	14	17	20	20	28	35	37	42	33	32	29	34	23	18	18	14	16	14	17	14
11	16	16	15	16	17	16	18	22	18	30	33	28	43	49	47	22	22	17	20	15	18	15	15	16
12	15	15	16	15	17	17	17	22	28	22	34	49	30	28	27	35	23	23	17	16	18	15	15	15
13	14	16	15	16	16	17	17	18	22	24	30		37	34	29	24	21	21	16	14	16	18	15	17
14	15	17	15	16	16	16	20	26	26	24	35	40	40	31	29	24	21	17	18	18	17	20	20	15
15	17	17	16	14	16	17	24	23	34	38	39	40	40	40	48	40	26	20	26	17	14	14	23	15
16	15	15	17	16	16	17	23	28	35	42		43	43	40	40	27	26	20	18	18	17	15	16	16
17	16	20	16	14	16	18	18	23	35	42	42	42	39	39	41	39	24	20	17	17	16	16	17	17
18	18	17	16	14	15	20	18	24	38	28	34	37	38	38	28	30	23	20	17	17	17	14	15	16
19	18	17	18	18	15	22	17	20	27	27	38	41	45	40	40	40	24	18	22	18	16	18	17	14
20	17	15	14	14	14	18	21	20	24					49	46	27	22	18	17	15	20	17	17	17
21	17	16	16	14	14	17	17	26	42	38	41		42		40	41	32	18	17	14	16	16	17	18
22	16	17	16	17	15	16	18	17	33	40	50	33		43	48	17	22	18	17	17	17	15	15	15
23	16	15	16	15	14	17	20	24	36		36	54	48	32	40	33	24	17	17	16	14	17	16	17
24	17	16	14	16	17	17	18	22	27	36	39	36	49	38	32	26	24	18	17	17	16	15	16	17
25	16	16	15	15	16	17	20	21	27	34	B	91	68	62	60	41	24	22	17	16	15	16	16	17
26	16	15	17	15	14	22	21	21	24	39	37	35	40	43	35	42	26	21	16	18	15	17	16	15
27	16	16	15	16	15	21	17	20	23	33	33	35	32	28	28	22	21	18	17	17	17	16	15	17
28	16	16	17	16		27	18	20	32	27	40	29		42	28	24	22	18	17	18	18	17	17	15
29	15	17	17	14	15	15	16	18	27	23	32	30	32	39	27	24	17	18	17	17	16	17	17	15
30	16	16	16	15	16	18	17	17	20	23	27	50	29	35	41	28	18	17	16	17	16	15	16	16
31	17	15	16	14	15	15	17	20	26	27	27	B	40	49	26	23	18	27	17	15	16	15	18	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	31	29	31	31	31	30	29	27	22	25	28	29	29	31	31	31	31	31	31	31	31
MED	16	16	16	15	15	17	18	22	27	35	37	38	40	38	35	28	23	18	17	17	16	16	16	16
U Q	17	17	17	16	16	18	20	23	34	38	39	42	43	42	41	37	26	21	18	17	17	17	17	17
L Q	15	15	15	14	14	17	17	20	24	27	33	35	34	33	28	24	22	18	17	15	15	15	15	15

HOURLY VALUES OF FOF2 AT AKITA

AUG. 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	81	86	85	86	83	88	86	107	A	111	91	97	90	96	101	91	90	90	90	86	74	A		A
2	A	72	70	59	51	44	44	A	A	A	A	A	A		A			A	A	42	54	A	68	69
3	54	52	54	52	56	53	45	52	A	A	A	A	A	A	A	A	A	A	A	50	51	A	A	65
4	53	53	60	63	58	36	52	53		76	81	A	A			69	51	72	76	54	53	A	40	44
5	A	A	66	50	41	A	A	A	A	A			45	47		78	77	A	56	A	70	A	52	A
6	A	50	50	48	43	49	83	87	88	85	80	97	98	97		77	81	81	82	56	49	78	41	65
7	A	53	75	68	52	38	53	53	51	A	A	A	A		A	N	A	64	54	48	A	54	50	A
8	A	53	A	A	47	52	A	A	A	46	A	A	A	A	A	A	67	54	54	52	54	A	54	54
9	A	53	54	54	41	45	67	A	79	A	91	85	88	87	90	78	88	97	87	129	A	24	56	A
10	A	A	52	A	51	52	A	A	A	92	A	A	A	A	A		48	51	36	44	28	A	A	53
11	53	54	52	50	53	49	62	73	88	84	78	80	80	85	80	76	80	80	84	85	A	38	72	A
12	A	A	52	68	54	66	72	82	86	97	90	87	91	86	84	83	90	A	91	88	A	63	A	A
13	A	A	52	52	51	47	53	A	A	A	C	A	A	A	A	A	A	47	34	A	A	54	56	56
14	66	54	60	54	45	53	82	84	79	72	76	80	A	A	A	A	A	78	79	51	52	52	36	77
15	50	54	A	A	59	59	79	87	88	A	91	A	91	91	100	86	90	87	87	85	79	80	54	N
16	69	66	69	52	52	52	54	A	A	A	A	81	84	88	A	129	A	A	A	A	A	43	72	78
17	77	38	51	A	53	54	90	98	86	96	91	97	104	92	95	90	98	88	90	38	30	41	80	86
18	86	76	57	73	74	68	85	83	91	84	A	120	78	91	79	77	79	84	86	A	A	35	77	A
19	A	A	A	A	51	68	88	90	112	112	90	A	91	91	109	87	84	45	94	87	79	46	70	51
20	A	A	53	A	A	A	A	56	A	A	77	79	84	90	86	86	90	87	N	72	65	87	87	68
21	80	80	78	50	51	51	75	81	80	73	74	76		85	86	85	90	78	N	110	A	65	33	64
22	41	43		44	50	31	61	76	75	A	90	N	85		84	86	A	78	A	74	A	50	68	A
23	46	48	52	46	51	52	88	102	105	111	114	113	116	86	102	101	97	108	N	A	A	A	A	65
24	60	54	52	54	23	61	86	100	99	102	104	105	101	88	100	91	90	87	87	A	80	35	84	65
25	78	68	52	52	52	52	104	110	102	101		B	110	120	109	109	106	91	90	90	83	83	80	79
26	70	68	50	24	71	78	88	88	98	97	92	A	98	95	91	109	101	101	A	86	79	A	84	86
27	A	50	77	56	71	84	103	104	104	105	103	111	105	113	120	114	107	98	87	87	87		N	84
28	84	79	52	49	31	44	45	62	A	88	80	A	80	80	79	83	82	82	82	A	A	52	46	53
29	54	50	55	50	44	44	A	A	68	A	A	A	A	71	77	76	79	78	78	A	A	76	A	51
30	52	53	A	52	53	45	86	90	106	101	103	107	105	100	95	97	96	98	100	87	89	87	78	46
31	41	47	52	40	43	A	A	A	A	A	A	B	80	75	80	81	83	79	78	70	A	A	A	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	19	25	26	25	30	28	25	22	19	19	19	15	21	22	20	24	24	26	23	23	18	20	23	22
MED	60	53	54	52	51	52	79	86	88	96	90	97	91	89	90	86	89	82	84	74	68	53	68	65
U Q	78	68	66	57	54	60	87	98	102	102	92	107	102	95	100	94	93	90	90	87	79	77	78	77
L Q	52	50	52	49	45	45	53	73	79	84	80	80	82	85	82	78	79	78	76	51	52	42	50	53

HOURLY VALUES OF FES AT AKITA

AUG. 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	51	50	56	43	51	38	34	57	93	55	82	51	76	51	G	G	57	58	39	33	34	36	36	42
2	42	31	27	G	G	29	34	43	104	75	126	176	54	G	72	G	G	50	52	49	50	44	34	50
3	G	G	38	38	26	31	51	74	55	67	57	51	54	82	56	53	59	52	113	49	G	71	51	G
4	G	G	G	G	G	34	51	46		43	52	50	55	G	G	G	G	37	46	45	48	81	30	G
5	35	38	28	29	28	46	50	61	48	46	G		G	G	G	G	42	110	56	48	58	68	50	91
6	83	31	G	G	30	27	40	55	67	92	G	G	G	G		60	50	50	36	38	28	32	136	54
7	92	40	33	32	28	29	37	50	53	52	69	122	55		51	46	83	36	34	30	33	G	G	40
8	45	37	36	34	40	35	80	50	91	55	48	46	51	57	81	50	46	41	36	28	G	46	29	25
9	115	38	34	37	41	30	50	91	61	88	64	73	80	84	102	66	74	38	73	92	110	43	G	85
10	92	114	49	84	40	39	53	60	91	86	125	126	166	87	57	G	G	42	46	49	G	108	126	51
11	56	38	37	38	27	32	49	60	51	54	56	64	46	G	G	G	50	61	59	58	59	124	41	73
12	72	40	28	G	27	33	38	50	60	51	52	83	62	56	51	G	48	87	58	41	80	57	145	114
13	94	92	30	37	36	36	42	49	49	52	G	51	73	81	49	54	46	40	38	58	92	37	28	32
14	28	36	26	G	30	33	40	50	52	61	51	60	134	137	91	142	84	40	37	36	34	30	37	34
15	32	G	44	60	51	38	34	56	57	78	70	84	56	82	54	78	50	37	34	38	28	G	25	G
16	G	G	35	G	G	32	47	51	62	50	58	G	69	60	145	137	137	93	91	52	41	31	G	42
17	37	34	44	40	33	G	44	44	51	61	85	57	72	G	51	71	93	70	44	44	44	33	57	87
18	44	33	82	57	51	48	57	54	75	92	68	97	58	58	G	G	53	46	51	58	51	38	57	57
19	48	50	42	40	G	G	32	44	58	66	67	95	54	50	51	G	G	36	38	34	G	G	27	24
20	46	91	42	133	92	91	86	43	49	48	G	G	G	G	G	G	41	50	47	26	G	G	G	G
21	G	G	26	27	33	33	41	52	52	50	G	G	G	G	49	56	80	86	143	46	46	44	44	40
22	G	26	G	G	G	34	38	52	73	60	51	51	G	G	48	G	52	58	71	34	61	114	32	44
23	25	G	G	26	G	28	44	51	55	51	128	51	56	64	56	115	74	111	124	169	133	92	51	37
24	27	G	G	30	31	28	51	52	63	71	70	73	54	50	51	54	44	46	56	105	48	40	33	37
25	30	G	25	33	31	G	52	57	50	54	G	B	G	51	G	G	50	61	66	64	37	43	G	26
26	G	G	31	33	36	33	G	47	52	65	77	146	122	68	49	51	81	61	89	53	50	91	69	51
27	50	34	27	41	27	G	38	84	68	96	97	68	74	51	51	72	50	49	30	34	28	G	27	G
28	29	G	G	24	G	G	37	54	52	52	52	57	51	50	74	50	58	50	54	60	92	51	32	35
29	27	G	G	G	G	28	51	68	73	51	81	75	75	53	G	G	40	44	50	92	61	84	41	36
30	36	27	33	31	34	G	36	58	57	50	47	51	52	G	G	44	40	50	60	50	71	32	50	46
31	41	26	G	G	26	34	37	41	52	51	51	B	46	47	G	G	G	G	G	41	50	42	44	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	30	31	31	28	31	30	30	31	31	31	31	31	31	31	31	31
MED	37	31	30	32	30	32	42	52	57	55	57	58	55	51	51	46	50	50	51	48	48	43	36	40
U Q	51	38	38	40	36	35	51	58	68	71	77	83	73	64	56	60	74	61	66	58	61	71	51	51
L Q	27	G	G	G	G	28	37	49	52	51	48	51	46	G	G	G	41	40	38	36	28	32	27	25

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

AUG. 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	15	15	15	16	16	21	35	28	36	33	34	29	32	22	22	18	17	17	15	16	16	16
2	17	15	16	16	16	16	17	34	21	28	32	36	37		46	27	21	18	16	16	16	16	16	16
3	16	16	16	16	17	16	17	22	22	32	35	33	26	36	29	21	18	20	16	16	17	16	16	18
4	16	18	18	18	16	16	16	20		29	35	32	32		21		26	17	17	16	15	16	18	17
5	16	16	17	15	16	17	17	18	21	22			44	44		52	20	17	16	16	18	18	16	16
6	16	16	17	17	16	18	18	20	21	32	46		36	65		26	20	21	16	16	16	16	17	16
7	16	15	16	16	16	16	18	16	18	21	23	36	35		32	21	20	17	16	16	16	17	18	16
8	17	15	15	16	15	17	16	17	20	21	35	38	38	36	37	26	18	18	16	17	16	16	15	17
9	17	15	15	15	15	16	16	17	20	20	26	26	26	29	20	21	18	16	16	16	16	15	17	17
10	18	16	16	16	16	17	17	17	20	26	26	32	27	35	30	23	26	17	16	16	16	16	15	17
11	16	16	17	16	16	16	16	20	20	21	26	32	28	63	28	18	18	17	16	16	16	15	17	17
12	16	16	17	15	16	16	16	18	18	21	28	27	32	28	33	26	21	18	15	16	18	16	16	16
13	17	16	16	16	17	16	16	16	18	20	27	30	34	28	22	22	18	17	16	16	16	16	17	17
14	17	15	16	16	15	17	17	17	18	26	27	36	33	33	22	21	18	17	16	16	20	18	17	16
15	16	16	16	16	16	16	16	16	18	23	38	38	38	41	39	29	18	17	16	15	16	20	18	16
16	18	16	16	16	17	16	17	18	28	29	45		45	30	30	24	23	16	16	16	16	16	17	16
17	17	18	16	15	16	21	16	20	28	26	36	28	41	29	29	22	22	18	16	16	16	16	16	17
18	17	16	16	16	16	17	16	22	21	23	28	34	35	28	27	26	20	17	16	16	17	16	18	16
19	16	16	16	17	16	21	17	16	23	23	24	27	32	35	28	29	22	17	16	16	17	18	18	17
20	17	16	16	16	17	16	17	18	22	23		38	26	28	26	27	18	17	16	18	16	17	18	17
21	16	16	18	17	16	16	17	17	21	23	27	28	48	32	28	26	20	16	18	16	16	18	16	17
22	17	16	16	17	18	16	16	17	18	21	27	35	35	35	26		23	17	16	16	18	16	17	16
23	18	21	20	16	18	20	20	23	30	34	33	35	40	37	30	23	20	18	18	16	16	17	16	16
24	16	16	18	17	16	20	17	17	22	22	34	36	28	35	24	32	21	18	16	16	16	16	17	16
25	16	17	18	16	17	20	17	18	21	26	101	B	70	36	35	44	21	18	17	16	16	16	18	17
26	17	17	16	17	16	16	17	18	21	30	29	35	28	38	45	38	21	18	17	18	17	16	17	17
27	16	16	17	15	16	18	17	20	23	29	33	34	29	28	29	20	18	17	15	16	17	18	18	18
28	16	16	16	16		24	16	17	20	24	29	26	28	33	27	27	21	17	16	17	17	16	16	16
29	17	16	15	16	16	17	16	17	21	26	27	27	28	27	26	23	18	18	16	17	17	16	17	16
30	17	16	15	15	15	18	16	17	20	20	22	35	36	52	27	22	18	17	16	17	16	16	16	16
31	16	17	16	17	17	17	16	15	22	26	26	B	37	33	23	22	20	17	20	16	16	16	17	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	31	31	30	31	29	26	31	28	29	29	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	17	17	18	21	24	29	34	34	34	28	24	20	17	16	16	16	16	17	16
U Q	17	16	17	17	17	18	17	20	22	28	35	36	38	36	32	27	21	18	16	16	17	17	18	17
L Q	16	16	16	16	16	16	16	17	20	21	26	28	28	29	26	22	18	17	16	16	16	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

AUG. 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	82	99	95	92	92	93	99	105	104	105	102	102	98	111	110	102		95	98	86	82	81	90	86
2	92	83	79	57	58	62	70	68	A	A	A	A	A		60	71	69	64	71	80	A	69	66	66
3	56	68	69	82	64	N	72	77	70	50	A	A	A			51	51	59	56	65	A	63	A	62
4	55	57	58	60	57	58	70	80	A	81	90	86	A	71	81	75	74	77	74	82	68	51	61	60
5	68	68	A	57	50	A	53	58	58	A	50	72	79	77	79	86	86	81	77	A	66	60	70	72
6	67	A	62	57	57	57	74	92	90	85	86	96	107	96	91	86	92	93	80	77	74	77	82	58
7	A	75	75	68	64	55	70	68	66	46	A	A	97	A	92	80	80	77	81	62	58	63	60	62
8	68	62	60	57	51	57	57	62	68	50	A		53	56	A	A	72	68	A	62	A	68	68	66
9	69	59	62	56	A	56	76	78	A	98	96	96	103	105	113	91	96	104	96	97	A	A	A	72
10	69	A	A	A	60	64	A	68	A	A	A	A	A	A	58	63	60	A	63	A	68	58	60	58
11	58	55	60	57	57	58	71	82	92	91	83	84	86	96	91	79	86	86	81	84	78	70	72	73
12	72	73	69	71	71	72	78	93	105	99	A	93	96	89	91	93	93	103	103	104	A	65	58	84
13	71	63	67	72	57	48	60	68	59	67	66	A	A	A	93	62	69	66	69	75	63	58	59	70
14	73	63	69	56	57	57	78	92	92	A	73	81	A	A	A		87	92	86	77	75	81	70	74
15	79	71	71	75	70	61	94	98	86	86	94	110	100	101	101	98	93	108	101	84	83	80	94	81
16	82	71	67	74	73	72	71	69	A	94	93	93	104		106	114	107	98	84	78	82	82	82	93
17	82	83	76	74	69	75	99	104	98	54	99	106	115	96	102	100	100	102	101	94	68	80	97	94
18	93	80	63	75	76	74	86	96	A	A	90	100	94	A	97	91	89	91	86	81	71	82	97	75
19	81	74	63	67	58	73	96	92	106	110	95	91	102	105	113	101	86	80	98	93	83	55	80	79
20	75	78	73	70	79	72	A	91	100	97	98	103	102	96	100	93	91	100	94	84	86	88	94	90
21	93	87	74	68	68	58	91	90	81	80	86	85	86	91	97	100	102	106	93	92	64	69	66	58
22	75	82	61	60	58	57	82	82	82	100	92	96	93	84	96	97	82	82	92	87	A	69	79	70
23	67	73	75	57	56	67	98	114	96	105	116	120	116	114	106	106	106	103	107	94	82	A	85	85
24	81	73	73	71	71	69	84	104	96	101	113	115	108	112	108	105	95	91	95	94	82	84	81	82
25	84	83	80	82	68	78	106	115	103	111	B	B	119	128	128	126	118	113	127	97	87	97	93	87
26	N	94	83	93	100	92	98	105	105	92	97	101	105	106	110	N	108	107	101	94	81	87	85	92
27	93	86	82	76	81	82	113	104	102	102	117	120	124	132	131	131	116	111	101	96	93	98	93	94
28	86	93	84	67	59		58	87	76	97	92	84	86	A	89	91	91	92	86	83	A	72	74	70
29	79	71	67	57	69	52	58	76	A	51	52	A	80	77	81	83	83	82	86	81	82	76	95	82
30	81	80	94	72	76	76	98	106	112	105	106	115	116	101	100	102	103	105	108	105	94	96	115	81
31	58	73	73	58	49	47	59	58	46	76	86		86	90	95	90	94	91	92	82	80	80	55	70
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	30	30	28	29	31	24	26	24	22	25	22	28	28	30	30	30	29	24	29	29	31
MED	75	73	71	68	64	63	78	90	92	93	92	96	100	96	97	92	91	92	92	84	80	76	80	74
U Q	82	83	77	74	71	73	97	104	102	101	98	106	107	106	107	101	100	103	101	94	82	82	93	85
L Q	68	68	63	57	57	57	70	69	73	76	86	86	86	89	91	81	82	81	81	79	68	64	66	66

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

AUG. 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	60	56	61	45	29	30	33	49	60	62	66	G	58	49	G	56		60	43	82	39	24	26	50
2	G	32	26	G	G	G	G	40	56	97	46	46	50		56	46	44	40	G	61	103	59	40	58
3	60	44	45	75	31	33	36	G	48	G	74	55	49		G	G	61	62	53	44	81	26	94	58
4	G	G	G	G	25	G	42	47	61	53	58	62	63	49	G	G	43	71	44	64	47	60	92	70
5	34	40	61	55	37	26	38	55	G	53	45	59	59	51	G	G	61	61	43	74	40	G	49	51
6	52	61	48	32	26	G	G	48	58	56	G	G	G	G	G	45	43	40	43	49	G	59	52	60
7	93	50	43	44	40	34	G	55	48	58	57	73	78	168	81	62	G	G	31	38	38	48	33	48
8	28	G	G	G	G	G	G	G	46	G	58	G	G	G	70	93	61	61	69	62	61	34	25	58
9	60	36	26	60	122	G	38	58	109	57	51	62	52	56	122	104	53	58	57	54	103	107	94	96
10	60	97	100	95	58	46	116	61	124	94	184	146	52	90	G	G	G	68	58	72	35	G	33	34
11	26	26	28	22	48	25	50	45	71	78	60	69	50	58	G	44	48	54	54	59	57	58	60	94
12	53	50	38	37	29	28	G	55	59	85	101	73	62	58	58	53	41	62	52	45	130	46	94	92
13	96	60	41	G	27	33	51	50	53	60	58	52	58	78	70	48	48	43	40	44	60	66	53	29
14	G	43	36	60	49	33	45	53	71	88	60	72	100	150	118	124	52	96	30	91	40	G	23	36
15	50	34	35	50	51	41	G	48	45	68	73	95	64	86	61	62	57	40	36	58	55	52	36	G
16	G	G	29	27	25	G	G	45	77	75	G	G	G	138	56	97	134	65	60	59	64	156	41	32
17	39	26	34	34	27	G	G	G	59	87	62	62	57	47	63	82	78	56	44	31	G	104	60	58
18	47	57	72	60	45	48	66	82	136	128	83	63	81	95	G	66	45	37	67	61	59	49	40	60
19	35	34	56	60	62	58	G	39	50	60	62	62	72	67	72	56	G	36	G	30	23	23	G	48
20	31	30	28	22	28	59	97	79	46	55	57	G	G	G	48	52	44	50	31	26	45	33	G	G
21	G	G	G	46	33	54	54	93	56	61	49	G	G	G	62	66	92	62	48	74	58	94	61	59
22	G	31	30	25	G	G	32	43	62	128	104	56	G	52	50	G	57	58	64	76	122	40	92	43
23	40	31	30	28	33	G	44	53	58	57	66	60	47	62	57	64	66	80	78	58	G	134	79	93
24	58	54	34	32	37	29	44	68	75	70	80	80	74	94	76	74	57	64	77	73	109	80	57	34
25	31	G	G	G	24	G	44	94	101	56	B	B	G	77	62	57	58	85	125	93	79	60	51	40
26	G	G	G	G	26	G	G	43	46	46	61	48	47	G	46	56	67	84	96	47	44	63	82	48
27	56	49	38	31	25	26	34	46	67	49	60	82	62	64	55	55	39	46	48	54	40	34	G	31
28	G	G	G	23	G		35	50	58	56	54	G	74	96	G	G	48	55	54	37	72	58	50	39
29	29	34	29	26	G	44	34	45	68	44	G	55	G	G	57	55	74	63	55	50	61	77	55	46
30	32	26	G	G	24	G	34	50	60	57	60	83	72	61	61	G	92	91	61	70	60	59	28	60
31	25	34	G	G	30	29	38	45	51	57	52	G	48	51	G	60	58	48	32	43	57	39	70	57
	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	30	31	31	31	31	30	30	31	29	31	31	30	31	31	31	31	31	31	31
MED	34	34	30	31	29	27	35	49	59	58	60	60	52	58	56	56	55	60	52	58	57	58	51	50
U Q	56	50	43	50	40	34	44	55	71	78	66	72	64	88	63	66	61	65	61	72	72	66	70	60
L Q	G	26	G	G	25	G	G	45	50	55	52	G	G	48	G	44	44	46	40	44	40	34	33	36

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

AUG. 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	15	15	15	15	14	17	17	20	33	27	34	35	35	34	33	18		16	16	16	16	15	14	15
2	15	14	15	16	20		18	33	21	26		34	40		36	24	20	18	26	15	15	15	15	15
3	15	14	15	14	14	15	17	21	22	24	30	40	38			27	18	16	15	14	15	15	15	15
4	15	15	15	15	14	20	17	18	39	36	35	35	33	30	27	27	23	18	18	15	15	14	14	15
5	15	14	14	14	14	15	17	16	20	24	39	38	39	38	45	39	21	15	16	16	16	15	15	14
6	15	15	14	14	16	15	17	17	21	33	30	30	32	29	43	24	17	18	17	16	14	15	14	14
7	14	14	14	14	14	15	28	18	20	23	30	30	34	32	32	26	20	15	15	16	15	15	16	15
8	17	14	16	17	14	20	27	15	18	40	36	36	42	34	34	32	20	16	21	15	15	15	15	15
9	14	15	15	14	16	18	17	15	21	27	24	33	30	33	26	20	20	15	15	15	15	15	15	15
10	15	16	15	15	14	14	20	15	20	22	33	35	35	36	42	26	18	17	16	15	15	14	15	15
11	16	15	15	14	16	16	16	16	17	20	30	33	29	27	20	20	18	16	16	15	14	14	15	15
12	15	14	15	15	14	15	17	17	18	20	26	27	30	24	27	22	20	16	16	15	15	14	14	15
13	15	15	15	14	14	14	17	16	18	23	24	39	36	36	33	23	20	16	15	15	14	14	15	14
14	14	14	14	14	14	15	16	18	18	22	36	33	38	33	28	26	20	15	15	15	15	15	15	15
15	17	14	16	14	14	14	18	16	20	36	39	29	40	40	35	24	21	16	16	17	15	15	15	15
16	15	14	14	16	15	15	17	18	21	39	47		30	34	33	26	23	16	17	15	15	15	15	15
17	15	15	14	14	14	21	26	22	20	23	38	30	33	32	41	24	20	18	17	15	15	15	15	15
18	16	14	14	15	14	14	17	18	21	26	32	32	33	29	27	20	18	16	14	14	14	15	14	15
19	15	14	14	14	14	14	18	16	20	23	24	33	42	39	34	34	23	17	23	15	14	16	15	14
20	15	14	14	15	15	14	20	20	21	28	34	32	34	34	23	23	18	16	16	15	15	14	14	15
21	15	16	16	16	14	14	17	16	20	23	30	35	29	32	41	24	20	18	16	15	18	15	15	15
22	15	14	14	16	14	17	16	16	24	23	33	35	35	32	28	32	20	17	16	15	15	15	15	15
23	15	15	15	16	15	15	18	24	29	32	35	35	38	34	30	27	18	20	18	17	15	15	15	15
24	15	15	14	15	14	14	20	20	21	34	36	35	29	28	35	29	20	15	16	15	15	15	15	15
25	15	15	15	15	15	18	17	20	23	34	B	B	66	43	39	41	23	16	17	16	15	14	15	15
26	16	16	15	15	15	17	28	16	20	40	39	43	39	45	34	29	22	18	16	14	15	15	15	15
27	15	14	15	14	15	14	20	20	22	33	34	33	32	30	28	24	17	16	16	15	15	15	16	17
28	16	15	14	16			16	17	21	27	30	32	27	32	33	29	20	17	16	14	15	14	14	15
29	16	14	14	16	15	15	20	18	21	29	33	30	32	30	28	22	18	16	15	17	15	15	15	15
30	15	15	15	15	15	18	16	18	18	23	34	38	38	38	33	23	18	18	15	17	15	15	14	15
31	14	14	14	14	14	14	16	16	18	34	28	66	36	29	29	23	18	14	16	15	14	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	29	31	31	31	31	29	29	31	29	30	31	30	31	31	31	31	31	31	31
MED	15	14	15	15	14	15	17	18	21	27	33	34	35	33	33	24	20	16	16	15	15	15	15	15
U Q	15	15	15	16	15	17	20	20	21	34	36	35	38	36	35	29	20	18	17	16	15	15	15	15
L Q	15	14	14	14	14	14	17	16	20	23	30	32	32	30	28	23	18	16	15	15	15	14	14	15

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT YAMAGAWA

AUG. 1991

LAT. 31.2N LON. 130.6E 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	87	97	104	88	86	80	85	103	100	94	101	94	91	107	112	108	111	105	104	98	85	A	87	87
2	88	86	86	80	75	66	72	63	51	67	A	75	78	80	76	82	82	59	N	88	82	A	65	64
3	42	A	64	67	67	66	65	80	71	A	A	56	A			52	56	A	67	71	A	A	A	66
4	N	65	68	64	63	56	55	76	78	87	97	113	93	85	96	101	90	88	86	96	64	52	58	66
5	68	68	N	A	62	A	44	62	62	60	A	85	83	81	90	93	91	90	91	81	73	72	65	A
6	63	67	60	52	54	57	61	80	84	78	77	88	100	97	92	101	112	95	98	86	69	78	81	86
7	74	67	72	73	63	63	62	72	73	77	82	79	79	78	87	86	96	97	92	81	81	67	A	77
8	70	66	72	76	56	53	54	80	87	76	71	76	82	77	78	83	90	87	81	77	81	77	66	66
9	66	67	70	68	54	53	57	73	87	91	87	124	101	105	101	94	105	104	101	87	A	A	A	82
10	A	A	78	78	85	73	66	76	A	78	77	77	80	A	78	80	70	64	67	73	66	69	64	66
11	67	66	76	64	54	57	54	78	88	85	77	79	94	112	109	106	105	97	88	87	85	72	73	67
12	65	64	64	66	66	66	66	88	105	104	90	97	99	115	106	102	103	105	110	108	81	63	76	83
13	70	66	65	77	58	52	54	64	71	80	85	A	A	85	87	82	85	82	80	71	63	54	N	63
14	70	72	64	54	52	62	76	90	82	75	A	80	121	A	93	97	105	111	102	87	87	84	78	73
15	77	80	81	75	63	62	87	89	A	84	92	96	92	101	106	106		115	118	107	79	86	81	86
16	87	77	74	66	71	66	77	85	87	97	106	107	117	113	117	125	120	121	123	108	103	87	101	110
17	97	97	83	81	78	72	84	108	96	86	103	113	113	110	113	111	107	113	103	104	90	92	86	87
18	87	79	75	77	76	67	83	101	A	98	97	117	109	110	115	122	121	121	111		90	86	98	87
19	83	76	65	66	65	71	87		102	104	94	92	108	114	112	112	108	108	110	111	88	71	77	84
20	76	80	81	69	69	65	74	97	107	114	110	116	119	112	115	109	106	104	105	92	135	146	140	110
21	88	87	88	72	66	65	78	83	88	106	103	108	112	101	104	107		109	104	101	81	78	A	76
22	85	85	81	73	67	66	82	87	88	96	101	107							103	96	75	52	67	73
23	65	65	78	63	58	62	77	108	94	101	108	123	127		117	115	120	118	122	110	88	82	84	81
24	79	76	74	76	71	68	86	106	88	A	120	126	133	132	132	130	123	116	110	105	91	87	A	
25	88	90	83	78	74	74	90	108	101	102	102	135	142	146	146	146		133	125	132	101	95	106	111
26	111	110	85	83	81	86	88	111	106	96	100	116	120	124	128	132	123		118	107	89			87
27		130	112	85	86	86	87	101	104	108	115		140	146	147		144	143	131	A	107	111	103	108
28	109	108	98	76	33	66	65	84	74	101	112	101			104			101	101	90	75	N	78	79
29	75	77	74	74	67	66	64	77	54	A	68	80	83	100	97	96	95	95	98	89	88	85	90	86
30	86	85	79	72	67	67	76	88	103	96	95	108	112	104	106	111	108	112	120	110	104	106	87	100
31	86	83	86	78	62	54	42	74	63	80	96	94	95	103	104	98	105	105	102	90	80	80	N	78
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	31	30	31	30	28	28	27	29	27	25	29	28	26	28	30	29	29	25	23	29
MED	78	77	77	74	66	66	74	84	88	92	97	97	101	105	106	104	105	105	103	92	85	80	81	82
U Q	87	86	83	78	74	68	84	101	100	101	103	114	119	113	115	111	112	114	111	107	90	87	90	87
L Q	69	67	70	66	58	62	61	76	73	79	85	80	91	91	92	93	91	95	92	86	77	70	67	70

HOURLY VALUES OF FES AT YAMAGAWA

AUG. 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	41	G	G	29	40	66	48	G	49	67	62	65	54	G	G	G	G	43	43	42	G	72	30	G
2	34	44	30	43	G	G	32	G	50	56	74	95	G	60	49	G	46	47	62	70	41	72	24	28
3	41	41	48	69	59	37	31	68	60	59	72	61	49		G	G	56	72	51	54	58	70	92	44
4	24	43	28	G	23	G	29	42	G	G	G	60	G	G	66	G	61	38	40	35	43	38	G	G
5	46	34	159	136	93	90	58	46	46	52	114	60	50	72	69	G	G	45	42	G	G	28	68	46
6	45	26	26	40	40	39	28	G	G	G	G	G	62	G	G	G	G	47	44	43	40	36	48	34
7	36	28	30	47	54	40	55	50	46	50	62	G	G	57	54	52	50	42	38	32	29	36	92	44
8	44	34	26	25	G	G	G	G	G	G	G	48	G	G	G	46	79	84	59	50	69	37	37	32
9	G	G	G	G	G	G	32	G	56	50	G	99	86	81	68	92	61	82	66	48	107	92	110	92
10	172	145	92	92	46	G	30	49	166	73	G	52	53	132	89	68	G	G	39	30	40	36	40	48
11	29	34	39	54	44	39	G	G	65	92	72	73	106	82	70	56	50	56	64	39	69	25	27	58
12	G	43	G	G	24	29	31	38	40	48	61	94	84	60	62	54	G	61	62	49	25	G	G	29
13	92	92	71	69	38	44	41	43	57	66	56	78	96	72	56	49	59	49	71	80	69	40	90	65
14	40	44	29	25	30	28	45	59	62	107	97	G	76	134	62	92	74	43	G	G	39	39	58	60
15	58	60	49	34	39	30	G	41	72	70	56	63	56	61	71	78		83	64	37	28	48	35	41
16	23	32	G	G	G	G	G	43	73	56	70	68	G	G	G	72	118	76	66	46	82	44	36	36
17	40	28	G	41	66	39	28	44	46	G	G	128	G	G	52	70	53	95	84	60	40	46	50	34
18	G	43	48	60	58	64	38	57	144	84	53	62	53	G	G	G	56	58	69		90	92	83	57
19	69	G	32	G	G	26	G		61	60	63	61	66	72	65	54	G	39	35	39	34	37	49	35
20	30	32	35	29	28	G	G	52	93	75	82	82	50	G	G	G	66	74	58	58	29	G	29	41
21	G	G	G	G	G	G	44	49	54	81	78	73	64	G	62	54		56	68	50	28	32	110	91
22	92	43	68	40	47	49	G	39	50	58	88	72							47	33	31	59	69	58
23	40	38	36	30	33	29	49	53	G	64	G	G	58		58	G	G	49	50	G	32	G	28	28
24	G	43	29	25	G	26	G	48	76	94	76	105	82	71	66	76	64	72	96	71	31	41	110	163
25	92	44	44	32	25	G	G	44	45	92	G	G	81	G	G	G		117	100	115	72	74	28	38
26	34	G	G	28	28	G	29	G	46	48	57	63	69	53	66	56	55		72	93	50			38
27		49	59	39	32	33	G	44	54	62	62		90	54	104		116	61	82	150	92	41	26	G
28	G	G	G	G	G	G	G	G	40	50	G	G			G			48	57	32	45	40	40	G
29	G	34	35	30	G	G	G	G	G	77	G	G	53	48	55	56	57	52	70	84	25	G	24	G
30	24	41	34	31	26	G	G	G	43	51	56	56	59	67	68	60	54	69	72	78	38	28	40	59
31	45	59	39	29	29	G	29	43	60	83	65	G	G	64	106	65	55	71	47	26	34	G	30	39
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	30	31	31	31	30	29	27	30	28	26	29	31	30	31	30	30	31
MED	38	38	32	30	29	26	29	43	50	60	61	62	56	57	60	54	55	56	62	47	40	38	40	39
U Q	45	44	48	43	44	39	38	49	62	77	72	73	78	72	68	66	61	73	70	70	69	48	69	58
L Q	23	28	G	25	G	G	G	G	43	50	G	G	25	G	G	G	G	46	44	33	29	28	28	29

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

AUG. 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	15	15	16	16	15	15	15	18	34	33	35	36	38	58	53	44	43	17	15	15	15	15	15	15
2	15	15	15	15	16	15	16	34	21	39	42	44		57	55	42	35	22	16	15	16	15	15	15
3	15	15	15	15	15	15	15	16	21	27	40	42	81				38	22	16	15	17	15	15	16
4	15	15	15	15	15	15	15	16	42	40	35	39	45	55	37	52	22	20	17	15	15	15	15	17
5	15	15	15	15	15	15	16	16	20	24	40	43	43	43	42	43	42	16	17	20	15	15	15	15
6	15	15	15	15	15	15	15	16	21	33	51	44	46	49	59	42	42	22	21	15	15	15	15	15
7	16	15	15	15	15	15	15	16	18	30	36	55	39	38	36	32	26	17	16	15	15	15	15	15
8	15	15	15	15	15	15	22	16	18	26	28	32	60	71	49	36	33	18	17	15	15	15	15	15
9	15	16	15	15	15	16	16	16	22	34	34	36	36	38	36	30	24	22	15	15	15	15	15	15
10	15	15	16	17	15	15	15	16	18	34	35	35	48	40	40	36	23	17	16	15	15	15	15	15
11	15	15	15	15	16	15	15	16	21	23	35	36	36	34	34	34	24	17	15	15	15	15	15	15
12	15	15	16	15	16	15	17	23	18	22	36	36	39	40	42	38	28	22	15	15	15	15	15	15
13	15	15	15	15	15	15	15	15	17	21	38	40	43	40	42	36	21	17	16	15	15	15	15	15
14	15	15	15	15	15	15	15	16	17	21	34	40	38	36	40	36	22	16	15	22	15	15	15	15
15	15	15	15	15	15	15	21	17	20	35	39	44	48	44	43	39		24	16	15	15	15	15	15
16	15	15	15	15	15	15	15	17	23	36	44	43	55	45	53	37	34	20	15	15	16	15	15	15
17	15	15	18	15	15	15	15	15	21	44	44	43	52	54	43	41	39	16	16	15	14	15	15	15
18	15	15	15	15	15	15	16	17	20	35	33	34	36	35	48	45	39	18	15		15	15	15	15
19	15	15	15	14	15	15	15		17	21	40	40	44	45	38	40	39	18	16	15	15	15	16	15
20	15	15	15	15	15	15	15	17	23	36	39	43	42	49	45	44	27	18	16	15	15	15	15	15
21	15	15	15	15	15	15	15	16	21	24	33	36	44	45	45	43		32	16	16	15	15	15	15
22	15	15	15	15	15	15	15	16	18	29	35	36							18	15	15	15	15	15
23	15	15	15	15	15	16	15	17	37	34	45	49	39		39	42	39	20	16	15	15	15	15	16
24	15	15	15	16	15	16	16	18	24	37	40	39	46	44	44	42	36	21	15	15	15	16	15	15
25	15	15	15	15	15	15	15	17	20	30	131	151	58	78	67	45		22	17	15	16	15	15	15
26	15	15	15	15	15	16	15	17	22	40	42	44	45	44	43	43	39		17	15	15			15
27		15	15	15	15	15	15	16	21	35	36		36	36	35		22	16	15	15	15	15	16	17
28	16	15	15	15			15	16	17	36	42	45			47			20	16	15	15	16	15	15
29	15	15	15	15	16	16	20	18	39	36	45	46	35	46	42	36	34	17	15	15	15	15	15	15
30	15	15	15	15	15	15	15	17	16	36	39	44	43	42	39	36	27	18	15	15	15	15	15	15
31	15	15	15	15	15	15	15	16	18	24	35	58	48	36	35	30	26	17	16	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	30	30	31	30	31	31	31	30	28	27	29	27	26	29	31	30	31	30	30	31
MED	15	15	15	15	15	15	15	16	21	34	39	42	44	44	42	40	34	18	16	15	15	15	15	15
U 0	15	15	15	15	15	15	16	17	22	36	42	44	48	49	47	43	39	22	16	15	15	15	15	15
L 0	15	15	15	15	15	15	15	16	18	24	35	36	38	38	38	36	24	17	15	15	15	15	15	15

HOURLY VALUES OF FOF2 AT OKINAWA

AUG. 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	113	110	107	110	86	74	83	78	90	91	94	94	94	104	108	111	121	122	108	105	84	87	86	87
2	86	88	86	78	65	65	62	72	A	85	85	81	A	97	99	103	104	92	91	111	86	78	87	85
3	74	80	63	53	61	60	71	85	86	74	72	53			48	67	75	75	75	82	76	64	67	80
4	67	57	77	75	66	73	62	76	82	86	95	112	111	101	116	138	121	112	110	110	87	86	87	86
5	86	86	87	85	62	42	38	71	70	72	81	100	96	102	106	110	109	121	121	104	88	80		64
6	A	76	66	55	53	N	52	76	78	77	80	89	105	101		121	120	111	111	86	67	A	81	71
7	74	70	67	67	61	53	55	76	87	90	101	106	105	102	110	121	118	137	110	108	87	85	86	86
8	79	87	80	74	62	55	66	78	80	70	74	92	101	101	100	91	107	110	90	105	86	82	77	80
9	78	78	81	77	62	43	44	71	87	78	84	94	95	111	117	120	125	121	108	104	A	85	87	85
10	88	87	86	86	86	66		69	85	87	95	106	110	108	103	100	95	87	91	88	73	66	67	75
11	72	77	82	73	60	58	62	73	82	77	80	90	106	127	145	146	158	144	130	122	128	85	86	83
12	82	74	66	68	84	88	86	103	110	101	101	93	111	134	137	143	135	126	121	108	88	84	86	86
13	63	54	A	72	66	45	51	85	84	90	105	96	108	125	124	118	118	106	106	80	A	67	A	A
14	73	78	66	55	A	55	72	84	80	81	80	A	112	116	110	111	122	122	110	110	104	104	86	86
15	103	88	88	86	74	65	72	75	77	84	92	92	90	104	105	112	119	121	138	104	87	87	84	86
16	86	87	84	75	70	61	72	86	81	95	106	118	130	128	132	140	157	167	175	165	166	171	173	168
17	159	146	110	109	90	85	85	108	90	94	116	131	122	131	129	144	N	141	144	145	145	144	146	110
18	106	91	83	78	80	65	72	89	96	89	104	111	116	116	118	131	142	130	110	111	110	86	86	104
19	87	86	77	69	68	66	79	78	90	111	94	111	117	129	119	120	126	126	138	145	106	90	86	102
20	84	84	86	87	85	81	70	88	108	90	113	114	141	127	140	140	138	140	136	128	146	146	154	169
21	160	146	126	85	86	A	86	87	105	108	118	125	140	126	124	121	119	120	121	110	110	110	110	85
22	119	86	86	86	72	68	72	88	88	104	102	114	121	125	128	136	121	108	110	108	86	87	A	81
23	80	80	85	73	66	58	63	89	105	108	118	135	142	146	140	138	N	141	142		110	91	86	90
24	90	85	78	73	77	78	82	103	88	100	111	130	151	156	160	162	157	143	128	128	111	106	105	108
25	108	142	106	86	80	84	85	89	105	89		130	152	158	158	158	147	145	135	130	110	111	121	141
26	136	142	128	86	87	86	87	105	90	100	95	118	134	144	143	156	156	146	140	128	130	170	171	166
27	169	183	164	146	104	92	85	89	105	106	120	134	147	163	160	166	166	169	164	146	145	163	160	162
28	160	159	142	88	48	47	46	77	86	105	138	111	110	119	121	116	118	122	111	108	88	87	84	87
29	84	83	80	74	66	62	70	80	55	71	88	95	111	121	124	115	112	111	111	128	109	130	145	144
30	108	87	89	66	67	54	62	83	105	105	103	115	134	122	128	138	146	146	153	146	146	166	164	168
31	A	109	86	86	80	66	53	80	78	87	112	113	122	131	131	128	132	138	120	110	105	87	87	86
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	30	31	30	29	30	31	30	31	30	30	29	30	30	31	29	31	31	30	29	30	28	30
MED	86	86	86	77	69	65	70	83	87	90	98	111	112	124	124	121	121	122	120	110	105	87	86	86
U Q	110	109	89	86	84	76	82	89	96	101	111	118	134	131	137	140	144	141	138	128	119	111	133	110
L Q	78	78	78	72	62	55	62	76	81	81	85	94	105	104	110	112	118	111	110	105	86	85	86	85

