ISSN 0021–0382

F—489

IONOSPHERIC DATA IN JAPAN

FOR SEPTEMBER 1989

VOL. 41 NO. 9

CONTENTS

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MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

INTRODUCTION

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

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

A. IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example *Es* (for *foF2*).
- B Impossible measurement because of absorption in the vicinity of *fmin*.
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of too small ionization density of the layer (for *fEs*).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of trouble in the automatic data processing system, but existence of film record.

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. Daily Data at Hiraiso

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

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

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

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

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

* Measurement impossible because of interference.
B Measurement impossible because of bursts.

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

B2. Outstanding Occurrences at Hiraiso

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

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

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

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

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

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

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

C. RADIO PROPAGATION

C1. H.F. Field Strength at Hiraiso

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

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

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

C2. Radio Propagation Quality Figures at Hiraiso

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

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

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

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

C	artificial accident,
S	propagational accident,
U	inaccurate.

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

N	normal,
U	unstable,
W	disturbed.

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

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

C3. Phase Variation in OMEGA Radio Waves at Inubo

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

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

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

C4. Sudden Ionospheric Disturbances

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

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

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

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

Types of fade-out are as follows:

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

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

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

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

b. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF FOF2 AT WAKKANAI

SEP. 1989

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	62	70	60	60	A	69	83	108	90	90	90	96	82	80	93	81	82	81	79	85	88	83	66	66
2	68	68	59	53	60	62	82	78	82		81	84	87	80	72	83	85	84	75	84	75	62	64	62
3	63	55	54	57	50	60	79	87	89	70	85	91	90	89	82	81	78	87	90	86	84	66	63	62
4	58	60	58	52	51	56	86	90	92	91	89	88	87	89	92	91	87	89	81	67	80	80	80	A
5	56	58	52	57	53	52	65	84	85	82	79	78	90	75	78	82	85	82	83	76	71	68	66	57
6	57	58	61	54	58	61	85	94	89	94	101	97	89	87	81	81	85	91	91	87	82		78	64
7	62	63	63	N	52	54	81	80	79	94	86	86	83	84	84	84	85	95	84	80	75	72	60	52
8		54	52	52		54	58	67	63		62	58			N	70	74	71	67	57	A	61	57	58
9	50	52	52	52	44	57	66	94	100	110	95	91	88	88	85	81	80	84	78	72	76	75	66	58
10	54	62	54	54	63	65	84	91	105	111	95	110	96	92	91	87	86	87	91	86	75	74	66	66
11	62	64	66	52	54	57	90	88	103	109	104	105	100	99	99	100	95	93	92	66	89	80	74	65
12	N	67	67	64	62	76	102	106	116	120	122	108	110	104	101	96	101	106	88	85	77	76	76	77
13	66	64	66	66	57	62	96	122	121	125	128	121	110	112	103	110	109	113	102	91	88	83	74	66
14	64	71	74	71	65	78	90	126	112	121	118	118	117	117	105	110	108	109	90	91	97	94	81	68
15	74	66	67	64	60	66	88	91	114	120	114	125	120	110	102	107	120	110	106	88	76	75	65	66
16	58	62	57	52	40	32	66	102	94	108	118	106	100	110	106	99	87	97	92	84	65	64	66	58
17	53	66	59	53	54	58	80	111	108	91	101	91	107	101	101	103	104	108	92	84	74	68	63	65
18	60	62	58	58	56	59	97	107	117	120	121	120	100	116	105	97	102	88	95	92	88	66	67	65
19	61	62	57	44	53	41	81	66	82	96	96	89	98	93		100	100	114	67	72	64	63	59	52
20	58	54	64	52	51	58	86	99	111	115	108	107	108	100	106	109	105	110	86	84	71	70	64	61
21	61	65	66	64	59	66	89	91	119	121	108	120	104	107		110		108	96	86	66	63	68	63
22	62	58	62	55	60	60	87	108	128	118	100	107	123	110	110	110	120	112	113	92	68	66	62	64
23	54	58	66	60	48	48	73	90	112	119	120	113	110	113	98	112	101	103	90	86	71	64	66	65
24	63	57	62	58	56	54	99	121	110	110	119	111	111	116	119	104	108	102	96	87	83	64	62	62
25	58	62	73	61	54	56	64	111	112	112	112	106	116	114	108	110	103	90	90	81	86	70	63	60
26	60	57	53	57	55	58	89	103	114	122	119	113	110	110	100	109	110	112	90	88	66	62	62	N
27	61	68	43	37	A	A	52		A		57				57		60	61	60	56	51	53	49	40
28	47	42	40	42	40	36	65	78	90	94	91	91	95	106	96	98	103	124	91	84	73	63	53	53
29	51	53	54	42	48	45	73	86	118	122	116	110	113	110	106	100	96	102	94	78	71	73	70	65
30	58		60	55	51	59	80	120	120	118	119	117	123	116	115	111	111	105	85	54	78	71	67	64
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	28	29	30	29	27	29	30	29	29	27	30	29	28	28	27	29	29	30	30	30	29	29	30	28
MED	60	62	60	55	54	58	82	94	108	111	102	106	102	105	100	100	100	100	90	84	75	68	66	64
U Q	62	65	66	60	59	62	89	108	115	120	118	113	110	111	106	109	106	109	92	87	83	75	68	65
L Q	56	57	54	52	51	54	73	86	89	94	90	91	90	89	85	83	85	87	83	76	71	63	62	58

HOURLY VALUES OF FES AT WAKKANAI

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	34	36	36	G	G	G	G	67	G	G	G	G	63	46	60	94	59	G	G	35
2	30	G	G	G	G	G	57	50	49		G	G	G	G	45	46	70	67	60	59	59	49	G	G
3	G	G	G	G	G	32	41	56	91	79	G	G	G	G	G	G	46	69	40	G	60	45	35	G
4	G	G	G	G	28	G	46	42	46	G	G	G	G	G	G	G	G	43	39	42	45		58	59
5	34	27	G	G	G	G	G	53	58	68	G	G	G	G	G	G	G	G	G	G	G	30	30	30
6	31	G	28	G	G	G	G	40	54	G	G	G	G	G	G	G	45	54	47	135	69	48	G	28
7	G	G	G	G	G	G	G	G	G	G	55	G	G	G	G	G	G	G	32	29	28	G	G	G
8	G	G	G	G	28	32	G	G	G	G	G	G	G	G	46	G	40	41	64	60	72	61	41	29
9	G	27	11	G	G	43	40	39	G	G	G	G	G	G	G	G	G	G	G	G	G	G	50	G
10	G	30	68	47	36	35	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	G
11	G	G	G	G	G	G	35	G	44	G	G	G	G	G	G	G	G	G	28	30	28	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G
14	G	G	G	G	G	G	G	44	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	G	G	G	32	44	G	G	G	G	G	G	G	G	G	G	G	27	11	27	G	G	G
16	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	59	50	35	32	66	G	G	33
17	G	G	42	40	32	35	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28
18	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	26	G	G	G	G
19	G	G	G	25	33	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G
20	G	26	26	G	25	G	33	G	G	G	G	G	G	G	G	G	G		29	36	G	G	36	36
21	31	26	G	26	36	32	G	G	44	56	67	67	G	G		45	41	45	G	28	29	28	28	29
22	G	G	G	27	G	G	G	G	G	73	G	G	G	G	G	G	G	G	26	G	G	G	G	G
23	G	25	G	G	G	G		G	G	54	G	G		G	G	G	G	G	G	G	G	32	34	G
24	G	G	G	G	G	G	37	44	G	G	G	G	G	G	G	G	G	G	28	G	G	34	G	G
25	G	G	G	G	G	36	G	G	G	G	G	G	G	G	G	G	G	G	G	G	24	34	66	37
26	37	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	35	30	35	G	G	G	G
27	G	32	29	33	33	29	33	G	44	G	47			G	G		G	G	27	G	G	G	G	G
28	G	G	G	G	G	G	35	G	G	G	G	G	G	G	G	G	G	34	33	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G	G	G	G	46	G	G	42	46	38	69	29	G	30	24
30	G		G	G	G	G	G	G	50	46	G	G	G	G	G	G	34	40	45	69	31	58	28	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	30	30	30	30	28	30	30	29	30	29	28	30	29	29	30	27	30	30	30	29	30	30
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	6	12	G	G	G
U Q	G	13	G	G	28	32	35	39	44	G	G	G	G	G	G	G	40	45	38	36	31	33	30	29
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT WAKKANAI

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	18	17	17	18	17	22	22	44	42	52	46	42	50	56	53	42	38	33	17	15	17	16	16	16
2	17	16	15	18	16	20	22	27	33		48	52	52	48	41	35	26	23	18	16	16	16	15	16
3	17	15	16	16	17	17	20	30	50	34	50	50	56	49	40	39	24	24	16	16	16	16	17	17
4	16	15	16	16	16	20	20	23	28	49	40	58	52	53	43	40	34	24	17	17	15	16	16	17
5	16	16	17	18	15	18	21	22	29	41	42	60	50	42	42	39	35	18	21	15	16	17	15	17
6	17	15	15	15	16	18	20	32	35	52	59	50	43	52	37	52	29	23	15	16	16	16	15	16
7	16	16	15	18	16	18	27	27	27	52	39	48	48	52	49	39	27	27	16	17	18	16	16	16
8	16	16	15	16	15	16	27	32	28	N	53				38	53	32	26	17	17	15	16	16	16
9	16	18	18	20	15	16	22	29	40	45	50	49	46	49	49	40	27	29	22	17	18	20	18	20
10	18	20	15	17	16	16	30	34	42	49	50	48	52	49	45	48	36	28	18	16	17	23	17	21
11	17	16	15	16	15	17	28	39	29	43	49	49	45	48	39	43	35	30	24	22	18	20	16	18
12	16	15	15	15	15	18	27	34	39	56	43	48	50	48	52	43	39	30	24	21	15	15	15	16
13	16	17	20	15	16	18	27	33	41	44	44	50	42	50	48	39	35	21	17	16	16	16	16	15
14	15	16	15	15	15	17	27	23	28	40	44	49	47	43	39	35	28	27	17	16	16	22	17	17
15	16	15	15	15	16	15	23	34	27	39	44	45	44	41	40	36	30	27	15	16	17	18	17	15
16	16	15	16	15	N		20	30	43	46	45	46	49	42	42	38	29	18	15	17	17	15	15	16
17	15	15	15	15	16	15	27	24	40	41	50	46	44	43	48	24	20	17	16	16	16	15	20	21
18	16	16	15	15	14	16	24	34	36	42	42	45	39	44	39	35	32	17	16	17	15	15	17	16
19	16	15	15	16	15	16	27	32	36	39	42	43	40	42	23	26	29	20	17	16	16	16	16	16
20	15	16	15	16	15	16	18	23	30	40	45	40	43	45	40	35	28	23	14	16	18	15	16	16
21	15	15	15	16	15	16	24	22	28	27	40	40	44	39		29	27	18	15	18	18	17	16	20
22	15	15	15	17	17	16	23	29	33	27	32	43	40	42	41	33	28	20	15	15	16	16	16	15
23	16	16	16	15	16	15	20	29	29	32	28	42	38	39	39	26	28	24	15	16	15	18	16	15
24	16	15	15	15	15	15	18	22	34	35	41	43	42	38	40	34	28	24	18	21	16	17	17	17
25	16	14	15	15	15	15	26	30	23	32	41	46	42	42	35	32	28	23	15	16	15	17	15	16
26	18	20	16	16	15	16	23	30	23	40	38	38	40	40	38	22	33	18	16	16	17	16	17	17
27	20	14	15	15	15	18	18	24	23		34			N			28	22	17	17	16	16	16	17
28	18	16	15	15	16	17	21	29	24	42	43	42	40	40	23	24	30	21	17	17	15	16	16	16
29	16	15	15	15	16	15	23	32	22	23	42	39	39	36	37	24	27	18	15	17	18	17	20	15
30	17		15	16	16	17	23	27	28	30	39	38	50	39	38	34	18	18	15	16	20	18	16	17
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	30	29	30	30	29	29	30	30	30	27	30	28	28	28	28	29	30	30	30	30	30	30	30	30
MED	16	16	15	16	16	16	23	30	30	41	43	46	44	43	40	35	28	23	16	16	16	16	16	16
U Q	17	16	16	16	16	18	27	32	39	46	48	49	50	49	44	40	33	27	17	17	17	17	17	17
L Q	16	15	15	15	15	16	20	24	28	34	40	42	41	40	38	30	27	18	15	16	16	16	16	16

HOURLY VALUES OF FOF2 AT AKITA

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	66	65	63	64	57	64	84	104	102	89	91	93		86	86	91	A	83	83	90	85	77	78	67
2	66	66	63	61	66	67	86	89	90	83	82	85	92	86	86	86	86	88	91	85	69	75	79	71
3	68		63	63	51	61	85	104	98	101	96	103	108	102	97	87	84	92	87	96	66		66	
4	67	64	61	53	56	60	84	107	100	92	91	100	98	95	100	96	94	89	82	81	81	76	78	69
5	56	63	54	54	57	59	80	92	103	103	92	88	101	95	84	92	101	91	84	74	67	68	66	
6	64	63	64	60	56	63	90	95	107	106	108	110	103	91	90	86	86	92	90	86	80	83		67
7	64	52	72	62	46	56	86	84	95	97	91	92	96	94	91	91	89	88	92	86	53		68	52
8	51	54	61	55	46	54	68	84	68	64	78	76		78	76	73	76	76	76	79	67	62		58
9		51	51	51	54	54		102	106	91	92	99		93	94	88	84	86	86	81	73	75	65	52
10	65	67	51	52	66	74	86	105	105	110	108	112	104	109	104	94	95	95	90	84	78	72	68	66
11	65	65	68	62	60	60	87	112	111	103	116	117	113	110	108	109	105	104	91	82	77	79	78	79
12	77	67	71	71	67	71	98	105	114	115	116	117	116	112	112	98	100	102	102	87	81	80	80	77
13	74	67	77	64	57	57	89	116	119	120	117	114	118	111	N	104	105	112	109	91	83	84	83	84
14	51	78	73	74	72	84	88	116	122	116	118	116	115	113	110	106	112	106	110	103	88	87	76	77
15	77	75	69	69	66	72	103	118	124	113	128	129	116	116	108	103	110	115	110	85	76	75	76	75
16	54	64	67	56	48	51	86	114	110	116	120	118	89	116	112	105	94	106	85	67	68	66	66	66
17	65	62	60	62	A	55	86	104	114	110	114	116	112	110	107	109	104	104	88	83	69	72	71	67
18	67	65	67	65	53	57	85	108	117	114	120	115	114	114	113	107	104	99	90	90	81	66	66	67
19	66	65	64	54	59	52	72	84	88	100	110	103	112	104	100	108	101	86	86	71	68	68	64	80
20	74	64	77	67	66	78	103	108	116	120	124	115	114	112	106	102	111	108	112	N	80	65	67	66
21	74	72	71	35	64	68	84	104	120	122	112	111	108	110	115	120	112	108	90	81	73	64	66	66
22	66	68	69	63	63	64	90	112	124	110	104	120	120	121	111	112	120		124	85	84	66	67	70
23	66	52	70	66	49	51	77	108	120	116	122	131	118	118	109	106	108	108	92	88	78	70	63	67
24	67	52	67	63	55	58	82	102	114	118	113	103	107	117	115	108	108	111	108	87	80	66	64	63
25	64	52	68	67	50	50	81	111	109	106	102	116	115	115	117	110	110	110	100	87	85	67	68	67
26	65	63	62	60	53	57	87	108	103	108	114	126	116	113	111	118	116	114	86	80	75	66	66	63
27	64	60	51	42	30	25	48	45	A	A	A	A	A		67	71	64	68	63	58	51	54	51	51
28	49	47	47	47	44	42	66	89	90	86	88	93	100	108	111	112	120	108	91	79	76	52	54	55
29	54	51	58	42	46	50	80	104	117	115	114	113	116	116	107	112	116	119	93	83	74	66	54	69
30	54	64	58	56	51	57	84	112	119	110	117	132	120	116	120	115	113	108	91	75	78	64	69	52
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	29	29	30	30	29	30	29	30	29	29	29	29	26	29	29	30	29	29	30	29	30	28	28	28
MED	65	64	64	62	56	58	85	104	110	110	112	113	112	110	107	104	104	104	90	84	76	68	67	67
U Q	67	66	69	64	63	64	87	111	118	115	117	117	116	115	111	109	111	108	100	87	81	75	76	70
L Q	60	53	60	54	49	54	80	95	101	98	92	99	103	95	92	91	91	88	86	79	69	66	65	63

HOURLY VALUES OF FES AT AKITA

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	27	G	G	G	G	31	36	41	58	73	G	54	G	G	G	69	131	148	97	79	82	58	32	48
2	36	32	25	30	49	26	33	41	74	G	G	G	65	G	G	50	53	44	69	109	45	46	47	34
3	58		G	G	30	G	37	54	G	G	G	G	G	G	G	52	60	70	57	58	92	59	54	
4	44	30	27	30	28	G	49	62	59	62	54	51	50	48	50	44	G	39	55	104	30	34	G	G
5	37	32	G	31	G	29	33	40	G	66	48	61	G	G	G	G	G	44	G	G	G	G	G	
6	G	G	G	G	37	28	32	43	49	56	72	59	G	49	52	46	55	46	64	55	33	85	90	44
7	29	G	G	G	G	G	G	G	48	59	57	56	G	G	G	G	40	54	84	70	86	58	32	G
8	G	30	31	32	G	34	40	46	49	48	53	52	G	G	48	49	40	38	58	94	56	49	57	58
9	36	G	G	G	G	G		50	50	49	57	G	G	G	G	G	G	G	33	G	G	G	G	32
10	40	40	29	31	45	29	54	50	43	G	G	G	G	G	G	G	51	68	32	40	33	G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	30	G	34	G	24	G
12	G	G	G	G	G	G	G	G	G	G	58	G	G	G	G	G	39	41	G	31	G	G	23	23
13	G	G	G	G	G	27	G	G	G	G	G	G	G	G	G	G	G	37	27	G	G	G	G	G
14	G	G	G	G	G	G	G	37	G	47	G	G	G	57	50	G	58	37	37	37	40	G	G	33
15	29	G	G	G	G	G	33	45	58	G	G	G	G	G	G	G	45	G	27	G	G	G	G	G
16	G	G	G	G	G	G	G	40	G	G	G	G	54	G		G	G	37	82	31	37	37	37	G
17	G	G	G	G	35	36	33	37	G	G	G	G	G	G	G	G	G	G	31	G	G	G	G	G
18	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
19	G	28	G	G	29	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G
20	G	G	G	G	28	25	G	G	G	G	G	G	G	48	G	G	G	G	36	29	29	32	G	G
21	G	29	26	26	G	G	G	G	51	G	G	G	G	G	G	52	54	52	50	30	40	G	33	G
22	G	G	G	G	33	G	G	G	G	G	52	G	G	50	G	G	G	38	34	37	37	G	G	26
23	G	G	G	G	32	29	G	38	G	50	48	G	G	G	G	G	G	G	36	37	29	30	G	G
24	G	G	G	29	G	G	38	G	C	G	G	G	G	G	G	G	G	G	G	G	31	38	G	25
25	G	27	G	G	G	G	G	G	43	G	G	G	G	G	G	G	G	33	G	G	59	G	G	29
26	G	G	G	G	G	G	38	G	G	G	G	G	G	G	G	G	43	40	50	G	30	32	G	G
27	G	G	29	33	28	G	32	40	49	49	54		61	G	G	G	G	36	G	G	G	G	G	G
28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	50	G	43	45	52	41	53	30	26	G
29	G	G	G	G	G	24	31	G	46	50	G	52	51	50	G	45	36	37	52	56	G	G	G	29
30	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	36	32	31	29	37	59	33	23
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	30	29	30	29	30	30	29	30	29	30	30	29	30	30	28	30	30	30	30	30	30	30	30	28
MED	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G	18	38	35	30	32	G	G	G
U Q	29	27	G	27	29	27	34	41	49	49	52	26	G	G	G	44	45	44	55	55	40	38	32	29
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT AKITA

SEP. 1989

LAT. 39.7N LON. 140.1E 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	16	15	16	15	16	21	21	21	23	30	27	44	27	30	39	22	24	16	20	15	15	16	17
2	16	15	17	15	15	20	18	21	23	C	49	33	24	35	27	36	21	16	16	17	16	17	16	16
3	16		15	17	15	18	17	22	38	45	45	48	36	35	50	26	23	20	23	16	17	16	16	
4	16	16	16	15	15	18	17	20	23	30	33	29	29	28	23	22	18	17	17	18	17	16	20	18
5	17	15	16	15	15	18	17	22	24	24	29	36	21	23	63	27	22	16	20	18	17	20	20	
6	18	15	15	16	15	18	16	21	23	38	42	36	36	35	21		16	21	16	21	16	16	16	16
7	17	15	15	15	16	17	17	20	21	22	26	29	35	28	23	26	18	17	16	16	16	17	18	17
8	18	15	15	16	16	16	18	21	20	27	32	35	35		30	24	21	20	17	17	16	16	17	17
9	18	17	16	15	17	17		21	24	34	27	63		27	46	24	21	18	16	18	17	17	18	17
10	16	15	16	15	15	16	17	18	23	27	46	52	49	61	43	39	23	22	15	16	18	17	18	18
11	17	15	15	15	15	16	28	22	22	34	28	35	52	23	22	24	22	18	16	16	17	20	17	16
12	17	15	15	15	15	18	26	20	21	49	23	47	48	46	45	45	38	23	22	16	18	20	16	16
13	18	16	15	15	15	15	28	21	42	23	46	45	24	48	46	21	21	17	20	17	18	17	18	16
14	18	15	15	16	15	18	26	16	21	23	29	28	29	38	30	21	18	21	15	17	16	17	18	15
15	16	15	16	15	15	17	18	21	21	23	45	46	50	48	21	22	22	18	17	18	17	21	18	16
16	18	16	15	16	N	N	18	18	39	37	33	45	34	39	28	28	22	18	16	15	16	16	16	21
17	18	15	15	15	15	15	17	20	21	24	27	45	26	26	23	36	22	21	15	20	18	16	16	17
18	17	16	15	15	15	17	20	17	20	23	26	23	26	44	39	34	23	17	18	17	18	17	22	17
19	20	15	15	15	15	18	22	20	21	26	26	43	49	21	18	26	17	24	18	17	17	20	21	18
20	20	15	15	15	15	16	24	21	20	23	24	24	27	24	23	23	21	21	14	17	18	16	18	17
21	18	17	15	17	15	17	26	20	21	22	23	45	46	45	22	21	15	21	16	17	16	16	16	18
22	17	15	16	15	15	18	23	18	21	22	22	22	23	17	21	16	21	22	15	15	16	18	16	18
23	16	15	15	15	15	18	16	20	20	21	27	24	24	23	22	22	29	15	15	16	16	18	21	17
24	18	15	15	15	15	16	20	21	21	22	23	26	44	24	23	36	18	23	16	17	17	17	20	17
25	23	16	15	15	15	16	23	16	20	23	22	43	28	45	23	21	21	20	16	17	16	17	18	17
26	17	15	15	15	15	17	20	17	21	44	26	28	24	44	26	21	18	17	17	18	18	17	17	22
27	22	15	15	15	15	N	16	18	23	21	23	22	23	26	22	22	18	16	16	18	18	17	18	16
28	17	15	15	15	15	16	23	17	23	48	43	43	45	45	27	21	21	18	15	16	16	17	16	16
29	18	15	15	15	15	18	16	16	17	22	35	33	22	35	28	23	21	18	17	16	17	16	20	15
30	16	16	15	15	15	17	23	20	20	21	23	42	62	44	40	23	20	18	16	16	15	16	17	21
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	30	29	30	30	29	28	29	30	30	29	30	30	29	29	30	29	30	30	30	30	30	30	30	28
MED	17	15	15	15	15	17	20	20	21	23	28	36	34	35	26	24	21	18	16	17	17	17	18	17
U Q	18	16	15	15	15	18	23	21	23	34	35	45	45	44	39	31	22	21	17	18	18	17	18	18
L Q	16	15	15	15	15	16	17	18	21	22	24	28	24	25	22	21	18	17	16	16	16	16	16	16

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT KOKUBUNJI

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	71	60		72	62	68	91	N	94	94	92	97	101	95	98	92	91	87	86	91	61	81		82
2	79	71	74	72	66	72	87		113		94	105	106		94	92					70	72	83	65
3	75	73		68		61	91	111	108	108	108	122	119	121	111	105			107	96	65	69	81	81
4	73	73	70	60	58	72	85	119	99	91	98	103	103	94	105	108	95	119	93	91	79	76	82	75
5	68	68	66	69	60	65	85		108	105	100	103	114	101	92	100	106	100	88					
6											111	113	108	100	100	93	92	94	96	88	80	86	78	67
7	66	58	73	54	54		91	119	108		105	102	107	102	102	97		96		59	68	73		68
8	56	62	89	58	54	57	B	88	72	70	84	90	87	87	86	78	78	85	88	81	64	59	63	62
9	60		57	53	55	58	86	105	105	99	104	102	105	110	106	95	98	96	102	87	70	88	72	73
10	73		72	60	73	75	97	101	99	112	113	118	116	116										
11	68	67	74	69	57	60	92	106	112	110	120	121	126	123	121	118	115	112	110	84	92	89	84	85
12	82	82	72	81	74	71	92	115	122	119	122	120	120	116	118	114	106	106	106	94	87	92		
13	82	82	73	68	59	59	86	112	112	117						110	116	113	112	95	80	88	92	84
14	80	92	78	87	78	76	94		123	116	122	125	119	122	117	112	112	114	114	104	100		77	79
15	92	78	72		70	69	102	127	123	118	128			125	117	114	117	126	125	91	71	80	79	82
16	64	72	84	52	85	92	90	117	120	126	129	139	120	126	121	114	108	104	98	72	80	70	64	69
17	N		67	64	57	58	88	112	116	121	130	128	128	121	121	116	111		109	86	90	81	79	78
18	76	72		69	56	58	87	110	117	122	119	115	124	121	115	115	107	100	86	86	76	72	72	72
19	70	70		53	57	54	71		96	108	130	116	112	109	108	118	117		90		73	80	68	75
20		74	76	72	66	71	99	120	113	119	118	124	123	119	111		107	116	114	87	78	80	71	89
21	76	76	76	72	77	60	94	112	134				113	120	126	124	126		109		79	81	70	71
22		69	72	76	69	69	93			96	107	123	128	130	124	115	130	128	118		92	77	74	80
23	81		77	76	48	55		116	127	119	130	143		121	113	115	112	117	116	96	89	86	82	
24	81	75	76	65	56		92	102	114	125	121	104	115	118		114	111		116	94	81	73		
25	76	65	74			49	82	115	107	112	114	97	117	124	126	115	121	116	111		83	74	69	70
26	78		73	57	54	64	95	112	111		115	131	126	127	127	126	129		113	77	78	77	91	65
27		71	64	43	45	34	47	56	59	55	55	73	75	85	84	89	89	84	82	89	59	62		
28	53	50	51	57	52	48	74	96	97	77	91	107	114	116	120		124	127	103	78	93	79	83	68
29	73	59	66	42	43		82	106	120	106	111	123		128	115		122	128	107	81	74	71	73	73
30			70	62	55	58	92		114	111	124	138	134	125	131	127		115	106	92	75	74		71
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	24	23	25	27	27	26	27	22	28	25	28	27	26	28	27	26	25	22	27	23	28	27	22	24
MED	74	71	73	65	57	60	91	112	112	111	114	116	116	120	115	114	111	112	107	88	78	77	78	73
U Q	79	75	76	72	69	71	93	116	118	119	122	124	123	123	121	115	119	117	113	94	85	81	82	80
L Q	68	65	68	57	54	58	85	105	102	97	102	103	107	105	102	97	102	96	93	81	70	72	71	68

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT KOKUBUNJI

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G			G	G	28	34	49	50	56			G	77	48	48	62	60	54	94	99	58	96	55
2		G	G	70	49	54	59	60	59		53	52	53	G	54	54	79	85				56	56	37
3	30	30		G			34	48	44		52	G	G	G	G	56			75	69	58	27	24	29
4	29	26	G	G	G	26	G	G	72	51		65	64	56		44	G	37	40	85	55	29	59	31
5		G	29	22		24	34	40	G	49	54	G	G	G	G	G	G	42	30					
6											56	54			G	44	65	66	57	43	41	49	59	
7	61	32				28	G	43	57		68	55	61	59	54	54	43	39	58			73	59	41
8		32	42		G	24		49	60	55	58	54	64	55	49	43	G	34	38	42	29	G		28
9	24		G	G	G	32	G	56	56	54	G	G	G	G	G	G	G	G			G	G	G	G
10	G		G	G		34	G	50	58	52	48	G	G	G										
11	G		G	G	G	G	G	G	G	G	G	G	G	G		G	40	40	30	33	34	30	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G			G	G	33	G	G	G
13			G	G	G	G	G			G							G	37		26	26	G	G	G
14	G	G	G	G	50	G	31	G		G		50	52	51					G		G		29	
15	G		G		G	G		42	54	55		49	G	G	G	66	42	35	26			G	G	G
16	G	G				G	34	40			G	G	G	G	48		46	40	40		58	49	56	34
17	34	39		29	26	37	44	62	G	G	G	G	G				43	51	46		30		25	22
18	26			G	G	G	31	37	45	51		G	G	G		G	G	G	23	G		G	G	G
19	G	G		23		24		G	G	G	G	G	G	G	G	G	39	32	41	30			G	G
20	G			G	G	G	G			47	48	48	48				46		30	29	34	31	34	35
21	32	26	28	G	35	29	G		46				G		61	50	64	55	48			49	30	G
22	G		G	G	G	G		45	44		G	G	G		58	G	G	36	30		36	54		G
23	G			25				78	44	59		47	G	G	G	G	G	G		G	59	59	26	G
24	G	G	G	G	G	G		G		G	62	G	G	G	G	G				G		33	40	
25	G	G	G	G	G	G		38	59		G	G	G	G	G	G	G	G	G		G		41	G
26	28			G	G	G	37	46	G	G	46	G	G	49	45	44	58	58	28	60	30	32	27	
27		G	28	36	30	G	30	42	45			57					43	37	44	33		23		
28	G	G		29		G	G		G	G	G	G	G		G	42	77	50		32	46		30	G
29	30	26	G		28	28	38	48	47	54	55	55	52	55		77	68	57	124	52	29	G		G
30	25	G	G	24	G	G	G	38		G	G	G	G	G	G	G		33	32	41	56	46		37
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	24	18	18	24	21	27	22	25	23	21	21	27	27	22	20	23	24	24	23	18	20	23	23	23
MED	G	G	G	G	G	G	16	42	45	47	46	G	G	G	G	42	42	38	38	33	34	31	29	G
U Q	28	26	G	23	27	28	34	49	57	54	54	52	48	51	48	50	60	53	48	52	55	49	56	34
L Q	G	G	G	G	G	G	G	19	G	G	G	G	G	G	G	G	G	33	28	26	29	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT KOKUBUNJI

SEP. 1989

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

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

HOURLY VALUES OF FOF2 AT YAMAGAWA

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	86	80	80	68	66	66	84	88	88	91	91	96	112	118	111	112	112	108	98	A	87	79	A	82
2	57	71	62	62	53	63	A	111	84	A	A	114	120	121	125	122	115	110	110	87	84	C	84	84
3	A	65	66	71	66	63	79	88	112	106	N	137	145	145	146	146	N	125	111	108	87	89	86	84
4	88	85	76	72	68	61	76	89	98	98	102	112		114	121	118	101	95	108	106	84	85	86	84
5	73	71	70	63	63	61	66		113	110	101	123	136	140	127	130	131	120	106	109	90	88	97	92
6	86	86	84	77	64	67	74	108	121	109	115	128	131	128	126	113	104	104	104	101	88	84	83	79
7	78	78	82	76	66	63	78	111	120	104	104	121	123	131	132	127	124	116	111	106	88	89	80	81
8	66	63	64	75	50	59	71	91	86	97	98	107	112	113	95	88		96	103	87	77	65	76	75
9	74	79	71	N	61	60	71	89	109	98	102	118	121	118	116	112	111	110	113	107	86	83	86	79
10	87	83	84	67	74	71	80	88	104	110	117	122	126	N	N	141	135	120	114	108	87	88	86	87
11	83	80	80	80	58	58	74	102	103	112	116	131	134	138	141		140	136	124	120	108	134	142	109
12	134	122	101	85	71	60	76	108	123	113	114	125	135	135	137	126	121	118	112	106	88	85	87	88
13	84	84	80	77	57	52	65	89	108	112	109	121	127	127	122	114	118	120	119	107	88	92	90	87
14	86	87	86	83	74	66	78	110	127	114	120	137	140	142	141	128	124	133	134	124	88	90	84	84
15	86	88	84	83	72	63	77	108	116	116	134	135	133	137	136	N	110	124	123	109	80	82	86	86
16	76	77	84	68	62	53	52	87	110	128	140	148	140	140		131	119	110	104	84	77	76	68	76
17	71	64	67	66	56	62	69	103	122	125	144	154		159	159	149	148	145	134	125	109	130	137	134
18	N	109	105	83	68	63	66	104	122	126	118	118	132	140	129	123	113	108	112	104	87	A	80	76
19	78	75	74	58	61	52	35	104	88	101	137	128	116	124	122	133	118	111	108	87	70	66	70	71
20	66	66	67	74	66	64	77	103	122	102	110	126	132	130	126	117	122	126	122	96	82	79	84	86
21	80	84	83	84	75	54	58	90	122	106	102	110	121	125	127	128	131	128	124	110	108	90	85	84
22	77	74	74	73	66	51	67	108	117	100	108	126	138	146	150	145	154	153	142	145	147	157	146	144
23	139	124	109	126	87	73	85	109	124	120	135	146	148	144	133	128	126	141	138	124	104	87	88	86
24	88	90	80	76	58	53	60	84	107	122	101	98	115	126	130	120	120	128	128	122	104	88	82	82
25	84	86	84	78	51	44	59	89	102	108	106	114							132	120	84	77	80	78
26	68	66	67	57	56	44	61	102	110	121	114	121	136	140	139	144	144	141	131	91	88	108	109	88
27	84	79	79	48	44		52	88	78	99	91	101	102	103	102	95	95	91	88	84	80	81	87	84
28	78	68	67	67	54	49	66	88	88	93	90	108	126	132	132	130	135	135	120	104	88	88	86	84
29	76	77	68	53	34	43	51	102	118	114	110	134	144	136	135	126	137	135	122	104	89	84	85	87
30	85	109	78	68	53	59	72	88	104	117	132	129	136	139	140	134	127	126	122	105	87	83	84	80
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	28	30	30	29	30	29	29	29	30	29	28	30	27	28	27	27	27	29	30	29	30	28	29	30
MED	82	80	80	73	62	60	71	102	110	110	110	122	132	134	130	127	122	120	116	106	88	86	86	84
U Q	86	86	84	79	68	63	77	108	121	116	119	131	136	140	139	133	135	134	124	115	89	89	87	87
L Q	75	71	68	66	56	52	60	88	102	100	102	114	121	124	122	117	113	110	108	98	84	81	82	80

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT YAMAGAWA

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	44	G	G	G	49	51	56	56	G	51	81	94	86	46	84	46
2	41	34	38	41	32	31	68	48	79	149	164	G	G	G	G	G	60	44	44	55	58	58	48	45
3	69	43	G	G	G	G	28	43	G	G	G	G	G	G	G	G	G	53	54	G	G	G	G	G
4	32	G	G	G	G	G	G	G	G	50	57	G	G	61	50	G	G	60	85	40	40	G	G	G
5	G	G	G	G	G	G	G	34	45	G	G	G	G	G	G	G	G	44	56	40	23	32	36	30
6	28	G	G	G	G	G	28	38	40	G	G	G	G	G	G		G	53	46	35	38	37	30	46
7	31	48	49	31	G	G	G	40	47		70		67	112	89		53			40	34	G	30	G
8	25		G	G	G	G	G	G	48	77	60					54	57	50	54	43		G	G	G
9	G	G	G	24	G	G	G	G	42	G	91	87		G	G		G		37		G	G	G	25
10	G	G	G	G	G	28	G	G	G	G	G	G				G			61	41	G	G	G	G
11	G	G	G	G	G	G	G	G	G	G		G			G	G		47	34	G		G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G		G	G		G	G	G	G	G		G	G
13	G	G	G	G	G	G	G	36	44	G	G	G		G			G	G	40	G	G	G	G	G
14	G	G	G	G	G	G	G	34	G	46	G	G	G	G	51	G	G	G	31	28	G	G	G	G
15	G	G	G	G	G	G	G	36	41	G	G	G	G	G	56	G	G	G	G	45	25	46	G	G
16	G	G	G	G	G	G	29	36	G	G	G	G	G	G	G	47	G	G	61	41	69	40		37
17	37	G	G	G	G	G	G	G	G	52	G	G	G	G	G	G	54	48	44	41	42	49	55	32
18	G	G	G	G	G	G	G	G	46	52	52	51	52	G	G	G	G	G	G	91	69	58	G	G
19	G	G	G	G	G	G	G	G	G	50	G	G	G	G	G	G	G	G	28	G	G	G	G	G
20	G	G	G	G	G	G	G	33	40	48	58	80	73	G	G	51	59	39	G	28	24	G	40	28
21	G	50	33	33	25	G	G	G	G	G	G	G	G	G	G	G	G	43	43	28	G	G	30	30
22	G	32	24	G	G	G	G	G	40	G	49	G	G	G	G	G	G	37	60	55	58	G	G	G
23	G	G	G	G	G	G	G	37	44	46	52	53	54	61	51	50	G	G	34	33	41	43	G	G
24	G	G	G	G	G	G	23	G	G	44	G	G	G	G	G	G	G	40	33	G	G	G	G	G
25	G	G	G	G	G	G	G	G	40	G	G	G							G	G	G	G	G	G
26	G	G	G	G	G	G	G	36	44	G	G	48	G	48	48	59	41	40	43	69	30	32	32	G
27	44	27	G	23	G	25	G	G	G	50	G	G	50	G	G	48	45	48	51	58	33	G	G	G
28	G	G	G	G	G	G	22	G	G	G	G	G	G	G	G	55	62	56	58	41	44	34	24	G
29	G	G	G	G	G	G	23	G	G	45	G	53	G	G	55	G	51	48	41	31	26	25	G	G
30	G	G	G	G	G	G	G	40	52	G	G	G	G	G	G	G	G	42	31	33	41	28	29	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	30	30	30	30	30	30	30	29	29	28	23	26	26	24	27	26	29	29	28	29	29	30
MED	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	42	43	40	28	G	G	G
U Q	25	G	G	G	G	G	G	36	44	49	52	G	49	G	50	49	51	48	55	44	41	38	30	28
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	14	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT YAMAGAWA

SEP. 1989

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

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FOF2 AT OKINAWA

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			123	86	80	78	82	80	92	90	97	111	122	127	132	135	136	127	112	104	88	86	84	84
2	86	90	86	74	66	58	72	108	104	97	105	118	141	156	165	162	161	145	130	128	140	106	N	85
3	76	73	66	66	61	58	66	N	104	103	120	145	166	162	170	174	169	155	146	140	145	144	116	136
4	126	122	109	87	86	85	86	106	104	99	104	113	137	138	140	140	110	108	121	108	90	90	88	87
5	86	87	110	86	84	66	80	100	108	106	122	137	154	169		164	162	148	137	146	146	155	154	158
6	140	127	110	111	86	84	88	112	117	102	A	132	146	146	152	146	141	131	128	122	141		165	144
7	144	143	111	78	84	79	85	110	122	104	111	131	144	156	164	165	162	164	162	162	164	146	122	88
8	86	85	88	87	74	65		104	102	91	105	121	140	138	124	120	117	114	122	103	88	84	85	97
9	131	139	138	85	84	66	75	103		104	104	134	145	141	142	144	145	140	144	134	141	146	151	145
10	131	145	169	123	86	88	86	88	104	108	121	136	157	164	168	171	159	164	156	146	131	145	144	141
11	138	102	109	102	60	58	74	85	96	111	115	140	146	142	160	168	165	156	160	164	165	164	165	168
12	171	167	167	137	108	75	76	102	108	100	121	136	146	163	158	N	146	141	136	132	137	145	144	
13	128	140	110	85	62	52	53	88	104	104	105	120	138	142	132	132	130	135	129	122	135	N	147	
14	108		110	109	84	66	78	88	119	105	122	137	145	158	160	144	144	141	146	144	119	120	85	111
15	123	128	110	91	85	72	72	102	108	127	135	138	147	157	71	136	138	140	120	108	90		84	85
16	110	82	97	84	58		48	86	111	98	148	148	156		156	146	138	126	107	108	88	82	85	83
17	80	84	82	68	40	54	65	89	108	133	155	167	170	171	171	171	172	135	163	145	163	164	193	146
18	162	161	142	149	90	73	66	88	112	118	122	133	153	160	154	145	133	138	134	105	111	88	87	110
19	87	111	85	102	50	54	49	87	89	73	146	124	126	144	138	144	144	120	123	110	83	75	70	72
20	67	66	54	66	66	54	63	102	112	102	107	121	128	137	142	144	147	143	128	90	111	130	146	163
21	168	144	146	112	54	43	52	88	103	100	77	113	130	137	137	132	145	142	142	145	147	128	108	84
22	87	84	84	N	71	52	54	79	102	105	119	131	149	169	170	180	184	177	177	182	171	165	177	184
23	168	146	145	135	97	75	75	90	123	127	133	146	151	158	156	145	159	164	174	165	161	174	168	186
24	181	170	140	86	84	48	47	85	108	102	101	110	130	144	135	135	136	145	146	158	145	144	165	165
25	164	162	138	111	81	54	59	90	107	119	107	122	137	147	152	145	154	157	155	145	130	99	111	110
26	87	90	87	87	64	30	43	88	118	105	121	144	163	172	180	172	184	180	166	165	163	164	146	162
27	145	110	87	59	47	32	36	88	110	132	130	116	138	128	126	110	111	104	102	86	85	106	140	148
28	86	84	87	87	57	46	54	88	87	98	112	117	136	145	146	N	157	147	140	138	143	163	170	139
29	170	140	C	C	C	C	C	C	C	126	123	146	158	167	162	162	158	147	146	142	135	140	167	162
30	163	140	108	90	63	54	71	78	105	117	135	137	154	160	150	151	146	141	140	110	110	92	111	110
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	29	28	29	28	29	28	28	28	28	30	29	30	30	29	29	28	30	30	30	30	30	27	29	28
MED	128	124	110	87	74	58	68	88	108	104	120	132	146	156	152	145	146	142	140	136	136	140	144	138
U Q	162	143	138	110	84	74	77	102	111	117	126	138	154	162	163	164	161	155	155	146	146	155	165	160
L Q	86	86	87	84	60	53	53	87	103	100	105	120	137	141	137	138	138	135	128	108	110	92	87	87

