

IONOSPHERIC DATA IN JAPAN

FOR APRIL 1991

VOL. 43 NO. 4

CONTENTS

Preface	
Introduction	1
A. Ionosphere	
A1. Automatic Scaling	
Hourly Values at Wakkanai (f_oF2 , fEs and $fmin$)	5
Hourly Values at Akita (f_oF2 , fEs and $fmin$)	8
Hourly Values at Kokubunji (f_oF2 , fEs and $fmin$)	11
Hourly Values at Yamagawa (f_oF2 , fEs and $fmin$)	14
Hourly Values at Okinawa (f_oF2 , fEs and $fmin$)	17
Summary Plots at Wakkanai	20
Summary Plots at Akita	28
Summary Plots at Kokubunji	36
Summary Plots at Yamagawa	44
Summary Plots at Okinawa	52
Monthly Medians $h'F$ and $h'Es$	60
Monthly Medians Plot of f_oF2	62
A2. Manual Scaling	
Hourly Values at Kokubunji	63
f -plot at Kokubunji	77
B. Solar Radio Emission	
B1. Daily Data at Hiraiso	86
B2. Outstanding Occurrences at Hiraiso	88
C. Radio Propagation	
C1. H.F. Field Strength at Hiraiso	89
C2. Radio Propagation Quality Figures at Hiraiso	91
C3. Phase Variation in OMEGA Radio Waves at Inubo	92
C4. Sudden Ionospheric Disturbances	
a. Short Wave Fade-out (SWF) at Hiraiso	94
b. Sudden Phase Anomaly (SPA) at Inubo	94

COMMUNICATIONS RESEARCH LABORATORY
 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 follow-

ing 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 replace 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 atmospheric.
 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 $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$ 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

SGD Code	Letter Symbol	Morphological Classification
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	propagation 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 JJJ (Japan Standard Wave) station. The conditions are denoted as follows:

N	normal,
U	unstable,
W	disturbed.

Characteristics	Transmitter		Receiver
	WWV	WWVH	
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	$\lambda/2$ vertical	$\lambda/2$ 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 ($\Delta\phi$) 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 deter-

mined accurately, they are accompanied by one of the following symbols.

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

Types of fade-out are as follows:

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

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

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

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

b. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

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

HOURLY VALUES OF FOF2 AT WAKKANAI
 APR. 1991
 LAT. 45.4N LON. 141.7E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	61	58	59	53	52	60	79	100	102	100	121	120	125	129	120	117	108	98	92	87	77	83	78	72
2	67	76	66	64	62	66	86	98	113	128	124	129	125	118	118	118	113	100	95	90	88	76	N	90
3	68	59	65	59	66	66	86	108	121	128	131	135	134	131	128	124	113	101	104	86	88	84	73	87
4	84	62	63	65	53	60	66	80	A	74	72	74	80	87	87	96	97	90	96	90	77	72	54	44
5	44	55	44	41	41	44	44	60	84	96	100	100	122	120	100	113	107	91	104	87	86	74	67	65
6	N	63	73	63	61	69	96	111	125	130	129	135	133	131	127	124	120	113	110	90	97	73	84	78
7	87	81	77	70	70	81	104	124	146	130	134	129	134	131	128	122	126	120	118	100	90	91	92	86
8	90	86	84	83	73	87	88	120	133	138	138	141	137	136	128	127	123	124	120	109	89	89	90	90
9	85	81	83	74	74	71	87	107	129	130	140	133	138	133	126	123	118	114	112	104	90	87	86	N
10	80	80	74	72	66	N	78	82	90	71	91	110	100	100	91	101	101	102	91	84	67	84	71	68
11	66	70	73	73	70	83	97	113	125	131	130	131	125	N	117	113	105	105	108	94	87	N	89	86
12	87	85	87	86	71	87	102	125	127	130	125	125	122	83	116	107	107	104	98	97	89	90	N	85
13	78	67	N	79	N	67	90	128	127	132	130	125	125	124	112	115	111	108	111	108	88	84	90	86
14	88	87	87	82	82	87	116	122	136	136	133	130	128	125	120	N	111	113	113	104	90	90	92	84
15	90	90	85	87	75	86	113	132	129	135	N	126	N	122	115	115	112	111	107	108	96	87	91	89
16	89	N	86	86	79	87	110	130	135	136	135	131	128	127	121	120	114	107	90	98	96	96	97	96
17	89	85	86	66	79	89	121	138	138	140	136	133	127	126	117	99	99	100	98	99	90	88	85	85
18	90	80	84	85	73	66	99	117	124	122	122	126	128	126	120	112	111	99	99	90	87	87	N	84
19	84	80	77	73	66	69	102	122	127	131	125	125	N	124	118	114	114	110	113	97	84	86	87	74
20	87	82	N	66	66	82	87	91	80	82	N	92	101	106	101	98	100	104	104	96	85	88	87	80
21	90	84	73	66	71	81	90	90	86	86	91	106	112	108	110	108	96	96	87	90	88	73	82	68
22	79	83	81	67	71	83	95	110	112	118	126	127	119	127	125	126	114	106	98	100	98	89	78	84
23	84	92	79	67	72	91	90	119	119	121	123	121	122	125	123	118	108	101	98	89	92	92	86	83
24	85	87	87	77	65	83	90	117	110	112	111	120	124	127	123	123	114	111	96	99	97	90	90	87
25	86	73	82	79	73	67	90	101	103	123	114	128	126	N	118	115	116	110	108	93	88	88	81	86
26	73	78	76	66	68	80	90	98	90	97	110	119	123	113	107	111	110	107	96	91	75	90	86	85
27	84	81	74	65	64	66	65	67	72	82	90	86	91	100	107	104	102	101	89	90	87	86	83	81
28	73	72	74	76	67	73	80	84	87	87	92	104	111	98	113	107	98	100	97	92	92	90	90	87
29	73	70	73	60	65	63	62	67	74	82	75	96	91	110	103	100	91	94	96	97	91	85	82	66
30	70	62	39	43	47	53	52	66	71	70	83	91	91	89	100	90	96	100	87	86	81	74	74	66
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	28	30	29	29	30	30	29	30	28	30	28	28	30	29	30	30	30	30	30	29	27	29
MED	84	80	76	68	68	73	90	109	119	122	124	125	124	124	118	114	110	104	98	94	88	87	86	84
U O	87	84	84	79	73	84	99	122	128	131	130	130	128	127	123	121	114	110	108	99	91	90	90	86
L O	73	68	73	65	64	66	80	90	88	87	96	106	111	107	107	105	101	100	96	90	86	83	78	73

HOURLY VALUES OF FES AT WAKKANAI

APR. 1991

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	31	41	39	39	G	G	G	G	G	G	61	G	56	G	G	G	G	G	G	G	G	G	G	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	40	29	27	G
3	32	G	G	G	G	G	G	G	G	70	G	G	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	28	36	44	179	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	42	57	G	G	59	44	G	37	G	30	G	G	G	G	G
6	30	G	G	G	G	G	G	G	G	G	G	G	55	68	44	G	41	47	54	45	33	G	58	35
7	36	30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	33	27	G	G	G	G
8	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G	G	27
10	G	G	G	G	G	G	G	44	G	42	74	G	62	G	G	G	G	41	48	40	40	29	28	G
11	28	36	39	28	34	G	G	G	G	44	G	G	G	G	G	G	G	47	27	33	31	G	G	G
12	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	54	46	41	32	41	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	G
14	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33	48	32	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	G	G	G	G	G
17	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	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	27	G	G	G
19	G	G	G	G	G	G	G	G	G	G	G	G	48	G	G	G	G	G	41	49	G	G	G	G
20	G	G	G	G	G	G	G	G	45	G	G	G	G	G	44	G	G	48	47	44	44	32	G	G
21	G	G	28	G	G	G	G	G	41	G	G	G	71	G	G	G	G	G	38	34	25	25	27	27
22	G	G	25	G	G	G	G	G	43	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G	G	G
24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	46	G	G	46	31	44	36	G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G
28	G	28	31	G	G	G	G	44	41	47	56	G	G	G	G	G	G	G	30	G	27	G	G	G
29	26	G	G	G	G	G	G	G	G	52	62	G	G	G	52	G	G	42	33	34	39	33	G	28
30	G	G	29	G	G	G	39	G	G	G	G	G	G	G	G	G	G	G	G	44	33	30	38	45
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	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	14	G	G	G	G	G
U 0	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	34	34	33	G	G	G
L 0	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF FMIN AT WAKKANAI
 APR. 1991
 LAT. 45.4N LON. 141.7E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	17	15	17	16	17	29	26	40	42	38	48	39	48	39	27	33	26	22	17	15	17	16	17
2	18	16	16	16	17	17	26	32	34	40	40	43	42	45	40	23	32	27	20	16	17	16	17	16
3	16	16	16	15	16	16	27	32	37	46	44	49	46	42	42	36	33	26	21	20	18	17	16	18
4	15	18	16	18	16	20	22	21	14	38	48	71	49	39	39	38	18	26	20	16	15	16	18	66
5		17	16			20	26	20	23	33	34	44	43	27	29	27	22	21	16	18	18	16	15	18
6	17	17	16	16	17	17	18	20	21	40	42	43	38	32	27	27	21	17	17	18	17	16	17	17
7	17	15	17	17	18	18	29	21	24	39	43	29	30	44	40	26	20	17	16	17	15	16	16	16
8	18	16	15	15	17	18	18	20	27	32	42	48	43	39	39	36	22	18	21	16	16	16	16	17
9	20	17	16	16	17	18	27	20	35	23	41	43	40	42	40	39	21	17	17	17	15	16	17	17
10	18	17	17	17	17	18	28	34	26	42	35	38	35	48	42	26	20	24	17	17	14	15	17	18
11	17	17	18	17	15	21	27	24	41	38	47	48	54	46	43	30	41	20	28	20	17	17	17	16
12	17	16	17	16	17	22	18	21	26	41	49	49	49	48	47	27	20	20	17	17	16	17	16	17
13	18	16	16	16	16	22	18	22	38	43	49	50	52	42	42	40	21	18	23	17	17	15	16	16
14	17	15	15	15	15	23	18	21	26	40	49	49	50	55	43	40	22	32	23	18	16	17	16	16
15	17	16	16	16	16	22	32	34	26	44	49	50	50	50	43	43	22	18	18	18	16	17	16	16
16	16	16	16	15	16	22	18	36	40	44	52	52	46	50	48	45	38	33	18	17	17	17	17	17
17	17	16	17	16	17	22	18	35	40	50	52	56	53	50	40	24	46	21	18	16	17	16	18	18
18	16	15	16	16	17	23	18	36	23	42	45	49	50	46	43	39	22	18	22	18	17	17	16	16
19	16	17	16	17	16	22	29	23	40	42	48	43	40	43	42	26	22	20	22	17	17	17	17	16
20	17	17	17	16	18	22	32	36	40	42	46	48	43	49	36	40	39	21	20	17	17	20	17	16
21	17	18	17	16	18	22	29	24	45	43	49	48	33	29	42	40	21	30	18	17	18	17	18	18
22	17	18	18	16	16	22	29	22	35	40	42	49	43	45	40	28	35	29	28	18	18	17	18	20
23	17	22	15	17	17	22	29	21	38	42	43	48	44	42	24	21	33	18	21	20	21	17	16	16
24	18	15	15	16	16	21	20	18	23	41	45	47	48	44	43	24	23	20	22	16	18	18	17	14
25	18	17	16	17	16	21	28	21	36	39	42	40	36	41	46	26	21	32	18	15	17	17	18	18
26	18	16	14	16	18	22	18	35	23	39	43	49	43	39	42	23	20	20	22	21	27	16	16	17
27	17	16	16	15	16	22	29	20	35	26	30	44	43	40	38	26	23	20	21	17	18	18	16	17
28	18	17	16	15	18	22	20	22	23	40	39	47	46	40	40	35	39	33	23	16	17	16	18	18
29	18	17	15	16	16	22	28	21	23	35	36	53	44	40	34	27	35	18	17	16	18	17	16	18
30	15	17	15	17	17	22	32	20	44	40	81	54	44	40	40	23	34	30	24	17	17	14	17	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	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	17	17	16	16	17	22	27	22	34	40	44	48	44	42	40	27	22	20	20	17	17	17	17	17
U O	18	17	17	17	17	22	29	32	40	42	49	49	49	48	43	39	34	27	22	18	18	17	17	18
L O	16	16	15	16	16	18	18	21	23	39	41	44	40	40	39	26	21	18	18	16	16	16	16	16

HOURLY VALUES OF FOF2 AT AKITA

APR. 1991

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		65	60	A	A	64	34	88	110	111	128	131	112	125	132	120	121	88	87	84	A	65	A	A	
2	38	79	85	70	52	54	86	111	118	136	132	133	131	132	N	132	122	111	104	93	68	65		71	
3	43	51	54	66	74	75	87	120	126	134	134	144	136	137	135	131	112	112	122	86	93		A	78	
4	96	43		49	56	68	87	102	A	A		111	97	111	112	110	110	106	104	90	57	66	52		
5	52	57	45	48	44	41		68				116			128	128	115		90		87				
6	66	72	86				86			127						132	121	N	111					86	
7	84			67					124								117				86	87		N	
8	86	88			82				134	134	137	135	133	134	134	132	122		111	87	89				
9	86	88	86				87	123	131		136	137	137	135		131	N		111						
10					66		86	88	103	116	128		134		114		110								
11		83	84	79		80		111	120	119	122	136	116	120	116	117	114	111	111		87	86	86		
12	88			87					132	133	116	119					101	110	87		88	89			
13										114		127	117		112	107	109	113	111			85		86	
14			86		87	110	130	130			133				124						91		86		
15	87	86	87		79		110		130	133	117		115	121		112	108	108	90			87		109	
16	86	87	88	86	78		104	119	131	129	136	136	115	114	N	116	114	112	111		89		90	90	
17		85	87	78		86		133	136	136	133	118	126	121	116	86	110	112	111	90		87	90		
18						86	127	137	129	134	138	133	130	133	114			109	87		86			87	
19			84	76					132	131		134							112					84	
20		86	83	66	72	81	88		90		131		131	N	125		113	112	110		87			90	
21		86	86	66	54					112	115	133		133	124	115	107	110	111	91	89	83		83	
22		87			66	80	86	113	112	116					134				111			88	86	85	
23	87	88	85	71	54	C	111		122			129	131	124	131	127	119				87		86		
24		85	88		56		108		104	114				136			128	110	111	95				87	
25		84		67	67	78	104		117	C	134				137	134		110	109			87			
26		90			54	85	86		105		118		121	126	113		112		111			86	66	87	
27			86									106		117	120		108		N		60			83	
28			73		85				106			113		119	117	118	110				85				
29							75		77	91							106		110		87				
30		A			49	54	53						90	121	116	115	N			110	A		31	66	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	12	19	18	14	17	13	19	14	23	18	16	19	17	18	20	18	23	15	24		17	13		15	
MED	86	85	86	68	66	78	87	116	122	123	132	133	126	124	124	119	112	110	111		87	86		86	
U 0	87	87	86	78	76	83	104	127	131	133	134	136	133	133	132	131	119	112	111		89	87		87	
L 0	59	72	83	66	54	59	86	102	106	114	120	116	115	119	115	114	109	109	104		85	74		83	

HOURLY VALUES OF FES AT AKITA
 APR. 1991
 LAT. 39.7N LON. 140.1E SWEEP 1MHz to 25MHz AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	25	35	36	27	G	G	G	G	G	50	G	G	48	G	G	G	G	33	36	G	33	36
2	G	G	G	G	G	G	G	G	G	42	51	G	G	G	G	G	G	G	51	30	G	G	G	G
3	G	G	G	G	G	G	G	G	G	G	G	56	G	53	51	G	G	G	G	32	G	G	27	G
4	G	G	G	G	G	G	G	36	42	50		G	G	50	55	50	G	32	34	38	33	G	G	
5	G	G	G	G	G	G		G				G			G	G	G		33		36			
6	26	G	32				50		G							G	G	G	30					32
7	36			37					G								51				G	G		G
8	G	G			G				41	G	47	47	G	G	53	G	G		47	37	26			
9	G	G	G				G	G	49		G	G	48		G	G	G		48					
10					G		G	G	G	G	G		55		G		G							
11		33	30	27		24		G	52	52	46	52	54	44	G	G	42	58	62		56	35	32	
12	G			25				73	G	52	G						48	45	60		41	56		
13									G		G	G		G	G	G	G	G	40				G	G
14			G			G	G								G						G		G	
15	G	G	G		G		G		G	G	G		G	G	G	G	G	G	32			48		G
16	29	29	G	G	G		G	G	G	G	G	48	66	G	G	G	G	G	32		G		G	G
17		G	G	G		G			G	G	G	G	G	G	G	G	G	G	G	G		G	G	
18						G	G	G	G	G	G	54		48	G	G		G	44		31			G
19			G	G					G	51		G						G						43
20		G	G	G	G	G	G		51		55		G	54	58		G	43	44		48			G
21		29	G	G	G				G		49	48		G	58	G	G	46	50	36	G	G		G
22		26			G	G	32	G	52	53					G				49			33	G	G
23	G	G	G	G	G	C	G		G			G	G	G	G	G	G				G		G	
24		G	G		G		G		G	G				G			G	G	G	32				G
25		G		G	G	G	G		G	C	G				56	G		G	36			58		
26		G			G	G	G		G		G		G	G	G		45		30			G	35	29
27			G									G		G	G		50		36		G			G
28			33		G				G			G		G	46	42	G				27			
29						G			49	G							G		44		81			
30		32			26	G	37					G	49	52	G	48		30		51		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	13	20	19	15	18	13	19	14	24	19	16	19	17	19	23	19	24	16	25		19	14	12	17
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34		27	G	G	G
U 0	13	13	G	25	G	G	G	36	42	50	46	50	48	48	51	G	G	39	47		41	35	29	15
L 0	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	15		G	G	G	G

HOURLY VALUES OF FMIN AT AKITA

APR. 1991

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

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	22	20	17	18	16	16	30	36	36	48	46	36	48	N	29	26	36	28	26	16	16	16	16	16
2	18	16	16	15	16	16	24	30	23	26	45	36	46	67	68	39	35	29	18	16	18	16	23	17
3	17	16	16	17	17	17	26	21	23	65	67	33	28	27	26	28	35	18	23	16	17	20	16	17
4	17	29	20	22	17	18	21	28	28	26		36	48	34	29	21	17	16	15	16	16	17	16	
5		16	20	17		17		32				26			43	26	22		16		16			
6	18	17	16				16			23						23	21	28	16					16
7	15			15					21								16				16	16		16
8	16	15			15				20	26	24	26	44	26	24	21	15		15	16	17			
9	16	16	16				26	17	17		35	45	35	48		23	22		15					
10					16		26	20	23	28	47		39		45		23							
11		15	17	18		16		17	27	33	47	38	34	35	32	44	36	18	15		16	15	16	
12	17			17				18	23	23	36						16	16	17		15	15		
13										26		52	46		45	43	27	16	16			16		16
14			15			18	29	18	22			33			46						15		16	
15	16	16	16		16		29		22	26	49		52	47	33	26	22	21	17			15		15
16	16	15	15	16	15		20	21	26	27	38	50	32	53	48	49	26	21	17		16		15	15
17		16	16	15		20		17	31	48	44	52	48	35	45	29	44	20	26	16		15	15	
18						29	18	26	27	46	38	36	27	26	21		18	17		15				16
19			15	15					24	26		49							23					15
20		16	16	17	16	20	29		22		38		35	38	30		36	21	21		15			16
21		15	16	16	18					44	28	34		49	28	43	24	18	16	15	16	17		15
22		18			17	21	17	20	34	26					26				15			16	18	16
23	16	15	15	15	15	C	29		24			45	44	42	30	23	20				17		17	
24		16	18		18		17		22	23				28			17	16	22	16				16
25		16		16	15	20	27		22	C	42				27	21		18	22			16		
26		16			17	21	28		22		42		52	24	40		20		20			17	16	15
27			15									28		28	32		20		16		16			16
28			17		15				27			30		49	39	27	21				17			
29						17			21	52							22		17		16			
30		15			16	20	18					49	35	28	23	26			18		17		17	16
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	12	20	19	15	17	13	19	14	24	19	16	19	17	18	23	19	24	16	25		19	14	12	17
MED	16	16	16	16	16	18	26	20	23	26	43	36	44	35	32	26	22	18	17		16	16	16	16
U 0	17	16	17	17	17	20	29	28	26	44	46	49	48	48	45	39	31	21	21		17	17	17	16
L 0	16	15	15	15	15	16	18	18	22	26	37	33	35	28	27	23	20	17	16		16	15	16	15

HOURLY VALUES OF FOF2 AT KOKUBUNJI
 APR. 1991
 LAT. 35.7N LON. 139.5E SWEEP 1MHZ TO 25MHZ AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	76	72	65	68	57	62	80	97	112	121	130	140	141	140	135	126	122	114	105	98	84	A	87	83
2	71	83	91	70	62	70	93	114	128	134	134	135	137	137	134	135	130	120	113	103	85	90	80	82
3	84	73	62	76	74	77	102	122	128	132	137	140	144	141	141	140	137	127	127	105	89	87	76	87
4	92	92	79	80	82	85	108	117	120	114	126	133	139	141	140	135	129	124	117	102	82	67	67	49
5	54	51		50	48	51	69	74	116	112	122	134	142	142	135	136	136	127	111	104	86	76	77	77
6	80	78	84	81	63	63	86	111	126	128	140	138	140	138	138	137	135	128	117	100	85	87	90	96
7	100	87	87	70	72	79	103	121	130	133	135	141	138	136	138	138	130	122	121	105	101		105	102
8	95	91	86	86	77	81	105	126	135	131	137	140	140	140	140	138	135	129	123	107	90	104	108	102
9	102	90	92	84	77	80	103	124	135	133	140	139	143	140	140	136	128	124	125	117	101	89	N	89
10	90	87	88	80	74	80	98	121	126	138	138	143	141	137	136	127	117	108	111	93	90	88	84	91
11	100	88	87	81	78	77	102	118	126	128	138	140	141	137	134	130	126	123	115	101	91	102	105	113
12	105	102	103	87	72	79	112	130	135	128	130	128	127	126	110	116	115	N	118	99	88	89	102	104
13	96	88	100	91	81	85	106	120	128	132	128	130	132	130	128	124	120	120	109	99	90	101	100	102
14	103	101	92	87	82	88	112	126	130	130	136	137	134	132	130	126	120	116	116	108	102	102	110	114
15	108	106	102	90	81	85	107	124	128	132	131	131	131	117	121	120	121	118	112	105	N	100	111	110
16	111	106	99	88	70	78	98	117	132	137	136	135	132	122	127	121	117	114	104	101	101	52	58	90
17	100	92	78	53	52	52	90	129	131	118	118		115		117				87	106	73	63	104	114
18	105	87	84	92	92	87	97	127	138	138	138		138	140	135	119	122	104	109	102	90	97	101	92
19	88	99	87	84	77	85	105	115	134	140	149	138	140	138	136		134	131	117	77	A	87	56	66
20	86	87	84	73	76	81	99	111	121	135	139		138											
21	90	100	89	54	74	77	93	110	120	102	135	140		138	138	119	102	122	116	111	89	90	85	100
22	88	92	56	77	57	83	106	118	114	122	135		133	141	139	134	120	137	132	118	103	101	99	102
23	105	112	98	79		87	106	112	125	128	118	137	140	127	128	131	126	119	121	87	113	100	90	90
24	87	98	92	55	70	77	106	105	107	114	122	120	140	142	139	141	136	127	127	120	108	94	90	87
25	97	92	92	78	65	69	104	112	118	121	136	140	142	145	133	140	129	119	124	86	85	91	102	97
26	104	92	86	80	56	84	103	110	110	117						124	102	126	126	112	87	88	89	99
27	94	98	88	78	72	80	108	106	105	111	111	119	127	131	133	130	124	112	113	90	87	88	90	88
28	66	85	77	81	81	90	103	106	117	120	102	123	140	132	130	129	128	122	118	102	86	88	83	47
29	84	78	77	67	68	76	80	90	86	96	123	138	136	135	130	133	126	117	122	118	99	77	82	89
30	75	52	60	60	61	52	63	70	83	95	104	117	131	131	133	133	120	132	126	102	87	87	87	83
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	30	29	30	30	30	30	30	29	25	28	27	28	27	28	27	29	29	27	27	28	29
MED	93	90	87	80	72	80	103	116	126	128	135	137	138	137	134	131	126	122	117	102	89	89	90	91
U 0	102	98	92	84	77	85	106	122	130	133	137	140	140	140	138	136	130	127	123	107	101	100	102	102
L 0	84	85	78	70	62	76	93	110	116	117	122	130	132	131	130	124	120	117	111	99	86	87	82	85