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

AUG. 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	40	32	32	G	G	G	33	88	43	56	81	58	53	50	G	46	G	42	37	32	G	25	41	40
2	28	29	30	29	28	28	32	46	69	61	47	58	99	91	117	71	58	85	64	35	33	G	G	G
3	33	34	G	30	36	28	48	36	48	60	72	55	G	G	57	45	45	47	40	32	G	25	39	68
4	28	32	29	34	31	G	32	G	G	48	G	96	G	61	58	G	51	43	38	38	34	29	G	36
5	G	G	G	G	G	G	G	33	44	61	G	94	63	60	57	84	62	52	46	39	30	40	33	43
6	38	29	32	35	37	34	28	G	G	G	G	G	G	G		G	G	G	40	39	39	38	32	G
7	30	30	25	24	G	G	G	G	38	66	56	102	55	63	57	57	48	51	40	32	32	58	40	G
8	33	26	G	G	G	G	G	39	48	54	52	47	G	G	62	61	51	111	79	50	72	40	25	28
9	39	54	32	G	G	G	28	37	45	60	114	74	G	55	61	57	50	72	111	62	93	53	32	G
10	29	32	57	42	59	49	39	90	115	94	68	G	57	G	G	53	42	47	48	44	49	49	33	37
11	46	37	35	38	42	39	43	G	43	49	88	73	65	72	58	72	42	45	34	41	107	58	38	45
12	40	27	25	33	37	30	30	39	41	G	G	G	99	G	58	72	81	48	39	32	38	G	G	G
13	28	24	92	91	84	57	56	40	60	62	65	76	100	56	81	63	49	61	43	39	65	59	93	59
14	72	58	45	40	50	38	30	111	68	48	149	118	81	85	90	54	71	62	58	67	39	41	32	29
15	39	42	30	25	29	30	35	45	45	45	G	56	58	49	56	100	85	152	69	51	32	G	26	33
16	92	29	33	26	G	G	G	37	46	63	63	70	80	85	72	61	94	82	55	43	29	24	G	G
17	29	29	29	G	G	G	29	38	43	60	62	65	G	G	57	59	55	G	G	G	G	G	24	G
18	34	32	29	24	24	26	32	61	83	92	136	58	56	50	61	56	G	58	40	30	33	G	90	91
19	39	50	33	G	G	G	G	34	45	43	62	74	98	92	102	58	45	40	34	G	G	33	28	80
20	38	38	36	30	24	26	29	35	51	96	76	G	G	63	G	52	67	46	84	70	58	72	40	68
21	58	26	G	28	46	43	43	32	G	45	52	74	G	G	G	G	52	44	40	G	33	G	G	23
22	28	60	55	41	33	25	24	50	44	50	47	G	G	64	G	G	44	58	66	60	39	86	44	54
23	41	40	46	30	34	33	30	36	40	48	51	G	G	62	62	58	100	64	110		81	34	38	G
24	G	G	G	G	G	G	29	41	51	80	111	176	146	60	61	73	92	114	144	58	37	57	40	58
25	30	34	33	G	G	G	24	37	52	42	G	G	G	G	73	45	94	60	58	61	116	31	32	38
26	37	34	28	G	G	G	G	33	46	57	48	G	G	65	74	72	92	54	51	58	58	45	58	90
27	40	36	40	50	48	23	23	G	G	71	79	124	51	116	88	118	125	41	61	28	26	G	G	G
28	24	G	G	G	G	G	G	36	45	51	45	G	G	G	G	G	50	48	34	60	45	36	58	32
29	28	26	G	26	G	G	G	G	G	G	G	G	58	72	97	57	79	86	134	112	25	36	35	30
30	G	G	G	G	G	G	G	34	G	66	G	58	67	90	56	58	77	58	41	G	40	25	G	58
31	57	38	38	26	G	G	30	40	49	62	81	G	79	86	74	62	62	44	46	38	28	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	30	31	31	31	31
MED	34	32	30	26	24	G	29	37	45	57	56	58	55	60	60	58	55	52	46	39	37	34	32	33
U 0	40	38	36	34	37	30	32	41	51	63	79	74	79	72	74	71	81	64	66	58	58	49	40	58
L 0	28	26	G	G	G	G	G	33	40	48	G	G	G	G	56	46	45	44	40	32	29	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

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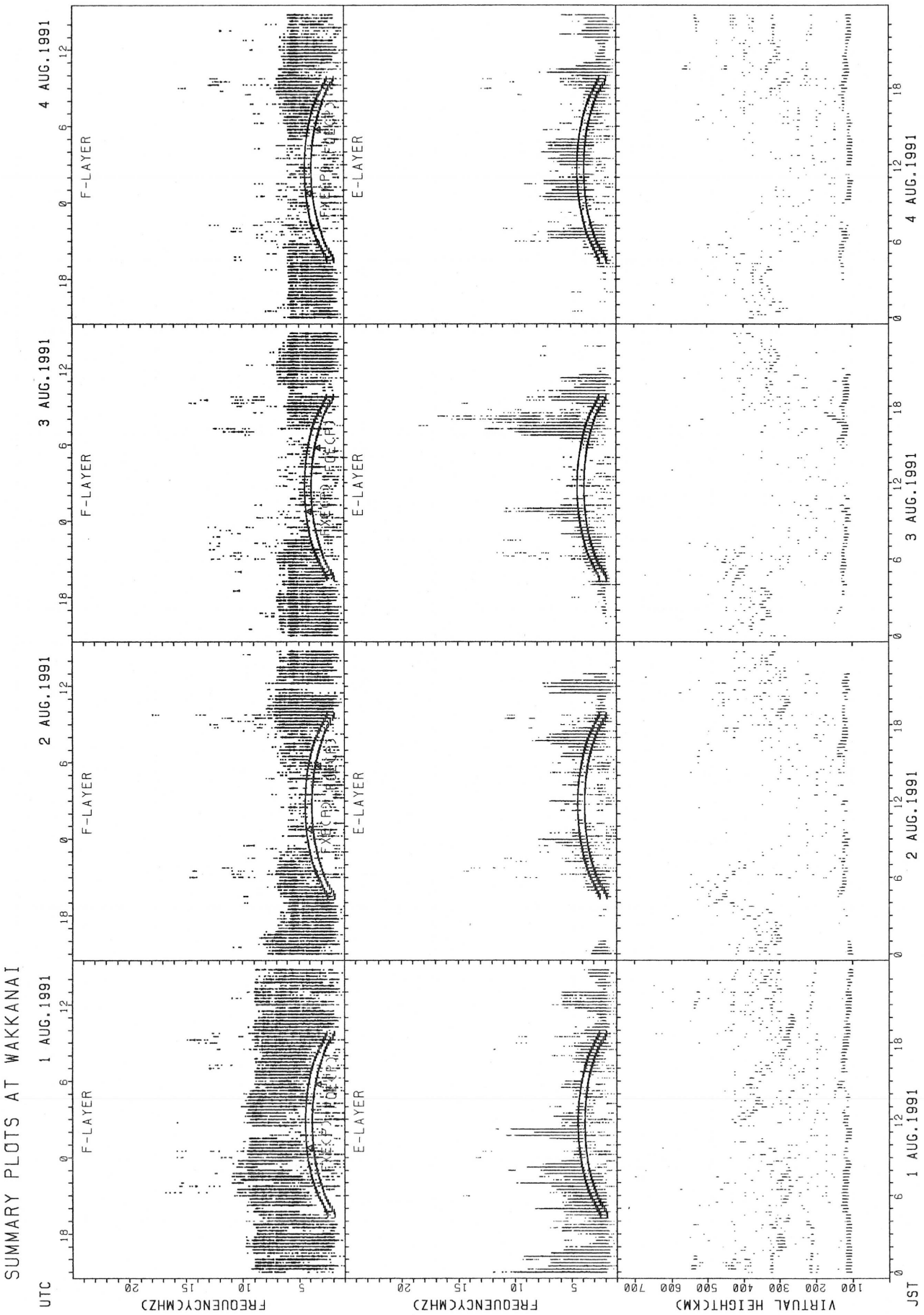
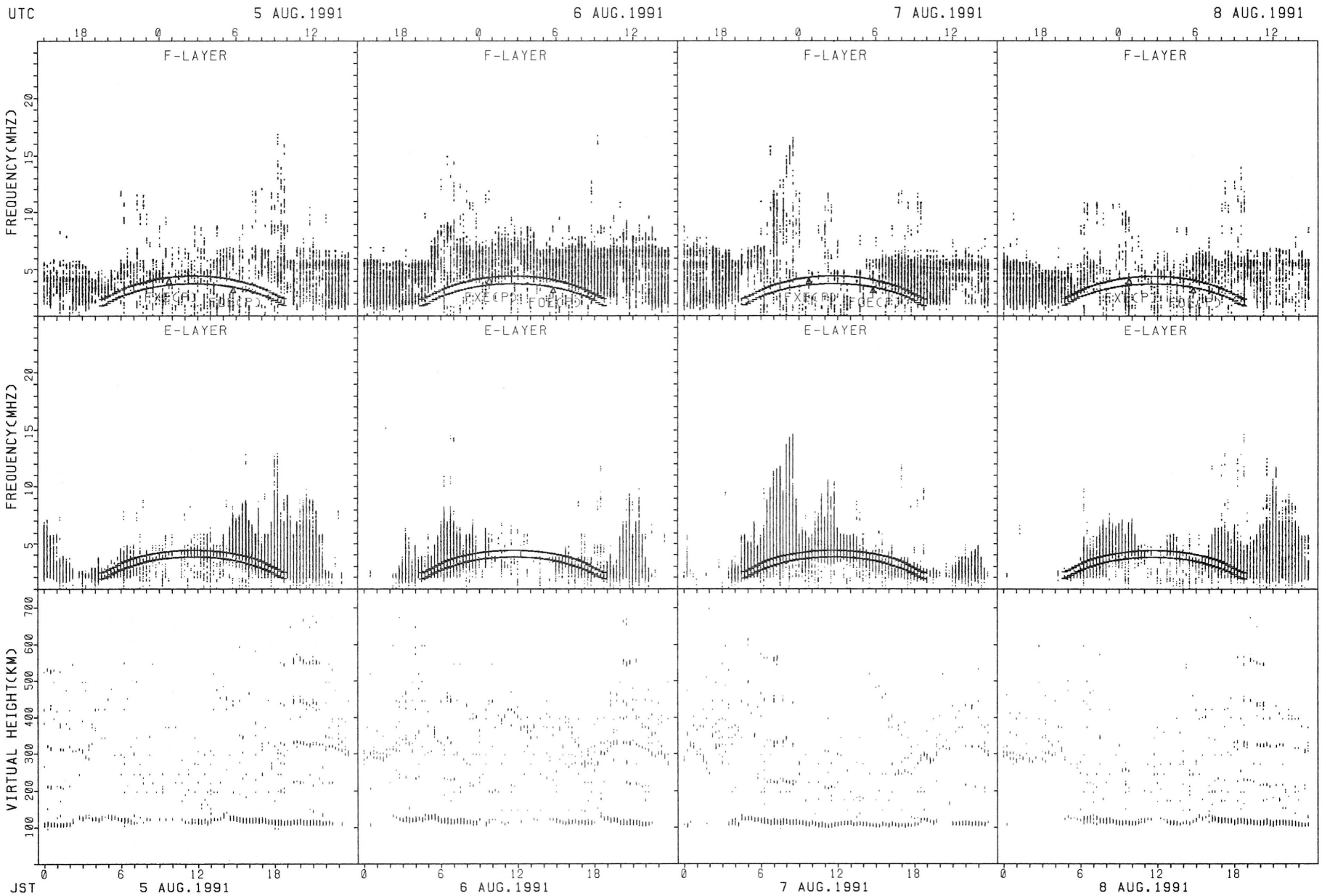
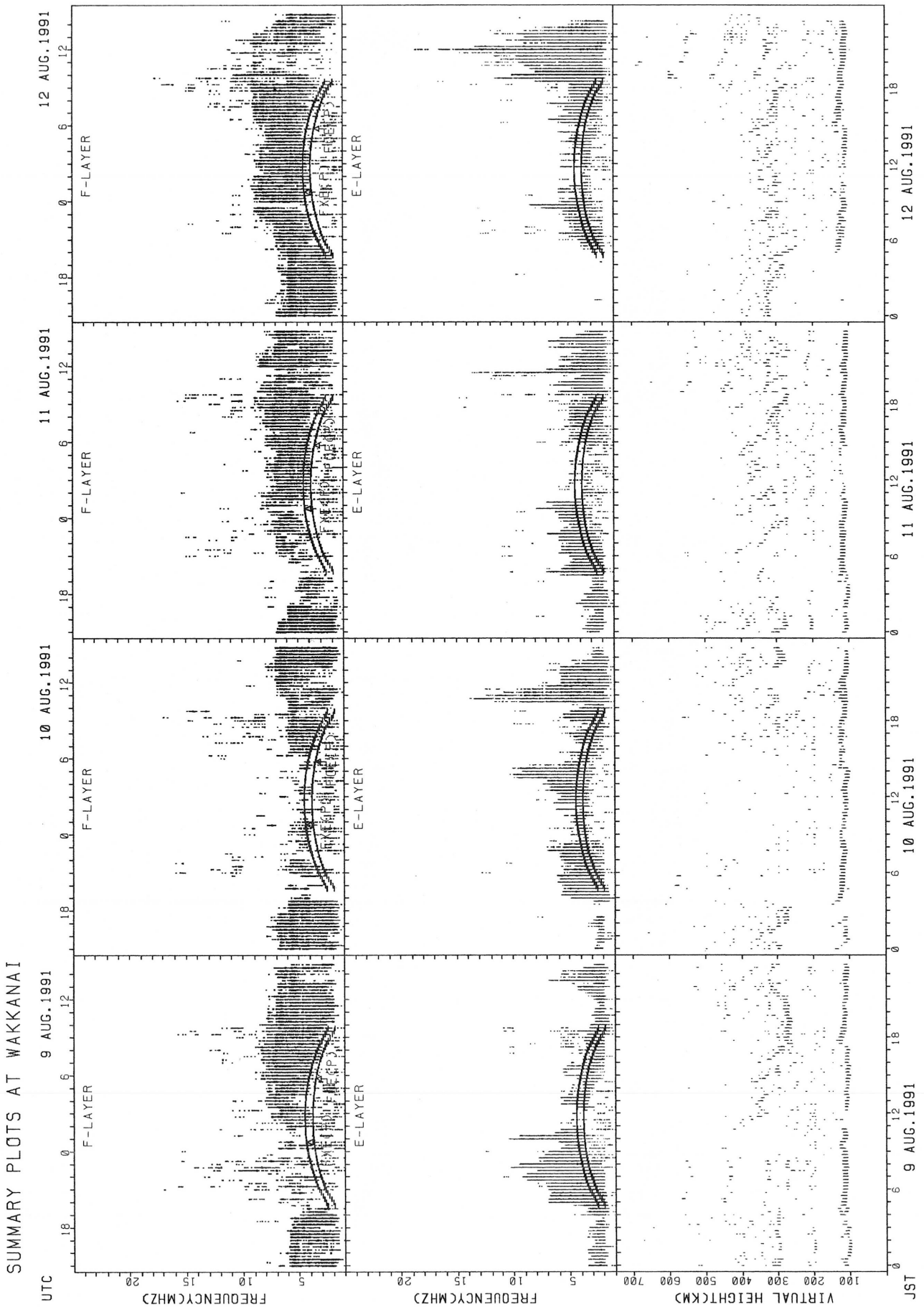
30	14	15	15	15	15	15	17	16	23	26	29	34	38	44	33	29	26	16	15	17	14	16	20	15
31	15	15	15	15	15	16	15	15	18	23	27	N	42	35	32	26	23	18	16	15	15	15	17	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	30	31	31	31	31	31	30	30	30	30	31	31	31	31	30	31	31	31	31
MED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

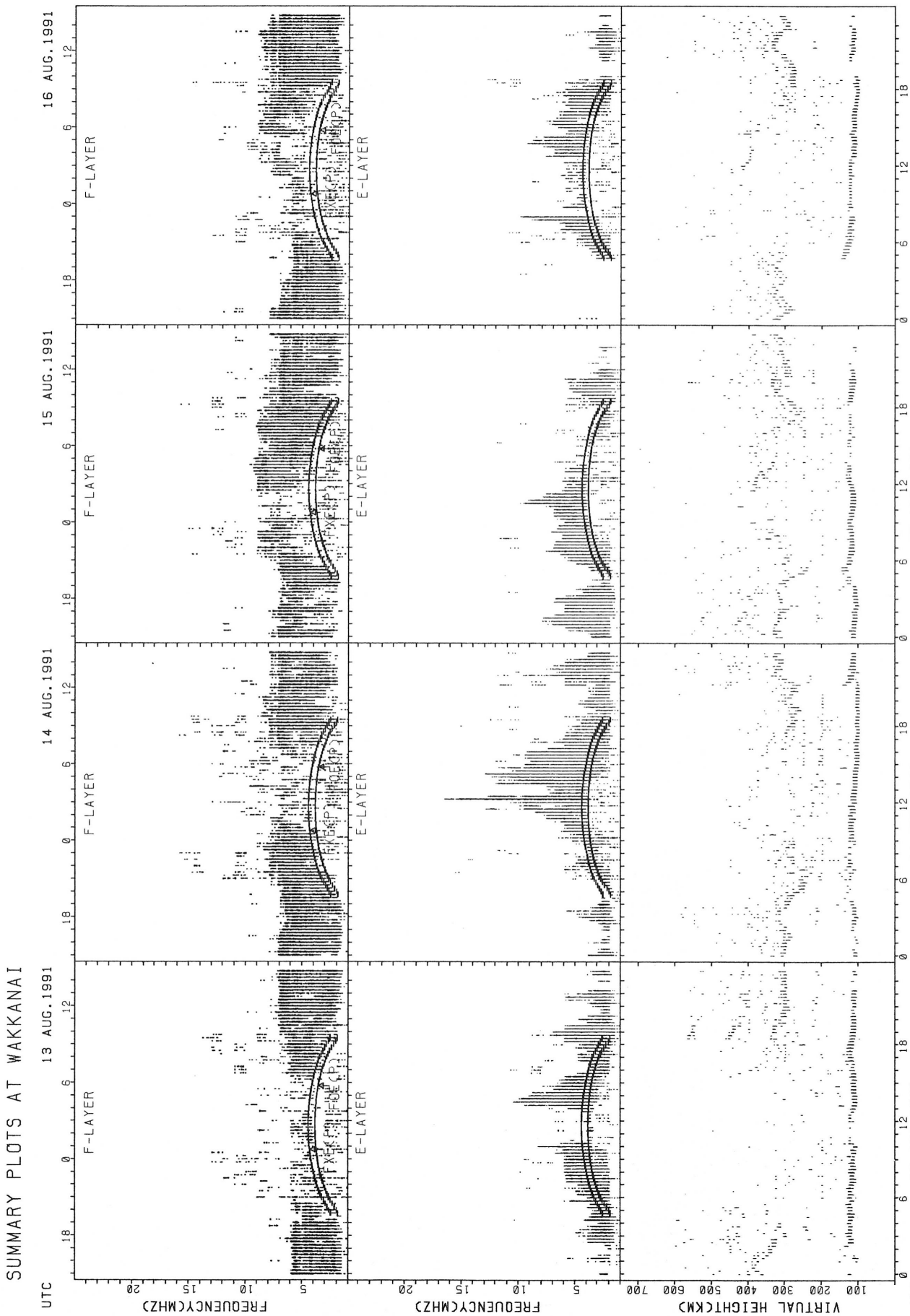

SUMMARY PLOTS AT WAKKANAI
UTC
JST
1 AUG.1991
2 AUG.1991
3 AUG.1991
4 AUG.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

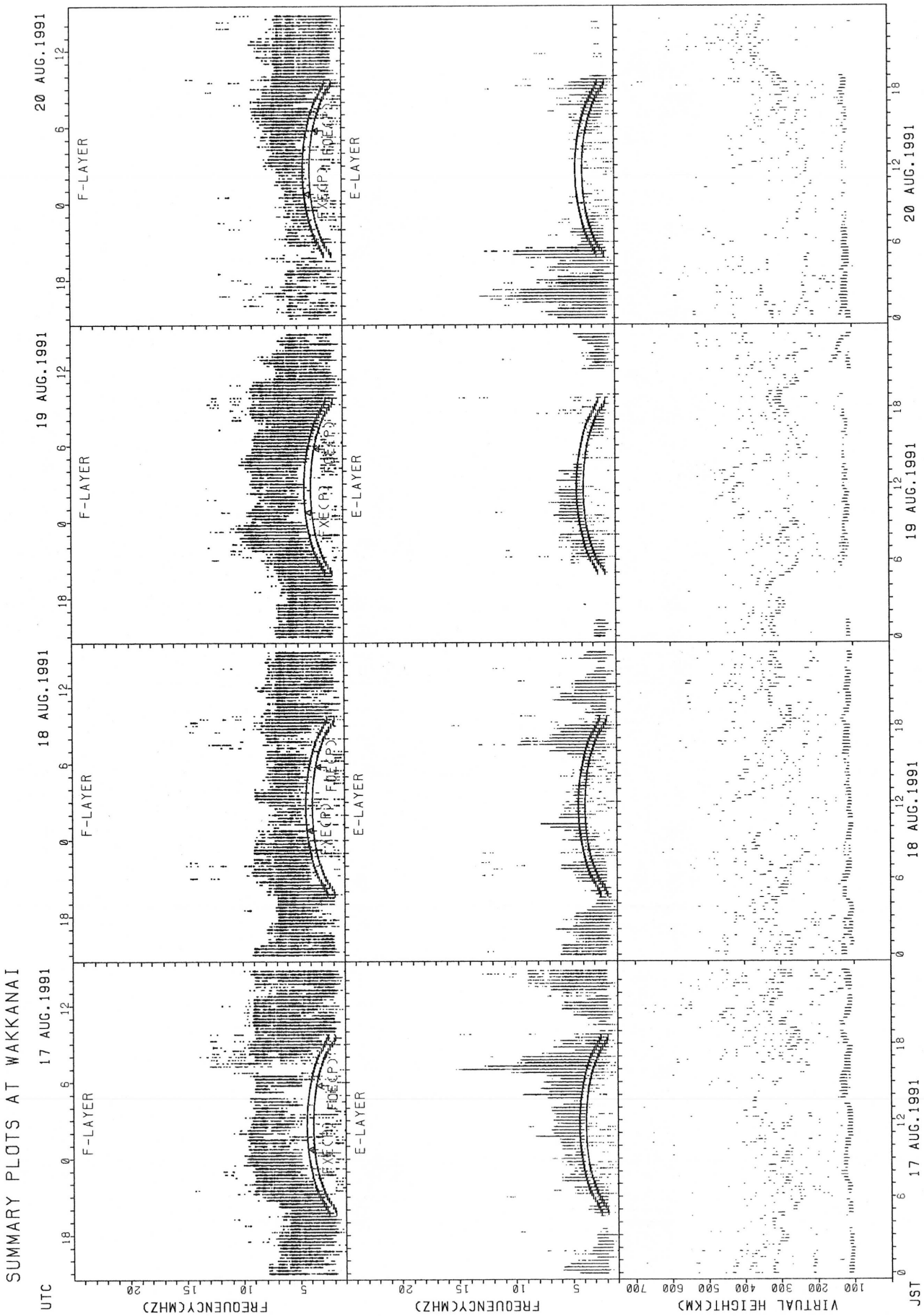
SUMMARY PLOTS AT WAKKANAI



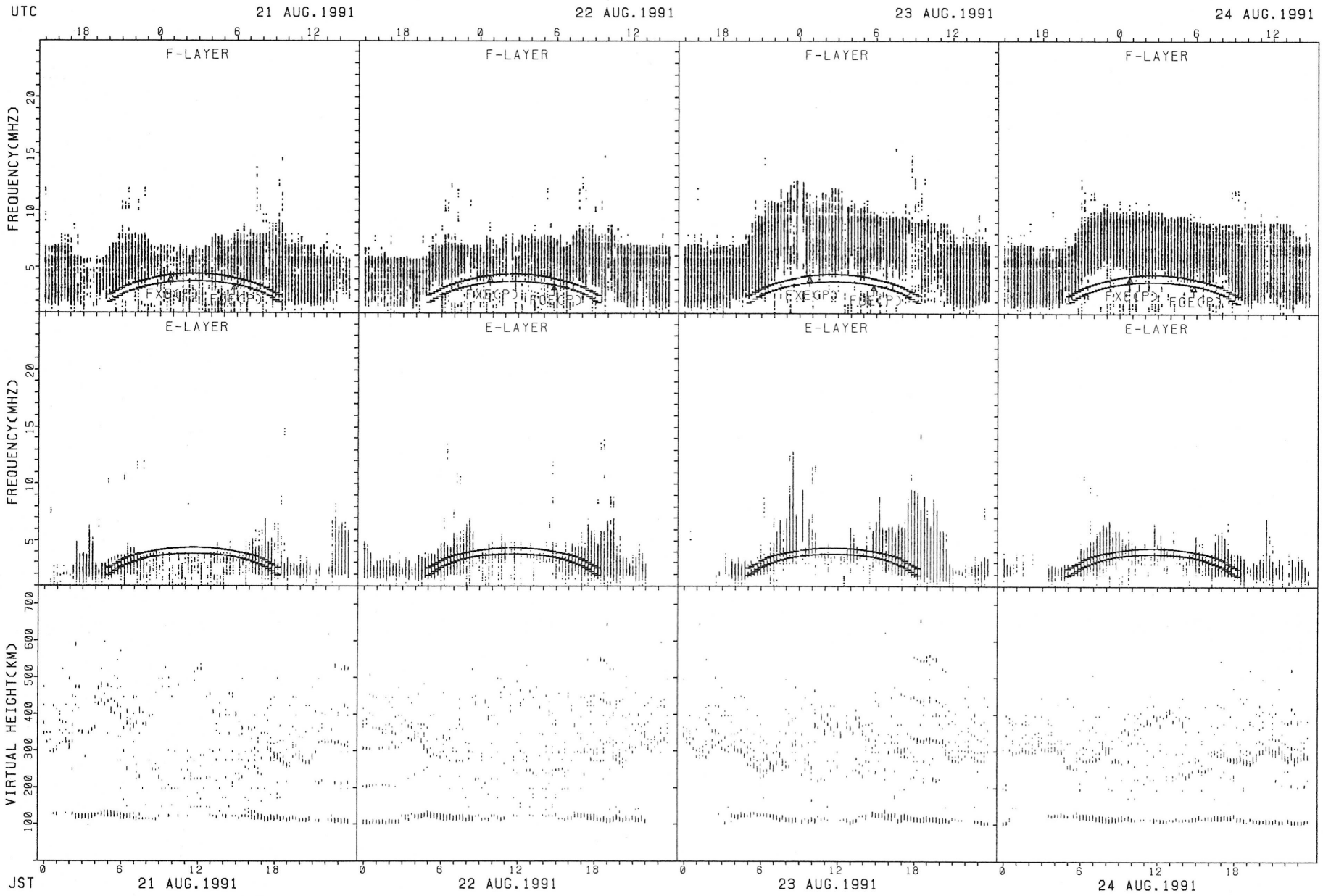
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
9 AUG.1991
10 AUG.1991
11 AUG.1991
12 AUG.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

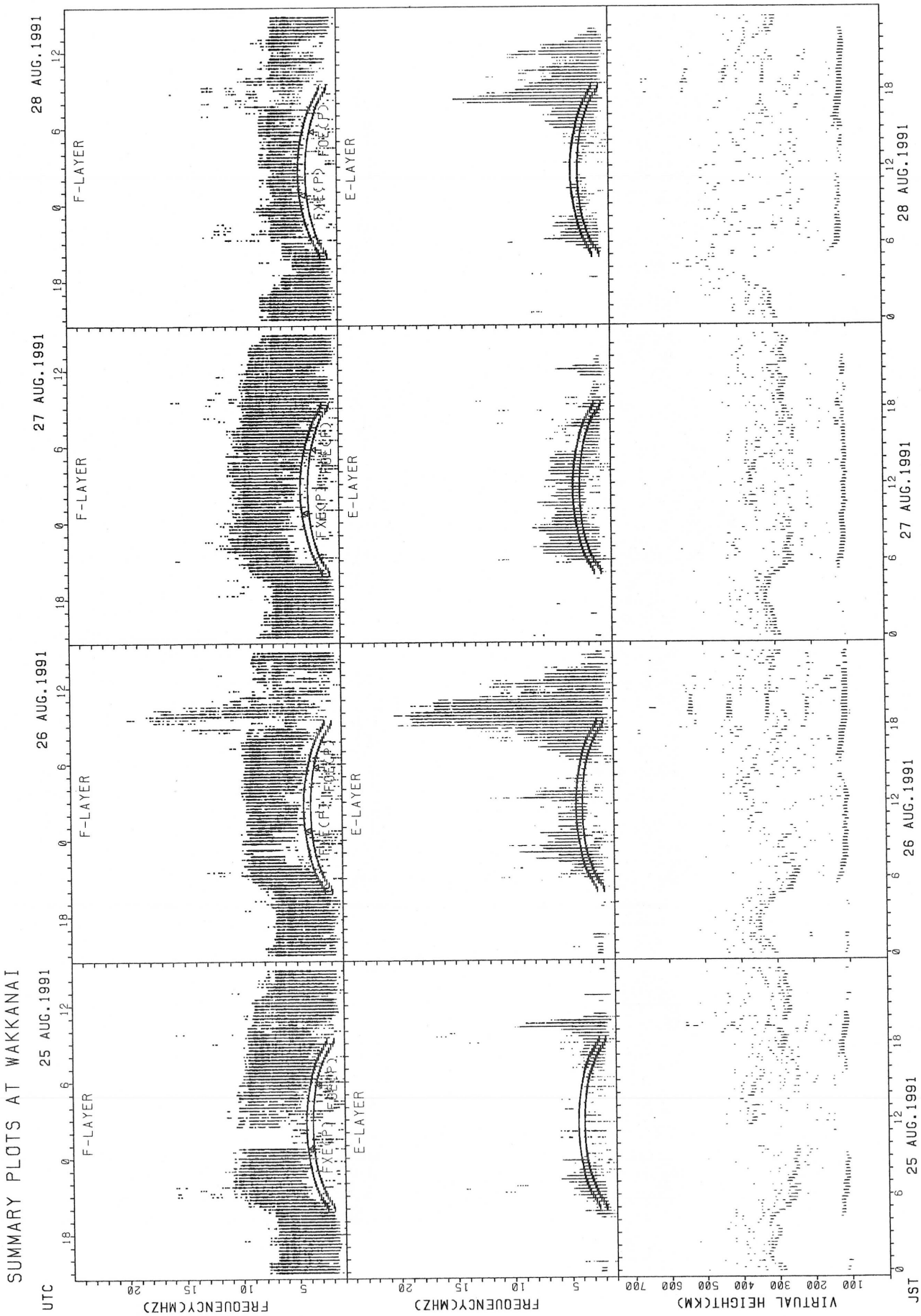

SUMMARY PLOTS AT WAKKANAI
UTC
13 AUG.1991
14 AUG.1991
15 AUG.1991
16 AUG.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT WAKKANAI
UTC
17 AUG.1991
18 AUG.1991
19 AUG.1991
20 AUG.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

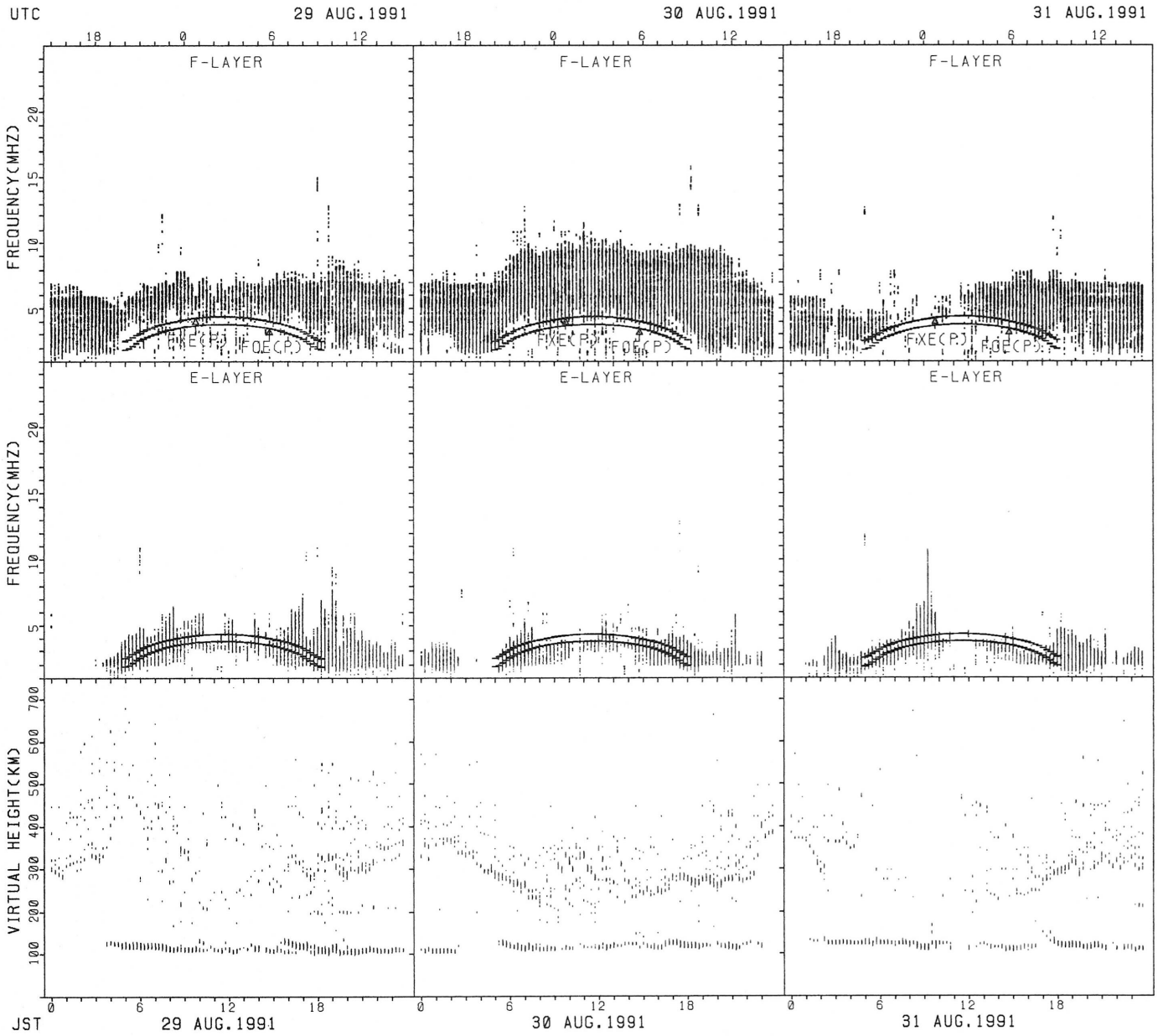
SUMMARY PLOTS AT WAKKANAI



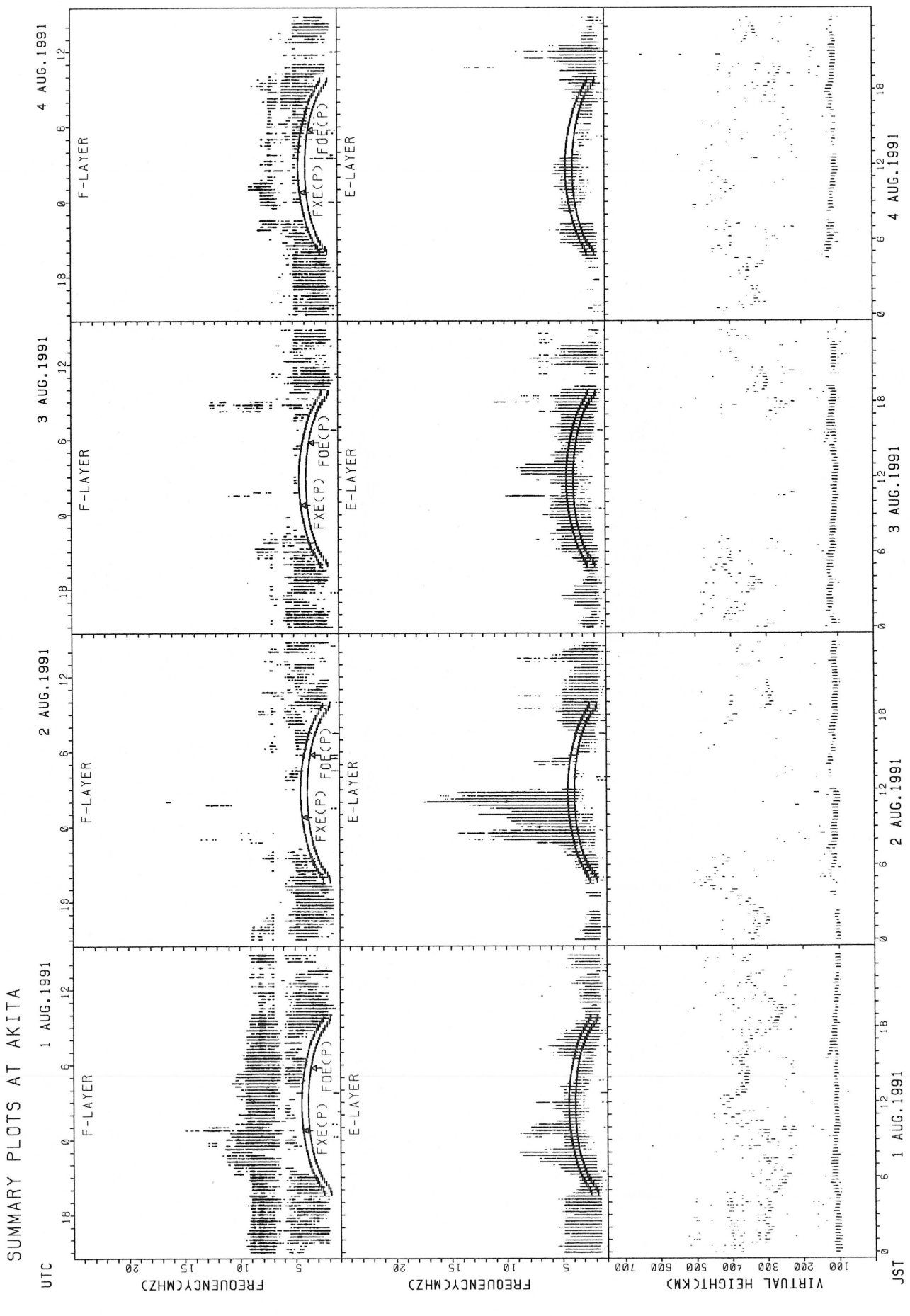
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

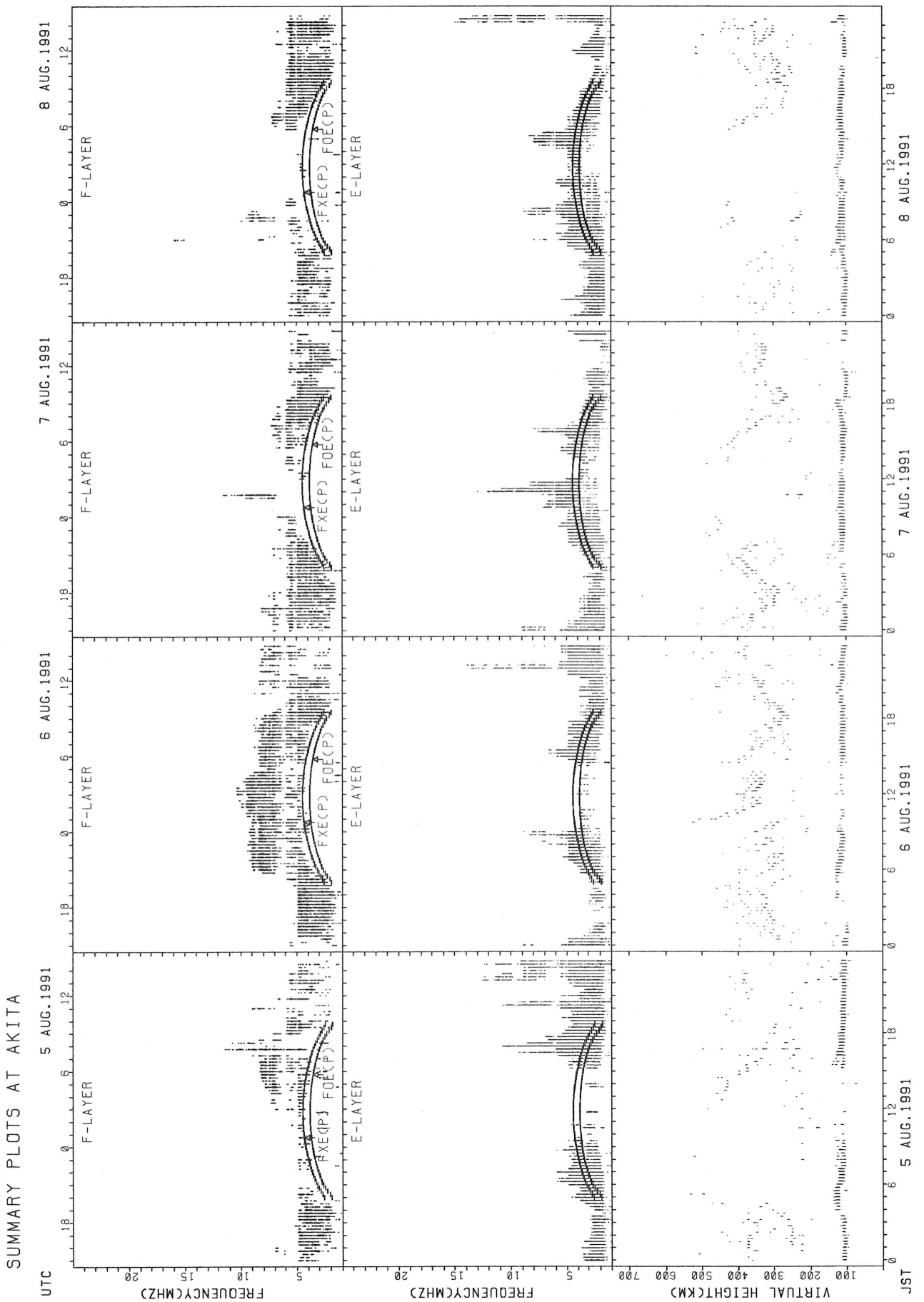

SUMMARY PLOTS AT WAKKANAI
UTC
25 AUG.1991
26 AUG.1991
27 AUG.1991
28 AUG.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