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FES AT OKINAWA

SEP. 1989

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	25	42	46	48	G	G	78	G	G	G	G	45	49	61	57	60	36	33
2	29	G	G	G	G	25	31	G	G	G	G	G	G	63	50	G	52	64	46	36	G	G	G	G
3	38	38	36	G	G	G	24	58	G	47	G	G	G	G	G	G	G	43	G	G		G	G	G
4	G	G	G	G	G	G	G	G	43	G	G	G	G	G	G	G	G	52	57	48	58	26	26	G
5	G	G	G	G	G	G	24	33	G	47	G	G	G	G	G	62	50	51	56	40	34	28	G	G
6	G	27	G	G	G	G	24	38	46	50	108	G	G	G	56	58	59	74	70	38	31	34	26	
7	G	G	G	G	G	31	28	35	51	72	74	80	G	60	71	59	109	51	45	86	32	29		G
8	G	G	G	G	G	G		G	G	49	60	58	G	G	55	G	56	44	43	34	37	G	G	33
9	40	G	G	G	G	G	G	39		110	G	50	G	G	G	67	43	59	37	32	G	G	G	G
10	G	G	G	G	G	G	G	G	41	G	G	G	G	G	G	G	G	G	34	56	G	G	G	G
11	G	G	G	G	G	G	G	G	46	48	G	G	62	G	G	G	G	52	44	67	37	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	25	28
13	G	G	G	G	G	G	G	38	47	58	G	G	51	G	G	G	G	56	44	27	38	G	24	G
14	24	G	G	G	G	G	G	34	42	50	50	G	54	57	55	64	45	38	58	49	32	33	33	G
15	G	G	G	G	G	G	G	33	42	44	G	G	G	G	G	G	G	G	G	36	28		G	G
16	G	G	G	G	G	29	G	39	48	G	46	G	60	58	56	70	G	42	60	68	43	33	48	40
17	G	25	G	G	G	G	G	G	G	G	G	50	G	G	52	G	53	50	44	46	32	28	39	31
18	24	G	G	G	G	G	23	35	G	G	G	G	G	G	G	G	G	83	80	81	32	28	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	G	25	G	24
20	25	G	G	G	G	G	G	33	40	G	56	63	54	52	57	56	G	43	31	36	29	G	G	G
21	G	G	G	G	11	G	28	37	59	G	G	G	G	G	51	61	44	38	29	28	27	29	32	38
22	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G	G	G	29	G	G	G	34	23
23	G	G	26	G	38	G	G	36	42	51	51	59	68	59	58	58	G	43	40	51	84	39	30	G
24	G	G	G	G	G	G	24	36	45	46	G	52	G	G	G	48	46	41	37	29	G	G	G	G
25	G	G	G	G	G	G	G	G	43	G	G	G	G	G	G	47	G	G	G	G	G	G	G	G
26	G	G	G	G	G	G	G	34	45	G	G	55	G	G	G	G	57	38	41	38	G	G	G	G
27	G	G	G	G	34	G	27	37	48	44	G	G	G	G	G	49	50	52	50	49	45	82	24	24
28	G	G	G	G	24	29	G	33	G	G	G	G	G	60	64	57	62	50	47	93	56	G	24	G
29	G	G	C	C	C	C	C	C	C	G	G	G	G	G	G	G	45	64	50	92	40	33	23	26
30	26	G	G	G	G	G	G	33	49	44	G	G	G	G	G	G	G	39	38	36	29	28	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	29	29	29	28	29	28	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29
MED	G	G	G	G	G	G	G	34	42	22	G	G	G	G	G	G	G	44	44	38	32	25	G	G
U Q	G	G	G	G	G	G	24	37	46	48	G	50	G	G	55	58	50	52	50	56	39	31	28	25
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	34	29	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF FMIN AT OKINAWA

SEP. 1989

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	16	15	15	15	21	27	32	32	33	53	46	49	55	36	24	15	15	15	17	15
2	17	17	15	15	15	15	14	20	23	49	29	32	47	29	29	28	28	29	17	14	15	15	15	15
3	15	15	15	16	15	15	16	15	38	28	42	45	38	36	35	39	29	17	15	17	16	16	15	15
4	17	15	14	15	15	15	16	28	26	38	48	50	33	45	33	29	29	26	23	14	15	14	15	15
5	15	15	15	15	15	15	15	16	20	27	29	46	32	33	55	28	27	18	15	14	15	15	15	15
6	15	15	15	15	14	15	17	20	28	29	43	49	48	49	29	44	28	26	16	15	15	15	15	16
7	16	15	15	15	15	15	14	15	21	27	36	38	49	43	40	38	27	22	14	16	15	15	15	15
8	15	15	15	15	15	15		28	24	27	27	36	48	55	41	29	30	22	17	17	15	22	15	15
9	16	15	15	15	15	15	18	21		27	35	34	48	29	50	27	21	15	15	15	15	15	15	16
10	15	20	15	16	16	15	17	28	26	27	33	33	32	34	29	29	27	35	15	14	17	15	15	15
11	15	15	15	15	15	15	20	29	28	28	52	36	35	49	34	30	29	21	18	14	15	15	15	15
12	17	15	15	14	15	15	16	17	22	43	44	46	30	61	N	N	68	45	29	20	17	16	15	15
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25	15	15	15	15	15	15	15	15	16	28	29	33	30	35	29	26	21	16	16	15	15	15	15	15
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29	20	20	C	C	C	C	C	C	C	27	32	47	33	48	45	40	28	18	15	15	15	15	15	15
30	15	15	15	15	15	15	15	16	18	26	28	29	59	48	31	44	26	22	15	15	15	15	15	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	29	29	29	28	29	28	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	15	15	17	21	27	32	34	34	37	34	29	27	21	15	15	15	15	15	15
U Q	16	15	15	15	15	15	16	22	26	33	39	46	45	48	40	36	29	26	17	15	15	15	15	15
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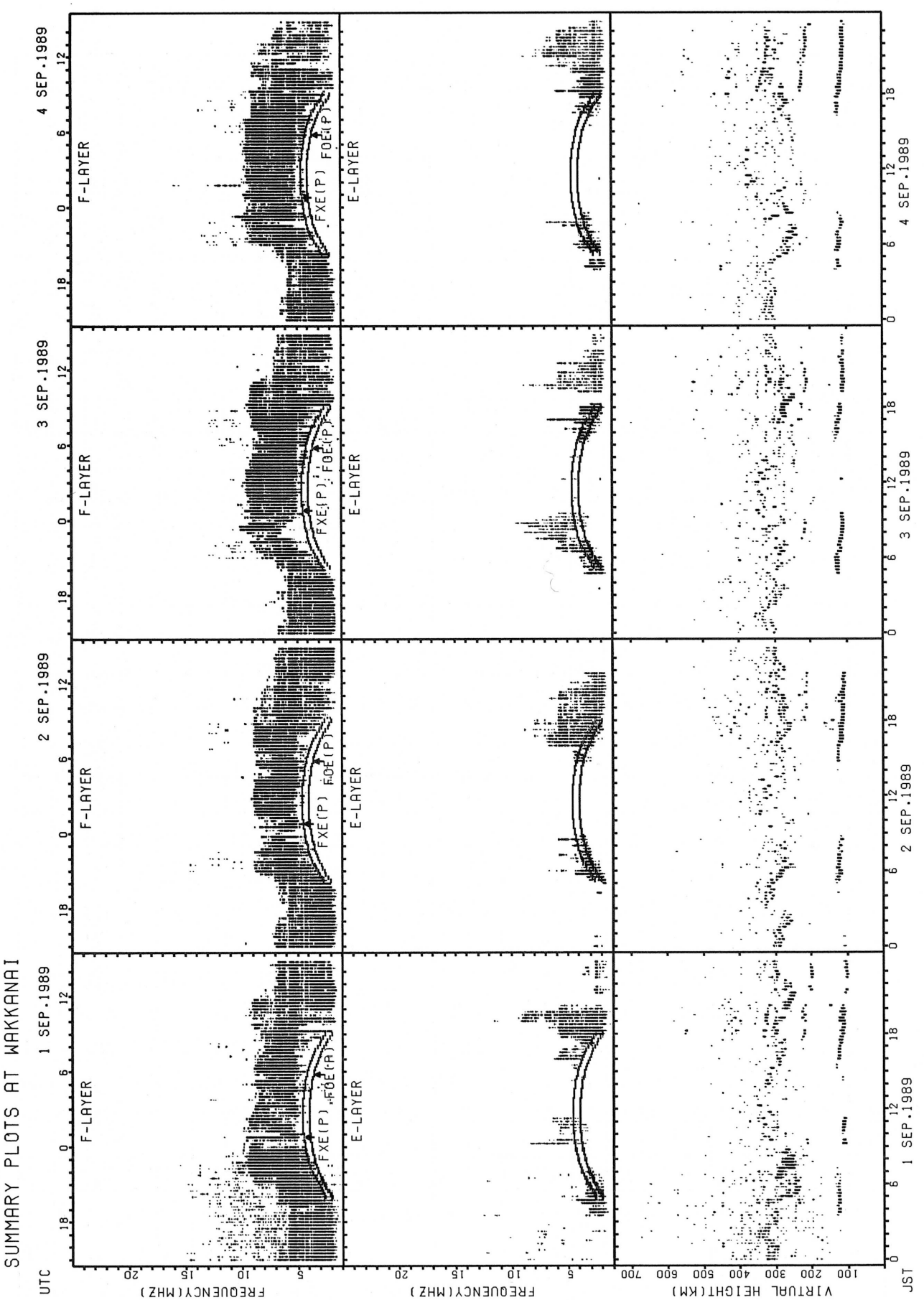
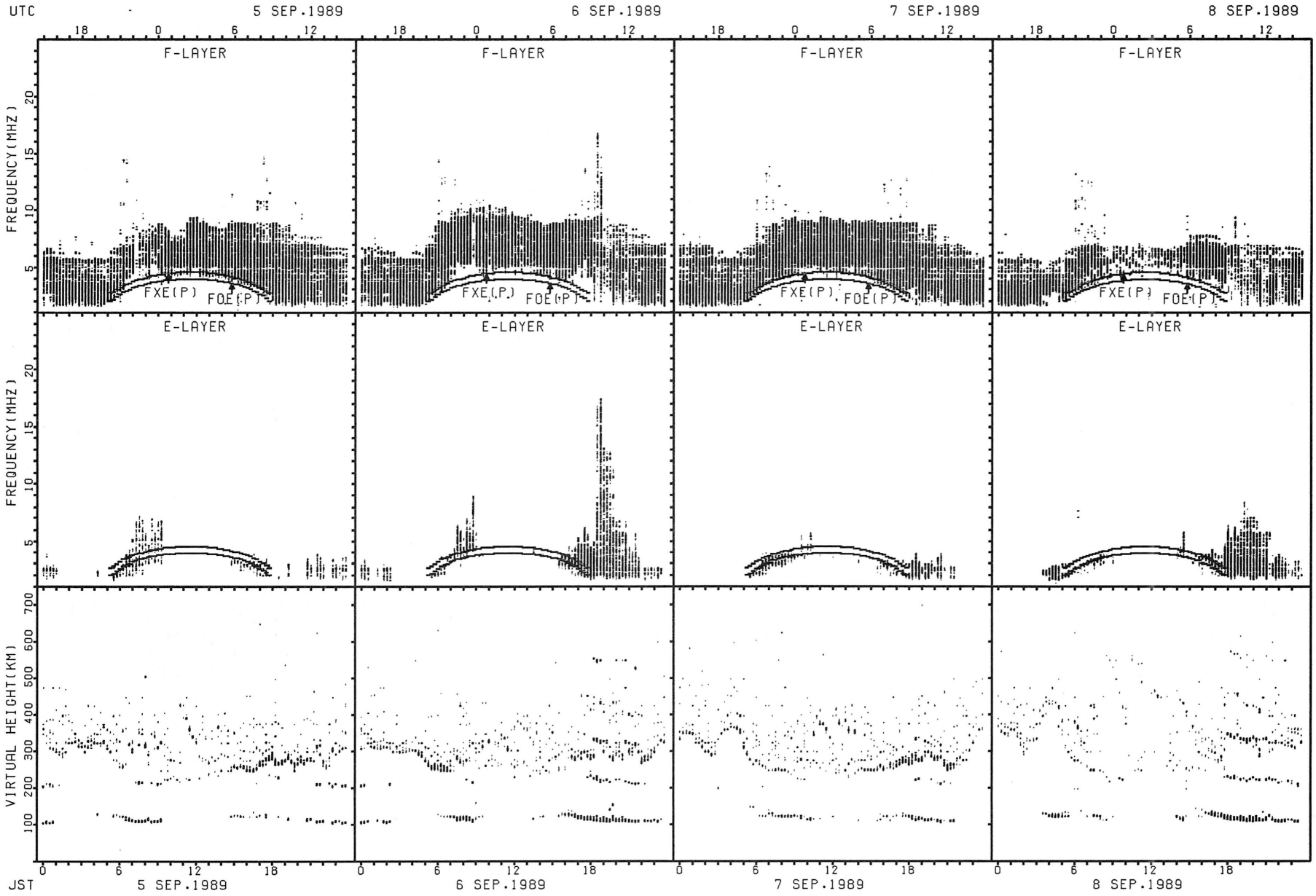
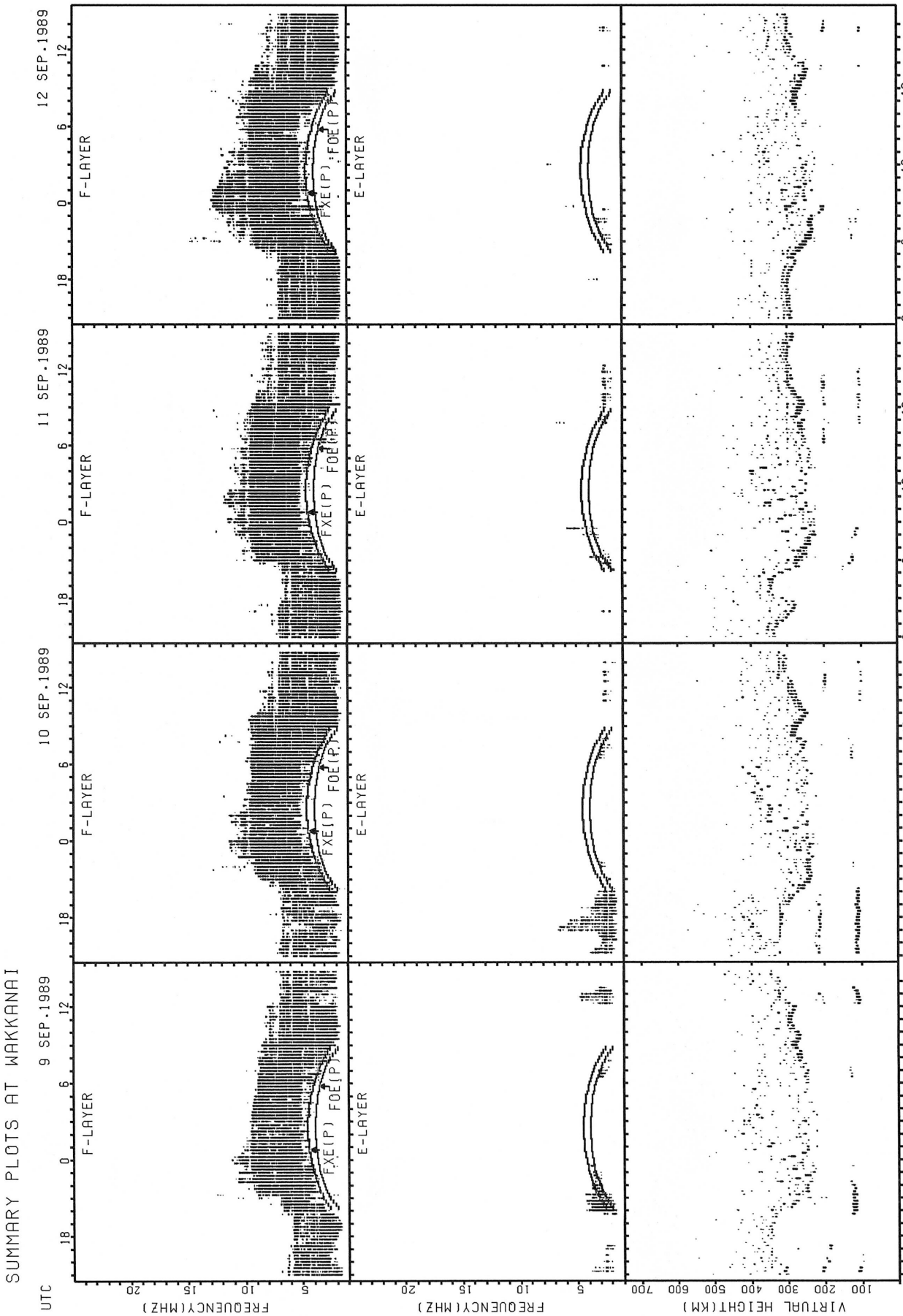
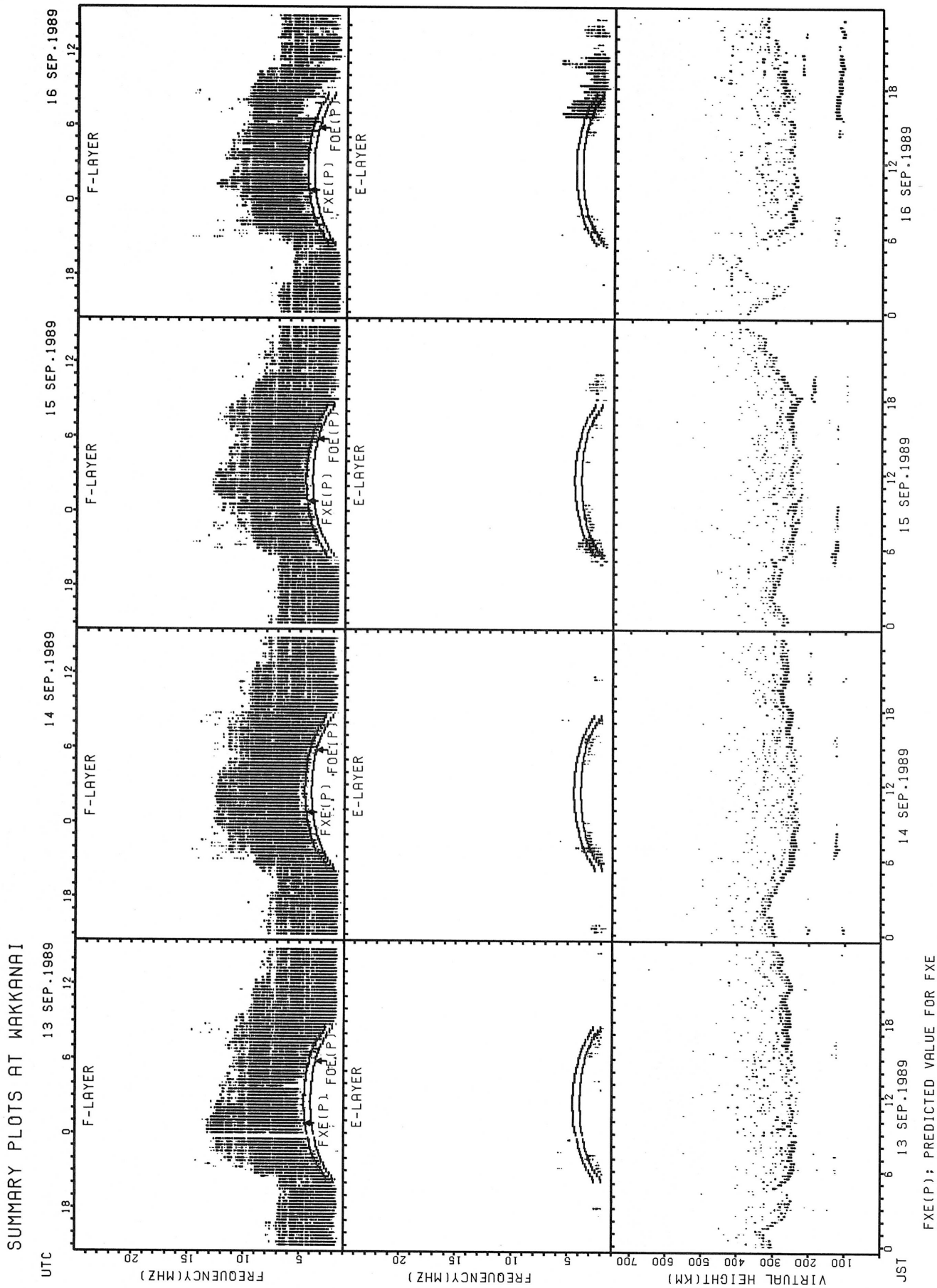

SUMMARY PLOTS AT WAKKANAI
UTC
1 SEP.1989
2 SEP.1989
3 SEP.1989
4 SEP.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

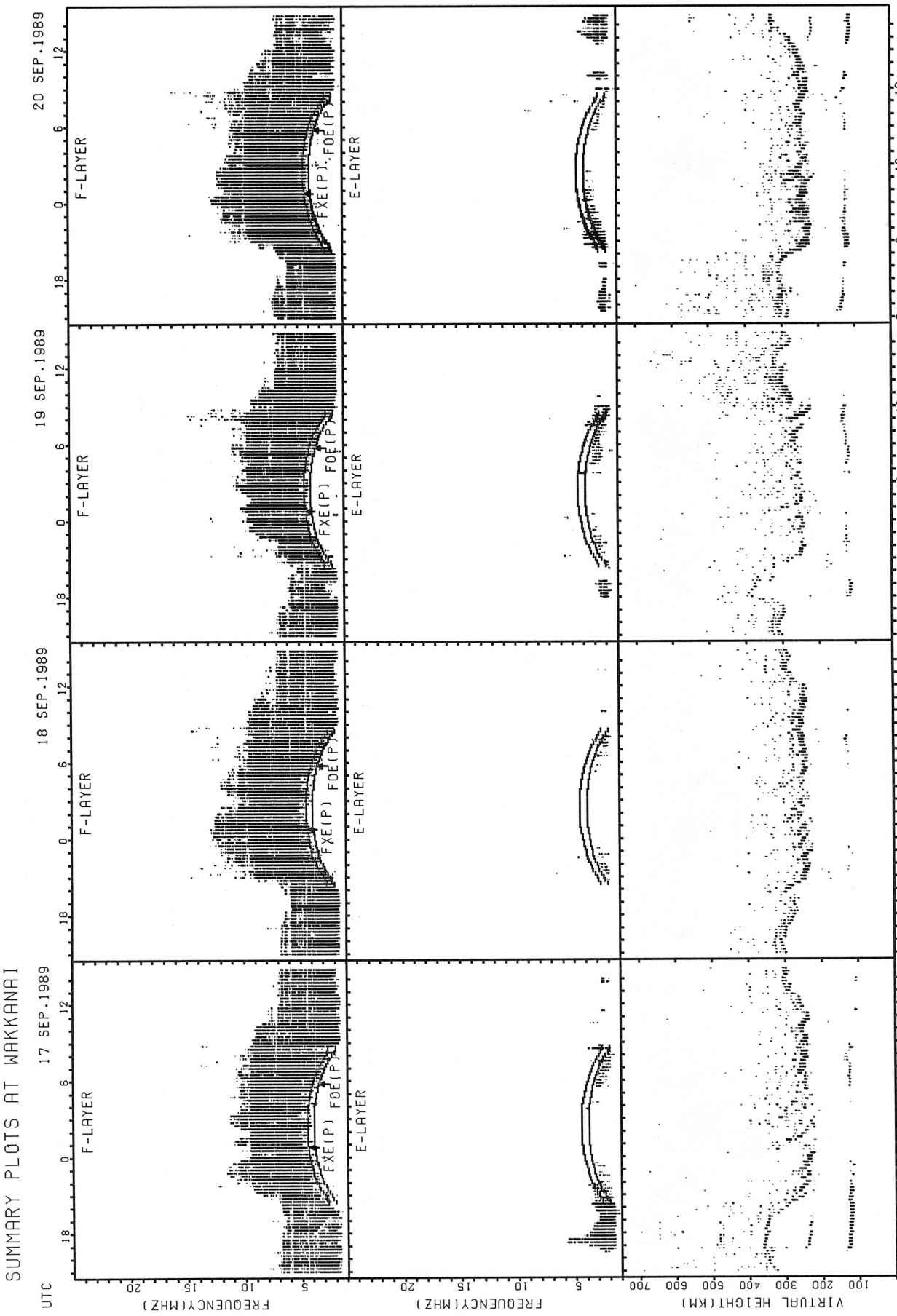
SUMMARY PLOTS AT WAKKANAI

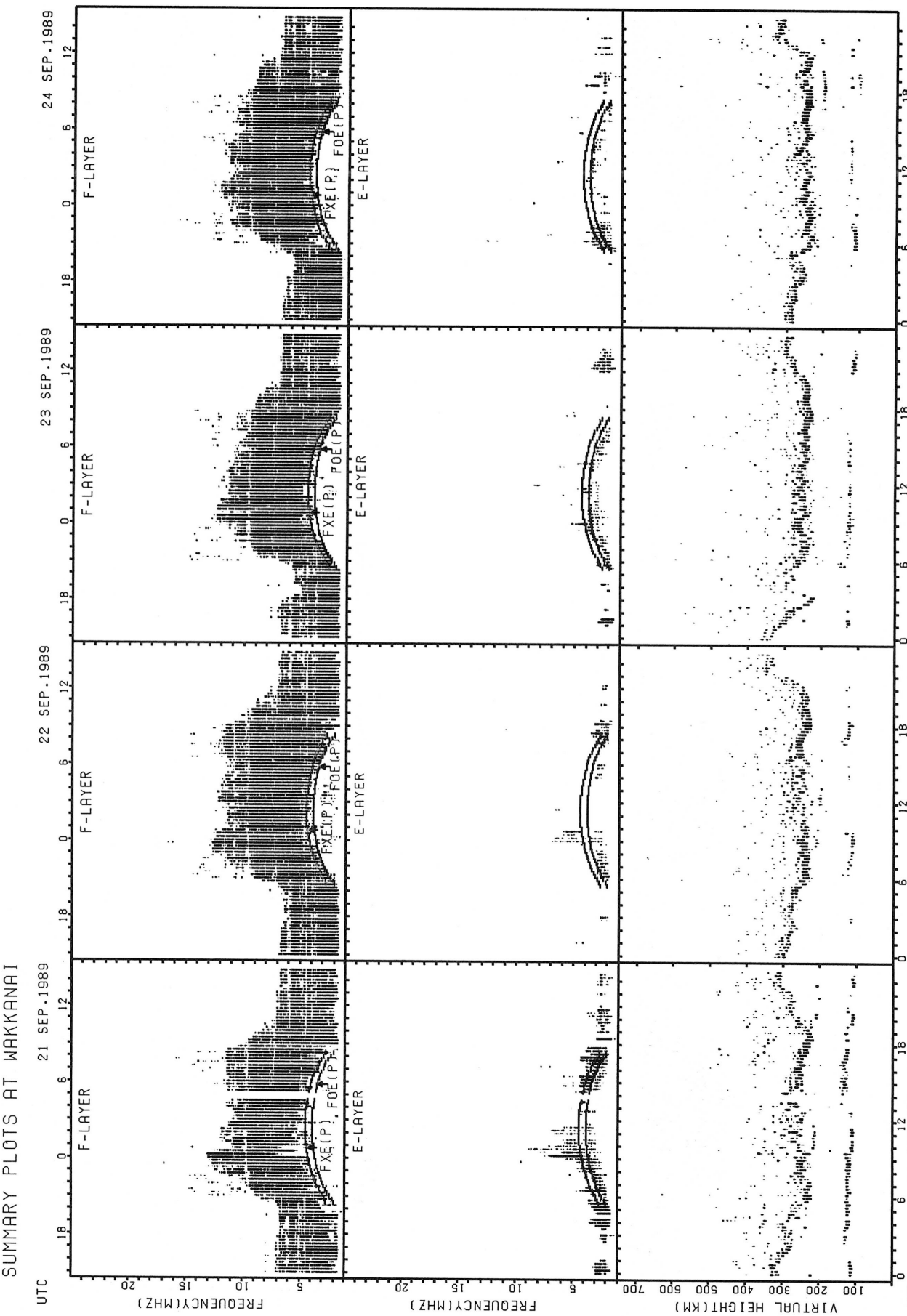


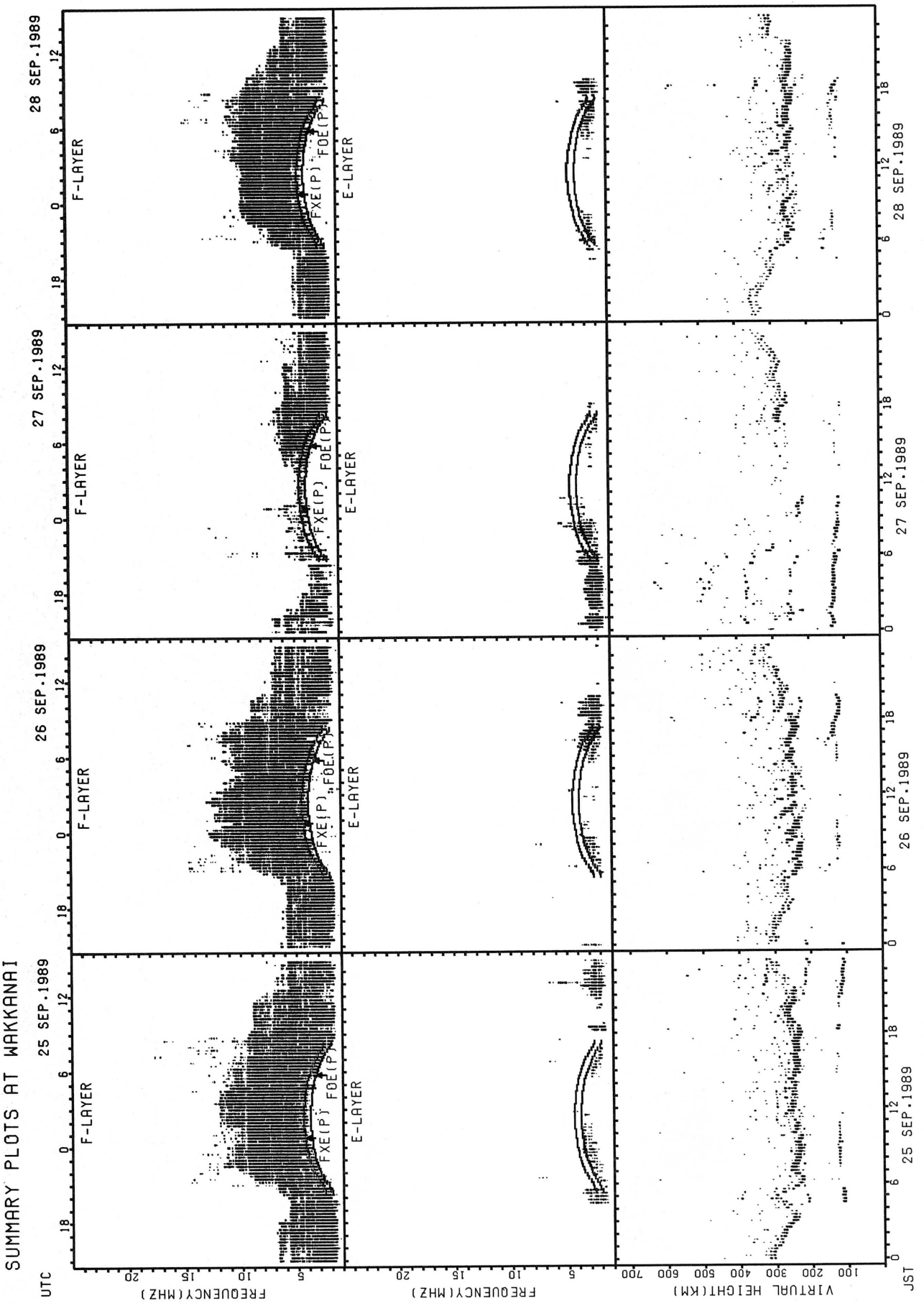
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

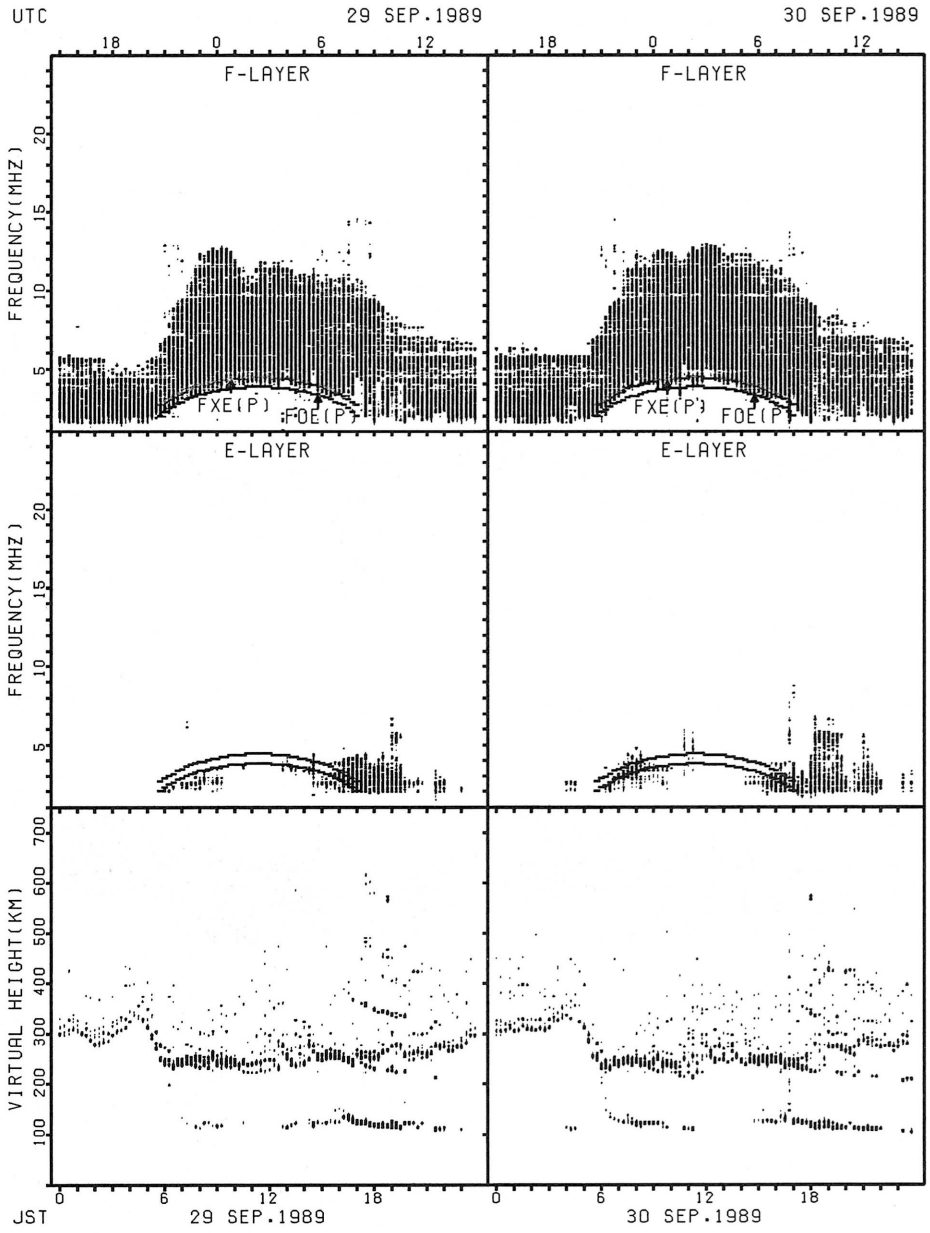

SUMMARY PLOTS AT WAKKANAI
13 SEP.1989
14 SEP.1989
15 SEP.1989
16 SEP.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

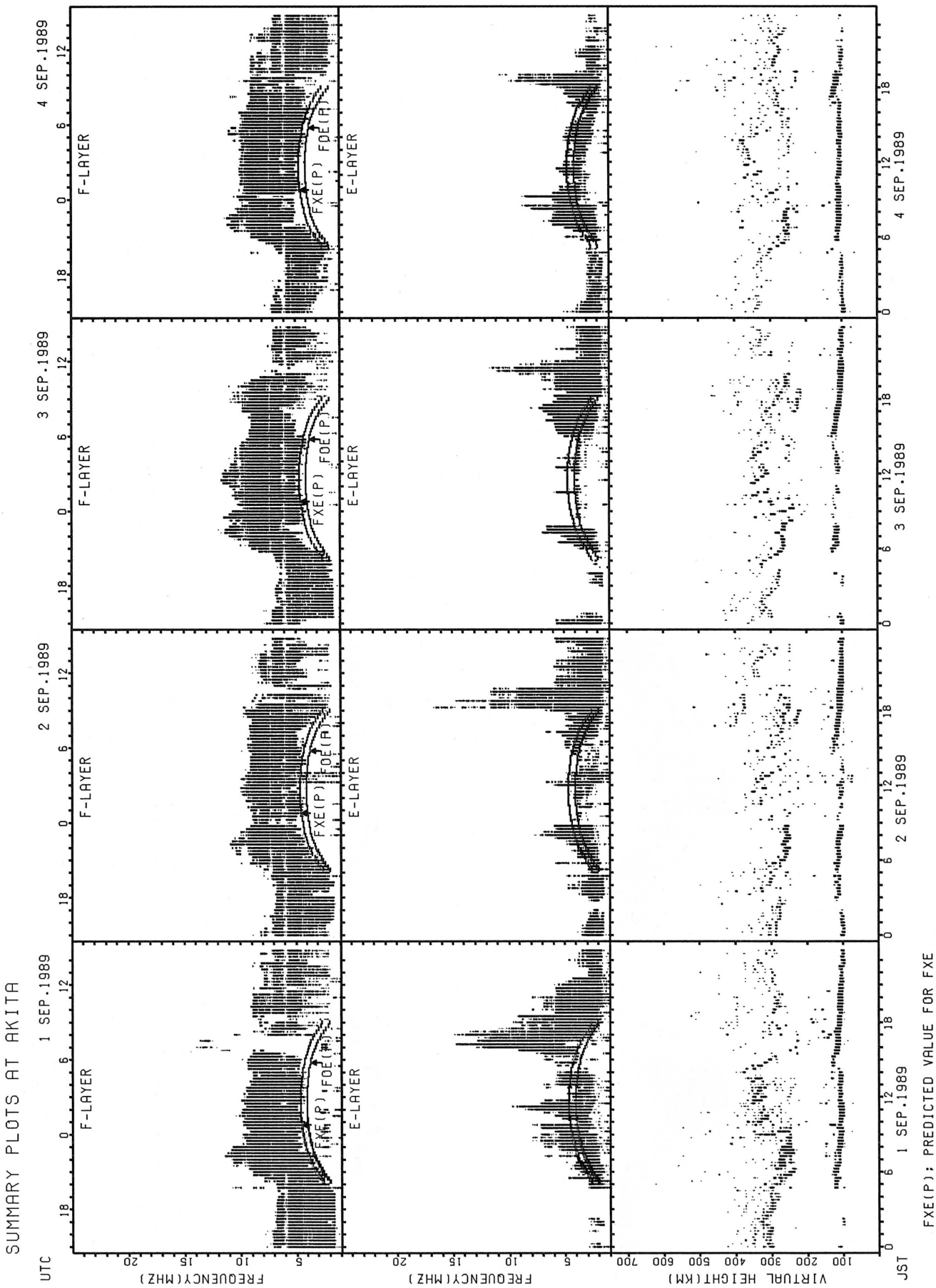

SUMMARY PLOTS AT WAKKANAI
UTC
21 SEP.1989
22 SEP.1989
23 SEP.1989
24 SEP.1989
F-LAYER
E-LAYER
FXE(P). FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

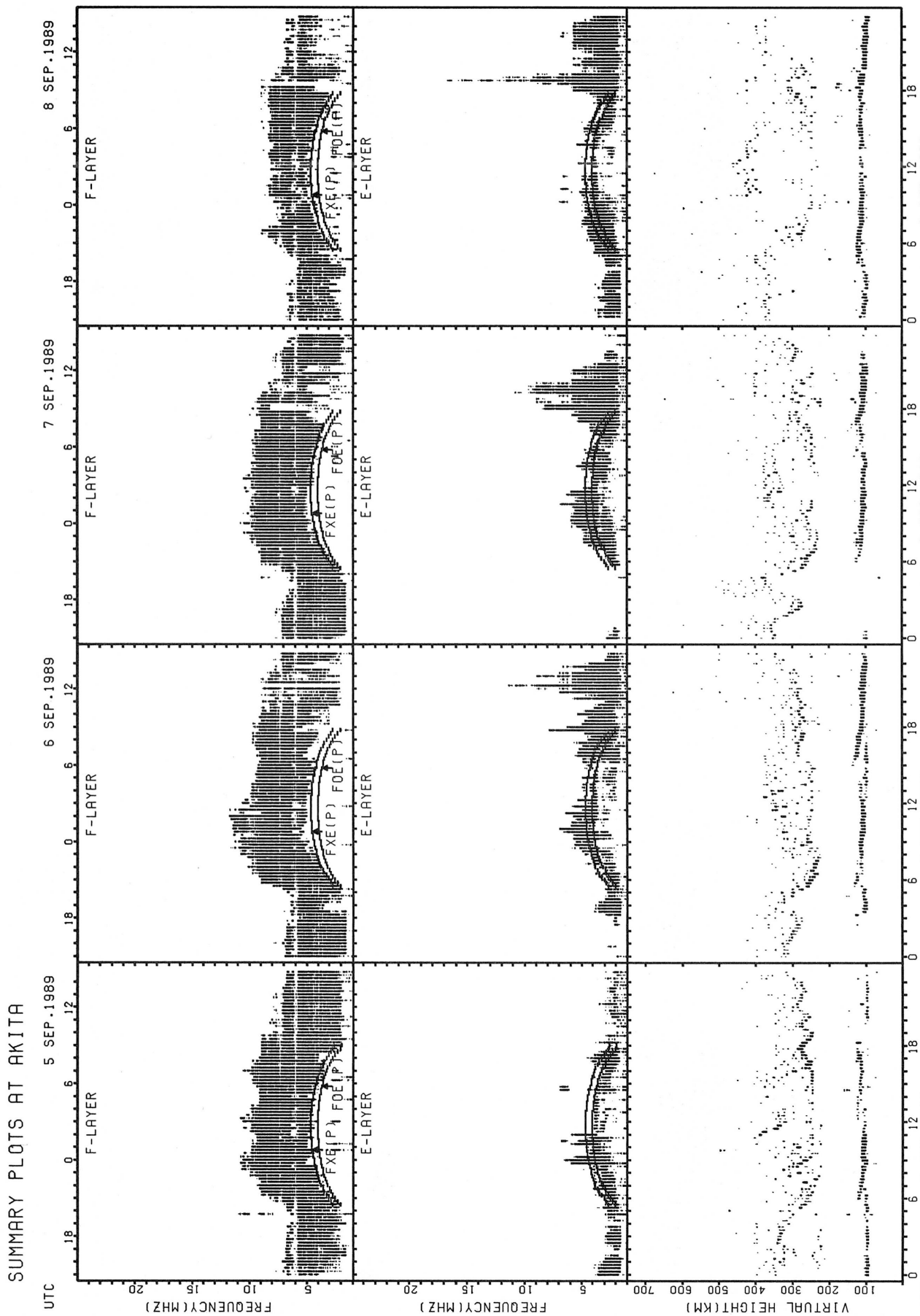

SUMMARY PLOTS AT WAKKANAI
UTC
25 SEP.1989
26 SEP.1989
27 SEP.1989
28 SEP.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI

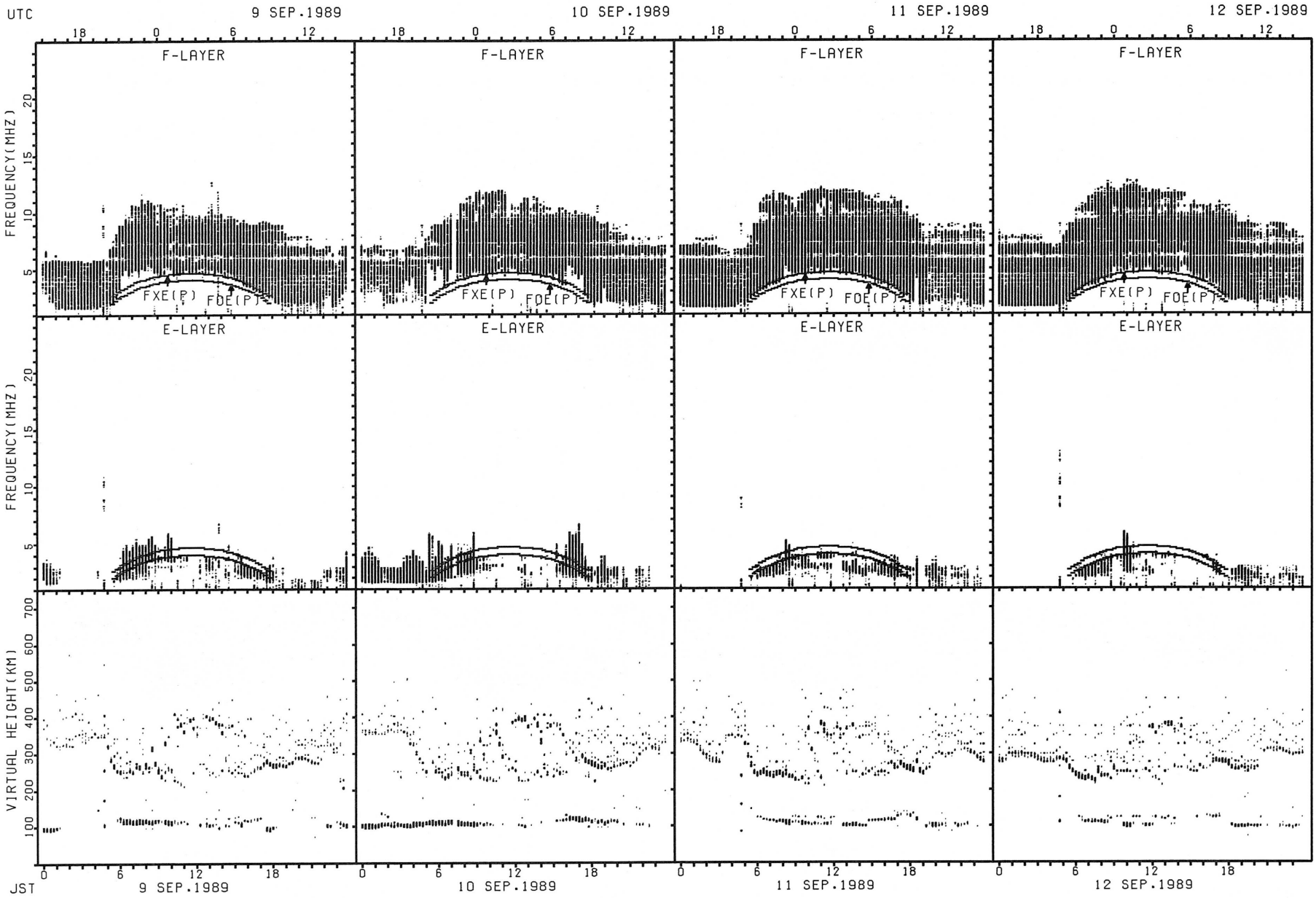


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

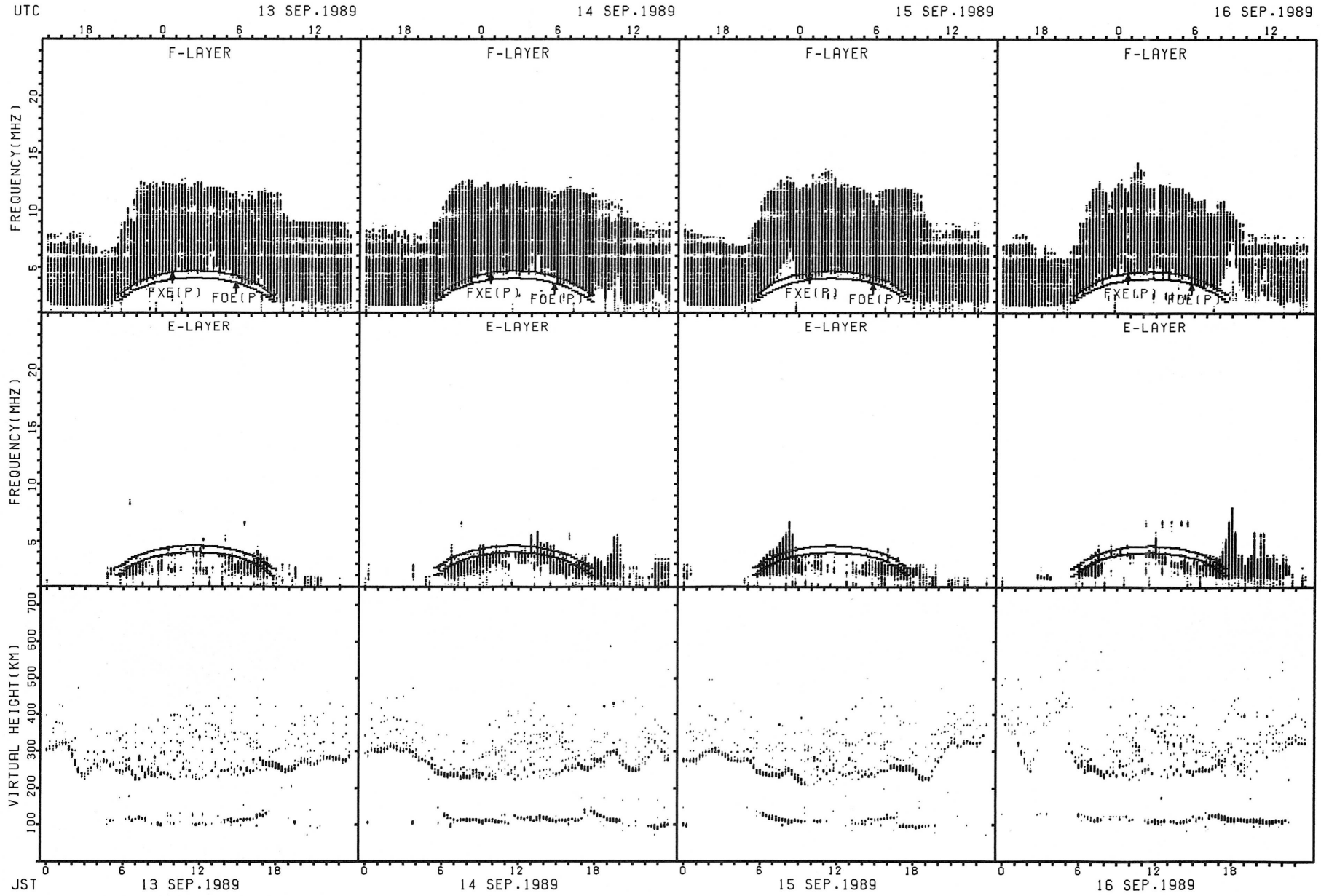

SUMMARY PLOTS AT AKITA
UTC
JST
5 SEP.1989
6 SEP.1989
7 SEP.1989
8 SEP.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

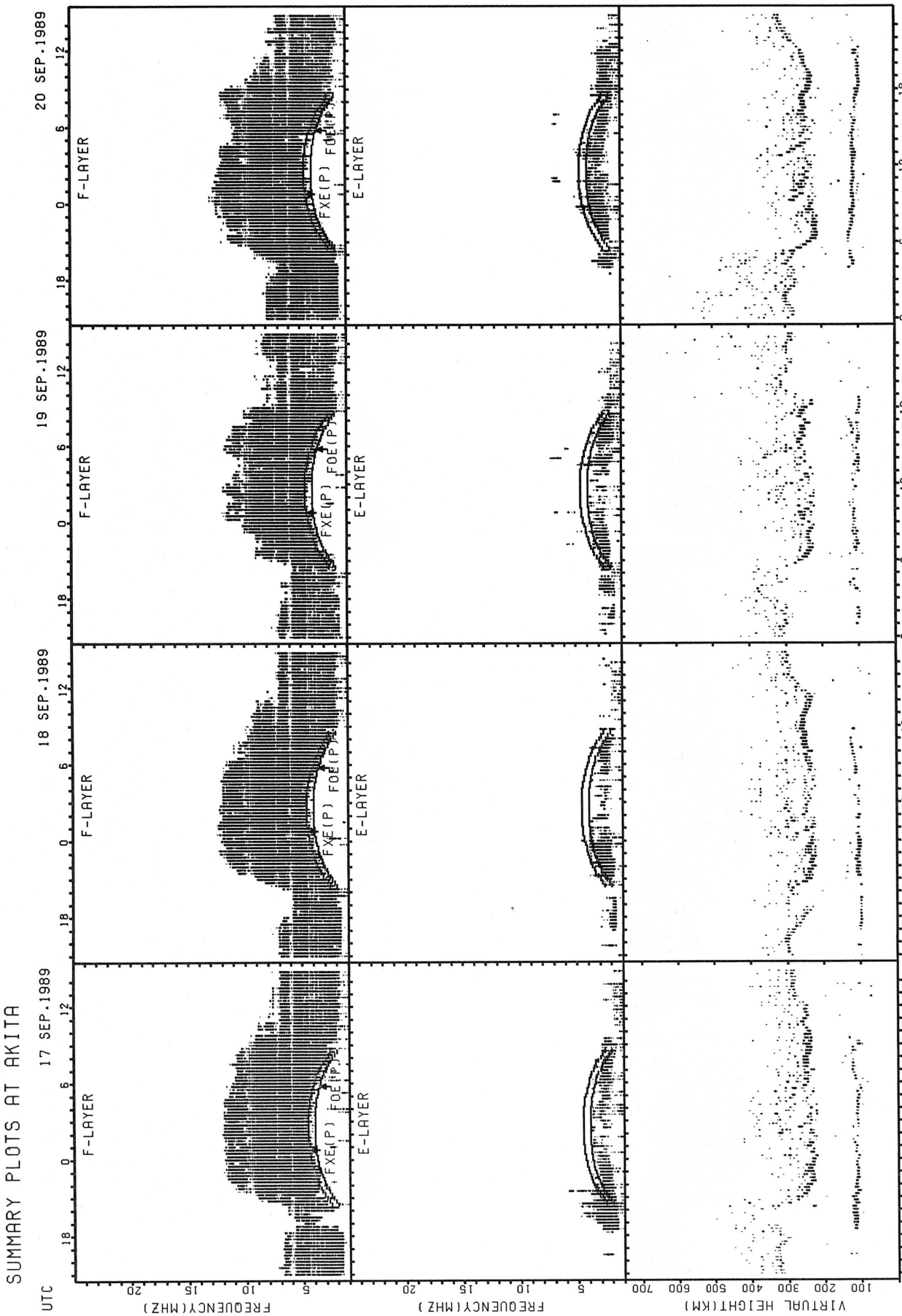


FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

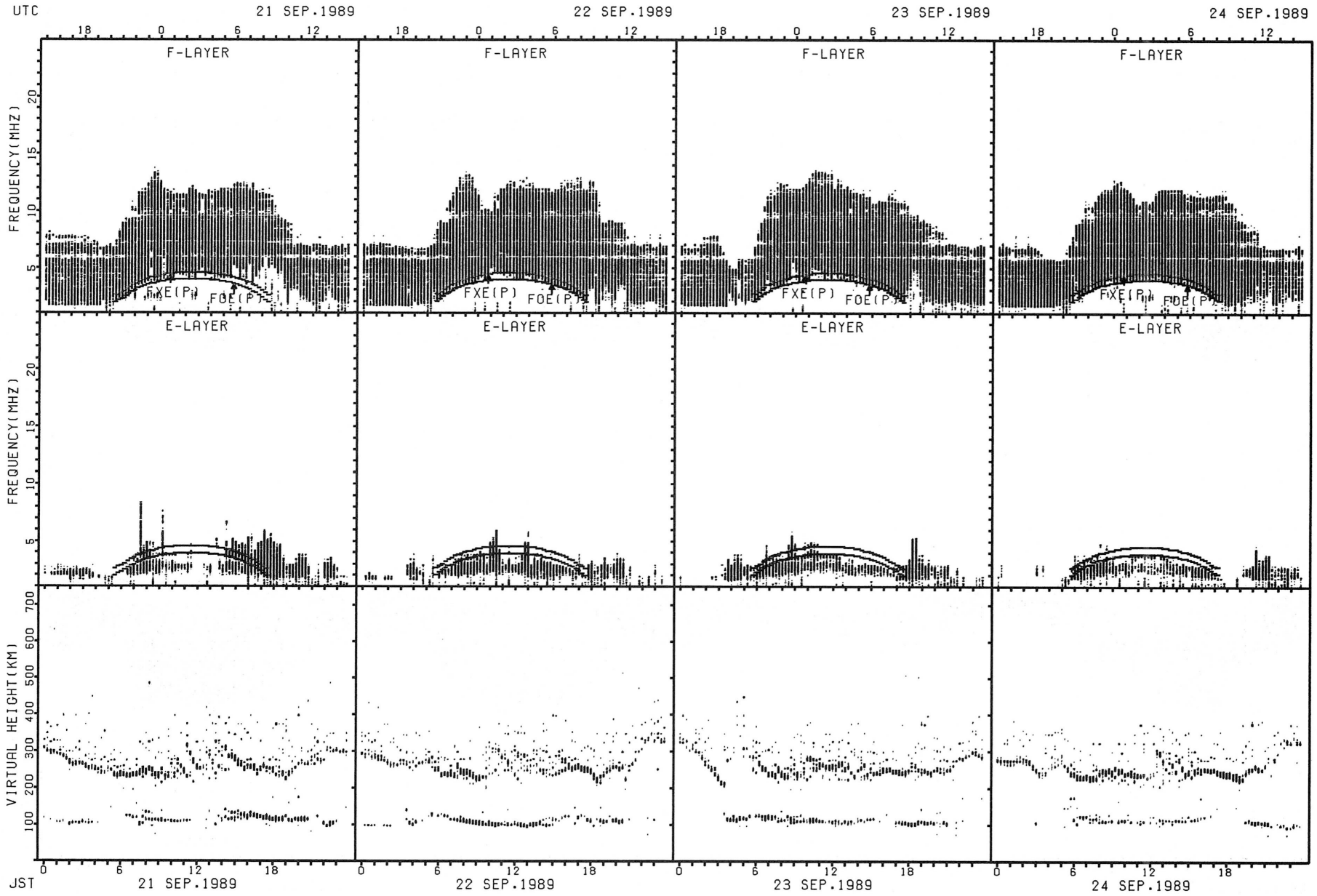
SUMMARY PLOTS AT AKITA



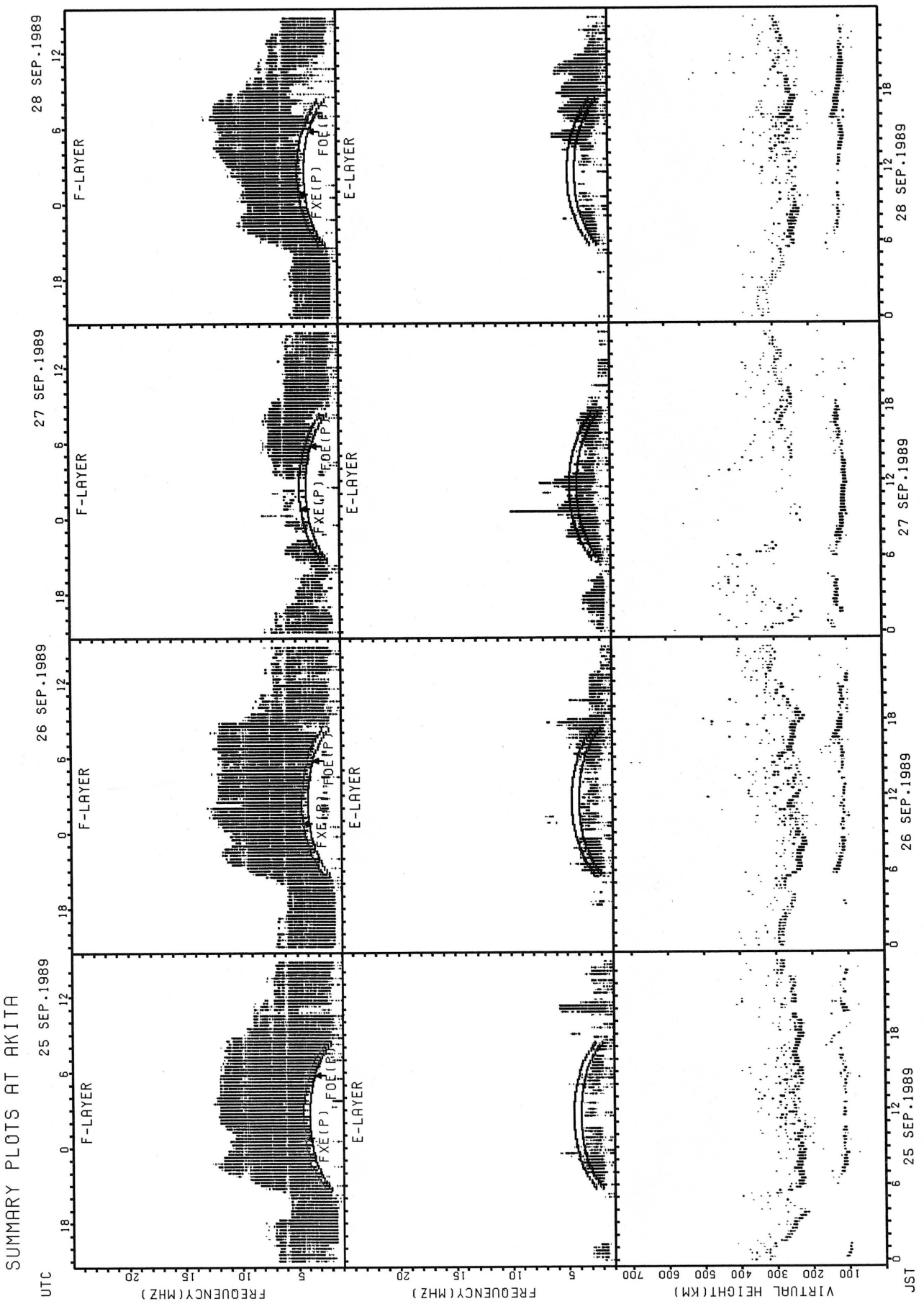
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

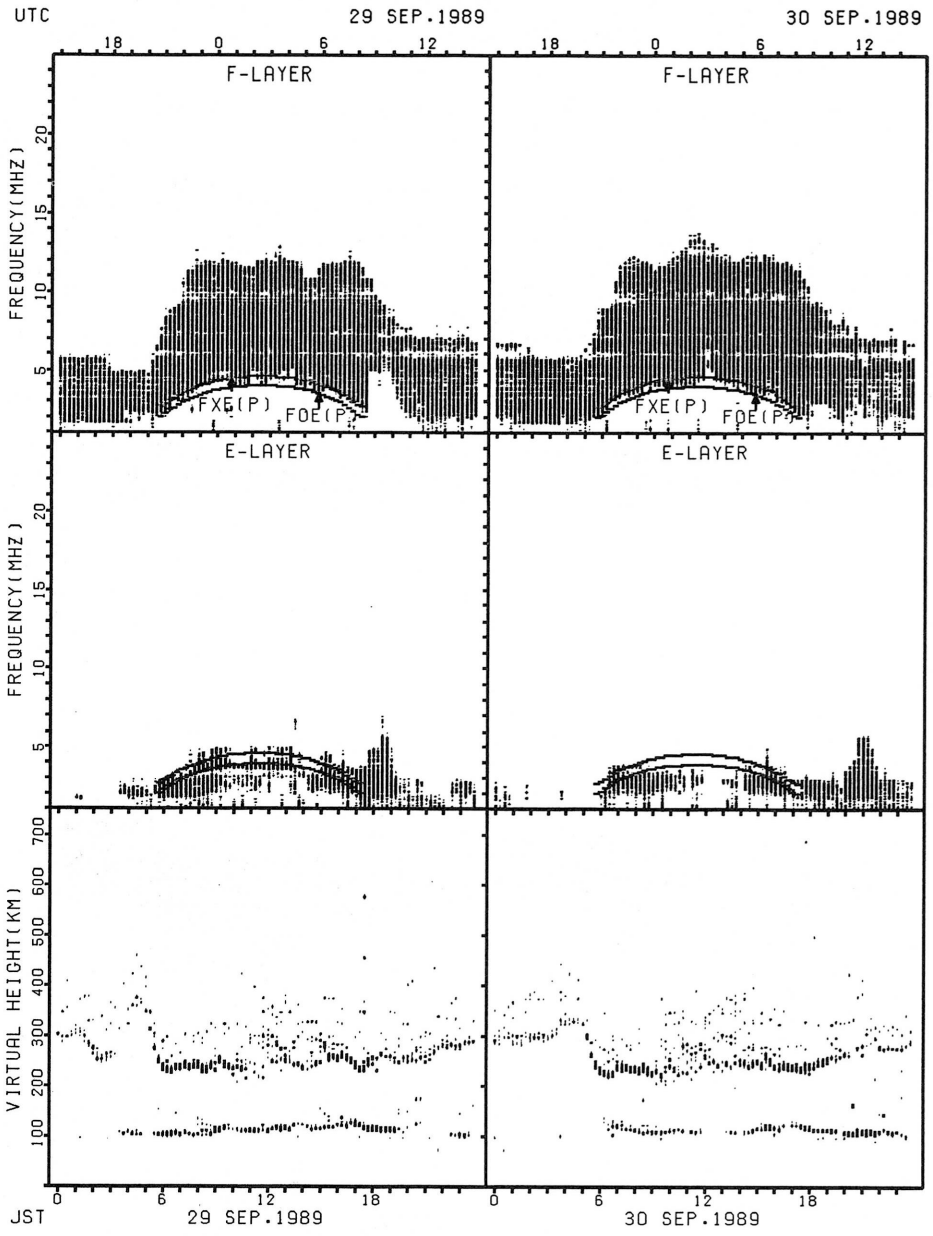
SUMMARY PLOTS AT AKITA



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

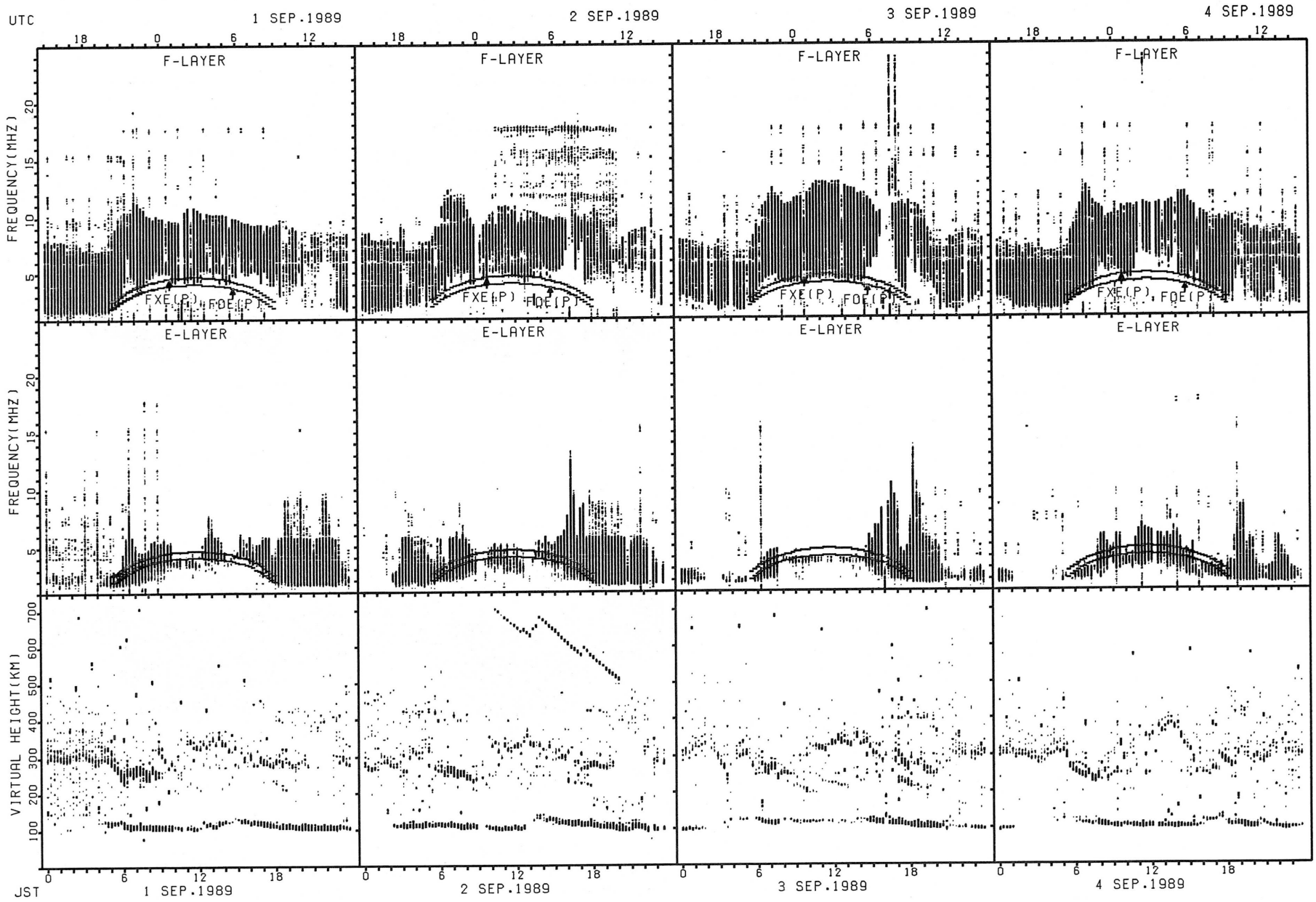

SUMMARY PLOTS AT AKITA
UTC
JST
25 SEP.1989
26 SEP.1989
27 SEP.1989
28 SEP.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



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

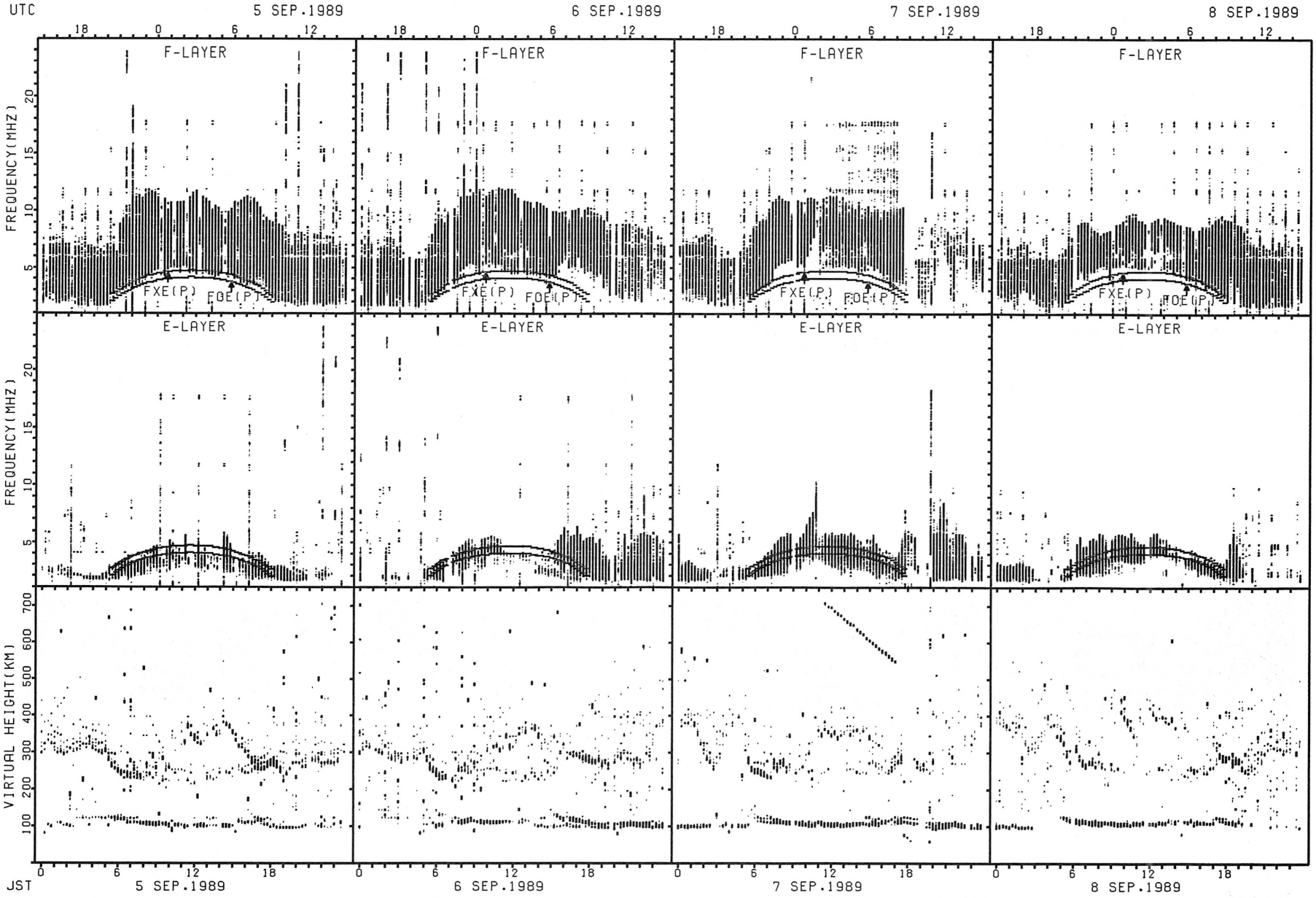
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

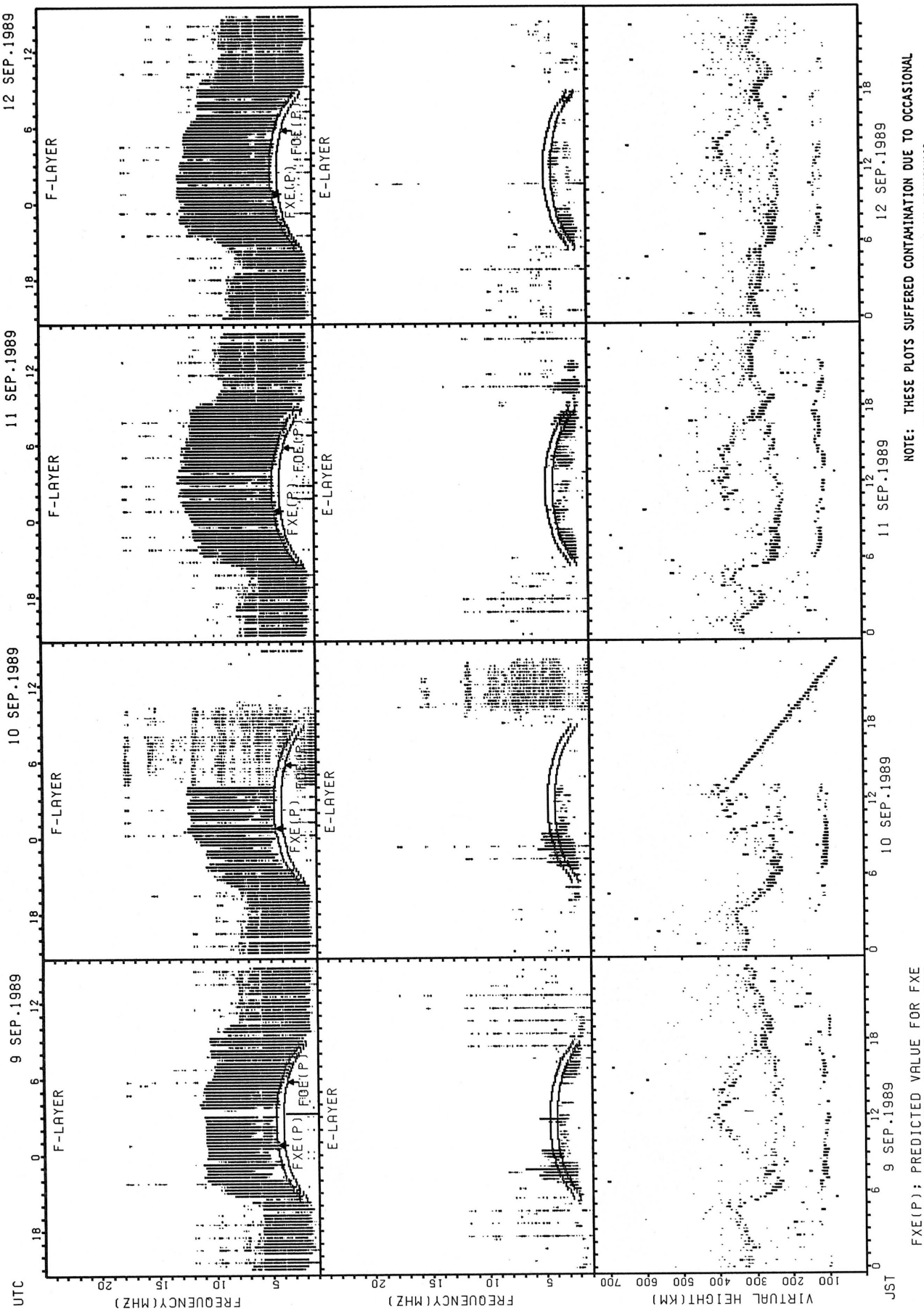
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT KOKUBUNJI TOKYO

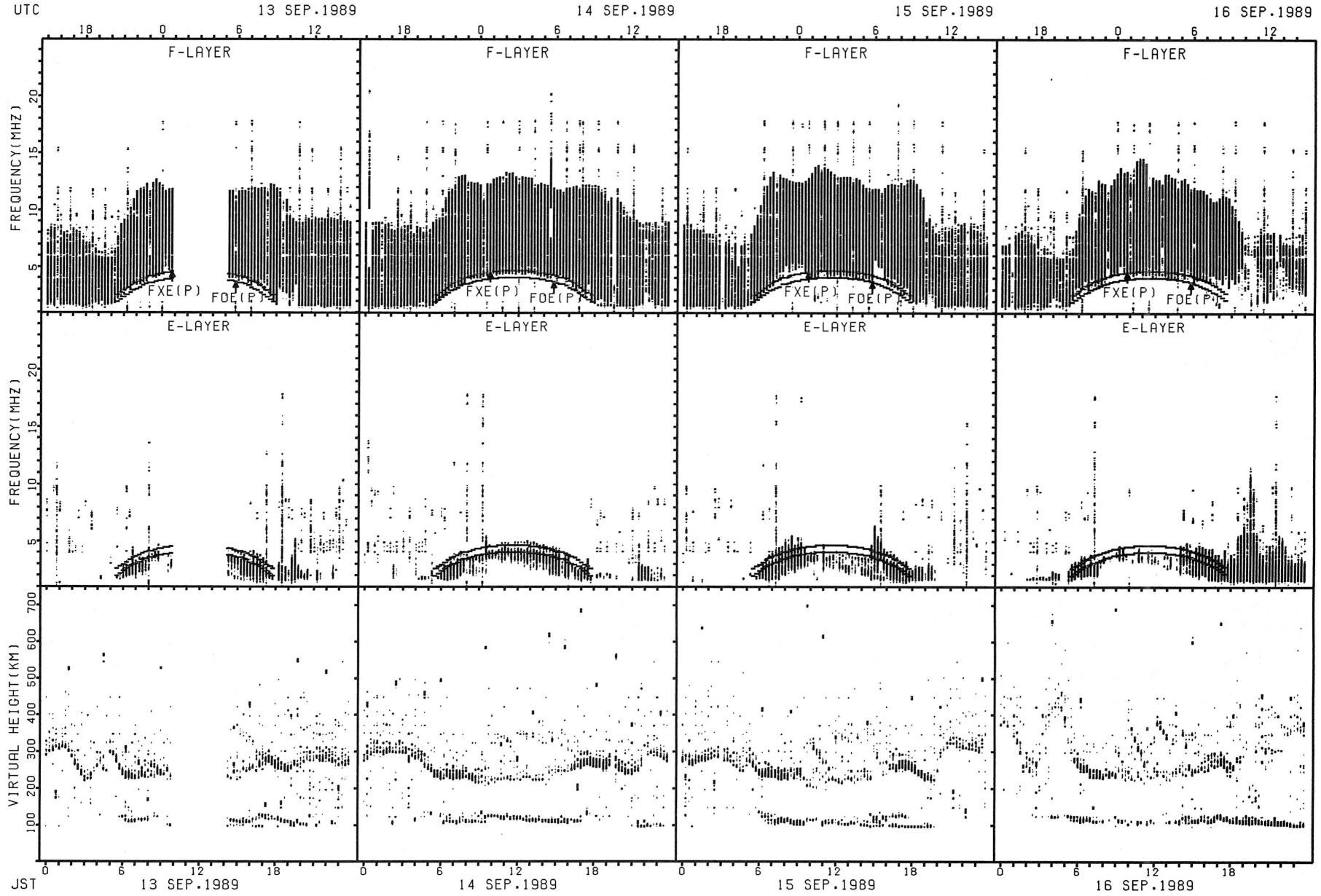


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

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

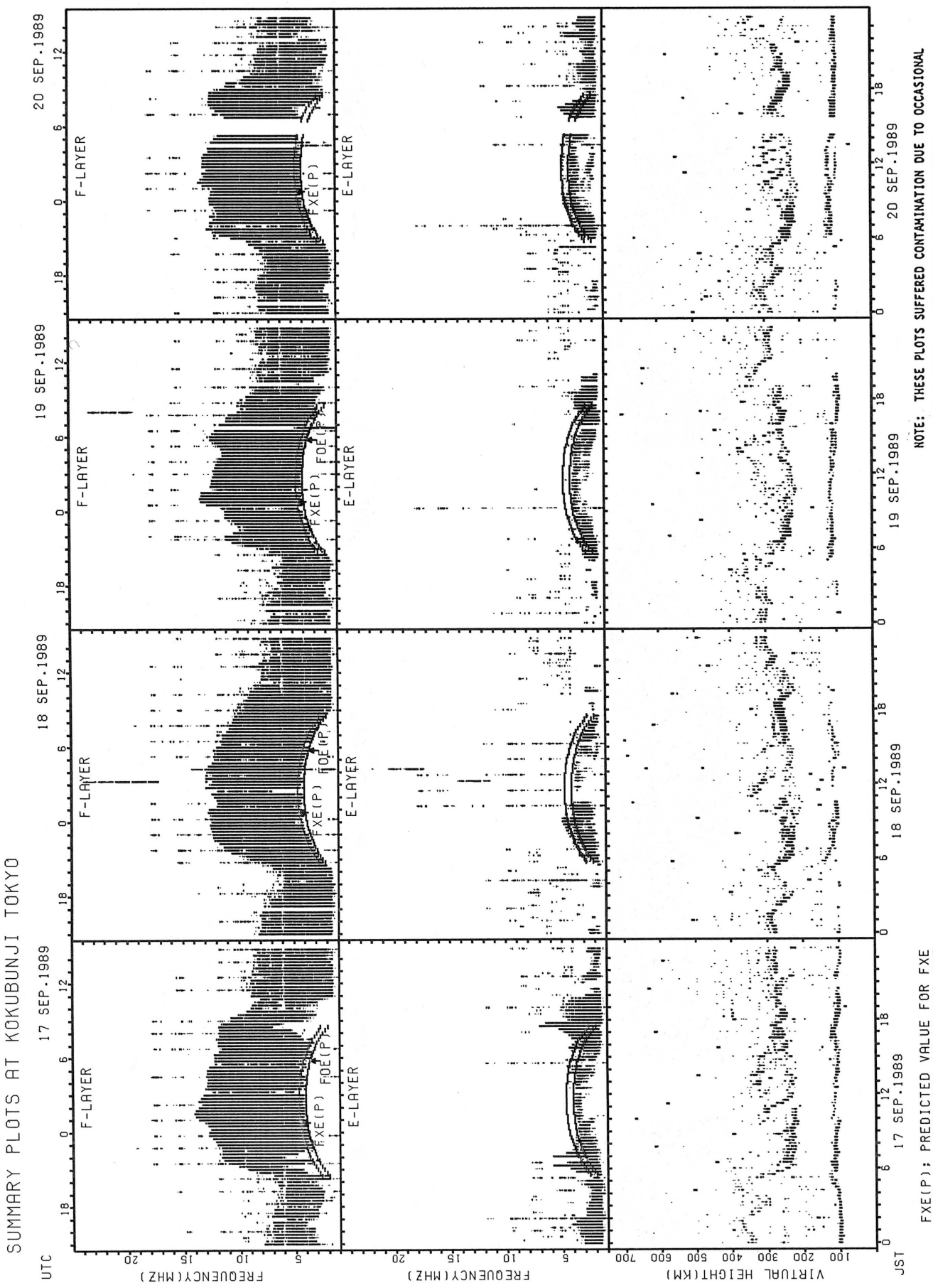

SUMMARY PLOTS AT KOKUBUNJI TOKYO
9 SEP.1989
10 SEP.1989
11 SEP.1989
12 SEP.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
UTC
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL
MALFUNCTION OF THE IONOSONDE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