HOURLY VALUES OF FES

AT KOKUBUNJI

APR. 1991

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	39	33	33	G	33	28	G	G	G	G	45	G	85	54	47	G	G	34	G	32	58	70	59	24
2	55	39	27	G	G	G	G	G	40	G	49	58	52	61	51	G	G	G	32	59	29	31	34	28
3	27	26	25	G	G	G	G	G	G	G	45	48	50	52	47	70	G	G	41	54	32	26	G	G
4	26	31	31	25	G	G	G	G	44	51	72	80	86	58	G	G	G	38	30	26	G	G	G	G
5	G	G	G	G	G	11	34	G	46	G	G	G	54	54	G	48	44	44	33	40	33	28	31	27
6	31	72	57	G	26	27	G	37	40	50	46	G	G	G	G	G	G	G	G	28	G	34	34	32
7	30	36	G	38	34	30	G	36	40	51	52	60	61	51	G	41	52	46	40	36	61	G	G	G
8	G	G	G	G	G	G	33	37	43	G	47	G	47	50	44	53	50	70	62	38	33	29	G	G
9	G	G	G	G	G	G	G	43	51	53	54	G	53	53	G	G	G	35	G	G	30	G	G	G
10	G	G	G	G	G	G	G	G	50	43	G	G	G	53	G	G	G	G	61	45	43	58	55	44
11	40	29	G	G	G	G	G	G	G	50	G	G	G	G	G	G	G	55	59	61	38	31	37	30
12	31	40	25	G	G	G	38	43	49	51	G	52	48	G	60	58	74	92	79	92	35	39	59	G
13	G	G	G	G	G	G	G	38	42	53	53	G	46	55	51	57	62	62	86	125	40	56	38	33
14	24	G	G	G	G	G	G	38	43	50	G	56	52	G	G	G	63	48	34	58	59	G	25	G
15	G	28	G	G	G	G	G	36	G	G	G	49	G	G	G	43	G	G	G	25	24	40	G	G
16	G	G	G	G	G	G	G	G	G	51	G	G	51	54	G	42	G	G	G	G	32	74	72	73
17	72	66	73	G	G	68	70	74	G	G	G	G	G	G	G	G	G	G	G	G	32	74	72	73
18	G	G	G	G	G	G	G	G	49	44	53	G	G	G	G	G	G	45	31	34	35	29	G	G
19	G	G	G	G	G	G	G	44	48	51	G	G	G	G	G	G	39	41	G	32	97	48	84	24
20	61	G	32	G	31	28	55	43	52	70	52	G	62	G	G	G	G	G	G	G	G	G	G	G
21	49	34	G	31	53	26	G	G	48	97	50	55	G	48	G	G	95	64	48	71	G	34	G	G
22	G	G	77	G	G	G	G	G	50	65	G	G	G	G	69	86	62	54	47	29	G	142	G	G
23	28	G	30	28	G	G	G	G	47	G	G	G	G	50	G	G	G	G	G	26	26	24	G	G
24	G	G	G	G	G	G	G	38	58	G	53	52	50	48	48	47	53	47	61	40	28	37	30	33
25	24	G	G	G	G	G	G	G	46	55	50	G	53	52	132	48	49	39	35	49	24	32	43	58
26	G	G	G	G	G	G	G	42	G	48	G	G	G	G	G	58	74	54	40	43	50	N	G	G
27	30	35	G	G	G	G	G	43	46	G	G	G	G	G	44	G	44	49	63	30	24	24	G	G
28	44	G	34	26	G	G	36	44	50	44	50	G	G	46	54	G	G	56	58	58	58	28	26	54
29	G	G	G	G	G	G	G	46	48	51	G	G	G	G	G	G	G	42	46	26	30	G	44	147
30	60	32	32	G	G	G	G	52	59	49	54	G	61	70	55	172	58	44	58	53	60	76	24	32
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	30	29	30	30	30	30	30	29	26	28	28	28	27	29	28	29	29	29	27	29	29
MED	25	G	G	G	G	G	G	36	46	50	45	G	48	49	G	G	G	44	40	40	32	31	26	G
U 0	39	33	31	G	G	G	G	43	49	51	52	52	53	53	49	53	55	54	60	56	46	48	40	32
L 0	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	G	G	17	15	28	25	24	G	G

HOURLY VALUES OF FMIN AT KOKUBUNJI
 APR. 1991
 LAT. 35.7N LON. 139.5E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	15	15	14	28	20	23	29	34	44	38	34	40	22	20	16	21	15	16	15	15	16
2	16	14	15	15	15	16	26	16	18	28	42	32	39	38	20	15	18	15	16	16	15	14	16	15
3	16	15	15	17	16	15	26	17	23	45	36	30	28	26	21	18	15	17	16	15	15	14	15	15
4	15	15	15	15	15	15	20	18	17	22	28	34	32	33	27	36	16	18	16	15	16	16	15	15
5		17		17	16	15	17	17	20	21	34	26	36	28	24	20	20	18	17	15	15	14	15	16
6	16	15	14	14	16	15	24	15	17	21	27	45	43	24	32	20	17	15	21	14	16	15	15	15
7	15	15	16	14	14	14	21	16	20	21	26	33	35	34	27	21	20	14	18	15	14		16	16
8	15	14	14	15	15	15	27	15	20	20	33	34	34	29	26	23	18	16	16	14	15	16	16	15
9	15	15	15	16	15	16	27	16	18	21	23	34	36	34	33	21	20	16	23	15	15	15	15	17
10	16	16	15	15	15	16	21	16	17	27	43	36	38	39	42	39	21	16	16	15	16	15	15	15
11	15	15	15	15	15	16	28	16	22	24	46	30	44	44	30	27	24	16	16	16	14	15	15	15
12	15	15	15	15	14	17	16	17	21	24	45	33	32	45	44	26	17	16	16	14	15	16	15	16
13	16	14	15	14	15	17	29	18	20	28	38	46	39	39	33	28	22	16	16	15	15	15	15	15
14	15	15	15	15	15	18	29	20	20	26	45	30	34	70	30	21	17	15	18	16	15	14	16	16
15	16	15	14	14	15	18	29	17	21	23	35	30	47	45	42	28	22	17	23	16	15	14	15	15
16	15	15	15	14	15	18	29	18	26	26	46	50	37	35	34	33	22	18	28	16	16	15	15	15
17	15	16	15	16	15	18	18	20	45	74	76								14	15	15	15	16	15
18	16	14	15	15	14	18	29	20	23	43	34		46	48	28	24	20	15	16	14	15	15	15	15
19	15	15	16	14	15	17	28	17	21	24	75	45	36	33	33		27	16	16	15	16	16	15	15
20	15	15	15	15	14	15	16	17	22	32	38		35											
21	15	15	16	17	15	16	30		20	34	34	33		33	33	42	21	17	16	17		15	15	16
22	15	15	17	14	18	18	17	17	23	23	70		37	45	30	24	17	15	16	16		15	15	15
23	15		16	16		18	16		21	29	42	42		32	32		21	17	22	16	16	16	16	63
24	14	15	18	15	15	16	16	17	21	18	24	29	32	34	20	20	18	16	16	15	16	15	14	14
25	15	14	15	15	15	21	17	16	17	20	23	39	39	38	23	17	18	15	16	14	15	15	15	15
26	15	15	14	14	14	18	17	17	20	22						20	18	16	14	15	14	14	16	15
27	15	14	15	15	15	18	17	18	20	21	22	45	29	40	23	17	17	15	15	14	15	14	16	15
28	18	15	14	15	14	18	16	16	20	36	27	29		23	39	40	20	29	17	14	14	15	14	15
29	28	14	14	15	15	20	28	17	18	23		26	30	21	21	18	17	16	16	17	15	15	14	17
30	15	14	14	17	16	20	17	17	20	21	35	34	32	26	21	34	17	16	16	14	14	15	26	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	29	29	29	30	29	30	30	28	30	30	28	25	25	27	27	26	28	28	29	29	27	28	29	29
MED	15	15	15	15	15	17	22	17	20	24	35	34	36	34	30	22	19	16	16	15	15	15	15	15
U O	16	15	15	15	15	18	28	18	22	29	44	43	39	40	33	28	21	17	18	16	16	15	16	16
L O	15	14	14	14	15	15	17	16	20	21	27	30	32	29	23	20	17	15	16	14	15	14	15	15

HOURLY VALUES OF FOF2 AT YAMAGAWA

APR. 1991

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	86	74	68	66	63	58	62	90	108	122	127	144	145	153	152	144	141	133	124	127	104	90	84	84
2	81	85	87	77	58	59	67	106	121	131	137	135	141	146	144	144	146	136	131	123	108	86	90	88
3	88	84	83	78	79	79	83	107	124	131	138	145	149	155	158	158	159	150	150	126	103	110	89	99
4	102	109	88	86	87	81	90	124	122	127	133	143	158	162	163	162	163	156	143	138	108	102	100	67
5	65	83	68	54	55	56	54	75	106	118	117	139	156	157	160	150	151	144	143	131	106	N	83	87
6	84	86	86	86	64	62	66	104	122	128	133	144	148	156	154	149	144	140	132	123	111	105	105	114
7	122	126	102	78	67	80	87	111	123	128	125	137	141	146	146	146	140	131	132	126	111	110	111	111
8	110	111	90	86	77	73	86	111	126	132	134	140	142	146	146	146	144	140	128	123	111	109	127	110
9	110	112	109	87	86	78	79	111	131	131	141	146	152	160	158	152	144	138	160	128	116	110	109	111
10	110	110	97	86	78	77	82	108	130	141	145	148	152	152	147	137	125	124	121	110	102	N	103	104
11	107	112	86	86	79	67	77	110	122	124	132	140	145	140	135	132	126	120	110	109	107	110	126	140
12	131	140	122	102	77	80	87	123	128	128	124	128	131	126	121	112	122	128	122	110	89	107	109	107
13	110	110	104	86	86	76	86	112	125	125	131	130	135	123	132	132	131	126	120	112	110	110	107	130
14	110	120	110	88	86	80	87	109	123	123	128	137	136	141	141	134	124	117	156	108	111	121	138	144
15	143	130	127	90	86	74	86	111	122	127	126	131	134	129	130	126	124	114	108	107	100	108	109	123
16	110	111	99	88	71	67	79	108	123	136	132	135	136	134	134	123	126	125	122	121	111	117	127	126
17	110	111	112	90	86	87	105	126	133	138	134	129	135	134	130	131	124	127	127	120	107	110	106	110
18	108	111	85	87	86	78	77	118	129	126	134	139	144	142	141	136	130	127	123	109	107	108	111	108
19	109	112	104	91	74	67	85	107	125	137	138	146	150	146	146	145	141	136	128	109	102	A	110	126
20	128	110	88	83	77	71	85	108	121	136	142	146	147	144	140	140	141	144	129	118	107	110	120	120
21	126	118	111	86	81	79	86	111	120	127	137	141	148	151	150	146	142	138	142	134	110	107	111	111
22	111	107	108	86	80	83	88	111	111	119	132	141	146	146	144	147	154	152	144	129	127	128	138	136
23	134	138	123	86	77	87	103	114	120	122	129	137	145	142	137	138	138	136	143	150	122	109	111	110
24	110	130	120	102	80	69	86	96	103	107	121	130	144	146	144	142	141	137	138	134	111	102	110	110
25	103	104	108	87	66	38	86	103	108	107	132	141	145	153	146	146	140	136	135	135	107	108	111	108
26	112	107	102	88	84	86	106	107	108	113	118	127	138	137	136	137	137	140	140	126	90	90	103	107
27	110	108	105	86	83	84	87	103	100	111	113	124	136	144	147	143	129	127	129	123	107	88	85	103
28	104	86	86	86	85	81	86	103	108	118	109	130	147	149	141	141	140	142	138	131	90	87	87	88
29	89	86	76	80	80	72	83	106	103	99	134	153	151	140	147	146	139	136	131	140	104	87	83	102
30	86	86	77	67	56	56	66	70	87	102	101	124	141	157	161	167	163	158	157	146	113	88	87	88
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	30	30	30	30	30	30	30	30	30	30	30	27	30	30
MED	110	110	100	86	79	76	86	108	122	126	132	139	145	146	145	144	140	136	132	124	107	108	109	110
U O	111	112	109	88	85	80	87	111	125	131	134	144	148	153	150	146	144	140	143	131	111	110	111	120
L O	102	86	86	83	71	67	79	104	108	118	125	130	138	140	137	136	129	127	124	112	104	90	90	102

HOURLY VALUES OF FES AT YAMAGAWA
 APR. 1991
 LAT. 31.2N LON. 130.6E SWEEP 1MHz to 25MHz AUTOMATIC SCALING

H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	40	33	30	G	26	G	G	G	G	G	G	49	G	G	G	G	G	G	G	40	59	38	40	28	
2	25	G	G	G	25	G	G	G	40	43	G	G	G	54	G	G	G	G	40	40	40	28	26	29	
3	30	29	23	G	G	G	G	G	41	G	52	54	130	G	G	49	50	68	40	29	G	G	G	29	
4	G	G	G	G	G	G	G	G	G	G	44	G	53	G	G	G	G	G	G	51	41	26	G	24	
5	G	G	G	G	G	G	G	G	39	G	49	G	G	G	G	G	G	G	G	G	28	36	38	G	
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	G	G	
7	G	G	G	G	G	G	G	G	G	G	51	51	G	G	G	55	55	82	58	94	60	27	G	G	
8	G	G	G	G	G	G	G	G	G	G	50	G	G	G	54	54	48	56	61	40	43	G	G	G	
9	G	G	G	G	G	G	G	G	44	50	G	G	G	G	60	67	72	70	74	59	58	45	32	G	
10	G	G	G	G	G	G	G	37	45	51	G	53	G	G	G	G	G	G	38	G	G	G	G	G	
11	G	G	G	G	G	G	G	G	128	G	G	52	G	G	G	G	G	52	64	35	G	G	G	G	
12	G	G	G	G	G	G	G	G	40	G	G	49	G	G	G	57	70	54	61	47	28	24	45	36	
13	G	G	G	G	G	G	G	G	G	51	52	G	G	G	54	G	84	104	117	54	28	25	G	G	
14	G	G	G	G	G	G	G	G	49	52	G	G	G	G	61	61	66	71	161	115	37	29	G	G	
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	48	45	38	G	G	
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	38	40	32	G	G	G	G	
17	G	G	G	G	G	G	G	G	G	G	24	G	G	G	G	G	G	G	57	41	34	24	G	29	
18	G	G	G	G	G	G	G	G	G	50	G	G	G	G	G	G	G	G	42	40	40	34	33	30	
19	G	G	G	G	G	G	G	G	28	G	G	G	G	G	G	G	G	45	39	37	70	142	92	59	
20	32	31	G	G	G	G	G	G	55	62	70	G	67	68	75	44	G	54	44	92	46	29	28	G	
21	G	G	G	G	G	G	G	G	56	58	55	55	56	85	G	54	G	G	38	40	42	145	41	29	
22	23	G	G	25	G	G	G	G	39	55	53	G	53	55	84	44	44	G	32	40	24	G	G	G	
23	G	G	G	G	G	G	G	G	G	G	30	G	G	G	54	52	54	54	38	G	35	28	G	G	G
24	G	G	G	G	G	G	G	G	G	G	52	G	G	G	55	54	G	G	G	50	77	25	27	G	
25	G	G	G	G	G	G	G	G	G	51	54	59	54	52	52	51	52	G	G	G	G	25	84	G	
26	44	26	G	G	G	G	G	G	40	G	G	44	55	G	G	G	G	G	G	G	30	40	G	G	
27	G	G	G	G	G	G	G	G	48	51	51	50	49	51	51	69	63	67	50	37	29	26	G	G	G
28	G	G	G	G	G	G	G	G	29	29	39	45	48	G	G	63	45	61	50	43	60	72	69	65	65
29	24	39	34	G	G	G	G	G	38	45	51	59	G	G	60	64	G	G	G	49	38	34	41	33	G
30	G	G	G	G	G	G	G	G	34	44	52	53	52	G	54	54	51	G	G	49	40	49	68	46	25
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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	G	G	G	G	G	G	G	G	40	42	46	G	G	G	G	22	G	20	40	40	36	26	G	G	
U 0	23	G	G	G	G	G	G	G	45	51	52	50	53	54	55	54	54	54	57	50	46	38	38	29	
L 0	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	26	G	G	G	

HOURLY VALUES OF FMIN AT YAMAGAWA

APR. 1991

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	20	17	35	39	43	43	36	44	42	40	36	20	15	15	15	15	15	15
2	16	15	15	15	15	15	17	15	17	38	40	43	46	39	44	44	40	33	15	15	15	15	15	15
3	15	15	15	15	15	15	17	17	21	44	37	39	39	46	43	28	22	16	15	15	15	15	15	15
4	15	15	15	15	15	15	17	17	17	38	34	48	36	44	38	39	36	22	15	15	15	15	15	15
5	16	17	15	15	15	15	17	16	16	21	36	36	44	43	42	40	18	20	26	15	16	15	15	15
6	15	15	15	15	15	15	18	15	18	24	42	44	45	45	42	34	35	18	16	17	15	15	15	15
7	16	15	15	15	15	16	18	18	17	22	43	33	48	45	42	40	23	17	16	15	15	15	15	15
8	15	15	15	15	15	15	17	17	17	39	36	36	48	36	37	35	23	18	16	15	15	15	15	15
9	15	15	15	15	15	15	18	16	17	36	38	45	48	45	44	40	36	21	15	15	17	15	15	15
10	15	16	15	15	15	15	15	16	16	38	44	45	50	49	44	44	38	20	16	15	15	15	15	15
11	15	15	15	15	15	16	20	16	23	42	46	36	47	51	48	44	43	21	16	15	15	15	15	15
12	15	15	15	15	15	15	22	16	23	42	45	47	46	49	53	44	39	23	17	15	15	15	15	15
13	15	15	15	15	15	15	16	32	24	38	44	48	47	46	46	44	38	22	20	15	15	15	15	15
14	15	15	15	15	15	15	24	18	35	38	44	45	49	55	44	44	39	34	16	16	15	16	16	15
15	15	15	15	15	15	15	18	33	22	42	45	47	49	55	49	48	40	23	18	16	16	15	16	16
16	15	15	15	15	15	15	16	17	24	42	44	47	48	49	49	49	43	24	16	15	15	15	15	15
17	15	15	15	15	15	15	16	16	28	45	43	49	48	50	45	43	51	35	17	15	15	15	15	15
18	16	15	15	15	15	16	22	32	26	38	44	48	52	47	45	44	43	24	16	15	15	15	15	15
19	15	16	15	15	15	15	23	17	22	38	41	44	44	47	42	43	39	22	17	15	15	15	15	15
20	15	15	15	15	15	15	16	17	23	38	40	46	43	44	42	44	44	33	23	15	15	15	15	15
21	15	16	15	16	15	15	16	18	23	34	39	40	44	43	47	42	39	21	16	15	15	15	15	15
22	15	15	15	15	15	15	15	18	22	36	38	44	42	36	41	34	24	17	16	15	15	16	15	15
23	15	15	15	15	15	15	15	18	23	40	44	43	44	41	38	35	32	18	16	15	15	15	15	15
24	15	15	15	15	15	15	22	30	20	38	39	46	44	44	35	33	21	18	29	15	15	16	16	16
25	15	15	15	15	15	15	17	18	35	35	38	38	39	39	39	38	33	32	16	17	15	15	15	16
26	15	15	15	15	15	15	15	30	34	38	44	39	45	45	49	44	38	36	17	15	15	15	15	15
27	15	15	15	15	15	15	22	16	17	35	36	43	36	36	35	35	27	16	16	15	15	15	15	15
28	15	15	15	15	15	15	15	16	23	36	36	42	45	48	43	44	26	35	16	15	15	15	15	15
29	15	15	15	15	15	15	15	17	18	27	38	44	40	40	46	38	22	21	16	15	15	15	15	15
30	15	15	15	15	15	15	16	17	17	36	38	44	44	42	39	38	38	18	16	15	16	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	15	17	17	22	38	40	44	45	45	43	41	37	21	16	15	15	15	15	15
U 0	15	15	15	15	15	15	20	18	24	39	44	46	48	48	46	44	39	24	17	15	15	15	15	15
L 0	15	15	15	15	15	15	16	16	17	36	38	40	43	42	41	38	26	18	16	15	15	15	15	15

HOURLY VALUES OF FOF2 AT OKINAWA
 APR. 1991
 LAT. 26.3N LON. 127.8E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	105	86	80	80	66	52	54	88	105	120	134	144	147	168	171	159	170	168	146	146	104		85	87
2	85	87	86	85	67	54	62	88	108	120	137	130	146	151	145	146	161	151	160	146	142	140	108	108
3	108	105	88	80	85	67	63	90	120	130	138	144	161	171	178	183	189	190	176	164	146	164	167	127
4	126	145	127	91	91	85	86	101	108	121	135	145	158	171	176	186	187	189	177	177	N	170	171	125
5	86	86	84	86	66	55	38	73	107	122	133	151	165	165	168	167	175	177	171	162	163	160	140	122
6	109	86	108	88	66	59		88	111	133	138	146	161	170	161	170	164	154	145	146	146	153	156	168
7	159	166	140	86	80	81	86	108	110	124	129	136	146	160	161	146	144	144	143	147	165	166	163	159
8	146	145	140	86	86	73	78	95	108	132	133	140	146	152	157	156	158	145	144	137	145	146	140	134
9	127	126	109	88	79	46	66	96	122	131	138	146	158	174	177	171	170	161	146	157	162	163	178	178
10	185	171	146	112	85	79	85	105	131	138	144	148	158	164	141	140	133	121	130	122	119	131	N	140
11	145	145	141	99	84	64	67	103	108	121	133	141	144	145	145	132		118	111	102	111	158	147	162
12	168	184	168	127	87	91	109	128	130	126	117	127	135	129	112	120	131	131	122	103	86	136	143	158
13	110	150	119	86	86	67	83	108	122	127	134	134	132	134	145	146	144	135	128	107	111	145	170	168
14	168	171	166	110	87	86	88	108	122	119	128	131	145	151	150	147	145	132	130	133	127	168	170	177
15	164	170	166	128	86	64	78	103	122	111	121	124	132	139	132	136	113	111	105	104	105	111	121	140
16	144	127	109	86	74	63	65	103	122	132	136	135	136	145	145	145	147	146	144	141	145	161	171	167
17	164	171	146	86	130	126	107	108	137	133	119	123	133	132	134	132	136	135	123	104	118	133	140	146
18	146	164	134	109	105	86		103	127	125	135	145	151	147	143	151	146	145	138	121	131	130	121	140
19	145	142	110	87	78	67	76	99	122	132	141	143	156	162	164	162	165	157	146	140	141	146	144	163
20	146	140	111	86	79	67	78	101	111	136	141	146	146	146	146	146	146	146	142	130	133	N	134	149
21	146	140	126	86	72	72	82	101	111	122	131	141	153	157	161	162	157	166	165	161	143	146	143	146
22	145	128	110	85	86	84	85	108	111	112	126	142	150	164	168	163	177	187	176	166	171	188	190	197
23	188	189	168	99	86	88	105	108	108	122	123	139	143	142	141	141	141	147	164	161	140	146	165	145
24	169	171	159	110	66	38	62	94	88	95	119	134	144	161	151	145	148	163	170	170	146	170	146	163
25	144	142	136	80	73			88	100	98	121	141	156	165	157	158	151	146	161			124	130	144
26	141	143	114	86	86	87	88	106	107	105	120	132	142	141	146	145	180	146	142	121	86	94	138	146
27	146	176	164	112	86	84	85	90	104	108	117	135	143	146	160	146	142	134	142	146	124	108	110	111
28	89	103	86	85	86	85	76	90	104	105	116	134	156	161	154	155	160	165	162	146	90	90	91	86
29	86	86	86	81	74	62	73	96	96	89	136	163	157	146	162	160	164	164	146	146	90	90	110	86
30	86	90	85	79	66	78	66	80	94	111	111	133			196	197	194	193	196	178	146	110	86	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	30	30	30	30	30	29	27	30	30	30	30	30	29	29	30	30	29	30	30	29	28	28	29	30
MED	145	142	122	86	84	72	78	101	110	122	133	140	146	152	156	149	157	146	146	146	136	146	143	146
U 0	159	170	146	99	86	85	86	106	122	131	136	145	156	164	164	162	170	165	164	161	146	162	166	163
L 0	109	105	108	85	73	62	66	90	107	111	121	134	143	145	145	145	144	135	138	121	111	127	121	125