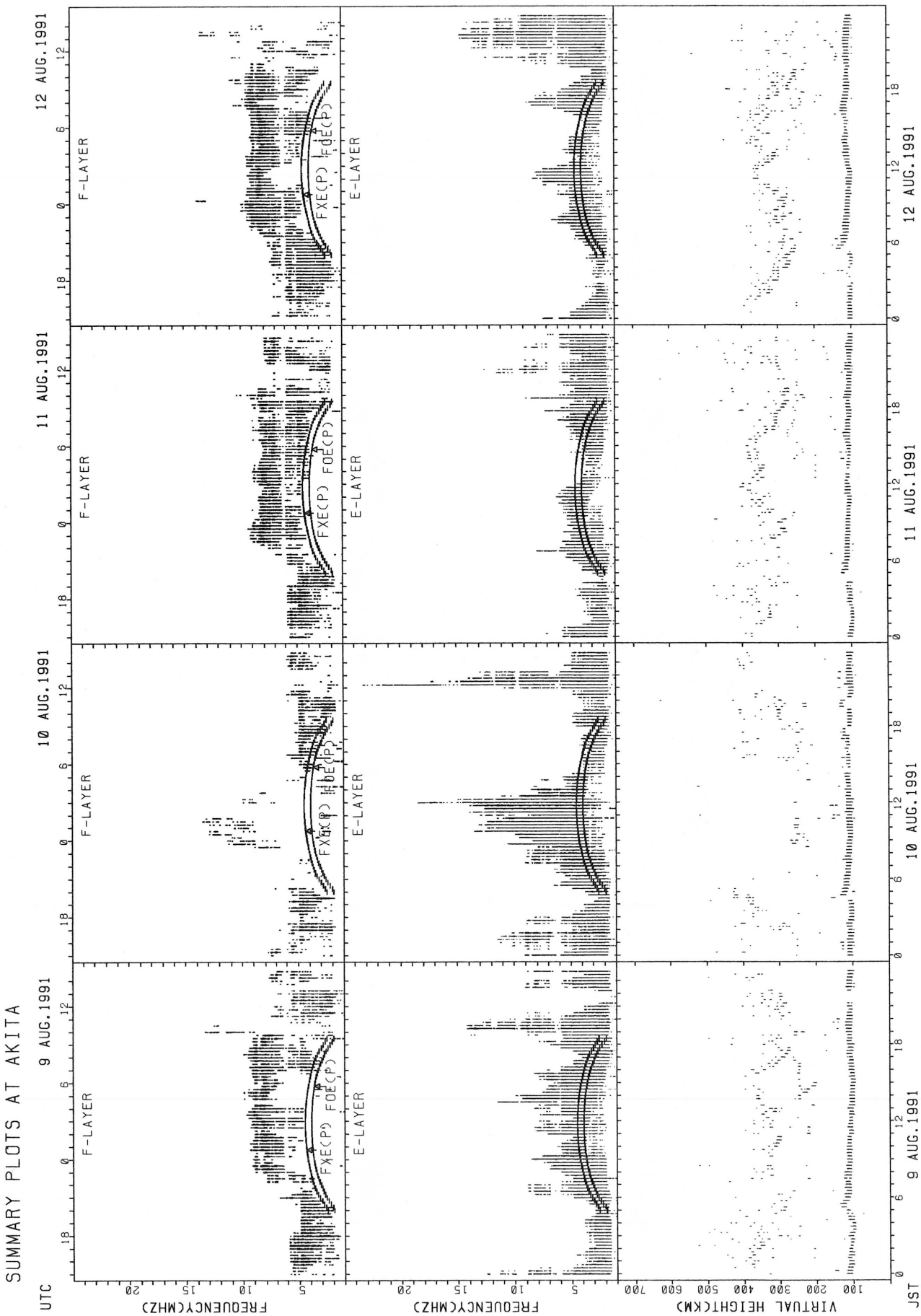
SUMMARY PLOTS AT WAKKANAI

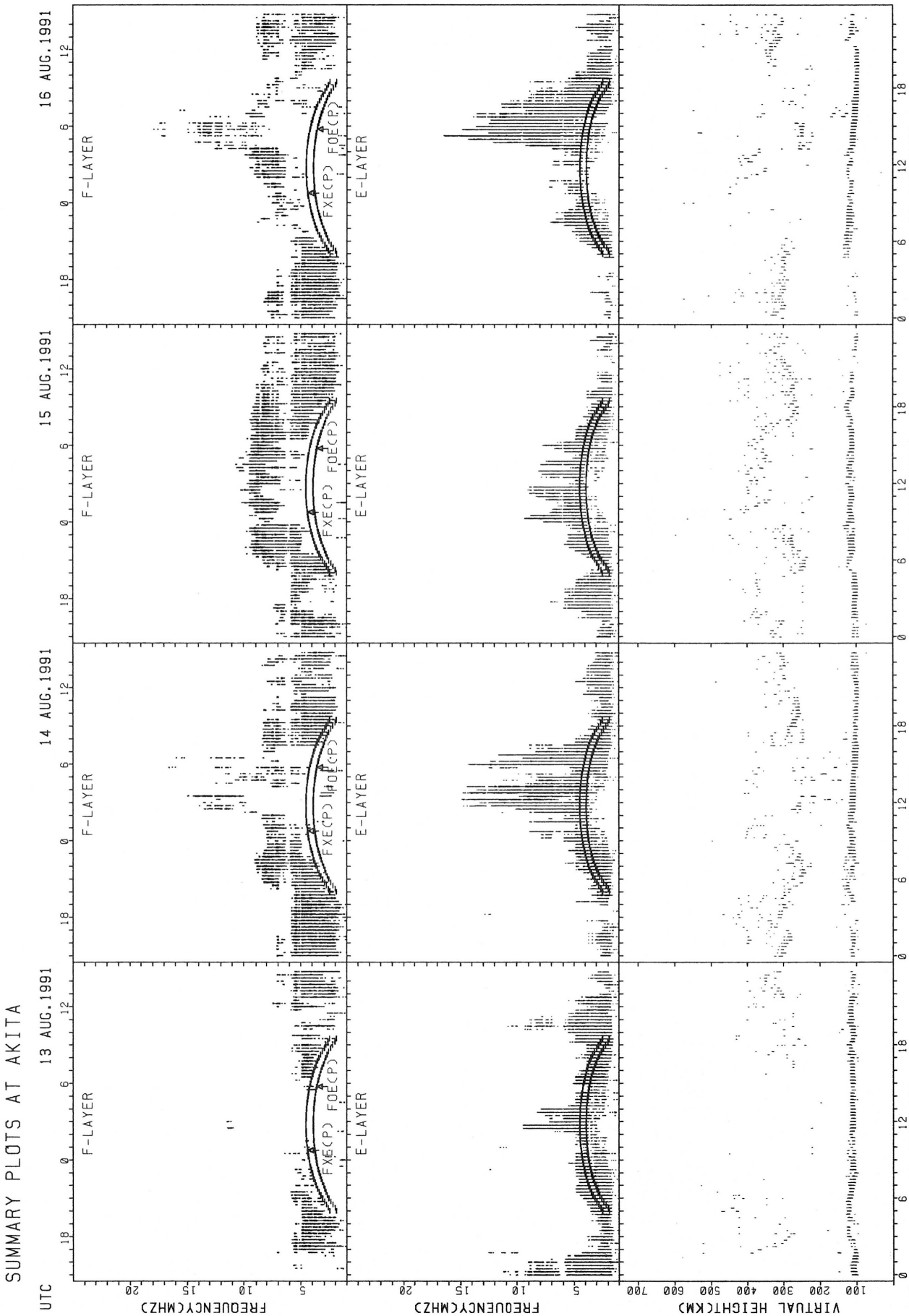


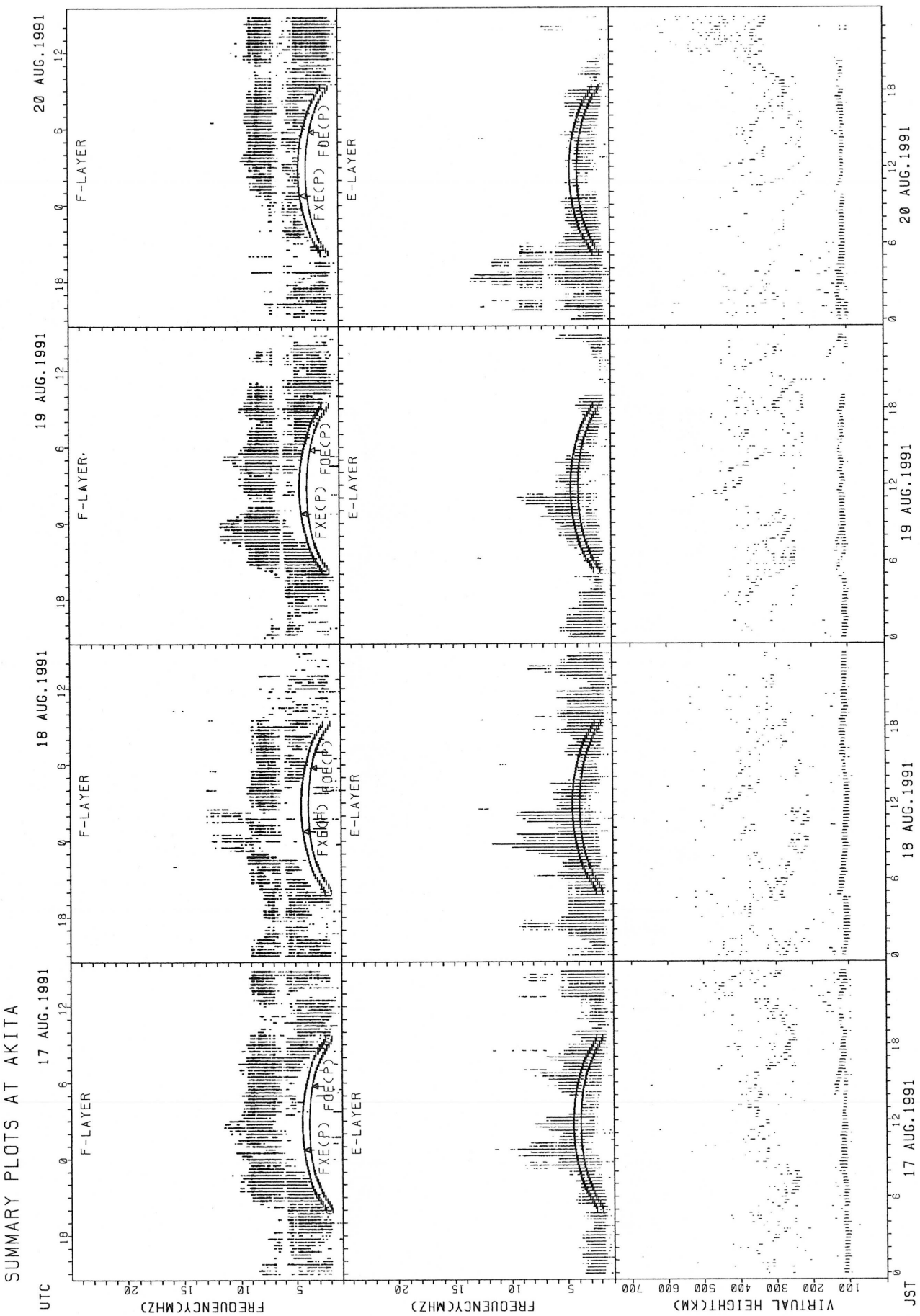
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

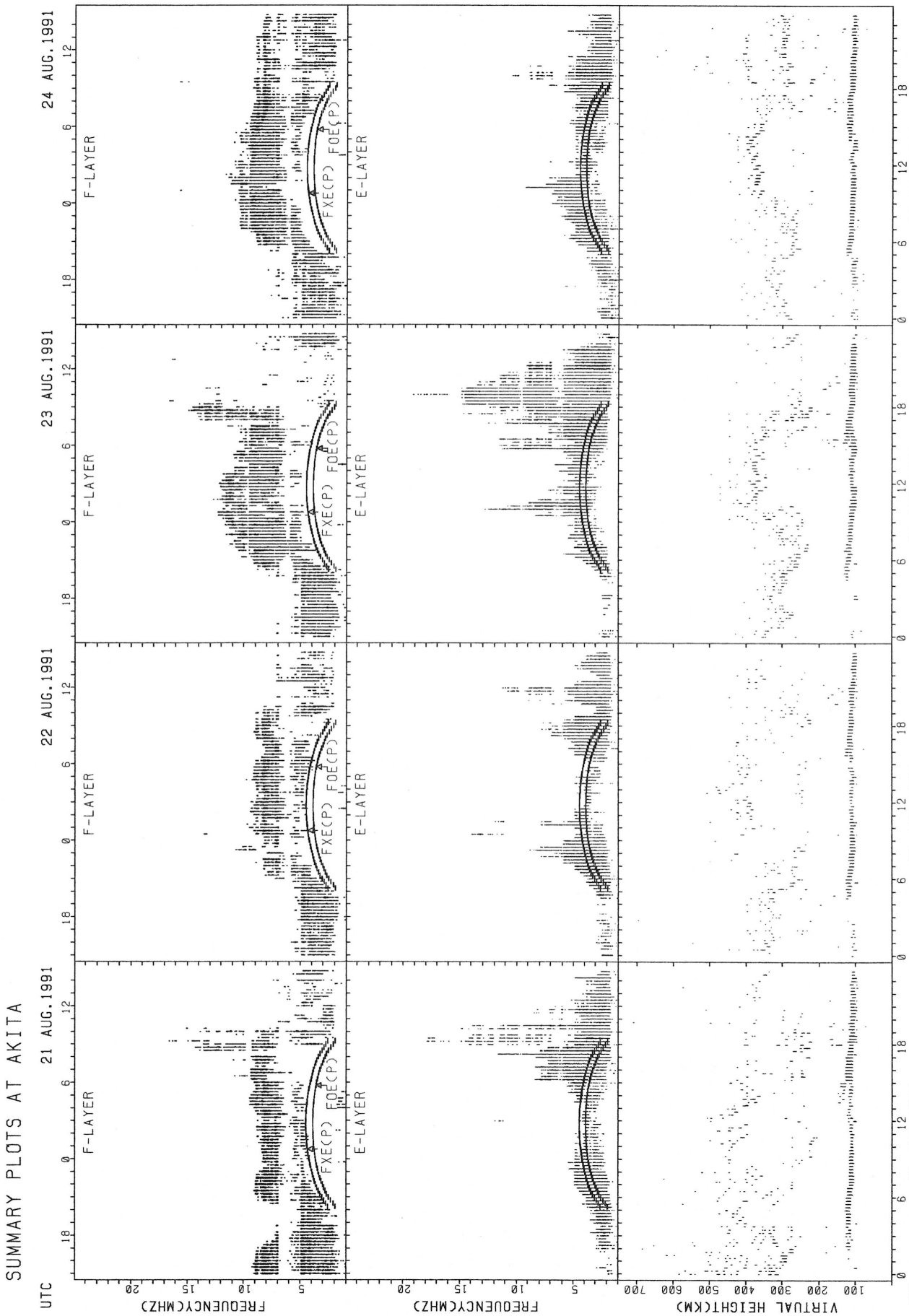

SUMMARY PLOTS AT AKITA
UTC
1 AUG.1991
2 AUG.1991
3 AUG.1991
4 AUG.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

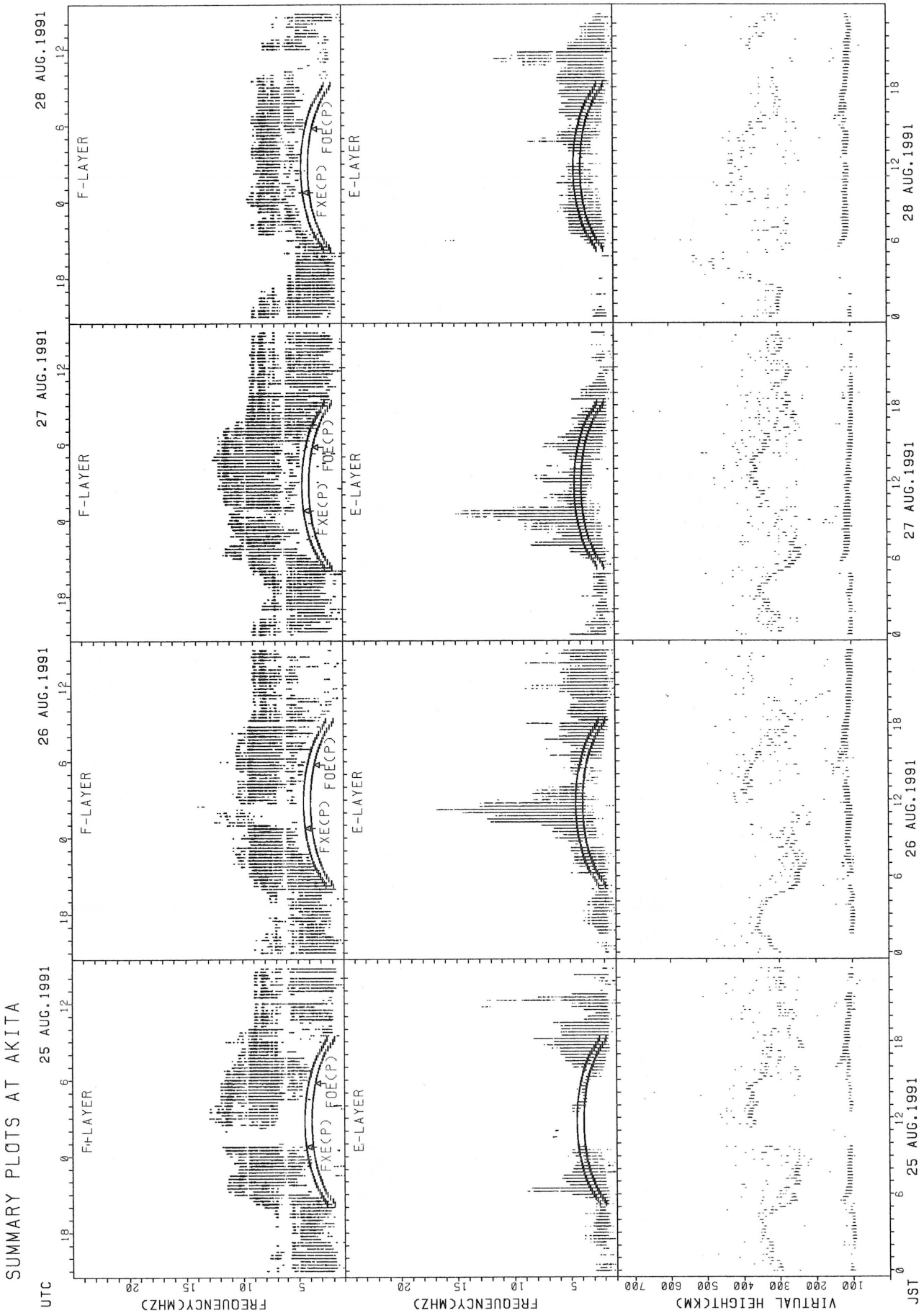

SUMMARY PLOTS AT AKITA
UTC
5 AUG.1991
6 AUG.1991
7 AUG.1991
8 AUG.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

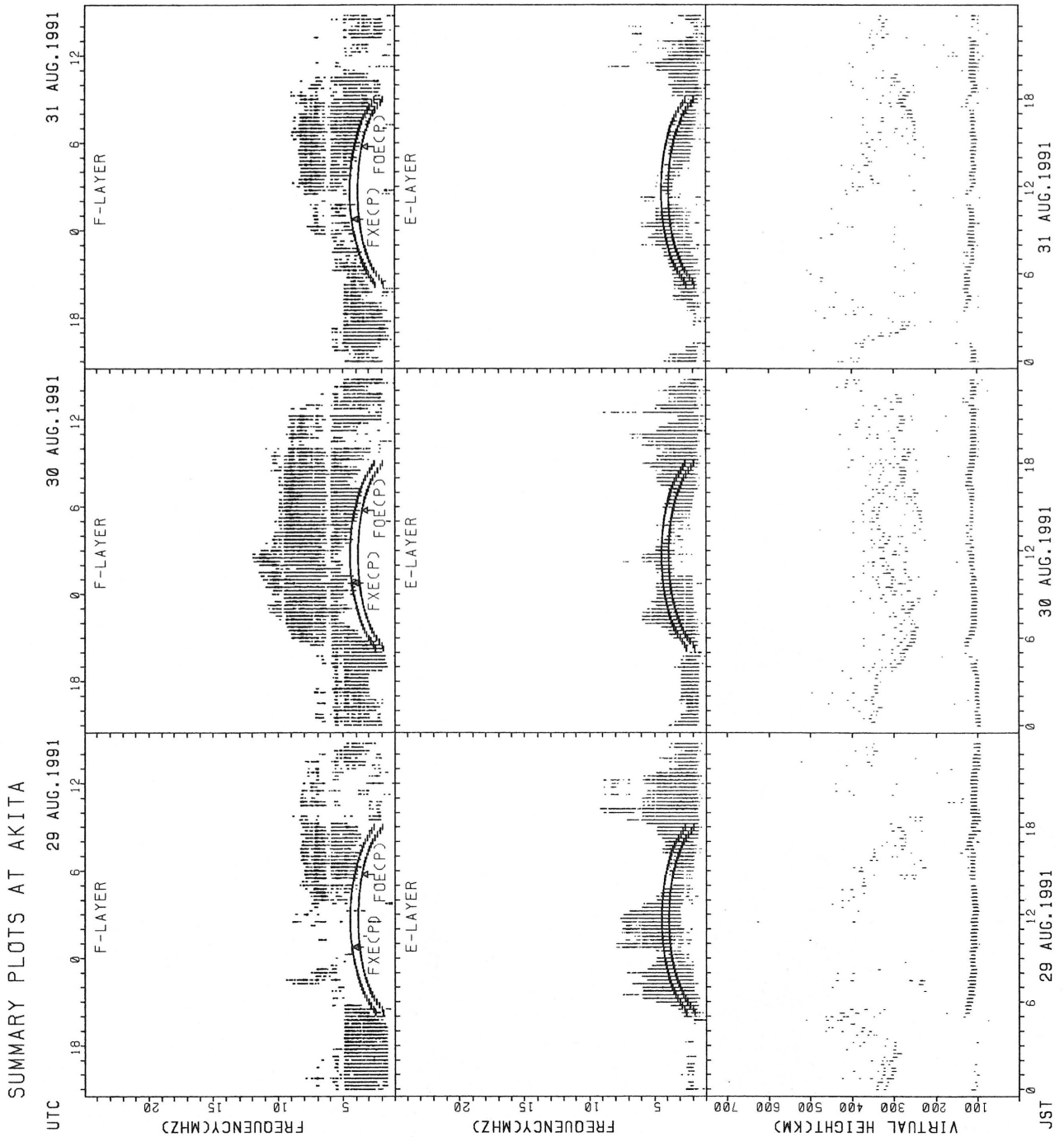

SUMMARY PLOTS AT AKITA
UTC
JST
9 AUG.1991
10 AUG.1991
11 AUG.1991
12 AUG.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

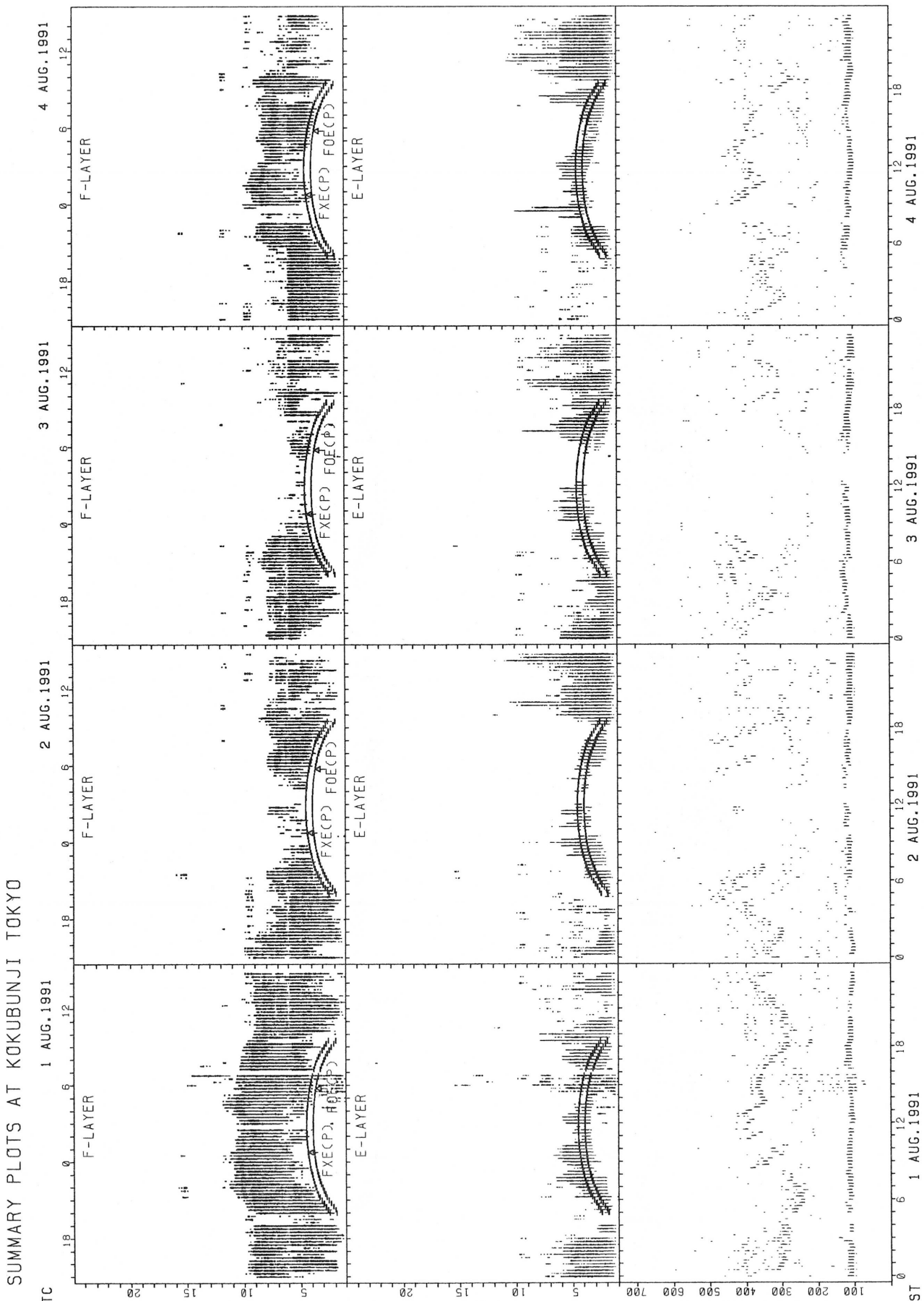

SUMMARY PLOTS AT AKITA
UTC
JST
13 AUG.1991
14 AUG.1991
15 AUG.1991
16 AUG.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

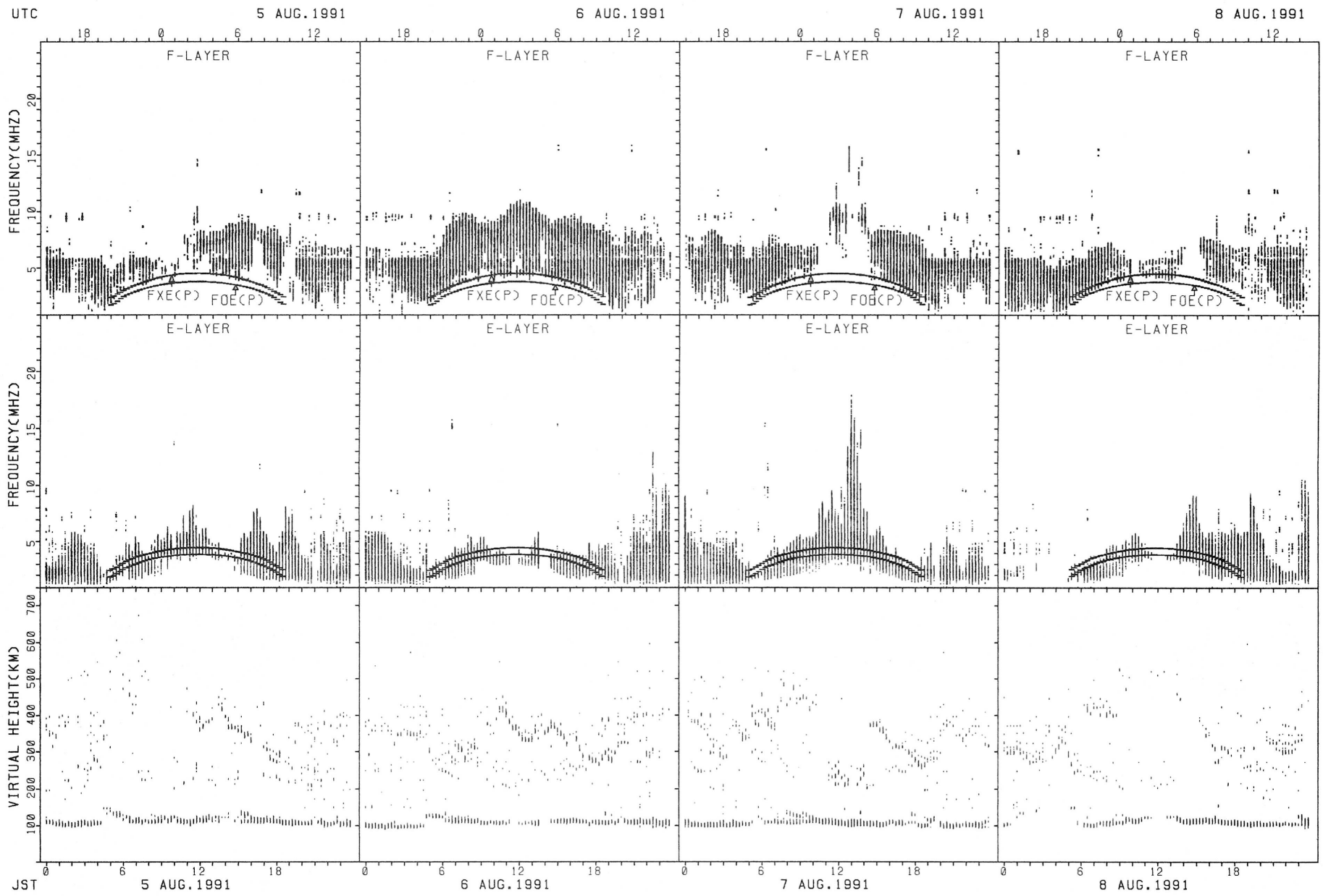

SUMMARY PLOTS AT AKITA
UTC
JST
17 AUG.1991
18 AUG.1991
19 AUG.1991
20 AUG.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

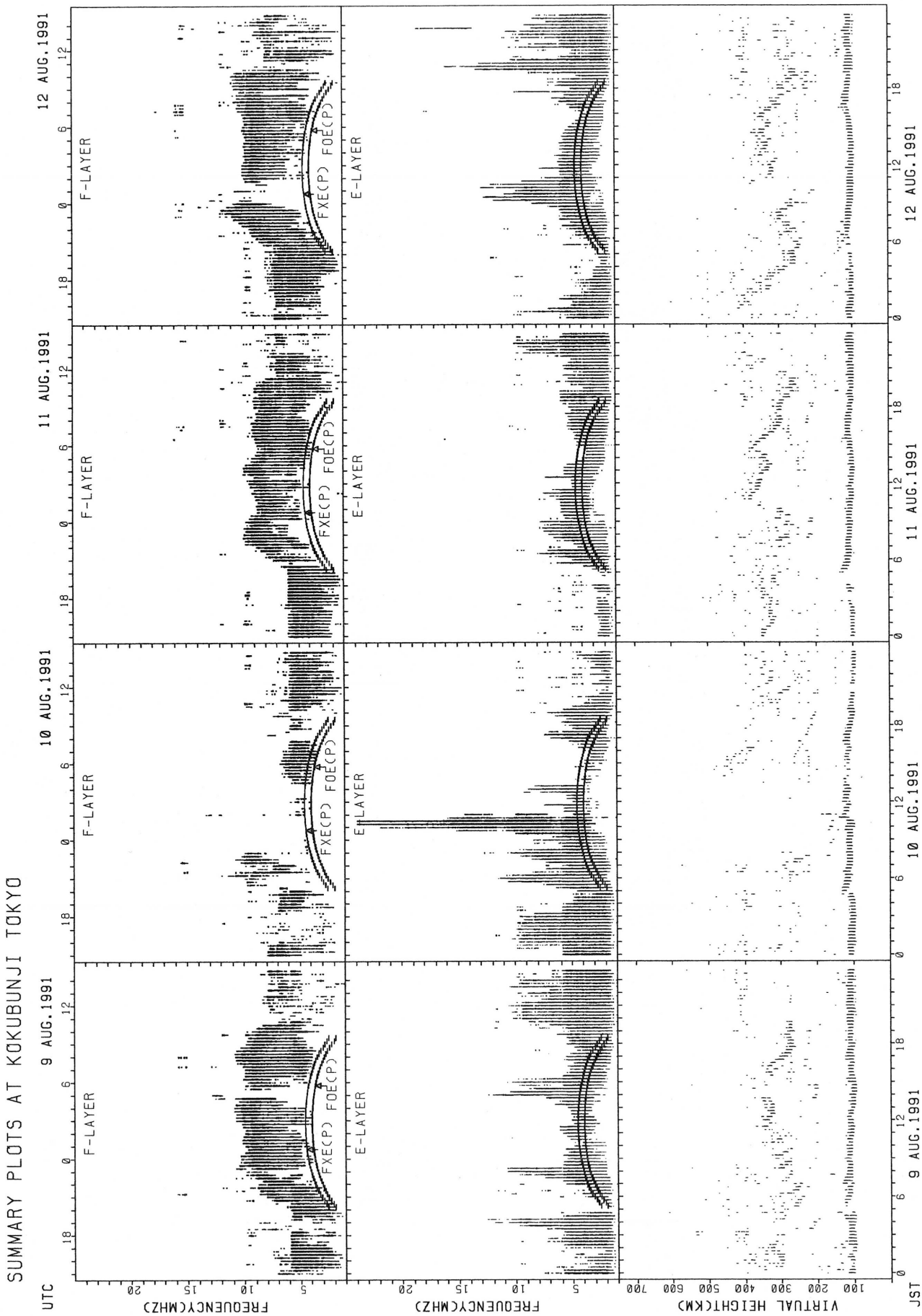

SUMMARY PLOTS AT AKITA
UTC
21 AUG.1991
22 AUG.1991
23 AUG.1991
24 AUG.1991
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

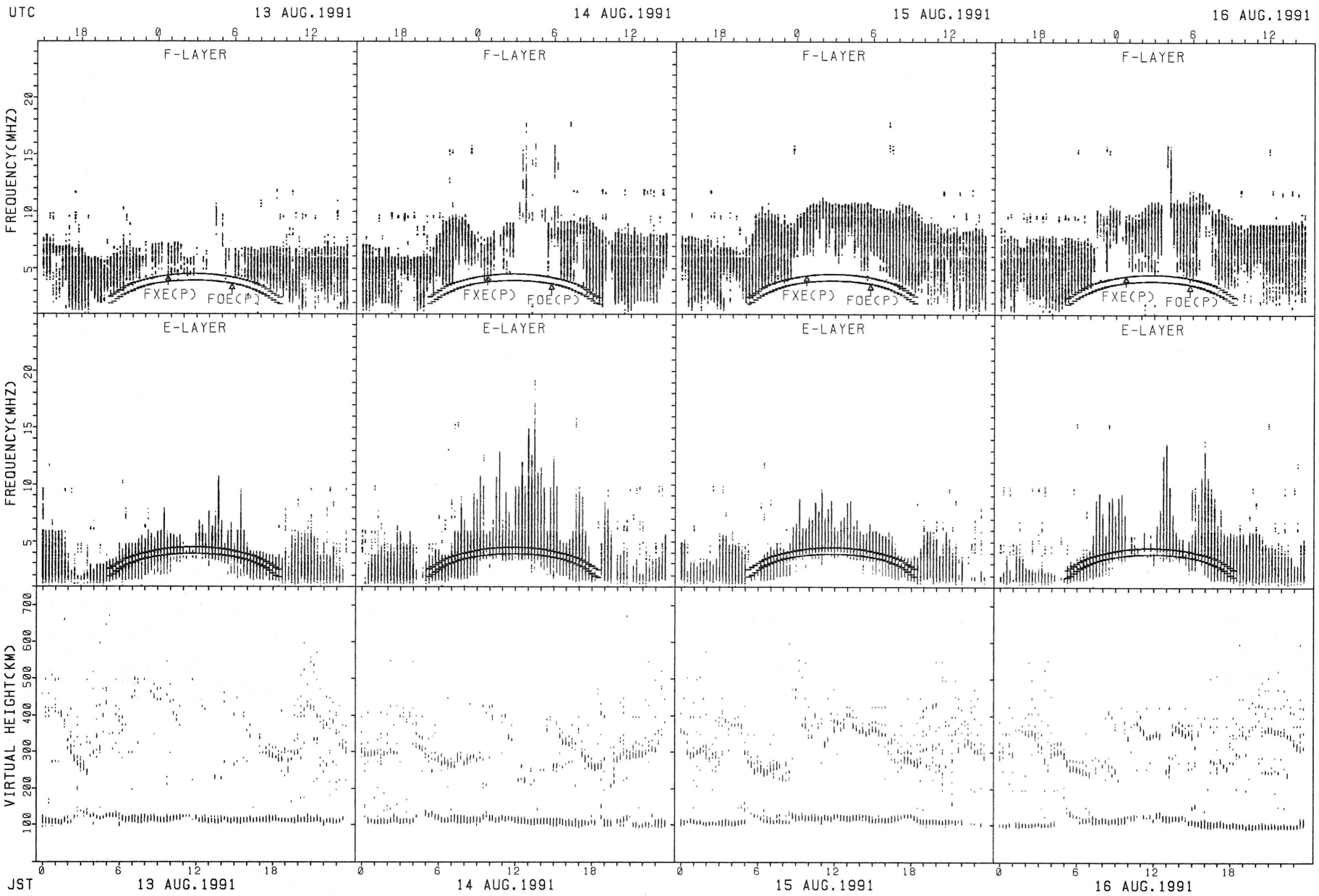

SUMMARY PLOTS AT AKITA
25 AUG.1991
26 AUG.1991
27 AUG.1991
28 AUG.1991
UTC
JST
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT AKITA
UTC
29 AUG.1991
30 AUG.1991
31 AUG.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

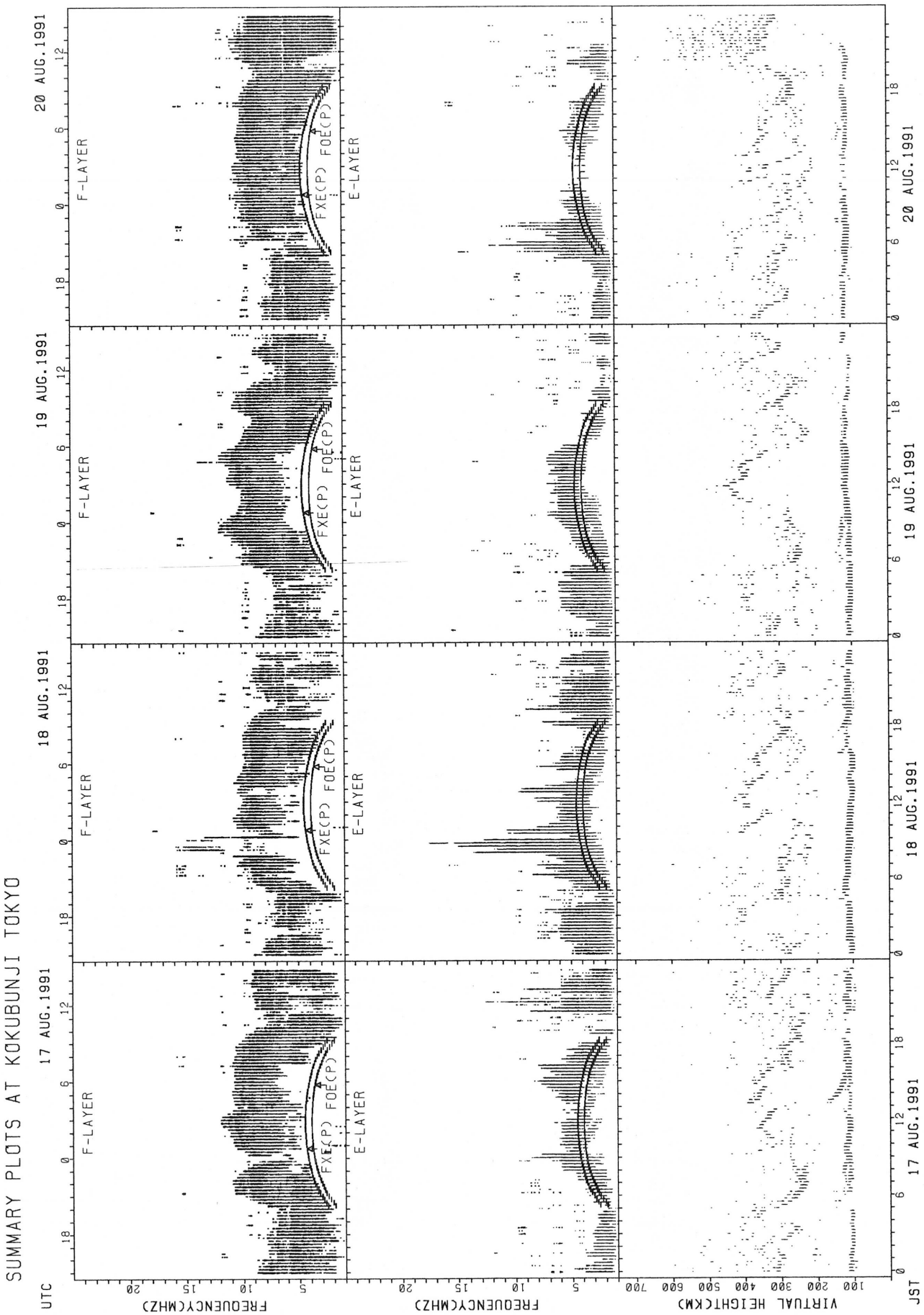

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
1 AUG.1991
2 AUG.1991
3 AUG.1991
4 AUG.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