SUMMARY PLOTS AT KOKUBUNJI TOKYO

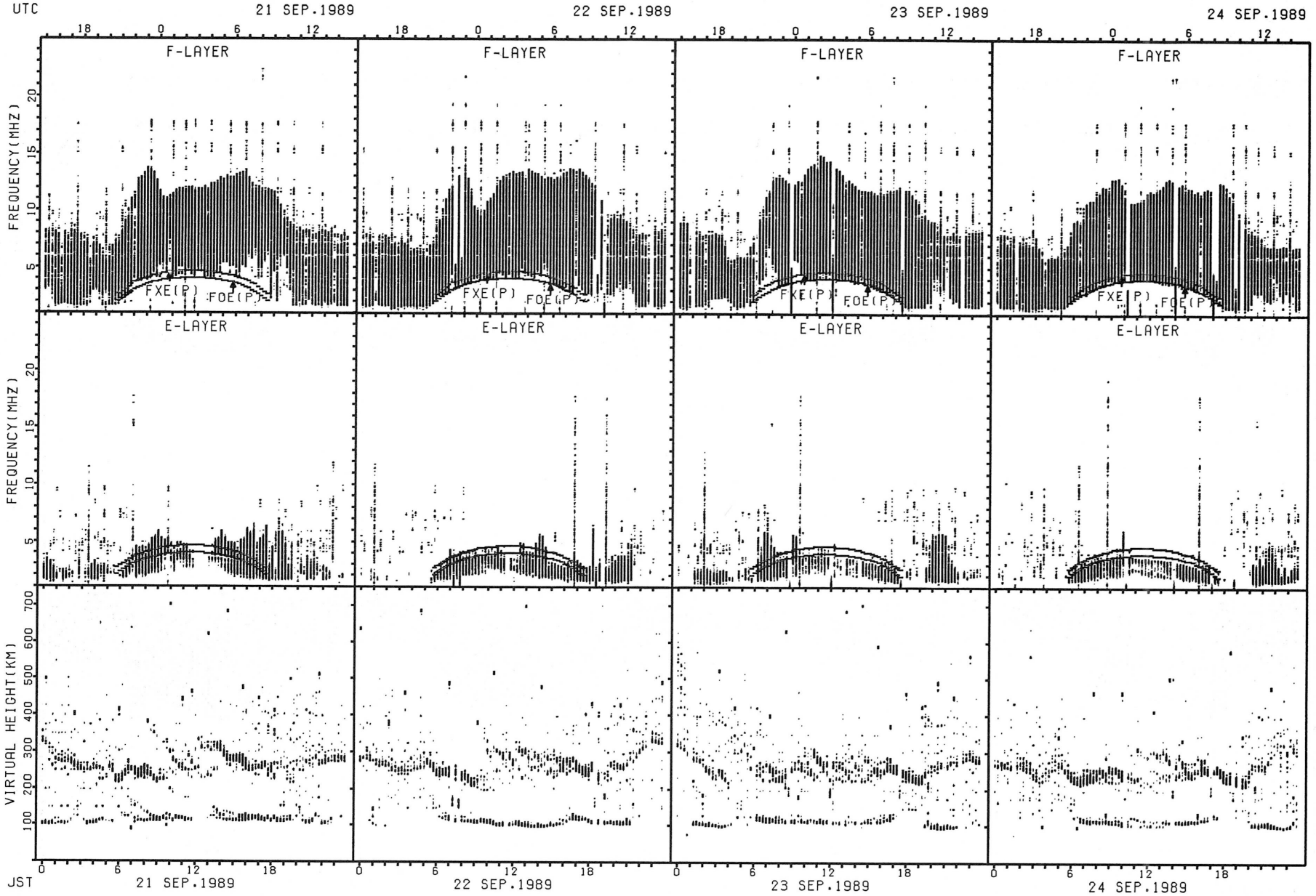


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

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


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

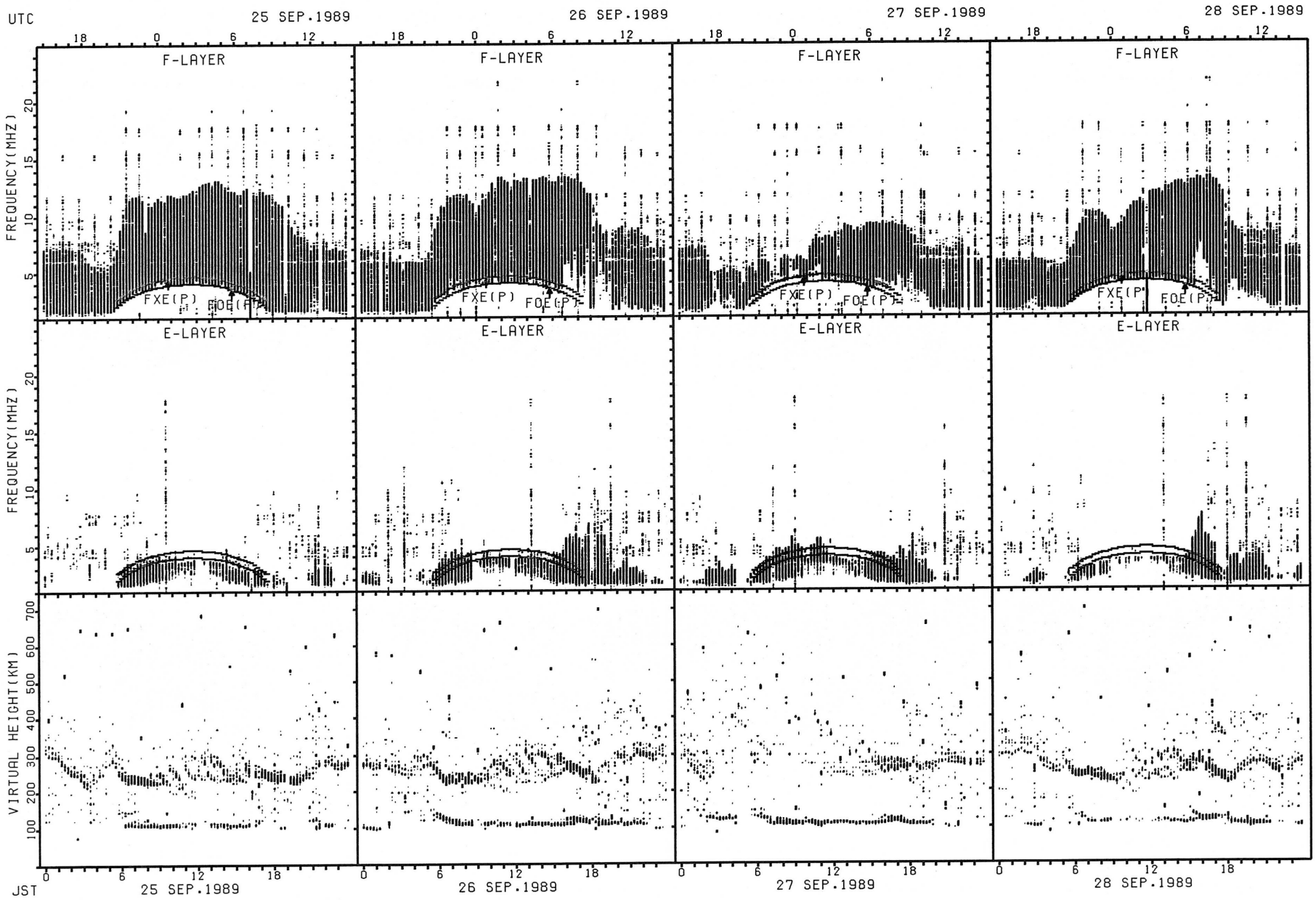
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

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

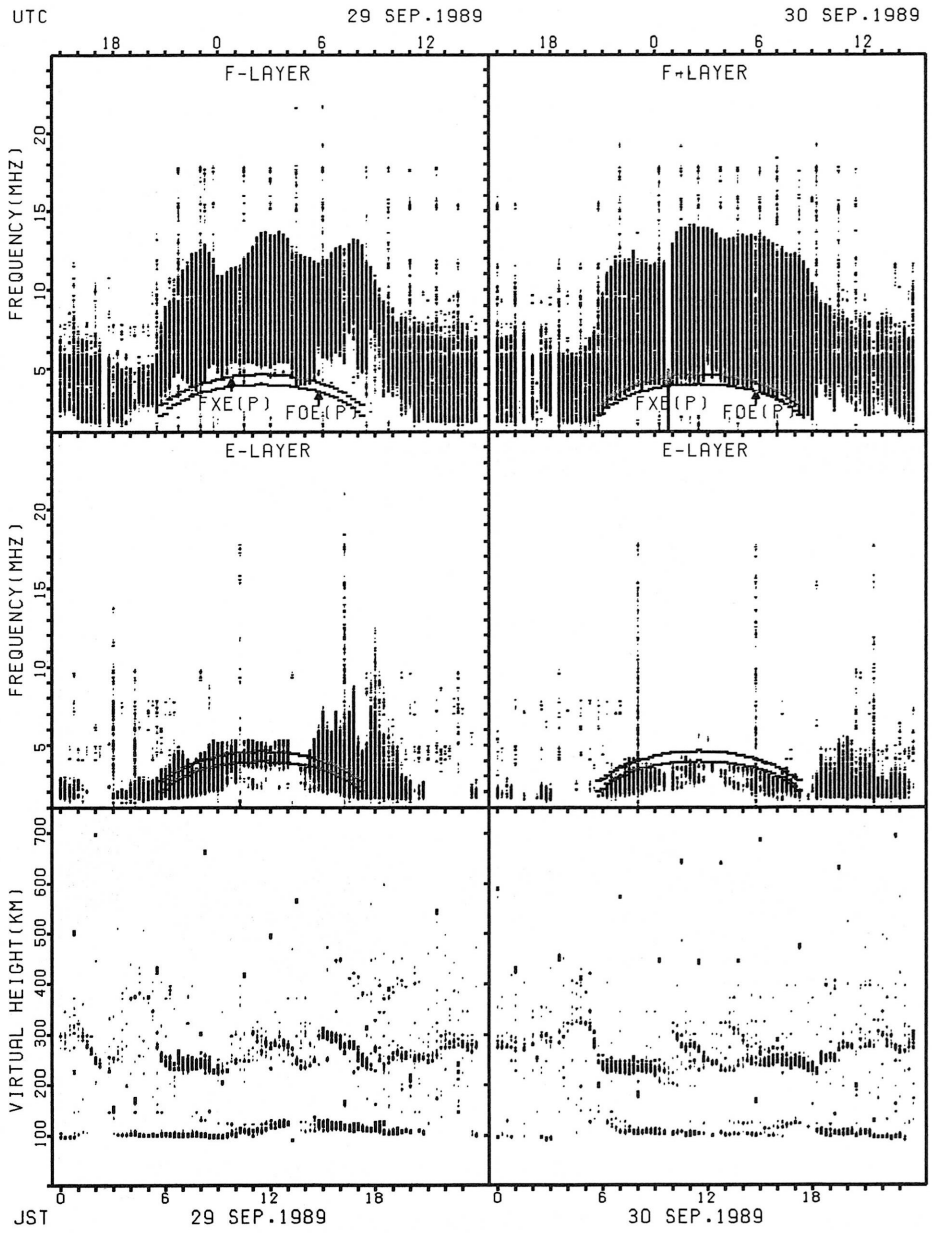
SUMMARY PLOTS AT KOKUBUNJI TOKYO



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

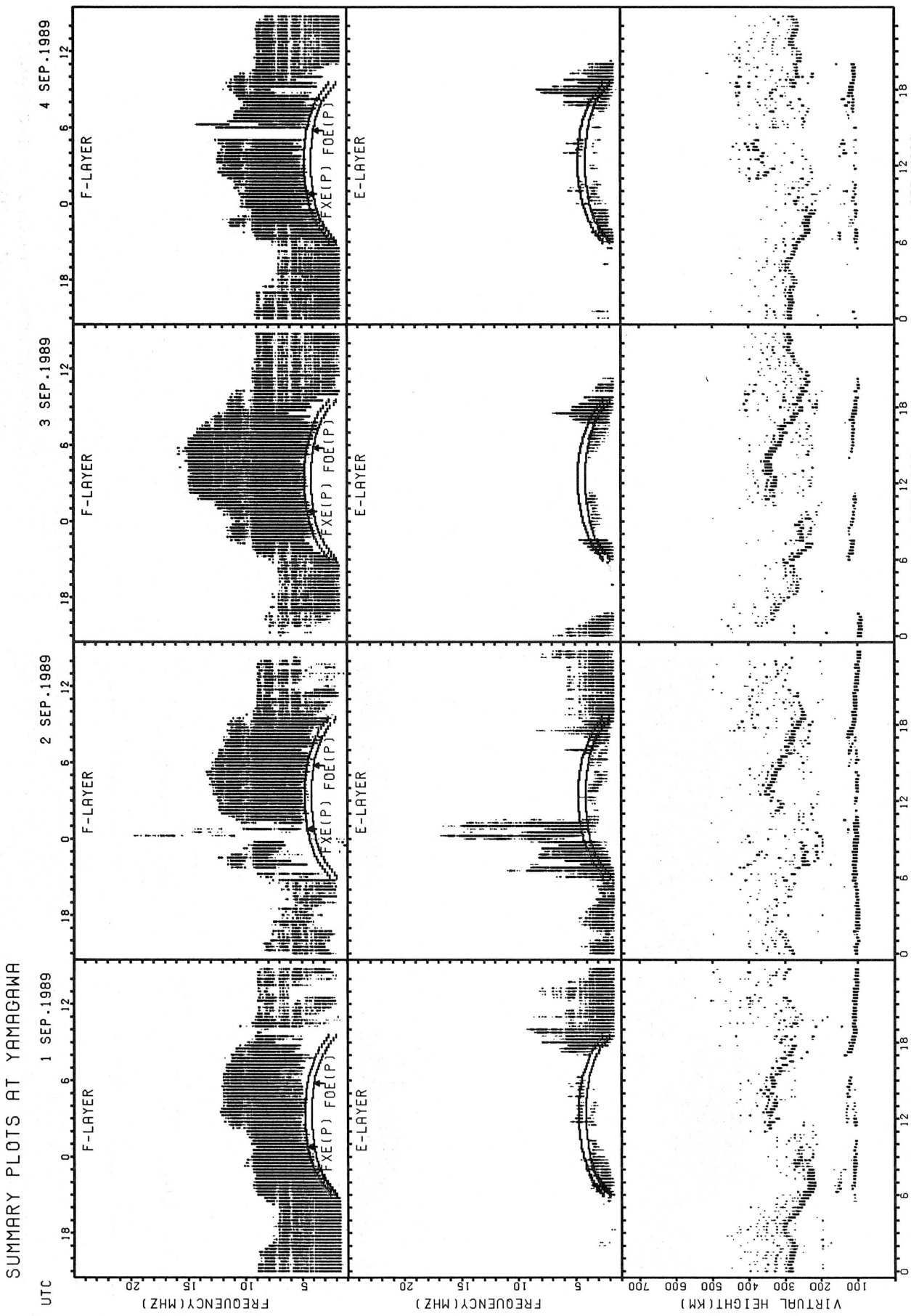
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.

SUMMARY PLOTS AT KOKUBUNJI TOKYO

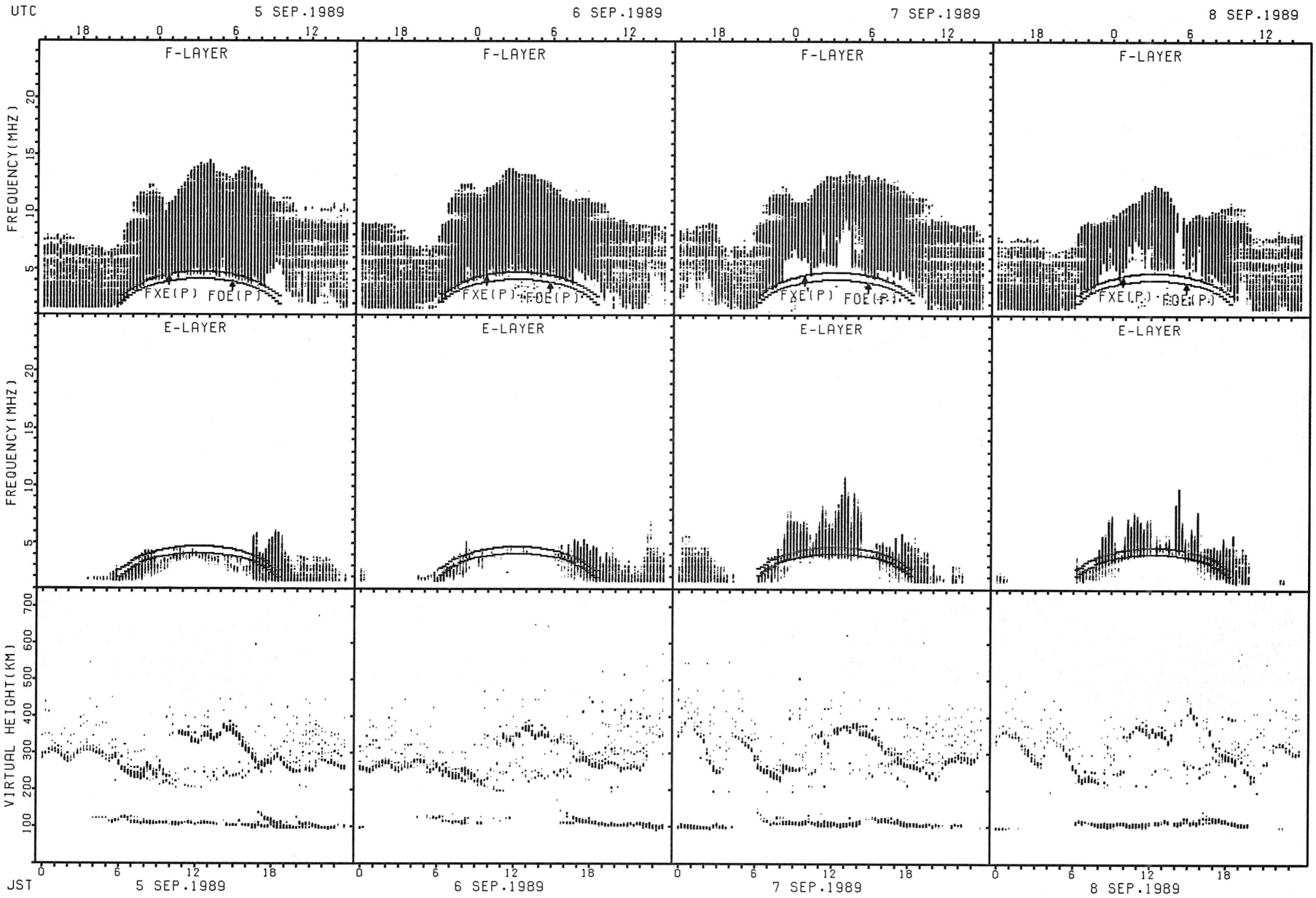


FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

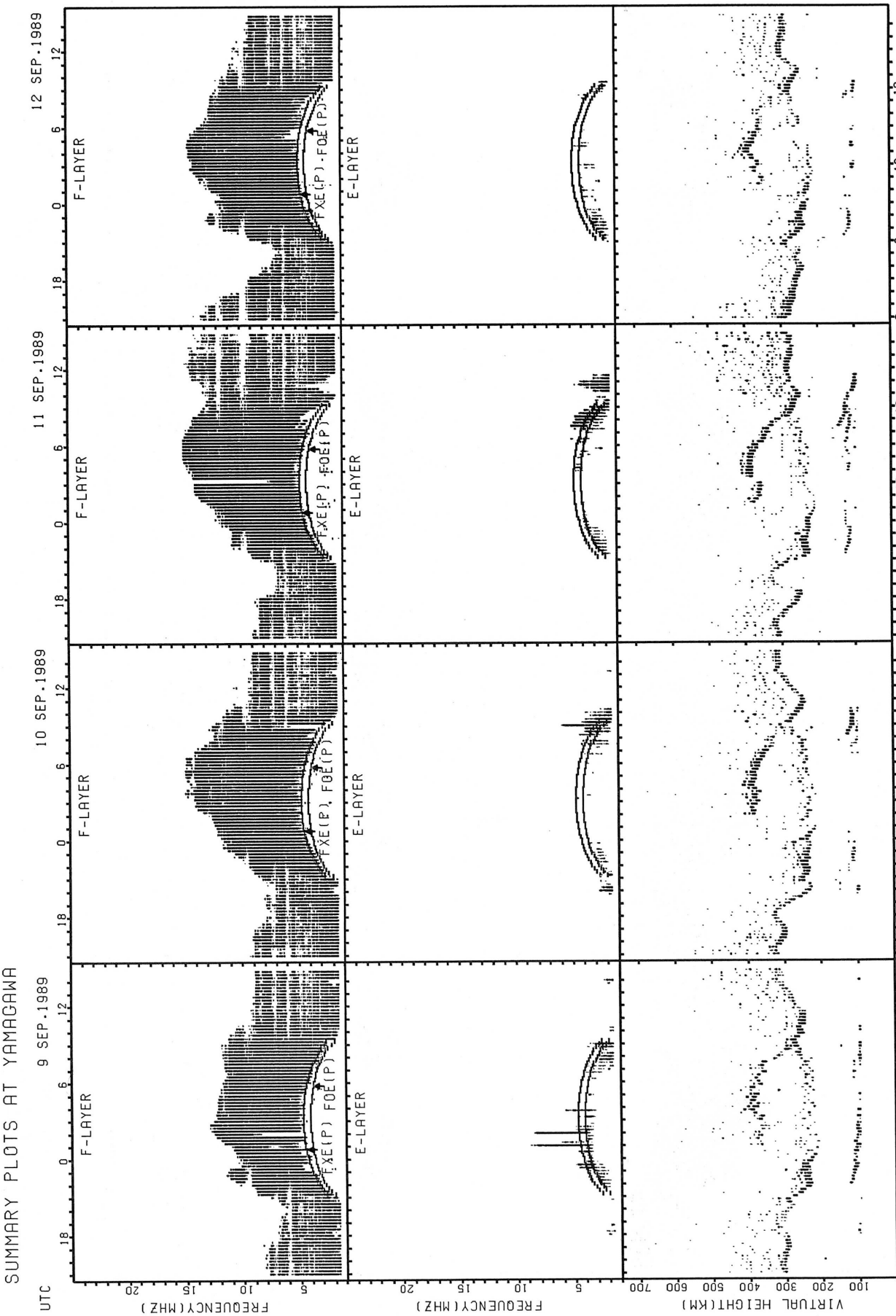
NOTE: THESE PLOTS SUFFERED CONTAMINATION DUE TO OCCASIONAL MALFUNCTION OF THE IONOSONDE AT KOKUBUNJI.


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

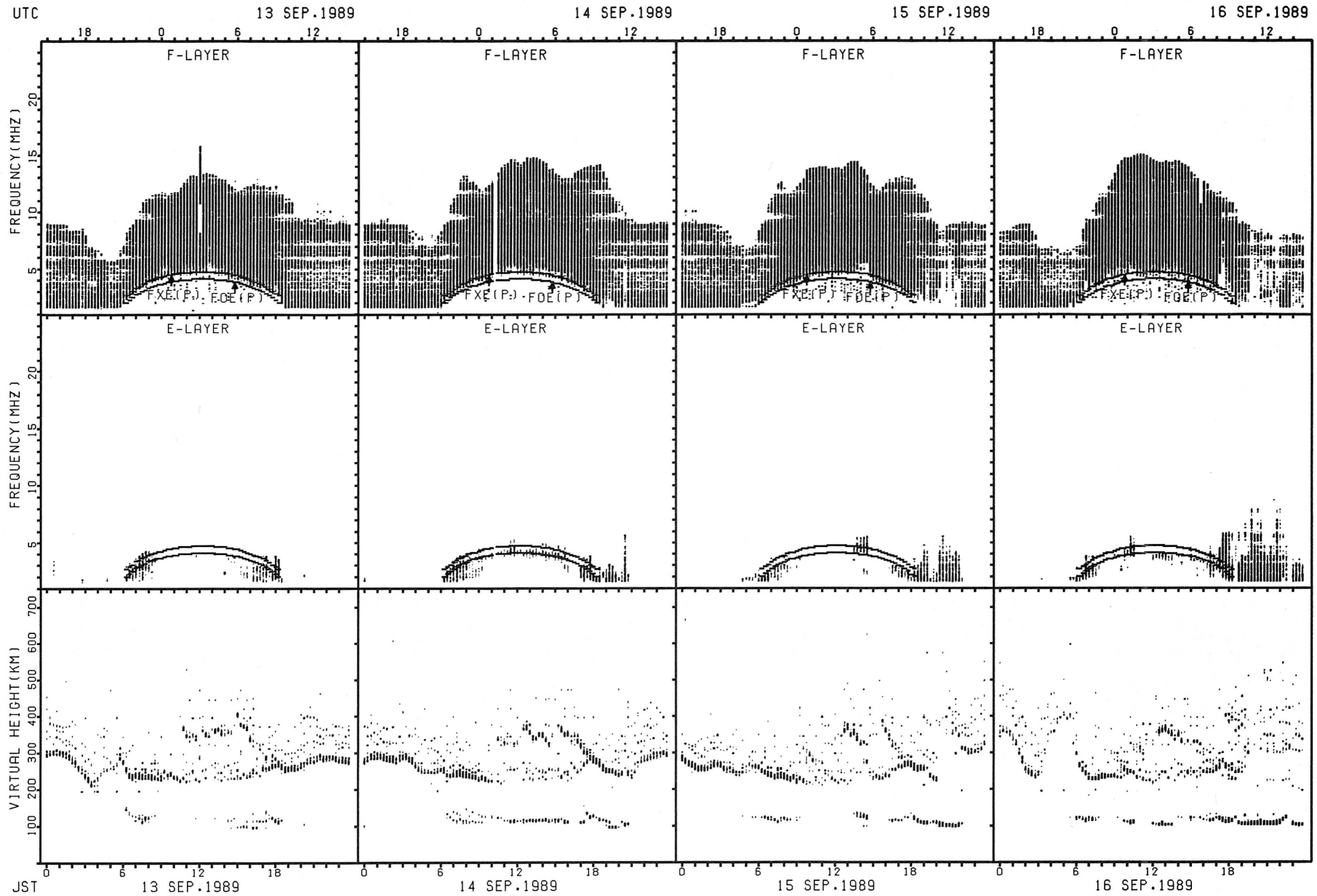
SUMMARY PLOTS AT YAMAGAWA



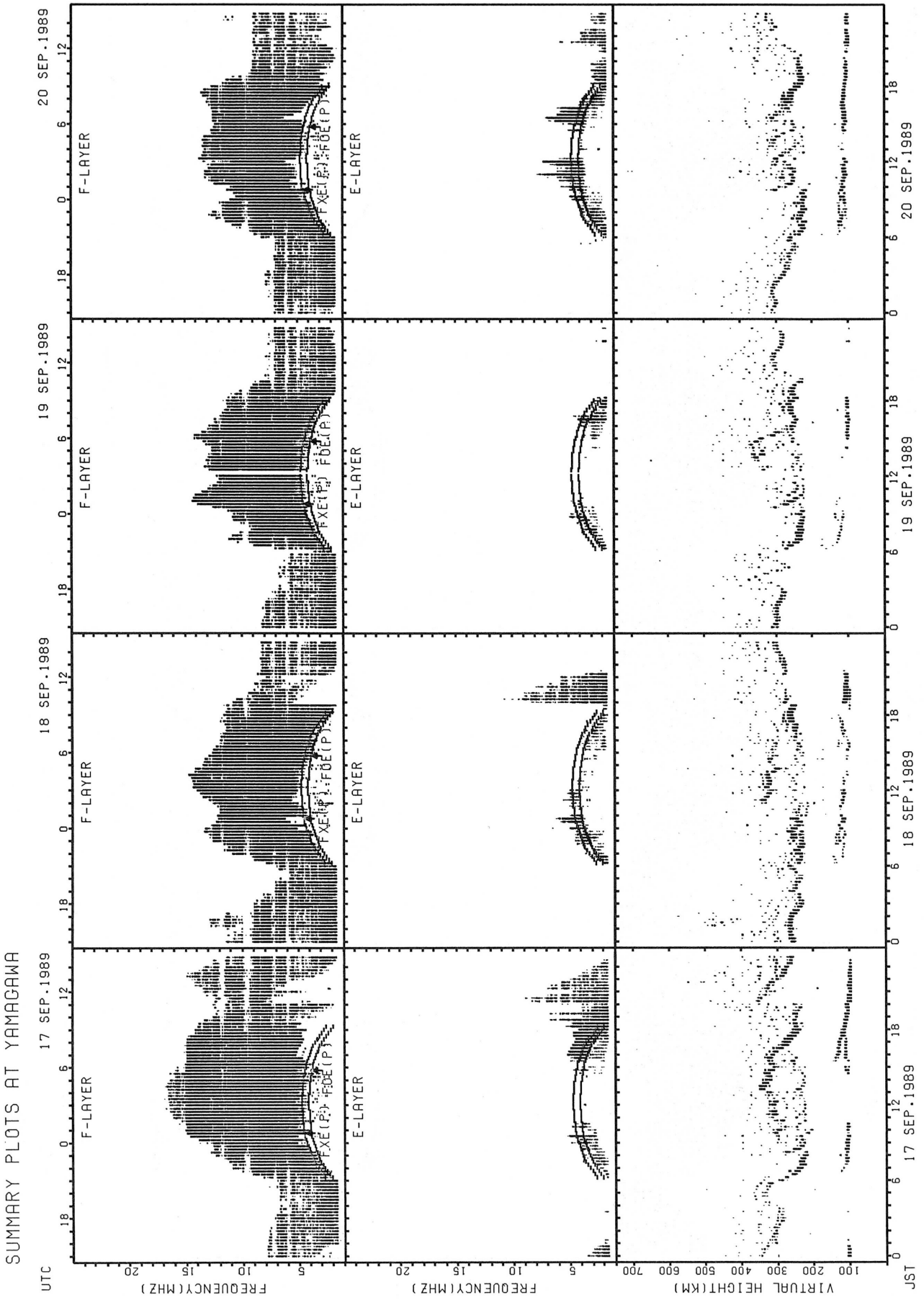
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

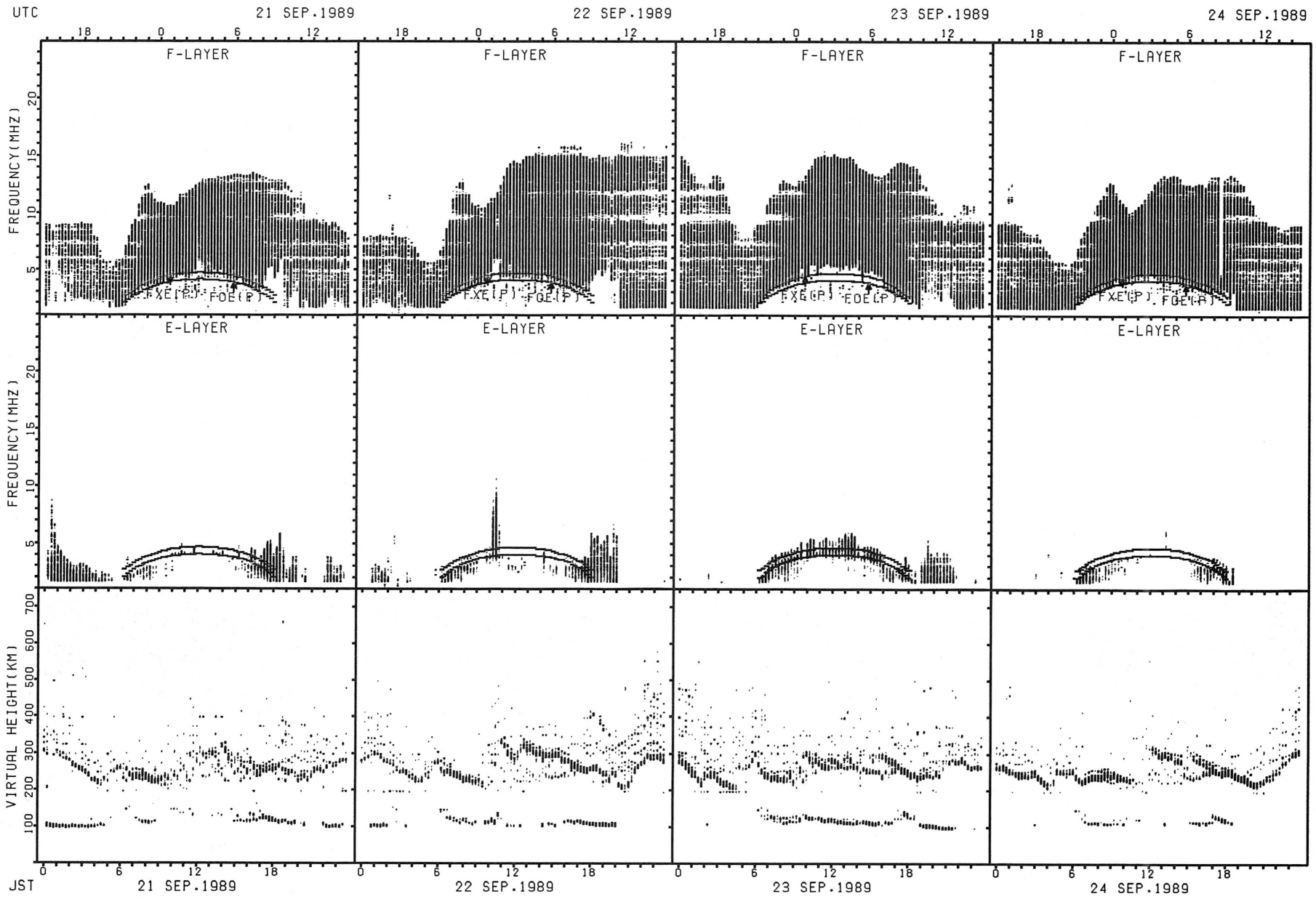
SUMMARY PLOTS AT YAMAGAWA



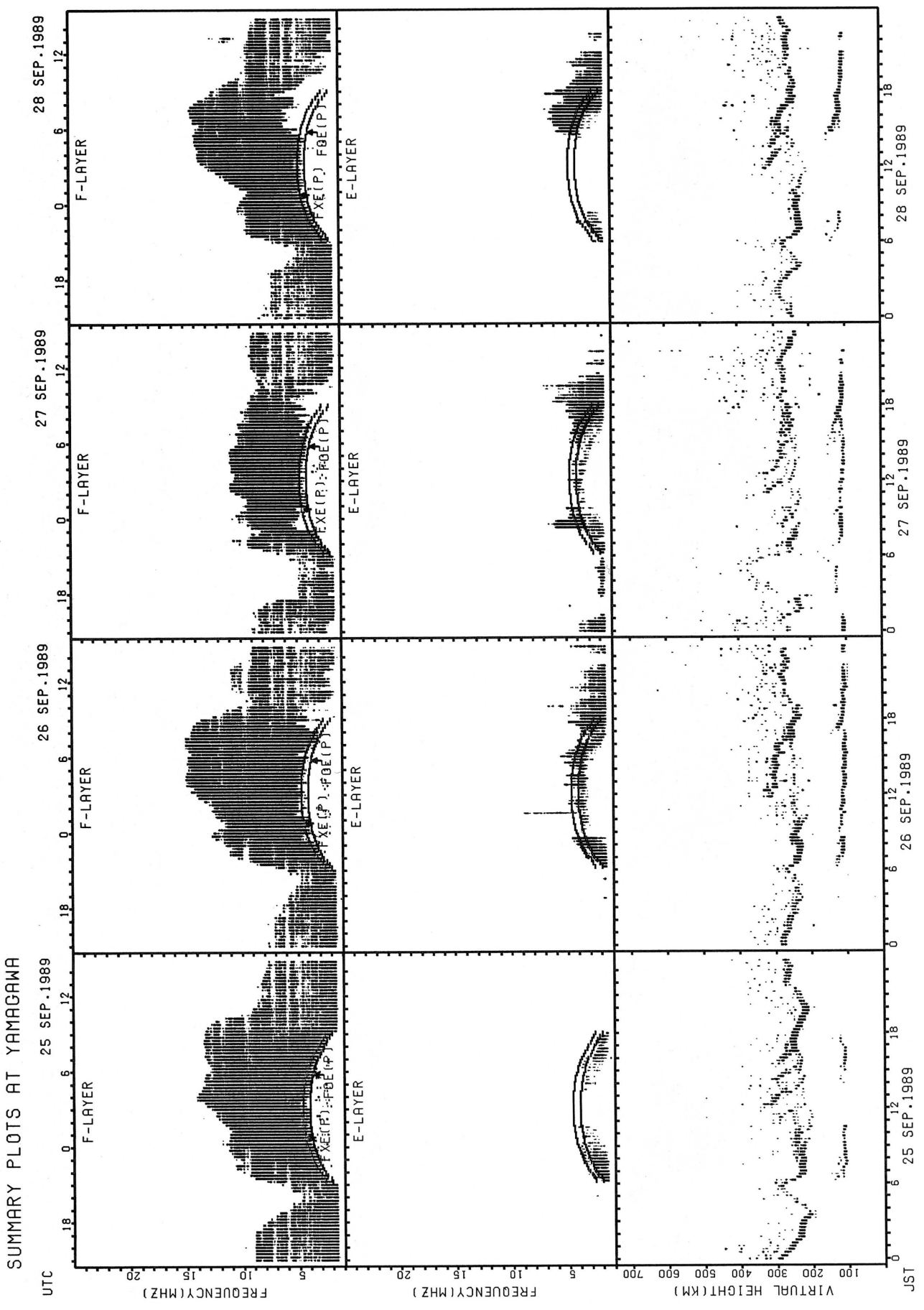
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

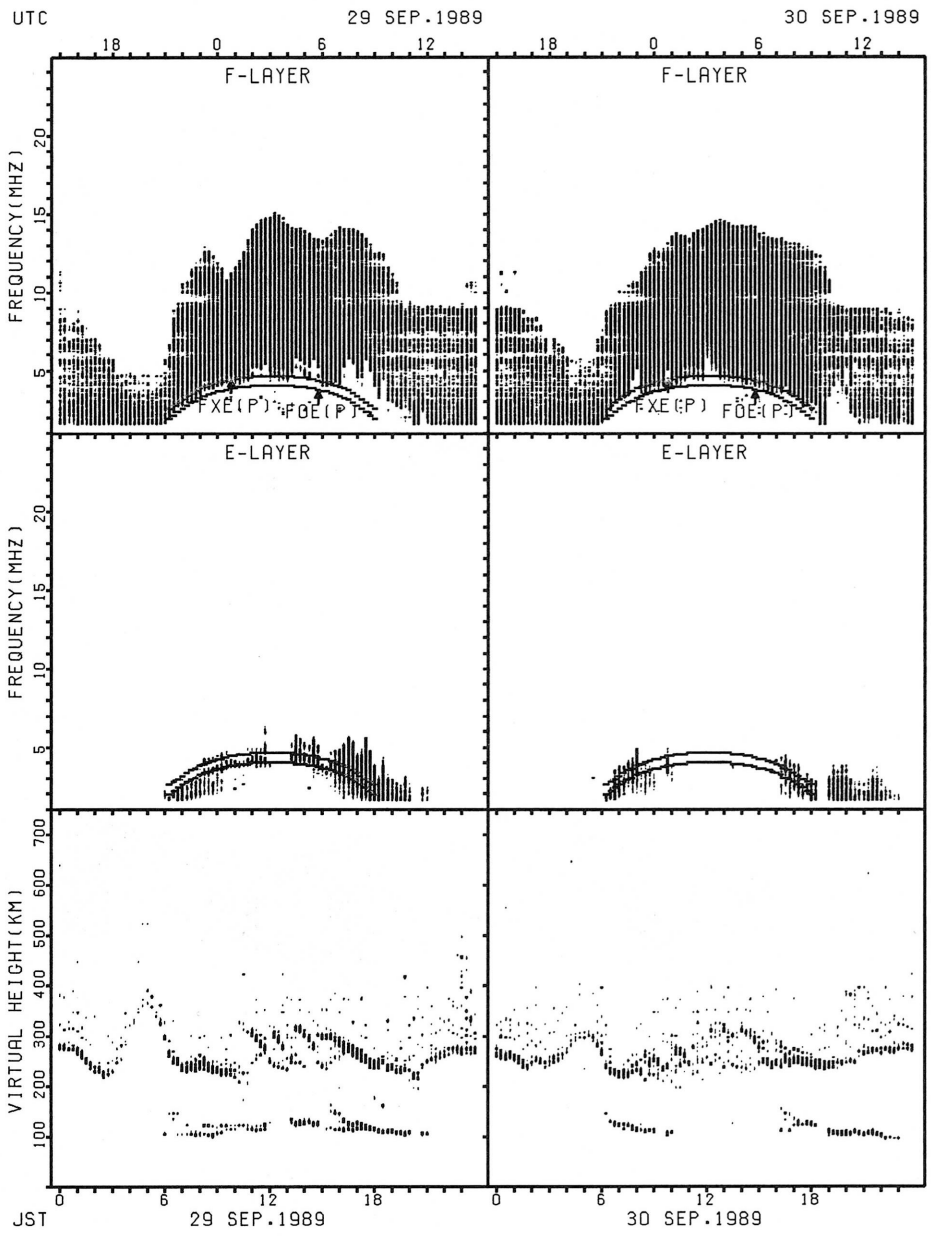
SUMMARY PLOTS AT YAMAGAWA



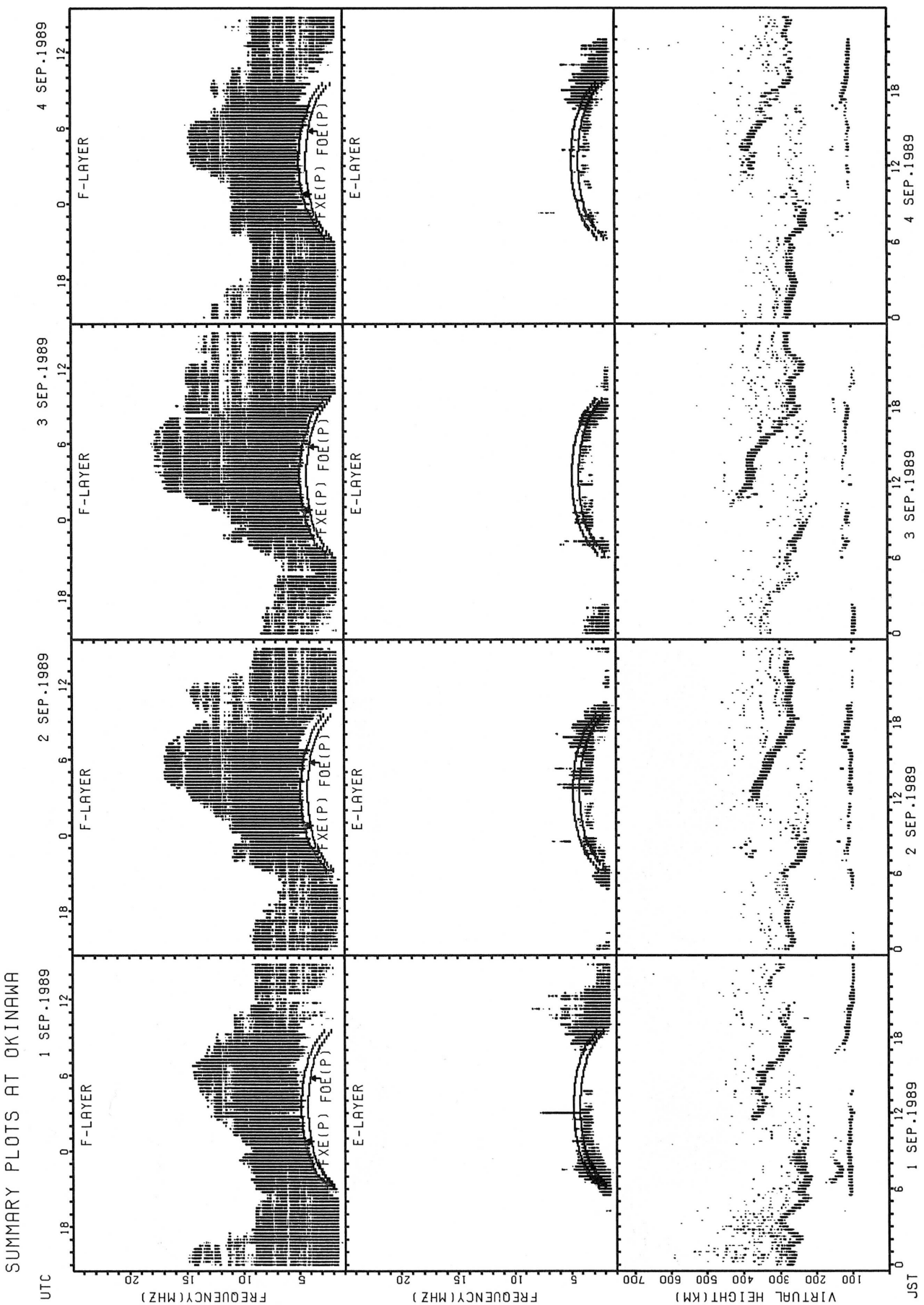
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