HOURLY VALUES OF FES AT OKINAWA

APR. 1991

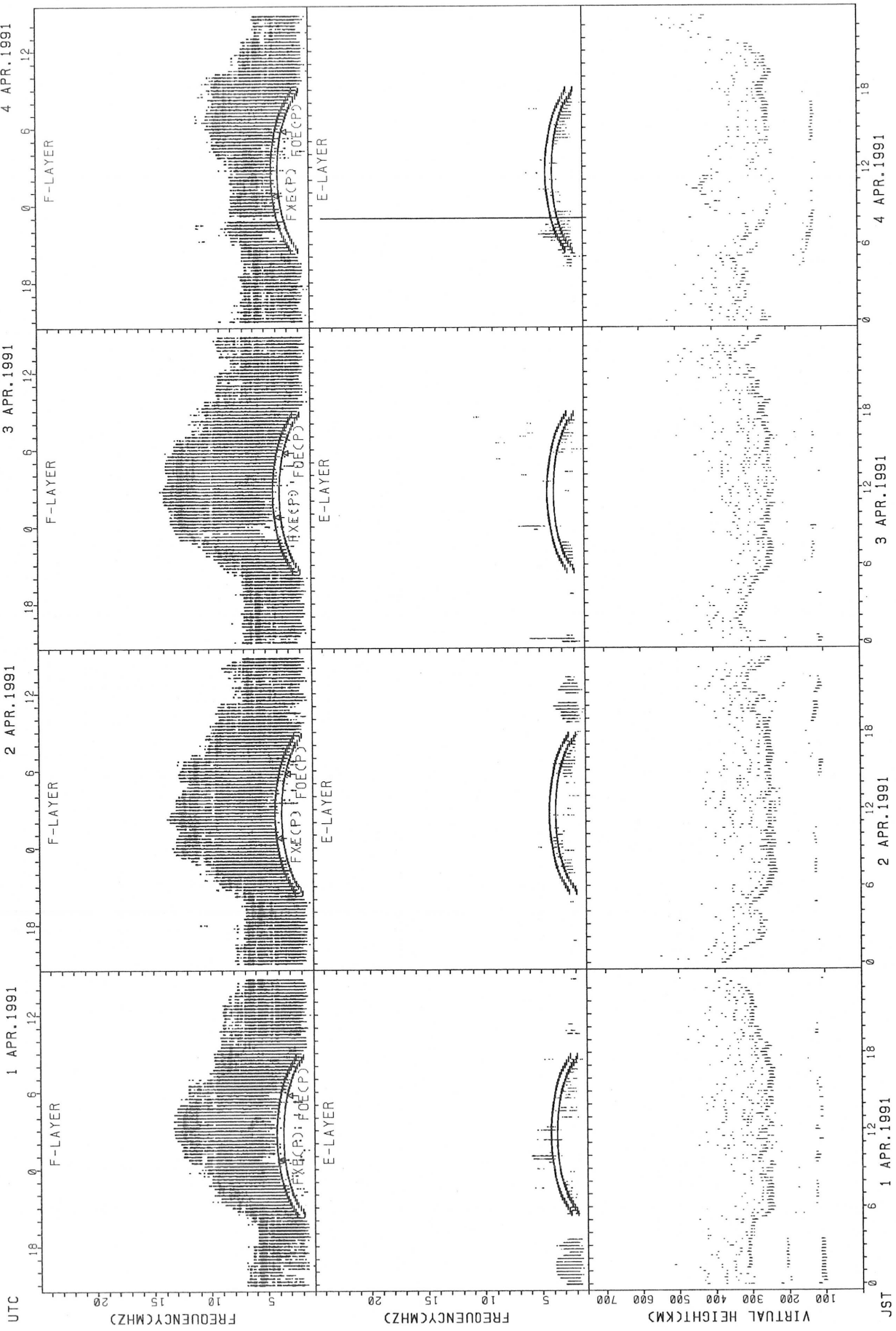
LAT. 26.3N LON. 127.8E SWEEP 1MHz to 25MHz AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	G	G	G	G	G	G	26	32	45	G	G	G	G	G	G	G	G	G	G	42	28	G	G	30	
2	G	G	26	G	G	G	G	G	37	42	46	G	G	G	G	G	G	G	G	28	32	24	24	G	
3	G	G	G	G	G	G	G	32	42	G	48	G	62	80	86	113	103	71	51	41	33	24	G	G	
4	G	24	G	30	G	G	G	G	37	G	47	G	G	G	G	G	G	G	G	27	G	G	27	G	
5	25	24	28	25	23	G	G	G	38	45	48	51	G	51	G	48	G	G	32	G	G	G	G	G	
6	G	G	G	G	G	G	G	G	G	G	G	G	48	49	G	G	G	G	38	35	G	G	G	G	
7	G	G	G	G	G	G	G	35	39	G	G	G	54	G	49	56	42	62	66	27	G	34	G	G	
8	G	G	G	G	G	G	G	31	39	48	55	57	56	59	47	46	62	44	G	38	32	G	G	G	
9	G	G	G	G	G	G	G	G	G	46	G	G	G	G	G	G	G	38	40	48	39	G	40	G	
10	G	G	G	G	G	G	G	G	44	49	52	G	G	G	46	G	53	40	51	G	G	G	G	G	
11	G	G	G	G	G	G	G	32	G	43	G	G	G	G	G	G	G	57	69	57	34	27	G	G	
12	G	G	G	G	G	G	G	G	38	43	G	G	60	G	G	G	52	53	58	41	34	G	28	G	
13	G	G	G	G	G	G	G	G	44	52	58	58	61	71	65	59	56	52	58	45	28	G	33	G	
14	G	G	G	G	G	G	G	G	42	54	58	59	50	G	G	G	G	58	60	64	30	32	31	G	
15	G	G	G	G	G	G	G	G	38	49	G	G	G	G	G	G	G	41	37	30	G	G	G	G	
16	G	G	G	G	G	G	G	34	G	G	G	G	G	G	G	G	G	40	41	43	28	G	G	G	
17	G	G	G	G	G	G	G	G	39	G	46	G	G	G	G	G	G	G	37	40	25	30	G	G	
18	G	G	G	G	G	25	G	G	38	42	G	G	G	G	G	G	G	40	59	38	40	28	26	25	
19	G	34	35	G	G	G	G	G	44	51	45	62	61	84	G	G	G	41	41	24	39	38	33	30	
20	G	G	G	G	G	G	G	G	45	58	62	81	55	63	79	G	42	49	59	60	45	30	24	G	
21	G	G	G	G	G	G	G	32	40	46	64	53	G	G	G	G	G	G	33	G	G	G	33	40	
22	G	59	39	29	G	G	G	32	55	57	48	G	G	56	56	71	63	61	65	60	32	G	118	31	
23	G	G	G	G	G	22	30	G	38	G	G	G	G	49	52	51	53	G	G	32	32	G	G	25	
24	G	G	G	G	G	G	G	G	G	G	G	G	G	56	56	G	G	G	G	32	40	27	G	G	
25	29	41	28	32	G	G	G	G	G	G	G	51	66	G	G	50	G	G	34	G	G	G	31		
26	G	38	28	G	G	G	G	G	G	G	G	53	58	61	G	87	100	90	125	38	30	G	32	G	
27	G	G	G	G	G	G	28	40	55	83	57	62	74	G	97	62	56	83	86	90	177	90	G	G	
28	G	G	26	G	G	G	28	41	43	48	56	66	62	61	G	G	G	G	46	83	G	G	81	66	
29	33	29	33	51	35	G	33	39	48	G	62	G	60	81	G	G	G	G	40	G	28	29	39	32	
30	G	31	36	57	33	23	31	46	50	51	62	G	G	G	58	G	G	45	41	49	58	32	49	60	
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	27	30	30	30	30	30	29	29	30	30	29	30	30	29	29	30	30	30	
MED	G	G	G	G	G	G	G	G	39	43	46	G	G	G	G	G	G	40	41	38	30	G	12	G	
U Q	G	24	28	G	G	G	G	32	44	49	56	53	60	60	52	50	53	53	59	48	36	29	33	30	
L Q	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G	G	33	27	G	G	G	G	

HOURLY VALUES OF FMIN AT OKINAWA
 APR. 1991
 LAT. 26.3N LON. 127.8E SWEEP 1MHz to 25MHz AUTOMATIC SCALING

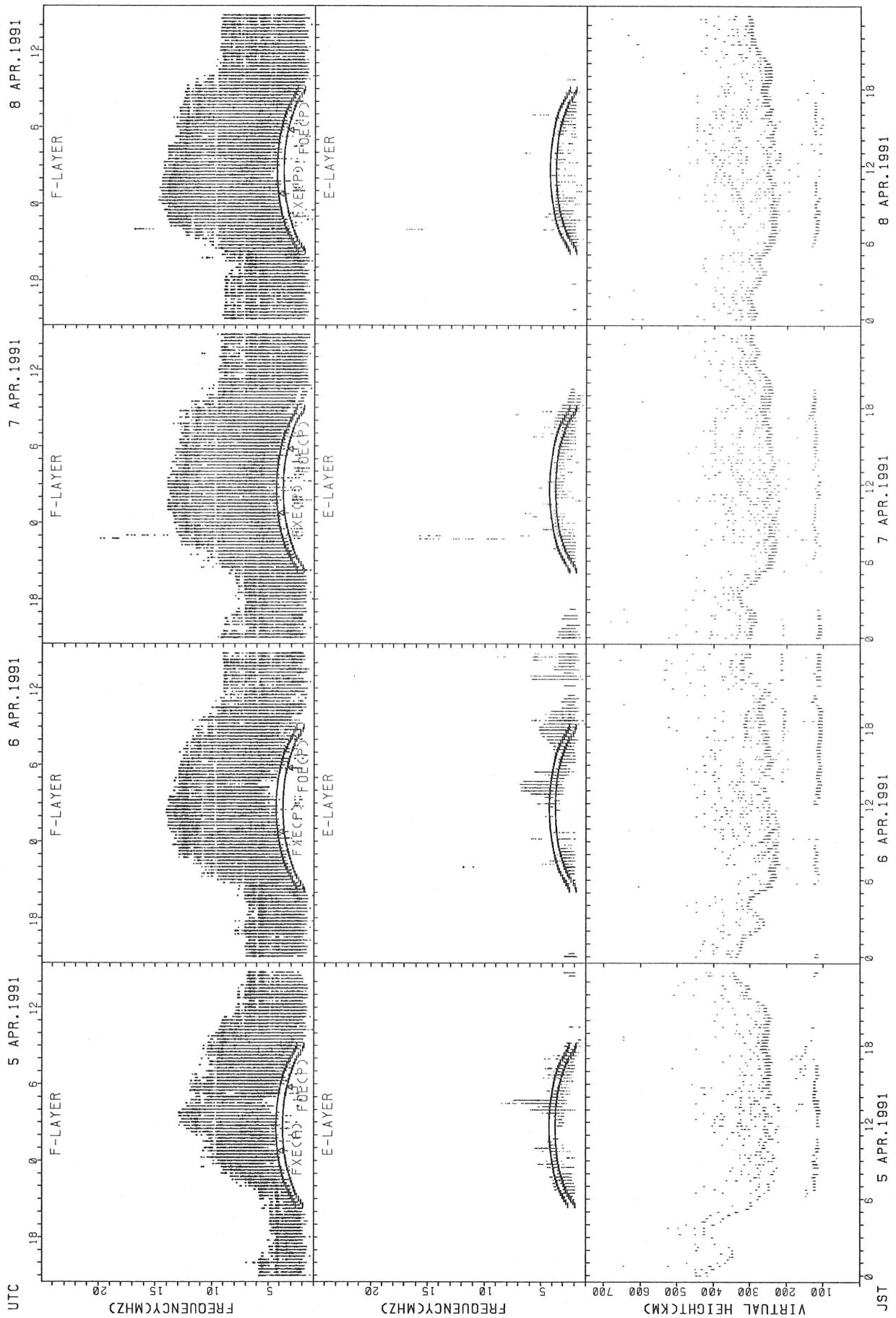
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	15	15	15	15	15	23	27	29	37	45	47	45	41	28		18	15	15			15
2	15	15	14	15	15	15	15	16	21	23	30	33	31	34	29	28	27	22	16	14	14	15	15	15
3	15	15	15	15	15	15	15	16	18	44	30	30	30	33	28	26	22	18	15	15	15	15	15	15
4	15	15	15	15	15	15	15	16	17	56	27	29	46	32	28	28	35	16	17	14	15	16	15	49
5	15	15	15	15	15	15	18	15	16	22	26	30	30	29	35	28	18	15	15	15	15	15	15	15
6	15	15	15	15	15	15		15	17	24	26		30	30	27	32	24	21	16	17	17	16	18	15
7	16	16	15	15	15	16	17	15	20	38	26	27	45	47	28	27	24	23	49	16	18	15		16
8		15	15	15		15	15	15	17	23	45	38	41	33	32	30		21	79	15	14	15	15	15
9	15	15	16	15	15	15	16			23	27	29	45	50	48	30	27	18	16	15	15	86	15	15
10	15	15	15	17	16	15	16	20	20	27	29	48	52	50	32	46	30	22	16	64	15	15	16	16
11	15	17	17	15	15	15	18	17	24	29	47	35	86	52	48	50		24	22	15	15	14	16	15
12	15	15	15	15	15	15	17	15	22	26	48	34	48	50	50	45	27	27	17	15	15	15	15	15
13	15	15	14	15	15	15	17	28	22	28	32	45	44	34	46	43	28	24	23	15	15	17	15	15
14	15	15	15	15	15	15	16		22	27	32	33	44	52	49	34		26	17	15	15	15	15	15
15	15	15	15	15	15	15	18	17	23	26	28	33	46	52	50	46	40	24	21	14	15	15	15	15
16	15	15	15	15	15	15	17	17	24	26	48		53	49	50	49	45	24	20	14	14	18	15	15
17	15	15	15	15	15	15	17		26		29	49	46	48	46	28		26	16	14	15	15	15	15
18	16	15	15	16	15	14			24	29	43	46	47	52	48	34	28	22	16	14	15	15	15	15
19	17	15	14	15	15	15	17	24	20	28	49	41	43	44	46	43	40	23	15	18	15	15	15	15
20	15		15	15	15		17		21	26	29	43	50	44	46	44	23	23	26	14	15	15	15	15
21	15		15	15	15	15	17	17	22	26	28	32	32	48	45	43	28	23	16	18	17	15	15	14
22		15	15	15	15	15	20	15	21	24	32	32		43	33	30	26	22	15	15	15	15	14	15
23	16	15	15	15	15	15	15	29	23	29	30	34	32	42	34	32	27	44	17	15	15	16	15	15
24	16	15	15	15	15	15	21	29	23	29	29	31	32	43	42	43	26	23	18	16	15	14		
25	15	15	15	15	15			18	23	24	27	30	29	44	27	36	23	74	16			15		15
26	15	15	15		14	15	21	18	21	49	30	30	30	32	47	40	27	21	17	15	15	15	15	16
27	15	15			15	15	15	15	18	23	29	35	33	30	30	30	23	18	16	15	15	15	48	15
28	15	15	15	15	15	15	14	16	21	33	29	44	32	42	43	41	26	35	16	15		15	15	15
29	15	15	15	15	14	24	14	16	21	24	27		30	42	29	27	26	20	16		15	15	15	15
30	15	15	15	15	14	16	15	15	17	22	28	30			32	29	23	18	17	14	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	28	28	29	28	29	28	27	25	29	29	30	27	28	29	30	30	26	29	30	28	28	29	26	29
MED	15	15	15	15	15	15	17	16	21	26	29	33	44	44	42	34	27	23	16	15	15	15	15	15
U 0	15	15	15	15	15	15	17	18	23	29	32	41	46	49	47	43	28	24	18	15	15	15	15	15
L 0	15	15	15	15	15	15	15	15	19	24	28	30	31	33	30	29	24	20	16	14	15	15	15	15

SUMMARY PLOTS AT WAKKANAI



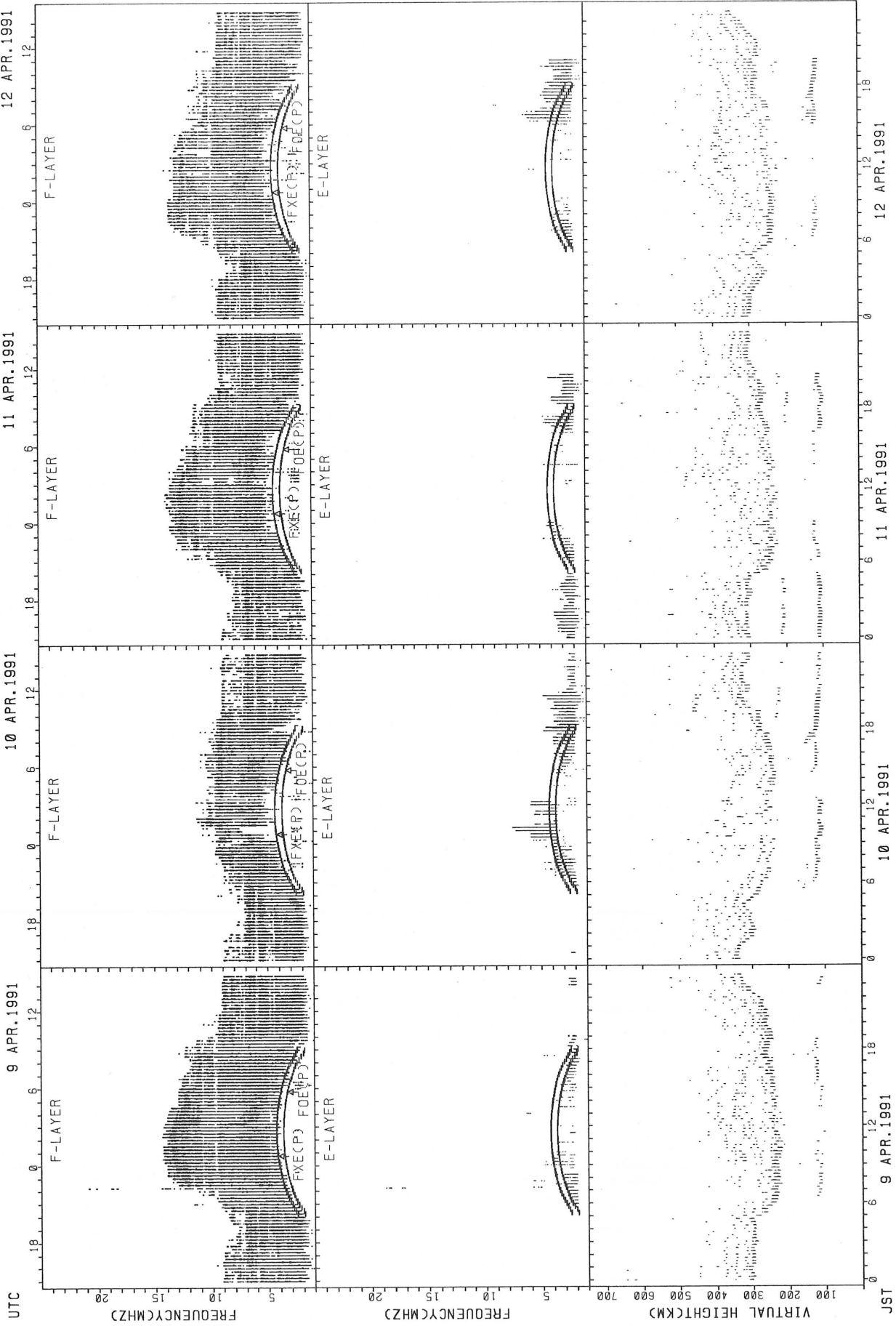
FXE(CP); PREDICTED VALUE FOR FXE
FOE(CP); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



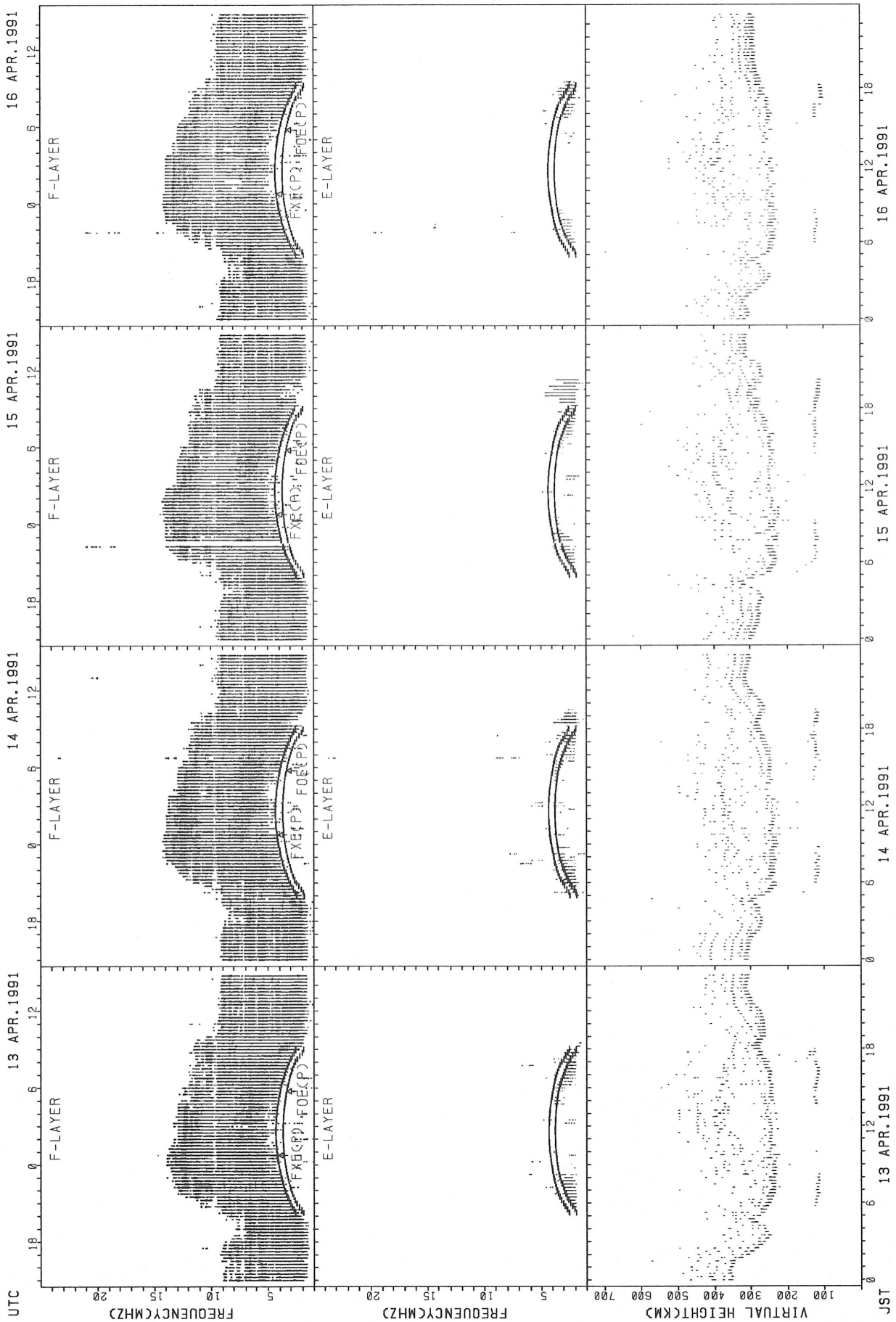
FXECP: PREDICTED VALUE FOR FXE
FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