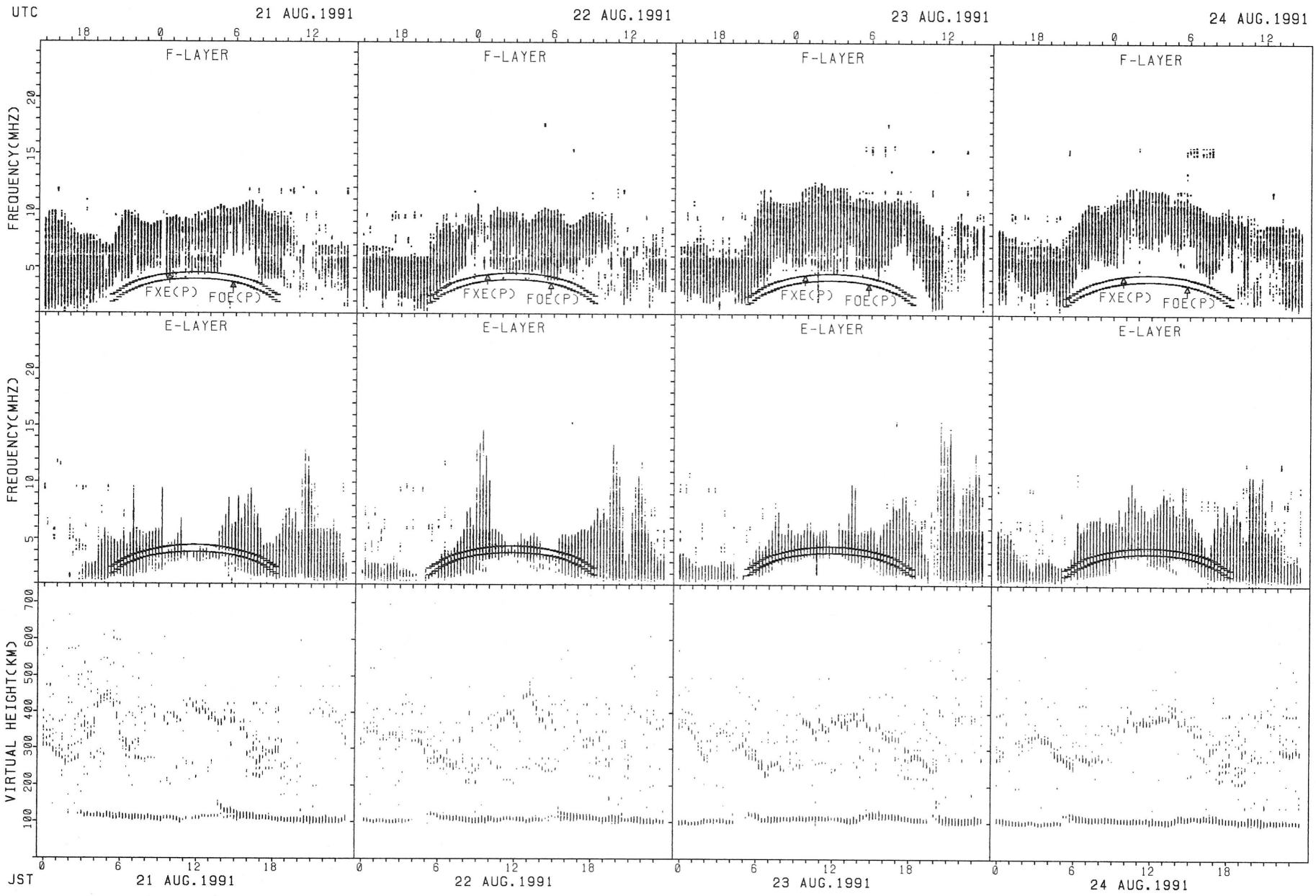

SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
5 AUG.1991
6 AUG.1991
7 AUG.1991
8 AUG.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
9 AUG.1991
10 AUG.1991
11 AUG.1991
12 AUG.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

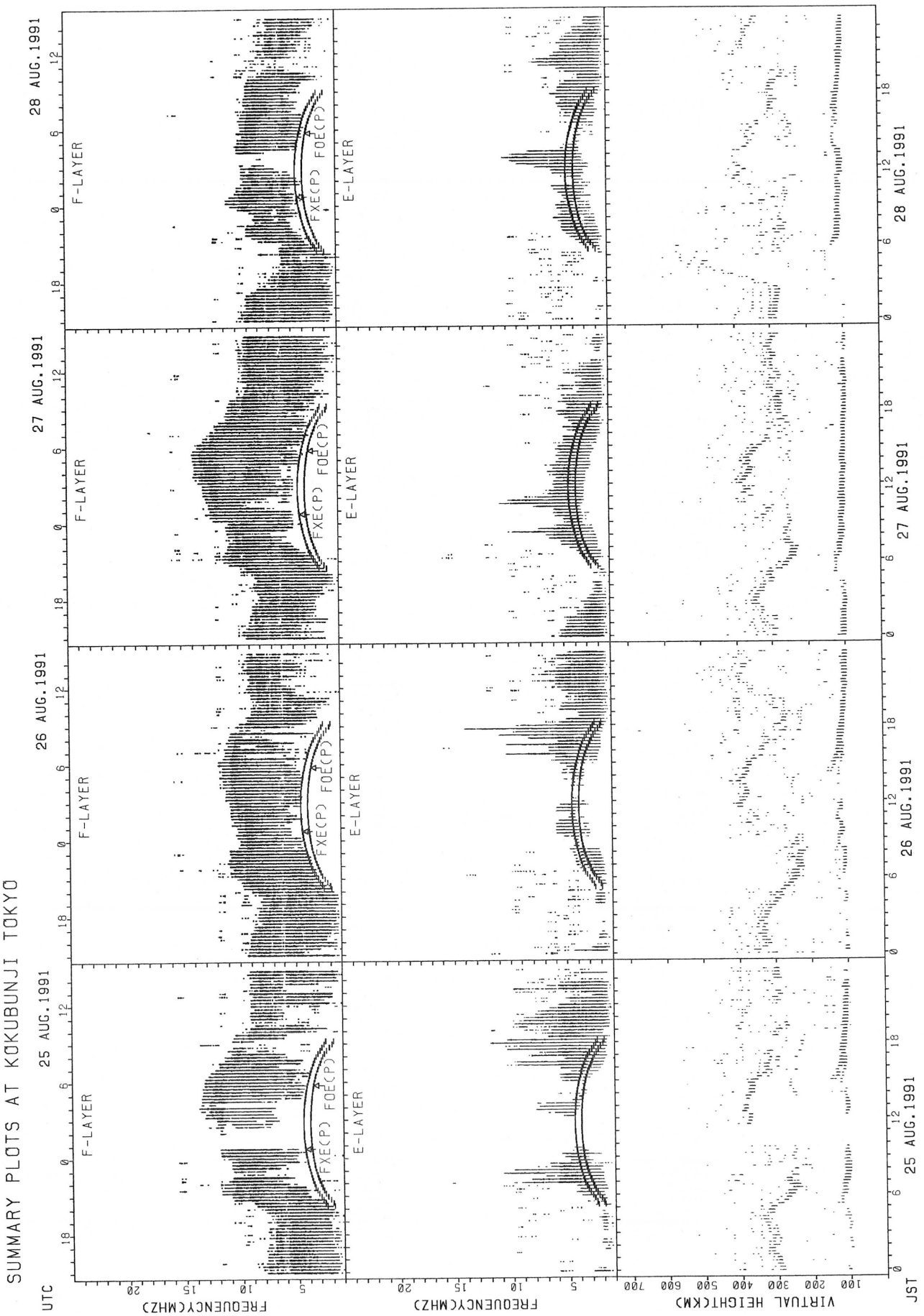


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

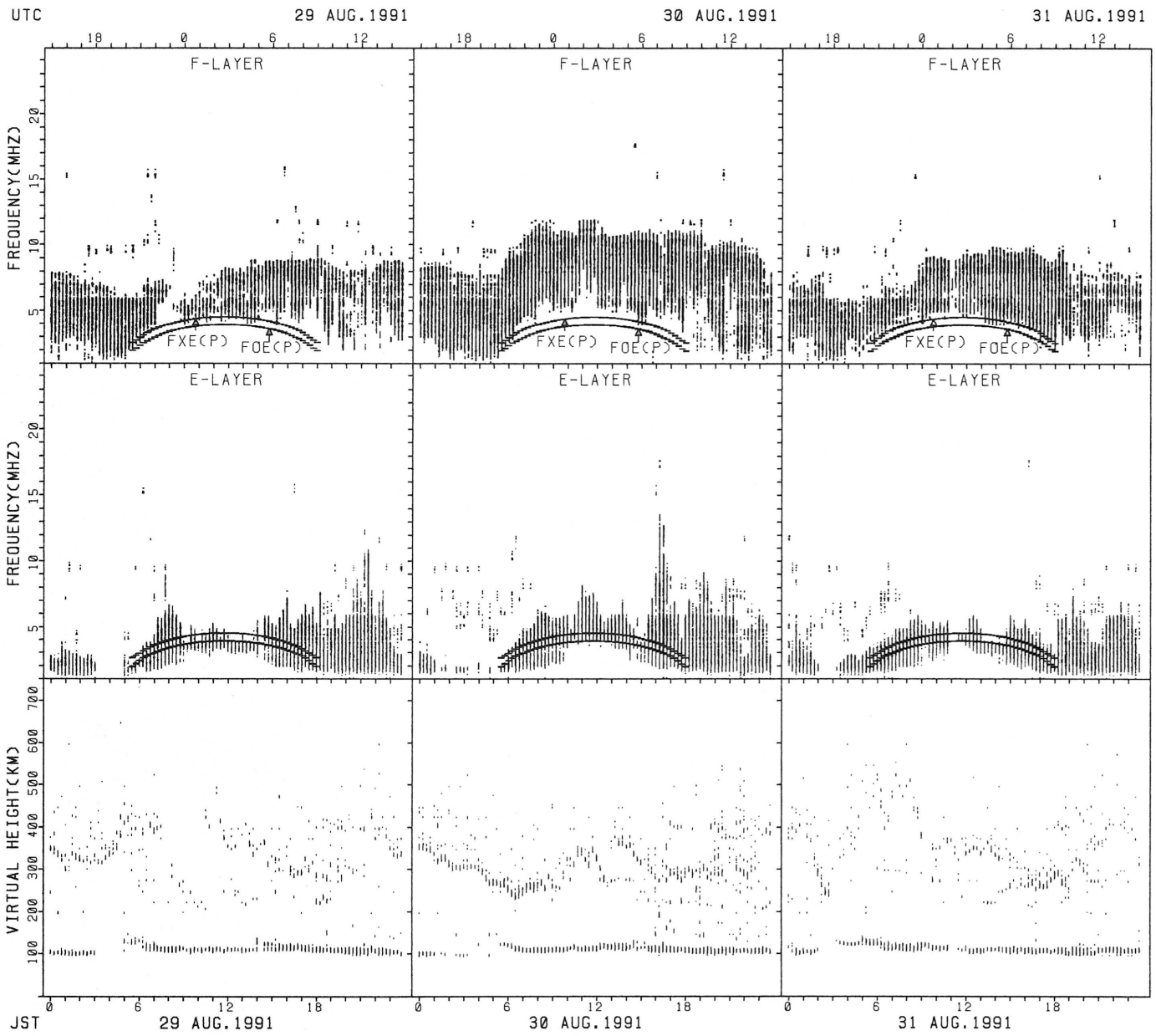

SUMMARY PLOTS AT KOKUBUNJI TOKYO
17 AUG.1991
18 AUG.1991
19 AUG.1991
20 AUG.1991
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE



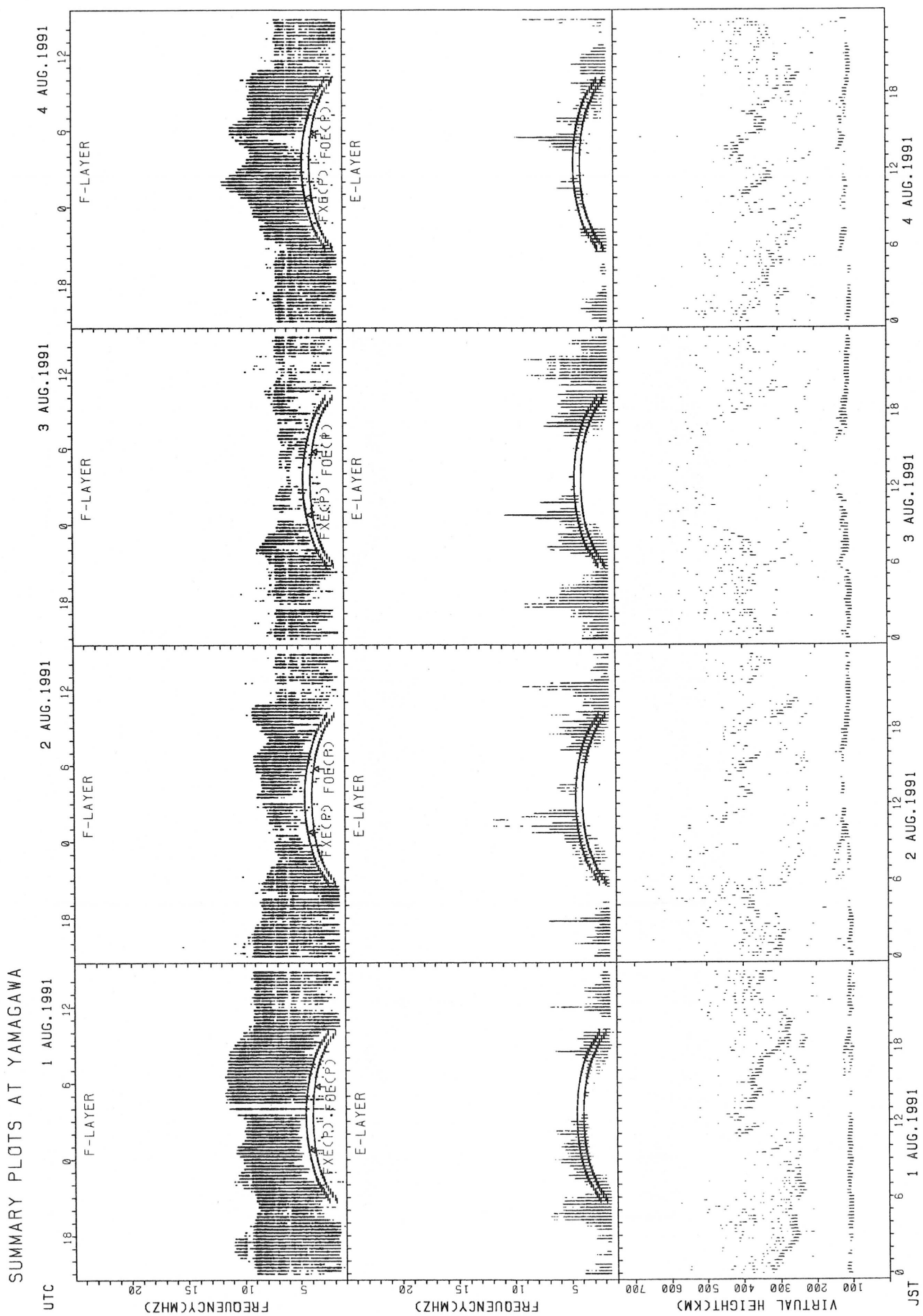
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT KOKUBUNJI TOKYO
UTC
25 AUG.1991
26 AUG.1991
27 AUG.1991
28 AUG.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

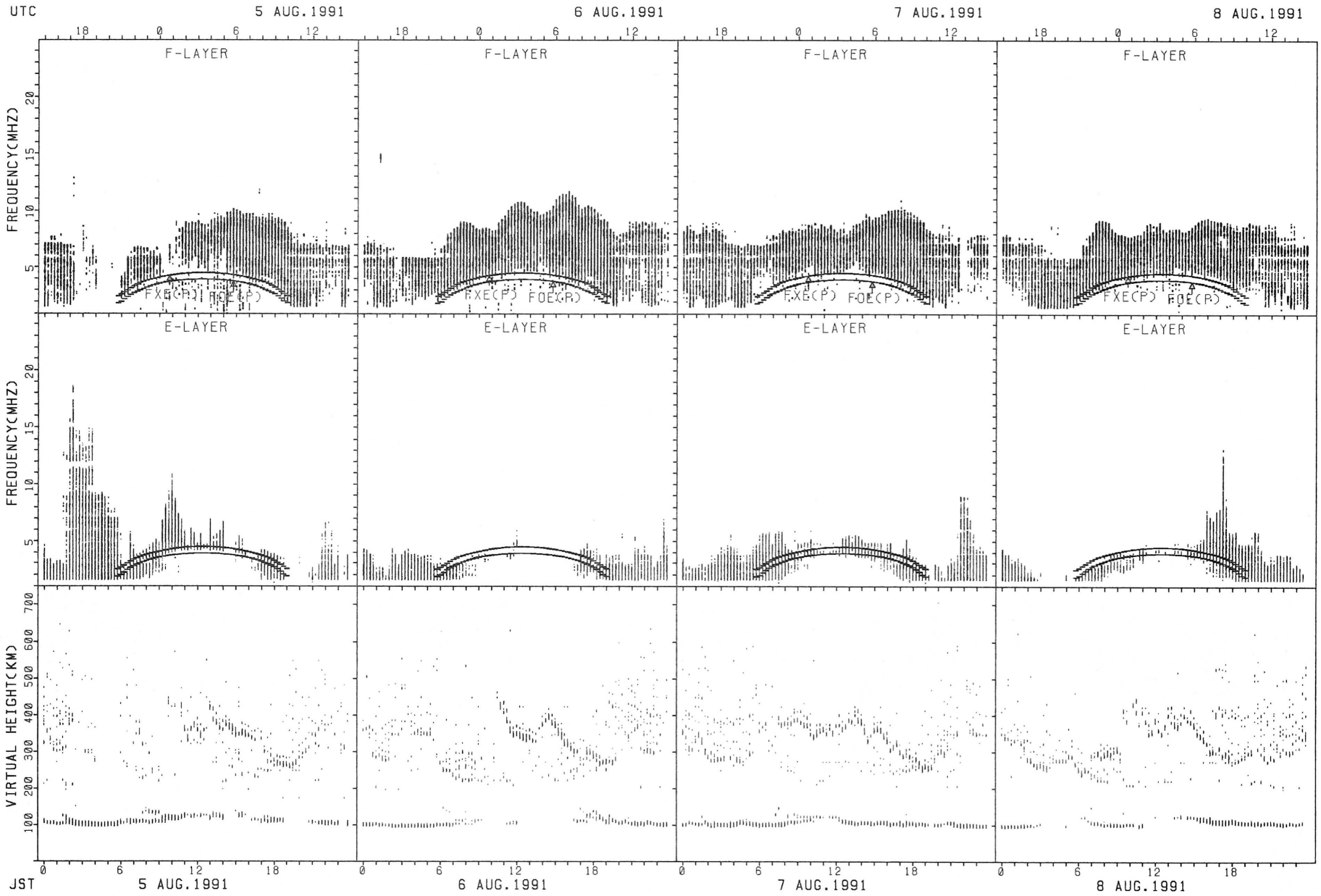
SUMMARY PLOTS AT KOKUBUNJI TOKYO



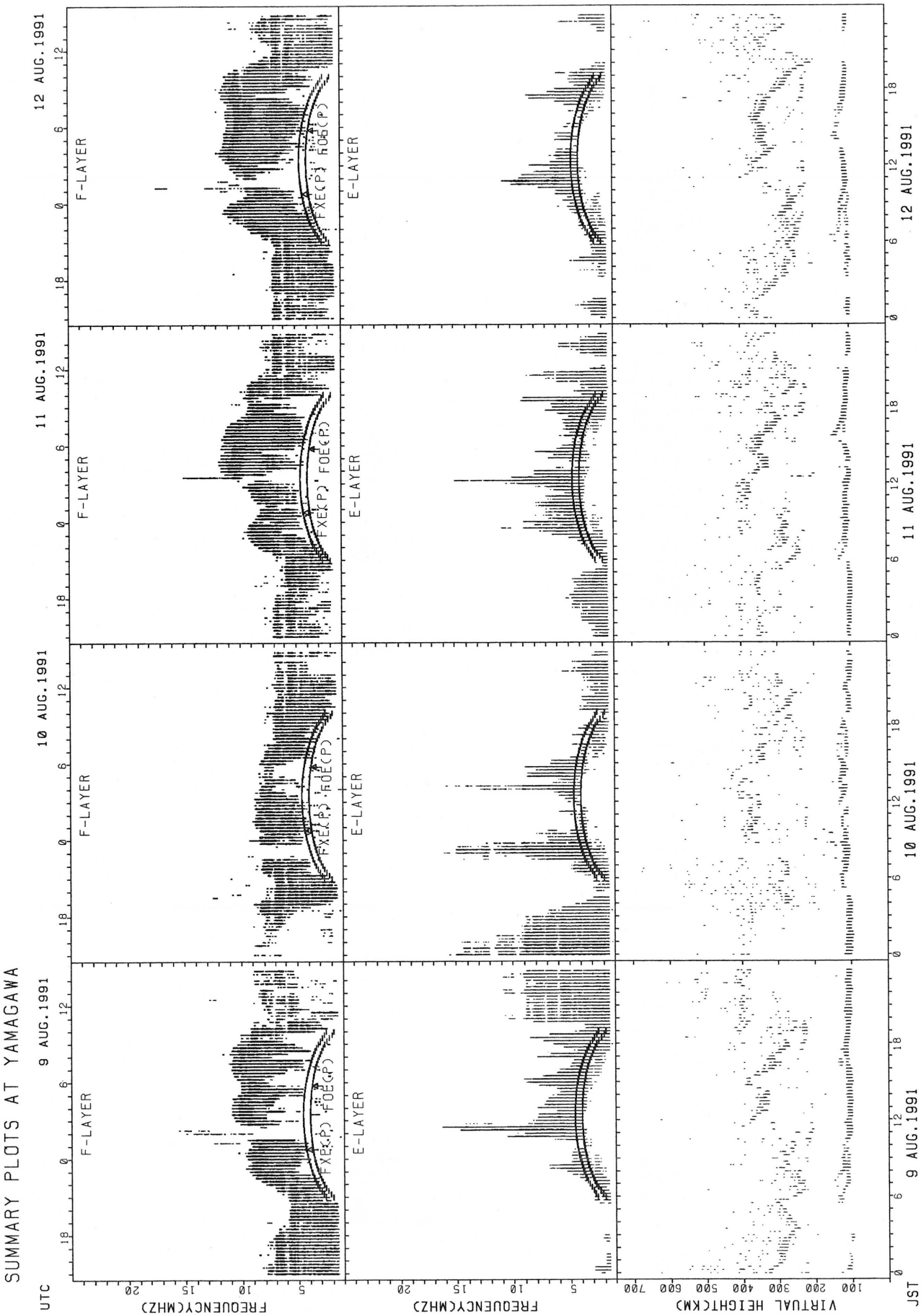
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

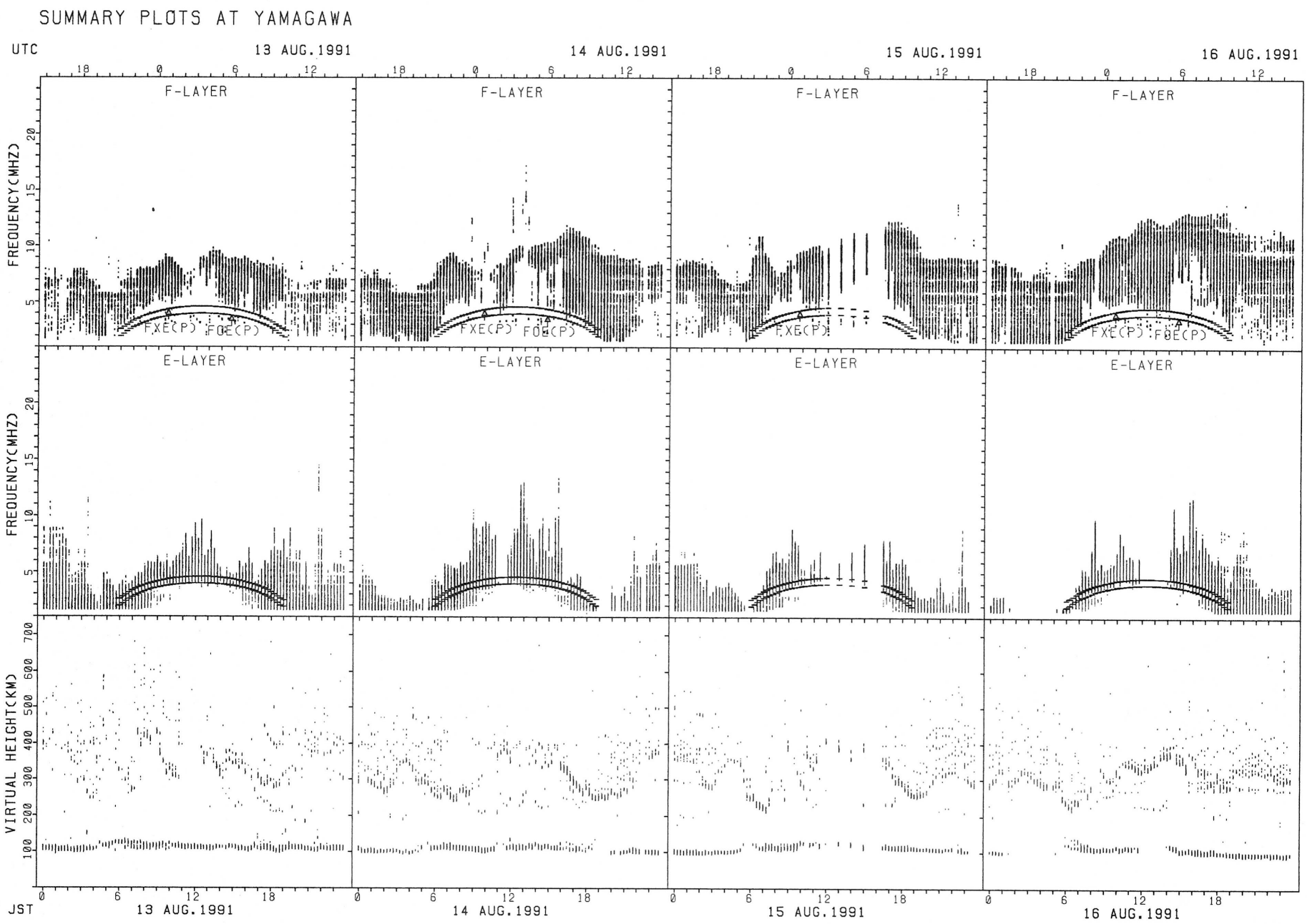

SUMMARY PLOTS AT YAMAGAWA
UTC
1 AUG.1991
2 AUG.1991
3 AUG.1991
4 AUG.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P) FOE(P)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

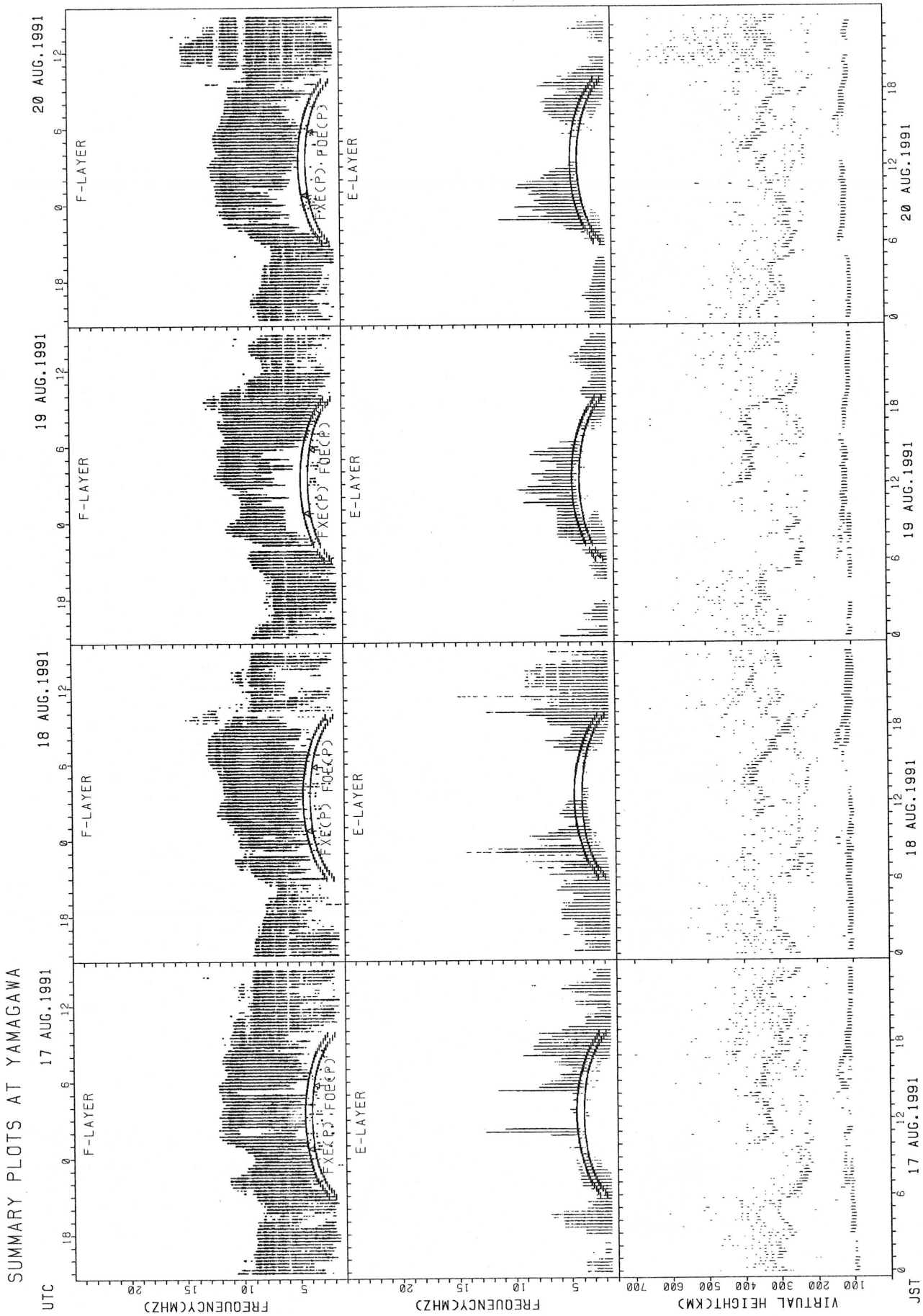
SUMMARY PLOTS AT YAMAGAWA



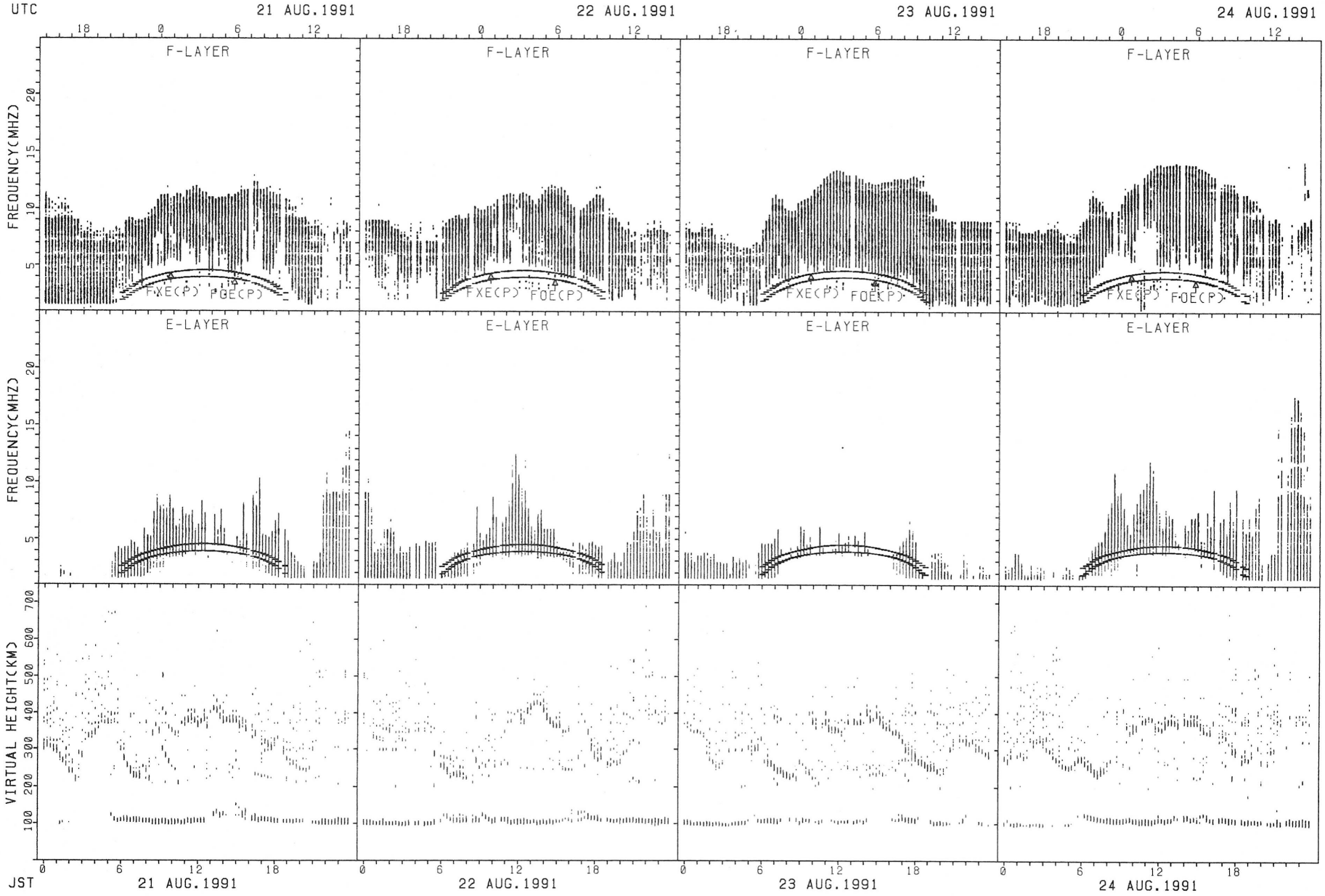
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
9 AUG.1991
10 AUG.1991
11 AUG.1991
12 AUG.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

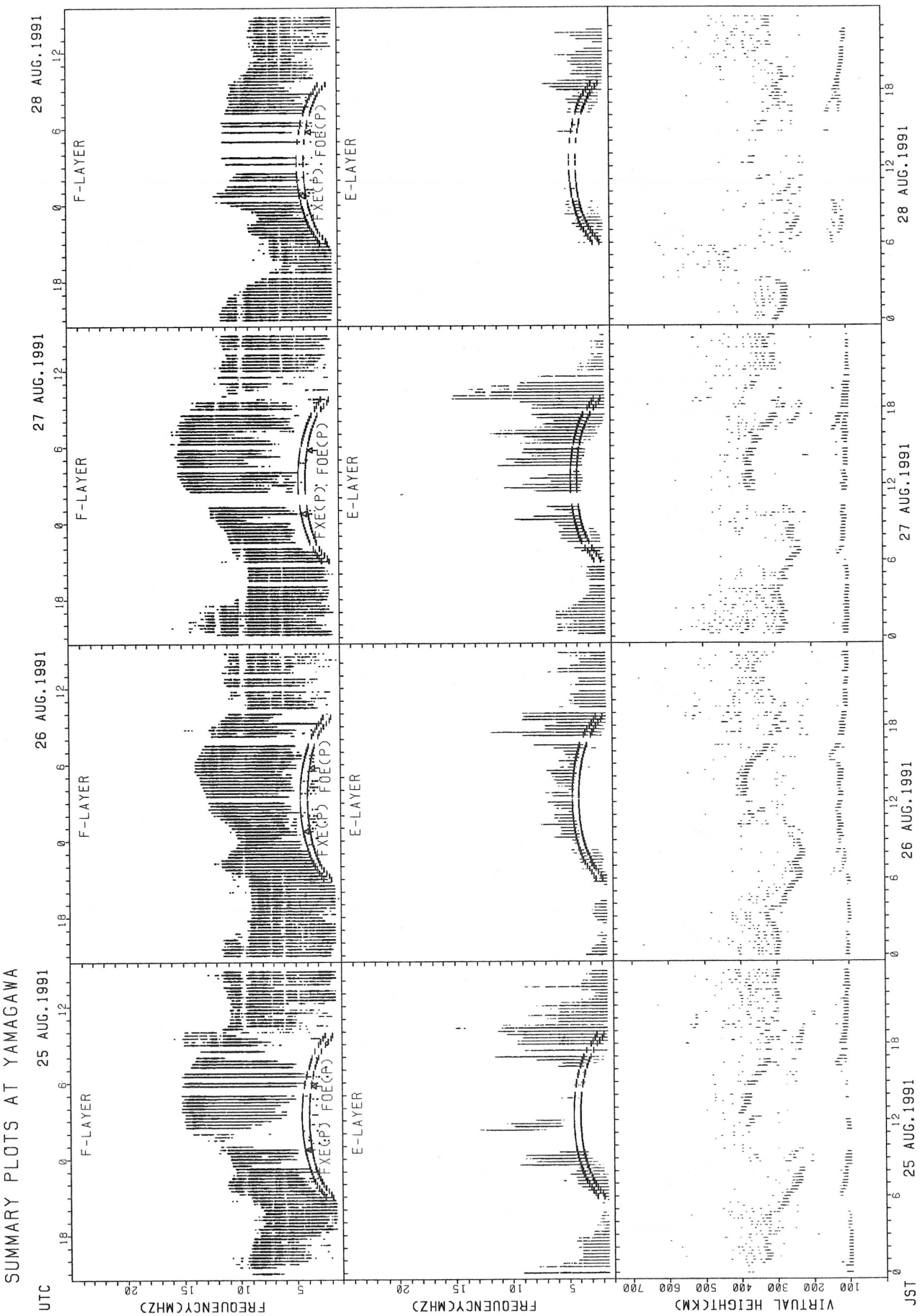

SUMMARY PLOTS AT YAMAGAWA
UTC
13 AUG.1991
14 AUG.1991
15 AUG.1991
16 AUG.1991
F-LAYER
E-LAYER
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P)
FOE(P)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
17 AUG.1991
18 AUG.1991
19 AUG.1991
20 AUG.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

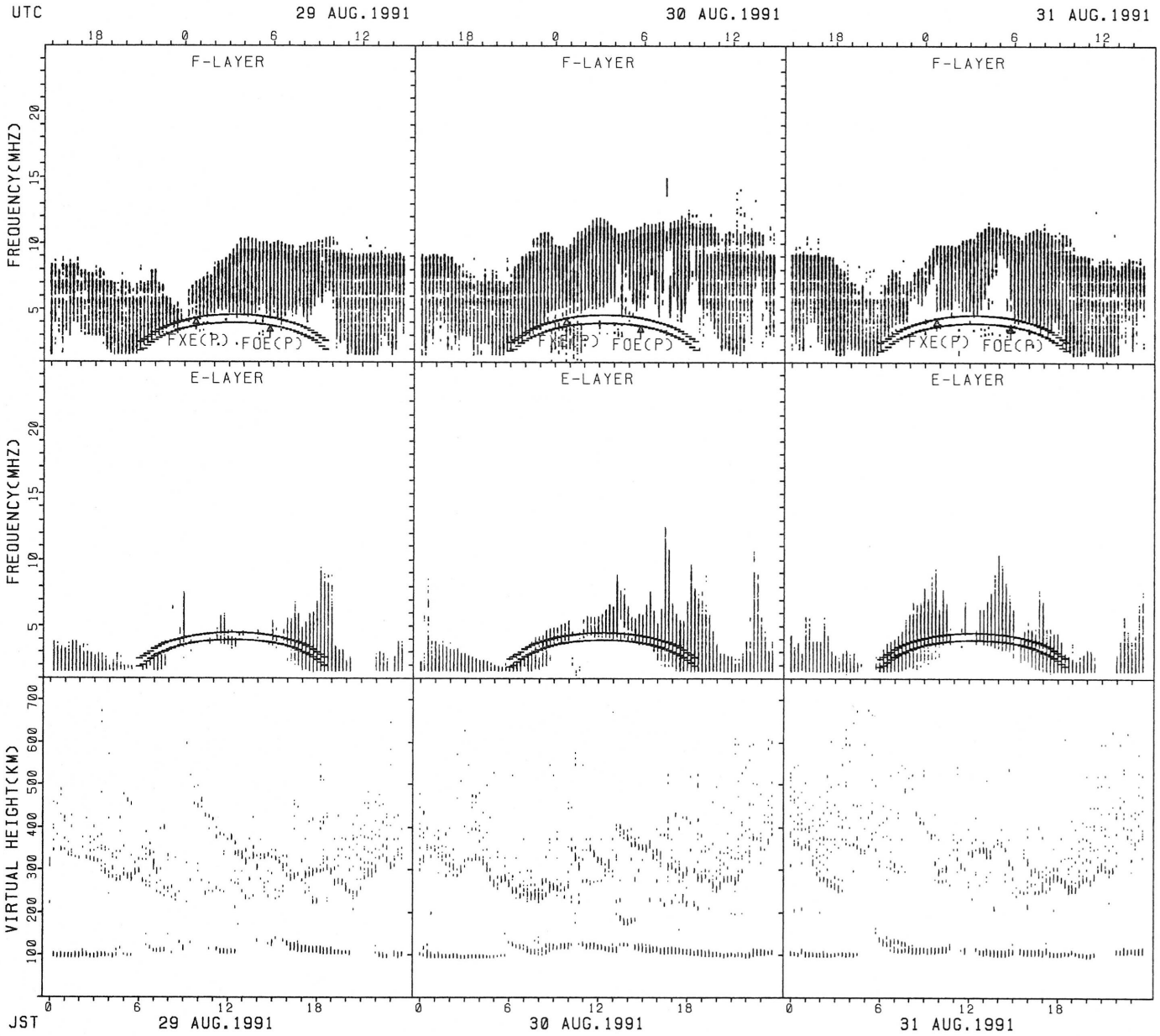
SUMMARY PLOTS AT YAMAGAWA



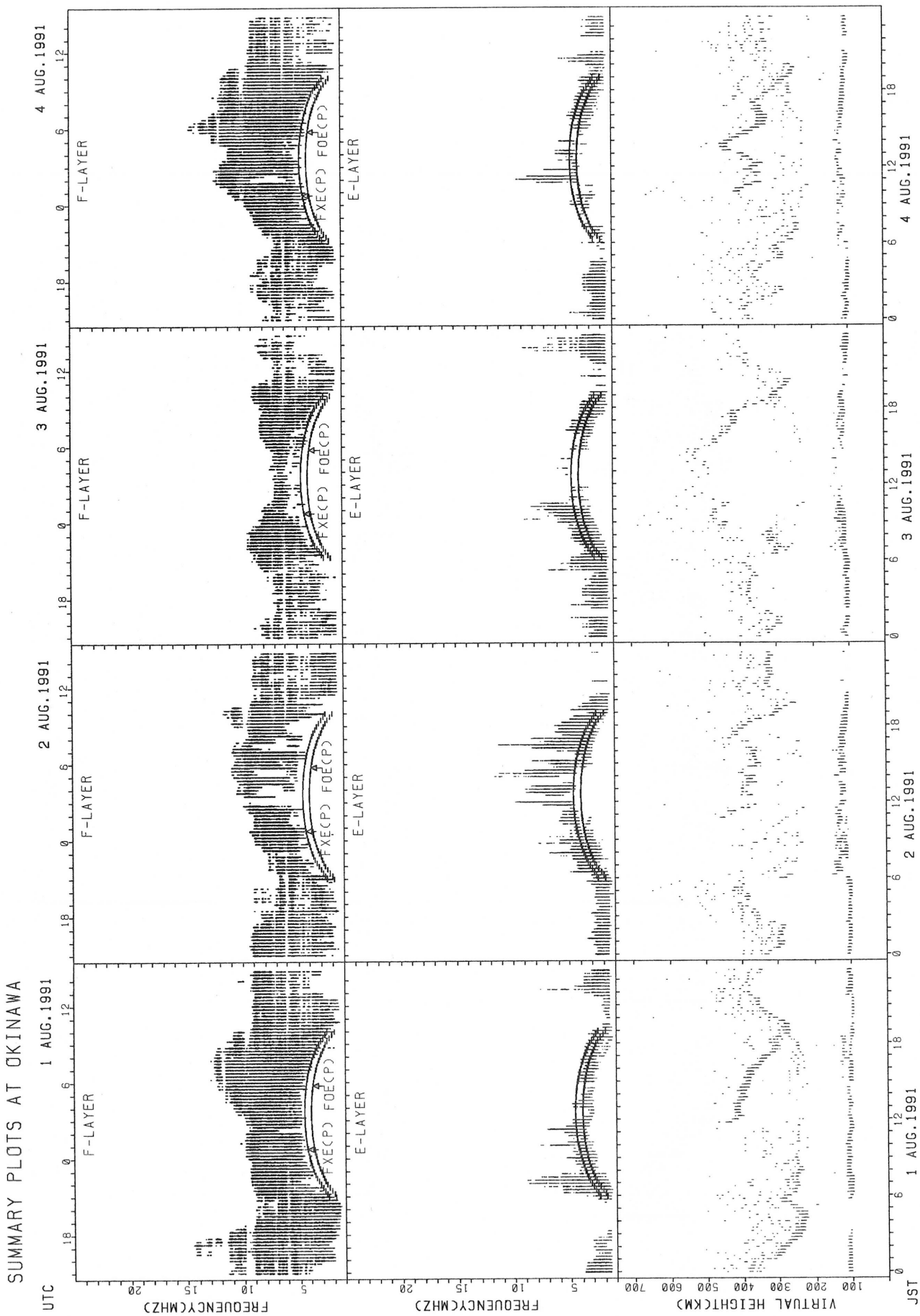
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