SUMMARY PLOTS AT YAMAGAWA
UTC
25 SEP.1989
26 SEP.1989
27 SEP.1989
28 SEP.1989
F-LAYER
E-LAYER
FXE(P)
FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

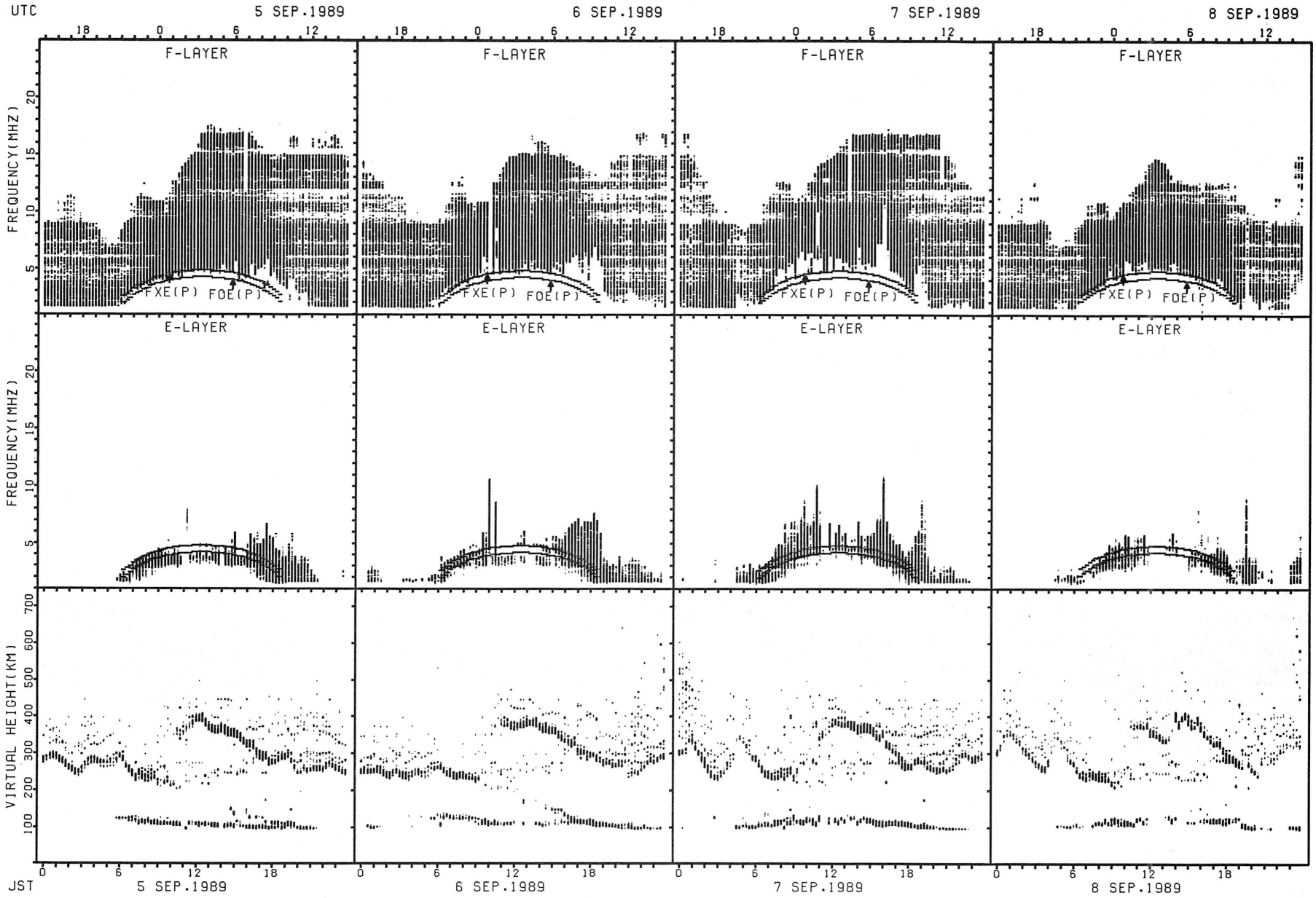
SUMMARY PLOTS AT YAMAGAWA



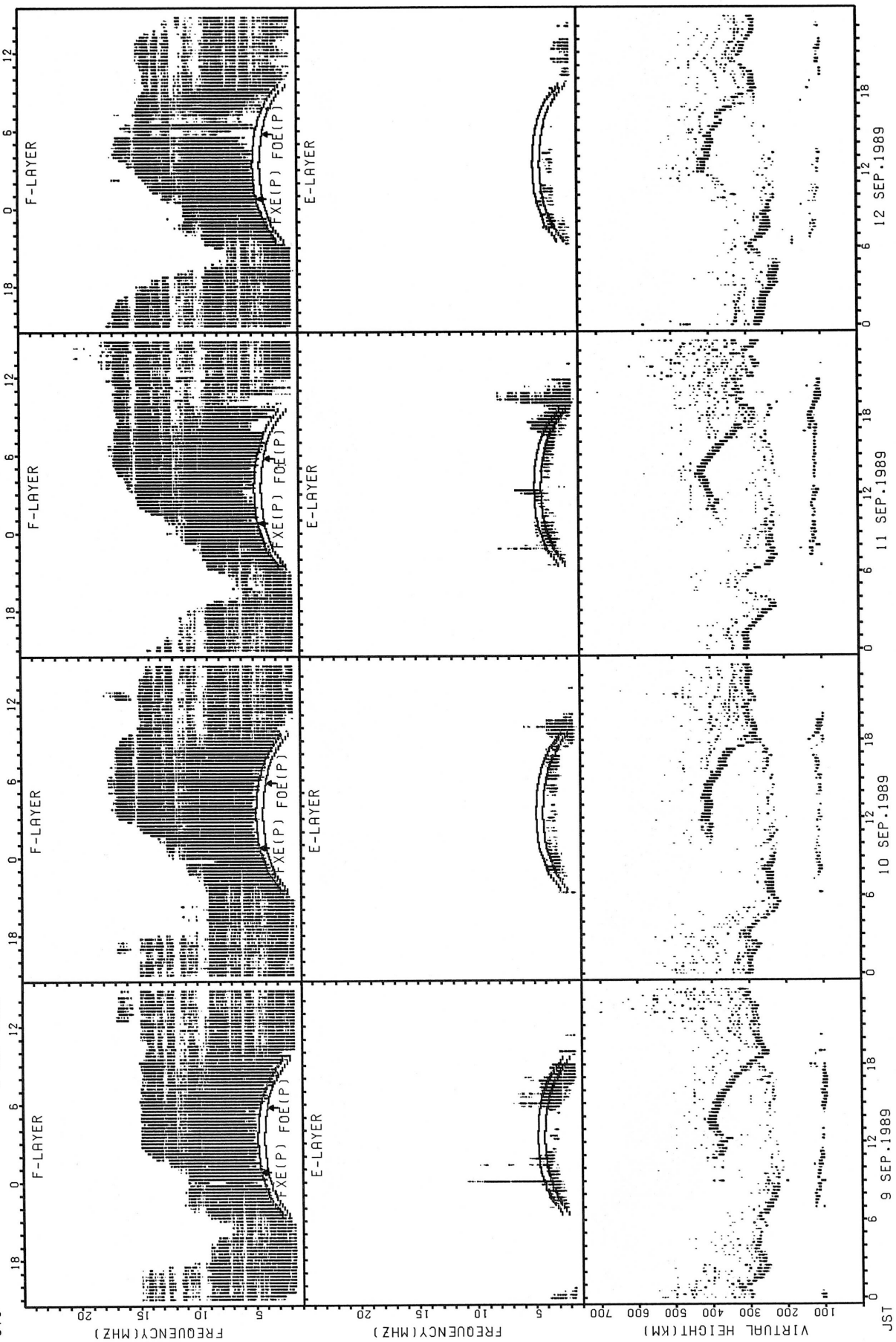
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE


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

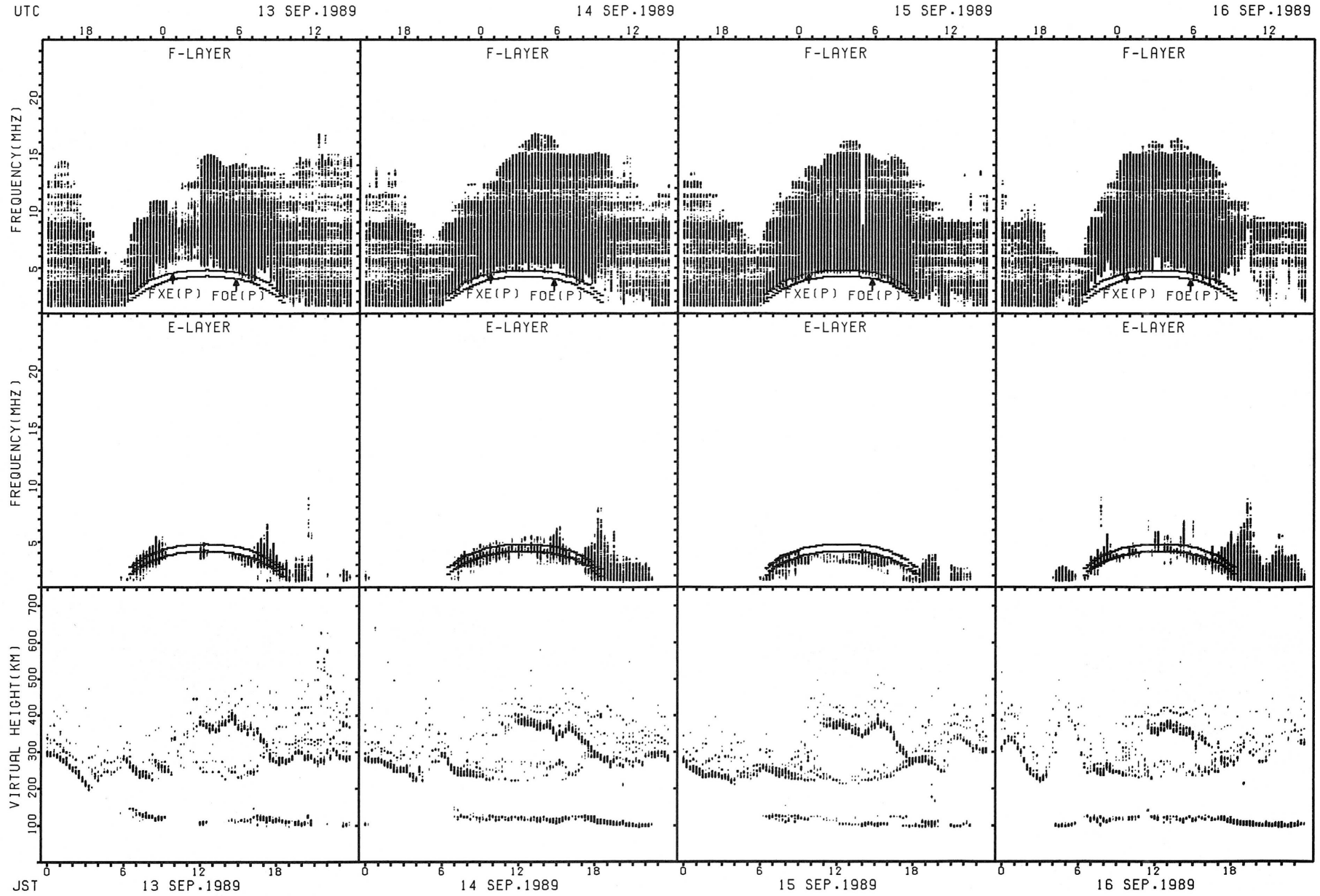
SUMMARY PLOTS AT OKINAWA



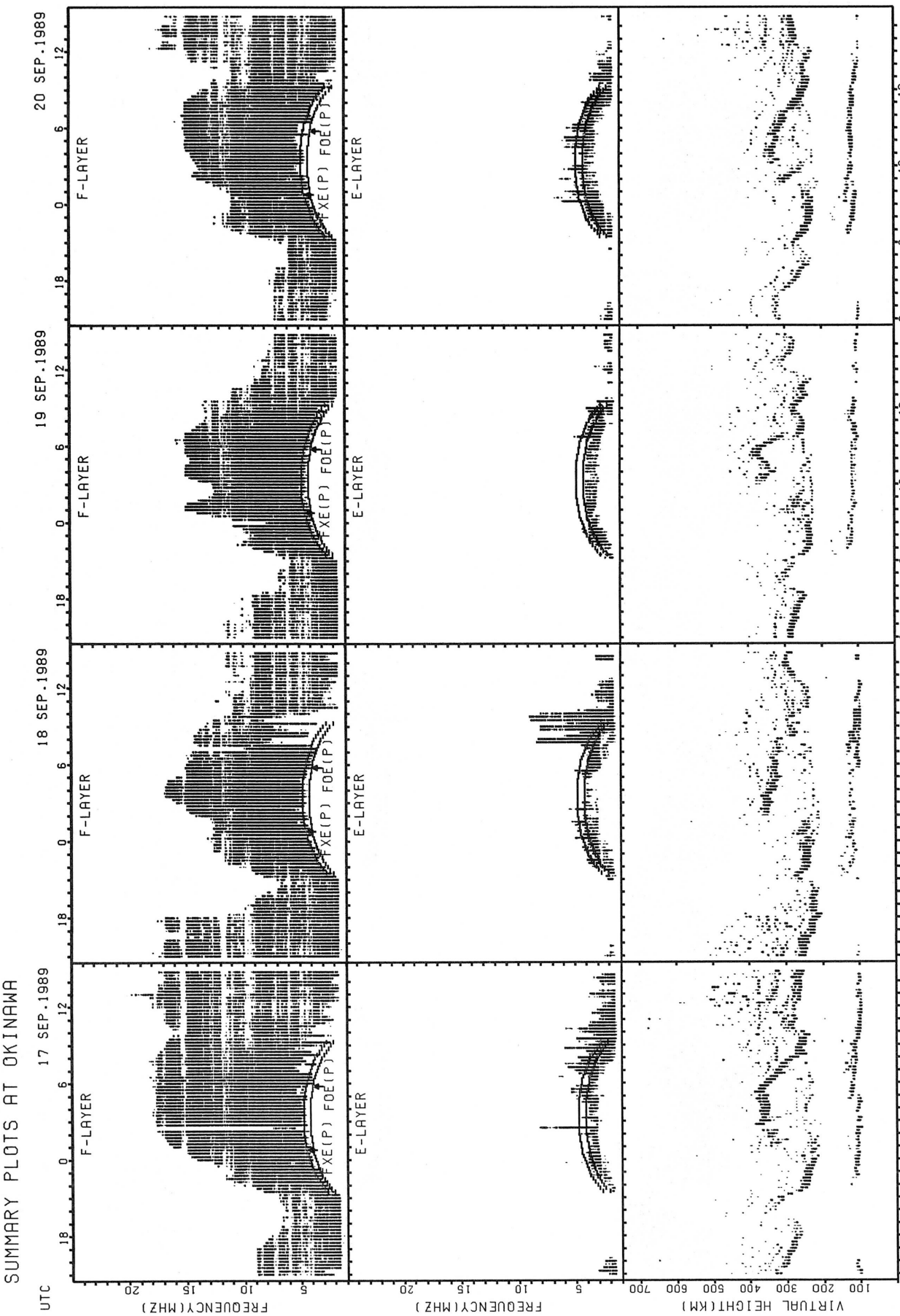
FXE(P); PREDICTED VALUE FOR FXE
FOE(P); PREDICTED VALUE FOR FOE


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

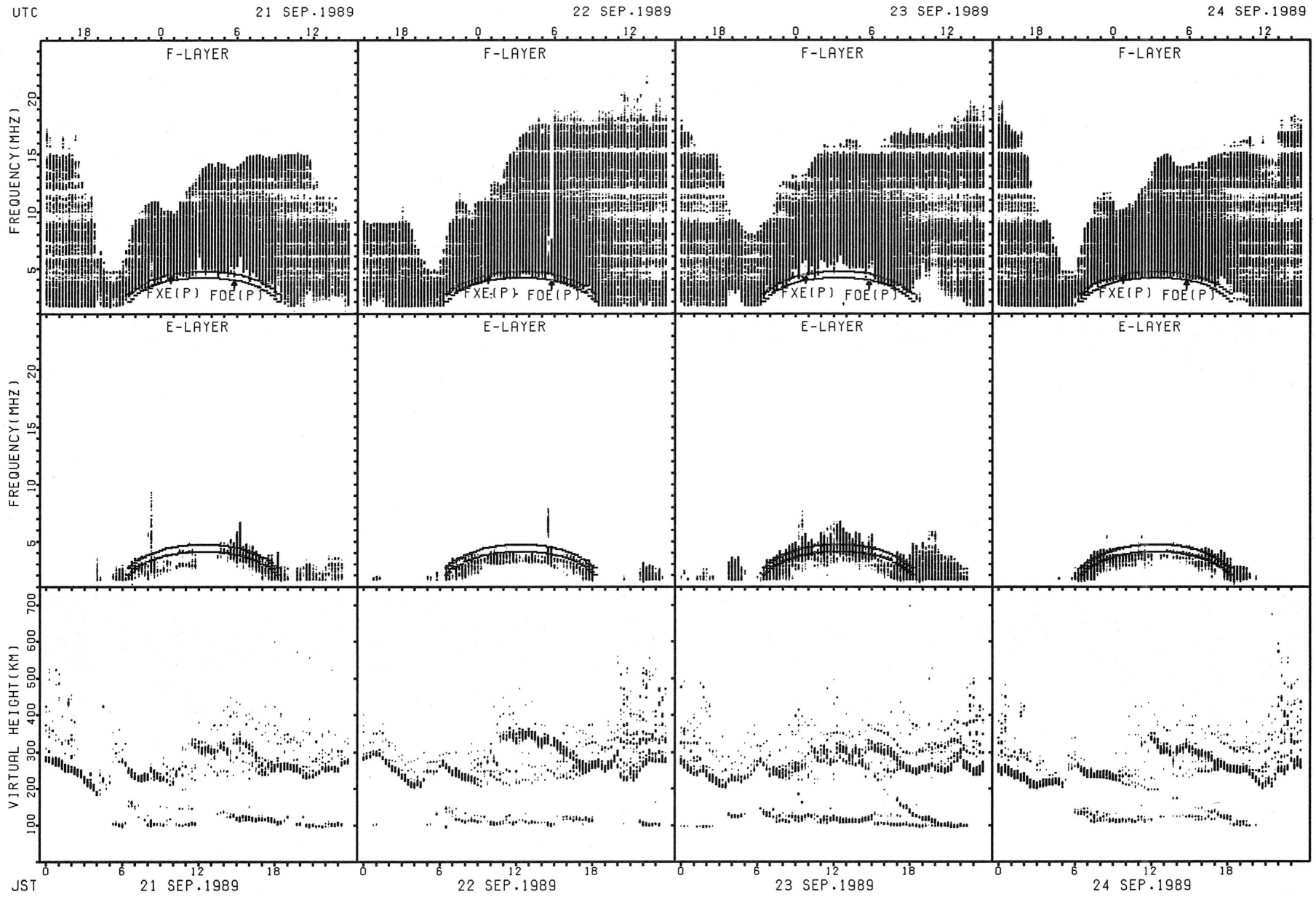
SUMMARY PLOTS AT OKINAWA



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

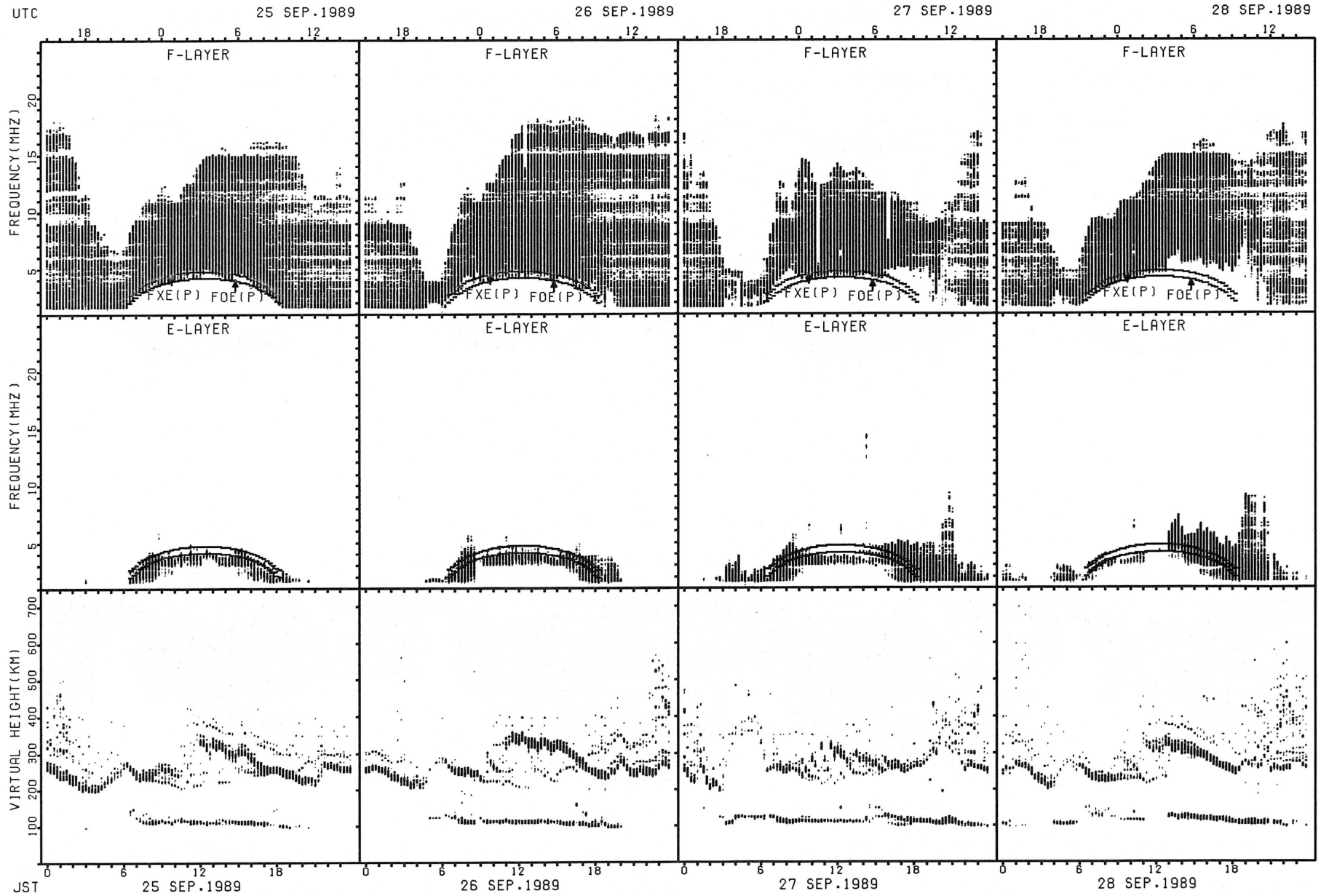

SUMMARY PLOTS AT OKINAWA
UTC
17 SEP.1989
18 SEP.1989
19 SEP.1989
20 SEP.1989
F-LAYER
E-LAYER
FXE(P) FOE(P)
FREQUENCY(MHZ)
VIRTUAL HEIGHT(KM)
JST
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



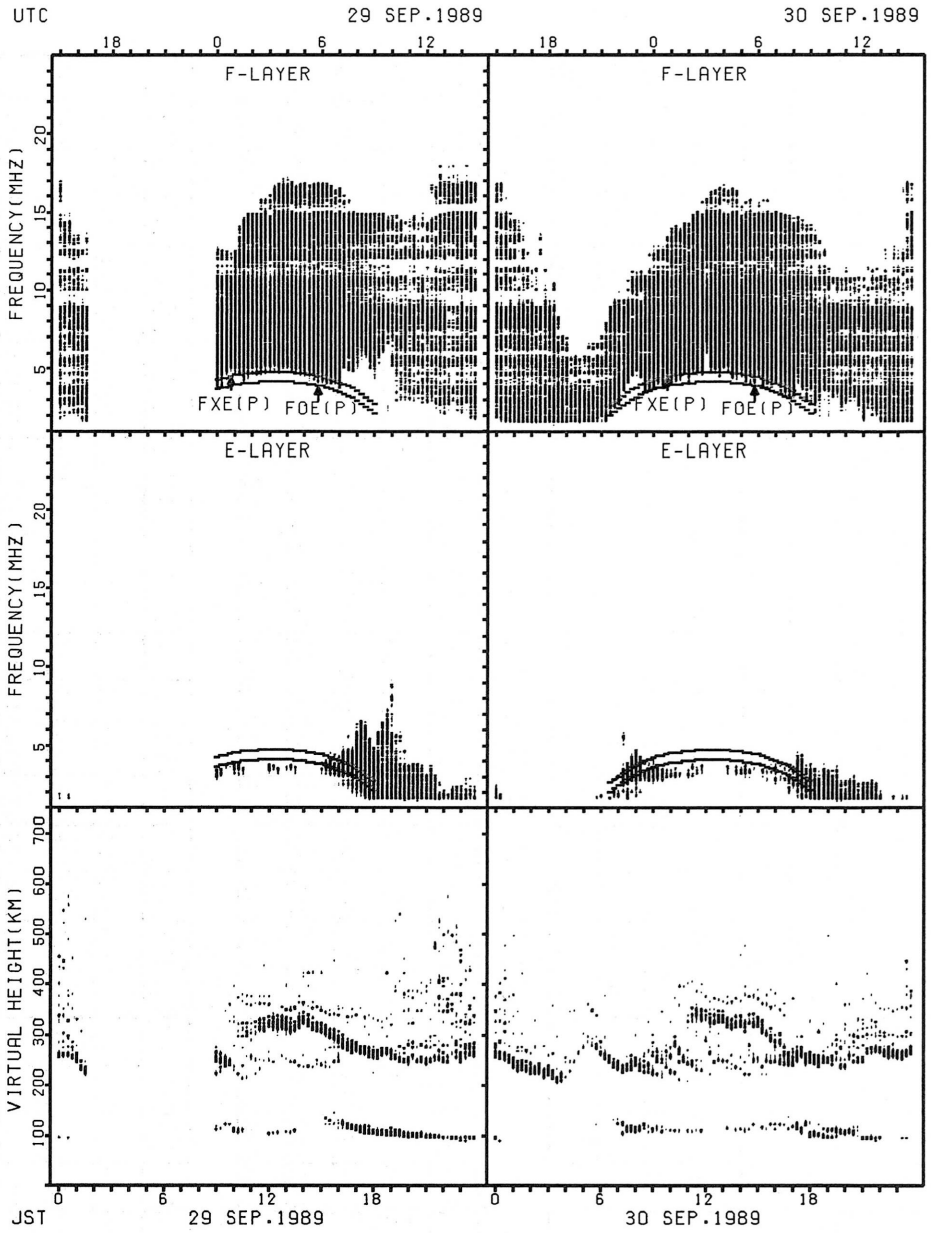
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



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

SEP.1989 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							24	28	28	19		11	13		20	28	27	29	30	26	19	12		
MED							279	264	258	248		264	264		267	290	276	270	280	297	312	330		
U Q							306	273	294	262		284	299		281	347	298	306	292	316	342	351		
L Q							259	251	247	242		258	256		253	260	262	257	262	286	286	306		

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					10	11	13		10								10	13	20	15	16	11	12	12
MED					126	125	123		119								131	125	121	123	118	117	115	115
U Q					129	131	127		123								143	128	125	125	123	121	119	117
L Q					121	119	121		117								127	123	116	119	113	113	115	111

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							25	30	29	24	19	16	12	10	20	26	26	30	28	17				
MED							268	252	248	248	260	274	278	279	294	306	292	279	276	294				
U Q							299	268	272	256	276	281	297	290	316	354	308	304	292	335				
L Q							260	244	238	235	246	258	267	266	274	276	268	254	254	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	10				12	12	16	17	14	12	11						16	23	24	19	21	15	13	13
MED	101				119	118	121	117	115	114	107						121	123	115	115	109	107	107	105
U Q	103				126	120	128	120	125	119	111						126	125	121	117	115	107	110	114
L Q	99				104	108	114	115	111	110	107						118	117	109	109	106	103	104	98

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	14	11	14				26	29	29	27	12	15	15	11	19	27	27	29	30	25	21	17	17	16
MED	374	370	324				261	242	244	250	260	272	274	286	302	300	280	270	263	288	348	344	360	358
U Q	402	392	350				286	265	258	274	270	290	312	298	332	336	316	298	286	319	374	385	387	378
L Q	348	338	290				252	234	237	242	249	266	262	268	288	276	266	249	246	265	297	336	334	339

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	11					13	13	21	18	15	13	13			10	14	16	21	21	15	18	17	18	11
MED	101					117	123	115	118	113	109	113			118	126	119	119	113	109	106	109	107	99
U Q	103					127	134	128	123	216	118	120			133	137	125	124	124	113	109	111	111	111
L Q	99					113	116	113	113	105	104	105			109	119	115	117	108	107	103	105	103	99

MONTHLY MEDIANS OF H'F AND H'ES

SEP.1989 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	18	17	12			12	31	31	29	18	15	12	10	12	31	31	31	31	29	23	20	21	19
MED	339	330	330	305			321	242	240	244	250	264	271	288	295	314	296	280	270	274	310	348	334	332
U Q	352	352	355	314			347	256	252	254	262	274	288	310	307	354	338	306	286	288	322	364	351	370
L Q	304	300	310	294			299	236	232	238	240	254	260	260	272	278	278	262	244	255	276	322	312	320

H'ES

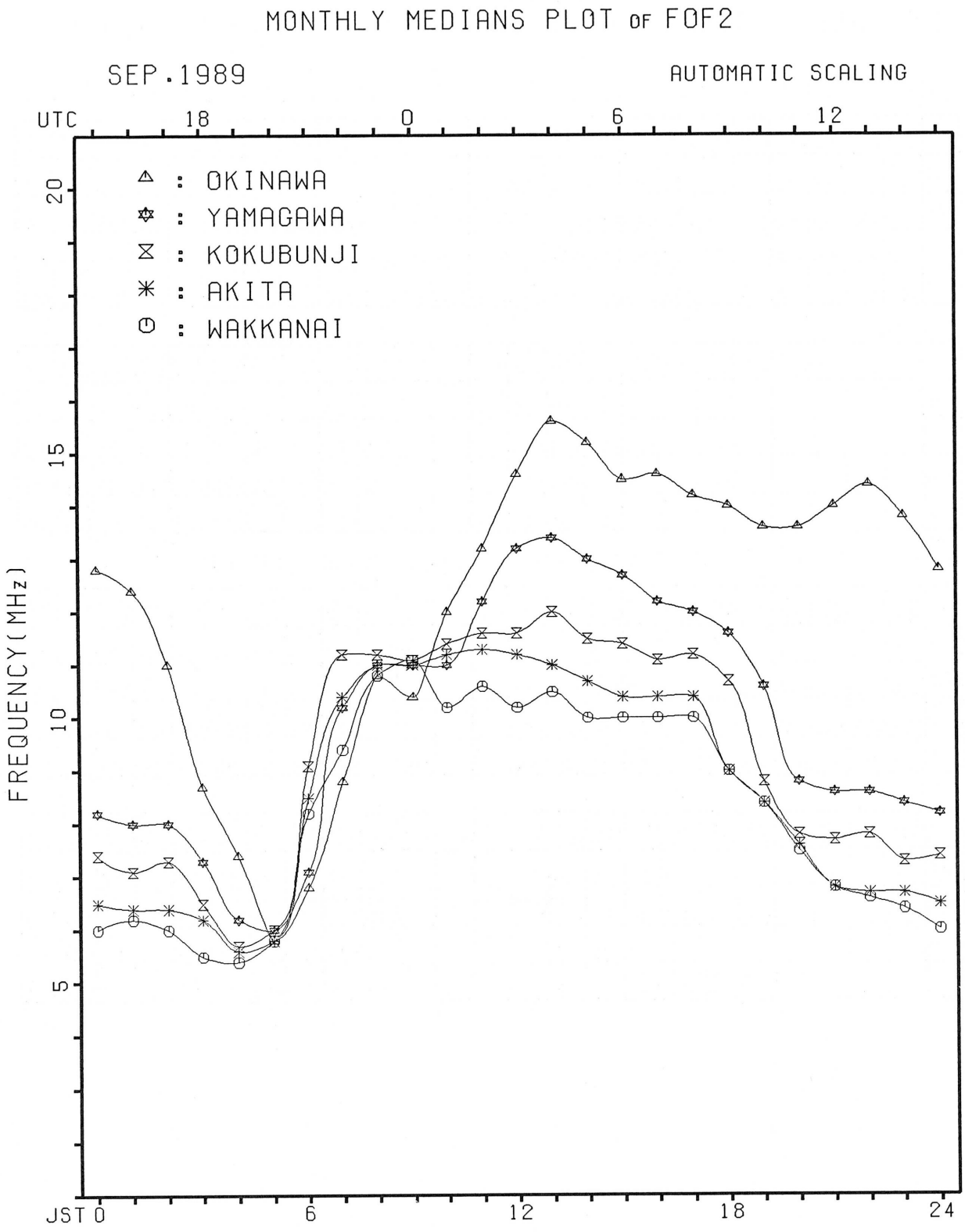
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								14	17	13	10				10	10	11	20	25	23	19	14	12	10
MED								119	119	119	114				128	121	119	125	117	109	111	107	106	103
U Q								131	125	129	129				141	135	137	127	120	115	111	109	110	105
L Q								119	115	113	111				113	111	119	120	113	107	107	101	102	99

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	29	25	27	26	15			31	30	30	27			10		30	30	31	31	31	30	27	26	28
MED	306	298	282	279	290			250	242	252	266			303		338	314	290	276	282	300	316	308	307
U Q	338	330	302	322	340			266	256	268	330			338		360	352	328	296	302	324	336	336	333
L Q	283	271	260	254	250			238	236	242	254			298		316	294	268	260	262	280	280	292	294

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							12	22	21	16					12	14	15	25	28	26	21	16	15	11
MED							122	134	121	118					119	120	125	119	115	109	105	103	103	103
U Q							136	143	136	122					134	137	137	125	124	113	111	105	107	107
L Q							105	123	114	115					113	115	117	113	110	103	102	99	101	101


MONTHLY MEDIANS PLOT OF FOF2
SEP.1989
AUTOMATIC SCALING
UTC
18
0
6
12
△ : OKINAWA
✡ : YAMAGAWA
⧖ : KOKUBUNJI
✳ : AKITA
◷ : WAKKANAI
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA

SEP. 1989 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 81	X 80	X 77	X 74	X 70															X 98	X 86	X 85	X 87	X 85
2	X 88	X 81	X 82	X 80	X 75															X 91	X 80		X 92	X 86
3	X 81	X 78	X 76	X 78	X 69															X 105	0 X 78	X 79	X 83	X 82
4	X 78	X 76	X 74	X 71	X 68															X 96	X 89	X 86	X 89	X 84
5	X 78	X 79	X 75	X 71	X 70															X 85	0 S 82	X 81	X 82	X 76
6	X 73	X 73	X 73	X 68	X 65															X 96	X 89	X 91	X 87	X 78
7	X 77	X 75	X 82	X 68	X 66															X 94	X 82	X 83	X 82	X 80
8	X 72	X 73	X 73	X 69	X 65															X 87	X 76	X 72	X 74	X 74
9	X 71	X 70	X 68	X 66	X 64															X 94	X 82	X 83	X 81	X 82
10	X 80	X 80	X 75	X 73	X 76															C	C	C	C	S
11	X 81	X 80	X 83	X 77	X 70															X 96	X 96	X 100	X 96	X 96
12	X 90	X 87	X 85	X 81	X 75						133	133								X 104	X 96	X 94	X 94	X 93
13	X 87	X 85	X 84	X 75	X 69															X 105	X 92	X 98	X 97	X 96
14	X 91	X 91	X 88	X 86	X 84															X 114	X 108	X 97	X 91	X 90
15	X 92	X 87	X 81	X 80	X 77	X 78														X 105	X 85	X 88	X 89	X 87
16	X 79	X 83	X 84	X 71	X 68	X 66													X 107	X 82	X 83	X 84	X 79	X 81
17	X 82	X 80	X 79	X 72	X 68	X 71													X 114	X 93	X 90	X 90	X 89	X 88
18	X 86	X 81	X 81	X 70	X 66	X 68													X 99	X 95	X 87	0 X 82	X 81	X 78
19	X 80	X 76	0 X 75	X 67	X 68	X 65													X 98	X 81	X 82	X 82	X 79	X 84
20	X 79	X 80	X 81	X 79	X 74	X 82													X 122	X 95	X 86	X 82	X 81	S
21	X 84	X 84	X 82	X 79	X 72	X 66													X 119	X 96	X 87	X 84	X 86	X 81
22	X 80	X 81	X 78	X 75	X 68	X 68													X 128	X 104	X 101	X 88	X 84	X 83
23	X 84	X 81	X 84	X 80	X 59	X 62													X 119	X 99	X 92	X 83	X 82	X 84
24	X 83	X 79	X 76	X 73	X 64	X 65													X 125	X 102	X 85	X 76	X 74	S
25	X 74	X 73	X 75	X 70	X 59	X 57													X 117	X 107	X 85	X 81	X 77	X 77
26	X 74	X 71	X 69	X 66	X 63	X 65													X 121	X 87	X 88	X 86	X 87	X 78
27	X 76	X 78	X 71	X 55	X 52	X 46													X 86	X 73	X 68	X 72	X 71	X 68
28	X 62	X 60	X 60	X 61	X 58	X 54													X 112	X 87	X 88	X 88	X 85	X 77
29	X 72	X 70	X 68	X 55	X 55	X 54													X 111	X 89	X 83	X 79	X 78	X 80
30	X 76	X 73	R 70	X 68	X 64	X 67													X 111	X 90	X 84	X 82	X 85	X 79
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	30	30	30	30	30	16					1	1							15	29	29	29	29	27
MED	X 80	X 80	X 76	X 72	X 68	X 66					133	133							X 114	X 95	X 86	X 84	X 84	X 82
UQ	X 84	X 81	X 82	X 78	X 70	X 68													X 120	X 102	X 89	X 88	X 89	X 86
LQ	X 76	X 73	X 73	X 68	X 64	X 60													X 109	X 89	X 82	X 82	X 81	X 78

SEP. 1989 | FXI (0.1 MHZ)

IONOSPHERIC DATA

SEP. 1989 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	75	74	71	68	64	69	92	H 106	95	97	93	101	102	99	93	94	90	82	91	92	80	79	81	79
2	82	75	76	74	69	73	94	124	113	90	98	107	107	101	98	94	93	96	101	85	74	F 81	86	80
3	75	72	70	72	63	63	92	116	110	112	114	126	126	122	116	109	99	106	109	99	S 72	73	78	S 75
4	S 73	69	67	64	62	62	88	119	102	94	102	104	105	105	110	110	98	90	94	90	83	80	83	78
5	72	73	69	65	64	66	85	108	111	102	102	105	113	103	96	103	108	93	88	79	76	75	76	70
6	67	67	67	S 62	59	63	72	95	110	114	112	116	111	105	102	95	95	97	99	90	83	85	81	72
7	71	69	76	62	60	59	86	95	108	107	108	108	110	108	103	100	98	96	U R 95	U S 88	76	77	76	74
8	66	67	67	63	59	62	79	Z 86	75	85	90	89	88	91	85	82	82	88	91	81	70	66	68	68
9	65	64	62	60	58	60	88	105	106	105	104	105	106	110	107	99	99	99	101	88	76	77	75	76
10	74	74	69	67	70	77	95	102	103	114	119	122	120	119	C	C	C	C	C	C	C	C	C	S
11	S 75	74	77	71	63	68	98	109	116	115	121	126	128	125	121	120	116	115	110	90	90	94	90	90
12	84	81	S 79	75	69	73	92	116	123	123	F 126	F 126	123	120	121	116	108	107	107	98	90	S 88	88	87
13	81	79	78	69	63	62	90	114	121	119	C	C	C	C	C	112	J S 113	117	117	98	87	93	93	S 91
14	84	85	81	79	78	81	96	J S 119	125	119	123	129	125	124	119	115	116	117	117	108	102	91	85	84
15	86	81	75	74	71	72	100	129	123	121	130	135	128	126	120	115	119	122	122	99	79	82	83	81
16	73	77	78	65	62	60	93	117	120	130	131	142	122	128	123	113	110	107	101	76	77	78	73	75
17	76	S 74	73	66	62	65	91	112	117	124	133	132	129	125	124	118	115	116	108	87	84	84	83	82
18	80	75	75	64	60	62	86	110	119	122	122	118	126	125	120	116	109	102	S 95	89	82	76	75	72
19	74	70	S 69	60	62	59	76	107	98	107	129	121	117	113	110	121	111	94	92	75	76	76	73	78
20	73	74	75	73	68	F 72	97	R 124	115	120	122	126	125	120	114	I C 110	109	120	116	89	80	76	75	I S 76
21	78	78	76	73	66	60	78	117	132	114	112	116	116	120	126	127	125	116	113	90	81	78	80	75
22	74	75	72	69	62	62	88	116	129	96	106	125	128	132	126	124	129	133	122	98	95	82	78	77
23	78	75	78	74	53	56	81	117	127	120	133	146	135	125	116	113	111	116	113	93	86	77	76	78
24	S 77	73	70	67	58	59	87	102	113	124	109	103	114	120	121	117	113	116	119	96	79	70	68	S
25	68	67	69	64	53	51	83	113	108	112	117	116	121	126	125	119	120	118	111	S 100	80	74	71	71
26	68	65	59	60	56	59	95	112	112	101	118	130	127	128	129	125	132	128	115	81	82	80	81	72
27	70	72	65	49	46	40	51	52	56	61	E G 54	74	H 79	84	81	85	87	85	80	U S 67	62	66	65	62
28	56	54	54	55	52	48	68	97	96	81	94	107	114	117	122	122	127	126	S 104	81	81	J S 82	S 79	71
29	66	61	61	49	48	49	85	109	124	106	111	125	131	128	117	113	124	127	105	83	77	73	72	74
30	70	67	S 64	62	58	61	94	118	118	113	127	138	137	128	132	130	125	119	105	84	78	76	79	73
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	30	30	30	30	30	30	30	30	30	30	29	29	29	29	28	29	29	29	29	29	29	29	29	28
MED	74	74	70	66	62	62	89	112	113	112	114	121	121	120	113	113	111	115	105	89	80	78	78	76
UQ	78	75	76	72	64	68	94	117	121	120	123	126	127	125	122	119	119	113	113	96	83	82	83	80
LQ	70	67	67	62	58	59	85	105	106	101	104	107	111	108	105	103	99	97	95	83	76	76	75	72