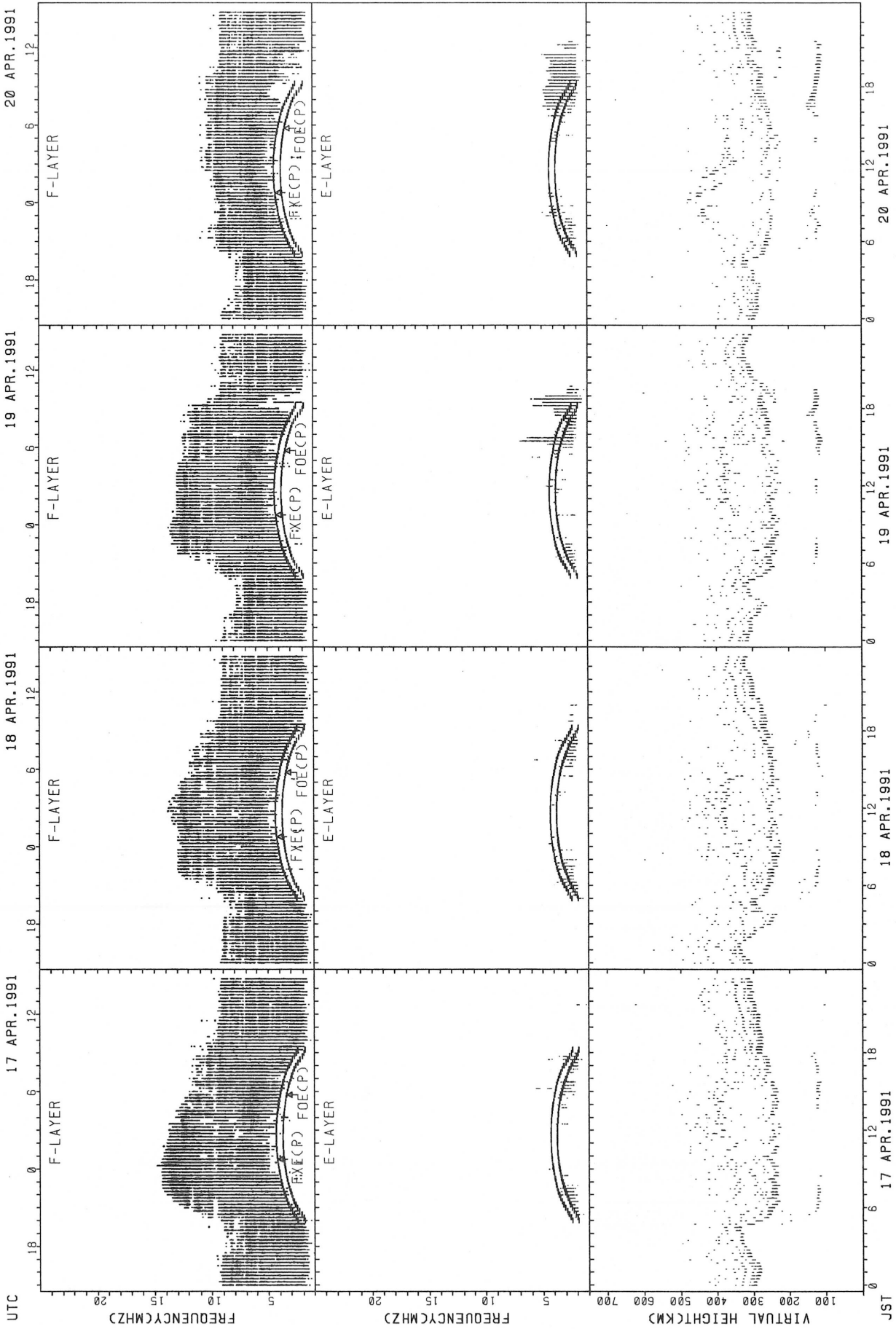
FXECP: PREDICTED VALUE FOR F_{XE}
FOECP: PREDICTED VALUE FOR F_OE

SUMMARY PLOTS AT WAKKANAI



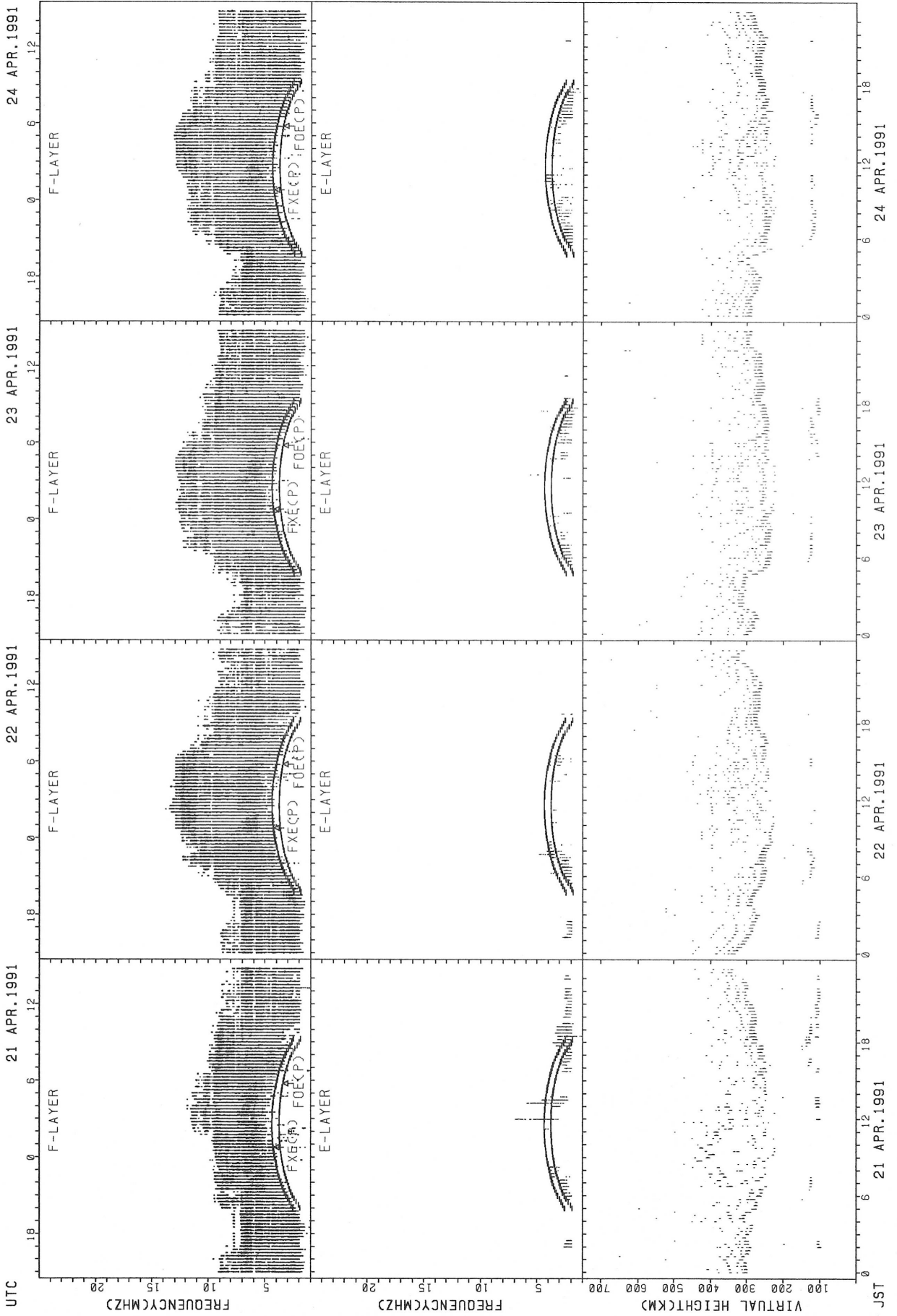
FXECP: PREDICTED VALUE FOR F2
FOECP: PREDICTED VALUE FOR F1

SUMMARY PLOTS AT WAKKANAI



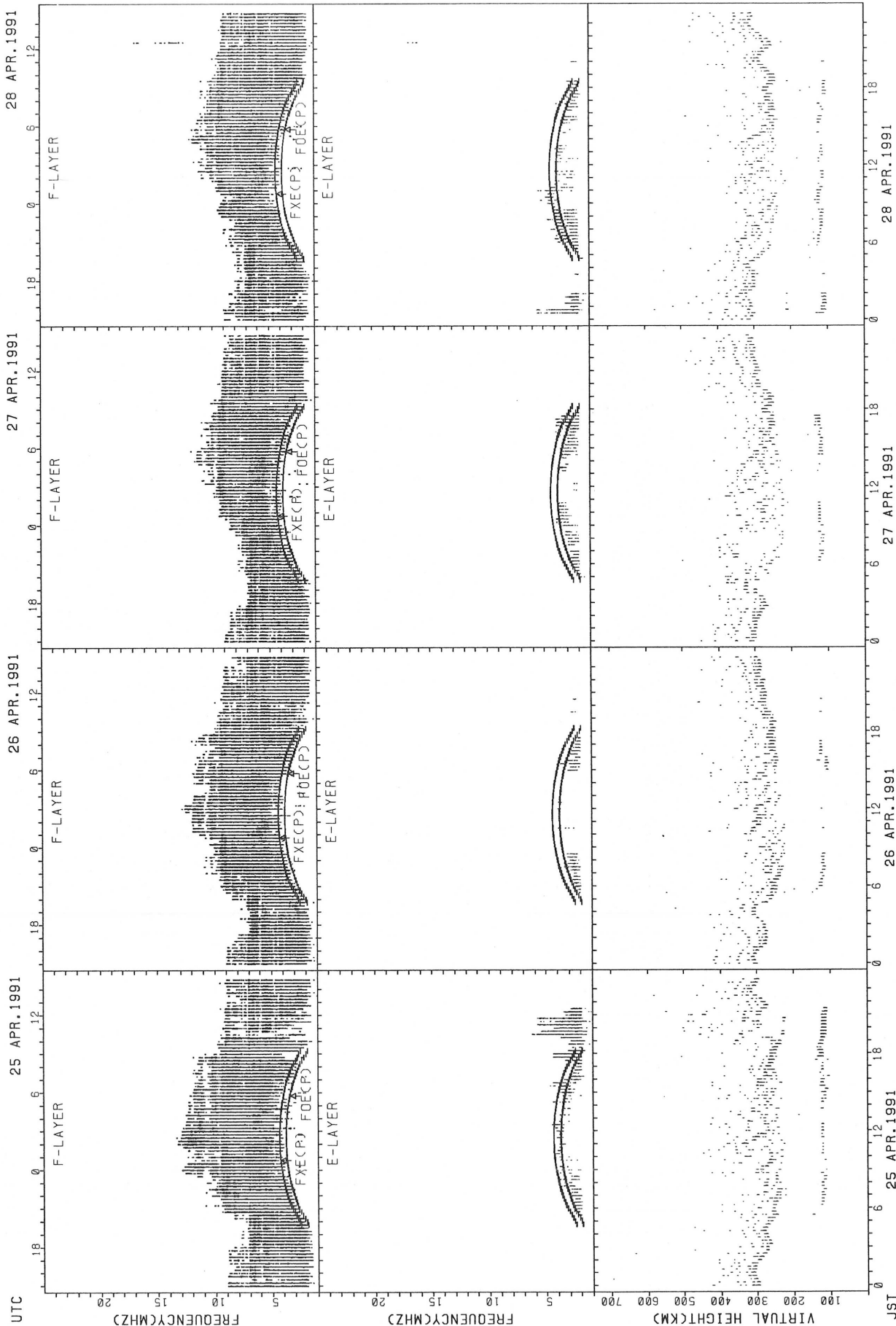
FXECP: PREDICTED VALUE FOR FXE
FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



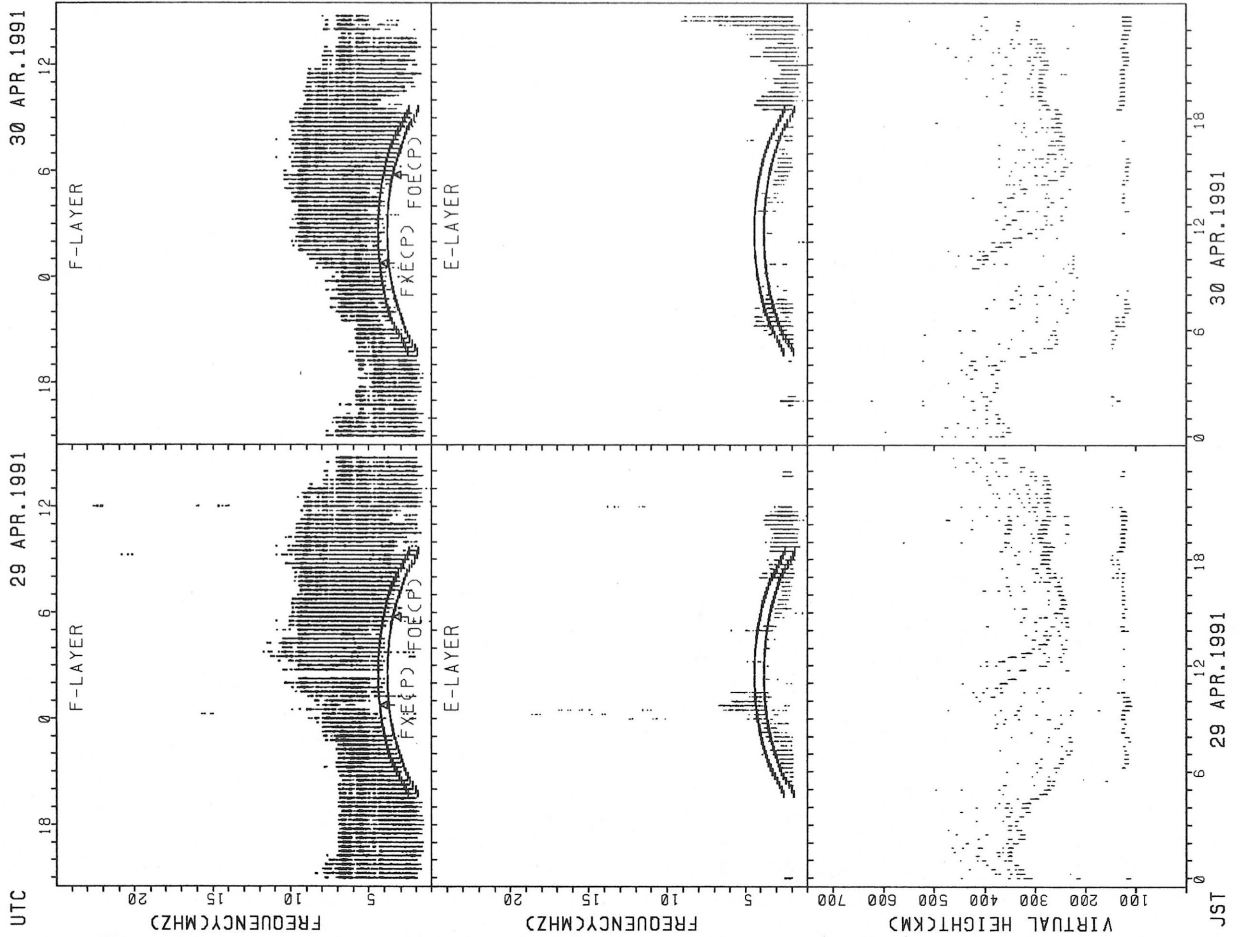
FXECP: PREDICTED VALUE FOR FXE
 FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT WAKKANAI



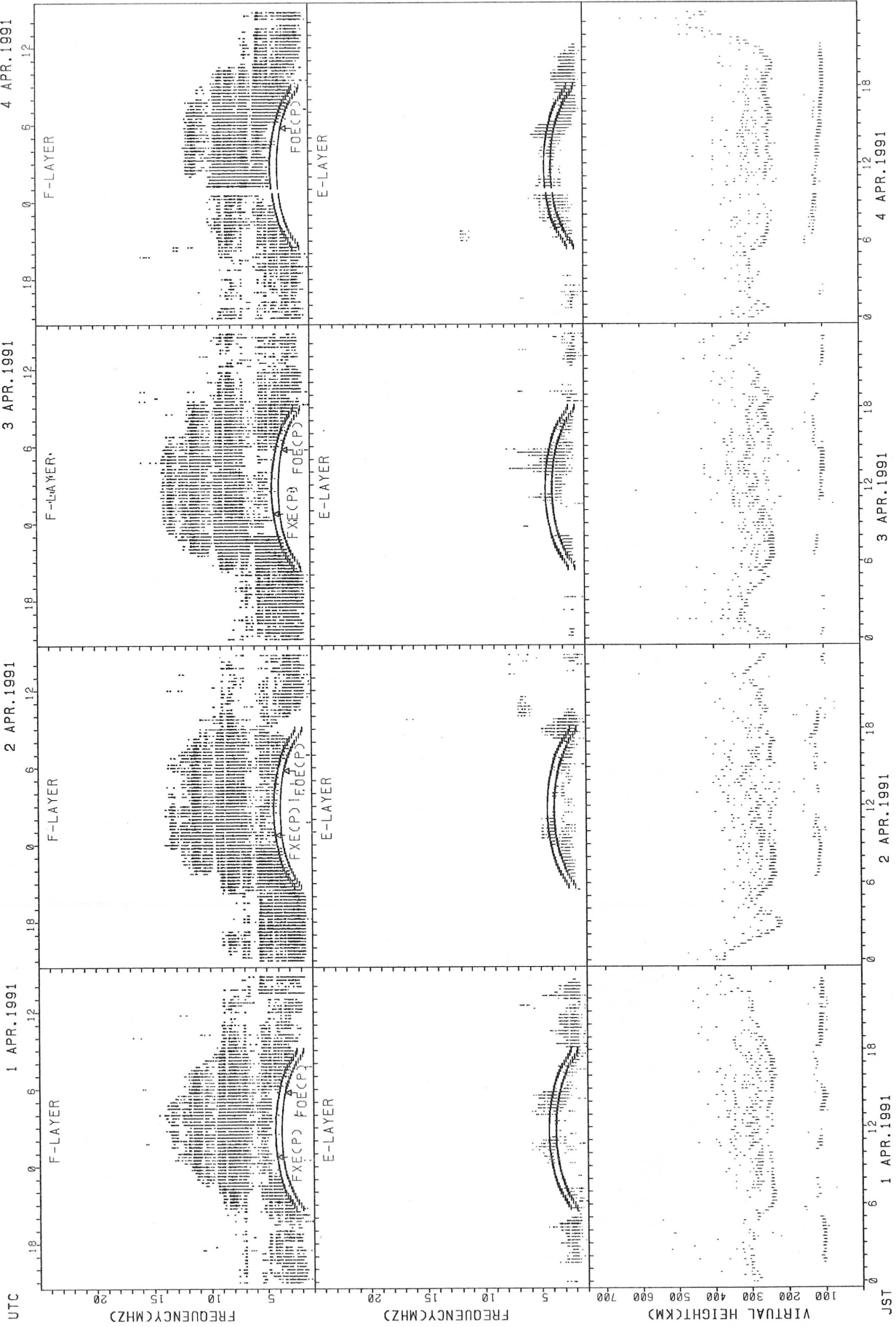
FxE(CP); PREDICTED VALUE FOR FxE
F0E(CP); PREDICTED VALUE FOR F0E

SUMMARY PLOTS AT WAKKANAI



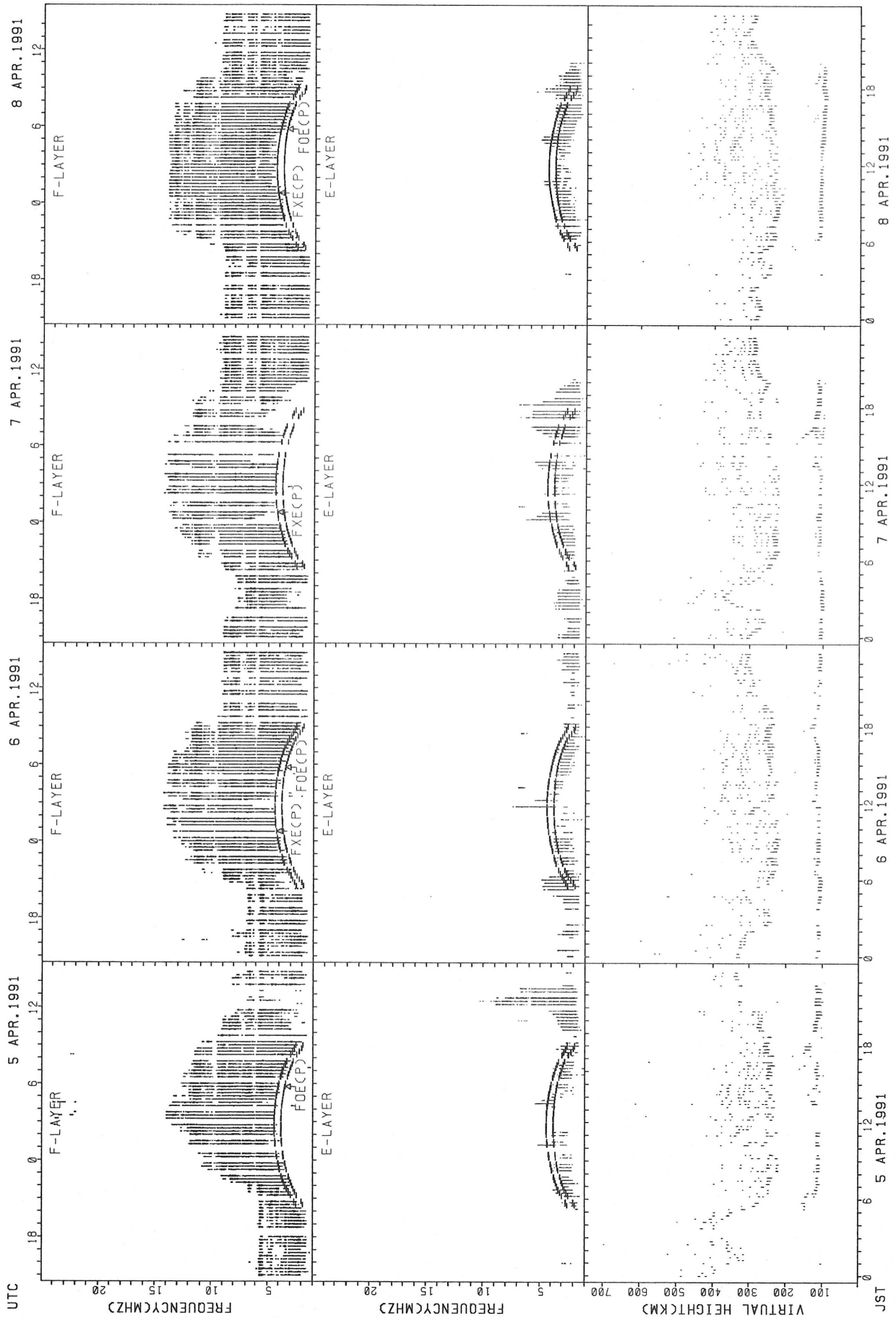
FXECP: PREDICTED VALUE FOR FXE
FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA



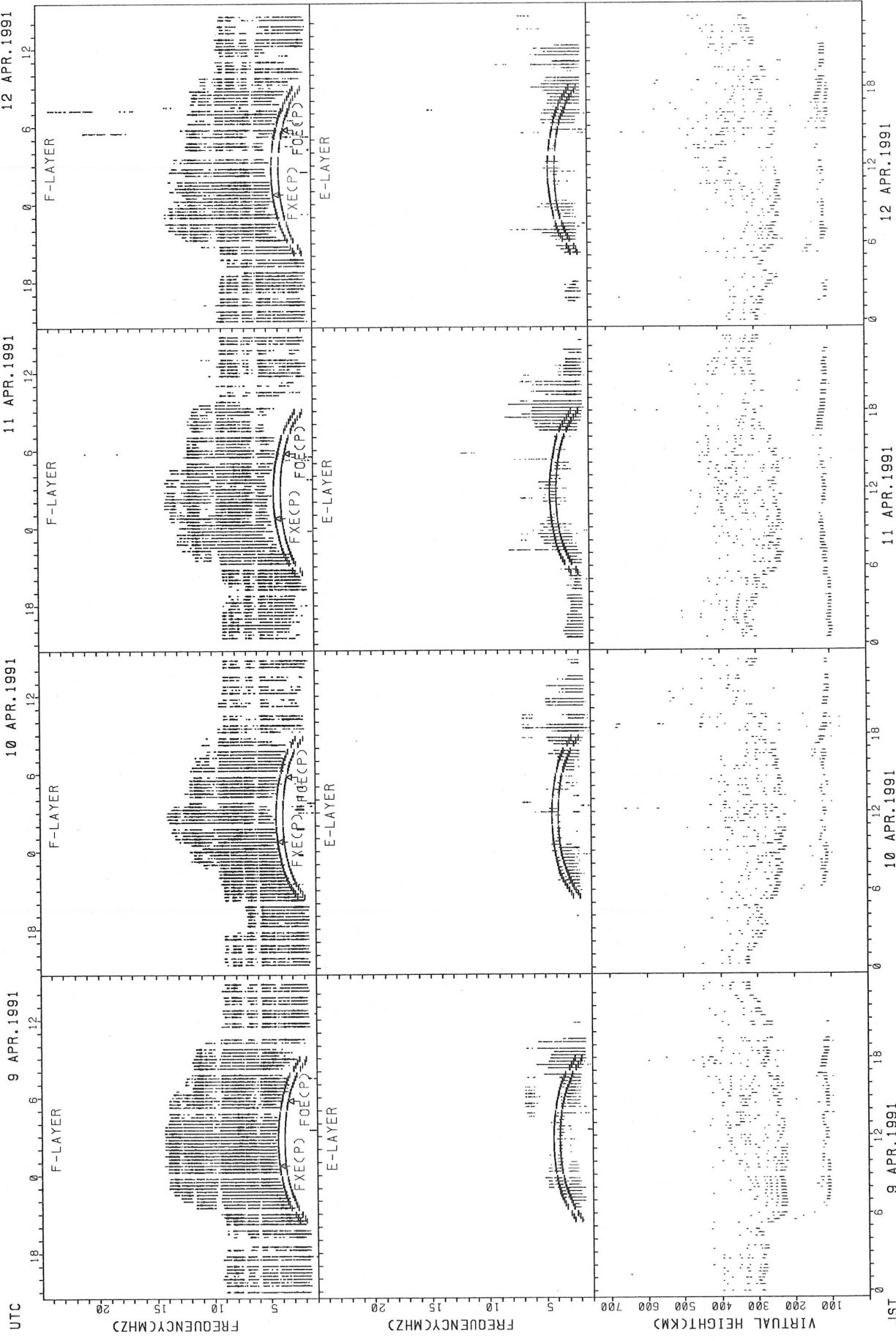
FXECP): PREDICTED VALUE FOR FXE
 FOECP): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

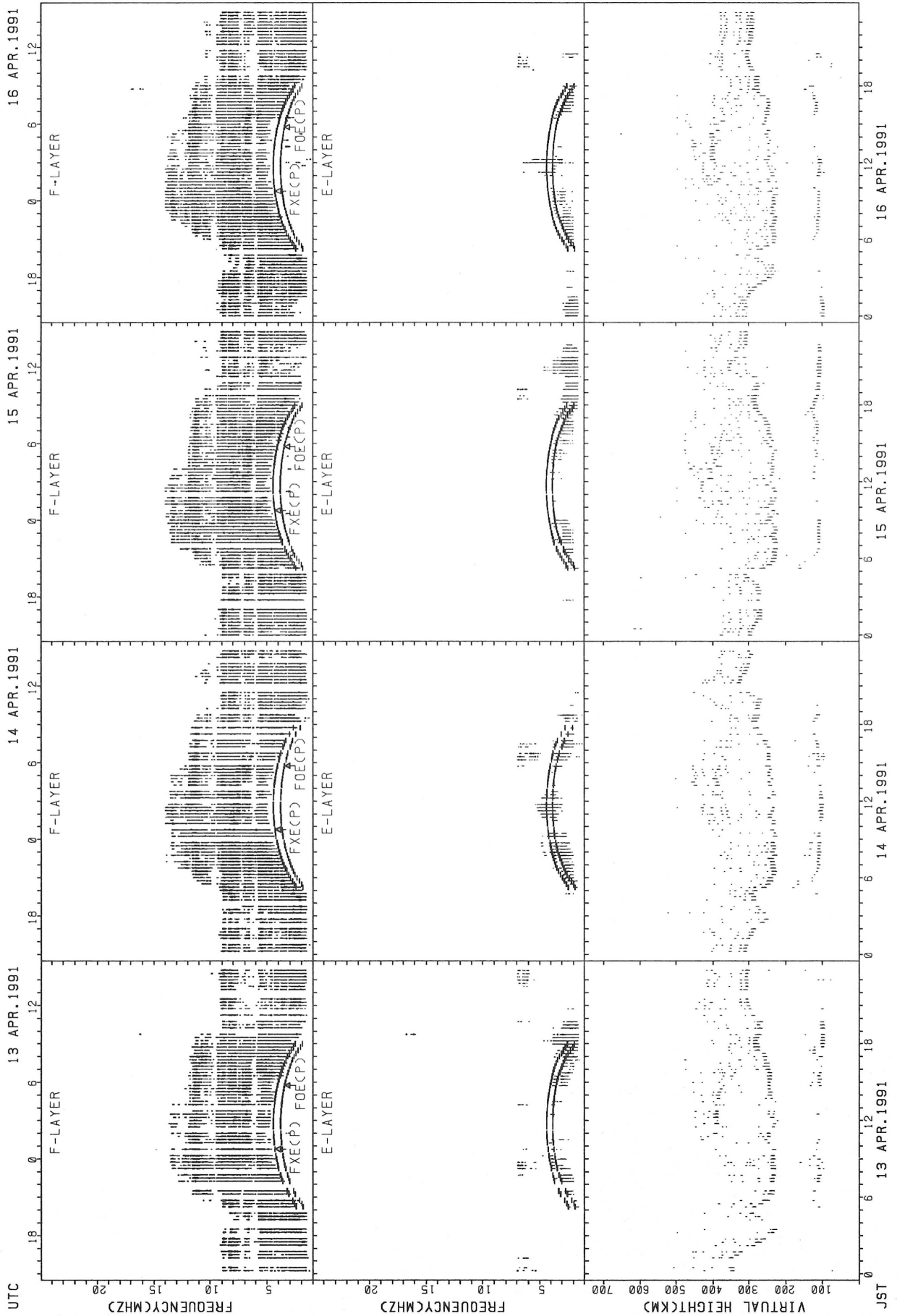


FXECP: PREDICTED VALUE FOR FXE
FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT AKITA