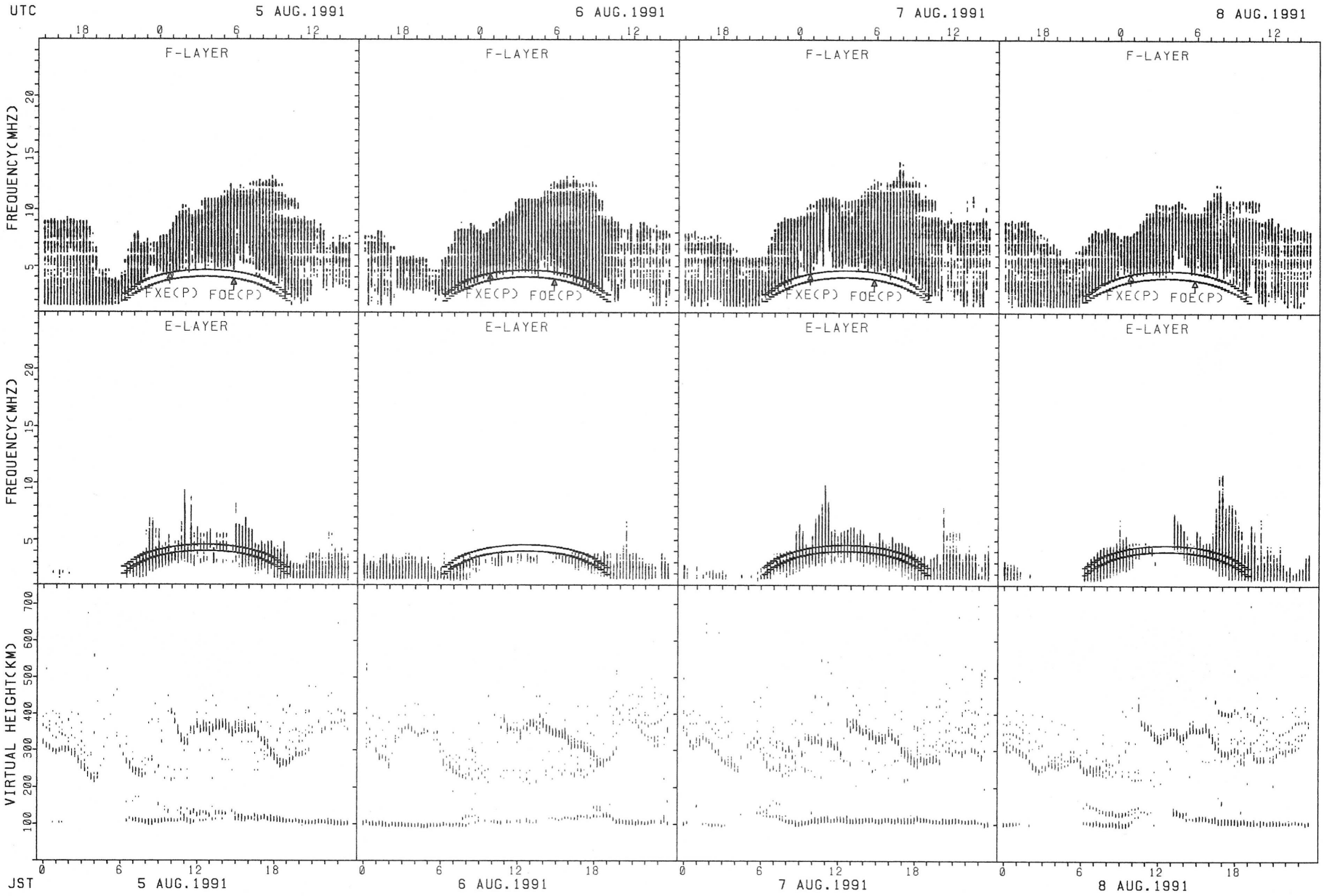
SUMMARY PLOTS AT YAMAGAWA



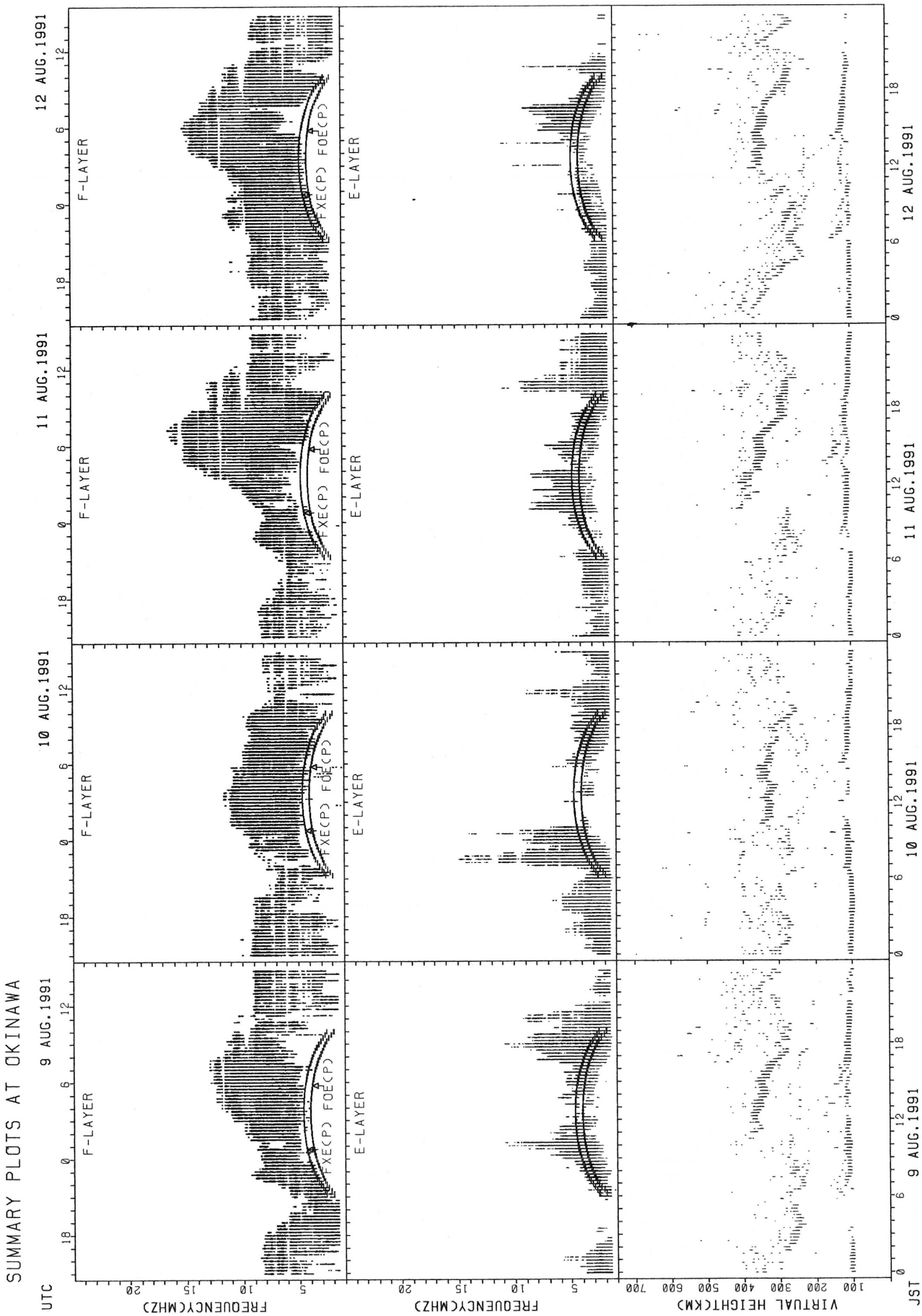
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
1 AUG.1991
2 AUG.1991
3 AUG.1991
4 AUG.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

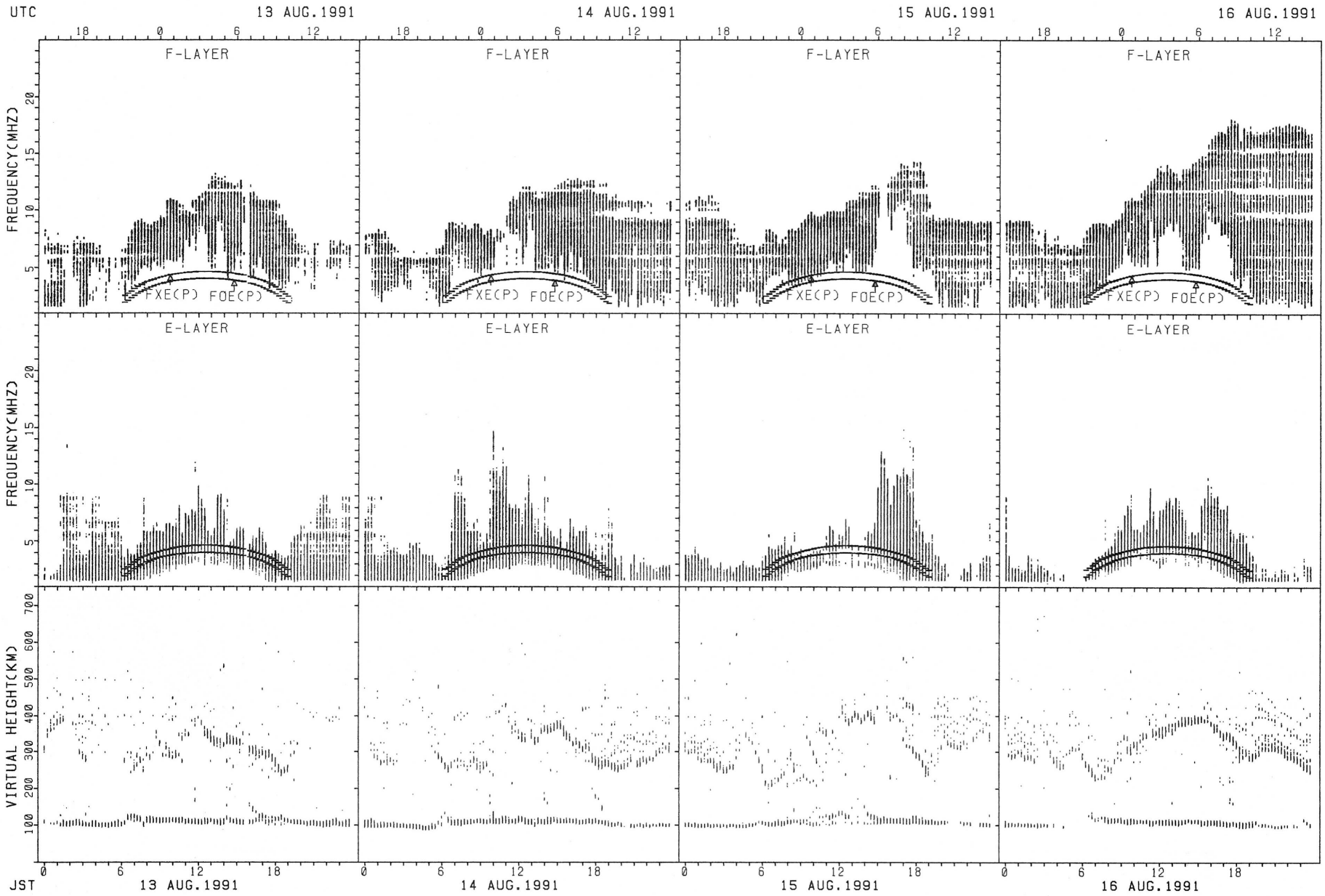
SUMMARY PLOTS AT OKINAWA



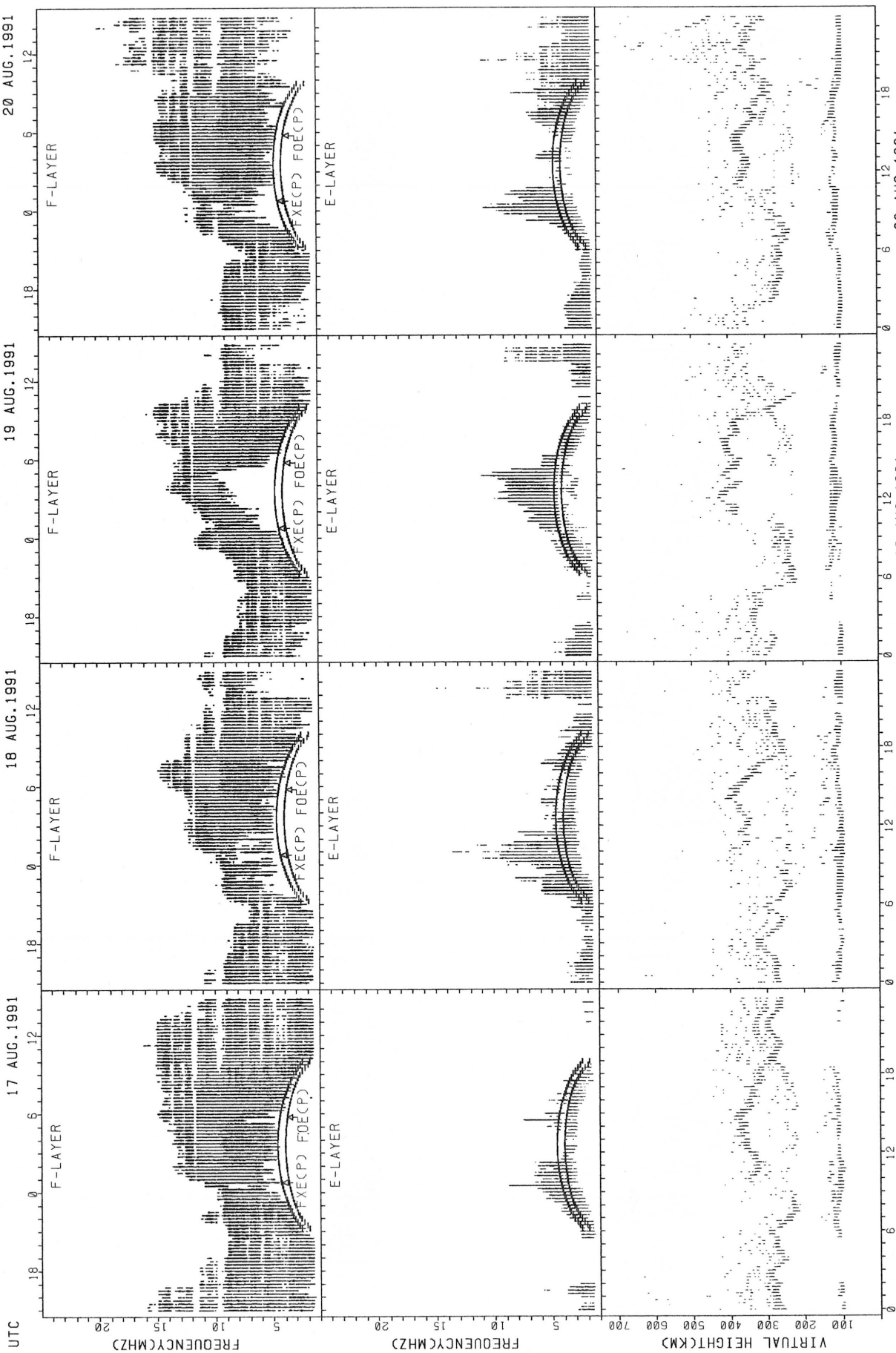
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT OKINAWA
UTC
9 AUG.1991
10 AUG.1991
11 AUG.1991
12 AUG.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

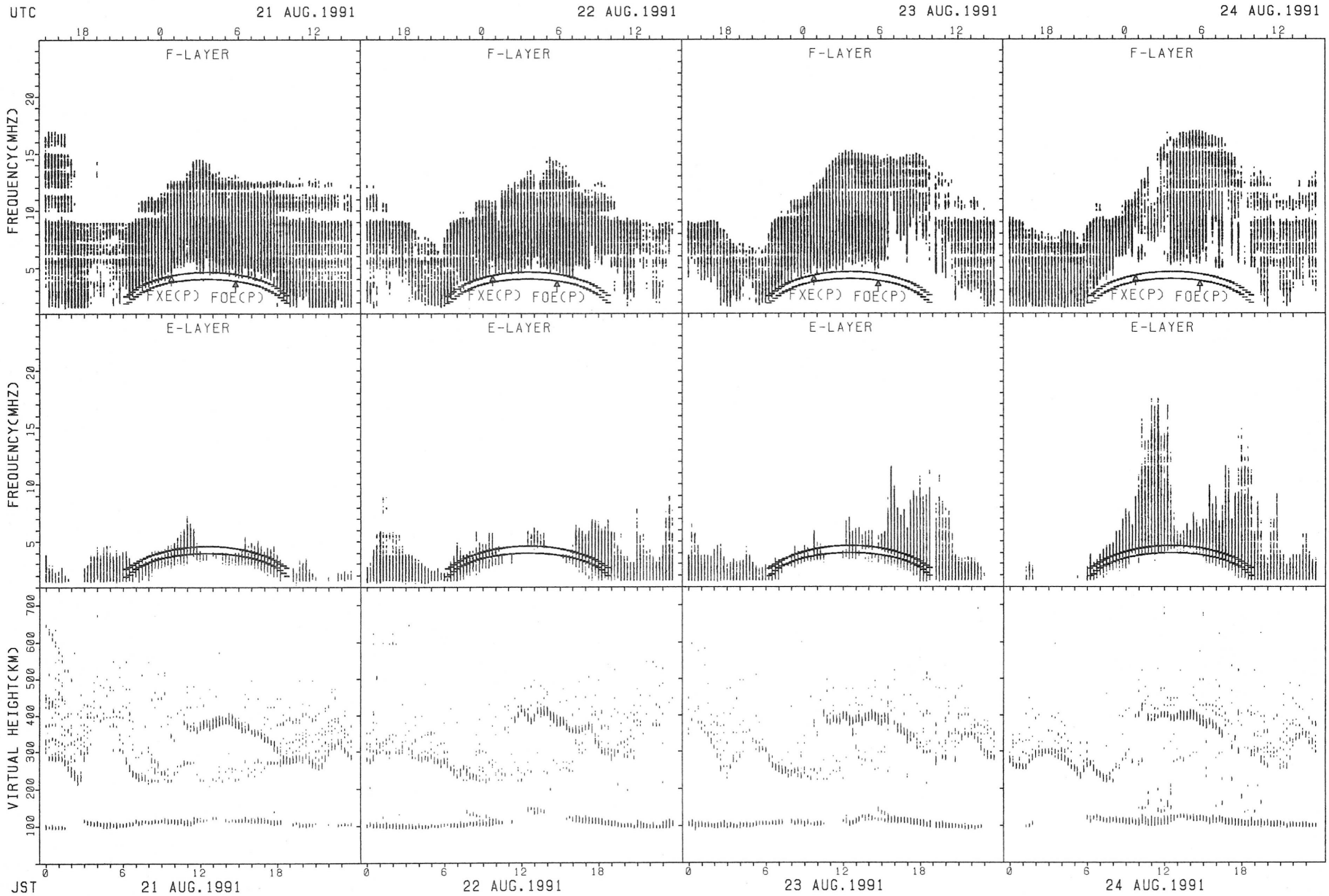
SUMMARY PLOTS AT OKINAWA



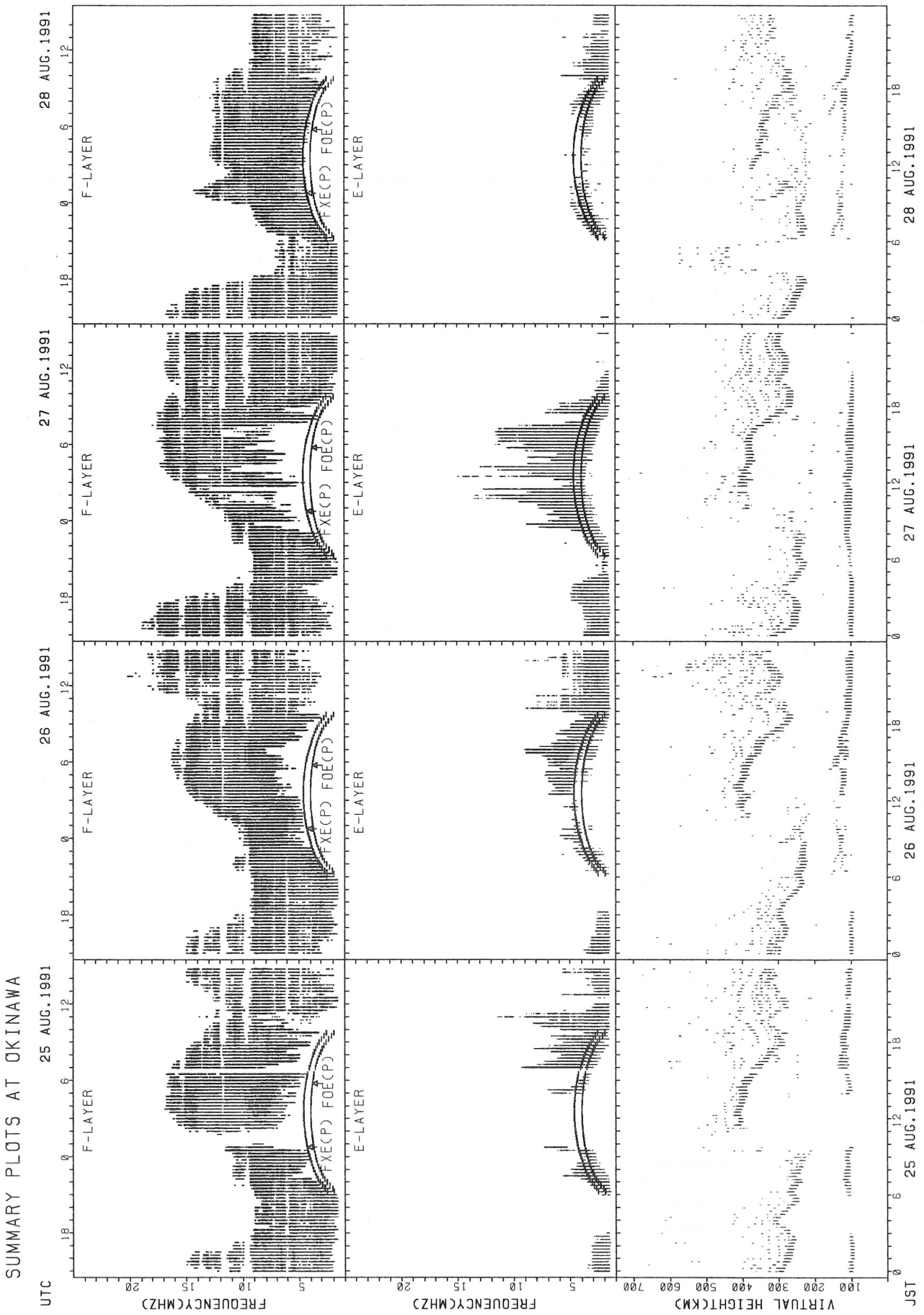
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

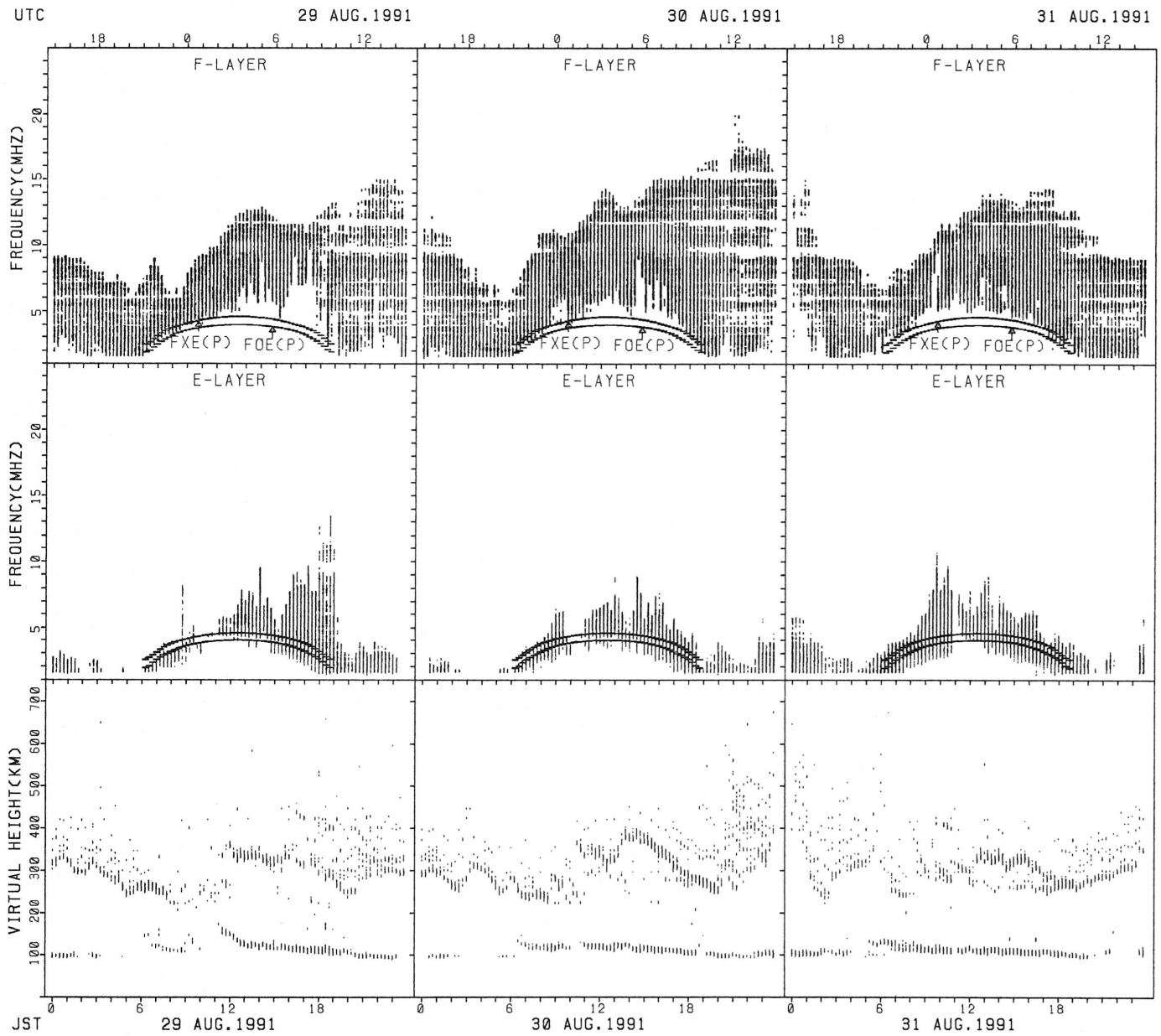
SUMMARY PLOTS AT OKINAWA



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


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

SUMMARY PLOTS AT OKINAWA



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

MONTHLY MEDIANS OF H'F AND H'ES

AUG. 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							10	13	10									13	18	13				
MED							286	278	287									298	319	324				
U Q							302	323	318									311	326	341				
L Q							266	257	252									280	296	297				

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	16	13	15	20	23	27	30	26	22	22	14	16	18	15	15	22	27	27	31	26	28	23	19
MED	113	114	111	121	125	123	121	119	117	114	115	114	113	113	113	115	122	121	117	117	115	117	113	113
U Q	115	127	123	127	128	129	123	121	119	119	121	119	118	115	127	125	125	123	121	123	123	118	115	119
L Q	111	108	108	107	120	119	117	115	113	113	111	111	110	111	111	111	119	119	115	113	113	113	109	109

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								12	14								16	14	12					
MED								291	276								345	309	308					
U Q								301	292								352	328	316					
L Q								263	260								338	294	268					

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	20	23	22	23	25	30	31	30	31	25	24	25	20	20	17	26	30	30	31	26	26	26	25
MED	109	108	107	107	107	123	119	117	114	113	111	111	113	111	115	115	120	116	113	111	111	111	109	109
U Q	112	110	113	117	121	127	125	119	117	117	113	115	117	116	123	129	125	119	117	113	115	117	111	113
L Q	104	104	105	103	103	116	117	113	111	111	108	107	108	107	109	109	113	113	111	109	109	109	105	104

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							17	21	15								21	23	23	21				
MED							276	260	266								324	296	296	304				
U Q							298	309	308								342	314	308	345				
L Q							263	253	250								298	286	282	274				

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	23	23	26	18	21	28	30	29	27	22	23	23	21	24	27	30	29	31	28	28	28	29
MED	109	106	105	107	111	120	119	117	115	117	115	112	111	107	115	113	117	115	111	109	109	111	108	109
U Q	113	111	113	111	119	129	121	120	119	119	117	119	119	117	129	126	125	119	116	113	113	115	111	112
L Q	105	103	103	105	105	113	115	113	109	109	109	109	107	105	108	106	113	113	109	105	107	109	105	105

MONTHLY MEDIANS OF H'F AND H'ES

AUG. 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	11	13	15				12	25	19	21							29	28	28	27	17	11		11
MED	346	346	354				289	260	264	280							330	312	287	296	332	348		350
U Q	380	377	362				314	290	278	321							345	329	304	308	356	386		356
L Q	330	334	322				262	236	242	254							315	291	236	274	319	330		336

H'ES

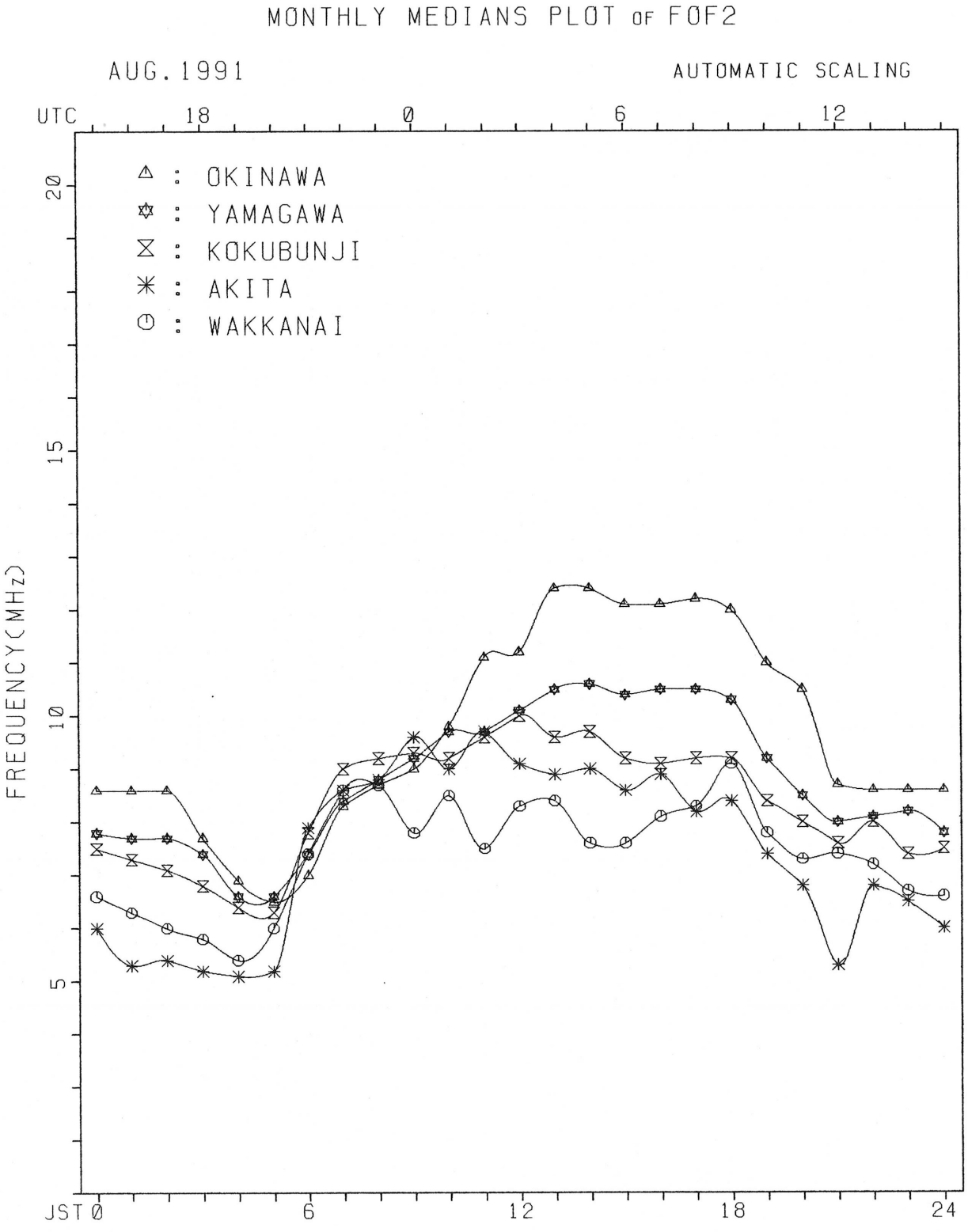
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	25	23	24	22	17	18	21	26	27	21	22	22	17	21	18	24	30	30	28	29	26	29	26
MED	106	103	101	103	104	105	117	115	115	115	113	115	112	113	119	116	125	119	111	110	109	109	109	107
U Q	109	106	105	107	107	109	131	122	119	123	120	123	119	125	130	127	142	121	117	113	111	111	111	109
L Q	103	101	101	100	101	102	107	112	111	109	107	109	109	109	107	113	111	113	109	107	105	105	105	105

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	22	22	13			11	19	24	21							24	28	28	29	23	16	10	16
MED	321	322	312	320			284	268	270	282							333	321	297	288	326	337	328	343
U Q	326	348	338	347			312	282	297	321							349	334	312	302	344	350	350	374
L Q	310	306	298	279			268	246	249	261							323	301	283	277	304	318	316	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	28	27	23	20	16	15	22	25	25	28	23	20	18	22	24	26	28	29	30	27	27	23	23	21
MED	105	105	103	101	101	103	107	125	119	115	117	119	117	116	124	118	118	119	116	111	107	107	107	107
U Q	109	109	107	107	105	105	109	135	120	125	125	129	131	125	133	127	125	127	121	117	109	111	109	110
L Q	103	103	101	100	99	101	105	111	111	110	113	112	113	109	113	113	113	112	111	109	105	101	103	104


MONTHLY MEDIANS PLOT OF FOF2
AUG. 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

AUG. 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 95	X 101	X 96	X 96	X 96															X 96	X 91	X 91	X 95	X 95
2	X 99	X 91	X 85	X 76	X 78															X 83	X 80	X 75	X 79	X 77
3	X 80	X 75	X 79	X 82	X 80															X 71	X 74	X 72	X 71	X 72
4	X 67	X 71	X 68	X 68	X 68															X 87	X 68	X 71	67	X 69
5	X 70	X 68	X 62	X 63	X 58															A	X 73	X 73	O X 75	X 72
6	X 73	X 69	X 67	X 63	X 62															X 82	X 82	X 86	X 86	X 79
7	X 82	X 78	X 85	X 76	X 71							A	A	A						X 67	X 66	X 69	X 69	X 67
8	X 70	X 67	X 65	X 60	X 57															X 71	X 77	X 77	X 75	X 73
9	X 71	73	67	63	O X 63	62									A					X 97	X 75	X 82	X 83	X 78
10	80	75	X 71	A	70		A				A									X 61	X 67	X 65	X 64	X 63
11	X 63	X 64	X 61	61	61	62														X 89	X 85	X 76	78	79
12	72	X 74	X 74	X 76	X 77															X 113	A	80	X 88	X 89
13	78	77	72	X 67	X 58									A						X 70	X 69	68	X 72	X 73
14	X 74	X 70	X 69	X 63	X 63								A	A						X 83	X 83	X 85	X 83	X 80
15	X 82	X 79	X 76	X 68	X 69					95										X 94	X 90	X 87	X 86	X 89
16	X 83	X 81	X 74	X 80	X 77									A						X 88	X 91	X 90	X 91	X 93
17	X 88	X 85	X 81	X 80	X 71															X 93	X 83	X 91	X 94	X 94
18	X 88	X 81	X 73	X 71	X 73				A	A										X 86	X 80	X 88	X 93	X 86
19	X 85	X 81	X 72	X 73	X 72															X 104	X 90	X 73	X 87	X 83
20	X 79	X 83	X 74	X 76	X 74		A													X 90	X 95	X 112	X 108	X 100
21	X 93	X 93	X 87	X 75	X 72	71	93	96	88											X 93	X 72	X 76	X 73	X 74
22	X 73	X 70	X 69	X 67	X 64															X 96	X 73	X 70	X 77	X 77
23	X 75	X 77	X 73	X 69	X 68															X 100	X 86	A	X 91	91
24	X 85	X 80	X 75	X 73	X 73															X 96	X 91	X 92	X 91	X 90
25	X 87	X 82	X 81	X 79	X 76														A	X 104	X 97	X 97	X 96	X 96
26	X 97	X 95	X 91	X 87	X 83															X 93	X 90	X 95	X 93	X 96
27	X 97	X 93	X 88	X 84	X 83															X 102	X 99	X 99	X 98	X 98
28	X 98	X 95	X 91	X 75	X 64															X 88	X 78	X 80	X 82	X 82
29	X 83	X 79	X 75	X 71	X 69	62														X 87	X 83	X 84	X 85	X 89
30	X 86	X 86	X 85	X 79	X 77															X 111	X 101	X 103	X 102	X 91
31	X 76	X 75	X 79	X 63	X 60															X 81	X 79	X 79	X 81	X 79
	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	4	1	1	1	1										30	30	30	31	31
MED	X 82	X 79	X 74	X 73	X 71	62	93	96	88	95										X 90	X 82	X 81	X 85	X 82
U Q	X 88	X 85	X 85	X 79	X 77	66														X 96	X 90	X 91	X 93	X 91
L Q	X 73	X 73	X 69	X 67	X 63	62														X 83	X 74	X 73	X 75	X 74

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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

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	89	95	90	90	90	90	98	108	105	110	106	R 101	102	111	109	103	101	99	97	90	85	85	89	89
2	93	S 85	79	70	72	71	73	69	61	R 62	65	72	R 68	67	67	74	72	67	72	77	74	69	73	71
3	74	69	73	76	74	76	84	78	70	64	65	64	E G 54	U R 57	57	58	57	56	61	65	68	66	V 65	66
4	61	65	62	62	62	63	78	81	77	84	92	90	J R 82	76	81	78	77	79	77	80	62	65	F 62	62
5	64	62	56	57	53	42	55	59	57	E G 51	H 56	72	78	78	82	86	85	81	75	A	67	S 67	U S 69	66
6	67	63	61	57	56	57	77	92	94	90	91	100	108	101	93	90	89	86	80	76	76	80	80	73
7	76	72	79	70	65	63	67	69	67	66	67	A	A	A	76	80	79	77	75	61	60	63	63	61
8	64	61	59	54	50	53	60	63	67	61	58	58	J R 62	R 61	65	71	71	68	65	65	71	71	69	67
9	65	59	F 58	F 54	57	F 52	76	77	94	99	96	94	102	104	A	94	97	104	96	91	69	76	77	72
10	F 72	F 69	65	A	F 63	63	A	67	55	55	A	55	55	58	61	61	59	56	55	55	61	59	58	57
11	57	58	55	F 54	F 53	F 55	68	82	91	92	83	85	90	95	88	81	85	85	83	83	79	70	J S 71	F 73
12	F 64	68	68	70	71	70	78	93	104	104	88	93	95	92	91	94	96	102	102	107	A	F 73	J R 82	83
13	F 71	F 69	64	61	53	51	65	63	62	68	67	J R 61	63	A	63	63	64	63	65	64	63	F 60	66	67
14	68	64	63	57	57	57	77	91	86	77	75	83	A	A	80	85	87	91	85	77	77	79	77	74
15	76	73	70	62	64	63	92	95	87	F 87	101	110	101	101	104	99	98	101	101	88	84	81	80	83
16	77	75	68	74	71	71	71	66	75	86	92	R 99	107	A	108	112	108	98	86	82	85	V 84	85	87
17	82	79	75	74	65	70	95	105	95	90	103	108	116	102	106	103	104	102	100	87	77	86	88	V 88
18	82	75	67	65	67	71	86	94	A	A	99	101	96	99	99	93	93	94	91	80	74	82	87	80
19	79	75	66	R 67	66	74	94	92	109	110	99	94	105	106	114	101	92	84	103	97	84	67	81	77
20	73	77	68	70	68	70	A	86	94	H 96	98	102	101	98	99	97	94	98	93	84	89	R 104	102	94
21	87	87	80	69	Z 67	F 61	F 85	F 88	F 79	83	86	H 87	91	95	98	99	105	97	90	87	R 66	70	67	68
22	67	64	63	61	58	59	80	78	81	85	96	96	99	88	98	98	84	89	96	90	S 67	64	71	71
23	69	71	67	63	62	68	98	Z 109	103	109	119	122	118	116	108	107	107	107	108	94	80	A	85	F 83
24	79	74	69	67	67	68	84	103	97	108	115	117	117	115	110	106	100	93	93	90	85	86	86	84
25	81	76	75	73	70	77	108	111	104	112	B	121	R 132	133	131	129	119	110	A	98	91	91	90	90
26	91	89	85	81	77	85	97	105	106	95	99	103	107	109	112	112	108	107	99	87	84	89	87	90
27	91	85	80	77	77	82	107	104	101	J R 113	121	122	127	132	133	130	119	111	104	95	92	93	92	92
28	92	89	85	69	58	58	54	86	77	100	96	88	89	93	93	91	91	86	85	82	72	74	76	76
29	77	73	69	65	63	F 55	61	68	70	J R 59	67	72	79	77	81	82	83	82	84	81	77	78	79	83
30	80	80	79	73	71	72	91	100	112	106	109	115	J R 115	102	104	106	103	108	108	106	95	97	96	V 85
31	J R 70	69	73	57	54	53	62	63	63	80	85	U R 86	88	90	93	89	93	89	86	76	73	73	75	73
	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	29	31	30	30	29	30	29	27	30	31	31	31	30	30	30	30	31	31
MED	76	73	68	67	65	63	78	86	86	88	92	94	99	98	96	94	93	91	88	84	76	75	79	76
U Q	82	79	79	73	71	71	93	100	101	104	100	103	108	106	108	103	103	102	99	90	84	85	87	85
L Q	67	65	63	61	57	57	68	69	70	68	71	83	80	78	81	81	83	81	77	77	68	67	69	68