SEP. 1989 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

SEP. 1989 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L	U L 530	L	L	L 580	L 600	U L 600	L	L	A						
2							L	L	L	B	L 640	L 640	L 630	590	L	L	A	A						
3								L	L	L	L	U L 670	L	L	L	L	A	A	A					
4								L		L	L	L	L	L	A	U L 590	L							
5									L	L	L	L	610	L	L	U L 590	L	A						
6									L	L	L	L	L	630	590	L	A	A						
7								L	L	L	L	L 660	U L 670	L	U L 660	U L 610	L	L						
8								A	A	L 630	600	L	650	L 660	U L 620	L	L	L						
9								L	L	L	U L 680	L	650	640	650	U L 610	U L 590	L						
10									L	L	L	720	L	690	C	C	C	C	C					
11								L		L	L	670	680	L 660	U L 700	U L 660	L							
12									L	L	L	L	L	L 670	L 640	L	L	L						
13								L	L		C	C	C	C	C	L	L	L						
14										L	L	L	L	L	U L 700		L							
15										L	L	L	U L 740	L	L	L	L							
16										L	L	L	U L 760	L	L	L	L							
17									L	L	L	L	L	U L 670	L	U L 590								
18									L	L	L	L 690	L	L	L	L								
19										L	L	L	L	L	U L 620	L								
20									L	L	L	L	L	L	L	C	L							
21									L	L	L	L	L	L	L	L	A							
22									L	L	L	L	L	L	L	L	L							
23									L	L	L	L	L	L	L	L	L							
24										L	L	L	L	L	L	L								
25									L	L	L	L		L	L									
26										L	L	L	L	L	L	L								
27									450	490	540	L	U L 520	L	L	L	L							
28									L	L	L	L	L	L	L	L	A							
29									L	L		L	L	L	L	L	A							
30										L	L	L		L	L	L								
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									-1	3	4	6	10	9	9	6	1							
MED									450	L 580	620	L 670	L 650	L 660	U L 640	U L 600	U L 590							
UQ										L 605	L 660	L 690	U L 680	L 670	U L 660	U L 610								
LQ										535	570	L 660	L 610	630	U L 620	U L 590								

SEP. 1989 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

SEP. 1989 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	245	A	A	A	A	A	415	U A 380	A	385	345	285	B					
2						B	A	A	A	B	A	A	A	R 415	395	375	330	265	B					
3						B	A	310	370	385	A	R	R	R	410	A 405	340	U A 265	B					
4						B	240	300	A	A	A	A	A	A	A	A	335	270	A					
5						B	A	305	355	A	A	R	410	410	390	385	330	260	A					
6						B	235	320	350	390	A	A	A	A	395	385	340	275	B					
7						S	245	320	350	A	A	A	A	A	A	A	A	255	S					
8						B	A	A	A	A	A	A	A	A	A	380	335	270	B					
9						B	235	315	A	A	395	R 410	410	410	405	385	335	270	B					
10						B	240	A	A	A	A	420	R 430	410	C	C	C	C	C					
11						B	230	325	370	395	420	420	R 425	420	400	395	330	255	B					
12						B	240	320	360	400	420	425	430	425	410	395	R 345	270	B					
13						B	245	305	370	R	C	C	C	C	C	365	325	250	B					
14						B	200	295	S	385	A	A	415	410	410	380	345	250	B					
15							240	290	330	A	395	A	S 395	390	380	360	315	230	B					
16							A	A	A	A	B	R	400	395	A	355	305	235						
17							185	305	355	370	395	420	405	395	A	345	310	225						
18							230	295	340	A	A	380	410	395	S	345	310	235						
19							230	295	335	390	400	400	395	380	360	335	290	A						
20							200	285	345	A	A	A	U A 390	A	A	C	A	A						
21							205	305	340	365	380	A	B	395	375	340	295	215						
22							215	275	330	U A 345	375	R	R	R	A	325	280	205						
23							A	A	325	355	370	380	R 380	B	355	325	285	220						
24							195	280	R 340	360	375	380	380	370	345	325	280	215						
25							200	290	330	A	380	385	S	385	360	325	290	215						
26							180	280	340	R 375	A	385	385	A	A	340	290	195						
27							A	270	315	345	360	A	A	R	360	330	280	205						
28							205	280	340	B	380	R	R 390	A	365	340	290	200						
29							A	A	U A 325	A	A	355	365	380	365	350	295	190						
30							205	230	325	A	370	390	B	395	375	350	290	200						
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							22	23	22	13	14	13	18	18	18	26	27	27						
MED							230	295	340	375	380	390	402	395	378	352	310	235						
UQ							240	308	355	390	395	420	415	410	400	385	335	265						
LQ							200	282	330	360	375	380	390	385	360	340	290	215						

SEP. 1989 | FOE (0.01 MHZ)

IONOSPHERIC DATA

SEP. 1989 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 15	16	E B 16	E B 14	E B 16	J A 20	29	J A 43	J A 43	J A 48	43	41	G 37	J A 70	46	46	J A 59	J A 53	J A 50	J A 86	J A 89	J A 53	J A 98	J A 53
2	J A 20	E B 14	E B 14	J A 55	J A 42	J A 40	J A 52	J A 53	J A 52	E B 72	J A 47	J A 49	J A 50	G	47	47	J A 72	85	61	J A 68	J A 54	J A 49	J A 52	J A 33
3	J A 26	J A 25	E B 14	E B 16	J A 20	22	27	41	44	41	J A 50	G 41	G 42	G 39	G	51	J A 83	J A 73	J A 68	J A 55	J A 49	24	22	29
4	27	J A 21	E B 12	E B 14	20	22	G	33	J A 56	J A 44	J A 40	J A 58	J A 57	55	J A 59	43	G 23	30	J A 36	J A 77	J A 49	J A 23	J A 51	27
5	19	E B 17	J A 22	21	20	22	26	35	G 33	J A 43	J A 46	G 37	G 31	G 31	G 36	G 27	G	34	J A 24	27	21	J A 43	J A 21	E B 16
6	E B 14	E B 14	20	21	J A 41	23	G 23	36	42	47	J A 51	46	41	40	G 31	43	J A 57	J A 59	55	J A 37	J A 35	J A 35	J A 54	J A 30
7	J A 52	30	J A 22	E S 18	E S 22	26	G	36	J A 50	J A 49	J A 59	J A 52	J A 56	J A 51	52	J A 46	36	33	58	E S 18	J A 58	J A 70	J A 53	J A 34
8	J A 29	31	J A 28	25	E B 14	J A 16	J A 39	J A 42	J A 52	J A 49	J A 51	J A 49	J A 56	48	J A 42	G 35	G 31	31	J A 32	J A 35	J A 22	E B 15	25	13
9	J A 19	E B 16	E B 14	E B 14	E B 14	J A 26	G 22	J A 50	J A 50	J A 48	G 37	G	G 39	G 37	G	G	G	G	J A 23	21	E B 16	E B 16	E B 15	E B 15
10	E B 15	E B 14	E B 15	E B 15	E B 15	J A 30	G	J A 43	J A 51	46	48	G 34	G 31	G	C	C	C	C	C	C	C	C	C	S
11	E B 16	E B 13	E B 16	E B 13	E B 14	E B 14	G	G	G	G	G 32	G 32	G 33	G 33	41	G	34	33	22	J A 26	32	J A 25	E B 15	E B 15
12	E B 15	E B 15	E S 19	E B 14	E B 16	E B 15	G	G	G	G	G	44	G	G	G	G 31	37	29	E B 19	E B 14	J A 26	E S 19	E B 15	E B 15
13	E B 14	E B 15	E B 15	E B 14	E B 14	E B 17	G 24	34	39	G	C	C	C	C	C	G 19	G 19	30	18	J A 19	24	E B 13	E B 13	E B 13
14	E B 15	E B 13	E B 12	E B 13	J A 48	E B 13	23	G	E S 36	G	43	48	46	44	G	G	G	28	E B 17	E B 14	E B 15	19	J A 22	J A 21
15	E B 15	19	E B 15	E B 14	E B 13	E B 15	G	33	J A 46	J A 48	41	J A 43	G	G 29	G 27	J A 59	35	27	J A 19	J A 18	J A 18	E B 15	E B 14	E B 13
16	E B 14	E B 12	J A 13	J A 15	J A 18	E B 16	J A 27	34	J A 36	43	E B 45	G 38	G 34	G	J A 41	G	39	32	J A 33	J A 61	J A 42	J A 43	J A 48	J A 27
17	J A 25	J A 34	J A 29	J A 22	J A 19	J A 31	J A 38	J A 60	G	G 31	G	G	G	G	35	36	36	J A 43	46	J A 35	J A 25	E B 14	J A 20	22
18	J A 20	J A 18	E B 14	E B 15	J A 19	E B 14	26	33	38	44	46	G	G	G	E S 38	G 21	G 20	G 20	E S 14	E B 12	E B 13	E B 13	E B 14	E B 12
19	E B 13	E B 14	19	22	J A 22	J A 21	J A 25	G 28	G	G	G	G	G	G	G 27	G 23	31	27	J A 37	J A 26	J A 18	19	E B 15	E B 13
20	E B 15	18	19	E B 14	E B 14	E B 15	G	G	G	41	41	J A 42	41	J A 40	36	C	39	J A 30	J A 23	J A 23	J A 22	J A 23	J A 27	33
21	30	21	19	E B 14	J A 26	23	G	37	40	J A 54	43	47	E B 46	41	J A 54	44	J A 61	J A 49	J A 41	J A 49	J A 20	J A 33	J A 23	E B 14
22	E B 14	J A 18	20	E B 14	E B 13	E B 14	25	37	37	38	G 36	G 37	G 28	J A 40	J A 53	G 27	G 19	29	J A 23	J A 22	J A 28	J A 47	J A 24	E B 15
23	E B 13	27	23	22	20	18	26	J A 70	36	J A 52	39	39	G 35	E B 39	G 30	G	G	G	E B 15	E B 14	J A 52	J A 51	J A 20	E B 14
24	E B 18	E B 14	E B 13	E B 13	E B 14	E B 14	G	G	J A 43	38	J A 55	G 27	G 25	G 24	G	G	G	24	20	E B 15	20	J A 27	J A 34	23
25	E B 16	E B 15	E B 13	E B 13	E B 13	E B 15	G	31	J A 53	37	G	G	G	G	G	G	G	G	E S 16	22	E B 13	E B 13	40	E B 13
26	J A 22	J A 20	E B 16	E B 13	E B 13	E B 14	27	40	G	G	J A 42	G 36	G 34	42	J A 39	38	J A 51	J A 50	J A 22	J A 57	J A 22	J A 24	J A 19	20
27	J A 16	E B 14	J A 25	J A 28	J A 22	E B 13	22	35	39	44	38	J A 51	39	26	37	37	34	30	44	J A 27	20	J A 18	22	E B 15
28	E B 15	E B 13	18	J A 23	E B 16	E B 13	G	30	G	E B 39	G	G 37	G 37	40	G	42	J A 71	J A 44	J A 22	J A 27	J A 34	28	21	E B 13
29	J A 26	J A 22	E B 12	20	24	27	J A 30	J A 43	41	52	J A 48	47	45	49	39	J A 71	J A 60	J A 51	J A 118	J A 33	J A 24	E B 15	18	E B 15
30	J A 19	E B 14	E B 16	J A 19	E B 14	E B 15	G	31	37	36	G 34	G 34	E B 51	G 35	G 25	G 24	33	26	17	J A 35	J A 52	J A 42	J A 26	J A 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	30	30	30	30	30	30	30	30	30	30	29	29	29	29	28	28	29	29	29	29	29	29	29	29
MED	E B 16	E B 16	E B 16	E B 15	E E 17	16	23	35	39	42	42	G 39	G 36	G 36	36	G 33	34	30	J A 23	J A 27	J A 24	J A 24	J A 22	E B 15
UQ	J A 22	21	20	21	J A 22	23	27	J A 42	J A 46	J A 48	J A 47	47	43	41	42	44	J A 51	J A 44	J A 44	J A 37	J A 42	J A 41	J A 34	27
LQ	E B 15	E B 14	E B 14	E B 14	E B 14	E B 14	G	31	E G 33	U 34	G 36	G 34	G 28	G	E G 25	E G 19	G 19	27	19	19	20	E B 16	18	E B 14

SEP. 1989 | FOES (0.1 MHZ)

IONOSPHERIC DATA

SEP. 1989 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 15	16	E B 16	E B 14	E B 16	19	G 20	34	37	41	41	41	G 34	45	43	42	47	39	37	26	37	22	66	18
2	E B 15	E B 14	E 3 14	22	20	26	27	33	37	E B 72	44	43	43	G	45	42	68	68	27	23	28	33	21	25
3	19	E B 16	E B 14	E B 16	E B 14	E B 15	26	37	41	41	41	G 41	G 42	G 38	G	47	78	49	61	42	26	E B 16	E B 14	21
4	18	16	E B 12	E B 14	E B 13	E B 13	G	32	37	41	40	56	54	47	59	38	G 22	29	21	51	27	19	44	19
5	17	E B 17	18	E B 13	E B 15	E B 15	26	34	G 32	41	42	U R 37	G 30	G 30	G 36	G 27	G	34	23	24	17	17	17	E B 16
6	E B 14	E B 14	E B 15	19	E B 14	E B 16	G 20	35	40	45	45	42	41	40	G 30	41	56	57	46	31	25	23	19	27
7	41	19	18	E S 18	E S 22	20	G	35	45	47	57	44	44	47	42	44	36	32	U S 56	E S 18	36	33	38	24
8	23	21	23	18	E B 14	E B 15	35	38	50	43	45	44	48	47	41	G 34	G 29	30	19	17	19	E B 15	E B 17	E B 13
9	E B 15	E B 16	E B 14	E B 14	E B 14	E B 15	G 21	G 27	40	43	G 36	G	G 38	G 36	G	G	G	G	21	E B 15	E B 16	E B 16	E B 15	E B 15
10	E B 15	E B 14	E B 15	E B 15	E B 15	E B 15	G	33	41	42	43	G 33	G 31	G	C	C	C	C	C	C	C	C	C	S
11	E B 16	E B 13	E B 16	E B 13	E B 14	E B 14	G	G	G	G	G 32	G 32	G 32	G 32	G 35	G	G	33	21	19	23	E B 15	E B 15	E B 15
12	E B 15	E B 15	E S 19	E B 14	E B 16	E B 15	G	G	G	G	G	44	G	G	G	G 30	37	29	E B 19	E B 14	E B 15	E S 19	E B 15	E B 15
13	E B 14	E B 15	E B 15	E B 14	E B 14	E B 17	G 21	34	39	G	C	C	C	C	C	G 19	G 18	29	16	16	E B 13	E B 13	E B 13	E B 13
14	E B 15	E B 13	E B 12	E B 13	E B 14	E B 13	22	G	E S 36	G	41	42	43	43	G	G	G	28	E B 17	E B 14	E B 15	E B 15	21	15
15	E B 15	E B 14	E B 15	E B 14	E B 13	E B 15	G	33	39	39	41	41	G	G 29	G 27	55	35	27	18	E B 16	E B 14	E B 15	E B 14	E B 13
16	E B 14	E B 12	E B 13	E B 13	15	E B 16	26	31	36	43	E B 45	U G 38	G 33	G	40	G	38	31	25	39	18	27	22	22
17	21	26	25	19	16	17	27	G 27	G	G 30	G	G	G	G	35	36	36	43	38	26	E B 14	E B 14	E B 15	E B 14
18	E B 14	17	E B 14	E B 15	E B 13	E B 14	24	32	36	41	41	G	G	G	E S 38	G 20	G 19	G 18	E S 14	E B 12	E B 13	E B 13	E B 14	E B 12
19	E B 13	E B 14	E B 13	E B 14	E B 13	E B 13	G 18	G 27	G	G	G	G	G	G	G 26	G 22	G	25	28	18	18	E B 15	E B 15	E B 13
20	E B 15	E B 13	16	E B 14	E B 14	E B 15	G	G	G	38	39	39	40	40	35	C	37	30	18	17	18	19	17	U S 33
21	23	E B 13	E B 15	E B 14	22	E B 14	G	37	37	40	42	41	E B 46	40	51	40	45	31	35	31	E B 15	22	19	E B 14
22	E B 14	E B 15	E B 15	E B 14	E B 13	E B 14	25	34	37	38	G 35	G 36	G 28	G 36	40	G 26	G 19	G 27	19	17	26	23	E B 15	E B 15
23	E B 13	16	17	17	E B 13	E B 13	23	29	36	45	G	39	G 32	E B 39	G 26	G	G	G	E B 15	E B 14	28	39	16	E B 14
24	E B 18	E B 14	E B 13	E B 13	E B 14	E B 14	G	G	G	38	G	G 27	G 25	G 24	G	G	G	24	E B 14	E B 15	E B 14	20	22	E B 15
25	E B 16	E B 15	E B 13	E B 13	E B 13	E B 15	G	31	35	37	G	G	G	G	G	G	G	G	E S 16	E B 14	E B 13	E B 13	15	E B 13
26	E B 13	15	E B 16	E B 13	E B 13	E B 14	G	G	G	G	40	G 34	G 33	42	38	37	39	U A 36	17	21	18	18	17	E B 14
27	E B 14	E B 14	19	24	21	E B 13	22	32	36	41	38	47	39	U R 26	G	35	32	27	29	23	E B 15	E B 15	E B 16	E B 15
28	E B 15	E B 13	E B 13	18	E B 16	E B 13	G	30	G	E B 39	G	G 36	G 36	39	G	37	71	28	16	24	22	23	E B 12	E B 13
29	19	18	E B 12	E B 14	16	18	27	35	36	40	42	45	44	46	39	44	47	30	52	23	19	E B 15	E B 14	E B 15
30	16	E B 14	E B 16	18	E B 14	E B 15	G	30	37	36	G 34	G 33	E B 51	G 34	G 25	G 24	30	25	16	20	23	17	21	17
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	30	30	30	30	30	30	30	30	30	30	29	29	29	29	28	28	29	29	29	29	29	29	29	29
MED	E B 15	E B 15	E B 15	E B 14	E B 14	E B 15	G 20	32	36	40	40	39	G 34	G 35	G 34	G 32	32	29	21	19	18	17	16	E B 15
UQ	18	16	E E 16	18	E B 16	E B 16	25	34	39	42	42	42	42	40	40	40	39	33	29	24	25	22	21	18
LQ	E B 14	E B 14	E B 13	E B 14	E B 13	E B 14	G	G 27	G	U 33	G 32	G 33	G 28	G	G	E G 19	G	27	16	E B 16	E B 15	E B 15	E B 15	E B 14

SEP. 1989 | FBES (0.1 MHZ)

IONOSPHERIC DATA

SEP. 1989 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	16	14	16	15	16	16	20	21	31	30	27	26	27	31	31	22	15	15	15	16	16	15
2	15	14	14	14	15	15	17	17	19	22	27	27	26	35	27	22	19	16	15	14	15	16	16	17
3	15	16	14	16	14	15	17	20	33	27	28	34	34	28	26	26	19	18	16	14	16	16	14	15
4	14	14	12	14	13	13	16	18	19	27	25	27	27	28	24	19	18	17	15	15	15	16	15	15
5	14	17	15	13	15	15	16	17	20	23	23	31	24	23	32	21	16	16	15	16	15	15	14	16
6	14	14	15	16	14	16	16	20	19	26	32	25	28	28	20	21	16	16	16	16	15	16	15	E S 18
7	15	15	13	E S 18	E S 22	E S 17	17	17	20	23	30	32	26	21	24	22	19	16	E S 22	E S 18	15	16	17	15
8	16	15	14	17	14	15	18	18	18	23	26	27	33	37	26	23	20	17	16	14	15	15	16	14
9	15	16	14	14	14	15	19	20	21	26	27	28	25	25	32	23	19	18	18	15	16	16	15	15
10	15	14	15	15	15	15	18	18	22	27	28	28	27	26	C	C	C	C	C	C	C	C	C	S
11	16	13	16	13	14	14	17	18	20	27	27	30	22	22	21	26	19	15	17	15	16	15	15	15
12	15	15	E S 19	14	16	15	18	17	22	34	22	22	22	24	27	26	30	21	19	14	15	E S 19	15	15
13	14	15	15	14	14	17	16	16	23	37	C	C	C	C	C	16	14	13	13	14	13	13	13	13
14	15	13	12	13	14	13	16	15	E S 36	19	32	32	28	23	23	20	17	13	17	14	15	15	16	13
15	15	14	15	14	13	15	17	15	17	24	27	22	25	20	18	15	16	14	16	16	14	15	14	13
16	14	12	13	13	12	16	17	18	26	31	45	29	29	25	20	19	19	16	13	15	15	14	15	12
17	15	14	14	16	12	12	16	16	18	23	20	32	24	22	20	18	15	15	15	E S 17	14	14	15	14
18	14	15	14	15	13	14	16	15	16	20	18	28	32	22	E S 38	14	14	14	E S 14	12	13	13	14	12
19	13	14	13	14	13	13	14	15	18	25	27	27	22	20	19	16	14	12	15	13	14	15	15	13
20	15	13	14	14	14	15	16	16	18	22	20	17	17	24	16	C	17	13	15	13	13	15	15	17
21	15	14	15	14	14	14	15	20	17	21	23	24	46	25	23	18	15	14	15	15	15	15	15	14
22	14	15	15	14	13	14	15	14	20	18	23	20	22	19	17	16	15	14	13	13	12	13	15	15
23	13	13	12	12	13	14	13	15	18	17	21	21	23	39	18	17	15	14	15	14	14	14	12	14
24	18	14	13	13	14	14	15	16	17	20	19	22	20	19	20	16	16	14	14	15	14	13	13	15
25	16	15	13	13	13	15	14	15	16	18	21	24	E S 26	26	20	18	16	15	E S 16	14	13	13	14	13
26	13	14	16	13	13	14	14	16	17	27	24	23	22	23	20	16	15	14	13	14	14	12	13	14
27	14	14	13	14	13	13	16	15	16	19	19	21	21	22	19	17	15	14	13	12	15	15	15	15
28	15	13	13	14	16	13	14	16	19	39	22	32	30	24	19	20	15	13	E S 13	13	14	16	12	13
29	14	15	12	14	12	13	15	14	16	18	22	20	22	31	21	18	16	13	15	13	13	15	14	15
30	13	14	16	14	14	15	17	17	17	19	20	21	51	21	18	18	14	15	13	13	14	14	13	14
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	30	30	30	30	30	30	30	30	30	30	29	29	29	29	28	28	29	29	29	29	29	29	29	29
MED	15	14	14	14	14	14	16	16	18	23	24	27	26	24	20	18	16	15	15	14	15	15	15	14
UQ	15	15	15	14	14	15	17	18	20	27	27	30	28	26	26	22	19	16	16	15	15	16	15	15
LQ	14	14	13	13	13	14	15	16	17	20	21	22	22	22	19	16	15	14	14	13	14	14	14	13

SEP. 1989 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

SEP. 1989 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	275	280	280	275	285	285	315	H 310	320	290	280	275	285	275	285	285	285	295	295	295	305	270	A	280
2	290	275	285	275	280	280	305	325	320	320	280	275	280	280	280	280	295	295	300	305	270	F 260	280	280
3	280	270	260	285	280	270	285	290	305	280	265	270	265	275	270	275	280	290	295	315	U S 285	260	270	S 280
4	S 275	260	265	265	250	275	305	325	310	285	290	265	270	265	270	285	280	285	290	290	285	275	270	280
5	270	275	275	270	270	285	305	295	295	305	280	265	270	270	270	265	285	305	290	305	285	275	285	285
6	270	270	275	S 290	280	280	325	320	300	290	275	275	270	270	270	275	280	290	295	295	285	285	285	285
7	255	245	285	290	250	260	305	300	300	270	280	265	270	270	270	275	285	280	U R 295	U S 310	310	265	270	275
8	255	255	275	275	245	270	285	Z 300	315	255	255	270	260	265	270	285	265	275	285	285	285	270	270	270
9	265	265	270	265	260	265	315	295	295	280	265	260	250	265	255	270	270	285	285	295	275	265	265	265
10	265	270	260	255	275	305	325	320	300	265	265	255	255	250	C	C	C	C	C	C	C	C	C	S
11	S 255	250	275	280	240	245	305	315	290	275	265	260	255	255	260	265	270	285	295	280	265	265	265	275
12	270	270	S 285	285	290	290	305	315	295	275	F 265	F 260	260	250	255	265	265	270	280	280	270	S 265	270	280
13	270	270	275	315	290	280	320	290	300	280	C	C	C	C	C	260	J S 270	275	290	295	255	260	265	S 275
14	260	260	265	260	265	275	300	J S 290	315	290	275	275	270	265	270	270	270	280	285	285	290	285	265	270
15	280	280	285	280	290	285	305	315	300	295	265	275	265	265	270	265	270	285	295	320	275	260	265	270
16	240	250	285	270	240	235	300	320	295	280	295	270	265	265	260	270	290	285	300	290	265	275	275	245
17	265	S 265	265	280	255	260	310	300	300	305	280	285	280	270	280	275	285	295	305	305	280	285	285	275
18	285	285	300	315	290	285	320	325	305	300	305	275	280	280	270	285	295	295	S 295	290	270	260	270	265
19	265	265	S 265	255	250	250	275	320	305	295	290	280	275	275	260	280	285	290	285	280	265	270	265	275
20	280	270	275	290	275	F 285	305	R 335	315	305	285	290	290	290	290	I C 290	290	300	315	320	310	290	270	I S 270
21	275	290	290	310	300	310	315	315	315	305	285	290	285	275	280	280	300	295	305	305	285	285	285	290
22	285	290	295	300	295	300	315	320	325	315	285	280	285	280	285	280	285	295	300	310	295	290	275	260
23	265	280	290	310	325	275	320	300	305	295	290	290	300	300	290	285	290	300	305	315	305	300	285	285
24	S 295	295	295	310	300	305	325	320	310	310	325	295	285	285	290	295	300	300	315	325	305	305	280	S
25	270	285	300	325	305	285	315	320	320	315	310	295	285	290	290	295	300	310	315	S 335	280	280	285	285
26	285	285	295	285	285	290	335	335	325	320	290	295	285	285	275	280	295	305	320	315	275	280	280	270
27	270	285	305	260	260	260	295	305	225	275	G	285	H 280	285	295	300	300	305	305	U S 325	290	285	295	290
28	280	285	280	285	305	305	330	325	325	340	290	290	290	285	295	290	305	315	S 320	295	280	J S 275	S 290	275
29	280	285	300	290	255	250	330	325	330	325	295	280	285	280	285	285	290	305	315	305	305	295	285	285
30	285	285	S 295	290	270	270	315	330	325	310	280	285	280	270	280	290	300	300	310	315	290	285	285	295
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	30	30	30	30	30	30	30	30	30	30	29	29	29	29	28	29	29	29	29	29	29	29	28	28
MED	270	272	282	285	278	280	312	318	305	295	280	275	280	275	272	280	285	295	295	305	285	275	275	275
UQ	280	285	295	290	290	285	320	325	320	310	290	285	285	280	285	285	295	300	305	315	290	285	285	285
LQ	265	265	275	270	255	265	305	300	300	280	265	270	265	265	270	270	280	285	290	290	275	265	270	270

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

IONOSPHERIC DATA

SEP. 1989 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L	U L 395	L	L	L 395	L 365	U L 360	L	L	A						
2							L	L	L	B	L 380	L 385	L 385	380	L	L	A	A						
3								L	L	L	L	U L 325	L	L	L	L	A	A	A					
4								L		L	L	L	L	L	A	U L 365	L							
5									L	L	L	L	385	L	L	U L 365	L	A						
6									L	L	L	L	L	365	375	L	A	A						
7								L	L	L	L	L 385	U L 375	L	U L 365	U L 360	L	L						
8								A	A	L 385	395	L	360	355	U L 370	L	L	L						
9								L	L	L	U L 385	L	365	365	365	U L 355	U L 365	L						
10									L	L	L	330	L	325	C	C	C	C	C					
11								L		L	L	375	370	L 360	U L 370	U L 365	L							
12									L	L	L	L	L	L 380	L 365	L	L	L						
13								L	L		C	C	C	C	C	L	L	L						
14										L	L	L	L	L	U L 325		L							
15										L	L	L	U L 370	L	L	L	L							
16										L	L	L	U L 365	L	L	L	L							
17									L	L	L	L	L	U L 365	L	U L 370								
18									L	L	L	L 345	L	L	L	L								
19										L	L	L	L	L	U L 355	L								
20									L	L	L	L	L	L	L	C	L							
21									L	L	L	L	L	L	L	L	A							
22									L	L	L	L	L	L	L	L	L							
23									L	L	L	L	L	L	L	L	L							
24										L	L	L	L	L	L	L								
25									L		L	L		L	L									
26										L	L	L	L	L	L	L								
27									350	335	385	L	U L 370	L	L	L	L							
28									L	L	L	L	L	L	L	L	A							
29									L	L		L	L	L	L	L	A							
30										L	L	L		L	L	L								
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									1	3	4	6	10	9	9	6	1							
MED									350	L 385	385	L 360	L 370	L 365	U L 365	U L 365	U L 365							
UQ										L 390	390	L 385	L 385	365	U L 370	U L 365								
LQ										360	382	L 330	U L 365	L 360	U L 360	U L 360								

SEP. 1989 | M(3000)F1 (0.01)

IONOSPHERIC DATA

SEP. 1989 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								260	240	310	270	335	325	345	335	L 305	305	275						
2							275	255	240	E B 295	340	340	330	335	325	315	315	E A 310						
3								270	260	L 300	L 310	315	340	330	330	310	E A 360	300	A 290					
4								250		L 310	L 270	375	355	365	365	310	L							
5									255	260	H 270	L 360	340	355	360	360	305	265						
6									250	285	310	310	L 325	360	355	L 345	A 320	A 290						
7								285	280	L 350	L 335	360	360	355	370	345	310	L 300						
8								270	A 280	430	395	L 330	420	400	370	L	L 365	335						
9								275	260	335	365	L 380	410	380	395	350	355	300						
10									270	H 255	270	375	L 370	410	C	C	C	C	C					
11								L 260		L 310	L 350	360	380	375	385	355	325							
12									255	L	325	360	355	385	370	330	L 345	305						
13								285	260		C	C	C	C	C	L 355	L 335	L 300						
14										L 245	L 300	L 320	L 350	L 350	335		310							
15										240	320	280	345	325	320	350	325							
16										305	335	305	355	345	L 355	330	L 280							
17									255	245	305	290	305	330	300	315								
18									255	255	265	340	310	290	L 310	290								
19										285	275	275	315	315	375	295								
20									250	260	295	255	295	275	275	I C 290	280							
21									250	225	305	260	310	320	310	285	260							
22									235	220	305	300	270	310	290	290	260							
23									235	260	285	280	265	265	265	285	270							
24										260	240	240	290	305	260	260								
25									235	250	260	L 275		300	265									
26										240	275	270	290	305	305	290								
27									545	405	G	350	325	310	295	280	280							
28									245	225	L	L 290	300	L 275	290	270	A 270							
29									245	230		315	280	290	310	310	275							
30										245	310	285		325	295	270								
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							1	9	21	28	27	29	27	29	28	26	21	10	1					
MED							275	270	255	260	305	315	325	330	322	310	308	300	A 290					
UQ								275	260	308	330	350	355	355	362	345	325	302						
LQ								260	245	245	272	280	302	305	295	290	280	290						

SEP. 1989 | H'F2 (KM)

IONOSPHERIC DATA

SEP. 1989 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	295	295	300	310	285	295	240	240	220	215	205	215	210	A 250	A 255	250	A	A	A 280	260	E A 265	295	A	280
2	270	265	275	295	295	A 305	245	240	225	B	225	225	220	225	255	245	A	A	A 265	240	A 305	360	295	285
3	280	305	320	280	270	310	255	240	235	220	200	230	225	215	230	A 275	A	A	A	A 255	230	280	305	290
4	285	295	300	280	290	310	250	245	220	215	210	E A 275	E A 290	A 260	A	235	250	255	270	E A 305	280	280	E A 350	280
5	290	300	285	305	310	305	250	235	220	220	200	H 215	220	225	250	240	245	A	275	255	285	275	260	270
6	305	315	290	285	280	310	245	225	230	240	235	220	H 210	235	230	245	A	A	E A 275	A 260	280	280	260	A 305
7	A	370	295	270	E S 400	355	250	240	A 250	245	A	215	225	255	245	250	245	260	S	265	A 265	A 330	A	300
8	A 370	360	E A 325	310	370	340	A 270	A	E A 275	210	210	230	250	255	235	235	240	260	280	260	A 255	290	310	310
9	315	320	320	325	345	335	255	240	235	H 225	220	220	230	230	245	245	H 245	265	275	260	270	285	310	310
10	325	315	340	350	300	255	245	245	235	220	220	235	H 220	235	C	C	C	C	C	C	C	C	C	S
11	330	340	290	270	340	330	235	230	235	230	225	220	230	245	230	235	250	270	260	250	305	300	305	295
12	285	295	295	275	275	275	245	235	230	235	230	240	225	225	235	245	250	275	275	250	260	310	300	290
13	290	310	290	230	260	300	245	235	230	240	C	C	C	C	C	225	255	260	260	245	260	275	280	265
14	275	300	300	300	285	255	230	230	220	210	210	220	225	225	220	225	240	260	260	255	255	245	285	285
15	270	270	280	280	265	265	245	240	225	225	215	225	H 225	230	225	A	H 240	260	255	225	250	320	310	310
16	375	345	265	280	390	H 380	265	245	230	240	255	235	230	230	245	245	260	270	250	E A 290	305	A 305	305	A 350
17	325	335	A 345	300	325	335	250	225	220	230	225	215	235	H 235	225	235	255	A 260	A 250	250	265	255	275	280
18	275	285	275	235	255	285	245	225	230	210	210	H 210	220	235	230	230	240	245	250	240	220	240	270	290
19	305	300	300	310	350	310	250	230	235	230	235	225	235	245	250	250	265	250	A 260	255	320	305	290	295
20	280	300	290	265	285	290	240	230	230	220	215	225	225	225	225	I C 235	250	255	240	225	255	265	305	E S 370
21	320	290	275	255	240	235	225	255	230	220	H 200	215	255	240	A	245	A	A 255	245	245	250	270	265	270
22	285	275	265	240	250	265	245	240	225	210	205	225	225	230	240	245	250	255	245	220	250	250	305	330
23	320	280	270	225	H 215	305	245	245	230	235	H 200	220	230	225	220	235	245	255	240	225	E A 250	E A 285	270	285
24	270	265	265	235	230	265	235	230	240	230	210	210	195	H 210	235	240	250	255	235	225	230	250	305	310
25	315	295	260	225	240	285	245	240	220	215	205	205	H 210	245	240	235	255	250	230	230	235	250	270	270
26	270	270	270	260	265	275	245	235	230	230	220	210	H 205	230	225	240	A 265	A 250	225	240	295	290	295	285
27	290	260	240	E A 370	E A 385	370	290	A 265	A 265	E A 280	220	A	235	245	240	240	A 255	260	A 260	240	265	280	270	270
28	285	290	305	290	260	255	240	245	225	220	H 200	H 205	H 230	230	225	250	A	235	220	A 240	270	270	240	260
29	280	300	245	235	A 340	A 355	240	235	230	225	240	245	240	255	235	A 265	A	255	A 255	250	250	250	275	280
30	275	270	280	285	310	325	235	235	240	230	215	H 205	255	230	240	240	245	250	230	235	265	270	290	265
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	29	30	30	30	30	30	30	29	30	29	28	28	29	29	26	28	22	24	27	29	29	29	27	29
MED	290	298	289	280	284	305	245	240	230	225	215	220	225	230	235	240	250	255	255	248	265	280	290	285
UQ	315	315	300	300	325	330	250	240	235	230	225	226	232	245	245	245	255	260	265	255	280	295	305	302
LQ	280	280	270	255	260	275	240	230	225	220	205	215	220	225	225	235	245	252	242	240	250	265	270	280

SEP. 1989 | H'F (KM)

IONOSPHERIC DATA

SEP. 1989 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	E A 155	110	110	115	A	A	E A 120	110	115	120	E B 125	120	B					
2						B	A	A	A	B	A	A	A	130	125	120	125	125	B					
3						B	A	120	E B 140	120	A 120	A	A	A	120	120	115	120	B					
4						B	120	110	110	A	A	A	A	A	A	A	E A 120	120	A					
5						B	A	120	E A 135	A	A	A	E A 125	E A 120	E A 125	A 120	110	115	A					
6						B	E A 145	120	115	115	A	A	A	A	E A 125	E A 135	120	E A 130	B					
7						S	130	120	115	110	A	A	A	A	A	A	115	120	S					
8						B	A	120	115	A	A	A	A	A	A	E A 135	E A 125	A 130	B					
9						B	E A 150	E A 140	115	A	E A 135	120	E A 130	E A 135	125	120	115	125	B					
10						B	130	A	A	105	A	E A 120	E A 120	120	C	C	C	C	C					
11						B	130	120	115	115	A 125	E A 125	E A 120	E A 125	E A 130	125	120	120	B					
12						B	135	120	120	130	115	E A 125	120	120	120	E A 125	E B 130	E B 130	B					
13						B	E A 155	E A 145	125	E B 140	C	C	C	C	C	115	110	A 120	B					
14						B	130	115	S	105	A	A	120	115	110	110	115	115	B					
15							135	115	115	A	120	A	115	A 115	115	A 115	120	A 125	B					
16							A	120	A	125	B	A	E A 125	120	110	115	120	125						
17							E B 140	E A 150	120	E A 120	115	125	120	120	A	E A 120	120	125						
18							140	115	120	110	A	110	120	110	S	115	115	A 120						
19							E A 160	E A 135	110	125	125	125	115	115	A 120	A 115	A 125	A						
20							140	120	125	120	120	120	125	120	115	C	A	A						
21							140	130	120	115	120	115	B	125	125	120	115	130						
22							150	115	120	A	E A 135	A	E A 125	A	A	A 125	E A 120	125						
23							130	120	120	120	120	120	E A 125	B	E A 125	120	125	135						
24							145	120	125	120	125	125	125	125	120	120	120	130						
25							135	125	115	A	115	120	120	120	110	110	110	140						
26							130	120	115	120	A	E A 130	E A 125	A	A	115	125	130						
27							135	120	115	115	110	110	A	G 120	E A 135	115	115	125						
28							125	115	115	B	115	A	E A 135	A	110	110	115	125						
29							A	A	A	A	A	E A 120	110	E B 135	E A 125	125	125	130						
30							140	115	E A 135	115	E A 135	E A 135	B	E A 135	E A 125	E A 125	E A 120	135						
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							24	27	25	20	16	16	20	20	21	26	28	27						
MED							134	120	115	116	119	116	115	119	115	118	118	125						
UQ							142	120	120	120	A 122	122	E A 125	122	E A 125	122	122	130						
LQ							130	115	115	115	115	120	120	116	115	115	115	120						

SEP. 1989 | H'E (KM)

IONOSPHERIC DATA

SEP. 1989 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	105	B	B	B	115	120	110	110	105	105	100	100	105	115	125	110	110	105	95	105	100	100	100
2	100	B	B	105	105	105	110	110	100	B	105	110	105	G	140	130	120	110	110	105	105	120	110	105
3	100	105	B	B	125	125	125	115	120	120	120	120	120	120	G	130	110	115	110	105	105	110	105	105
4	100	100	B	B	S 120	125	G	E G 185	115	105	110	105	110	105	100	105	105	140	110	110	100	110	105	100
5	100	B	105	120	125	120	120	120	110	105	105	105	110	105	105	105	G	120	125	100	95	100	105	B
6	B	B	130	120	100	135	105	130	115	120	115	115	115	120	105	140	120	120	115	105	110	110	110	120
7	100	105	105	S	S	105	G	140	120	120	110	115	110	110	110	125	120	125	115	S	105	105	110	115
8	105	105	105	110	B	130	120	115	110	110	110	110	115	110	110	110	110	130	115	115	110	B	105	B
9	100	B	B	B	B	180	120	115	115	115	115	G	110	110	G	G	G	G	150	100	B	B	B	B
10	B	B	B	B	B	115	G	110	110	110	105	105	110	G	C	C	C	C	C	C	C	C	C	S
11	B	B	B	B	B	B	G	G	G	G	110	115	105	105	105	G	E G 170	130	125	120	110	110	B	B
12	B	B	S	B	B	B	G	G	G	G	G	E G 185	G	G	G	110	E G 155	135	B	B	115	S	B	B
13	B	B	B	B	B	B	120	155	155	G	C	C	C	C	C	105	105	125	120	115	105	B	B	B
14	B	B	B	B	115	B	130	G	S	G	120	120	120	125	G	G	G	E G 175	B	B	B	105	100	110
15	B	105	B	B	B	B	G	120	115	110	140	105	G	105	105	120	130	125	100	100	100	B	B	B
16	B	B	140	130	125	B	110	125	115	120	B	115	115	G	110	G	140	130	120	115	115	110	105	105
17	105	105	110	105	100	120	120	115	G	110	G	G	G	G	110	E G 160	140	125	110	105	110	B	110	95
18	105	105	B	B	100	B	155	130	140	110	100	G	G	G	S	105	105	105	S	B	B	B	B	B
19	B	B	110	100	110	120	110	110	G	G	G	G	G	G	110	105	E G 160	135	100	100	105	100	B	B
20	B	105	100	B	B	B	G	G	G	125	130	125	125	115	115	C	115	110	110	105	105	105	115	110
21	105	110	105	B	105	115	G	160	140	125	125	120	B	E G 175	135	130	125	125	115	115	130	115	110	B
22	B	110	100	B	B	B	165	120	125	130	110	105	105	105	100	105	110	120	120	110	110	125	130	B
23	B	110	105	105	105	105	120	120	125	120	135	135	115	B	115	G	G	G	B	B	105	105	105	B
24	B	B	B	B	B	B	G	G	125	145	115	110	110	110	G	G	G	140	130	B	115	110	105	100
25	B	B	B	B	B	B	G	155	130	110	G	G	G	G	G	G	G	G	S	105	B	B	115	B
26	110	105	B	B	B	B	135	120	G	G	120	110	105	120	115	E G 155	135	120	120	115	115	110	115	95
27	105	B	120	125	125	B	135	135	120	115	115	110	110	L	E G 175	135	135	125	115	110	105	105	105	B
28	B	B	105	105	B	B	G	125	G	3	G	115	115	115	G	150	120	120	120	110	110	110	110	3
29	105	110	B	110	110	105	105	105	130	125	125	115	125	125	E G 180	130	130	120	120	110	115	B	110	3
30	100	B	B	95	B	B	G	135	120	120	110	110	B	105	110	110	E G 160	135	120	115	110	115	100	100
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	14	14	13	12	14	15	18	25	22	22	23	24	21	19	20	21	23	26	24	23	25	20	22	13
MED	102	105	105	108	110	120	120	120	120	118	115	111	110	110	110	U 118	118	125	115	110	110	110	108	105
UQ	105	110	110	120	125	125	130	132	125	120	120	116	115	119	115	130	133	130	120	115	110	110	110	110
LQ	100	105	105	105	105	110	110	115	115	110	110	108	110	105	105	105	110	120	110	105	105	105	105	100

SEP. 1989 | H'ES (KM)