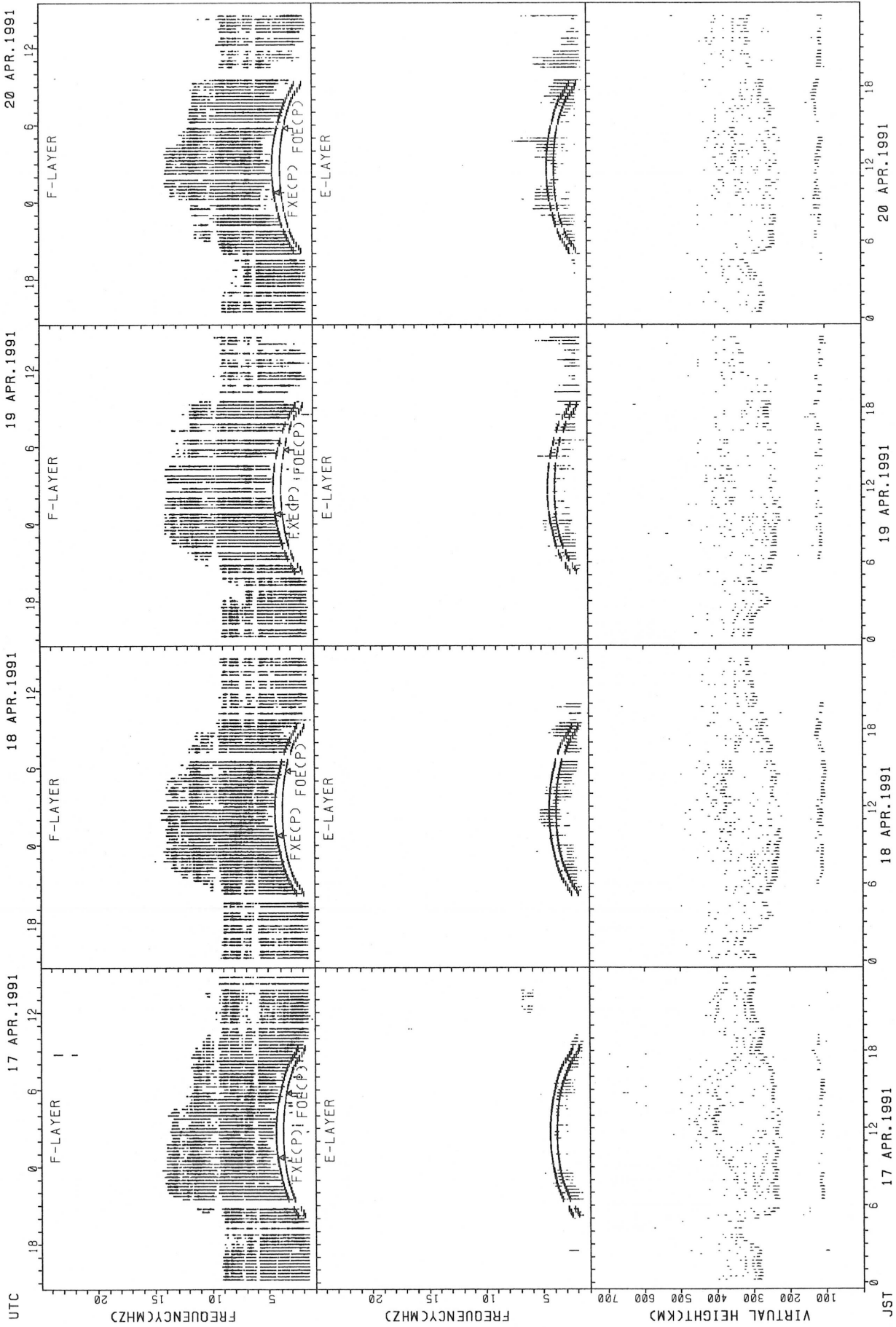


SUMMARY PLOTS AT AKITA



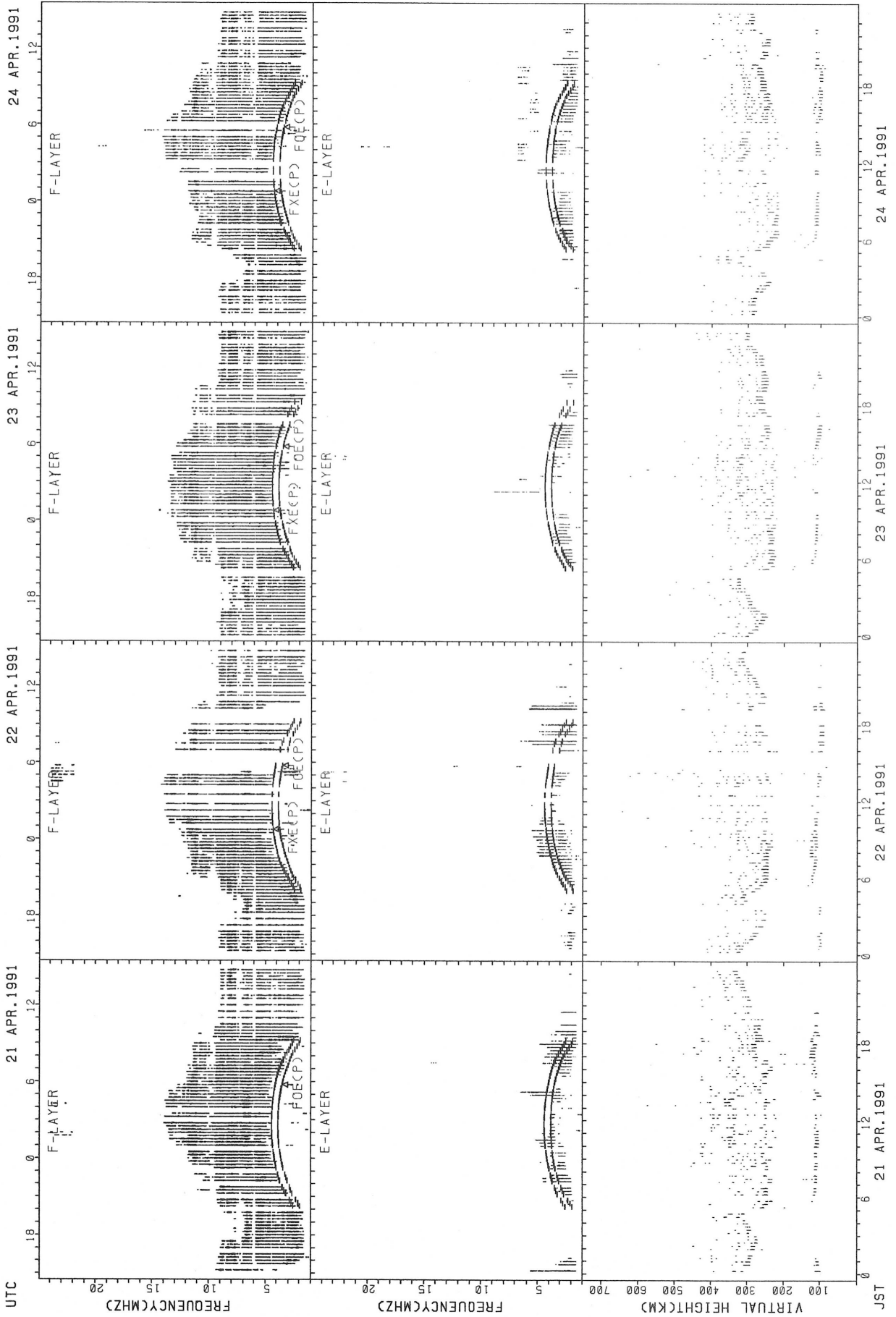
FXECP: PREDICTED VALUE FOR Fx
 FOECP: PREDICTED VALUE FOR F0F2

SUMMARY PLOTS AT AKITA



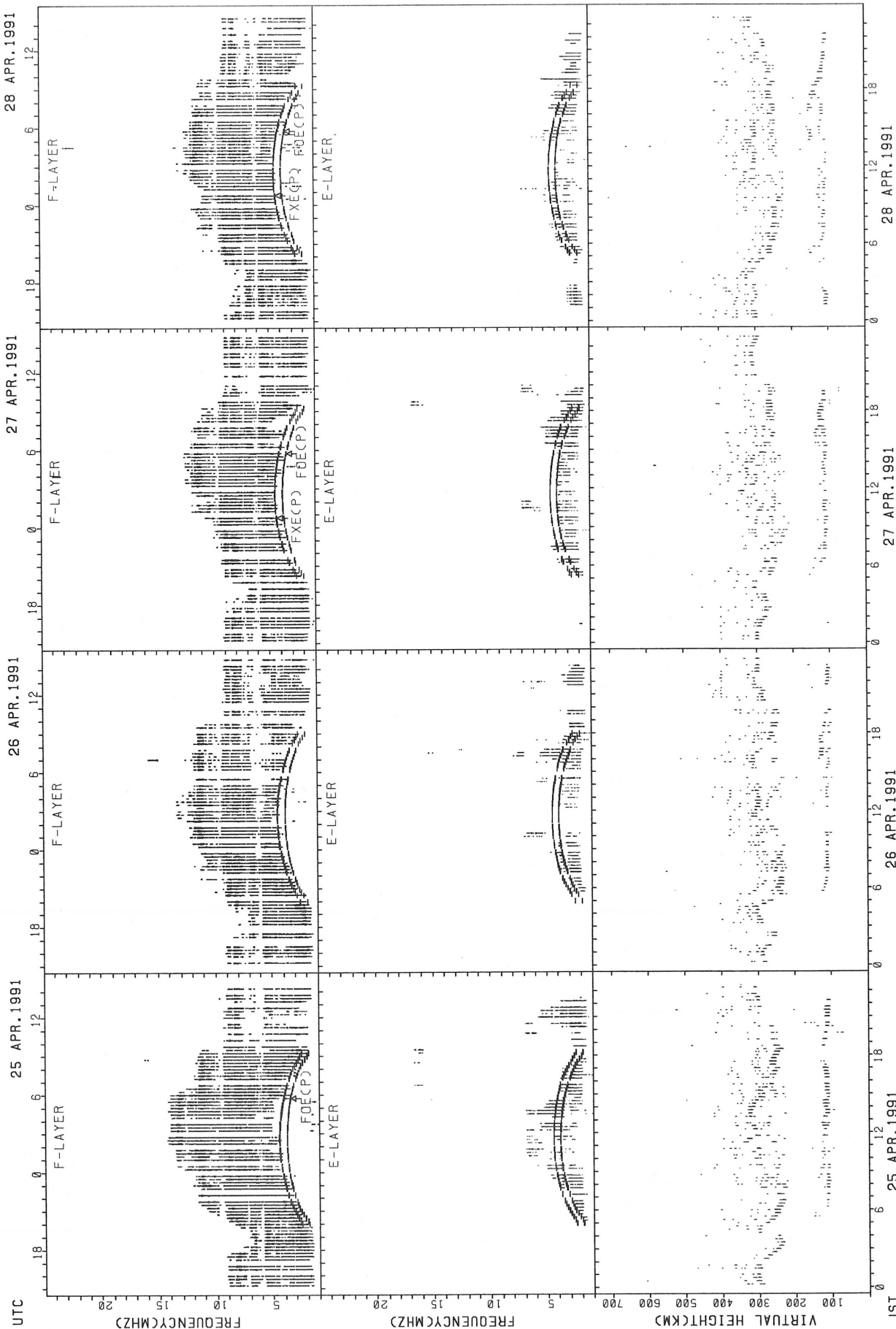
FXECP: PREDICTED VALUE FOR Fx
 FOECP: PREDICTED VALUE FOR F0F2

SUMMARY PLOTS AT AKITA



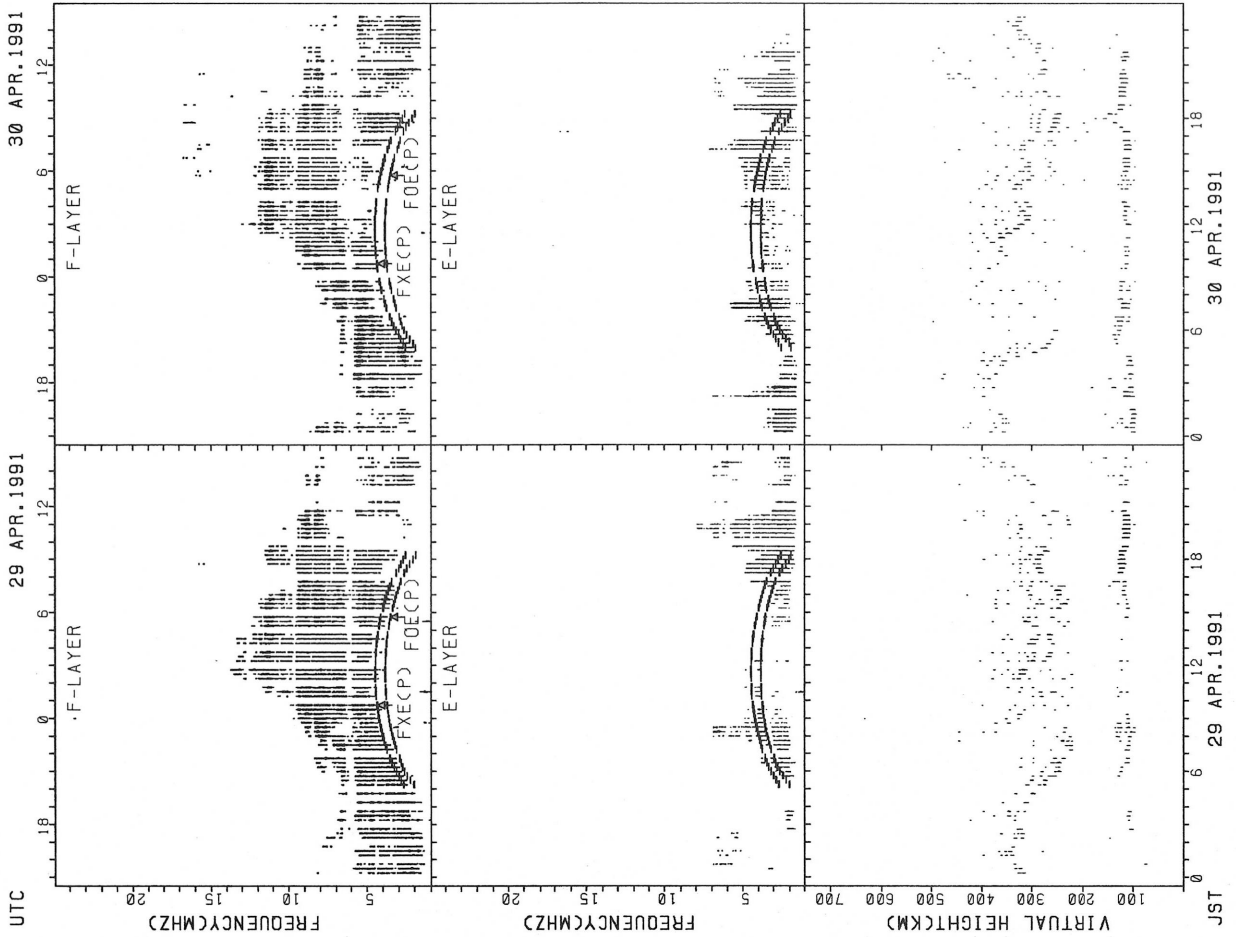
FxÉCP: PREDICTED VALUE FOR FxÉ
 FQÉCP: PREDICTED VALUE FOR FQÉ

SUMMARY PLOTS AT AKITA



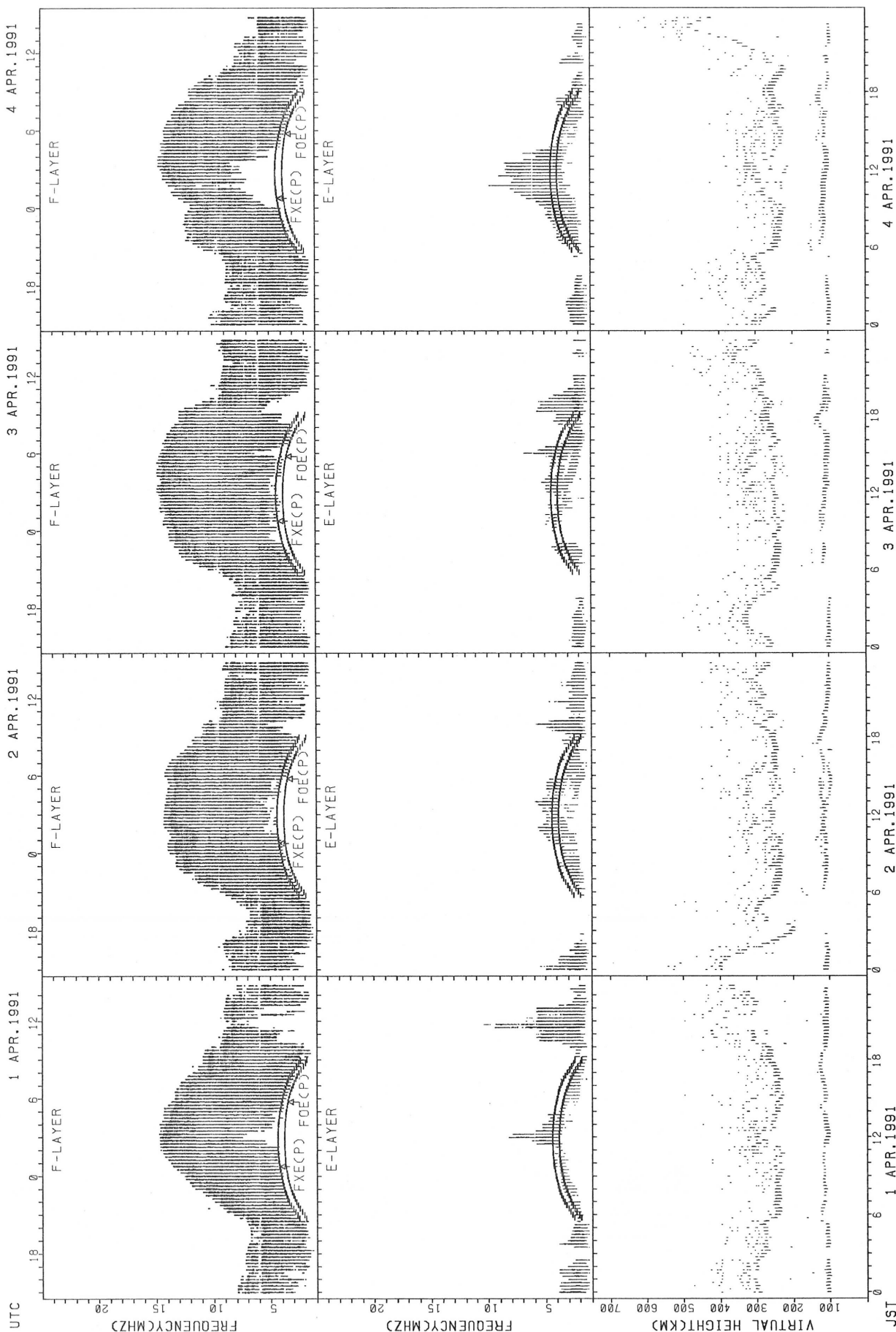
FXECP: PREDICTED VALUE FOR FXE
 FOCeP: PREDICTED VALUE FOR FOC

SUMMARY PLOTS AT AKITA



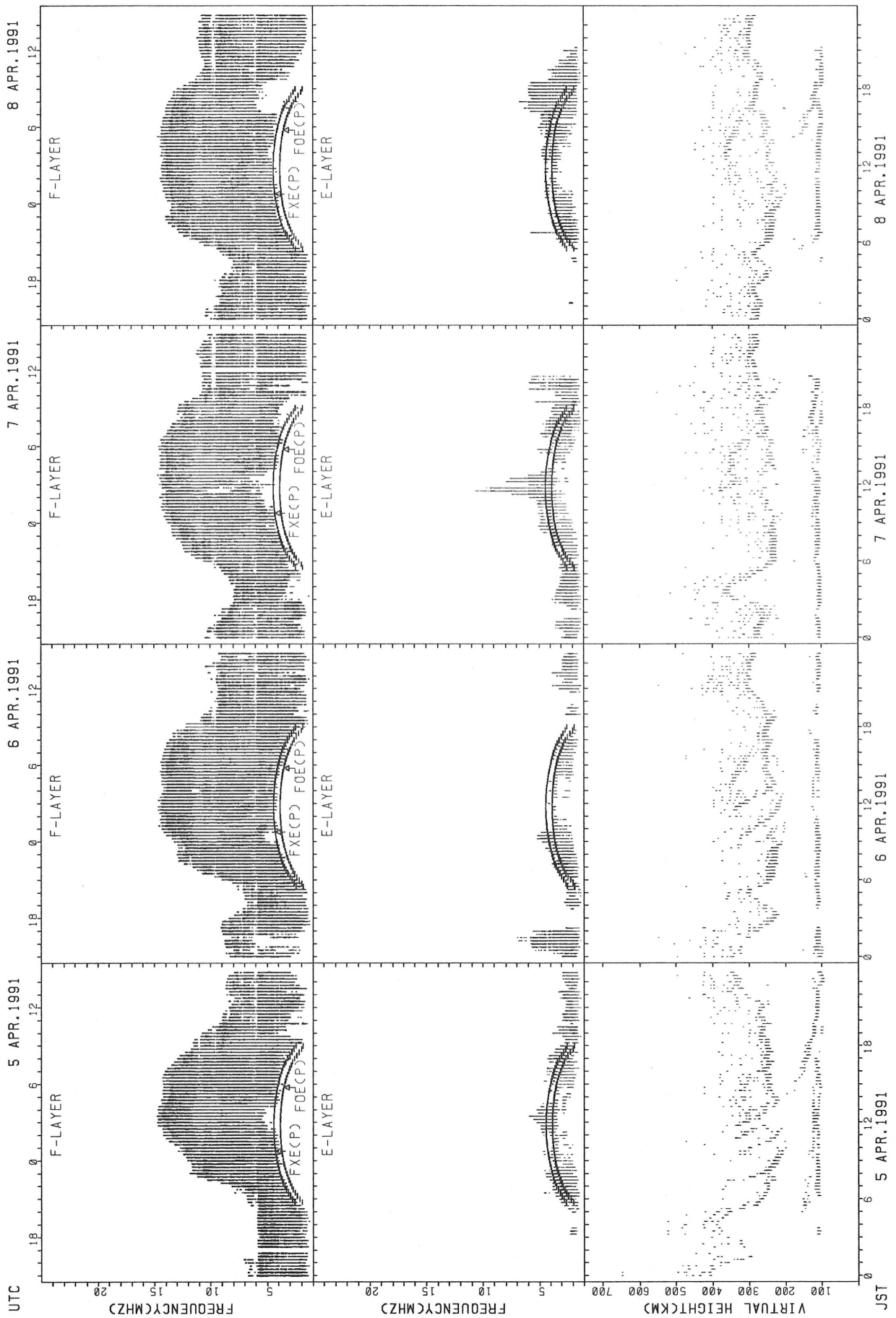
FXECP: PREDICTED VALUE FOR FxE
FOECP: PREDICTED VALUE FOR F0E