AUG. 1991 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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							L	L		620	L	R 650	L	625	625	600	L 560	L	L					
2						330	410	465	510	520	H 535	540	570	R 570	565	545	L 550	480	L 410					
3						L 340	420	475	480	515	530	540	535	535	530	510	500	455						
4						L	L	U L 495		545	580	620	R 550	550	570	L 570	540	L 500						
5						L	400	450	475	510	480	U A 560	550	H 600	565	L 565								
6							L	L	U L 545	U L 680	L	600	570	L 615	550	L 560	L	L						
7							400	450	470	500	505					540	L 500	U L 470	L					
8							L	450	460	H 480	R 500	520	530	530	U A 520	A	L 500	U L 420	A					
9							L			U L 620	U L 595	L	600	L 575		L 570	L 500	U L 450						
10								U A 430	455	480		500	510	U A 510	490	480	475							
11						L	L	L 440			L	580	530	545	510	520	L 485	L						
12							L	L	L			L 550	L 580	L 565	L 540	U L 520	L 520							
13						U L 290	L 405	470	460	U A 510	510	510	530			500	L 490	U L 450						
14							L	L	L	L	600	545					L 505		L					
15							L	L	L	L 670					U L 595	U L 580	L	L						
16											L 580	640	U L 645		590	U L 620		L						
17							L	L	L		L	L	620	L	L 640			L						
18												L	655		585	L 620	U L 585	L						
19								L	L	L	U L 715	655	655	L	L	L	L 590	U L 555	L					
20									L 605	605		645	645	630	L 650	L		L						
21							L		585	L	U L 645	L	620	625	L 630			L						
22							L	L			L	640	620	615	U L 635	U L 615	U L 600							
23							L	L		L	L 680	U L 730	U L 720	660	L 630	U L 645	L							
24										U L 650		L 660	L				U L 595							
25										L			R 665		620	615	U L 610							
26									L	L		L	620	U L 690	610	L 620	U L 600							
27								L		L	L	U L 710	690	645	645	590	L							
28						L 370	L	L	620	580	L	620	L 635		U L 625	U L 600	L							
29						U L 270	U L 400	435		550	550	L	L 600	L	U L 600	U L 590								
30							L		L	L	L		U L 620	U L 675	L 610	L	L							
31						L	420	470	485	550	U L 575	L 600	L 570	L 600	L 610	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						5	7	11	12	17	15	21	26	19	25	22	18	8	1					
MED						L 330	405	450	482	550	575	600	610	600	600	L 575	L 530	U L 462	L 410					
U Q						L 355	420	470	565	U L 620	L 600	648	645	630	L 628	L 615	U L 590	L 490						
L Q						U L 280	400	440	465	510	510	542	550	550	558	540	L 500	U L 450						

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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 175	275	A 345	A 370	420	A 405	A 410	A 410	A 430	A 420	A 400	355	315	A 215					
2						160	260	320	U A 365	400	395	A	400	B	B	385	350	300	U A 200					
3						B 160	275	320	B 345	A 365	A 395	A U A 390	A 410	A	395	370	340	A 290	A 345					
4						A 175	250	310	345	A	390	A	405	410	B	A	U A 345	A	A					
5						A	260	305	350	380	A 400	A	A	A	A	A	A 320	300	A					
6						180	250	300	335	355	A	A 395	R 405	400	A	A	A	A	A					
7						B	A	315	345	370	A	A	A	A	A	A	A	290	A					
8						A	A 240	290	U A 330	U A 340	A	A 425	390	380	375	365	335	280	A					
9						A	A	290	A	A	A	A	A	A	375	A	A	A	A					
10						A	245	300	340		A	A	A	A	A	A	A	A 290	A					
11						B	255	300	335	365	A 380	U A 395	400	380	370	A 340	A	A 275	U A 200					
12						B	245	315	350	380	395	A	400	390	A	A	A	A	A					
13						A	265	315	345	380	400	415	420	410	395	370	340	A 295	A					
14						160	265	340	370	A	B	R	430	425	415	A	A	A	A					
15						A	260	335	375	A 400	420	430	425	R 430	410	390	345	295	A					
16						A	240	315	A 360	A	A	A	A	A	405	A	360	300	200					
17						A	265	315	360	385	400	415	420	410	385	390	360	305	200					
18						A	A	A	355	380	395	425	A	435	A 405	390	350	A 290	B					
19						B	U A 250	305	350	A	A	R	R	420	405	380	360	A 280	A					
20						A	A	A	A	A	A	A	A	A	A	380	350	295	A					
21						175	U A 245	A	A	A	A	A	A	A	A	405	370	U A 305	A					
22						A	235	U A 320	360	385	A	A	A	A	A	A	A 355	305	A					
23						B	A 245	U A 315	A	A	B	B	A	A	415	405	350	285	B					
24						B	255	310	350	U A 400	395	A 410	A 410	425	410	395	345	285	B					
25						A	U A 215	290	325	A	A	A	A	A	A	A	340	A	A					
26						B	235	300	340	A	A	410	A	A	410	380	345	275	A					
27						160	220	300	330	A	395	A	A	405	400	370	335	U A 270	A					
28						B	U A 215	A	A 315	A	A	395	A 395	A 390	U A 375	370	A 295	A	A					
29						A	220	290	340	360	385	B	A	A	A	A	A	A	B					
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						7	27	27	25	17	14	12	13	15	18	18	23	23	5					
MED						175	250	315	345	380	395	410	405	410	405	380	345	295	200					
U Q						175	260	320	360	392	400	420	420	425	410	390	355	300	208					
L Q						160	240	300	338	365	395	A 395	400	390	385	370	340	285	200					

AUG. 1991 FOE (0.01MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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	J A 52	J A 49	J A 54	J A 30	J A 23	23	G 26	40	60	54	J A 60	44	51	43	40	40	37	J A 54	42	J A 75	J A 31	22	J A 20	J A 42
2	E B 14	31	J A 21	22	E B 18	21	G	40	49	J A 65	45	44	49	48	J A 49	41	G	37	24	J A 53	J A 90	J A 54	39	J A 52
3	J A 54	J A 36	24	35	J A 24	26	32	G	43	G	J A 69	55	47	E B 46	E B 44	40	J A 54	J A 54	51	J A 36	J A 75	J A 18	J A 83	J A 51
4	E B 13	E B 15	E B 14	21	J A 19	19	J A 35	J A 41	60	46	56	J A 55	63	J A 45	G 37	G 34	40	J A 66	43	J A 61	J A 36	J A 54	J A 84	J A 52
5	J A 27	32	J A 56	J A 49	32	20	33	J A 49	39	J A 48	45	59	J A 53	45	G	41	J A 54	J A 54	42	73	J A 33	E B 14	J A 38	J A 44
6	J A 46	J A 57	J A 40	J A 27	24	J A 22	29	40	J A 51	J A 50	43	40	G 37	G	E B 42	J A 42	40	J A 33	J A 39	J A 44	E B 13	J A 52	51	J A 54
7	J A 86	J A 44	J A 36	J A 36	J A 36	J A 26	G	J A 50	41	51	J A 52	73	78	J A 190	80	J A 56	35	G 29	24	J A 32	J A 30	J A 42	J A 28	J A 38
8	J A 21	E B 15	E B 17	E B 16	E B 13	G	G	33	39	39	51	43	G	42	J A 64	J A 86	J A 55	J A 54	J A 62	J A 54	60	33	J A 18	J A 51
9	J A 54	J A 29	J A 21	J A 53	J A 117	E B 18	31	J A 52	J A 102	J A 50	43	J A 55	45	J A 49	121	J A 98	J A 47	J A 51	J A 50	J A 47	J A 88	J A 101	J A 86	J A 88
10	J A 54	J A 86	J A 88	85	J A 52	J A 38	115	J A 54	J A 103	J A 70	J A 218	50	47	J A 84	41	40	36	J A 61	J A 52	J A 65	J A 27	21	J A 26	J A 25
11	J A 22	J A 20	J A 21	22	J A 23	26	J A 44	J A 41	70	78	J A 54	J A 63	J A 44	J A 51	G 33	J A 40	J A 44	53	53	J A 54	J A 50	J A 50	J A 54	J A 86
12	53	J A 42	J A 29	J A 32	J A 21	J A 21	29	J A 44	J A 54	J A 78	J A 97	J A 72	J A 55	J A 52	J A 51	J A 46	35	J A 54	50	J A 40	J A 131	J A 31	J A 88	J A 86
13	J A 90	J A 52	J A 26	J A 14	J A 20	26	J A 45	J A 44	46	J A 53	J A 51	47	J A 52	77	69	J A 42	J A 42	37	J A 34	42	J A 52	J A 57	J A 49	J A 22
14	J A 21	J A 33	J A 28	J A 55	J A 39	E B 14	J A 39	J A 47	J A 65	J A 82	J A 53	J A 66	J A 94	J A 144	J A 112	J A 119	J A 46	J A 91	24	J A 85	J A 27	J A 20	22	J A 29
15	J A 42	J A 26	J A 28	J A 44	J A 44	J A 24	G	J A 42	41	67	J A 66	J A 89	60	85	J A 55	J A 56	J A 51	34	J A 31	57	J A 48	J A 48	30	20
16	20	18	J A 22	25	25	J A 19	31	39	J A 71	J A 69	53	G	G	138	J A 50	J A 48	J A 138	J A 61	J A 54	J A 53	J A 58	J A 43	J A 36	J A 25
17	J A 32	25	J A 27	J A 26	J A 21	17	31	37	J A 53	J A 81	55	J A 55	49	47	J A 57	J A 75	J A 72	J A 51	42	J A 24	E B 13	J A 51	J A 55	J A 47
18	J A 34	J A 50	J A 64	J A 52	J A 36	42	J A 60	J A 75	J A 130	127	82	J A 57	J A 75	J A 89	43	J A 65	G 28	33	66	J A 54	J A 53	38	J A 26	J A 51
19	J A 27	25	J A 49	J A 52	J A 52	J A 51	G	38	43	54	J A 56	60	J A 65	J A 61	71	49	G	33	G 20	J A 23	22	22	J A 15	J A 21
20	J A 24	J A 23	J A 21	23	J A 22	J A 51	J A 89	J A 72	39	J A 48	50	G	46	G	46	46	40	J A 43	25	J A 19	J A 37	J A 26	E B 15	E B 16
21	E B 15	E B 16	E B 16	24	J A 26	J A 44	J A 47	J A 85	J A 50	J A 54	42	G 41	G 40	G	57	65	J A 86	60	47	J A 67	58	J A 73	J A 53	J A 52
22	E B 14	J A 24	J A 24	24	20	18	28	36	J A 55	J A 89	J A 101	J A 49	47	J A 45	J A 44	G	J A 50	J A 51	64	J A 69	110	40	J A 87	J A 37
23	J A 33	J A 24	J A 22	J A 22	J A 26	G 17	J A 38	44	J A 51	J A 51	J A 60	J A 53	46	61	J A 51	J A 58	J A 60	79	78	57	J A 31	J A 129	J A 65	J A 88
24	J A 51	J A 49	J A 27	J A 23	J A 26	J A 22	J A 38	J A 62	J A 67	J A 62	J A 72	J A 76	J A 67	J A 86	J A 68	74	J A 50	J A 58	76	71	J A 102	59	J A 51	J A 27
25	J A 24	E B 14	J A 19	21	J A 19	E B 19	J A 38	J A 85	J A 94	J A 49	B	E B 113	55	J A 75	46	51	51	J A 78	124	64	J A 72	J A 53	31	E B 13
26	E B 13	20	E B 13	19	J A 21	J A 18	G	35	39	45	J A 55	47	46	46	45	50	J A 61	J A 77	95	J A 42	32	J A 48	J A 76	J A 42
27	J A 49	J A 38	J A 30	J A 25	J A 20	18	27	J A 39	J A 60	J A 44	J A 54	J A 72	J A 54	J A 59	J A 51	J A 50	36	J A 39	J A 41	J A 36	J A 34	J A 28	E B 14	22
28	20	18	E B 13	22	E B 14	E B 16	27	J A 43	J A 52	J A 50	J A 47	G	J A 70	J A 85	G	G	40	J A 49	J A 47	34	J A 65	J A 51	43	J A 35
29	J A 23	J A 27	J A 22	J A 19	E B 13	25	26	J A 39	67	43	G 38	J A 48	45	43	50	J A 48	J A 67	J A 57	54	49	J A 53	J A 73	J A 37	J A 36
30	J A 25	J A 19	20	20	23	E B 14	27	J A 43	J A 53	J A 52	J A 54	J A 77	J A 66	J A 55	J A 54	39	J A 51	72	60	69	J A 53	J A 52	27	58
31	J A 22	J A 27	J A 17	E B 13	J A 22	21	30	35	43	J A 51	J A 46	E B 47	46	J A 44	38	J A 55	J A 51	J A 41	J A 25	J A 33	J A 35	J A 32	J A 62	J A 50
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A 27	J A 27	J A 24	J A 24	J A 23	21	31	J A 42	J A 53	J A 52	J A 54	54	49	J A 51	50	J A 48	J A 47	J A 54	47	J A 53	J A 50	J A 48	J A 39	J A 42
U Q	J A 51	J A 42	J A 30	J A 36	J A 32	J A 26	J A 38	J A 50	J A 67	J A 69	J A 60	J A 66	J A 63	J A 84	57	J A 58	J A 54	J A 61	60	J A 65	J A 65	54	J A 62	J A 52
L Q	E B 21	20	E B 20	21	20	18	G 26	39	43	48	47	44	46	45	42	40	37	39	34	J A 36	J A 31	28	J A 26	25

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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

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	31	19	20	E B 15	18	22	G	39	54	53	58	43	U Y 50	42	U Y 39	U Y 39	37	39	32	36	27	E B 13	15	32
2	E B 14	26	E B 13	E B 14	E B 18	20	G	38	47	45	44	44	44	U Y 47	47	41	G	G	24	23	43	32	24	20
3	29	23	E B 14	27	19	24	28	G	39	G	46	51	46	E B 46	E B 44	40	39	36	43	32	42	E B 13	16	23
4	E B 13	E B 15	E B 14	E B 14	E B 13	18	30	36	57	44	50	49	52	42	G 36	G 34	37	32	35	32	23	20	22	17
5	16	20	18	16	20	19	31	42	37	43	43	56	46	43	G	40	51	52	34	A A 73	29	E B 14	35	20
6	18	47	19	18	18	20	28	35	41	42	G 34	U Y 40	G 37	G	E B 42	39	G	31	31	17	E B 13	33	18	28
7	52	31	28	20	20	25	G	35	38	46	43	A A 73	A A 78	A A 190	70	45	35	G 23	24	27	16	32	21	27
8	E B 16	E B 15	E B 17	E B 16	E B 13	G	G	33	38	39	42	42	G	41	52	65	41	36	42	48	54	25	E B 13	E B 13
9	22	17	E B 14	18	43	E B 18	30	42	76	39	42	50	42	45	A A 121	42	36	31	43	36	40	18	49	19
10	43	36	53	A A 85	42	33	A A 115	43	39	41	A A 218	45	44	51	41	38	35	48	42	51	20	E B 13	22	21
11	17	15	16	E B 13	E B 13	18	34	39	62	70	48	50	43	50	G 32	37	37	40	44	31	28	37	27	46
12	32	31	18	18	17	17	27	36	45	75	81	45	47	42	45	45	34	51	39	32	A A 131	17	20	51
13	20	25	E B 15	E B 13	15	23	30	40	41	51	45	45	50	A A 77	56	40	35	35	32	33	24	34	20	20
14	E B 13	20	19	23	17	E B 14	33	35	44	49	44	46	A A 94	A A 144	78	68	36	63	22	35	20	E B 14	18	20
15	34	20	23	E B 13	25	18	G	38	39	61	64	83	60	78	51	54	48	32	26	48	45	38	27	E B 14
16	E B 15	E B 13	18	17	16	E B 13	29	38	63	67	52	G	G	A A 138	45	42	65	30	34	31	45	33	29	22
17	18	19	20	23	17	16	28	35	44	53	53	55	48	47	52	70	67	35	30	15	E B 13	20	21	16
18	29	42	31	35	31	30	55	54	A A 130	A A 127	70	56	49	71	42	41	G 26	32	61	36	21	27	E B 14	20
19	22	20	27	35	30	35	G	37	42	52	56	55	63	61	64	48	G	32	G 19	22	E B 12	E B 16	E B 14	19
20	23	23	17	E B 14	17	21	A A 89	56	38	42	49	G	44	G	45	43	38	39	23	18	25	21	E B 15	E B 16
21	E B 15	E B 16	E B 16	E B 15	19	32	36	64	44	51	42	U G 41	U G 40	G	53	61	65	36	41	63	50	34	17	21
22	E B 14	19	18	E B 14	E B 13	17	27	34	51	67	46	47	44	43	42	G	45	50	63	65	45	27	28	27
23	26	20	20	16	20	G 16	31	40	48	45	57	48	45	51	44	50	55	71	61	49	E B 14	A A 129	24	43
24	21	31	20	20	20	19	34	52	62	55	66	57	57	80	64	64	48	49	62	63	19	34	29	19
25	18	E B 14	E B 15	E B 14	E B 13	E B 19	33	59	92	47	B	E B 113	54	71	46	48	47	59	A A 124	47	43	29	20	E B 13
26	E B 13	E B 14	E B 13	E B 14	E B 14	E B 16	G	34	38	44	51	47	44	45	43	48	54	75	50	28	21	37	32	27
27	20	26	19	19	16	17	26	36	53	41	48	54	49	53	45	45	36	37	38	29	25	17	E B 14	E B 15
28	E B 15	15	E B 13	E B 15	E B 14	E B 16	27	39	49	46	42	G	60	79	G	G	39	45	42	26	49	30	28	19
29	17	19	18	16	E B 13	G	26	34	61	40	G 37	46	43	42	43	43	64	41	44	42	32	19	18	25
30	22	17	E B 14	E B 13	E B 14	E B 14	26	40	47	43	51	75	49	50	52	38	48	49	56	61	34	44	18	24
31	E B 13	18	E B 13	E B 13	19	18	28	33	39	40	43	E B 47	44	42	38	37	39	27	20	28	28	32	41	33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	18	20	18	16	17	18	28	38	45	46	48	47	46	47	45	42	39	37	39	33	28	27	21	20
U Q	26	26	20	20	20	22	33	42	57	53	56	55	52	71	52	48	48	49	44	48	43	34	28	27
L Q	E B 15	E B 16	E B 14	E B 14	E B 14	G	G 26	35	39	42	43	44	44	42	42	39	35	32	30	28	20	E B 17	E B 17	E B 19

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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

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	15	15	15	15	14	16	17	21	33	26	34	34	34	34	33	E S 33	22	15	16	15	14	13	12	14
2	14	12	13	14	18	13	17	27	18	24	28	32	31	40	35	25	18	18	16	13	14	13	13	13
3	15	13	14	13	13	14	15	20	21	22	28	33	26	46	44	21	19	15	13	13	14	13	13	12
4	13	15	14	14	13	15	17	17	39	29	35	34	33	27	24	22	21	18	18	14	14	13	13	14
5	14	13	13	13	12	14	17	15	17	20	33	34	40	32	37	24	18	14	14	14	14	14	14	13
6	15	14	13	13	15	14	17	16	18	34	25	26	31	30	42	22	17	17	16	15	13	14	14	14
7	14	14	12	13	13	13	15	19	19	20	23	28	27	28	23	23	19	16	13	15	14	14	15	16
8	16	15	17	16	13	14	19	13	18	20	23	31	25	32	31	21	18	16	14	13	14	14	13	13
9	13	14	14	13	16	18	14	15	20	21	20	31	27	29	21	19	17	15	13	14	14	13	15	13
10	14	15	14	14	13	13	18	15	20	21	26	32	22	33	24	22	19	17	16	14	13	13	14	14
11	13	14	14	13	13	13	16	16	17	20	27	32	30	26	20	20	17	15	15	14	13	13	14	15
12	15	13	13	13	13	12	16	17	17	19	22	20	24	24	22	21	17	16	16	14	13	15	14	14
13	14	14	15	13	13	13	16	15	17	20	18	32	33	25	20	19	21	16	13	13	14	14	14	14
14	13	13	13	14	13	14	15	18	18	21	26	33	35	34	22	21	19	14	15	15	15	14	13	15
15	16	13	15	13	13	13	18	17	18	21	26	27	36	35	33	22	19	16	15	16	14	14	13	14
16	15	13	13	15	13	13	15	17	21	34	43	38	29	34	26	23	21	17	14	13	13	13	14	14
17	14	13	13	13	13	13	17	19	19	23	36	28	24	32	21	22	18	15	18	14	13	14	14	14
18	16	13	14	13	13	13	17	17	20	22	28	24	33	30	23	20	17	16	13	13	13	13	14	14
19	15	15	13	14	14	14	18	16	19	22	24	25	36	34	34	33	22	18	16	15	12	16	14	14
20	14	13	13	14	14	13	21	19	21	23	34	30	34	34	23	22	17	16	16	15	15	14	15	16
21	15	16	16	15	14	15	17	16	18	23	29	36	26	32	34	22	19	18	17	16	18	15	15	16
22	14	15	13	14	13	13	15	16	22	21	34	32	33	31	25	31	17	17	16	13	14	14	14	12
23	15	13	13	13	15	13	17	22	29	31	35	35	37	35	31	21	18	20	17	15	14	13	13	13
24	13	13	13	13	13	13	18	17	21	25	34	34	28	29	22	22	18	15	14	16	14	14	14	13
25	13	14	15	14	13	19	17	19	21	23	B	113	48	38	35	35	22	16	17	17	15	13	15	13
26	13	14	13	14	14	16	18	16	18	31	31	34	33	34	30	26	20	17	15	13	15	15	15	14
27	15	15	14	15	15	13	18	20	21	32	34	32	31	30	27	21	18	18	17	14	14	14	14	15
28	15	13	13	15	14	16	17	17	19	23	21	24	25	27	31	22	19	18	16	13	15	14	13	13
29	14	13	13	14	13	13	14	18	21	22	32	26	31	26	25	18	19	15	14	16	14	13	14	15
30	14	13	14	13	14	14	15	17	18	22	33	34	34	30	28	21	18	17	14	17	14	15	13	13
31	13	14	13	13	14	12	15	15	17	20	25	47	35	26	28	21	18	14	16	15	13	15	16	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	14	14	13	14	13	13	17	17	19	22	28	32	31	32	27	22	18	16	16	14	14	14	14	14
U Q	15	15	14	14	14	14	18	19	21	25	34	34	34	34	33	23	19	17	16	15	14	14	14	15
L Q	13	13	13	13	13	13	15	16	18	21	25	28	27	28	23	21	18	15	14	13	13	13	13	13

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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

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	265	275	270	270	270	290	290	285	275	265	275	R 275	255	260	265	265	300	270	280	275	260	250	250	245
2	260	S 265	255	235	235	230	245	285	240	R 235	240	265	R 270	260	255	265	265	245	255	260	255	240	245	250
3	255	230	240	255	235	225	240	240	260	225	245	255	G	U R 210	215	240	245	235	270	265	250	250	V 245	240
4	225	250	250	250	255	255	250	255	245	250	260	265	J R 260	265	270	265	280	275	270	300	255	240	F 255	250
5	250	255	240	245	245	230	245	255	255	G	H 345	280	290	275	265	285	285	285	290	A	255	S 245	U S 255	255
6	260	255	275	255	255	255	260	280	280	250	245	250	270	270	280	270	280	295	290	275	245	245	265	245
7	255	250	265	270	255	250	240	265	260	260	260	A	A	A	A 280	270	285	290	295	280	250	260	260	270
8	275	270	275	275	265	275	265	255	270	245	235	240	J R 250	R 250	260	A 280	295	290	280	265	265	260	260	250
9	270	270	F 260	F 260	280	F 260	290	320	285	285	275	285	280	285	A	270	280	295	305	305	260	245	260	260
10	F 260	F 275	270	A	F 260	255	A	255	255	230	A	240	235	255	265	285	285	290	285	270	270	255	265	260
11	255	265	270	F 265	F 265	F 270	275	280	305	290	275	275	275	280	290	280	290	300	280	290	285	250	J S 255	F 265
12	F 275	250	255	270	285	290	285	300	290	315	A 295	290	290	280	285	280	275	280	285	305	A	F 260	J R 270	270
13	F 250	F 240	285	300	245	240	260	250	240	250	260	J R 270	255	A	275	280	280	295	295	285	270	F 255	250	260
14	275	275	280	265	265	265	310	325	335	315	260	275	A	A	A	285	290	295	305	285	270	270	270	265
15	265	265	270	275	270	275	315	315	295	F 245	255	280	260	260	270	260	265	275	285	270	270	260	250	260
16	270	265	250	265	270	285	300	290	280	285	280	R 270	270	A	270	275	285	280	275	265	255	V 255	255	265
17	260	265	255	280	250	260	310	320	320	270	275	265	280	265	270	270	270	280	295	290	250	245	260	V 275
18	290	265	255	260	260	275	280	280	A	A	260	275	250	265	280	270	280	280	290	280	240	245	270	265
19	255	265	255	R 245	245	265	310	280	275	285	275	255	250	260	265	270	260	245	265	270	260	220	255	260
20	245	265	255	240	255	275	A	275	295	H 280	275	290	295	285	280	280	275	295	290	270	240	R 260	250	245
21	250	250	255	240	Z 255	F 240	F 270	F 295	F 275	265	265	H 260	265	270	270	265	275	275	275	290	R 250	250	245	260
22	255	250	255	245	245	260	305	330	305	275	275	265	265	245	260	265	255	255	270	275	S 280	250	240	245
23	245	250	265	255	265	265	305	Z 310	270	260	255	255	255	260	255	255	265	275	290	285	250	A	250	F 260
24	270	255	260	255	260	280	290	300	265	260	260	260	260	255	255	260	270	275	280	275	255	250	260	265
25	260	255	260	255	255	265	305	315	A	265	B	B 260	R 250	250	255	260	265	270	A	280	250	255	255	255
26	255	255	245	250	265	285	310	300	290	275	265	265	255	250	255	260	270	285	290	275	245	250	245	255
27	280	270	260	255	255	270	320	295	290	J R 265	275	255	250	260	255	270	265	275	280	280	260	250	265	265
28	265	270	270	235	210	215	285	290	260	275	275	265	270	270	270	280	290	290	285	280	245	245	250	255
29	255	265	255	245	250	F 235	250	260	280	R	255	260	295	280	285	285	290	290	290	270	260	245	250	255
30	245	255	260	255	260	270	305	290	295	285	275	275	J R 285	265	265	275	275	285	290	295	275	260	265	V 245
31	J R 240	235	275	240	240	220	225	240	230	270	285	U R 295	285	275	285	280	290	300	285	270	260	255	245	245
	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	29	31	29	29	29	30	29	27	29	31	31	31	30	30	30	30	31	31
MED	260	265	260	255	255	265	285	285	275	265	265	265	265	265	270	270	280	280	285	278	255	250	255	260
U Q	270	265	270	265	265	275	305	300	292	282	275	275	280	275	280	280	285	290	290	285	265	255	260	265
L Q	250	250	255	245	245	240	255	260	260	250	258	260	252	255	258	265	265	275	280	270	250	245	250	250

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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							L	L		A 330	L	R 340	L	H 335	H 325	325	L 355	L	L					
2						285	320	330	370	370	H 405	370	350	R 315	345	340	L 315	305	L 295					
3						L 275	315	325	380	370	350	A	370	370	370	350	340	335	A					
4						L	L	U L 325	R	375	325	315	A	365	340	L 330	315	L 320	A					
5						L	A 305	310	350	375	430	A	375	H 340	360	L 340	A	A						
6							L	L	U L 340	U L 295	L	355	H 360	L 320	375	L 335	L	L						
7							310	320	365	A 350	390	A	A	A	A	A 325	L 330	U L 335	L					
8							L	345	390	H 380	R 335	385	390	365	A	A	L 340	U L 360	A					
9							L		A	U L 345	U L 335	L	335	L 340	A	L 315	L 340	L						
10							A	A	370	375	A	A 350	350	A	370	355	340	A	A					
11						L	L	L 365	A	A	L	A 325	385	A	365	340	L 335	L	A					
12							L	L	L	A	A	L 350	L 340	L 350	355	U L 335	L 320	A						
13						U L 280	L 305	A 315	A 335	A	A 340	370	A	A	A	345	L 330	U L 330						
14							L	L	L	L	340	385	A	A	A	A	L 330	A	L					
15							L	L	L	L 310	A	A	A	A	A	A	L	L						
16									A	A	A	335	U L 325	A	340	U L 310	A	L						
17							L	L	L	Y	L	L	345	L	L 330	A	A	L						
18								A	A	A	A	L	325	A	H 350	L 330	U L 330	L	A					
19								L	L	L	U L 325	335	A	L	L	L	L 350	U L 295	L					
20							A	A	L 325	H 355		365	340	350	L 325	L		L						
21						A	L	A	350	L	U L 320	L	350	H 335	L 325	A	A	L						
22							L	L		A	L	350	355	335	U L 300	310	U L 310	A	A					
23							L	L		L	L 320	U L 310	U L 305	320	L 335	U L 315	L	A	A					
24									A	U L 340	A	L 320	L	A	A	A	U L 320	A	A					
25									A	L	B	B	R 320	A	320	330	U L 325	A	A					
26									L	L		L	355	U L 285	330	L 315	A	A						
27								L		L	L	U L 315	305	310	310	320	L							
28						L 245	L	L	330	335	L	H 340	A	A	U L 325	U L 325	L							
29						U L 280	U L 310	350	A	H 345	365	L	L 325	L	U L 325	U L 335	A							
30							L		L	L	L	A	U L 335	U L 325	L 330	L	L	A						
31						L	290	320	330	305	U L 335	L 335	L 355	L 325	L 315	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						5	7	10	12	16	14	19	22	17	23	21	17	7	1					
MED						L 280	310	325	350	348	338	340	348	335	330	L 330	L 330	U L 330	L 295					
U Q						282	315	345	370	372	365	365	355	350	355	340	L 340	U L 335						
L Q						L 260	305	A 320	332	332	L 325	L 325	325	320	325	L 318	L 320	305						

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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							275	260		345	320	375	395	390	355	360	355	330	300					
2						445	435	350	540	570	560	460	410	Y	495	420	390	460	380					
3						435	405	430	425	575	515	505	G	755	710	565	520	540	A 380					
4						350	390	330	Y	435	400	390	415	415	405	L 380	375	335	310					
5						L 520	475	415	505	G	H 290	415	370	395	405	365	330	A 315						
6							L 330	320	310	410	L 410	410	350	335	355	370	345	295						
7							420	365	435	450	440	A	A	A	A	375	330	315	285					
8							L 380	425	400	535	565	565	515	510	460	R A 420	345	315	A 305					
9							310		E A 370	315	L 340	315	340	325	A	340	315	290						
10							A	385	515	565	A	585	600	510	460	410	385	A 380	A					
11						360	355	290	280	A 315	300	380	355	335	345	365	320	300	300					
12							L 270	260	300	E A 270	A	320	325	325	325	335	345	310						
13						435	390	455	505	445	440	465	490	A	A 440	410	365	340						
14							300	265	260	275	425	380	A	A	A	A 360	325	A 320	260					
15							280	255	300	460	A 345	360	360	E A 390	360	365	350	310						
16									E A 360	350	340	370	350	A	360	340	300	315						
17							270	265	250	E Y 415	335	355	335	360	360	365	A 330	300						
18								280	A	A	390	350	420	390	350	360	350	305	305					
19								285	L 285	275	365	420	420	385	350	L 310	375	405	310					
20							A	A 330	320	300		330	325	355	355	335		290						
21						A 435	340	315	370	L 390	L 400	435	405	385	370	375	330	310						
22							270	255		A 365	365	385	390	455	385	375	385	A 350	A 325					
23							280	255		340	375	385	385	380	375	360	350	A 330	A 300					
24									A 280	365	A 350	360	375	E A 390	395	355	350	A 300	A					
25									A	300	B	B	375	390	370	360	325	320	A					
26									235	H 250		370	385	385	385	370	335	A						
27								230		U L 315	310	355	385	360	365	335	305							
28						540	325	260	Y 435	350	H 270	400	385	A	360	350	320							
29						415	L 385	395	A 415	605	485	L 440	355	L 380	350	340	A 335							
30							260		275	265	325	330	330	360	360	320	L 320	295						
31						L 485	520	475	500	380	320	370	345	340	340	330	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						10	22	25	24	30	26	29	29	25	28	31	30	26	12					
MED						435	335	315	U 352	362	365	380	385	382	362	360	340	315	305					
U Q						L 485	390	390	435	450	425	428	412	392	400	375	355	335	318					
L Q						415	280	260	282	315	325	358	350	358	355	340	325	300	300					

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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

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	345	300	280	285	285	265	245	240	A 260	A	A	215	A	H 215	H 220	240	245	270	280	285	300	310	320	A 365
2	315	325	300	350	380	330	280	265	A 270	A 245	205	245	H 230	Y 275	H 260	240	250	255	290	300	A 340	A 380	370	330
3	360	370	330	340	340	355	265	255	220	215	H 235	A	230	235	230	240	240	260	A	A 325	A	315	350	375
4	380	330	290	340	320	310	250	240	A	215	E A 295	275	A	215	H 225	225	230	250	A	265	A 300	350	355	350
5	340	335	350	335	270	315	A 300	A	235	230	200	A	230	H 225	230	230	A	A	A 275	A	A 340	335	A 370	330
6	310	A	310	330	330	300	250	235	240	240	210	210	H 185	230	240	225	250	240	275	285	325	A 380	300	340
7	E A 410	A 380	300	285	350	325	270	A 270	240	A	215	A	A	A	A	A	220	240	275	A 280	300	360	330	335
8	305	295	270	275	305	290	245	235	220	H 210	H 250	210	210	230	A	A	A 270	A 260	A	A	A	325	305	320
9	330	300	315	300	E A 360	280	250	245	A	H 210	210	E A 280	H 205	A 250	A	255	235	260	265	260	A 305	355	A 365	335
10	A 355	A 325	A	A	A	370	A	A	245	220	A	E A 280	A 260	A	H 220	230	230	A	A	A	305	275	330	320
11	335	305	300	320	305	295	A 270	A 260	A	A	A	A	210	A	210	245	245	A	A	275	260	A 330	330	A
12	A 340	A 370	330	310	280	265	250	A 250	A 265	A	A	225	E A 270	225	A 240	A	240	A	E A 290	250	A	275	305	E A 310
13	330	A 405	315	260	H 255	A 380	E A 290	A	A	A	A	240	A	A	A	245	240	A 270	A 290	A 300	310	E A 400	355	340
14	305	290	300	340	325	310	A 255	245	A	A	210	205	A	A	A	A	235	A	260	A 275	280	290	290	310
15	340	295	300	270	320	300	255	240	230	A	A	A	A	A	A	A	A	A 255	275	A 305	A 315	A 340	340	305
16	285	290	340	310	295	290	255	245	A	A	A	250	240	A	240	260	A	240	260	A 310	A 355	A 350	350	320
17	315	295	335	275	330	315	255	230	240	250	E A 270	E A 270	250	255	A 280	A	A	A 255	270	255	270	340	325	290
18	275	A 320	A 340	E A 370	360	300	A 275	A	A	A	A	A	A 255	A	H 215	240	H 235	250	A	280	305	355	295	305
19	A 315	300	320	E A 370	A 365	A 325	245	240	225	A 250	A 255	E A 270	A	A	A	A 255	H 215	260	290	270	230	360	335	300
20	350	315	275	315	295	300	A	A	230	205	H 260	225	210	H 230	230	H 245	H 245	270	260	285	360	350	330	325
21	305	280	265	315	355	A	E A 305	A	235	E A 280	205	H 200	225	H 210	E A 290	A	A	A 255	A 290	A	A	A 350	345	340
22	315	330	315	310	325	290	265	240	A 270	A	235	230	210	240	245	240	A 265	A	A	A	A	A 345	A 365	345
23	355	335	270	315	305	310	265	235	240	225	E A 280	A 260	245	A 255	240	A	A	A	A	A 275	250	A	A 330	A 350
24	275	330	300	320	310	285	255	A 270	A	A 270	A	A	A	A	A	A	A 275	A	A	A	285	335	310	300
25	285	295	305	305	320	310	255	A 260	A	A 230	B	B	A	A	255	260	A 270	A	A	A 290	A 320	A 305	300	290
26	300	320	330	320	300	280	240	230	220	220	H 255	260	220	250	235	A 270	A	A	E A 280	265	290	A 340	375	350
27	300	300	310	335	305	305	250	235	E A 245	215	A 250	A 265	E A 245	A	E A 250	255	245	265	280	275	285	285	295	295
28	290	285	280	350	465	335	260	A	250	A 250	230	H 210	A	A	H 230	250	255	E A 290	E A 290	270	A	E A 350	360	335
29	330	300	310	305	335	345	265	250	A	H 200	215	235	225	225	235	A 260	A	285	A 280	A 310	310	320	350	335
30	340	330	315	300	305	270	255	240	A 250	230	A 260	A	A 265	255	A 275	250	E A 280	A	A 285	A 290	A 295	A 325	290	335
31	365	360	290	270	385	385	275	255	A 275	240	230	240	235	220	220	250	260	260	285	285	300	A 360	A 380	360
	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	30	30	30	30	29	24	21	21	21	22	21	18	23	22	23	20	21	25	25	30	31	30
MED	322	318	308	312	320	308	255	242	240	228	225	232	228	230	232	245	245	259	278	280	300	339	330	332
U Q	345	330	320	335	350	325	A 270	A 255	A 255	A 248	A 258	E A 265	A 248	250	A 250	255	A 260	268	A 290	A 295	A 318	355	355	340
L Q	305	295	290	300	305	290	250	238	230	215	210	215	210	225	H 225	240	235	252	272	270	285	320	305	310

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

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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

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 110		A	A	A 115	A	A	A	A	A	A	120	110	120					
2						130	120	120	115	110	115	120	120	135	125	120	120	120	A					
3						B 140	115	115	115	115	115	120	110	B	B	120	115	115	120					
4						B	115	115	B	115	A	A	A	A	A 120	E A 130	115	115	A					
5						B 140	120	115	110	110	120	B 120	A	A	B 120	115	115	115	A					
6						A	120	115	115	A	A 130	A	A 125	110	B	115	115	A	A					
7						A	115	115	110	110	120	115	115	A	A	A	A	A 125	A					
8						155	120	A 120	110	110	115	115	110	125	A	115	A	A	A					
9						B	A	115	115	115	110	120	A	A	A	A	A	A 125	A					
10						A	120	110	110	110	115	A	110	B 125	115	115	110	115	A					
11						A	A	110	110	110	A	A	A	A	A 120	A	A	A	A					
12						A	120	115	110	110	A	A	A	A	A	A	110	115	A					
13						B	120	115	115	115	115	120	B 125	A 120	115	115	A	A	A 125					
14						B	120	A 120	110	110	115	A	B 120	B 115	115	A	A	A	A					
15						A	125	110	110	110	115	E A 140	125	125	125	115	115	115	A					
16						E B 155	125	115	110	B 125	B	130	115	120	120	110	A	A	A					
17						A	120	120	110	110	120	110	110	E A 135	110	110	110	120	A					
18						A	120	115	115	115	A	110	A	A	A 125	A	A 120	115	105					
19						A	115	A 120	A	A 125	E A 125	110	B 125	B 120	B 120	B 120	115	115	A 130					
20						A	A	A	A 115	110	B 115	115	115	115	A	110	115	115	B					
21						B	120	110	110	110	110	A	A	115	B 120	110	110	115	A					
22						A	120	110	110	110	A	B 120	A	A	A	120	110	110	A					
23						120	120	A	A	A	A	A	A	A	A	115	115	120	A					
24						A	B 130	115	110	115	B 125	A	A		A	120	115	115	A					
25						B	120	110	A	A	B	B	A	A	110	120	115	110	B					
26						B	125	A 115	A 120	115	115	120	115	120	120	115	110	115	B					
27						A	120	115	110	A	A	A	A	A	A	A	A	A	A					
28						B	120	110	110	A	110	110	A	A	125	115	115	115	A					
29						125	120	110	110	A	E A 140	A	A	A	A 130	115	110	120	A					
30						B	120	115	A 120	110	B 130	B 120	B 130	120	120	115	115	A	A					
31						A	125	115	110	115	120	B	A	A	A	A	A	A	B					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						7	28	28	26	25	21	17	15	14	18	22	22	22	5					
MED						135	120	115	110	110	115	120	115	120	120	115	115	115	120					
U 0						155	120	115	115	115	122	B 120	B 125	125	125	120	115	120	A 128					
L 0						125	120	110	110	110	115	112	110	115	115	115	110	115	112					

AUG. 1991 H'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION KOKUBUNJI

AUG. 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	110	110	110	135	110	115	125	125	120	115	115	110	105	105	110	110	145	120	115	110	110	110	110	105
2	B	105	110	115	B	155	G	135	120	110	135	130	125	140	130	150	G	130	155	110	110	110	110	110
3	110	110	130	120	120	120	135	G	120	G	115	120	125	B	B	160	130	120	110	110	110	115	110	105
4	B	B	B	110	115	130	130	120	115	110	110	105	105	105	105	115	130	110	115	105	105	110	110	110
5	110	110	105	110	110	140	130	120	135	120	120	115	115	115	G	E G 160	125	120	115	110	110	B	105	105
6	105	100	100	100	100	130	130	120	115	110	110	110	110	G	B	120	120	115	110	110	B	110	110	110
7	110	105	105	115	105	110	G	115	140	125	120	110	110	115	110	105	E G 160	110	125	120	110	100	115	105
8	105	B	B	B	B	G	G	140	120	130	110	120	G	140	110	115	115	115	110	110	110	110	110	130
9	115	110	105	110	110	B	120	125	110	120	120	110	110	110	100	120	110	120	110	110	110	115	110	105
10	110	110	105	100	100	120	115	110	110	110	110	120	120	115	125	140	140	115	110	105	105	105	100	95
11	100	100	100	105	115	110	110	115	105	105	110	100	105	100	100	110	110	110	105	105	105	105	105	115
12	110	110	115	105	100	110	140	130	110	110	105	105	100	105	105	105	115	120	115	110	110	135	120	110
13	125	110	110	140	130	125	105	120	120	115	120	125	120	115	110	115	135	140	120	115	120	115	110	110
14	120	110	110	110	110	B	125	145	115	115	120	115	110	110	110	110	105	100	110	110	110	120	100	110
15	110	110	110	110	110	110	G	125	130	120	120	120	125	120	120	115	115	130	125	110	110	110	110	105
16	105	105	105	105	110	115	160	135	115	110	120	G	G	115	120	110	115	110	100	100	95	100	100	100
17	110	110	110	110	110	120	150	145	125	120	115	115	115	160	145	130	120	120	120	120	B	115	115	120
18	105	115	115	110	110	120	120	115	110	110	110	110	105	100	155	100	110	155	120	130	110	110	110	110
19	105	110	105	105	110	105	G	130	120	115	115	115	115	110	110	115	G	135	120	105	110	110	110	125
20	120	120	120	125	120	115	110	105	125	115	110	G	120	G	135	130	135	110	115	115	110	115	B	B
21	B	B	B	125	120	115	115	110	110	110	110	105	115	G	140	125	120	110	110	105	105	105	105	105
22	B	105	105	105	110	130	120	115	110	105	105	110	110	100	110	G	130	115	110	110	110	110	105	105
23	100	95	105	105	105	110	120	115	110	115	110	115	115	110	110	130	125	120	115	110	125	110	105	105
24	110	105	105	105	105	105	120	115	115	115	110	110	110	110	110	115	115	115	110	110	110	110	110	110
25	105	B	105	100	110	B	115	110	105	110	B	B	110	105	120	140	125	120	115	110	110	110	110	B
26	B	110	B	110	110	120	G	130	125	120	115	130	125	190	160	135	125	115	110	110	110	105	105	105
27	105	105	105	100	105	120	120	115	105	110	105	105	105	105	105	105	160	100	100	100	100	100	B	100
28	100	100	B	130	B	B	125	115	110	110	110	G	105	105	G	G	140	115	110	110	105	105	105	105
29	105	105	100	105	B	135	135	120	110	115	110	110	110	E G 175	130	130	115	115	110	110	110	110	110	110
30	105	105	105	100	120	B	120	115	110	110	110	110	115	120	115	135	110	110	110	110	110	110	110	110
31	110	105	110	B	130	140	130	120	120	120	120	B	115	110	115	110	110	110	110	105	115	110	110	110
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	26	29	27	25	25	30	31	30	30	26	29	27	27	29	29	31	31	31	29	30	29	29
MED	110	110	105	110	110	120	120	120	115	115	110	110	110	110	110	115	120	115	110	110	110	110	110	110
U Q	110	110	110	115	115	130	130	130	120	120	120	120	118	120	130	132	132	120	115	110	110	110	110	110
L Q	105	105	105	105	105	110	118	115	110	110	110	110	108	105	110	110	115	110	110	105	108	105	105	105