IONOSPHERIC DATA

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

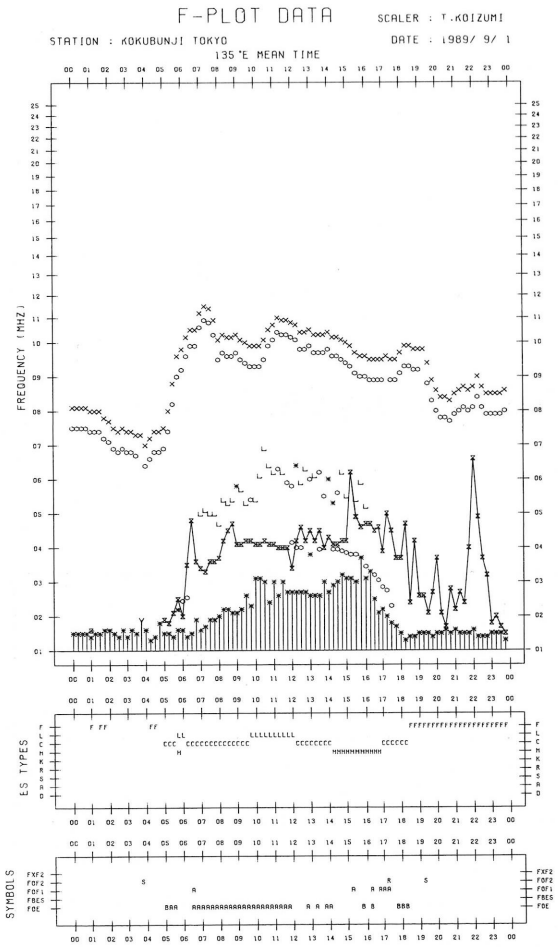
Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

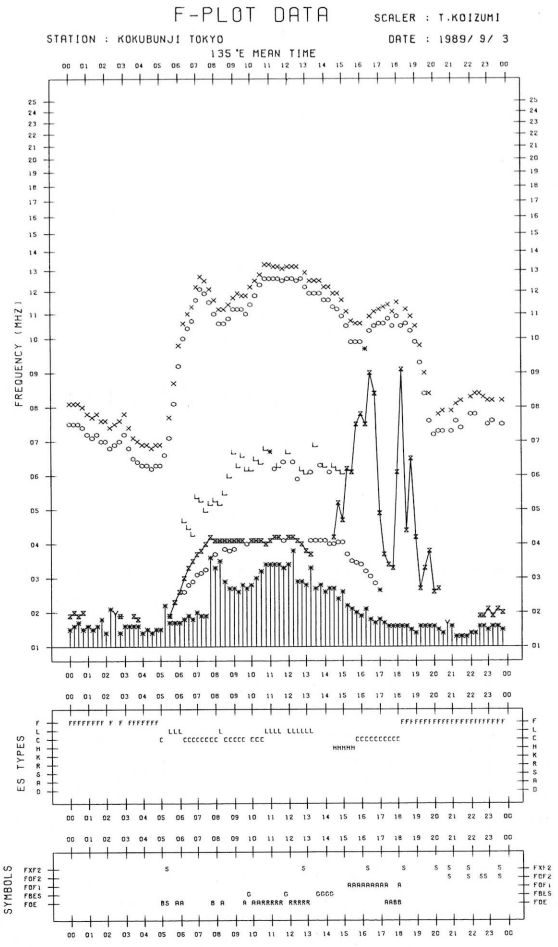
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		F 1				C 2	L 1	C 2	C 2	C 2	L 1	L 1	L 1	C 2	C 1	H 1	H 1	C 2	C 4	F 3	F 3	F 3	F 4	F 3
2	F 1			F 3	F 2	L 5	L 2	L 2	L 2		L 1	L 1	L 2		H 1	H 1	C 3	C 5	L 2	F 3	F 3	FF 12	F 2	F 3
3	F 2	F 2			F 1	C 1	L 1	C 2	C 1	C 1	C 1	L 1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

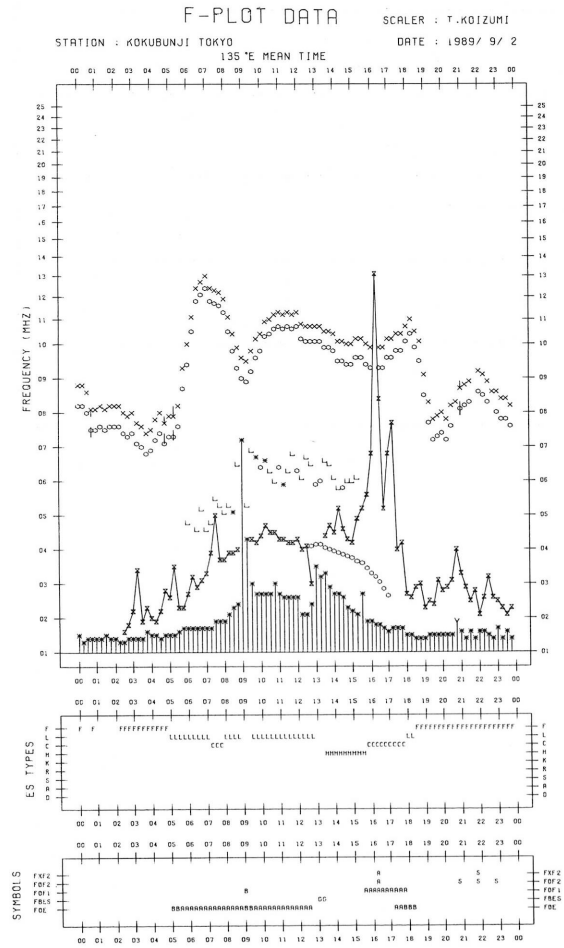
SEP. 1989 | TYPES OF ES

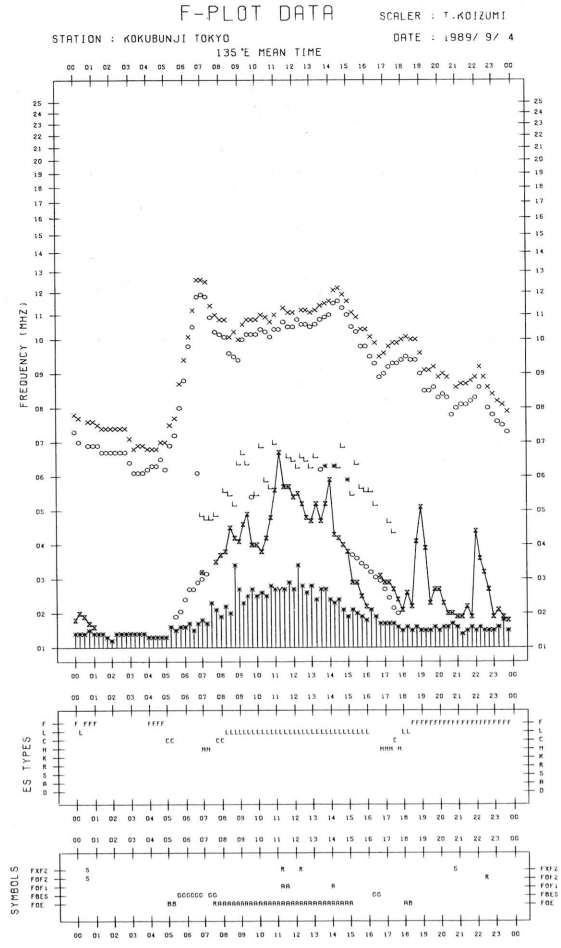
f-PLOTS OF IONOSPHERIC DATA

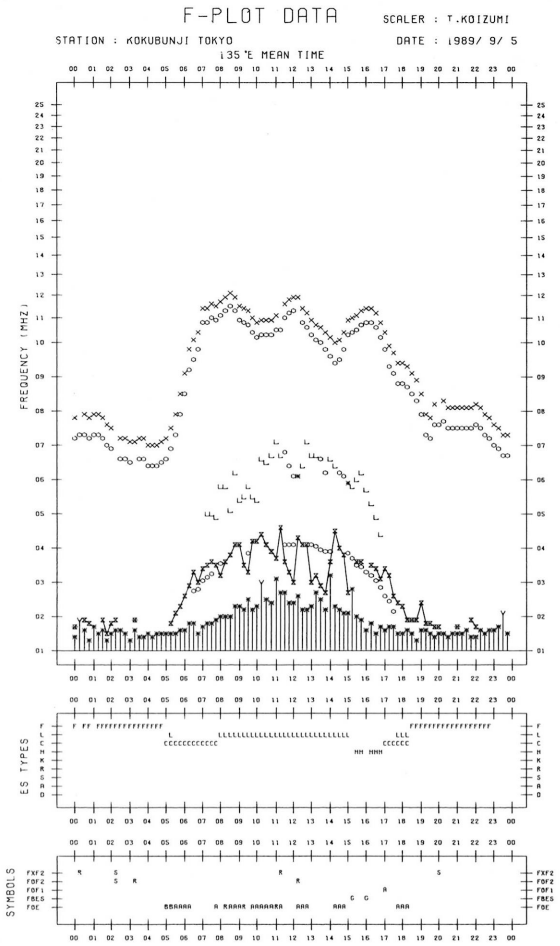
KEY OF F-PLOT	
!	SPREAD
⬡	FOF2, FOF1, FOE
X	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⧖	FBES
⌊	ESTIMATED FOF1
↑, ↓	FMIN
∧	GREATER THAN
∨	LESS THAN

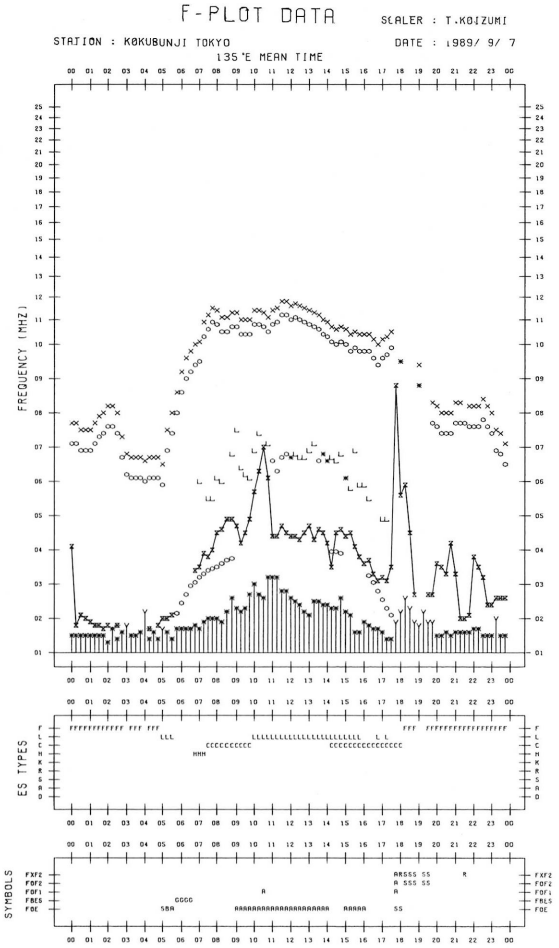

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 1
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

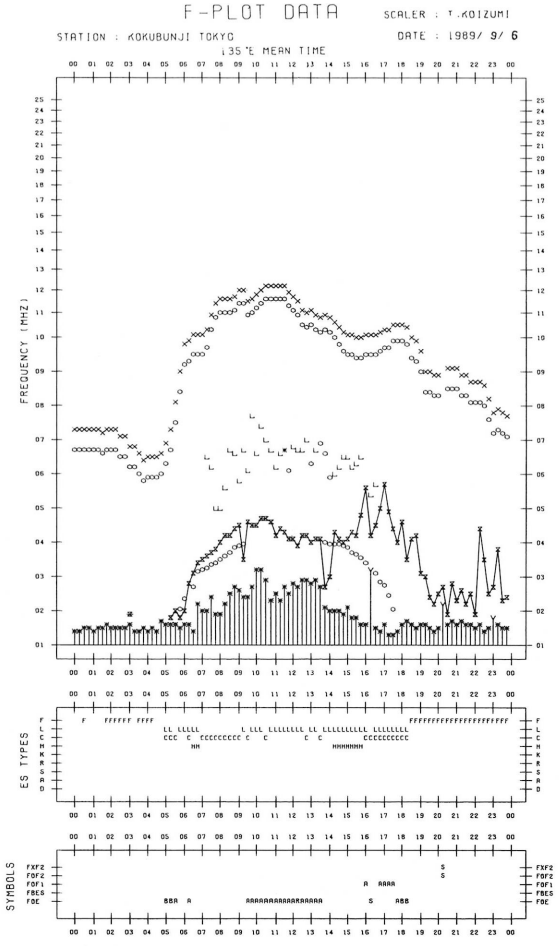

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 3
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

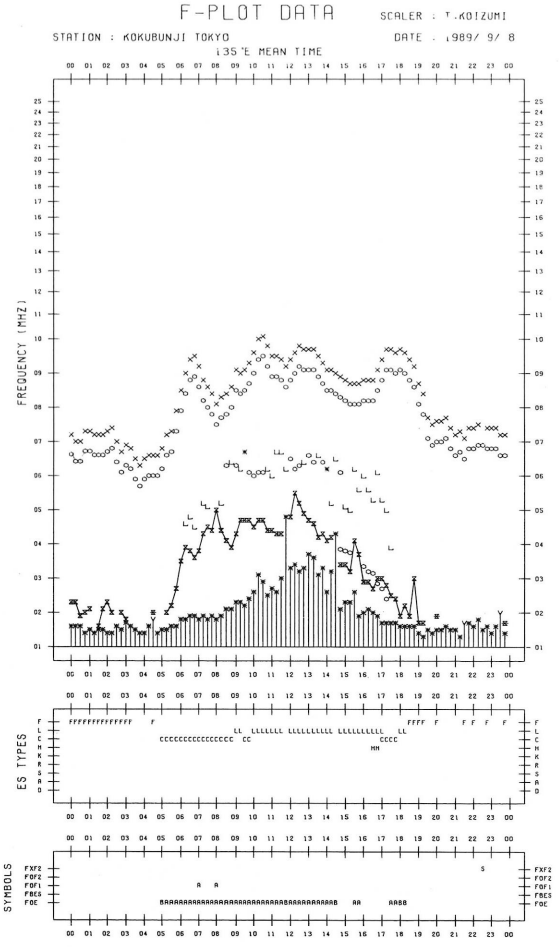

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 2
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

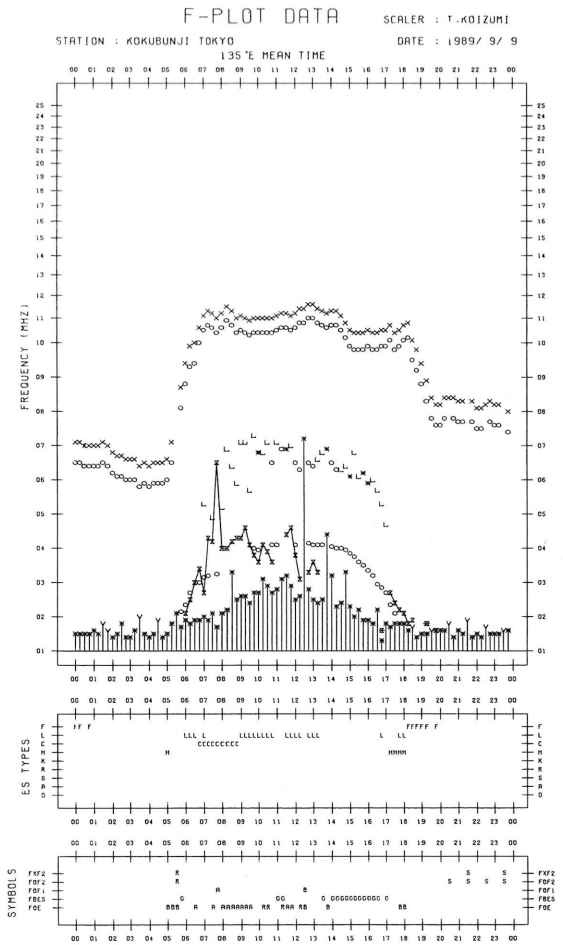

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 4
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

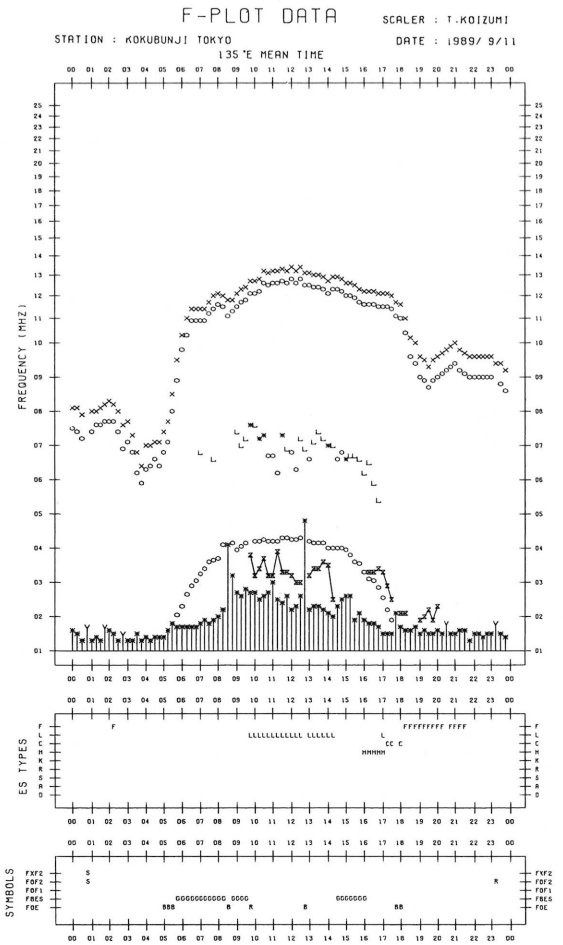

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

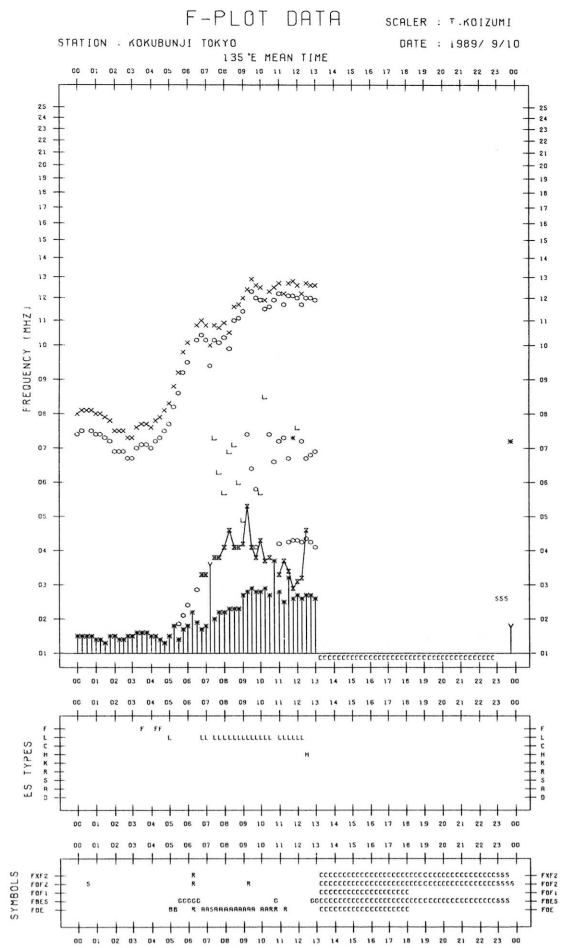

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

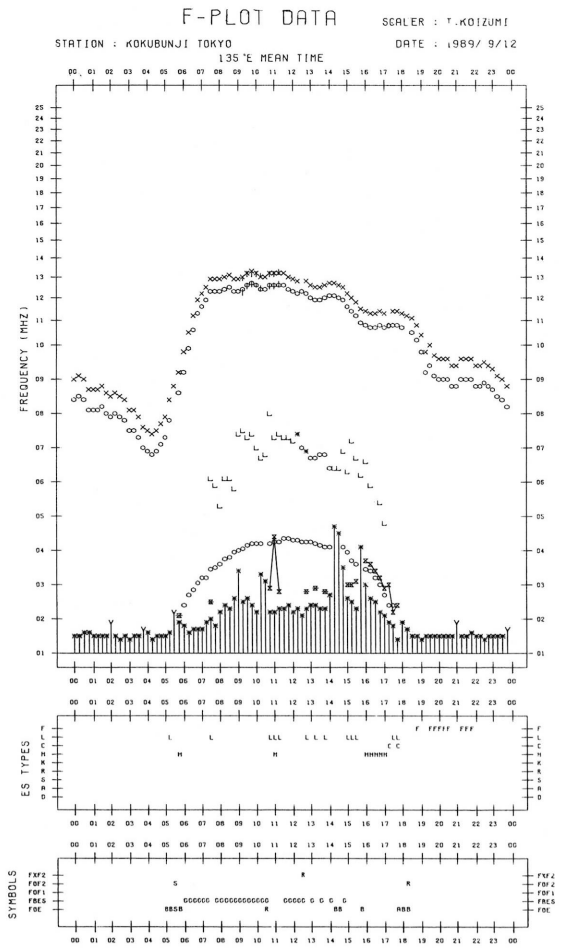

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

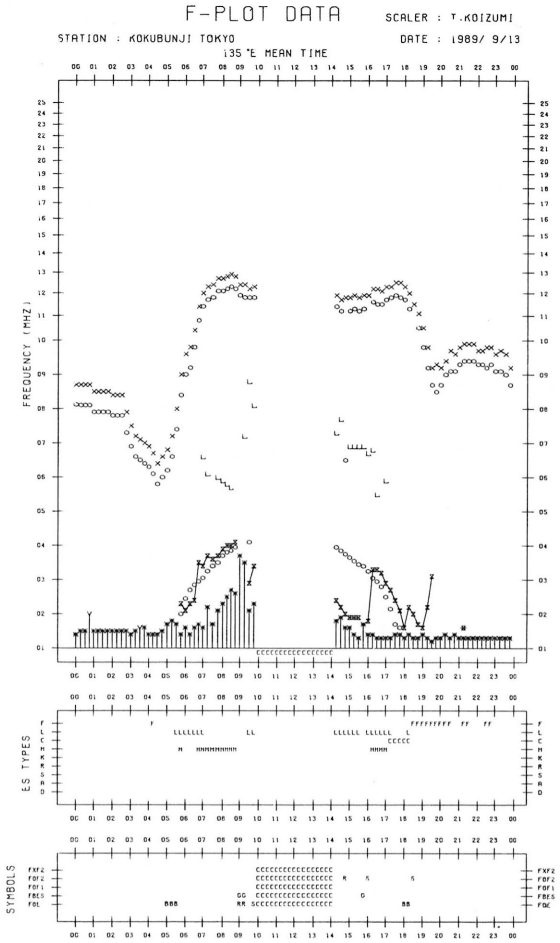

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

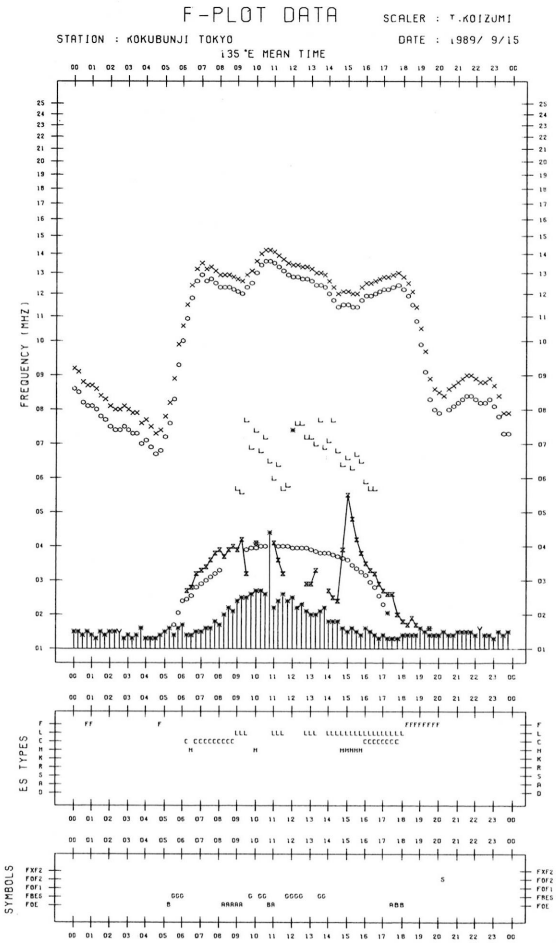

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/ 9
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

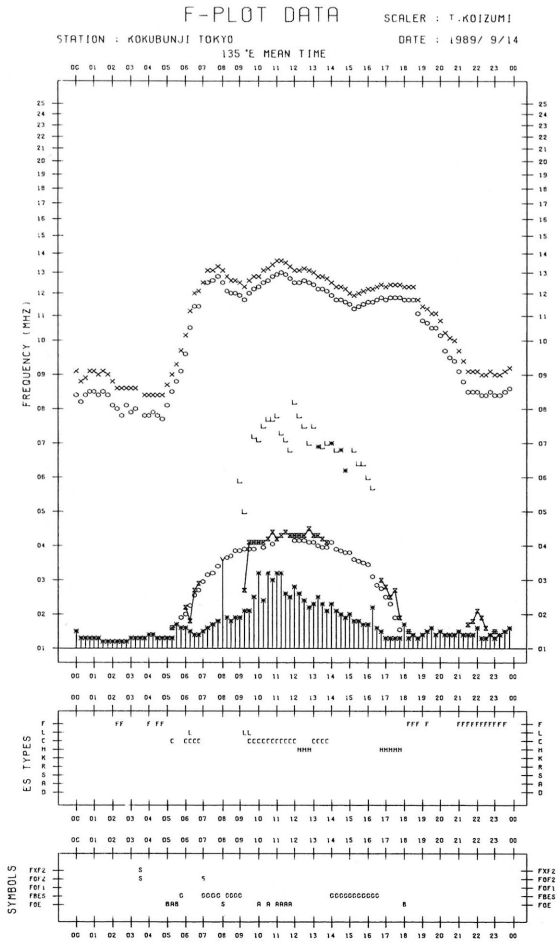

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/11
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

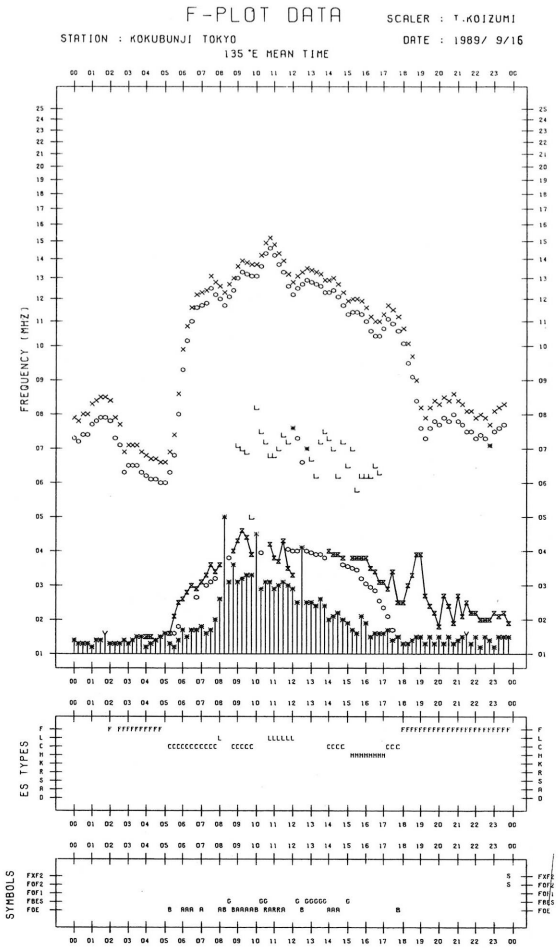

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/10
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

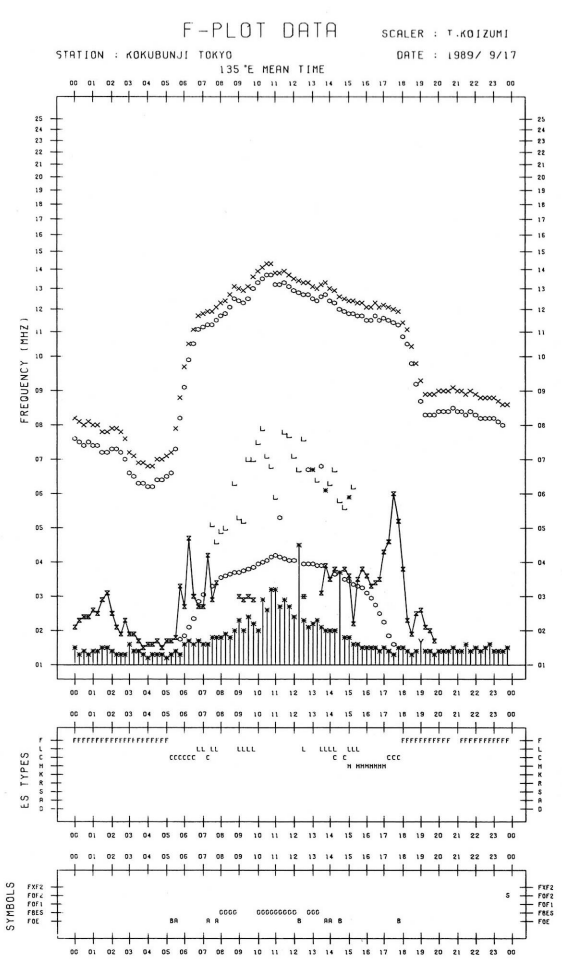

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/12
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