SUMMARY PLOTS AT KOKUBUNJI TOKYO



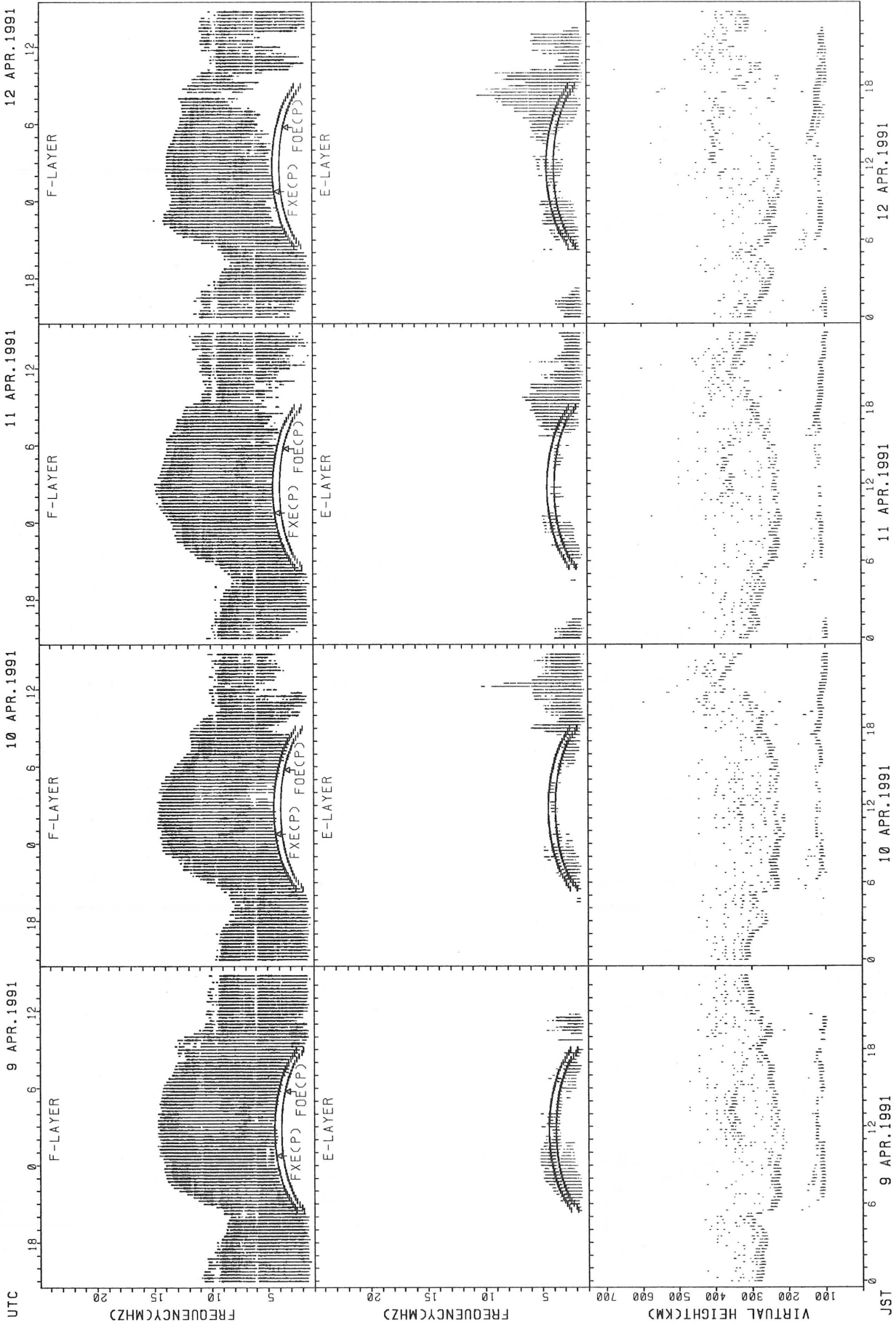
FXECP: PREDICTED VALUE FOR Fx
 FOECP: PREDICTED VALUE FOR Fmin

SUMMARY PLOTS AT KOKUBUNJI TOKYO



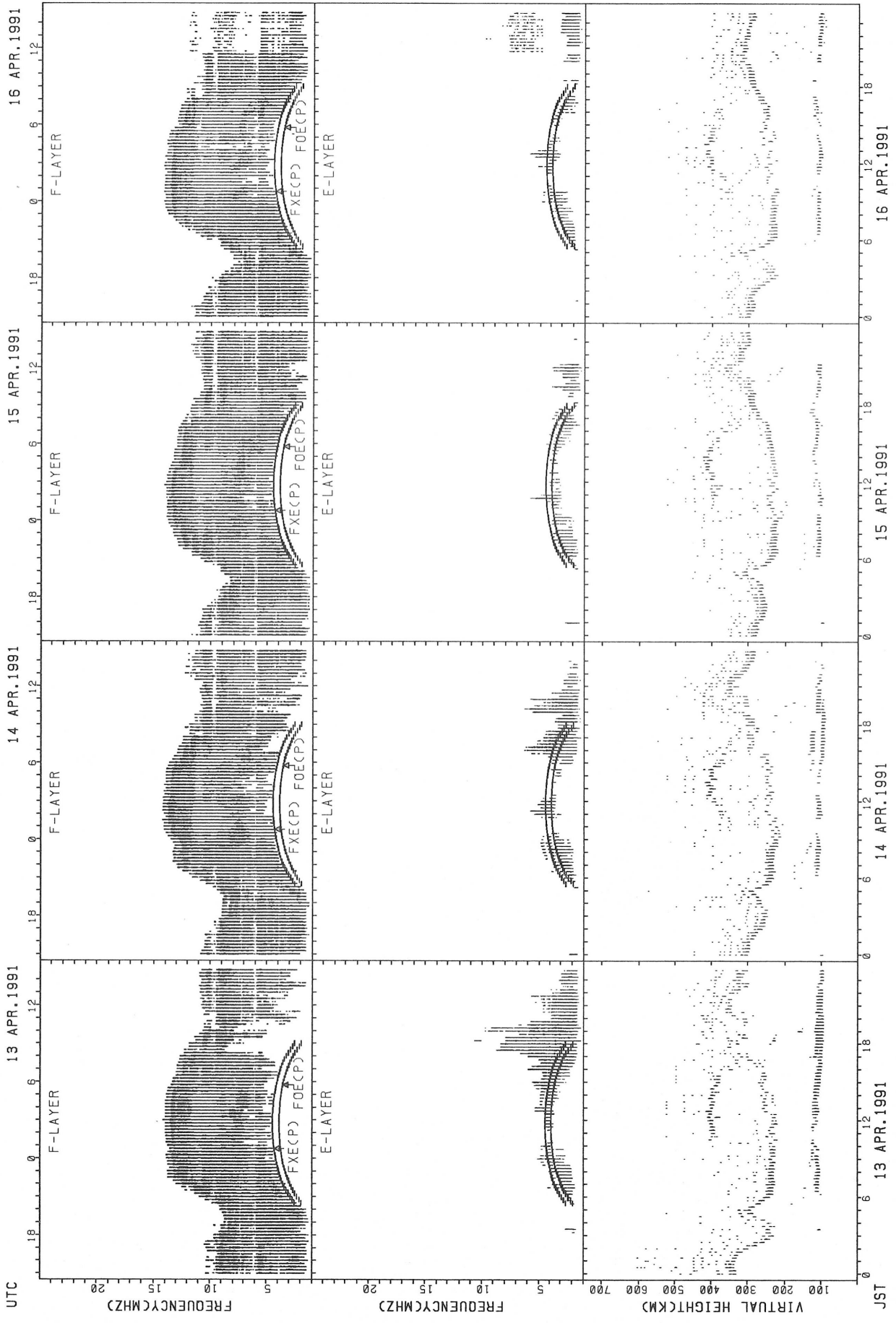
FXECP: PREDICTED VALUE FOR FXE
 FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



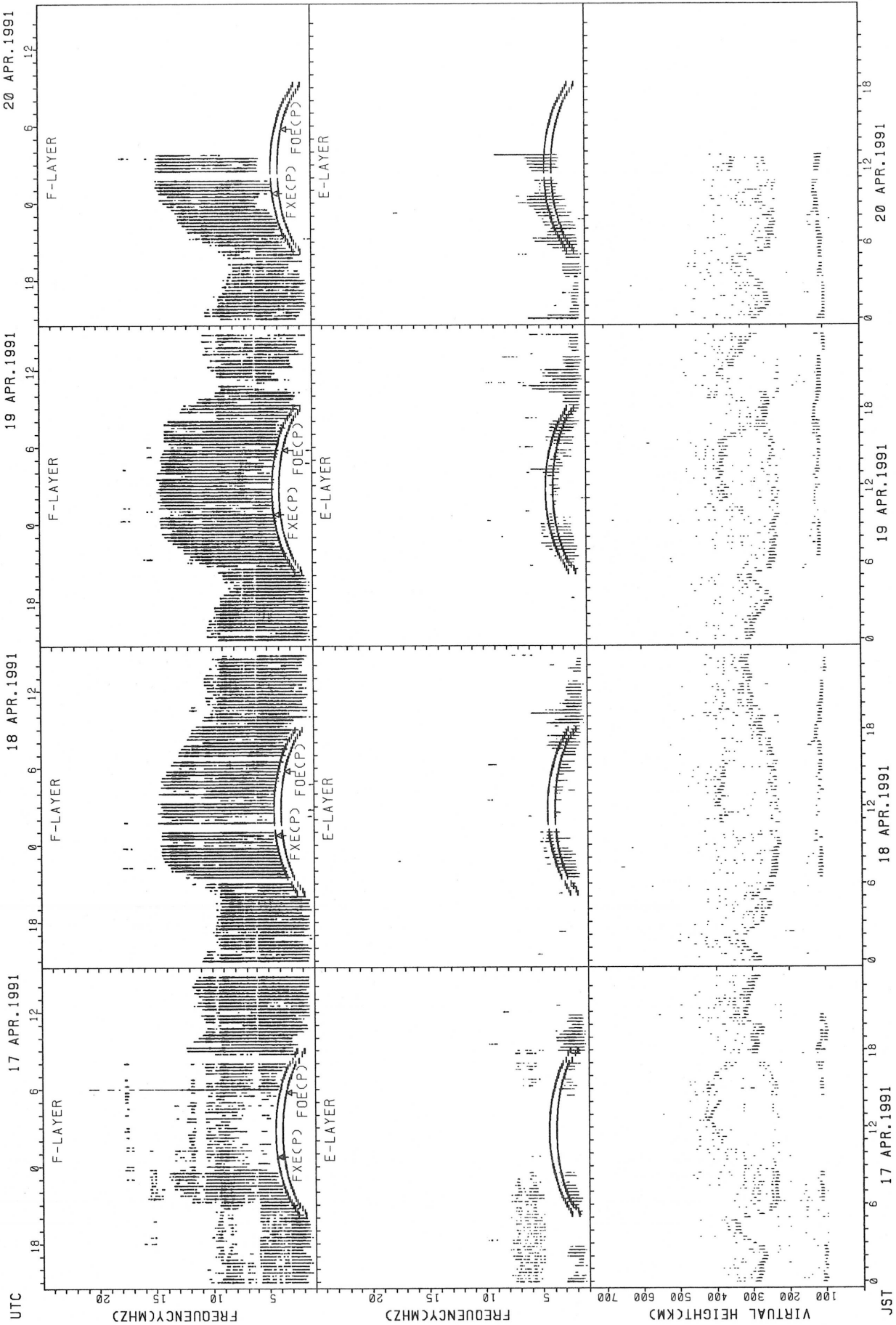
FXECP: PREDICTED VALUE FOR F_{XE}
 FOECP: PREDICTED VALUE FOR F_O

SUMMARY PLOTS AT KOKUBUNJI TOKYO



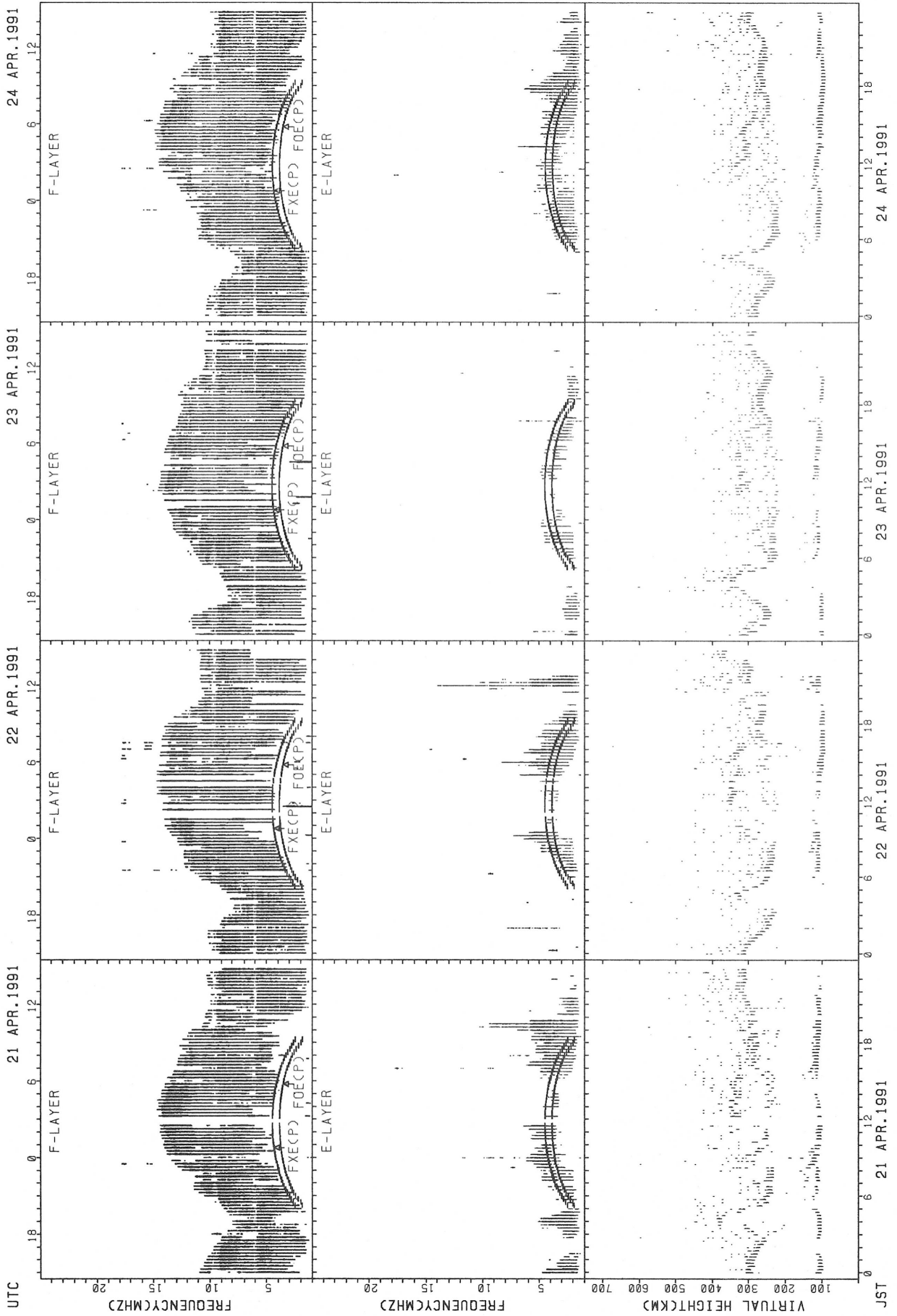
FXECP: PREDICTED VALUE FOR F₂
 FOECP: PREDICTED VALUE FOR F_oE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



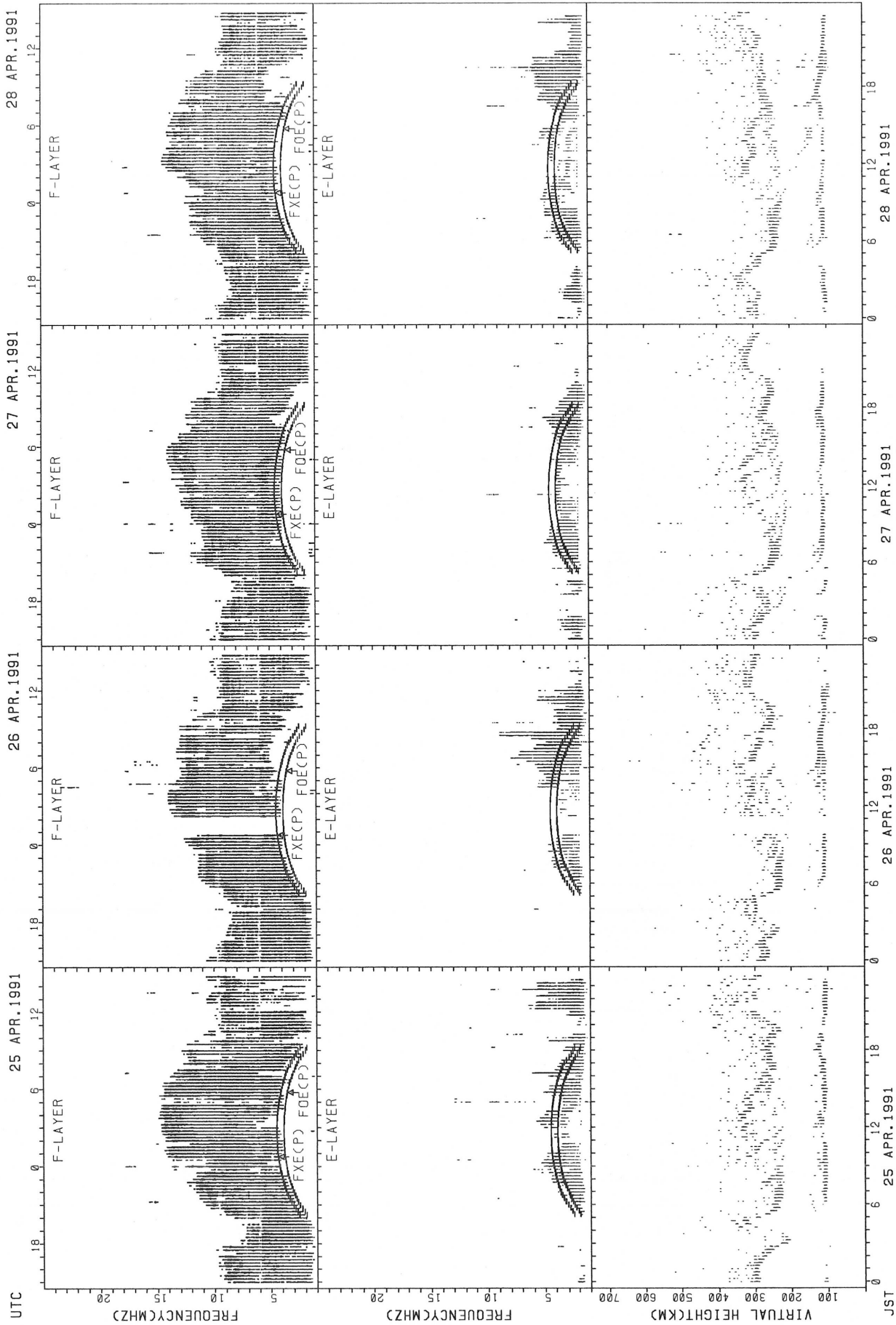
FXECP: PREDICTED VALUE FOR F_{XE}
FOECP: PREDICTED VALUE FOR F_OE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



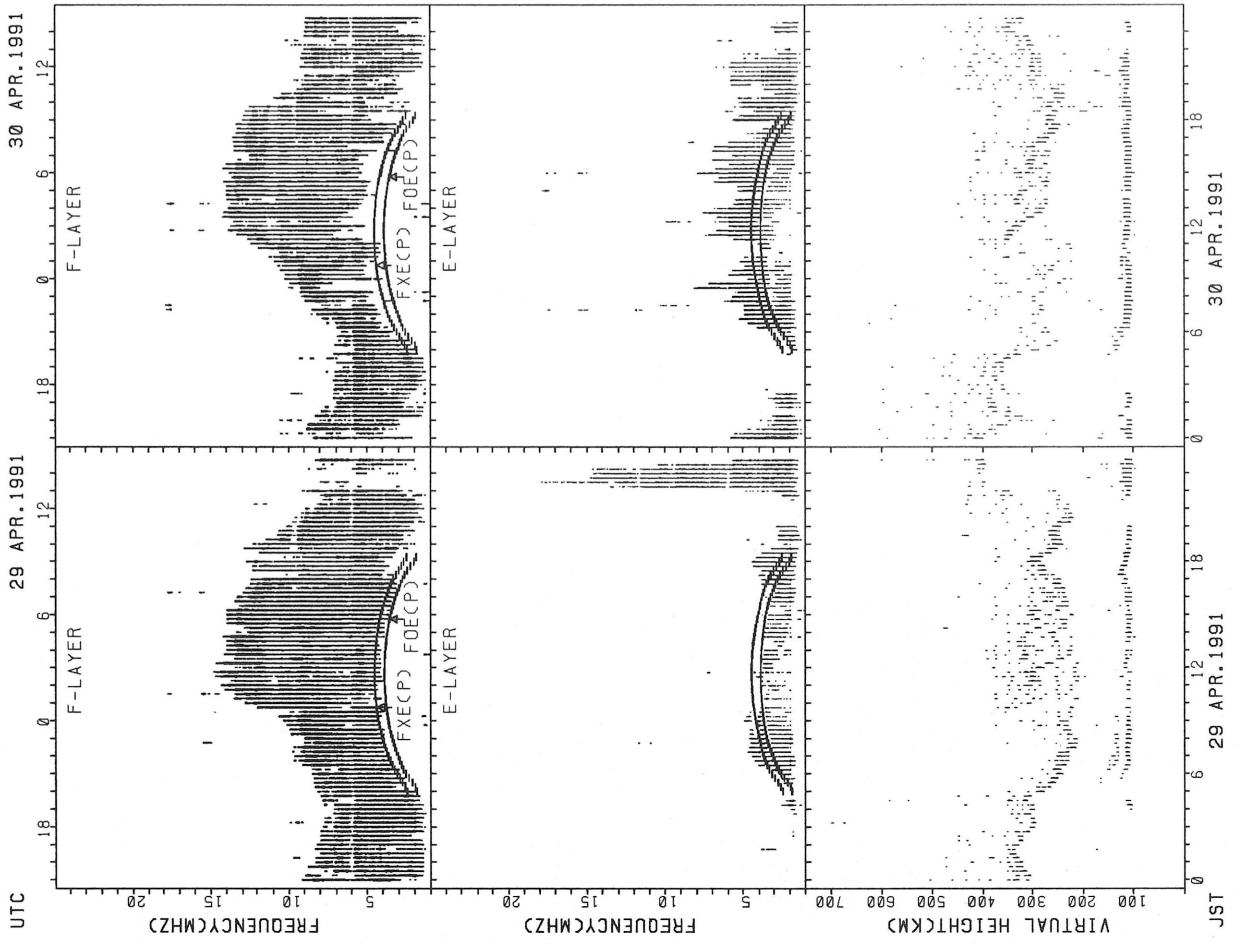
FXECP; PREDICTED VALUE FOR FXE
 FOECP; PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



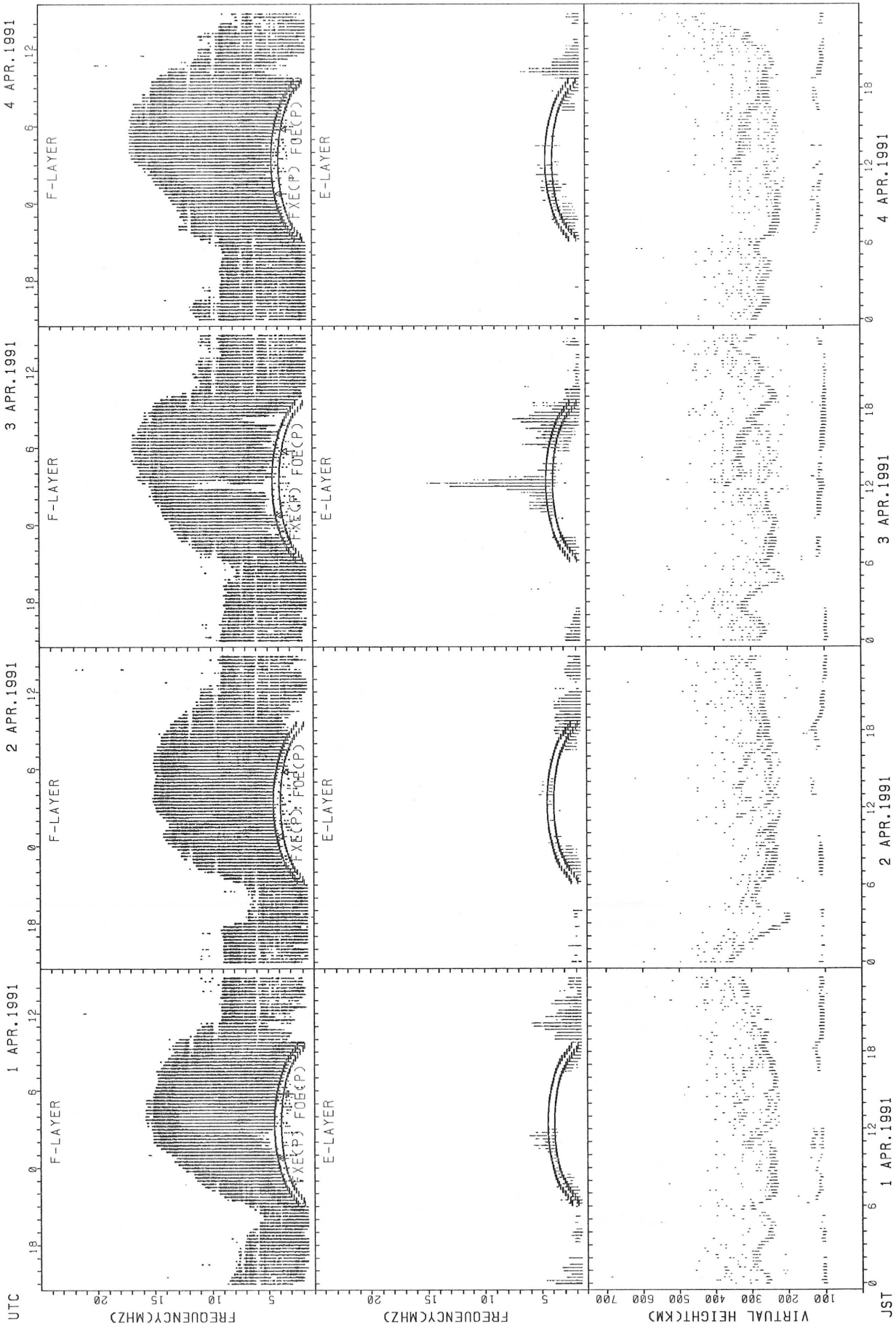
FXE(P): PREDICTED VALUE FOR FXE
FOE(P): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT KOKUBUNJI TOKYO