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

IONOSPHERIC DATA STATION KOKUBUNJI

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

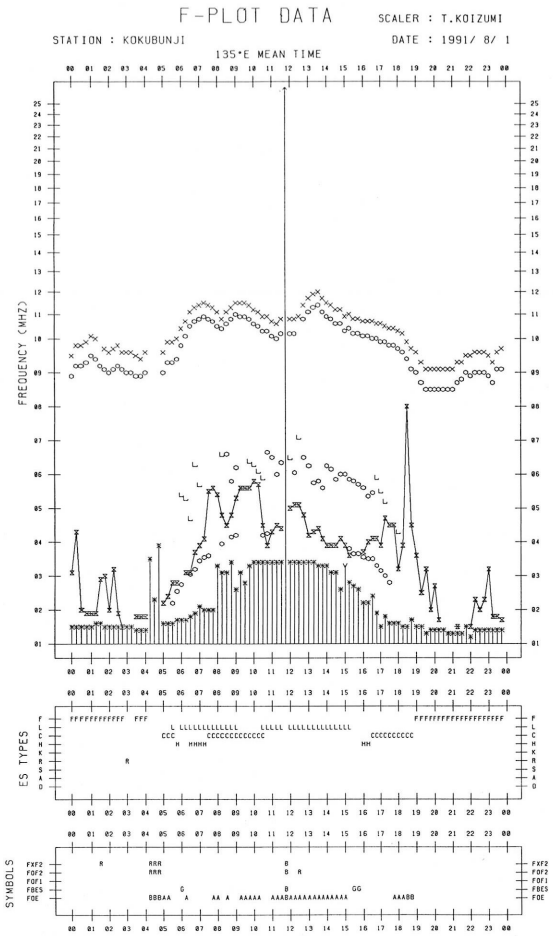
LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

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 3	F 2	F 2	R 1	F 4	C 1	L 2	HL 22	CL 21	CL 21	C 2	L 1	L 1	L 1	L 1	L 1	H 1	C 3	C 4	F 4	F 3	F 1	F 2	F 4
2		F 4	F 2	F 1		H 1		H 1	H 2	C 2	H 1	C 1	H 1	H 1	H 1	H 1		C 1	HL 11	F 2	F 3	F 4	F 4	F 3
3	F 3	F 4	F 2	F 5	F 3	C 3	H 2		C 1		C 1	C 2	C 1			H 1	H 2	C 3	C 3	F 3	F 4	F 2	F 3	F 4
4				F 1	F 1	C 1	C 1	C 2	C 1	C 1	C 2	C 2	L 2	L 1	L 1	L 1	H 1	C 2	C 3	F 3	F 4	F 3	F 3	F 3
5	F 2	F 2	F 4	F 3	F 3	C 2	H 2	C 3	H 1	C 2	C 1	C 2	C 1	C 1		H 1	H 2	C 4	C 3	F 5	F 7		F 4	F 3
6	F 3	F 4	F 3	F 2	F 2	C 1	H 1	C 1	C 2	C 2	L 1	L 1	L 1			C 1	C 1	L 2	L 2	F 2		F 3	F 3	F 4
7	F 4	F 4	F 4	FF 13	F 3	L 2		LH 11	HC 11	HC 21	C 1	C 2	C 3	CL 13	L 2	L 2	HL 12	L 2	CL 11	FF 32	FF 21	F 3	FF 22	FF 22
8	F 1							HL 12	H 1	H 1	C 1	C 1		H 1	C 2	C 3	C 2	C 2	C 3	F 5	F 5	F 5	F 2	FF 22
9	F 4	F 2	F 2	FF 22	F 5		L 2	CL 31	C 4	C 1	C 1	C 2	C 2	C 2	L 4	CL 12	L 2	CL 22	CL 32	F 5	F 3	FF 13	F 4	F 3
10	F 5	FF 14	F 5	F 5	F 6	C 3	C 4	C 3	C 2	C 2	CL 32	CH 11	C 1	C 2	H 1	H 1	H 1	C 4	C 3	F 4	F 3	F 1	F 3	F 3
11	F 2	F 2	F 2	F 1	F 1	LC 11	C 3	C 3	C 3	C 3	C 2	L 2	L 2	L 2	L 1	L 1	C 2	C 4	L 4	F 4	F 4	F 4	F 4	FF 14
12	F 4	F 4	FF 22	F 2	F 2	L 2	H 2	HL 21	C 3	C 3	L 3	L 2	L 3	L 2	L 2	L 2	C 2	C 3	C 3	F 5	FF 43	FF 12	FF 12	F 4
13	FF 12	F 4	F 1	F 1	FF 21	C 3	LC 12	C 2	C 2	C 2	C 2	C 1	C 1	CL 21	C 3	C 2	HC 12	HL 22	CL 41	F 4	F 2	F 5	FF 13	F 3
14	F 1	F 3	F 3	F 3	F 3		C 2	HL 11	C 2	C 2	H 1	C 2	C 2	C 2	C 3	C 3	L 2	L 3	LC 22	FF 22	F 3	F 2	F 2	FF 21
15	F 3	F 3	F 3	F 2	F 3	L 2		H 2	H 1	H 2	H 2	CL 21	C 2	C 2	C 2	C 2	C 4	C 2	C 2	F 4	F 5	F 5	F 3	F 1
16	F 2	F 1	F 2	F 2	F 2	L 1	H 1	H 2	C 3	C 2	C 1			C 2	C 1	C 2	CL 23	L 3	L 2	F 4	F 4	F 3	F 4	F 2
17	F 2	F 2	F 5	F 4	F 2	L 1	H 1	H 1	H 2	C 2	C 2	C 2	C 1	HL 11	H 2	H 2	H 3	C 3	C 2	F 2		F 3	F 3	F 3
18	F 3	FF 34	FF 24	F 3	F 2	C 3	C 4	C 3	C 3	C 2	L 2	L 3	L 2	L 2	HL 11	L 2	L 1	H 1	H 4	FF 25	F 5	F 4	F 3	F 3
19	F 3	F 2	F 3	F 3	FF 24	L 3		HL 22	HL 11	CL 21	CL 21	C 2	C 2	C 2	C 2	C 2		H 1	L 1	F 2	F 1	F 2	F 2	F 2
20	F 3	F 4	F 4	FF 11	F 2	C 3	C 3	C 3	HL 11	C 1	C 1		C 1		HL 11	H 1	H 1	C 2	C 2	F 2	F 3	F 4		
21				F 2	F 3	C 5	C 2	C 3	C 2	C 3	C 1	L 1	L 1		H 1	H 3	C 3	C 3	C 4	F 4	F 3	F 3	F 3	F 3
22		F 2	F 2	F 2	F 1	C 1	C 2	C 2	C 3	C 3	C 2	C 2	C 1	L 2	CL 21		H 2	C 4	C 5	FF 62	F 3	F 4	F 3	F 3
23	F 2	F 2	F 2	F 2	F 2	L 1	C 2	CL 22	C 2	C 1	C 2	C 1	C 1	C 2	L 2	H 2	C 3	C 4	C 4	F 4	F 1	F 4	F 4	F 4
24	F 3	F 3	F 2	F 2	F 2	L 2	C 3	C 3	C 3	C 2	C 3	C 2	C 2	C 3	C 2	C 2	C 3	C 4	C 4	F 6	F 5	F 4	F 4	F 2
25	F 2		F 1	F 1	F 1		C 2	C 3	C 3	L 2			L 1	L 1	C 1	H 1	H 2	H 4	C 3	F 3	F 4	F 5	F 3	
26		F 1		F 1	F 2	C 1		HL 11	HL 11	C 1	C 2	C 1	C 1	H 1	H 1	H 1	H 3	C 3	C 3	F 4	F 4	F 5	F 4	F 4
27	F 2	F 3	F 2	F 2	F 1	C 2	C 2	C 2	C 3	C 1	L 2	L 2	C 2	L 2	L 1	L 2	HL 12	L 3	L 4	F 4	F 2	F 1		F 1
28	F 1	F 1		F 1			C 2	C 3	C 3	C 2	C 1		L 2	L 2			H 2	H 3	C 6	F 4	F 5	F 5	F 4	F 2
29	F 2	F 2	F 2	F 2		H 1	H 1	C 2	C 4	C 1	L 1	L 2	L 1	HL 11	HL 11	H 2	C 3	C 4	C 3	F 4	F 3	F 3	F 3	F 3
30	F 3	F 1	F 1	F 1	F 1		C 2	C 2	C 3	C 2	C 2	C 2	C 2	C 2	C 2	H 1	C 3	C 3	C 4	F 6	F 4	F 5	F 4	F 4
31	R 1	F 4	F 2		F 3	C 3	C 2	C 2	C 2	C 1	C 2		C 1	L 1	L 1	L 2	L 2	L 2	L 2	F 4	FF 24	F 4	F 4	F 3
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

AUG. 1991 TYPES OF ES COMMUNICATIONS RESEARCH LABORATORY, JAPAN

f-PLOTS OF IONOSPHERIC DATA

KEY OF F-PLOT	
I	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, Y	FMIN
∧	GREATER THAN
∨	LESS THAN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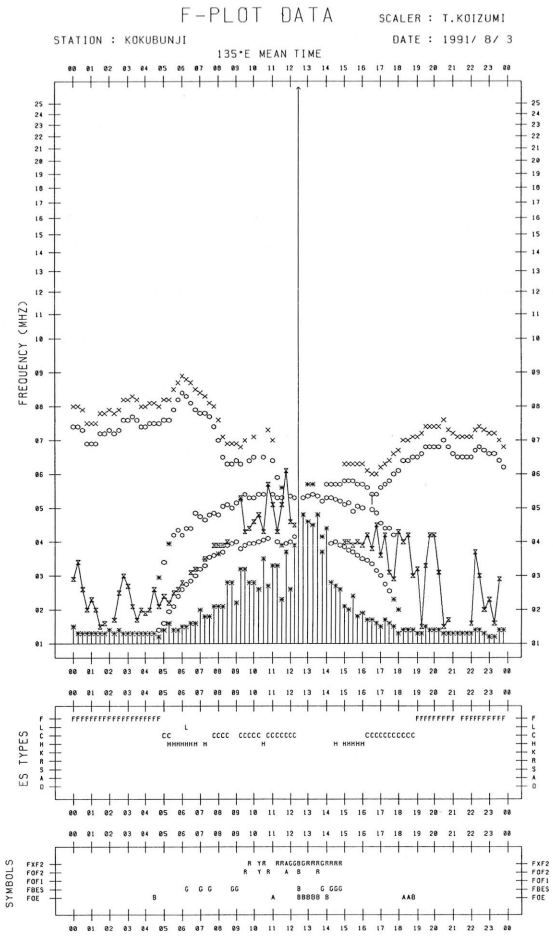
STATION : KOKUBUNJI
DATE : 1991/ 8/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1991/ 8/ 3
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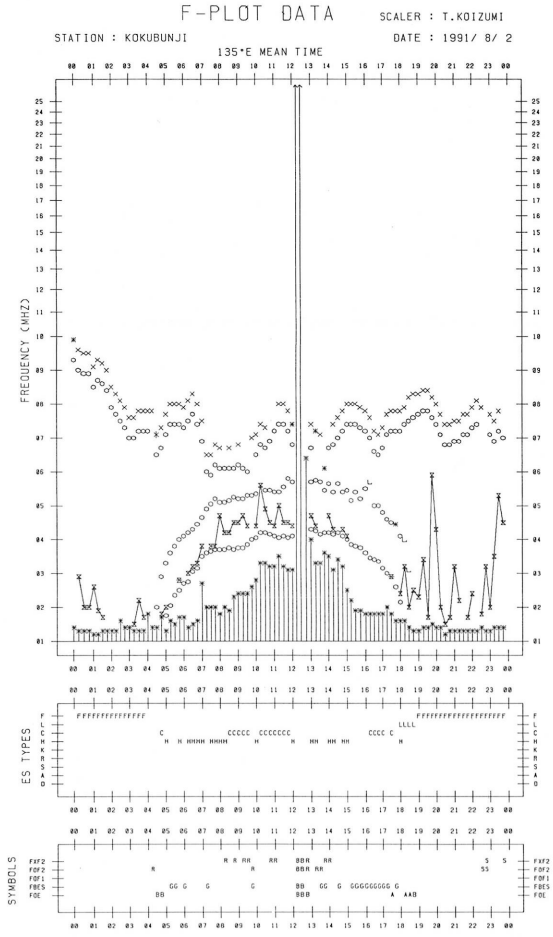
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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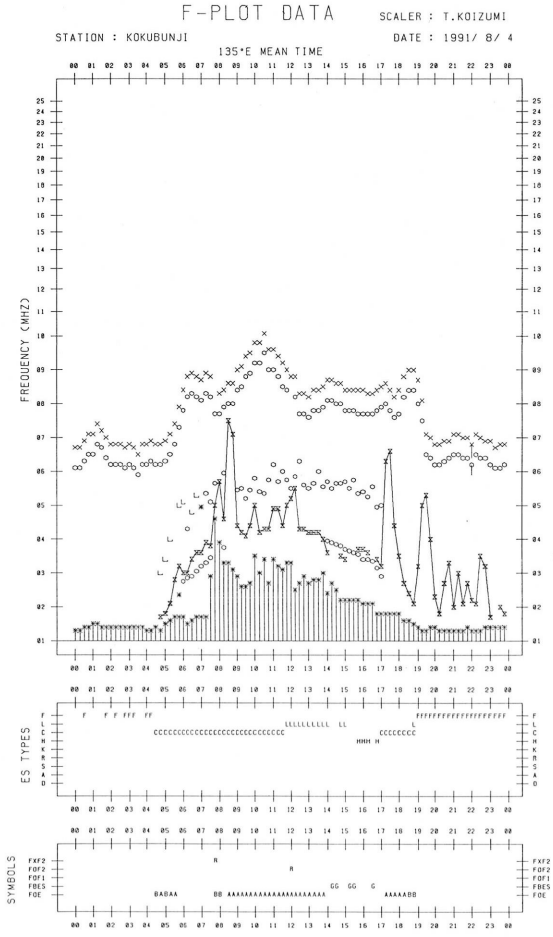
STATION : KOKUBUNJI
DATE : 1991/ 8/ 2
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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FREQUENCY (MHZ)
ES TYPES
SYMBOLS
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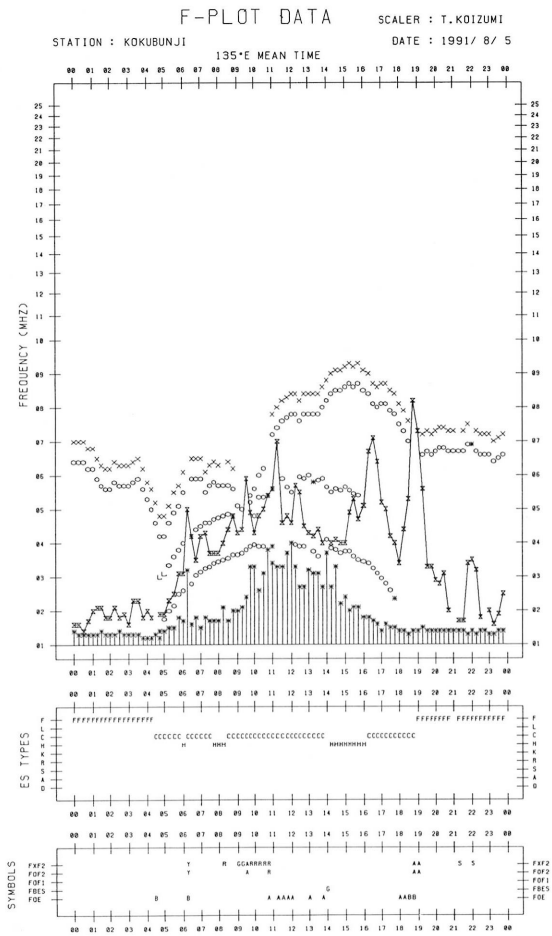
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1991/ 8/ 5
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FREQUENCY (MHZ)
ES TYPES
SYMBOLS
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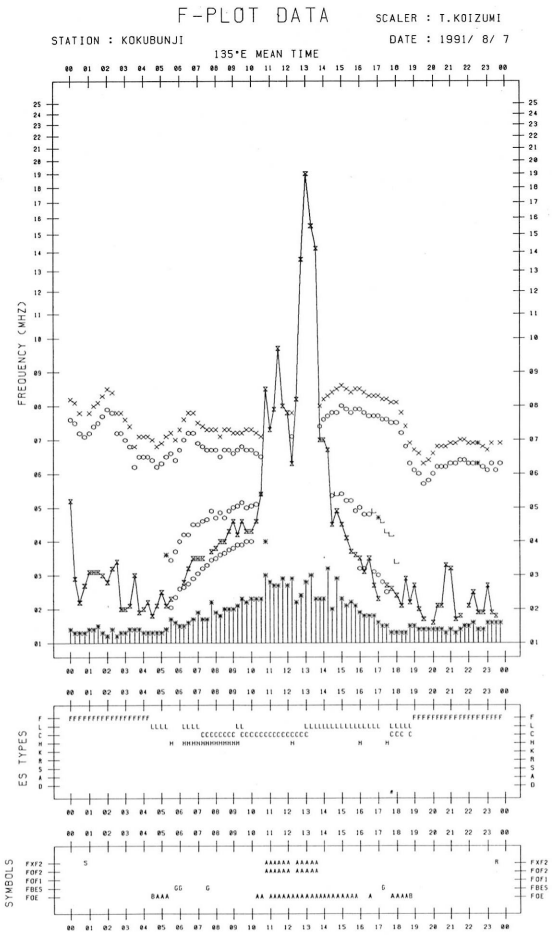
FOF2
FOF1
FBES
FOE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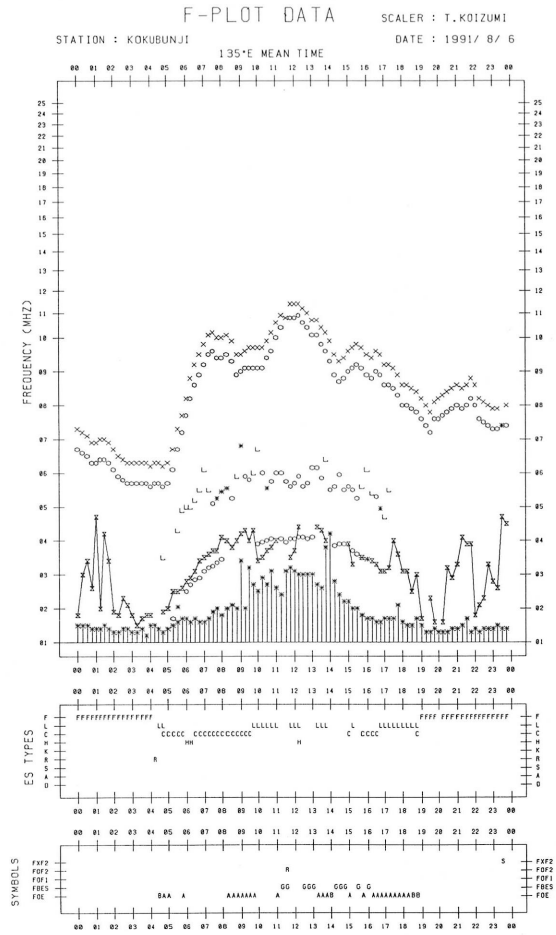
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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FREQUENCY (MHZ)
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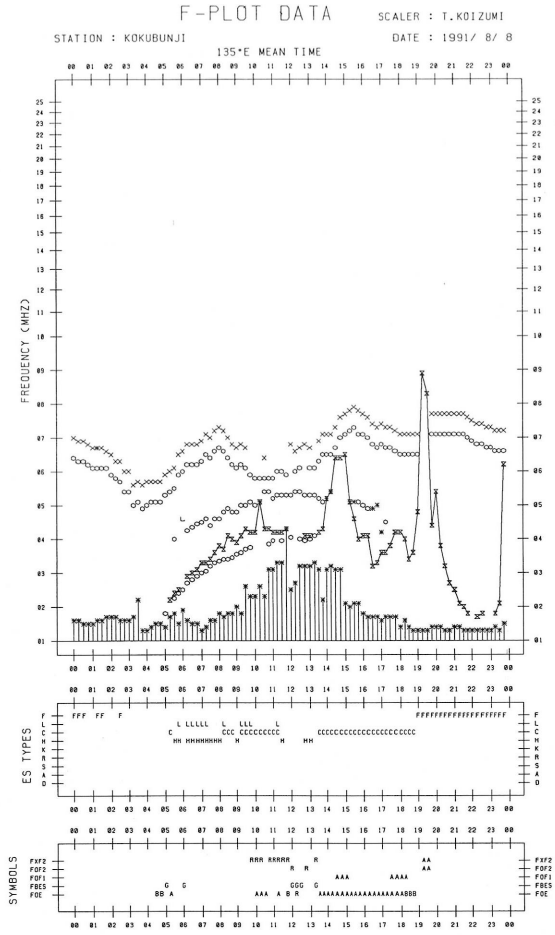
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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FREQUENCY (MHZ)
ES TYPES
SYMBOLS
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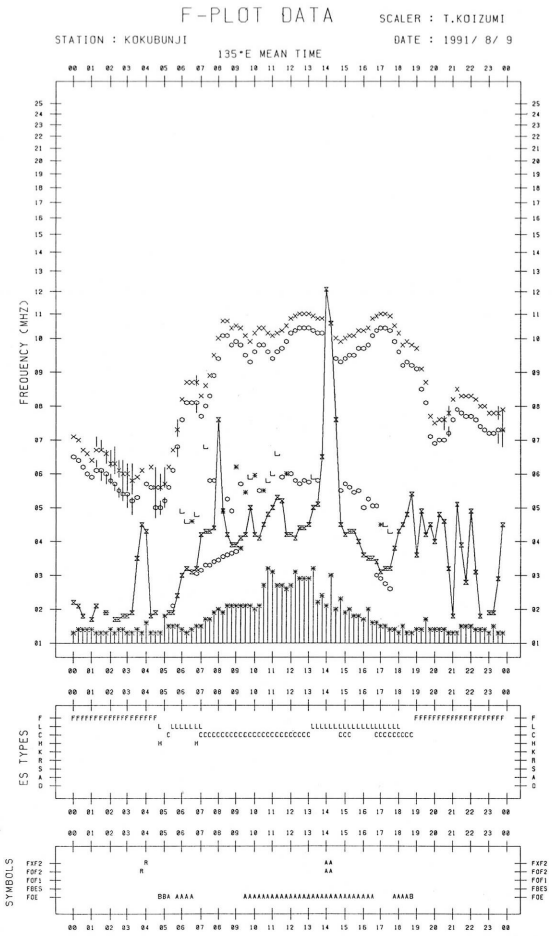
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
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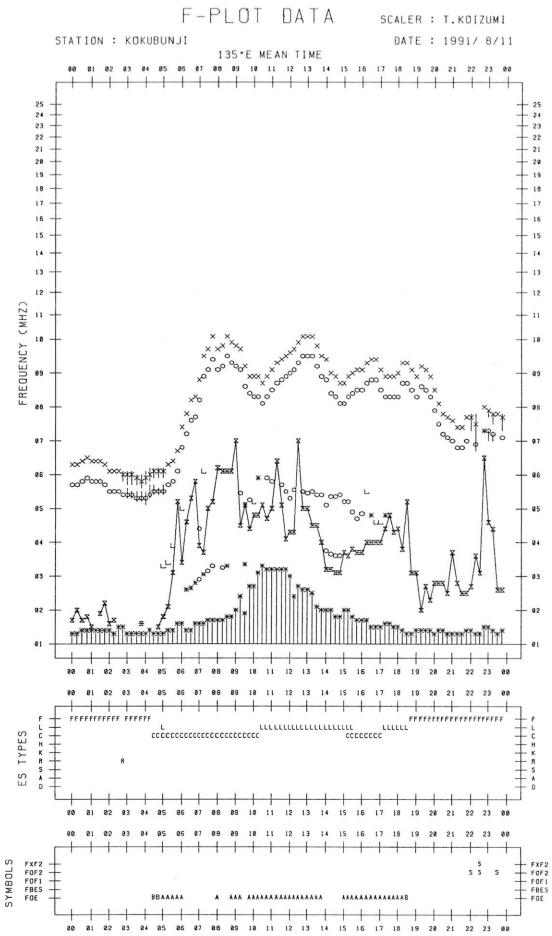
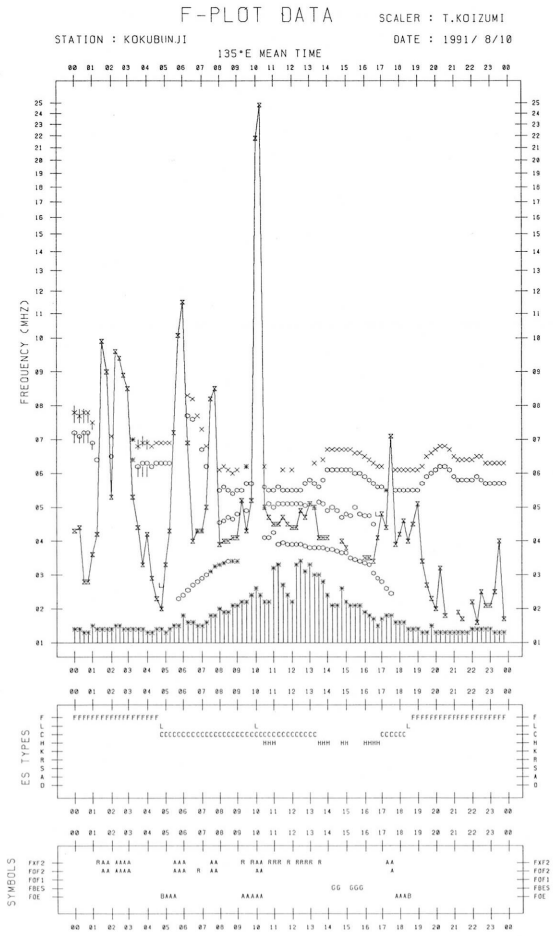
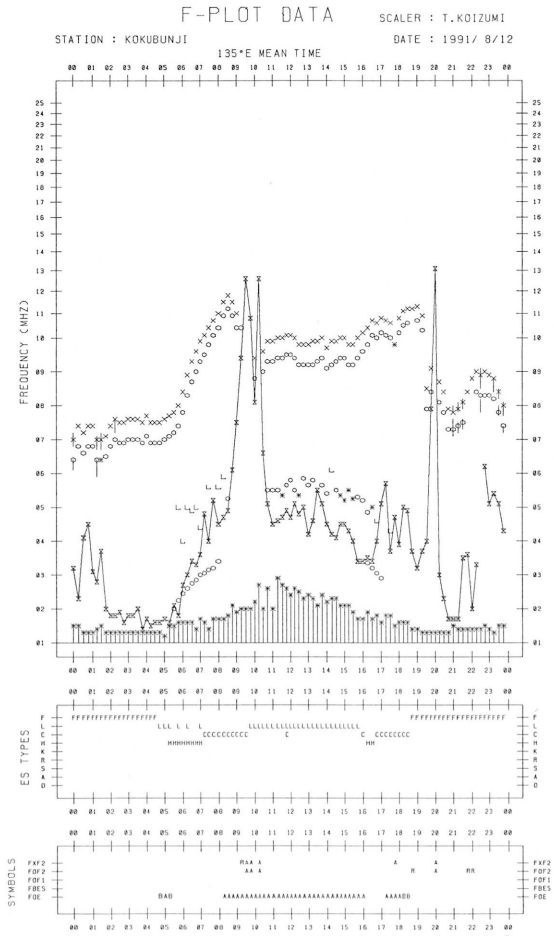
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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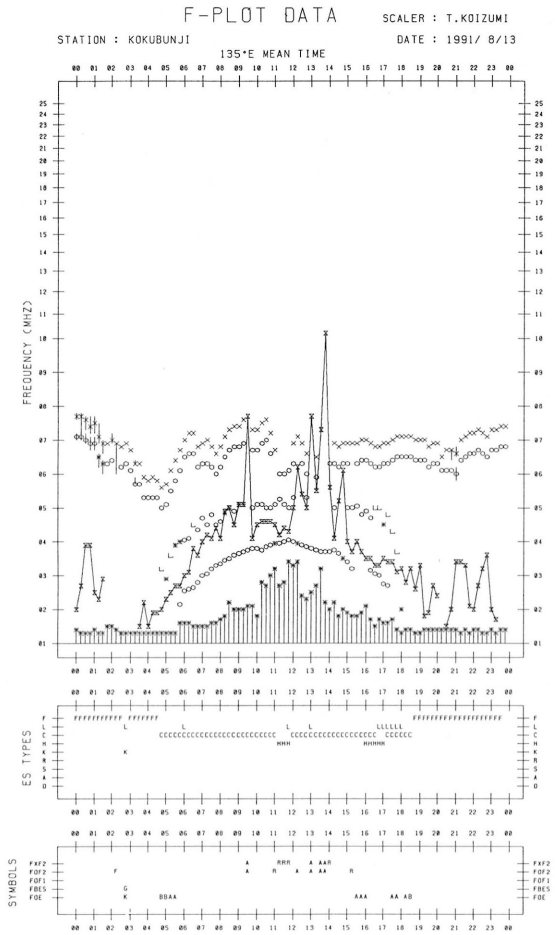
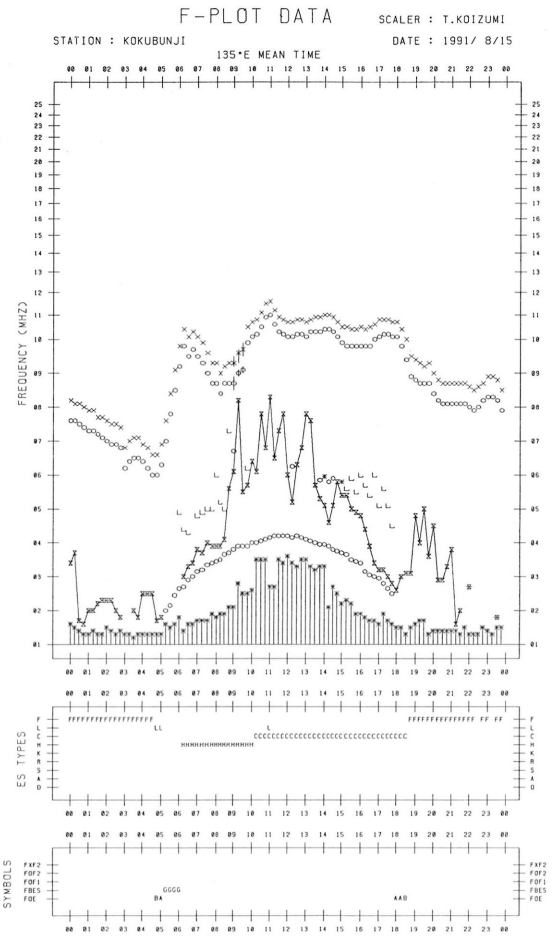
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/13
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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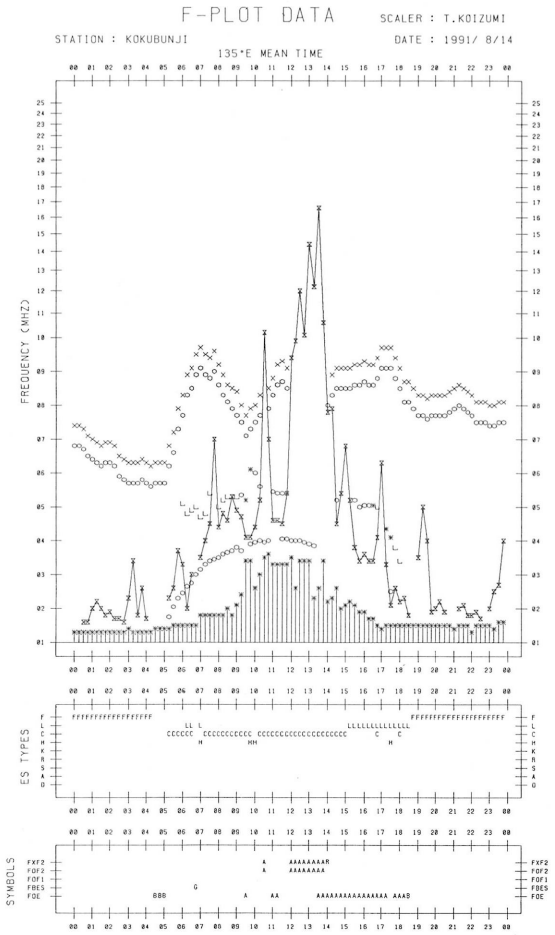
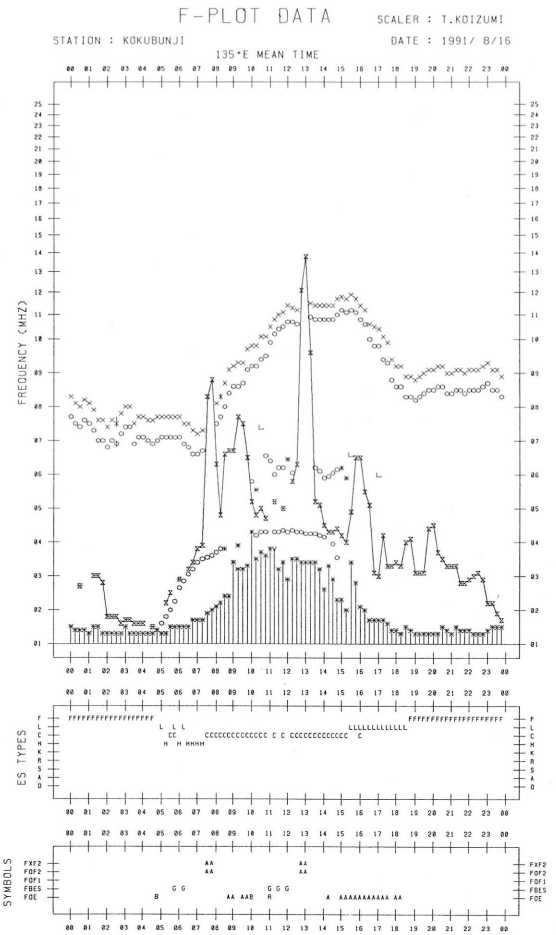
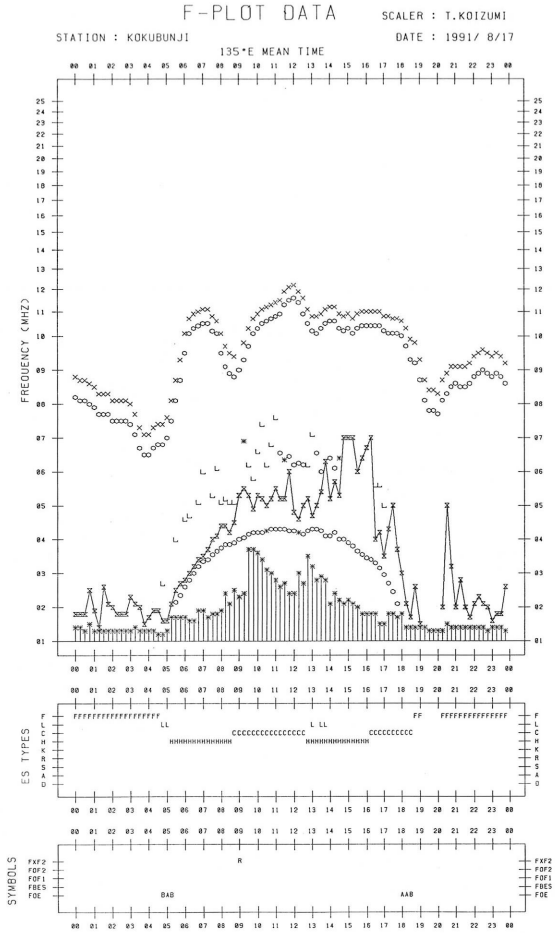
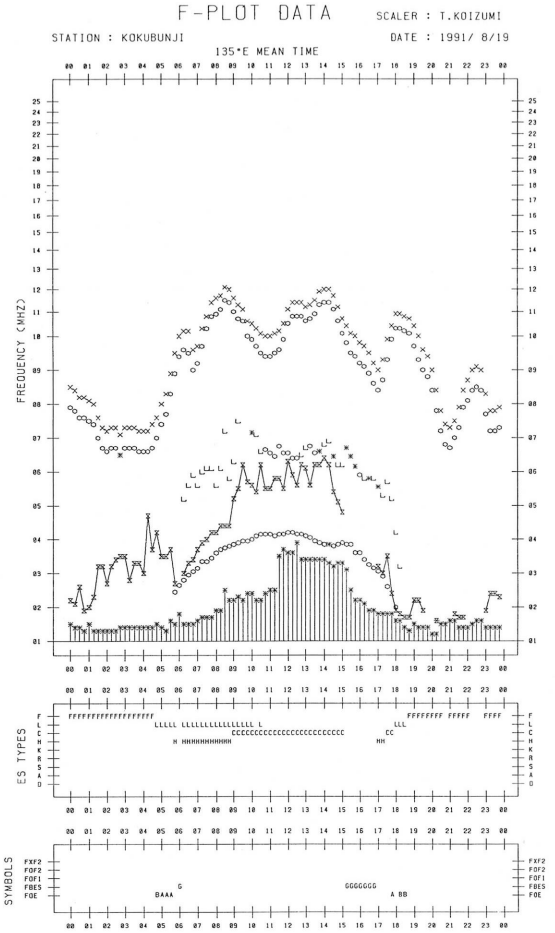
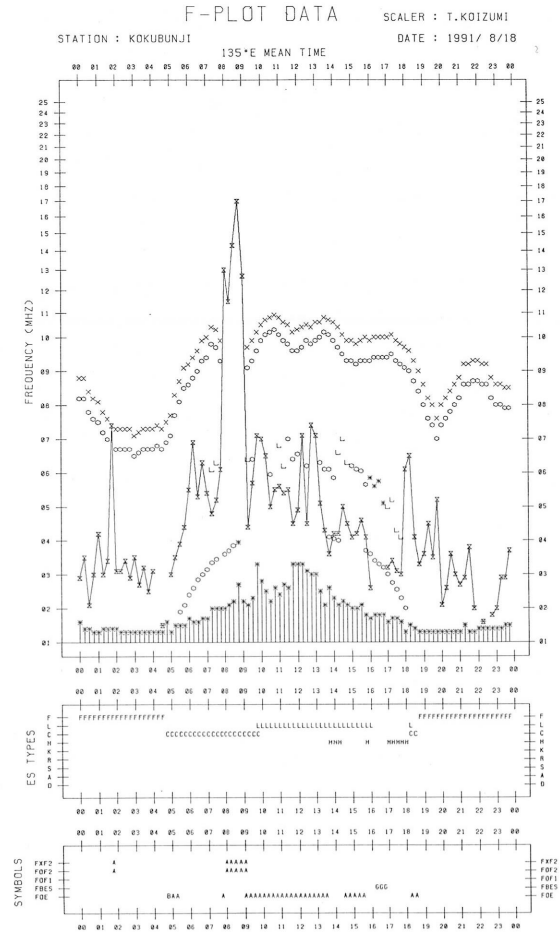
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/15
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

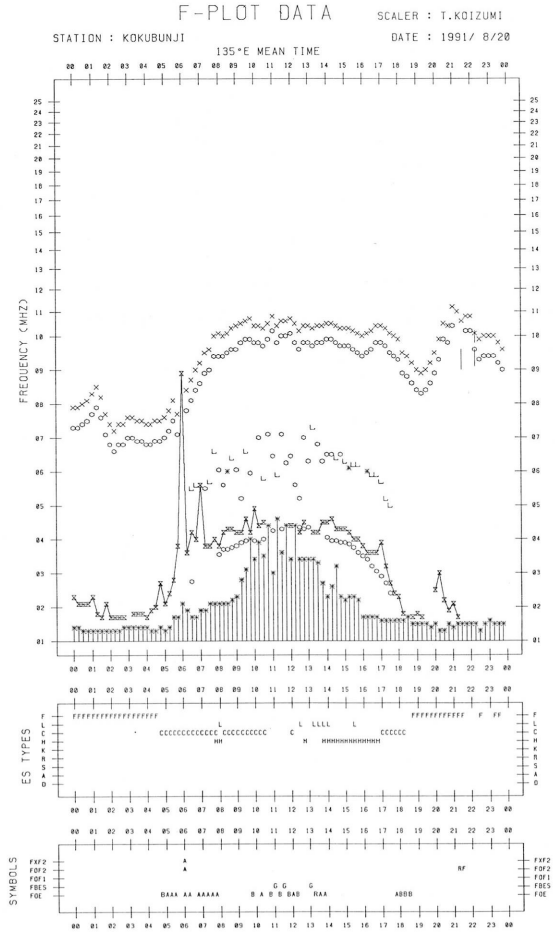

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/14
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/16
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/17
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE
BAB
AAB


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/19
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE
BAAA
A BB