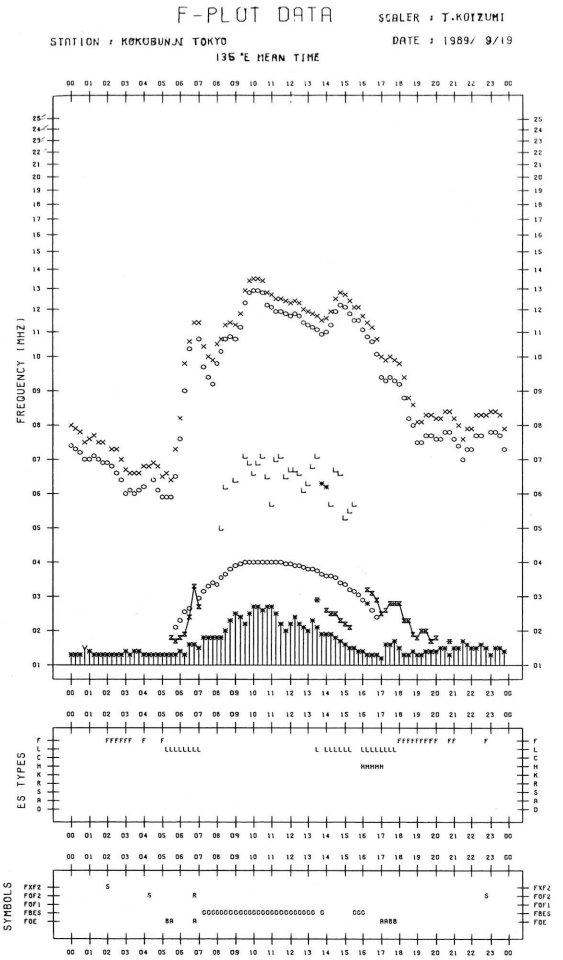

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

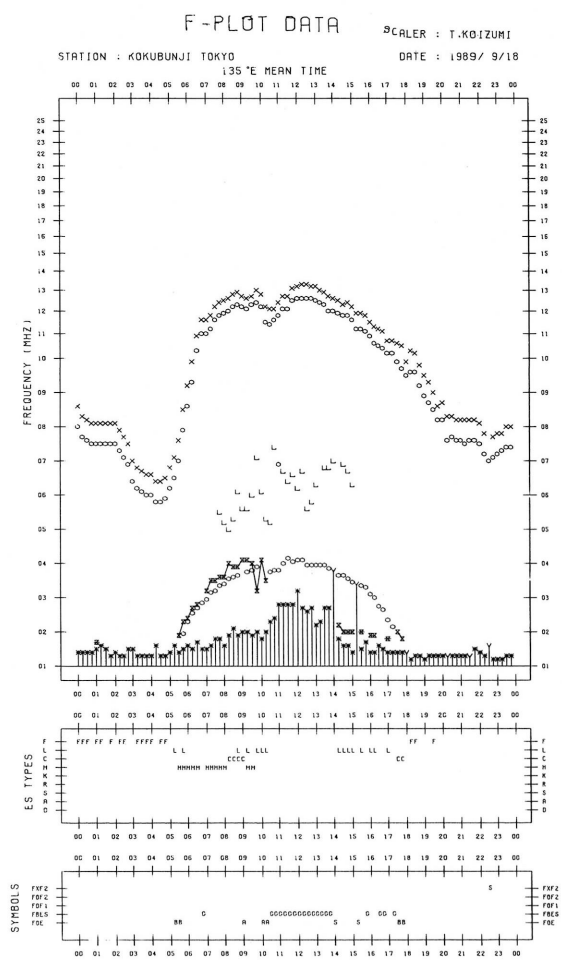

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

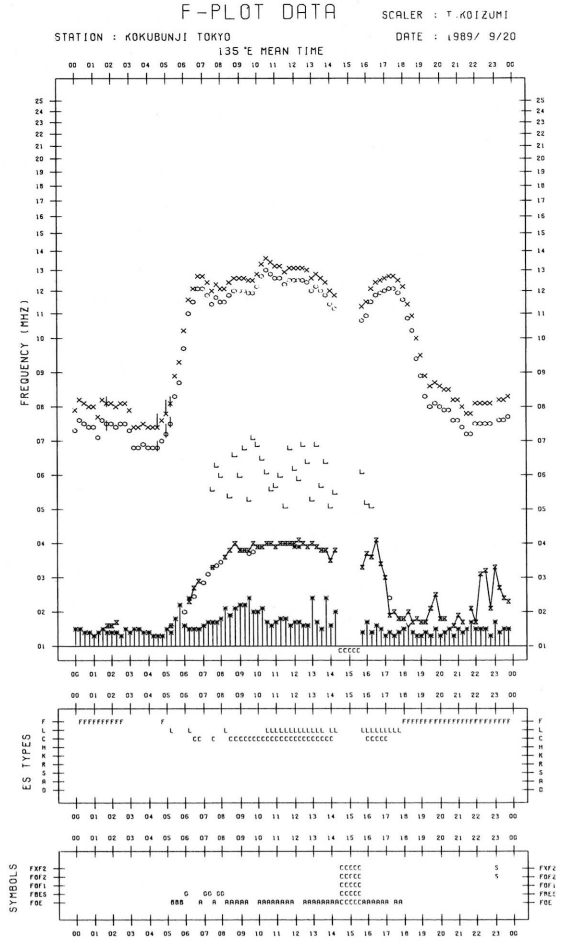

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

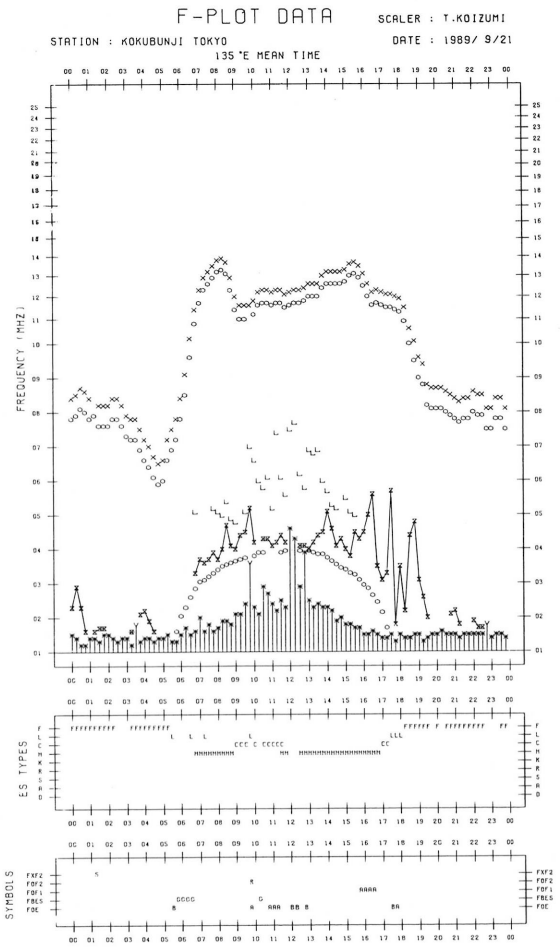

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE

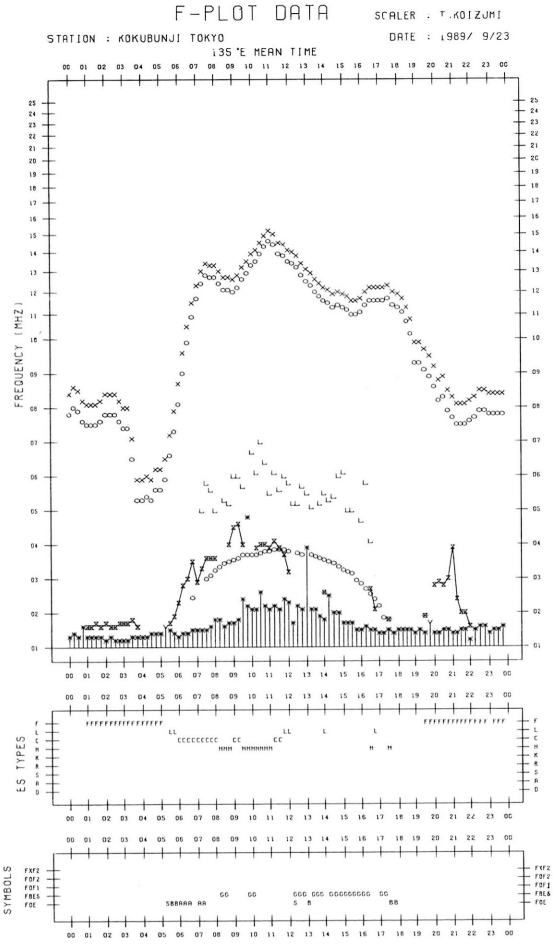

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

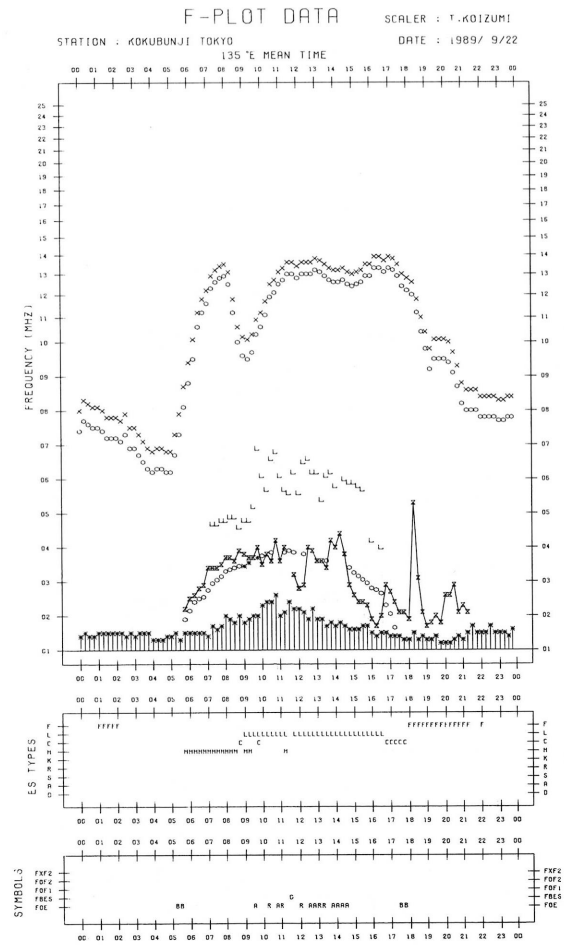

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

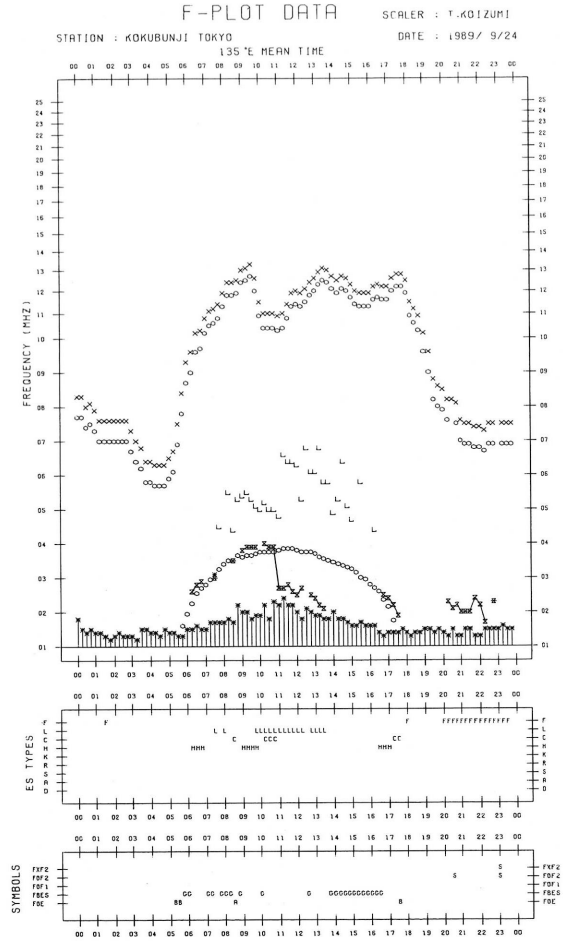

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

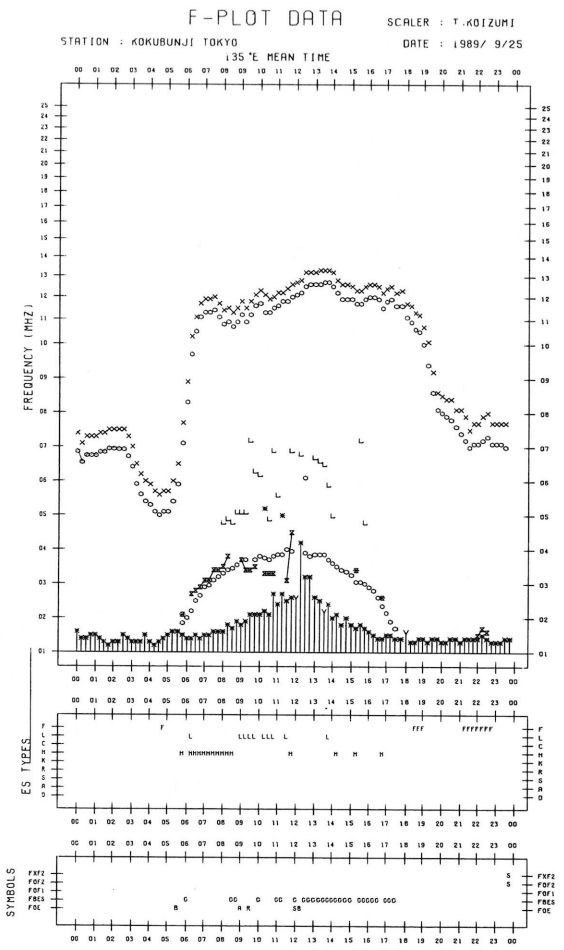

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

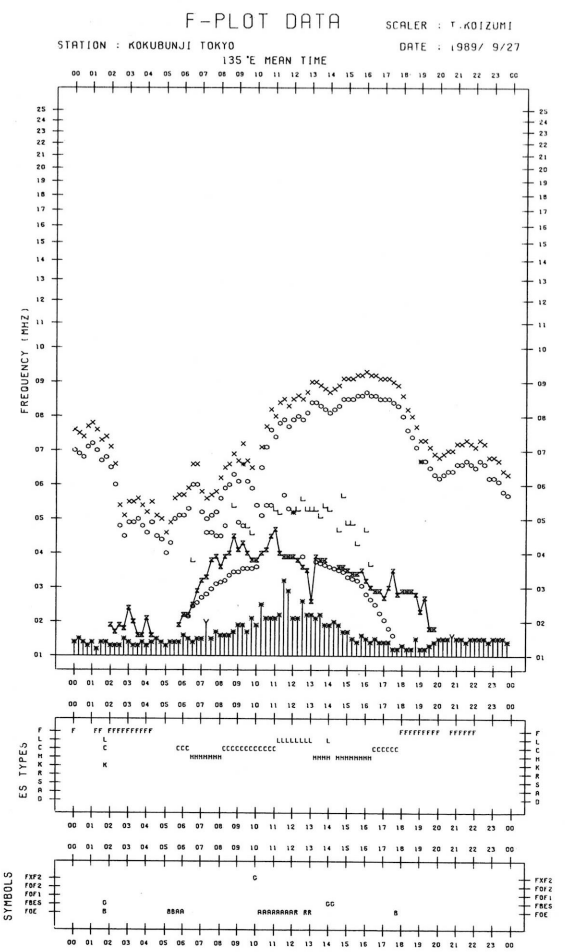

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

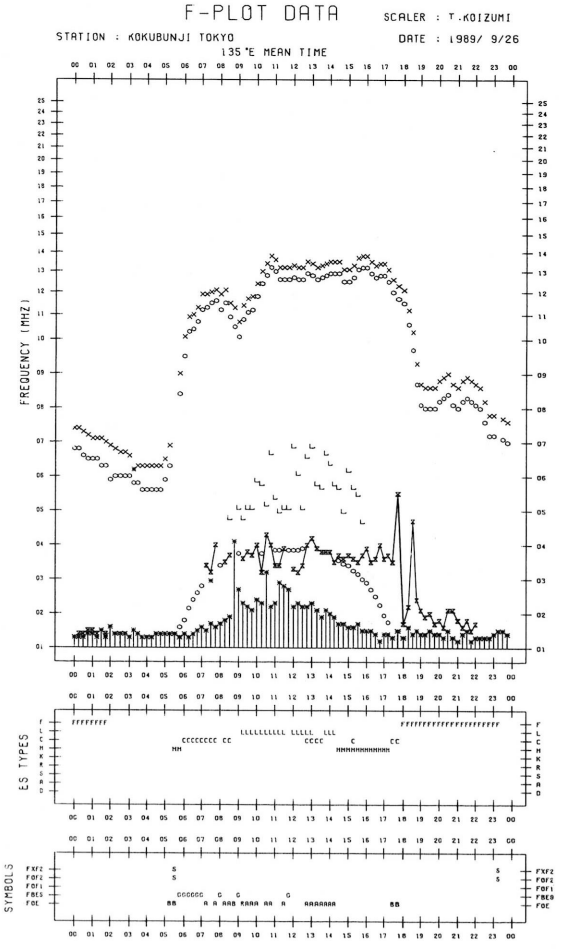

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

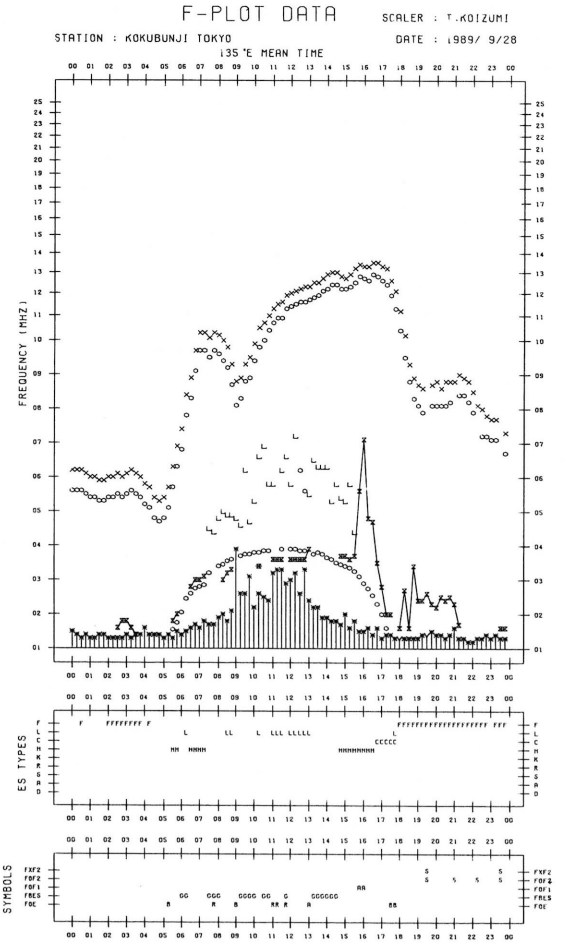

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

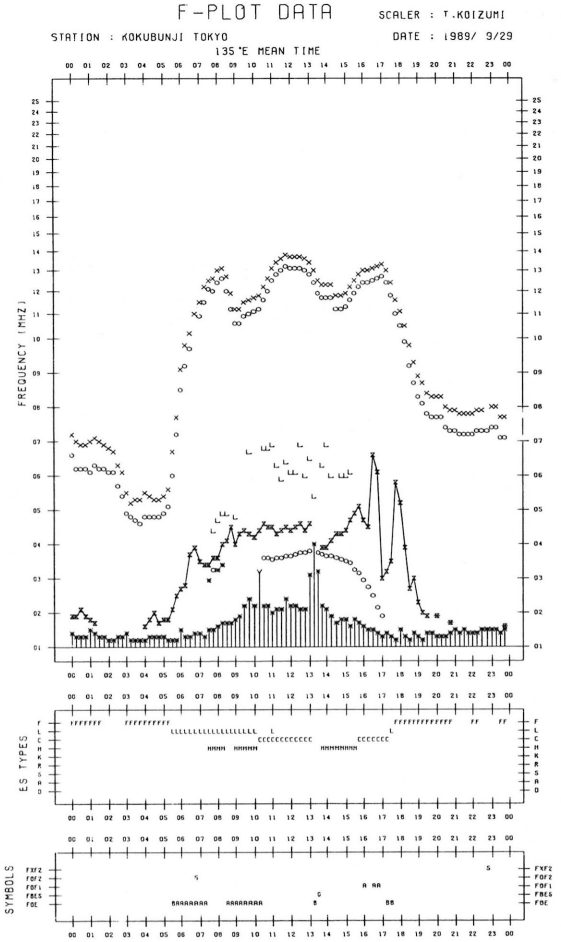

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

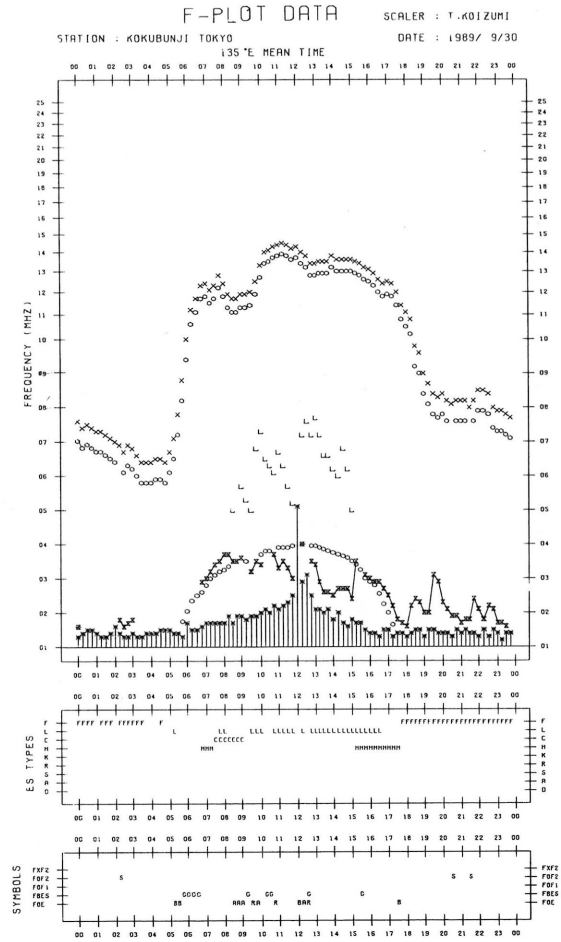

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/29
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FOF2
FOF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1989/ 9/30
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 September 1989

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

Note: No observations during the following periods.

19th 2022 - 2355

B.Solar Radio Emission

B1.Daily Data at Hiraiso

500 MHz

Hiraiso September 1989

Single-frequency total flux observations at 500 MHz

FLUX DENSITY: $10^{-22}Wm^{-2}Hz^{-1}$

UT DATE	00-03	03-06	06-09	21-24	DAY
1	65	B	B	62	B
2	62	62	61	59	62
3	63	59	66	B	62
4	B	B	B	64	B
5	60	60	59	-	61
6	64	64	64	65	64
7	64	65	65	63	65
8	63	64	64	62	63
9	62	64	65	63	63
10	63	63	64	67	63
11	68	64	60	61	65
12	64	63	61	59	62
13	59	60	56	56	58
14	57	56	56	54	56
15	54	52	51	57	53
16	59	55	54	53	56
17	B	52	50	54	54
18	58	59	54	59	56
19	57	54	54	-	56
20	52	52	51	50	52
21	49	50	49	52	49
22	50	48	47	49	49
23	49	48	48	48	48
24	48	48	47	46	47
25	47	48	48	50	47
26	49	49	48	50	49
27	51	52	51	54	51
28	55	53	53	54	54
29	56	55	56	52	55
30	53	55	53	51	53

Note: No observations during the following periods:

5th 2010 - 2351
19th 2020 - 2350

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso — September 1989

Single-frequency observations

Normal observing period; 2025 - 0845 U.T. (sunrise to sunset)

SEP 1989	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22}Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
1	500	46 C	0401.3	0429.8	93	335	94	WL
	500	20 GRF	0546.0	0624.6	125	362	132	WL
	500	4 S/F	2113.4	2114.7	3.0	9	-	WL
	200	42 SER	2231.7	2233.0	4.0	825	-	O
	200	43 NS	2300	0709	600D	19	8	ML
2	200	8 S	0013.2	0013.5	0.8	185	-	ML
	200	45 C	0021.9	0024.4	3.4	50	-	ML
	200	8 S	0240.9	0240.9	0.9	310	-	O
	500	46 C	0618.1	0621.3	31.5	3100	55	O
	500	41 F	0708.0	0712.0	15	16	-	WL
	200	44 NS	2010E	0105	770D	500	119	SL
	100	44 NS	2010E	0600	770D	570	266	-
	500	46 C	2105.0	2109.3	10.5	25	-	O
	200	42 SER	2106.6	2109.2	4.6	1080	-	O
	100	42 SER	2107.1	-	4.6	1000D	-	-
	500	41 F	2205.5	2216.0	29	21	-	WL
3	500	20 GFR	0533	0700	123	10	5	O
	100	44 NS	2010E	2058	770D	4300	480	SL
	500	44 NS	2010E	0716	770D	490	122	SL
	200	44 NS	2010E	0717	770D	1100	328	SL
5	500	46 C	0152.0	0153.1	12.0	60	-	O
	500	46 C	0457.8	0458.6	6.5	140	-	MR
6	500	46 C	0054.4	0054.7	13.5	4040	-	O
	100	42 SER	0549.5	0550.2	5.5	2100	-	WR
	200	42 SER	0549.6	0549.7	10.1	1990	-	MR
	500	42 SER	0550.3	0550.8	19	155	-	MR
	200	42 SER	2036.1	2036.2	10	490	-	O
7	500	42 SER	0133.6	0134.1	7.5	40	-	O
	200	42 SER	0133.9	0139.3	5.9	2280	-	O
	500	42 SER	0331.1	0333.2	2.5	66	-	MR
	500	42 SER	0518.3	0519.3	5.0	130	-	O
	200	42 SER	0518.6	0518.8	51.0	1290	-	O
	500	46 C	0535.7	0536.5	1.5	15	-	O
	500	46 C	0555.0	0555.2	2.5	875	-	O
	200	46 C	0818.7	0825.4	7.9	46	-	WR
7	100	41 F	2102.6	2109.8	27.7	360	-	-
	200	41 F	2104.3	2109.6	20.5	240	-	O
	500	42 SER	2104.8	2114.3	11.5	57	-	O
	200	42 SER	2230.4	2313.4	43	390	-	O
8	500	46 C	0335.7	0336.5	9.5	85	-	O
	200	42 SER	0405.5	0407.3	4.6	5000	-	O
	500	46 C	0407.3	0407.5	6.5	2600	-	O
				0409.5		430		WR
	100	42 SER	0407.3	0407.9	3.0	4800	-	O
	500	46 C	0423.8	0424.8	7.7	25	-	O
				0429.2		23		O
	500	46 C	0614.8	0615.3	1.1	257	-	WR
9	500	46 C	0010.9	0011.2	7.0	150	-	WR
	200	48 C	0527.7	0528.6	5.3	11000	1270	WR
		29 PBI	0534.7	0540.9	19	30	-	WR
	500	48 C	0527.8	0529.7	36.5	2130	50	SR
				0541.6		65		MR
	100	48 C	0528.6	0529.4	5.9	3500	-	WR
	500	41 F	0741.6	0742.0	2.0	66	-	WR
	200	44 NS	2016E	0721	750D	11	4	MR
	500	41 F	2121.5	2122.0	7.0	167	-	SR
	200	42 SER	2232.7	2250.8	20	145	-	O
	500	27 RF	2300	2315	95	9	4	O
10	500	42 SER	0020.0	0029.8	14.5	315	-	SR
	200	41 F	0156.8	0208.9	15	40	-	WR
	100	42 SER	0200E	0209.2	31.7	855	-	-
	500	46 C	0219.5	0226.2	9.7	1430	247	SR
	200	46 C	0221.1	0225.5	7.3	920	-	O
	200	42 SER	0357.4	0414.1	35.6	710	-	O
	500	42 SER	0357.5	0414.4	30	640	-	MR
	100	42 SER	0411.2	0415.2	19.1	2900	-	WR
	500	42 SER	0458.5	0513.6	15.5	65	-	WR
	500	46 C	0558.8	0603.5	6.5	510	-	SR
	500	48 C	0642.8	0651.0	19	5540	695	SR
	200	46 C	0646.2	0650.5	11.2	620	75	MR
	200	44 NS	2026E	2100	750D	90	36	SR
	100	41 F	2128.0	2133.0	5.9	940	-	-
	500	41 F	2128.2	2133.5	17	635	-	WR
	100	41 F	2300.7	2306.6	54.8	1000D	-	-
	200	42 SER	2306.6	2327.7	33	1360	-	O
	500	46 C	2307.0	2308.0	9.5	240	-	WR
	500	46 C	2318.3	2322.3	33	1130	90	SR
				2328.8		580		SR
11	500	46 C	0037.8	0039.5	6.0	115	-	MR
	500	46 C	0258.0	0302.2	5.5	235	-	SR
	500	42 SER	0501.5	0504.3	3.3	217	-	O
	200	46 C	0829.3	0830.0	2.0	1540U	-	O SUNSET
	200	44 NS	2016E	0340	750D	84	61	SR
	100	44 NS	2016E	0355	750D	170	54	-
	500	42 SER	2146	2158.8	14.1	40	-	MR

SEP 1989	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} Wm^{-2}Hz^{-1}) MEAN	POLARIZATION REMARKS
11	200	46 C	2344.9	2345.5	2.4	1045	-	0
12	100	46 C	0029.7	0029.8	4.6	920	-	WR
	500	42 SER	0030.8	0031.9	3.8	56	-	MR
	200	46 C	0046.2	0052.9	15.2	135	-	SR
	500	41 F	0501.8	0502.2	6.0	98	-	MR
	500	46 C	0715.3	0717.5	8.5	35	-	MR
	200	44 NS	2017E	0425	750D	74	50	SR
	100	44 NS	2017E	0520	750D	180	59	-
	500	41 F	2114.2	2115.5	5.3	57	-	MR
	200	46 C	2351.2	2353.6	5.3	320	-	WR
13	500	46 C	0334.0	0402.4	60.5	121	22	MR
				0335.0		110		WL
				0347.7		50		WR
	100	42 SER	0419.8	0428.4	17.8	540	-	-
	200	44 NS	2017E	2326	750D	46	19	MR
	100	44 NS	2017E	0505	750D	240	110	-
14	500	46 C	0658.0	0700.0	9.5	13	-	0
	200	44 NS	2019E	2100	750D	20	8	MR
15	200	41 F	0319.1	0319.8	21	39	-	ML
	500	41 F	0355.3	0356.5	7.0	24	-	0
	200	42 SER	0600	0618.5	52	85	-	0
	500	41 F	0614.0	0617.5	21.5	11	-	0
	200	44 NS	2019E	-	750D	-	23	-
	200	27 RF	2235	0100	430	177	37	ML
	100	43 NS	2244	0143	580D	450	145	-
	500	46 C	2304	0023.0	104	43	8	WR
				2316.0		16		0
	200	46 C	2344.2	2357.4	16.5	400	130	ML
16	200	42 SER	0010.2	0031.9	39	345	-	ML
	200	46 C	0136.5	0141.9	13.2	330	-	ML
	500	42 SER	0326.3	0326.8	13.5	245	-	SL
	100	46 C	0520.7	0521.9	15.3	360	-	-
	200	44 NS	2022E	0010	750D	75	14	MR
	500	20 GRF	2327	0025	150	17	8	WR
17	100	46 C	0407.6	0407.9	2.0	980	-	-
	200	45 C	0407.6	0408.4	2.8	580	-	0
	200	44 NS	2022E	0100	750D	26	11	MR
	500	43 NS	2235	0338	280	12	4	WR
	200	8 S	2227.3	2228.0	0.8	1185	-	0
	500	8 S	2227.5	2228.1	0.5	24	-	WR
18	500	41 F	0011.0	0014.7	4.0	103	-	0
	200	44 NS	2022E	2222	460D	15	9	MR
20	200	42 SER	0623.1	0624.8	7.9	1700	-	0
	100	42 SER	0624.4	0624.8	11.4	850	-	-
21	200	46 C	0126.9	0127.6	1.5	2300	-	0
	500	46 C	0127.4	0127.6	1.5	2750	-	WR
	100	46 C	0127.5	0127.7	1.3	890	-	-
	500	42 SER	0244.8	0306.4	23	310	-	ML
	200	46 C	0304.0	0304.5	2.6	80	-	0
	500	27 RF	0310	0317.5	35	13	4	0
21	200	20 GRF	0319.8	0354.8	142	55	12	MR
	100	46 C	2024E	2054.8	56D	340U	180U	- SUNRISE
	200	46 C	2024E	2055	66D	60	-	WR SUNRISE
	200	44 NS	2024E	-	730D	-	25	-
	200	42 SER	2150.7	2151.5	18.5	3600	-	0
	500	42 SER	2151.5	2202.0	18	118	-	ML
22	500	42 SER	0331.8	0338.3	7.0	110	-	0
	100	41 F	0535.3	-	4.4	1000D	-	-
	200	41 F	0536.3	0536.6	3.5	780	-	0
	500	46 C	0536.8	0538.7	3.5	420	-	WL
	200	46 C	0626.0	0626.5	3.0	900	-	MR
	500	8 S	0626.3	0626.5	0.6	163	-	0
	200	42 SER	0704.0	0707.6	5.3	385	-	0
	100	42 SER	0704.2	-	5.9	1000D	-	-
	500	46 C	0706.3	0708.0	5.0	120	-	0
	500	46 C	0737.5	0738.1	1.8	174	-	0
	200	44 NS	2024E	2300	730D	37	17	0
23	200	41 F	2237.3	2240.5	6.0	225	-	WR
	500	46 C	2308.9	2309.8	2.1	32	-	WR
25	500	46 C	2343.8	2344.1	5.0	14	-	0
27	200	41 F	0255	0334	112	70	-	0
	200	44 NS	2025E	-	450D	-	15	-
	200	46 C	2025E	2047U	76D	365U	110U	0 SUNRISE
	100	48 C	2031	2057	89	1000	238	-
	500	46 C	2353	2353.5	2.2	251	-	0
28	500	46 C	0643.8	0644.0	1.3	168	-	0
	500	41 F	2322.0	2322.7	3.2	595	-	0
29	200	20 GRF	0017	0138	125	7	4	0
	500	27 RF	0038	0056	64	7	3	0
	200	43 NS	0450	0513	170	8	3	0
30	500	7 C	0555.3	0557.4	27	24	5	0
				0608.0		7		0

C. RADIO PROPAGATION

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

SEP 1989 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

C. RADIO PROPAGATION

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

SEP 1989 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

C. Radio Propagation

c2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

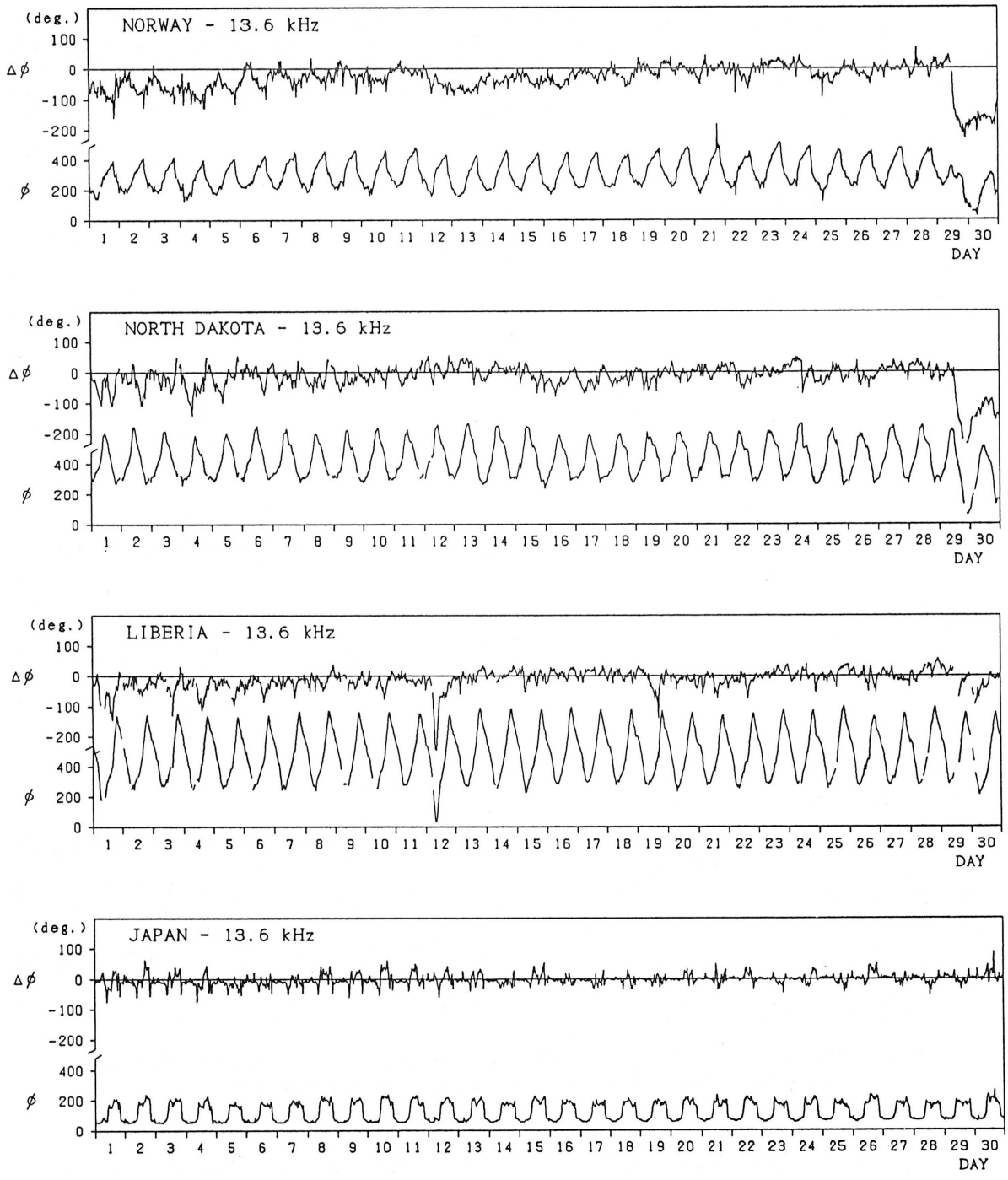
Time in U.T

Sep. 1989	Whole Day Figure	W W V 00|06 06|12 12|18 18|24	W W V H 00|06 06|12 12|18 18|24	Conditions 00|06 06|12 12|18 18|24	Principal Geomagnetic Storms Start h m	End h	Range nT
1	4-	4U S 4U S	3 4 4 3	N N N N			
2	4+	4U 5U 5U 5U	3 4 4 4	N N N N			
3	4-	4U S 4U S	4 4 3U 3	N N N N			
4	4+	4U 5U 4U S	4 4 5 5	N N N N			
5	4-	4U S 5U S	4 3 3U 3U	N N N N			
6	3+	3U S 5U S	3 4 3U 3U	N N N N			
7	4o	4U 5U 4U S	4 4 4 4	N N N N			
8	4o	4U 5U 4U S	3 4 4 3U	N N N N			
9	4o	4U 5U 4U S	3 4 4 3U	N N N N			
10	4o	4U 5U 4U S	4 4 3U 3U	N N N N			
11	4+	4U 5U 4U S	4 5 5 3U	N N N N			
12	4o	4U S 4U S	4 4 5 4U	N N N N			
13	4+	4U S 5U 5U	4 4 5 4	N N N N			
14	4+	5U 5U 4U S	4 4 5 4	N N N N			
15	4o	4U 5U 5U S	4 4 4 3U	N N N N	0046	---	142
16	4-	3U S 4U S	4 4 4 4	N N N N	---	18	
17	4-	4U S 4U S	4 4 3 4	N N N N			
18	4o	4U 5U 5U S	4 4 2U 3U	N N N N	1028	---	283
19	4-	3U S 4U S	4 3 4 5	U U U U	---	21	
20	4o	5U S 3U S	4 4 4 5	U U U U			
21	4+	4U 5U 4U S	5 4 4 4	N N N N			
22	4+	5U S 5U 5U	4 4 3 5	N N N N			
23	4o	3U S 4U S	5 4 4 4	N N N N			
24	4-	4U S 4U S	5 3 3 4	N N N N			
25	4o	4U S 5U S	4 4 4 4	N N N N			
26	4o	4U 5U 3U S	5 4 3U 3U	N N N N	0542	---	190
27	3o	4U S 3U S	4 2 2U 3U	U U U U	---	15	
28	4-	5U S 4U S	4 3 3U 4	U U U U			
29	4-	4U S 3U S	4 4 3 4	N N N N			
30	4o	4U 5U 3U S	4 4 4 5	N N N N			

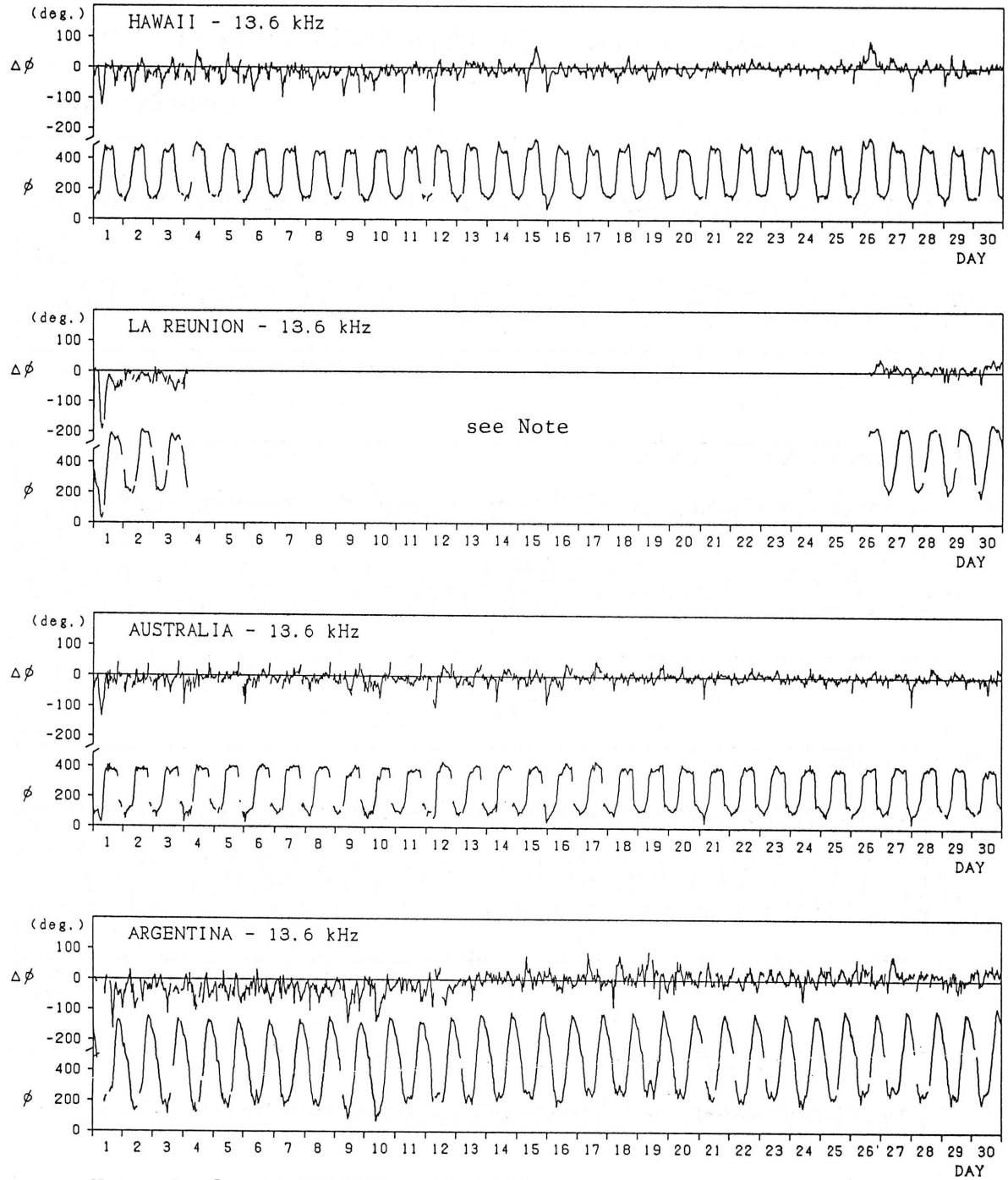
C. Radio Propagation

C3. Phase Variations in OMEGA Radio Waves at Inubo

Inubo September 1989



Inubo September 1989



Note: As for LA REUNION - 13.6 kHz, no record during September 04 - September 26, 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.)
Sep.04/0133	Sep.06/0200	Sep.04/1130	96.5
Sep.12/0355	Sep.14/2306	Sep.13/0700	93.6
Sep.15/1022	Sep.15/2100	Sep.15/1500	42.1
Sep.16/0256	Sep.16/2300	Sep.16/1200	68.4
Sep.29/1205	Oct.03/2230	Sep.29/2000	238.7

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso — Time in U.T.

Sep. 1989	S W F									Correspondence	
	Drop-out Intensities(dB)					Start	Duration	Type	Imp.	Solar Flare	Solar Noise
	CO	HA	1)	2)	3)						
1			24		6	0813	18	SL	2	x	x
1			25	x	x	2353	28	SL	2	x	
2	12	8	16	x	13	0616	20	SL	1+	x	x
3					27	1427	35	S	2-	x	
4		25	7	x		0302	20	SL	3-	x	x
4			14	x		0458	7	S	1	x	
4	x		8	x	7	0630	28	S	1-	x	x
4			7	14	20	0857	15	SL	1+	x	
4					15	0918	13	S	1	x	
5		x			18	1338	9	S	1+	x	
5					7	2143	21	S	1-	x	x
5					10	2221	16	S	1-	x	x
6			10			0045	22	SL	1-	x	x
6			17	x	11	0550	15	SL	1+	x	x
7			13	x	x	0527	18	SL	1	x	x
7					9	0824	15	S	1-	x	x
8		27	7			0356	32	G	2+	x	x
9			5	x		0443	9	S	1-	x	x
9			10	x	8	0523	42	SL	1-	x	x
9				x	25	0910	20	SL	2-	x	
10			4			0026	19	G	1-	x	x
10			5			0412	23	S	1-	x	x
10			8		11	0535	30	SL	1-	x	
10			10		x	0828	12	S	1-	x	
10			10		15	0753	30	SL	1	x	
12	20	35	8		7	0458	38	G	3	x	
13	34	27	15	x		0321	76	SL	3-	x	x
13				x	10	0828	17	SL	1	x	
14			20		10	0658	32	SL	2-	x	x
19			5	x		0524	16	SL	1-	x	x
21	19	27	18	x		0258	28	S	3-	x	x
21					10	1301	20	S	1-	x	
22			14			0100	16	S	1	x	x
23			9			0320	15	SL	1-		
24			13	x	12	0811	30	SL	1	x	x
25					7	1311	22	SL	1-	x	
28					13	1344	11	S	1	x	
29		x		x	30	1105	195	G	2		
30		22	21	x		0249	61	SL	2-	x	x

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Sep. 1989	S				P		A		
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
1					23	24	0044	0212	0106
1			237	92	53		0409	0814D	0654
1		—	301	116			0814E	1036	0821
1		33					1459	1538D	1509
1		40					1538E	1622	1552
1					17		2047	2117	2055
1					26		2122	2202	2128
1				6	6		2324	2344	2328
1	81	65	94	130	117	106	2350	0143D	0002
2	17		16	22	10	8	0143E	0154D	0146
2	18	18	62	59	33	31	0154E	0227D	0156
2			22	16	8	16	0227E	0328	0235
2		25	12	14			0435	0520	0438
2			13	8		21	0522	0606	0530
2	50	96	155	88		18	0620	0753	0628
2		46	38				0843	0926	0900
2		23	22				1059	1139D	1105
2		60	46				1139E	1251	1149
2					42		1930	2032	1948
2					44	25	2044	2212	2116
2	55	42	56	93	116	120	2228	0020D	2241
3					10		0020E	0042D	0025
3			17	15	13		0041	0106	0047
3	34	37	59	71	41	31	0158	0341	0219
3			12	8			0438	0511D	0445
3			15	13			0511E	0602	0515
3			11				0717	0734D	0721
3			16	6			0734	0808	0739
3		74	113				1042	1209	1048
3		145					1428	1615	1442
3	51	40	60	106	102	81	2336	0025D	2344
4	23		—	48	39	24	0025E	0155	0037
4	34	52	98	78	50	41	0303	0355	0312
4	18		—	38			0501	0523D	0512
4	22	25	—	51			0523E	0619	0527
4	31	99	—	71			0626	0752	0638
4	33		—	69			0859	1008	0905
4		49	—				1204	1300D	1216
4		52	—				1300E	1400	1307
4		33	—				1525	1621	1530
4			—		38	—	2108	2228	2114
4			—		14		2242	0025	2314
5	33	22	—	—	45	28	0153	0354	0203
5	39	49	—	—	27	25	0457	0545	0505
5		84	—				1338	1502	1347
5		38	—				1559	1653	1618
5	35		—		109	101	2143	2222D	2148
5	34	19	—	49	121	108	2222E	2310D	2226
5	19		—	35	54	39	2310E	0047D	2349
6	32	34	—	64	67	46	0047E	0238	0052

Inubo

Sep.	S				P		A		
1989	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
6			—	14	9	15	0248	0325	0253
6			—	11			0405	0452	0411
6			—			23	0456	0536	0511
6	59	106	—	92	33	28	0552	0735	0557
7	12	18	—	32	21	24	0139	0242	0143
7	41		—	54	13	11	0521	0713	0536
7	27	69	—	30			0826	0918	0839
7		41	—				1536	1648	1545
7			—		60	54	2106	2209	2117
8			—	26	18	14	0233	0251D	0237
8			—	35	25	12	0251E	0328D	0300
8			—	50	33	21	0328E	0408D	0342
8		19	—	53	37	13	0408E	0515	0411
8			—	16			0618	0645D	0624
8			—	14			0645E	0712	0647
8			—	10			0725	0757	0734
8		52	—				0832	0951	0851
8			—		17	20	2029	2103	2036
8			—		64	64	2104	2304	2143
8	21		—	14	15	19	2335	0013D	2347
9			—	22	20	11	0013E	0103	0015
9			—	11	5	17	0109	0140	0121
9	26		—	35	17	22	0149	0319	0209
9	33	55	—	70*	41	26	0423	0529D	0446
9	44	73	—	72	13	17	0529E	0715	0542
9	76	—	—	64			0910	0955	0915
9		23	—				1535	1619	1543
9			—		23	37	1852	1917	1857
9			—		129	132	1926	2125	1937
9			—	10	22	20	2255	2349D	2302
9	21		—	30	35	23	2349E	0107D	2356
10	12		—	32	30	17	0110	0139D	0118
10	22		—	55	47	28	0139E	0224D	0141
10	10	18	—	53	34	28	0224E	0346	0233
10	24	21	—	43	14		0415	0508D	0419
10			—	18	17		0508E	0536D	0518
10	37	46	—	59	18		0536E	0628D	0545
10	42	37	—	43			0628E	0654D	0635
10	37	43	—	29			0654E	0724	0656
10	40	—	—	90			0748	0941	0803
10		33	—				1259	1330D	1308
10		29	—				1330E	1400	1341
10		14	—				1512	1548	1520
10			—		9	13	2153	2226	2205
10	19		—	23	28	20	2326	0033	2337
11			—	—		11	0041	0134	0051
11			—	—	8		0303	0342	0310
11			—	—		21	0600	0645	0613
11			—		85	66	1937	2039	1947
11			—		35	43	2059E	2206	2113
10			—	5	7	21	2239	2305D	2252
11			—	5	10	16	2309E	2343D	2316
11	41	37	—	97	92	76	2343E	0151	2351
12			—	10	4		0339	0427	0357
12	55	91	—	95	51		0458	0613D	0518
12			—		40		0610E	0638D	0616
12		43	—				1008	1032	1015
12		27	—				1459	1536	1511
12			—		6		2154	2247	2208
12	21		—	70	51	33	2352	0104D	0006
13			—	27	8	14	0104E	0130D	0117
13	16		—	39	18	18	0130E	0255	0144
13	52	90	—	117	83	52	0332	0537	0343
13		21	—	8		15	0636	0702	0645
13		75	—	22			0828	0941	0842
13		46	—				1229	1325	1246
13			—	10	15	23	2226	2308	2243
14	—		—	34	24	15	0039	0142D	0103
14			—	12			0142E	0224	0152
14			—	6	5		0228	0243	0231
14			—	10			0335	0418	0347
14			—	10			0435	0459	0441
14			—	14			0539	0635	0546
14	58	—	—	112		23	0659	0929	0709
14			—		4		2057	2115	2100
14			—		12		2139	2239D	2152
14			—	5	13		2239E	2342	2246
15			—		4		0002	0040D	0012
15	20		—	26	22	24	0040E	0210	0059
15			—	22			0636	0803	0711
15			—		8		2056	2125	2103
15			—	24	81	47	2218	0055D	2322
16			—	6	39		0055E	0255	0100
16		24	—				1628	1704	1638
17			—	22	15	21	0111	0202	0126
17			—	11			0321	0355D	0338
17			—	10			0355E	0441	0403
17			—	7			0647	0711	0653
17			—		8		2137	2218	2142
18			—	—	12	16	0032	0114D	0043

Inubo

Sep.	S				P		A		
1989	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
18			—	—	8		0114E	0158	0136
18			—	—	32*		0412	0543	0440
18			—		19		2058	2247	2126
18	16		—	8	10		2335	0021	2341
19			—		5		0047	0121	0055
19			—	6	6		0133	0213	0145
19			—	10		14	0411	0432	0413
19			—	35	12		0527	0639	0534
19		38	—				0958	1049	1005
19		25	—				1224	1301	1244
19		69	—			46	1609	1710	1618
19			—		26	20	2045	2143	2101
20			—		7		0057	0144	0113
20			—	10			0236	0253	0237
20	24		—	25	12	11	0302	0356	0309
20			—	34	21		0545	0647	0554
20		53	—	25			0711	0756	0725
20		34	—		5		2205	2235	2212
20			—	7	7		2324	2342	2329
21			—	10	6		0011	0042	0016
21			—	22	13		0128	0219	0135
21	61	83	—	141	—	71	0258	0456	0307
21		72	—				1300	1400	1310
21			—		15	20	2158	2302	2207
22	23	24	—	67	50	32	0102	0209	0107
22			—	26	9	14	0334	0402	0339
22	23	20	—	43			0540	0621	0542
22			—	31			0628	0721	0635
23			—	40	16		0321	0410	0325
23			—		34	21	2233	0023	2246
24			—	18	12	11	0113	0225	0126
24			—	18			0446	0520	0452
24	56	—	—	77			0808	0950	0822
24		46	—				1445	1615	1505
24			—		56	32	2040	2152	2050
25	19	20	—	—	27	22	0139	0300	0150
25	23		—	—	39*	31*	0307	0508	0339
25		33	—				0816	0922	0827
25		70	—				1313	1448	1329
25		21	—				1539	1624	1549
25			—	—	27	12	2120	2217	2133
25			—	10	14	13	2301	2341D	2307
25	40	32	—	101	98	58	2342	0128	2350
26			—	10		14	0149	0234	0157
26			—	14			0446	0532	0454
26			—	14			0623	0708	0630
26			—	8			0725	0803	0730
26		24	—				0856	0923	0905
26		25	—				0925	1000	0932
26		25					1048	1139	1102
26		50					1239	1355	1255
26		33					1438	1603	1447
26					13		2156	2251	2204
27			18		19	19	0002	0101D	0012
27	20	15	20	—	23	18	0102	0123	0109
27			5	—			0221	0240	0226
27			7	—			0306	0330	0311
27			11	—			0345	0417	0356
27	23		53	—			0502	0603D	0513
27			21	—			0603E	0654	0612
27			12				0700	0736	0713
27		32					1047	1145	1107
27		26				24	1659	1753	1709
27	19	31	32	54	48	40	2353	0104	0000
28				11			0210	0232	0216
28	14		15	10	6	10	0245	0313	0249
28			15	16	7	10	0334	0401	0340
28			13	10			0421	0452	0431
28			13	12			0519	0554	0526
28			7				0608	0632	0618
28			22				0823	0907	0835
28	16	—	113	12			0923	1038	0931
28		86					1348	1451	1357
28	38	34					1747	1827	1758
28				4	4		2322	2351	2330
29	48	33		88	72	56	0019	0127D	0042
29	19		31	39	28	27	0127E	0235	0135
29	15	30	48	45	23	17	0305	0337D	0314
29	17		33	37	14		0337E	0440D	0356
29			20	22		11	0440E	0515	0453
29			19				0800	0841D	0807
29			22				0841E	0907	0843
29	45	—	190				1047	1300	1132
29					24	—	2050	2138	2055
30	13		16	18	10		0149	0225	0155
30	30	62	172	120	85	42	0236	0540	0300
30			72	51			0555	0803	0612

IONOSPHERIC DATA IN JAPAN FOR SEPTEMBER 1989

F-489 Vol. 41 No.9 (Not for Sale)

電離層月報（1989年9月）

第41巻 第9号（非売品）

1989年12月20日印刷

1989年12月25日発行

編集兼 郵政省通信総合研究所

発行所 〒184 東京都小金井市貫井北町4丁目2－1

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