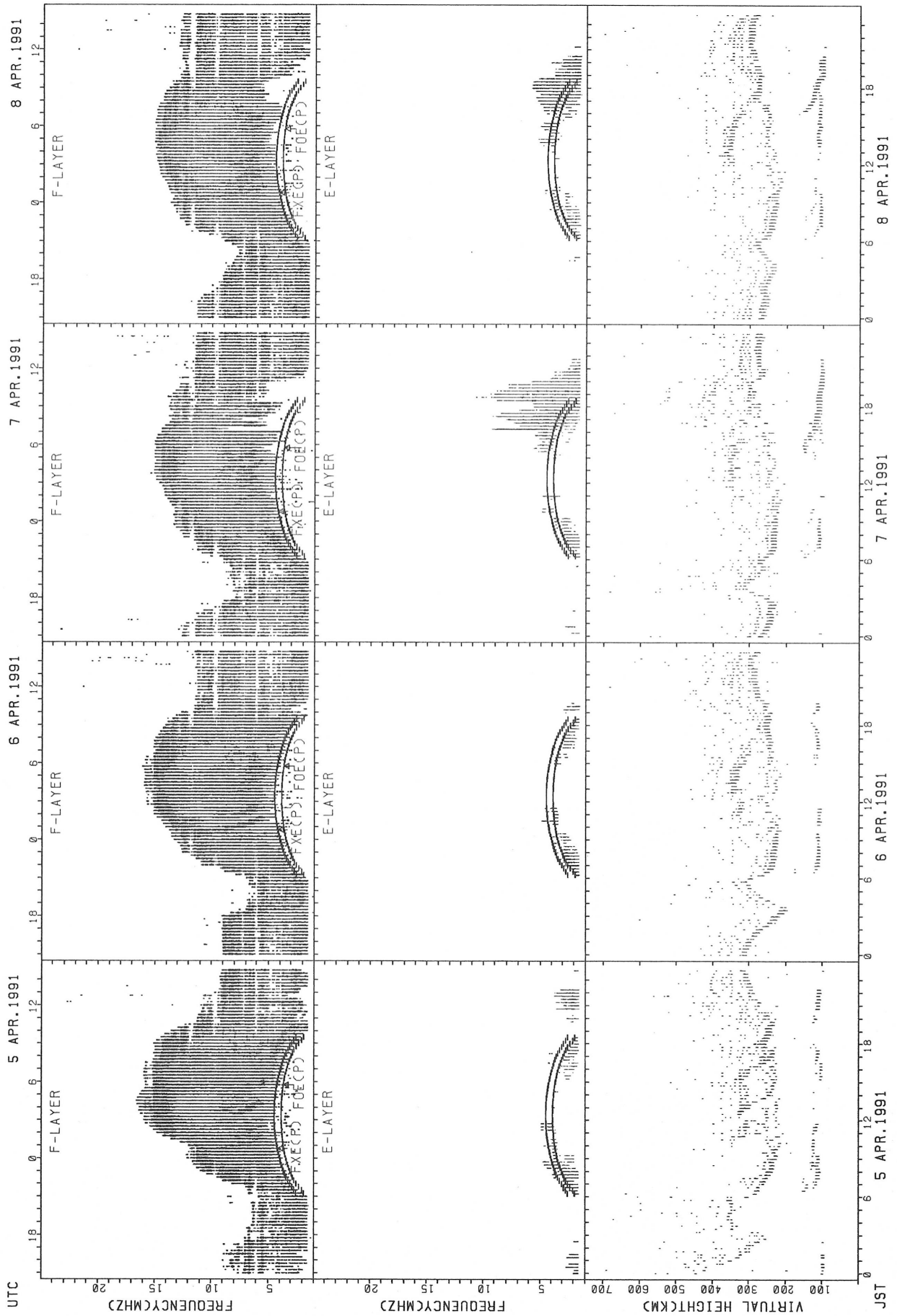
FXECP): PREDICTED VALUE FOR FXE
FOECP): PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



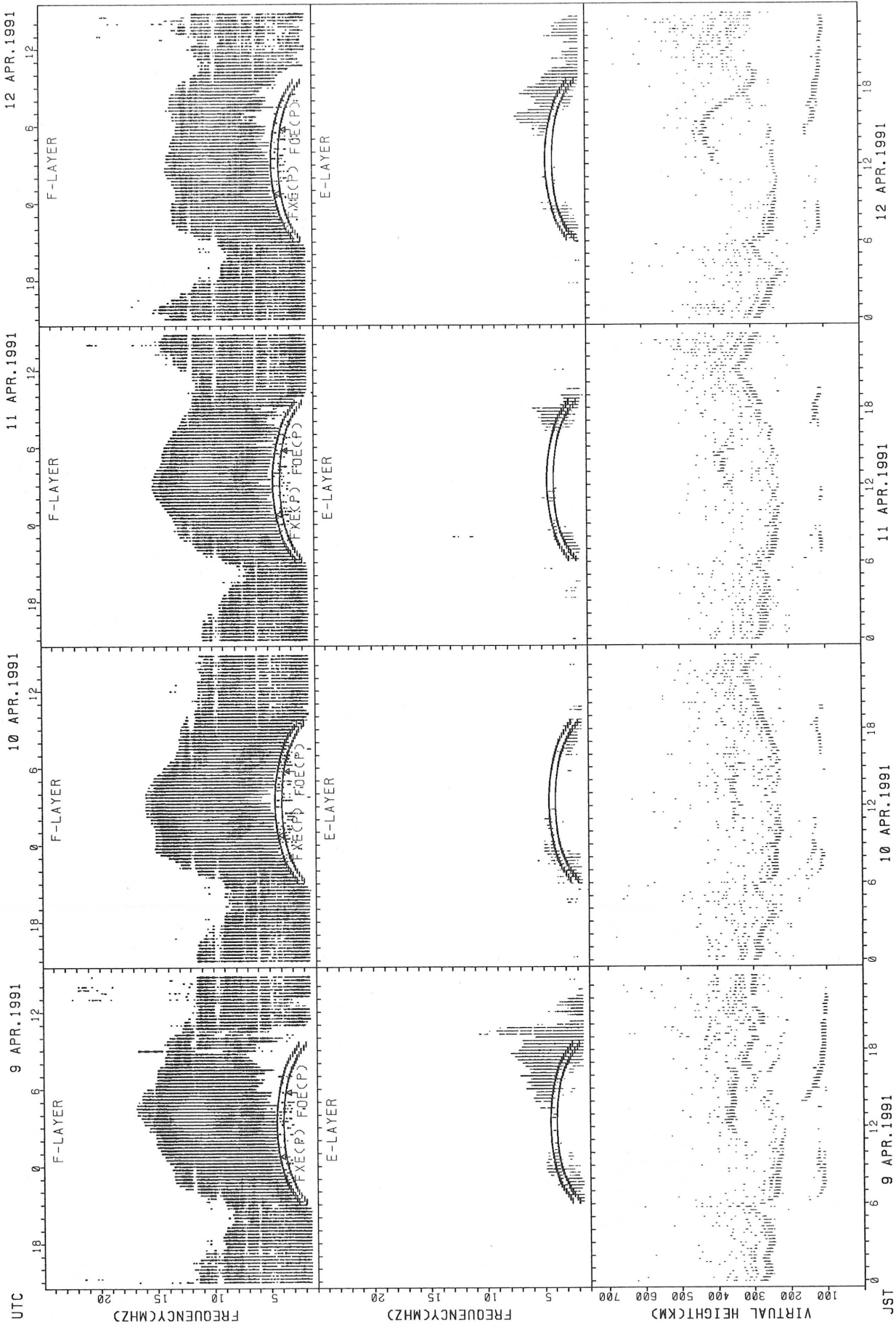
FXE(P); PREDICTED VALUE FOR FXE
 FOE(P); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



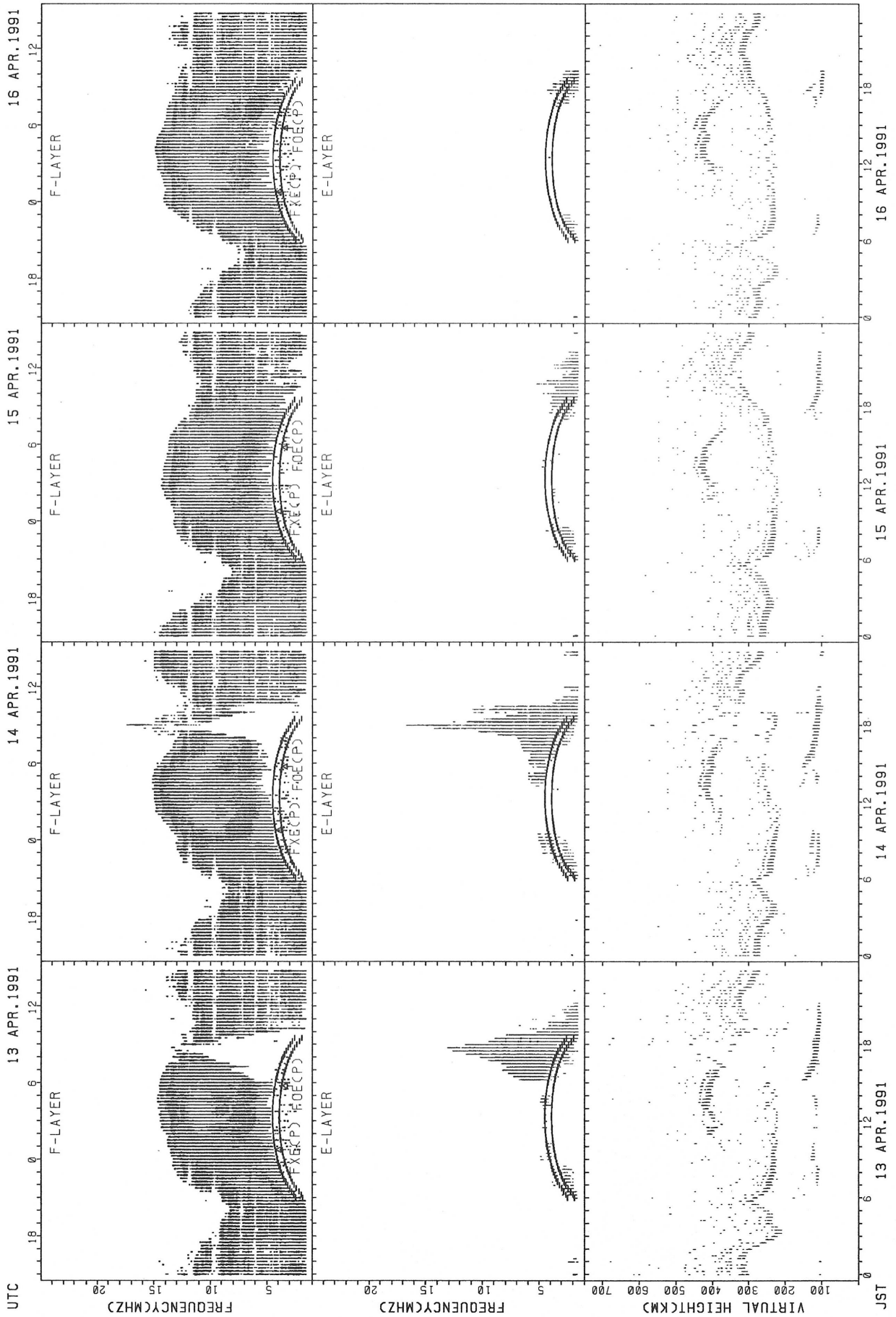
F0F2(P): PREDICTED VALUE FOR F2
 F0E(P): PREDICTED VALUE FOR E

SUMMARY PLOTS AT YAMAGAWA



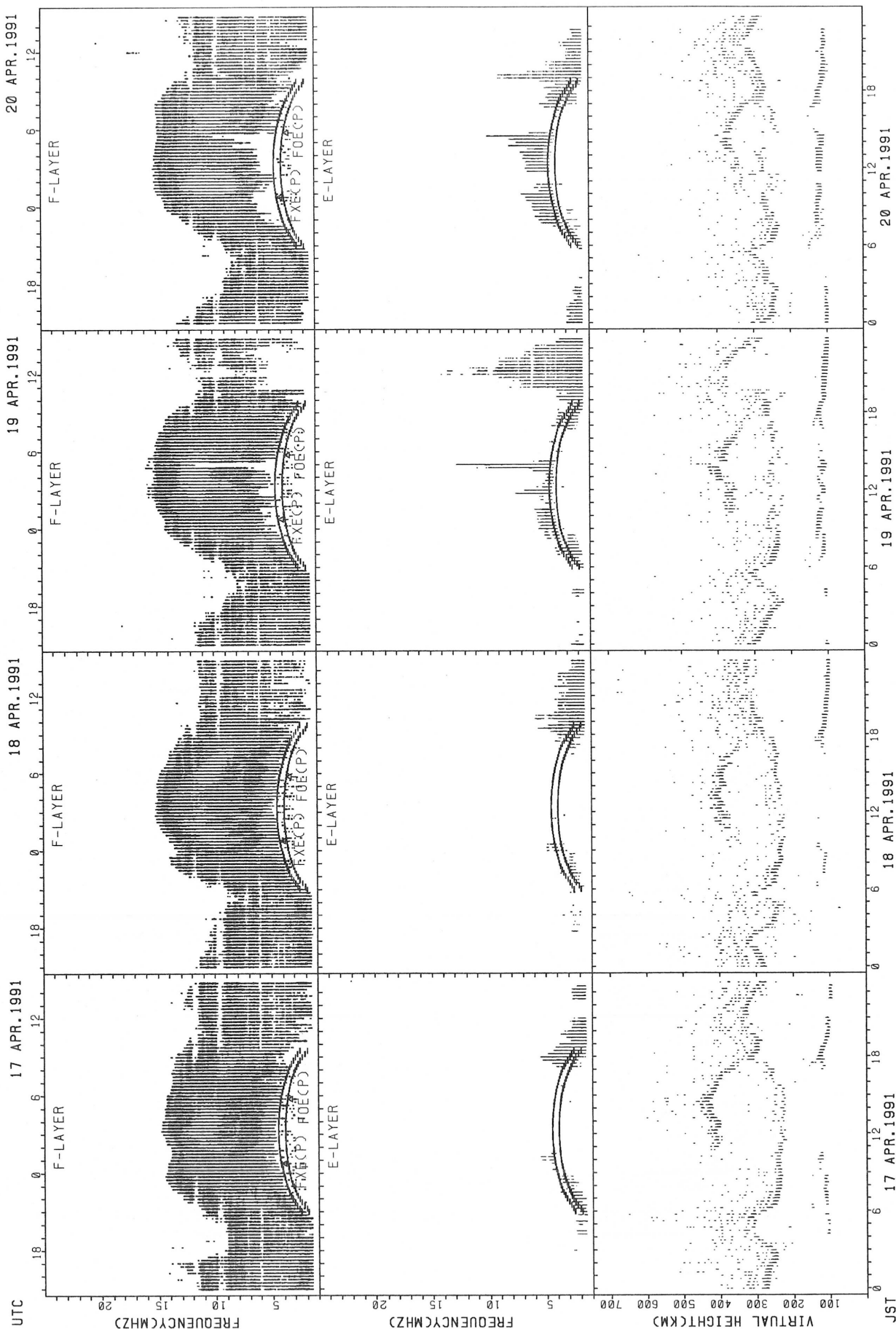
FXECP; PREDICTED VALUE FOR FXE
FOECP; PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



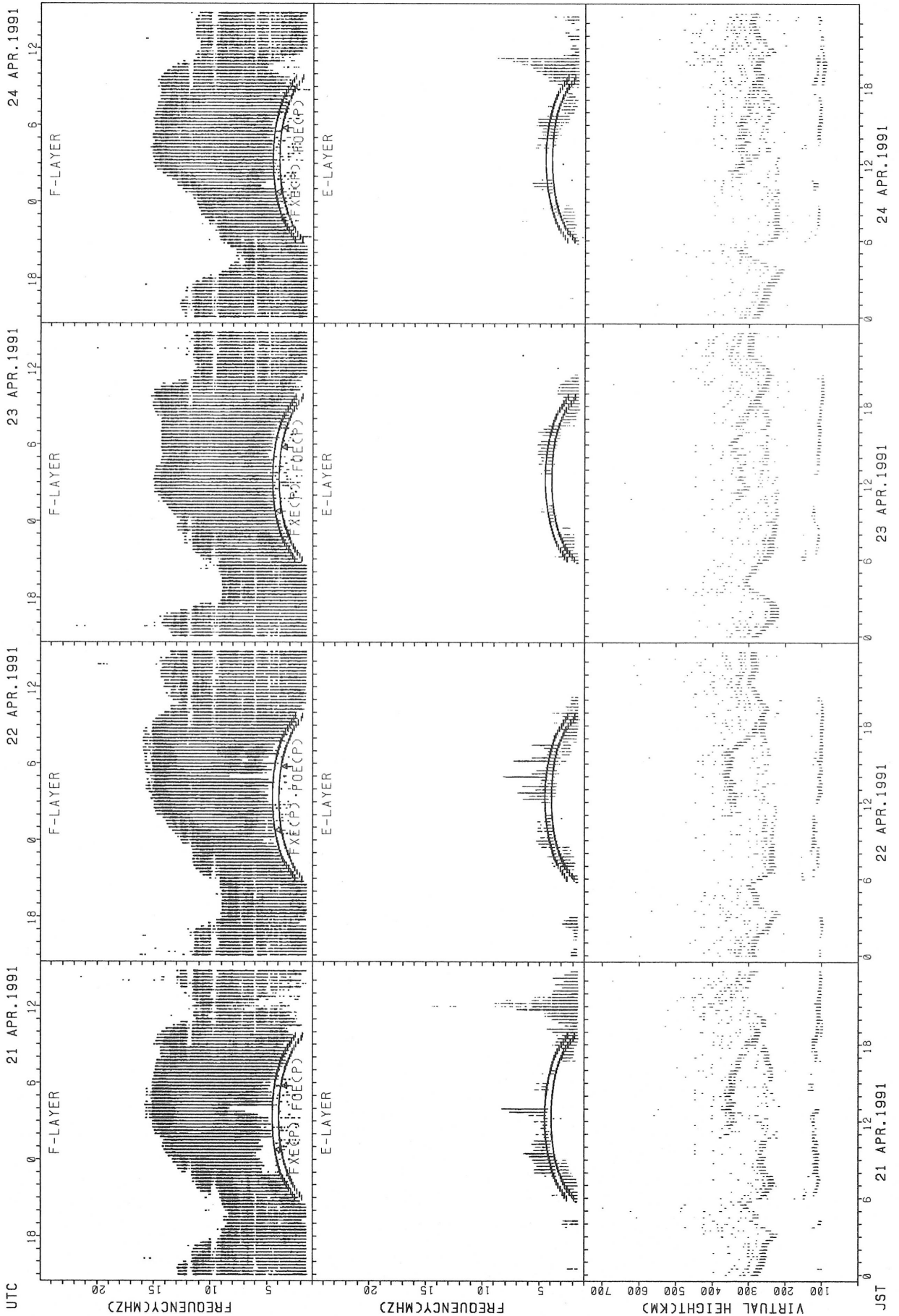
FXECP) PREDICTED VALUE FOR FXE
FOECP) PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



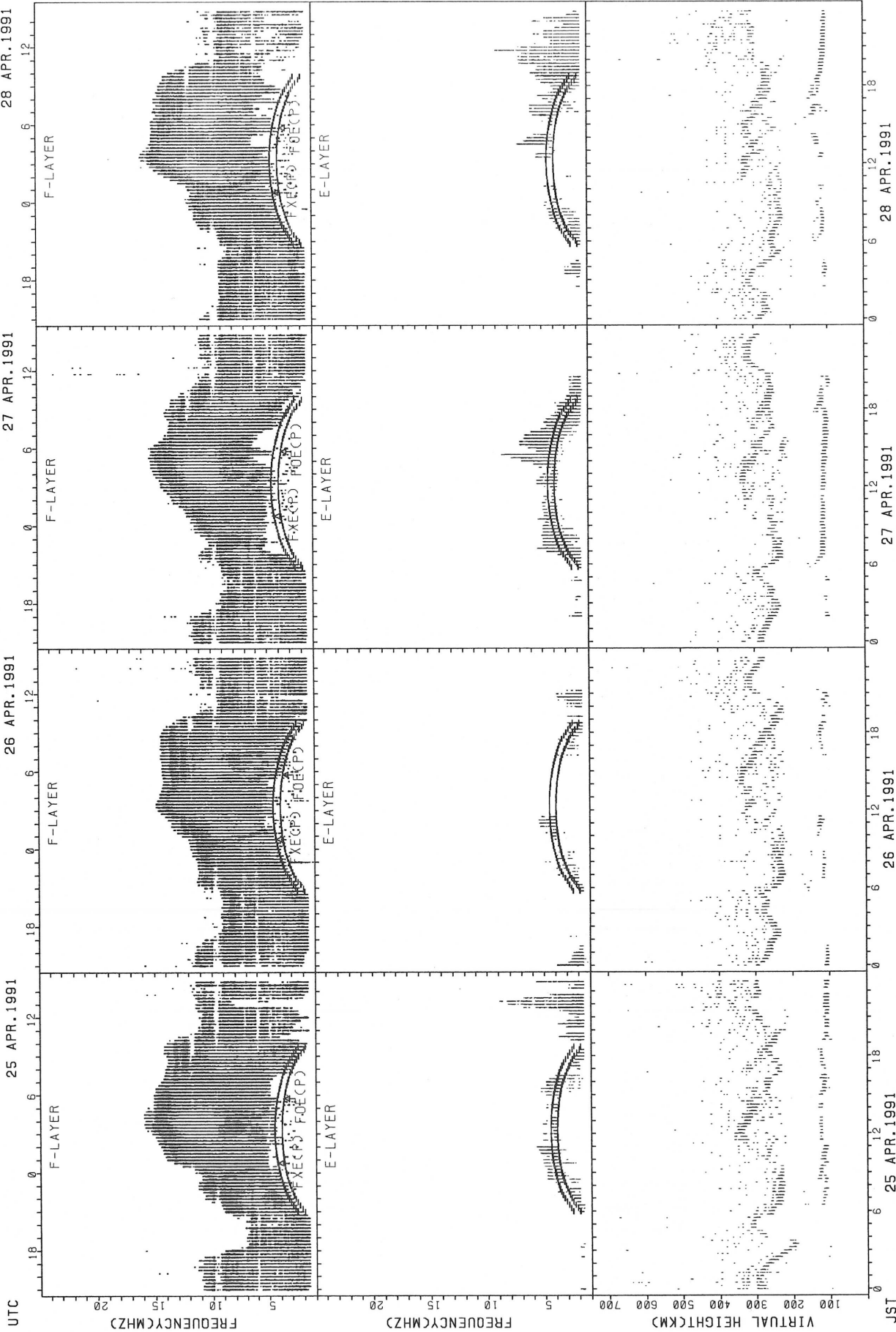
FXECP: PREDICTED VALUE FOR Fx
FOECP: PREDICTED VALUE FOR Fy