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/18
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE
BAA
AAAAAAAAAAAAAAAAAAAA
GGG
AA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STATION : KOKUBUNJI
DATE : 1991/ 8/20
135°E MEAN TIME
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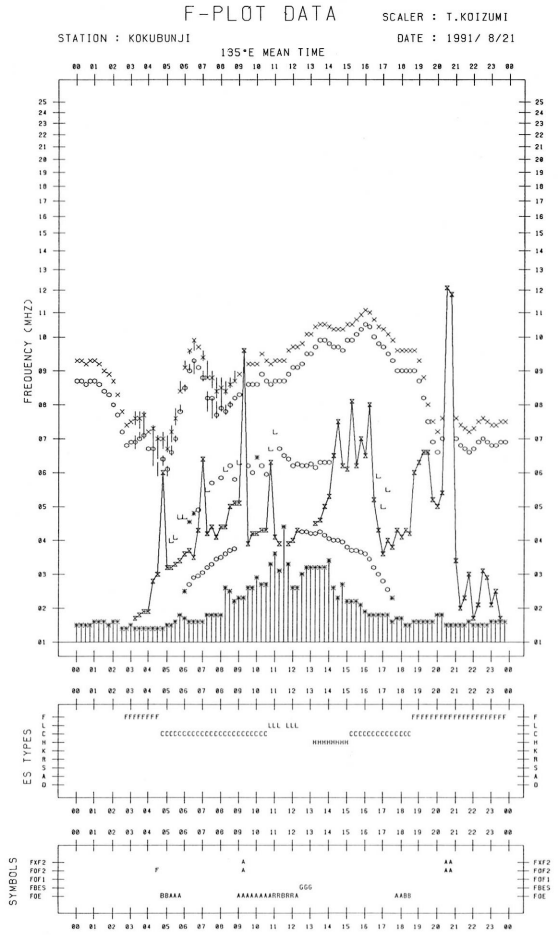
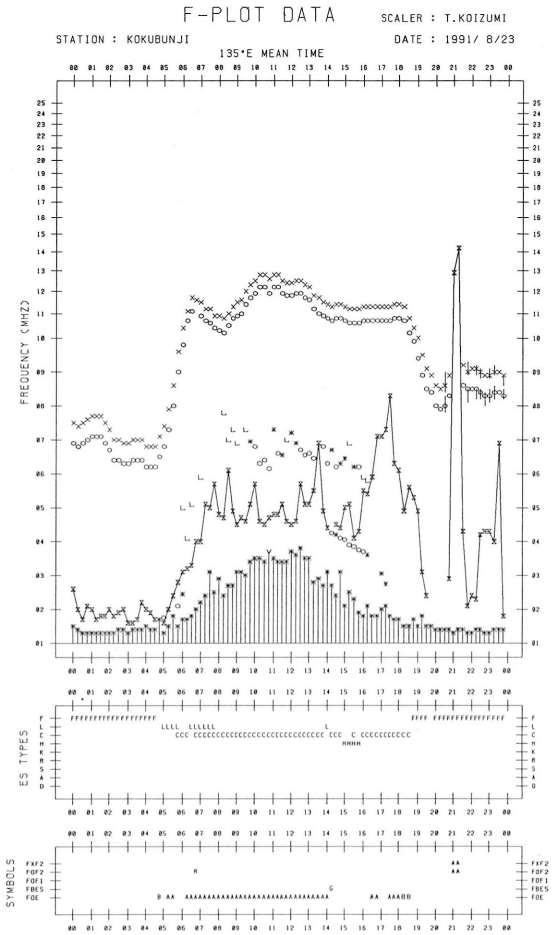
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE
BAAA AA AAAAA
ABBB


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/21
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FQF2
FQF1
FBES
FQE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STATION : KOKUBUNJI
DATE : 1991/ 8/23
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FREQUENCY (MHZ)
ES TYPES
SYMBOLS
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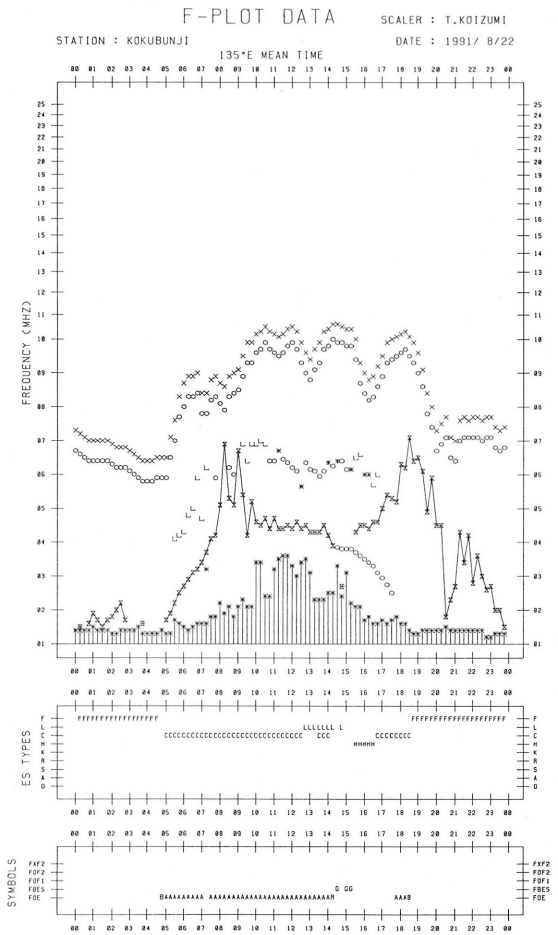
FQF2
FQF1
FBES
FQE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STATION : KOKUBUNJI
DATE : 1991/ 8/22
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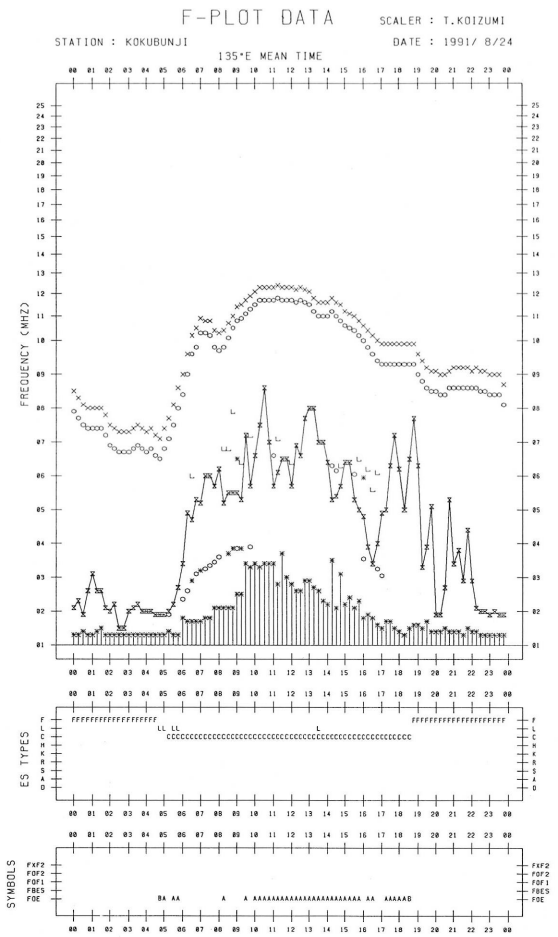
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FQF2
FQF1
FBES
FQE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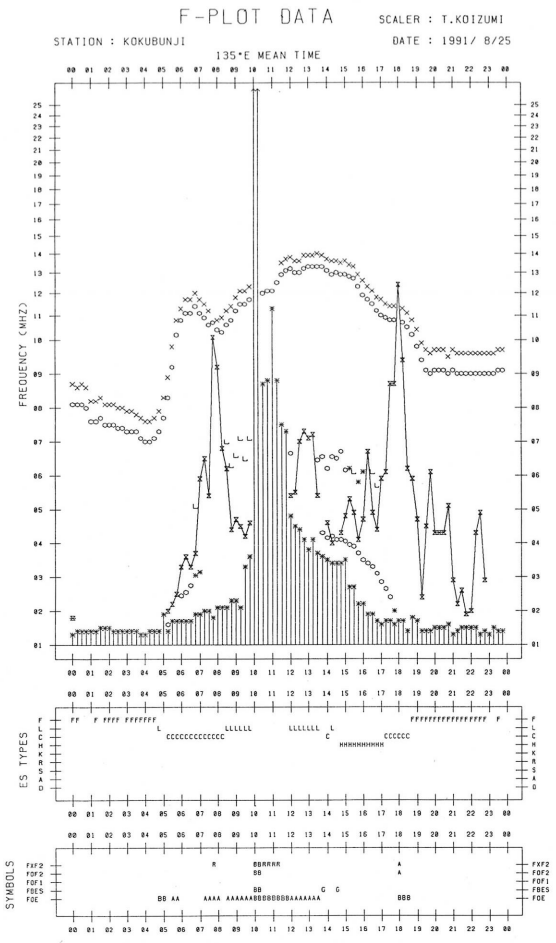
STATION : KOKUBUNJI
DATE : 1991/ 8/24
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FQF2
FQF1
FBES
FQE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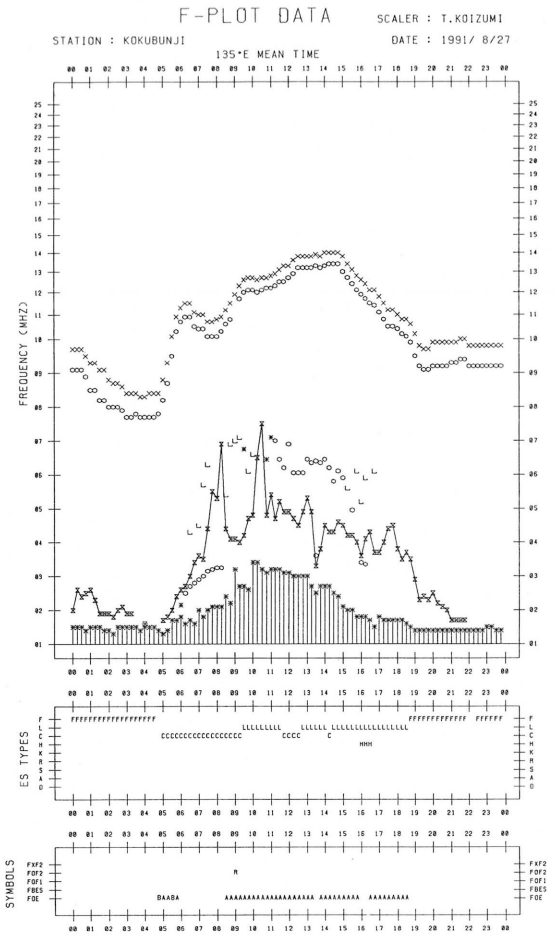
STATION : KOKUBUNJI
DATE : 1991/ 8/25
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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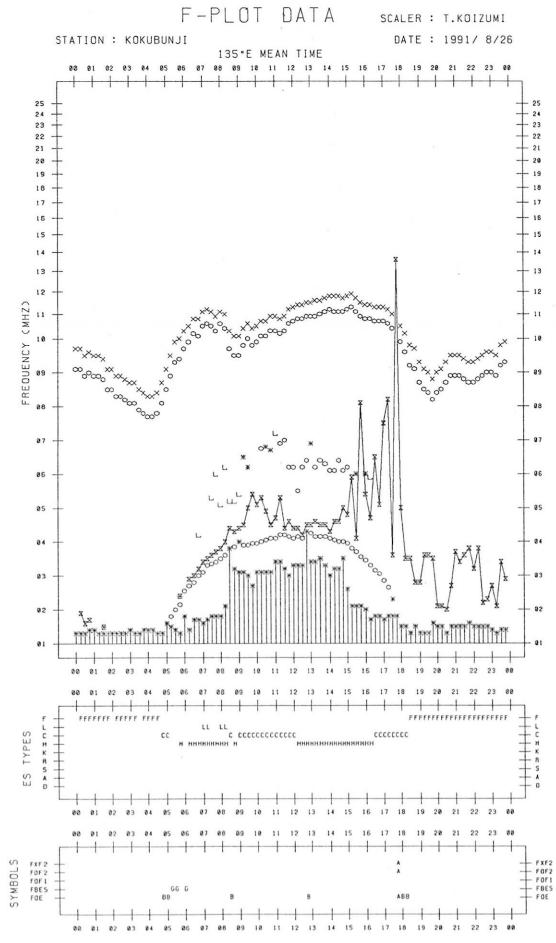
STATION : KOKUBUNJI
DATE : 1991/ 8/27
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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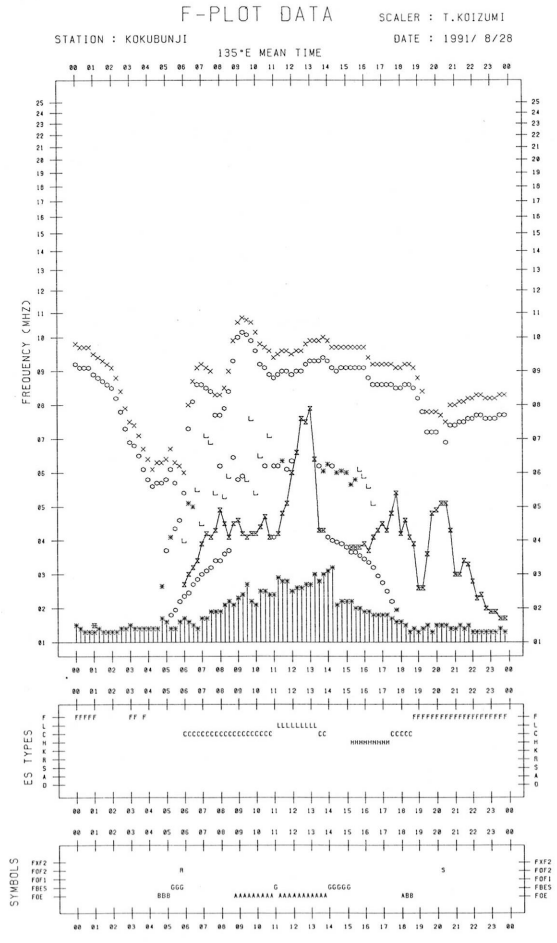
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/26
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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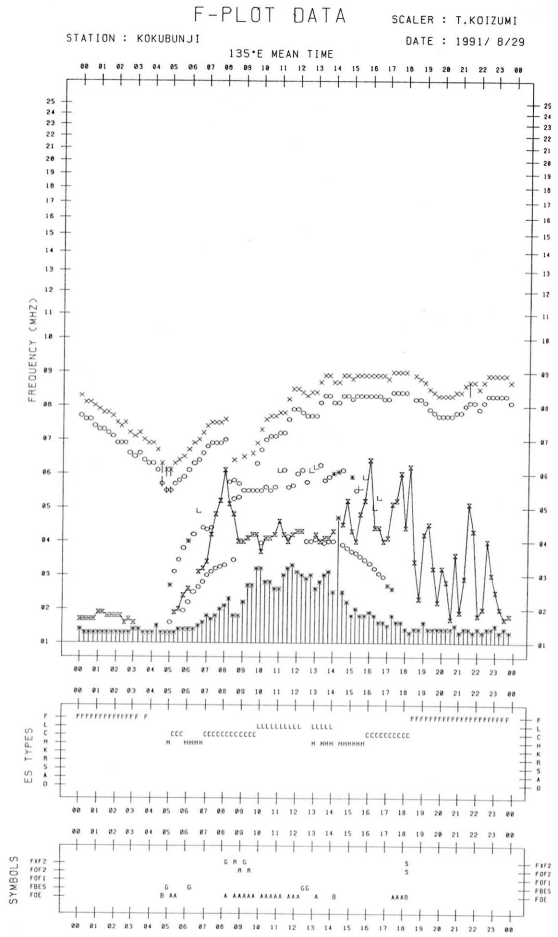
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/28
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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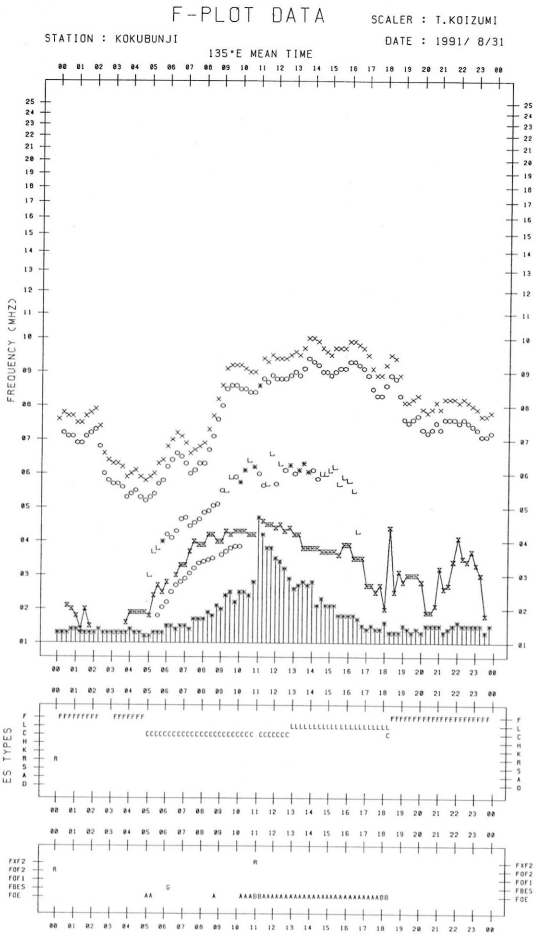
SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 8/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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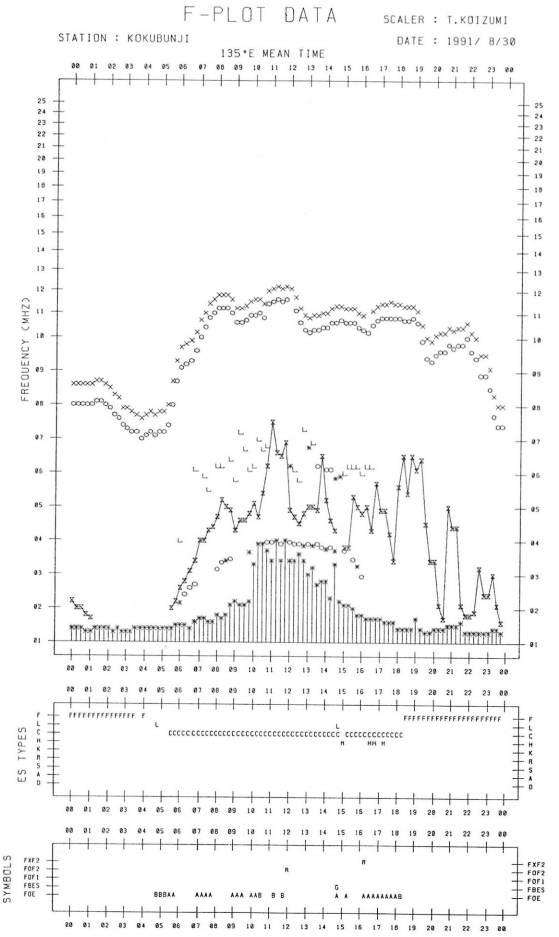
STATION : KOKUBUNJI
DATE : 1991/ 8/31
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE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STATION : KOKUBUNJI
DATE : 1991/ 8/30
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

B. Solar Radio Emission

B1. Daily Data at Hiraiso

200 MHz

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

Notes: No observations during the following periods.

5th 2030 - 6th 0412 11th 2030 - 2340 14th 2030 - 2340
15th 0429 - 0802 30th 2030 - 31st 0216

No observations for 500 MHz due to equipment failure by lightning.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso

August 1991

Single-frequency observations

Normal observing period: 2030 - 0930 U.T. (sunrise to sunset)

AUG. 1991	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	200	27 RF	0340	0408.0	80	200	40	SL
	200	44 NS	2325E	0347	600D	100	20	SL
2	200	44 NS	2330E	0134	510D	100	60	ML
	100	44 NS	2330E	0308	510D	300	150	ML
3	200	6 S	0121.1	0121.6	1.5	700	500	0
	100	6 S	0121.4	0121.5	1.2	16000D	10000D	-
	200	27 RF	0400.3	0442.1	92	600	200	ML
	100	27 RF	0410.3	0454	123	1500	600	-
	200	44 NS	2305E	2350	600D	40	25	ML
	100	44 NS	2305E	0128	600D	350	100	ML
4	200	44 NS	2330E	2333	600D	60	20	ML
5	200	8 S	0528.1	0528.2	0.3	120	-	WL
	100	8 S	0528.3	0528.5	0.4	310	-	WL
6	100	44 NS	0415E	0530	300D	200	80	ML
	200	44 NS	0415E	0600	300D	80	50	ML
	100	44 NS	2325E	0210	600D	450	250	ML
	200	44 NS	2325E	0646	600D	40	30	ML
7	200	44 NS	2215E	2216	660D	50	20	ML
	100	44 NS	2215E	0345	660D	130	70	ML
17	200	46 C	0145.0	0145.6	1.0	160	60	-
19	200	46 C	0530.7	0544.3	29	40	8	WR
	100	46 C	0538.0	0552.0	35	1000D	-	-
20	100	43 NS	2117	2309	600D	600	100	-
	200	43 NS	2233	2321.5	600D	100	40	MR
21	200	44 NS	2010E	0316	780D	80	30	MR
22	200	46 C	2048.5	2054.5	54	80	20	WL
	100	46 C	2053.6	2140.0	71	120	30	-
23	100	46 C	0036.9	0039.0	7.3	680	100	-
	200	46 C	0039.0	0039.5	4.8	75	25	MR
25	200	46 C	0040.5	0052.5	38	90	30	ML
	100	46 C	0046.6	0102.7	32	900	500	-
28	100	42 SER	0402.0	0406.0	8	1000D	-	-
	200	42 SER	0402.4	0405.1	7.5	2300	-	ML
29	100	46 C	0500.0U	0503.6	6.6	190	50	0
	200	46 C	0501.3	0503.7	2.7	90	30	0
31	200	44 NS	0230E	0230	390D	50	30	ML
	200	44 NS	2020E	0105	760D	40	20	ML

Note: No observations for 500 MHz due to equipment failure by lightning.

C. RADIO PROPAGATION

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

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

AUG 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	7	12	14	15	22	21	24	28	32	24	34	28	28	17	23	26	26	ES 6	21	14	17	16	10	9
2	-3	12	8	9	8	16	21	17	27	28	28	28	24	27	9	7	15	15	2	ES -24	15	30	9	ES -24
3	14	7	12	10	10	14	21	20	23	23	22	27	25	26	2	2	26	14	12	15	12	15	2	10
4	14	12	18	16	24	10	14	19	25	24	25	27	22	17	4	12	16	19	2	7	ES -9	7	-3	2
5	ES 7	7	10	15	17	22	24	29	29	24	24	24	24	24	21	16	17	10	4	22	12	12	11	14
6	10	10	9	12	9	22	27	24	26	26	26	31	25	24	11	22	21	20	19	16	12	12	10	7
7	12	5	11	14	17	22	22	24	29	28	25	29	24	25	24	20	2	22	10	-3	-3	14	12	10
8	14	9	10	14	18	20	24	26	25	30	28	32	27	27	22	13	24	17	12	15	12	15	9	2
9	8	10	12	13	18	21	25	26	25	23	19	21	22	21	20	-3	2	19	9	14	9	9	9	2
10	6	11	10	15	20	21	21	21	21	23	20	23	22	15	7	0	14	25	2	9	19	16	11	12
11	12	10	7	17	20	24	26	25	27	25	27	26	24	26	23	20	10	22	16	12	14	14	10	2
12	7	10	8	11	18	20	25	29	27	25	27	27	27	29	9	7	9	19	12	9	9	12	15	12
13	12	12	14	14	16	19	23	23	21	24	25	20	20	21	20	20	17	14	10	21	16	17	14	9
14	9	7	14	14	21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	2	2	7	12	19	22	25	24	26	29	30	27	29	24	25	25	28	20	23	17	7	ES 12	-3	-3
16	ES -24	7	9	15	17	21	24	25	24	26	32	27	28	27	24	22	24	31	12	12	10	12	10	7
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	2	7	10	15	19	22	21	31	29	29	27	24	26	26	25	25	29	25	10	15	14	10	10	7
19	-3	7	10	17	20	25	25	25	24	27	28	24	26	22	23	22	26	29	16	22	15	12	7	2
20	9	12	14	14	16	21	23	26	27	24	22	22	9	9	21	17	25	24	15	7	9	12	5	2
21	-6	9	15	19	19	27	26	26	30	24	24	26	9	9	7	ES -24	9	9	5	19	10	S	9	-3
22	10	10	9	12	20	18	22	26	27	27	28	24	26	26	14	20	22	31	14	14	12	9	10	9
23	4	10	15	19	19	27	26	26	30	24	25	26	9	9	7	ES -24	9	9	11	19	11	ES -24	9	10
24	2	7	12	13	19	25	16	26	27	25	29	27	27	25	21	25	14	21	14	15	14	12	9	10
25	-3	ES -24	ES -24	ES -24	14	22	24	26	27	29	29	27	26	24	26	25	27	22	19	19	10	10	4	ES -24
26	7	9	9	2	18	19	23	27	28	27	29	25	22	28	31	29	19	19	18	18	14	7	9	2
27	7	10	14	14	20	21	25	27	29	26	24	31	27	24	32	31	28	13	-3	ES -24	9	14	2	5
28	7	9	10	14	15	24	22	21	26	30	27	26	22	26	26	9	13	-3	ES -24	ES -24	9	10	7	ES -24
29	ES -24	ES -24	13	12	18	19	25	24	26	26	22	25	24	22	23	22	26	22	20	15	19	ES -24	ES -24	2
30	ES -24	ES -24	ES -24	15	17	22	21	26	26	26	27	26	26	24	ES -24	ES -24	7	31	ES -24	7	14	9	ES -24	14
31	ES -24	ES -24	ES -24	7	15	19	24	24	26	20	20	24	25	19	17	ES -24	ES -24	ES -24	ES -24	11	7	2	2	2
CNT	30	30	30	30	30	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29
MED	7	9	10	14	18	21	24	26	27	26	27	26	25	24	21	20	17	19	12	14	12	12	9	5
UD	14	12	15	17	21	25	26	29	30	29	30	31	28	27	26	26	28	31	20	21	17	16	12	12
LD	ES -24	ES -24	ES -24	7	10	16	21	20	23	23	20	22	9	9	4	ES -24	2	ES 6	ES -24	ES -24	7	ES 2	-3	ES -24

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

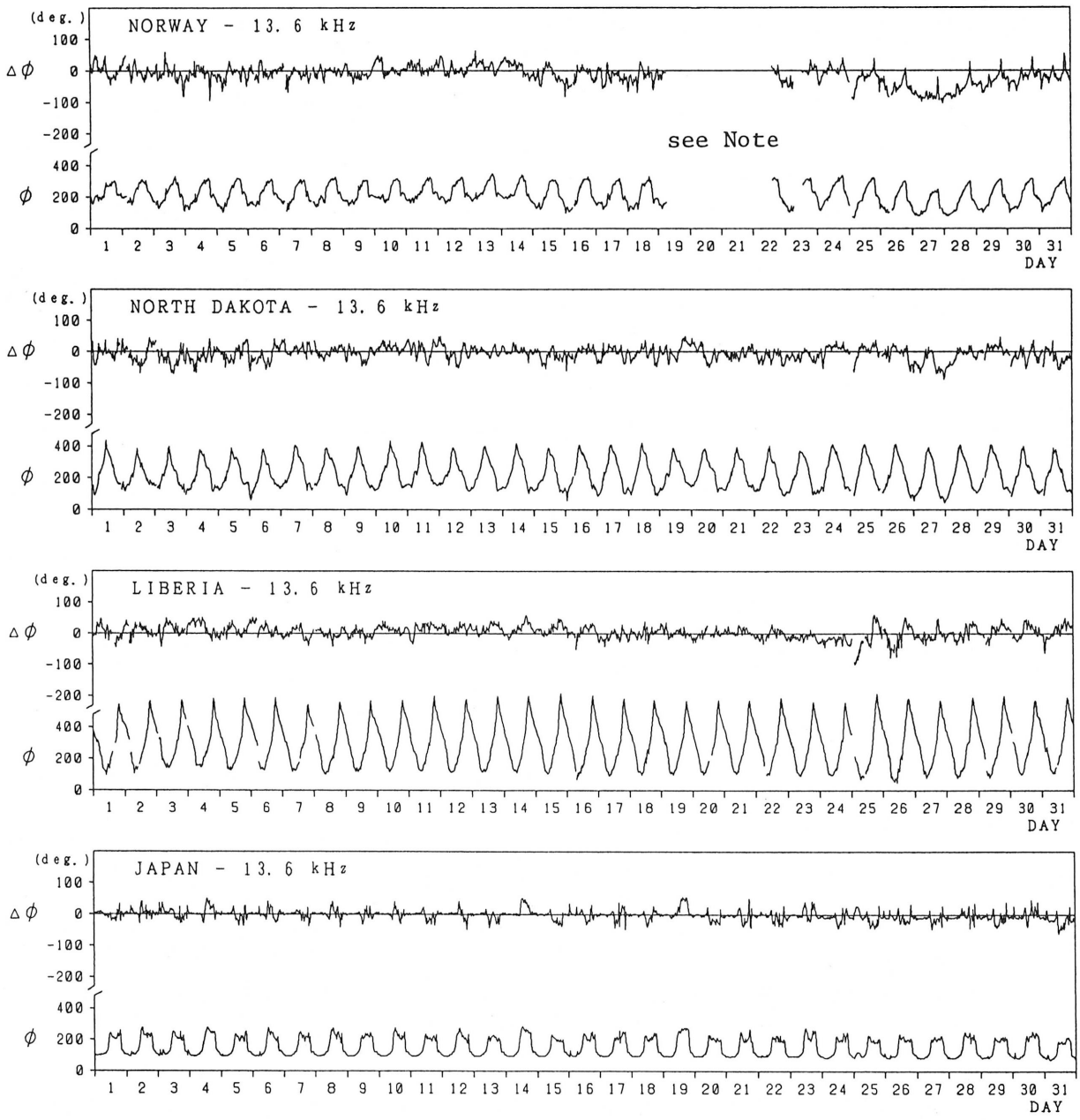
Hiraiso — Time in U.T.

Aug. 1991	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Conditions 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4+	5 5 5 5	4 4 4 4	N N N N			
2	3o	2 1 3 -	3 4 4 3	N U U U	0533	---	134
3	3+	1 3 3 -	4 4 4 4	U U U U	---	---	
4	4-	4 3 4 -	4 4 3 3	U U U U	---	---	
5	4o	3 4 4 4	4 4 4 4	U U U U	---	---	
6	4o	4 4 4 -	4 4 4 4	N N N N	---	19	
7	4o	4 4 4 -	4 4 4 4	N N N N			
8	4o	4 3 4 5	4 4 4 4	N N N N			
9	4o	4 4 4 -	4 4 3 4	N N N N			
10	3+	3 3 2 5	4 4 3 4	N N N N			
11	4+	5 4 4 5	4 4 4 4	N N N N	0253	---	164
12	4-	4 4 2 -	4 4 4 4	N N N N	---	---	
13	4o	3 5 4 5	4 4 4 4	N N N N	---	14	
14	C	5 C C C	C C C C	N N N N			
15	4-	3 3 4 -	4 4 4 3	N N N N			
16	4-	3 1 4 5	4 4 4 4	N N N N			
17	C	C C C C	C C C C	N N N N			
18	4+	4 4 5 5	4 4 4 4	N N N N	1834	C	223
19	3+	5 1 1 5	4 4 4 4	N N N N			
20	4o	4 3 4 -	4 4 4 4	N N N N	0759	---	217
21	4-	3 4 4 5	4 4 2 4	N N N N	---	---	
22	4o	4 3 4 5	4 4 4 4	N N N N	---	19	
23	3o	2 4 1 -	4 4 3 4	N N N N			
24	4o	4 2 5 5	4 4 4 4	N N N N			
25	4o	3 4 5 5	3 4 4 4	U U U U			
26	4o	3 4 5 5	4 4 4 4	N N N N			
27	4+	5 4 5 5	4 4 4 3	N N N N	1515	---	115
28	3o	4 2 2 -	4 4 3 2	N N N N	---	06	
29	3+	2 4 4 -	3 4 4 3	U U U U			
30	3o	3 3 2 -	3 4 3 3	N N N N	04.2	---	121
31	3-	3 2 1 -	3 4 2 3	U U U U	---	---	

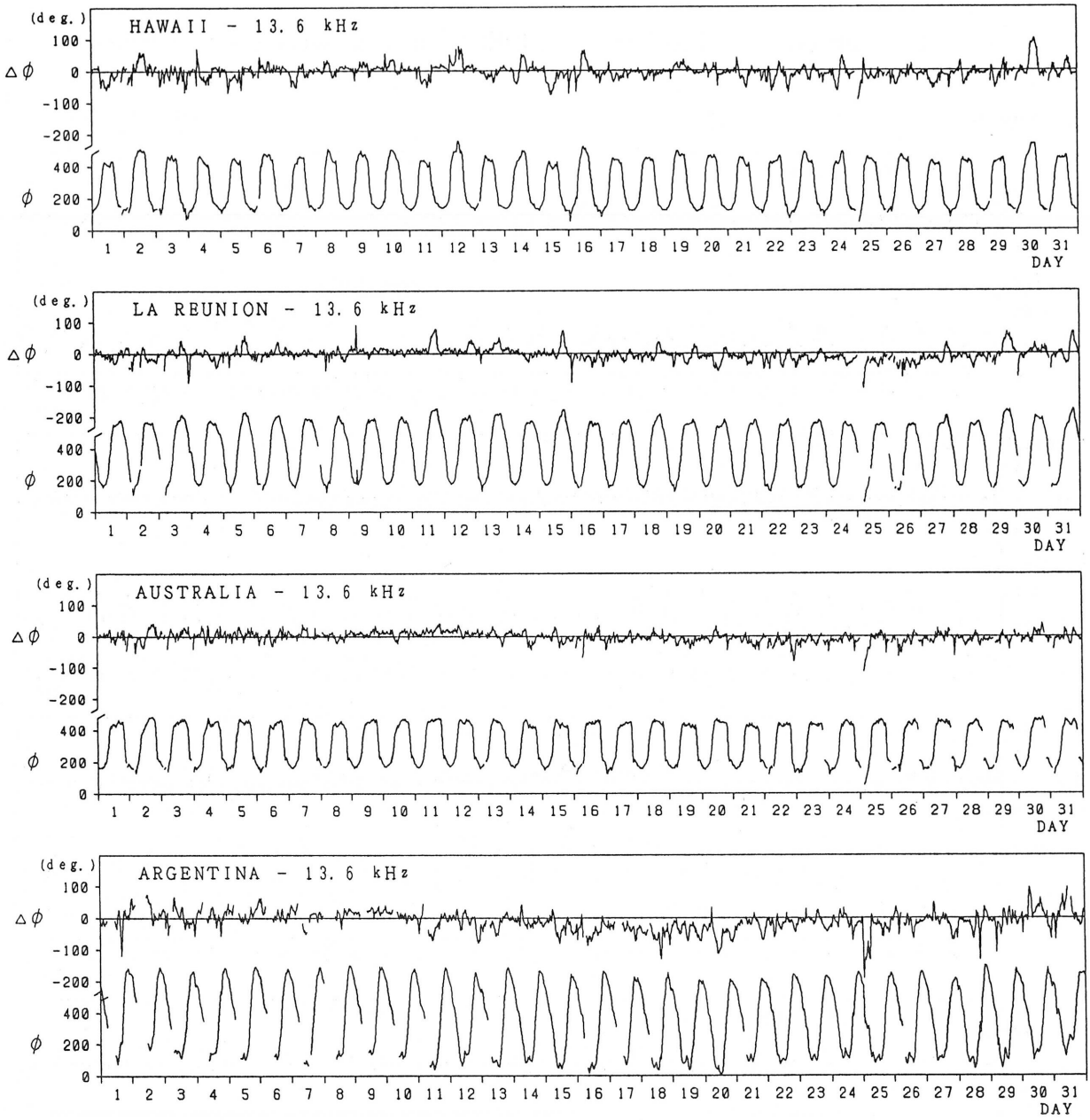
C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

Inubo August 1991



Inubo August 1991



Note: As for NORWAY - 13.6 kHz, no record during August 19 - August 22, due to the maintenance of transmitter.

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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Aug.25/2020	Aug.31/1918	Aug.27/1848	114.5

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Aug. 1991	SWF									Correspondence	
	Drop-out Intensities (dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst
	CO	HA	1)	2)	3)						
1					16	1450	21	1	1	x	
1					15	1513	25	2	1	x	
1		13		x		2146	56	2	2-	x	
2	>17	>22	14	>17		0309	34	2	1	x	x
3		>22	>28	>20		0121	21	1	2+	x	x
3			21	>10		0308	106	3	2-	x	x
3			20	10		2225	55	3	2-	x	
5		x	8		x	0530	8	1	1-	x	x
6		9	20	x		0442	23	1	2-	x	x
16			18			0043	35	2	1+	x	
16			5			0120	8	1	1-	x	
16			8			0132	42	2	1-	x	
16		12	28	x	>20	0618	25	1	2+	x	x
17			16	x		0026	16	2	1+	x	
18					8	1250	23	2	1-	x	
19			x		4	0532	23	2	1-	x	
22	10	10	14			0219	37	2	1	x	x
22			7		x	0547	21	2	1-	x	
22			16		9	2227	13	1	1+	x	
23			3			0135	15	2	1-		
23			6			0159	22	2	1-	x	
23			5			0251	12	1	1-	x	
23			3			0310	10	1	1-	x	
24			17		x	0020	33	2	1+	x	
25		>17	>30	>15		0038	202	3	3-	x	x
25			4			0517	7	1	1-	x	
25					8	0935	12	1	1-	x	
25		x	22	x		2313	47	3	2-	x	
26			14			0342	42	2	1	x	
26			10	x		0535	18	1	1-	x	x
26					9	1010	20	2	1-	x	
26				x	9	1157	26	2	1-	x	
27		10	14			2313	30	2	1	x	
28		11				1536	26	2	1+	x	
29	8	5	22	>25	>12	0502	28	2	2-	x	x
30		x	>36	x		0111	29	2	3	x	x
31		>19	29	x		0153	33	2	2+	x	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

Aug.	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
1				14	11		0101	0130	0106
1				9	5		0208	0230	0213
1			39	26			0632	0713	0643
1		29					0833	0857	0844
1		34	20				0913	1016	0924
1		18					1104	1127	1119
1		39	20				1149	1235	1202
1		92					1441	1514D	1503
1		110					1514E	1633	1529
1					22		1921	2005	1933
1	46	32	23	40	96	103	2151	2331	2156
2				10	5		0146	0217	0200
2			12	10	6		0232	0305	0239
2	158	186	312	207	165	144	0306	0438D	0318
2	39	48	101	75	46	25	0438E	0514D	0449
2	24	29	66	51	38		0514E	0628	0527
2		28	10				0638	0658	0645
2		—	54				1013	1117	1029
2					22		2118	2305	2203
3	58	55	120	116	94	79	0120	0204	0128
3	40	57	105	70	45	30	0307	0346D	0328
3	54	49	114	76	49	17	0346E	0625	0416
3					27*		1841	1925	1848
3					35		2035	2142	2049
3	82	72	76	—	139	165	2214	0050	2241
4		18		30	15	20	0150	0222D	0204
4				19		14	0222E	0302	0225
4					11		1958	2052	2019
4					7		2142	2216	2147
5				41	31	28	0029	0158	0056
5			16	—	7		0300	0335	0309
5		56	97	—	26	57	0528	0711	0532
5		29					1633	1728	1651
5					11		2256	2325	2304
6				23*	16*		0046	0150	0105
6			40	34	20	23	0217	0308D	0231
6			18	23	10		0308E	0417	0317
6	48	78	168	99	62	26	0440	0720	0449
6	21	25	14		18		2240	2319	2247
7		26	34	24	27	29	0631	0724	0638

Inubo

Aug.	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
7					71	62	1902	2037	1914
8			9	10			0246	0317	0300
8			16	19	9		0406	0446	0415
8		34	47	39			0620	0729	0631
8			46	13			0856	1005	0901
8		29					1411	1454	1422
9				7	3		0031	0054	0040
9				12	7		0141	0214	0152
13				20	16	19	0106	0204	0130
13			10	6			0515	0546	0525
13					4		2112	2133	2145
14				9	4		0242	0310	0250
14			9	10	6		0319	0338	0323
14				5			0447	0502	0452
15				—	10	9	0139	0235	0154
15			9	—			0636	0657	0643
15			10	—			0702	0731	0712
15			11	4			0817	0852	0824
15					9	17	2131	2147D	2137
15					14	15	2147E	2215	2157
15			12	10	13		2300	2329	2307
16	46	47	72	96	75	52	0045	0130D	0056
16	27	24	32	64	40	24	0130E	0244	0138
16			13	10			0432	0513	0441
16			15	10	15		0523	0613	0549
16	67	—	244	140	65		0617	0757	0625
16		33					1433	1507	1446
16					22		1808	1839	1817
16					19		1943	2042	1953
16					35	35	2127	2234	2145
16				16	12		2303	2335	2318
17	33	42	51	81	63	32	0026	0137	0034
17				19	13		0146	0216	0153
17	19		33	31	13		0342	0435	0351
17			18	8			0757	0855	0812
17					12	25	2125	2155	2142
17					15		2206	2237	2215
17				15	15		2336	0012	2347
18			12	8	5		0243	0306	0248
18			12	10	4		0316	0347	0323

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Aug.	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
18			26	17			0555	0659	0620
18			14				0732	0804	0746
18			9				0944	0956	0946
18			13				1018	1052	1023
18		49	12				1253	1334	1303
18		50					1432	1542D	1456
18		35					1542E	1638	1554
18					13		2003	2045	2012
19		52	58	—	18		0531	0657D	0546
19	—		30	—			0657E	0732	0701
19	—				8		2144	2222	2158
19	—				5		2249	2311	2259
20	—	85	23				1216	1400	1231
20	—				13		2100	2127D	2109
20	—				9		2127E	2202	2133
21	—	12		9	5		0104	0134	0112
21	—	22					1451	1523	1456
22	—	17		—	12		0156	0224D	0207
22	—	21	61	—	39		0223	0326D	0242
22	—		13	—	11		0326E	0349	0332
22	—		24	—	16		0458	0547D	0527
22	—	75	112	—	34	26	0547E	0702	0557
22	18	15	31		77*	49*	2045	0114	2233
23	17	31	54	43	32	28	0152	0249D	0208
23	20	22	32	29	16		0249E	0345D	0257
23	10		36	32	13		0345E	0442	0354
23			17	9			0545	0640	0558
23					13		1935	2019	1944
23					22	18	2138	2157D	2145
23					20	24	2157E	2232	2203
24	14	23	54	79	60	46	0023	0147	0035
24			15	10	6		0236	0308	0248
24		25	13				1058	1135	1108
24		44	12				1217	1301	1233
24		23					1635	1716	1640
24					29	29	1933	2018	1939
24					24	17	2038	2131	2048
24					13	17	2133	2158	2142
25	90	98	183	141	179	183	0035	0517D	0116
25	19		117	66	37		0517E	0830	0522

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Aug.	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
25	14	71	64				0934	1025	0942
25		25					1436	1507	1451
25		28					1540	1629	1549
25					21		1820	1900	1837
25					9		2042	2104	2049
25					16	16	2127	2154D	2143
25				—	14	17	2154E	2238	2203
25	56	44	55	116	102	104	2317	0148	2335
26	33	46	113	—	44	43	0343	0514	0351
26	35	78	137	—	36	37	0535	0644D	0541
26	—	29	29	—		9	0644E	0721D	0652
26	—	38	42	—			0721E	0753D	0731
26	—	69	78	26			0753E	0900D	0807
26		92	75	11			0900E	1011D	0917
26		70	53				1011E	1119	1017
26		82	35				1154	1241	1209
26		47					1424	1452	1431
26	11		19	39	31	23	2347	0047	0005
27			12	19	9		0352	0419D	0406
27			10	19	6		0419E	0456D	0425
27	18		37	34	13	16	0455	0538	0503
27				9			0605	0634	0618
27		27	10				0816	0839	0832
27		26					1405	1445	1423
27	19	22		41	43	38	2314	0025	2323
28			12	16	8	12	0224	0319	0245
28	12	21	20	14			0633	0710	0644
28		22					1217	1243	1228
28		85					1556	1717	1605
28					14		1950	2031	1957
29		8		16	14	8	0006	0031D	0016
29		10	12	26	21	14	0031E	0120	0038
29					2		0127	0143	0133
29	60	112	188	124	62	41	0501	0606	0510
29			23	5			0813	0923	0821
29			12				0944	1000	0949
29					8		2147	2228	2153
29					3		2234	2300	2242
30	50	52	107	115	90	69	0114	0400	0121
30			9	9			0607	0626	0609
30			13	8			0735	0807	0742
30	21	27	12	30	21	14	2236	2252	2241
31	57	82	159	130	97	85	0152	0353	0207

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