SUMMARY PLOTS AT YAMAGAWA



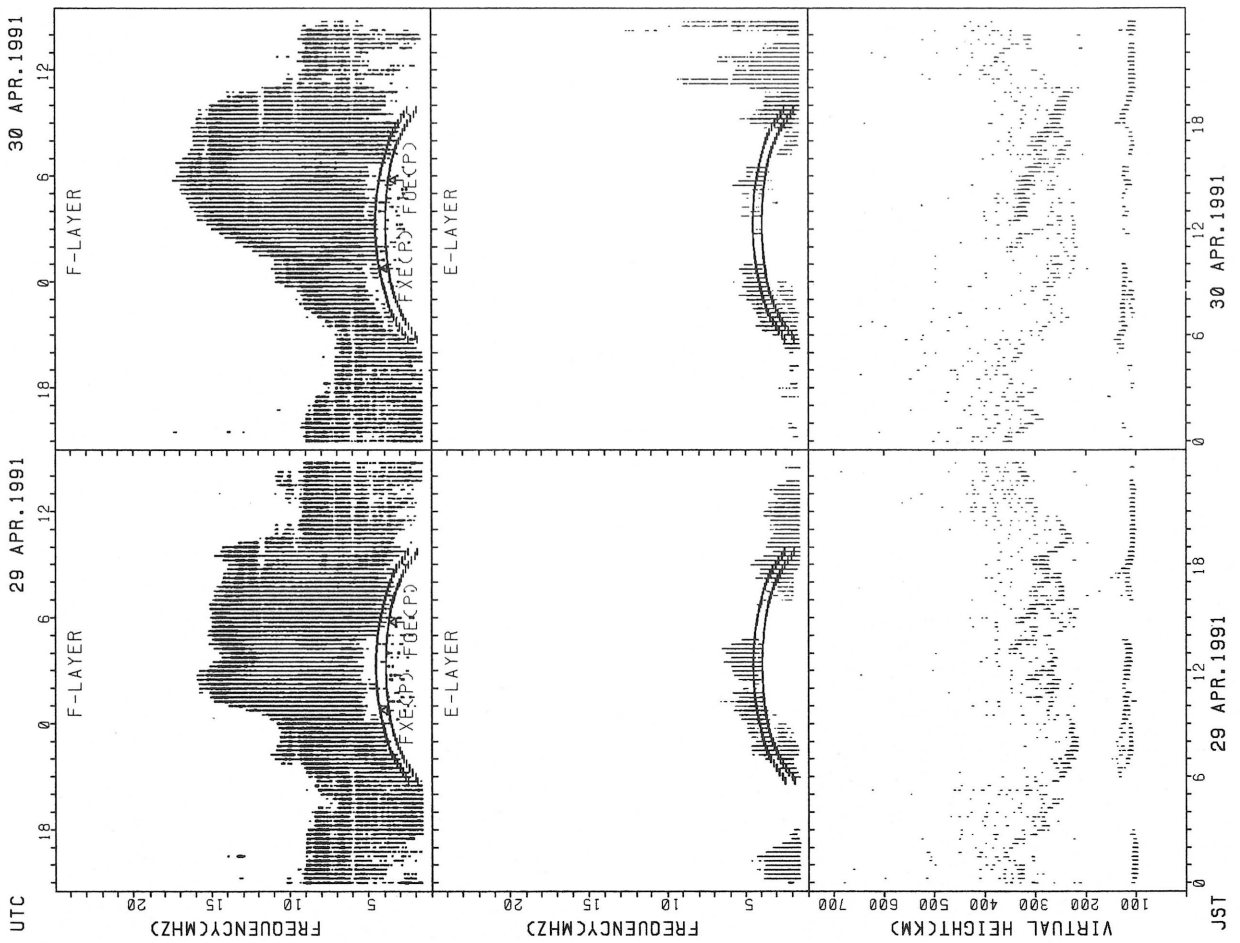
FXECP: PREDICTED VALUE FOR FXE
FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



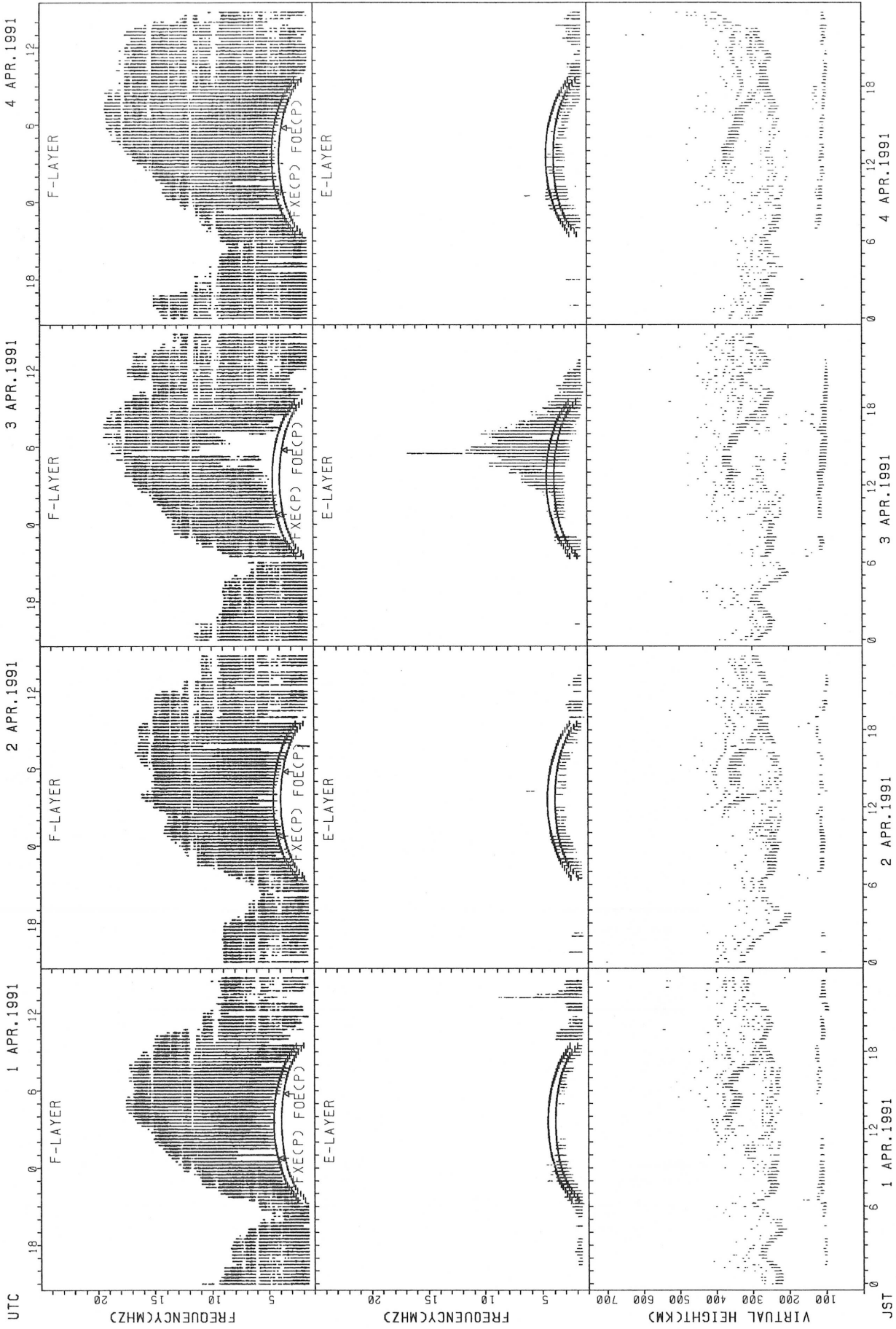
FXECP: PREDICTED VALUE FOR Fx
FOECP: PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT YAMAGAWA



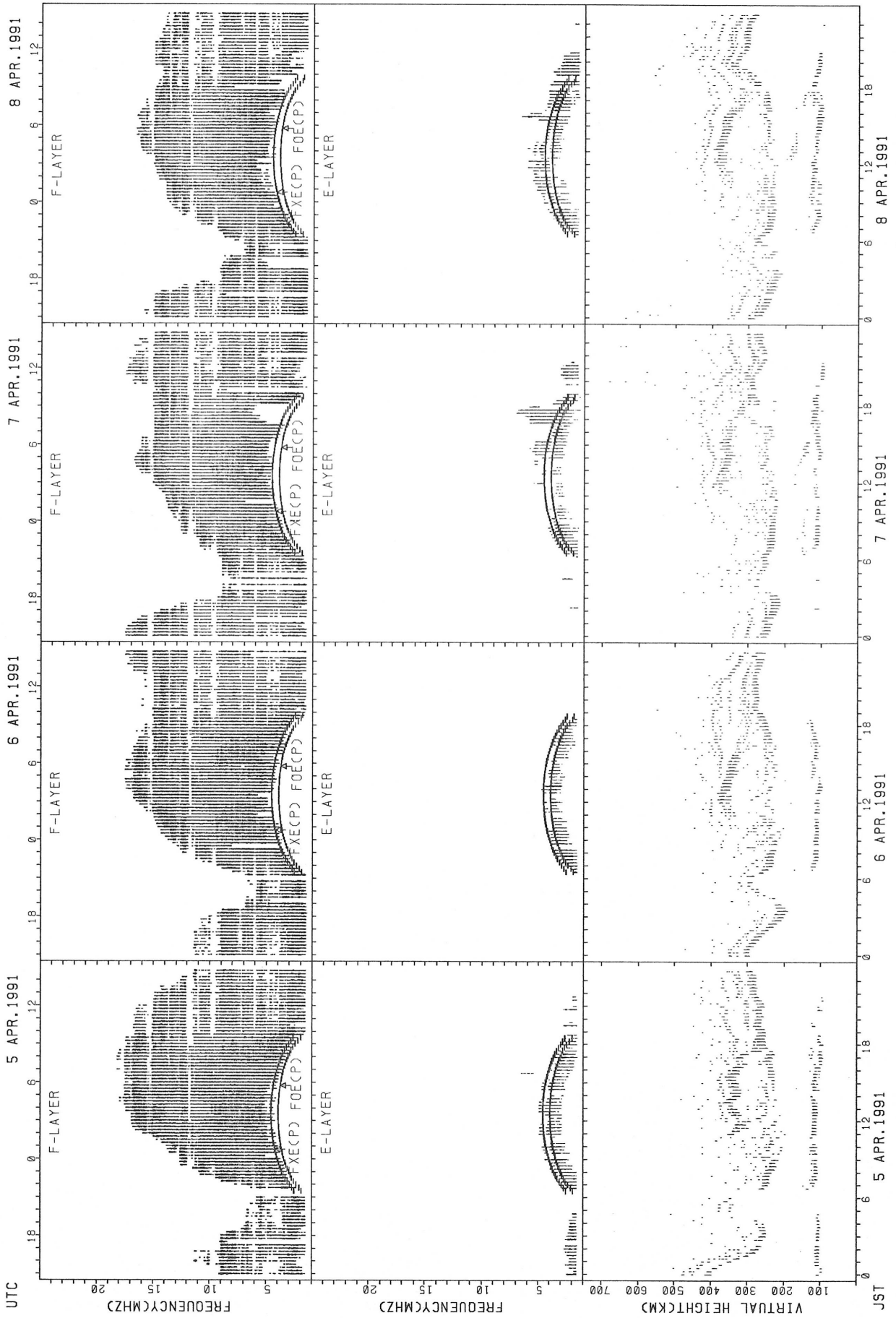
FX(FCP); PREDICTED VALUE FOR FXE
FOE(FCP); PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



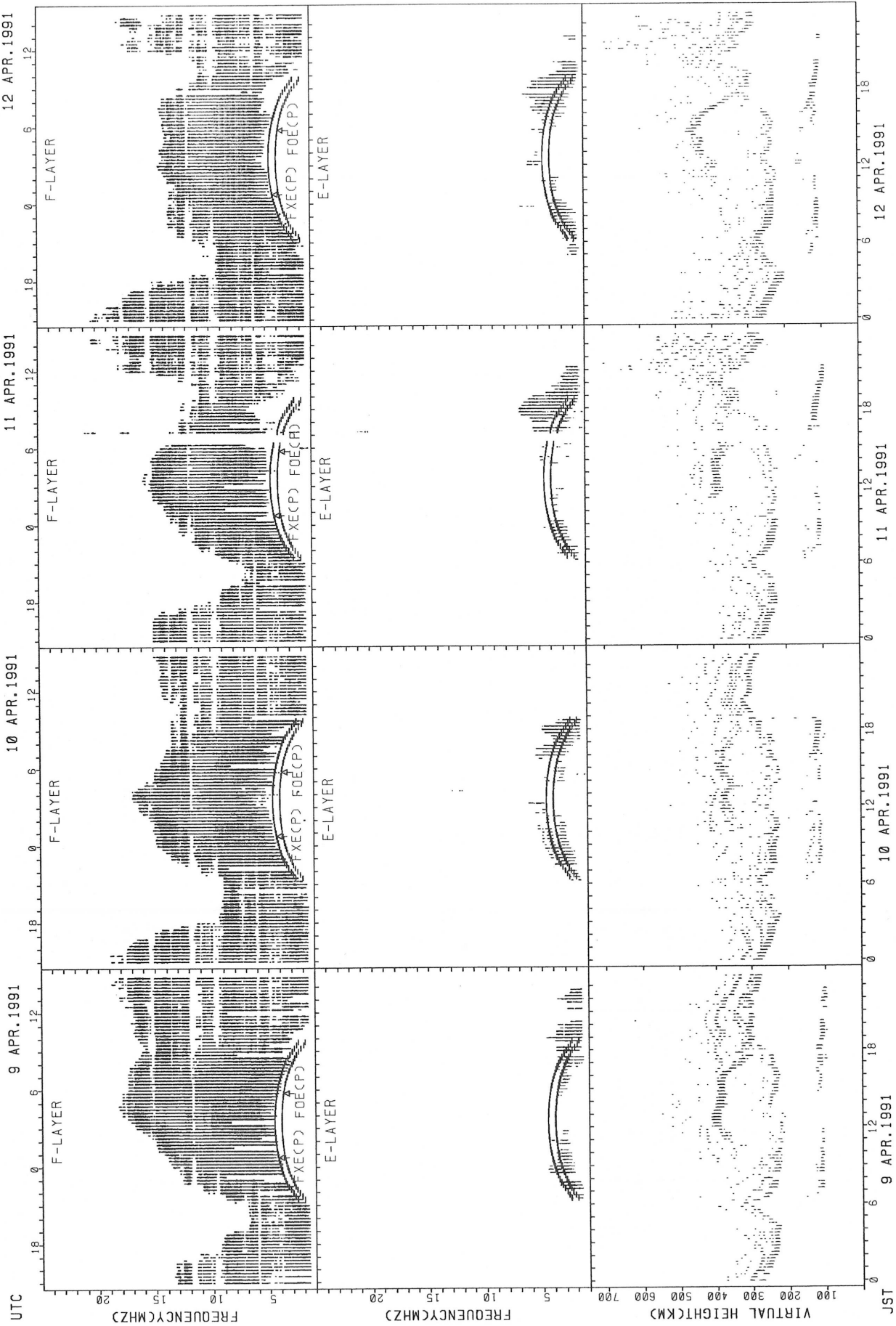
FXECP: PREDICTED VALUE FOR FXE
FOCPC: PREDICTED VALUE FOR FOC

SUMMARY PLOTS AT OKINAWA



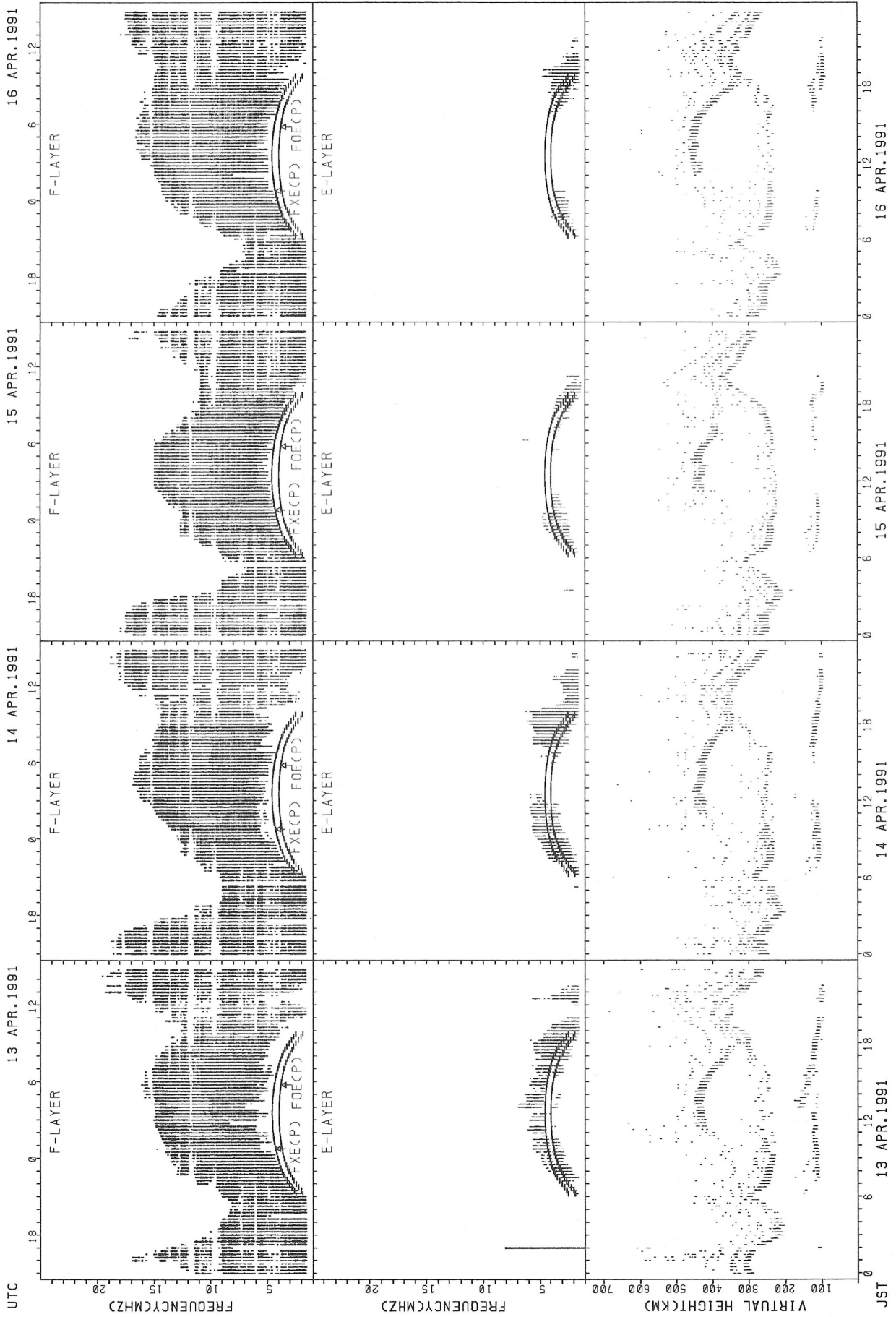
FXECP); PREDICTED VALUE FOR FXE
FOCPC); PREDICTED VALUE FOR FOC

SUMMARY PLOTS AT OKINAWA



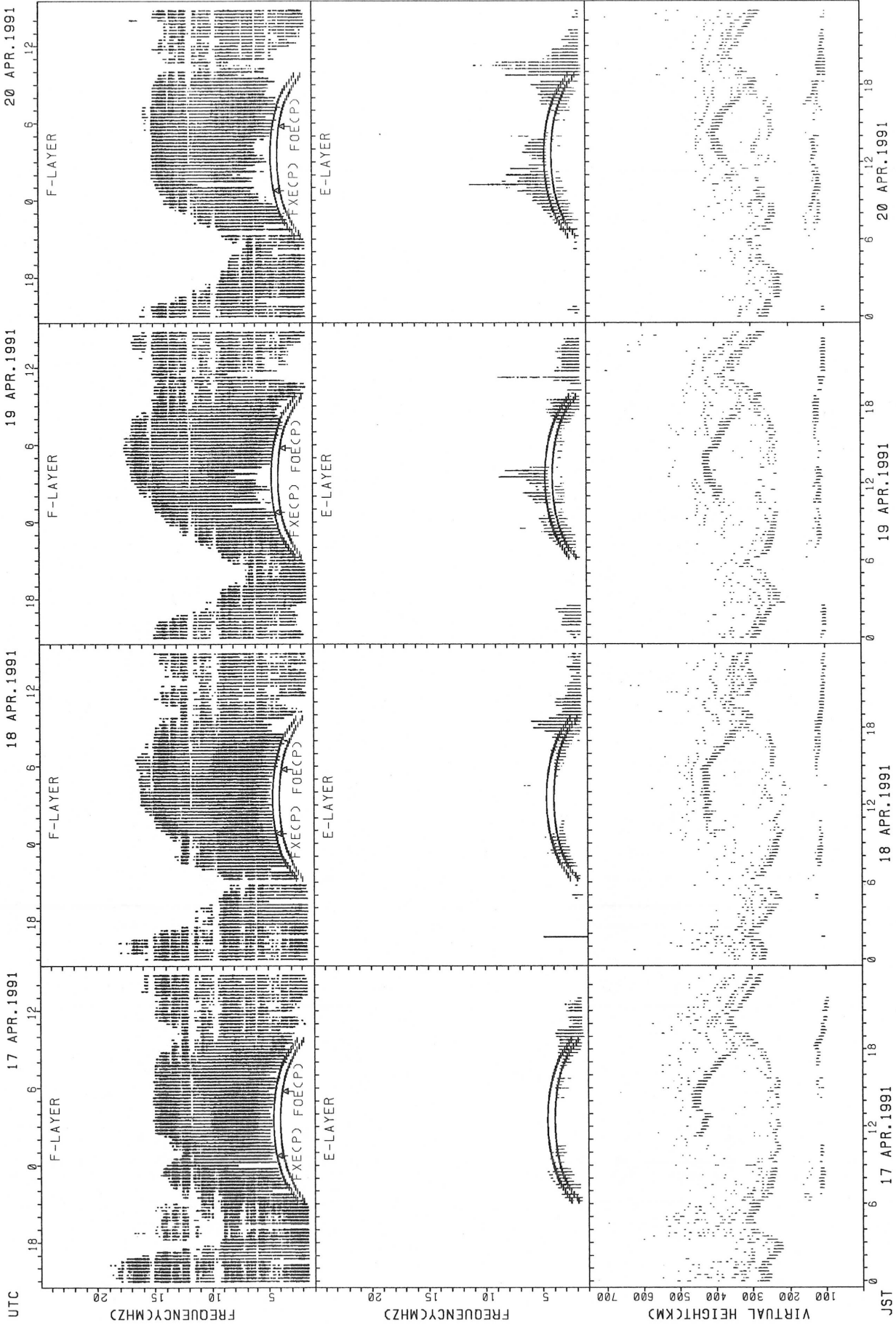
FXECP: PREDICTED VALUE FOR F
FOECP: PREDICTED VALUE FOR E

SUMMARY PLOTS AT OKINAWA



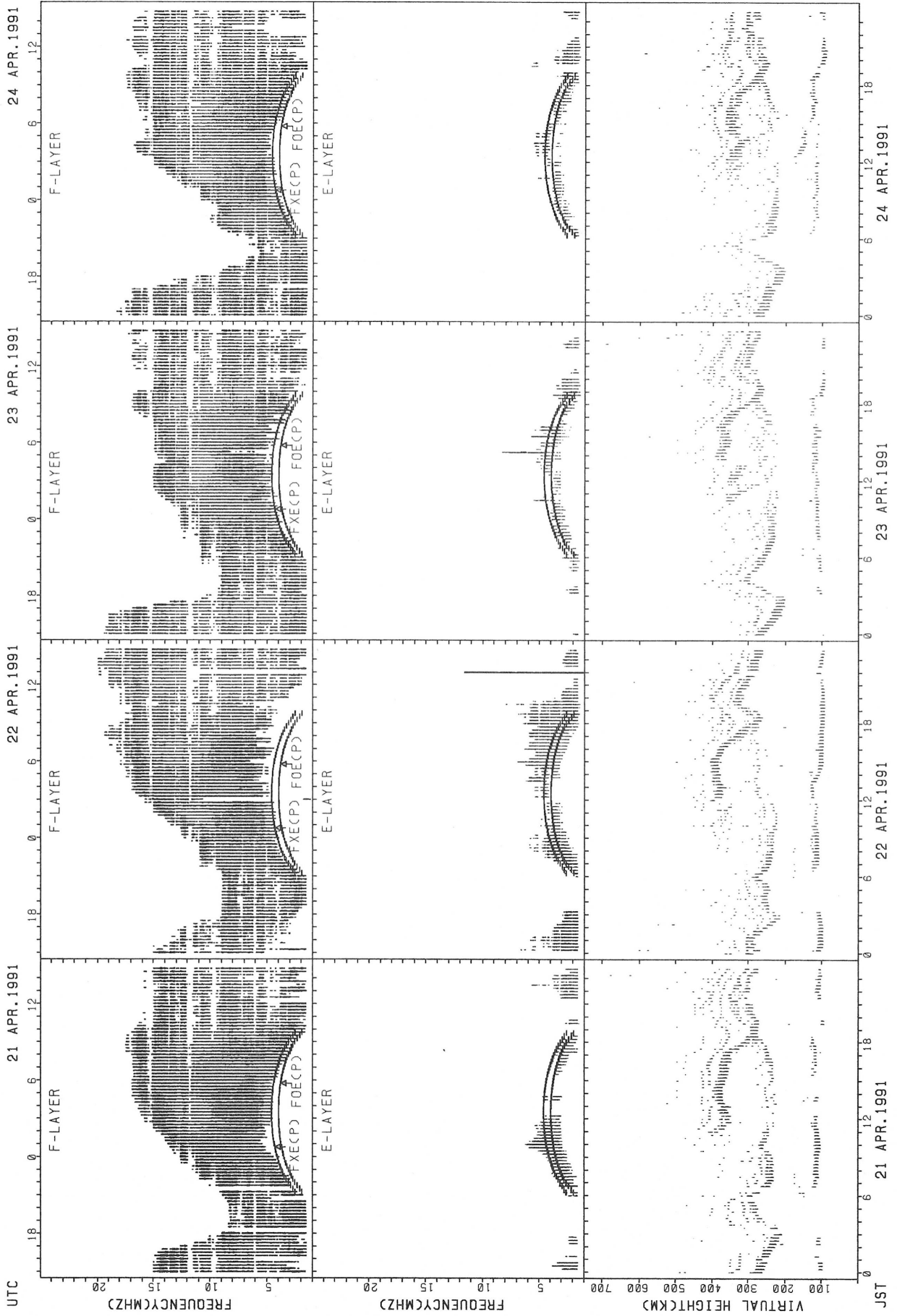
FXECP: PREDICTED VALUE FOR F_{XE}
 FOECP: PREDICTED VALUE FOR F_O

SUMMARY PLOTS AT OKINAWA



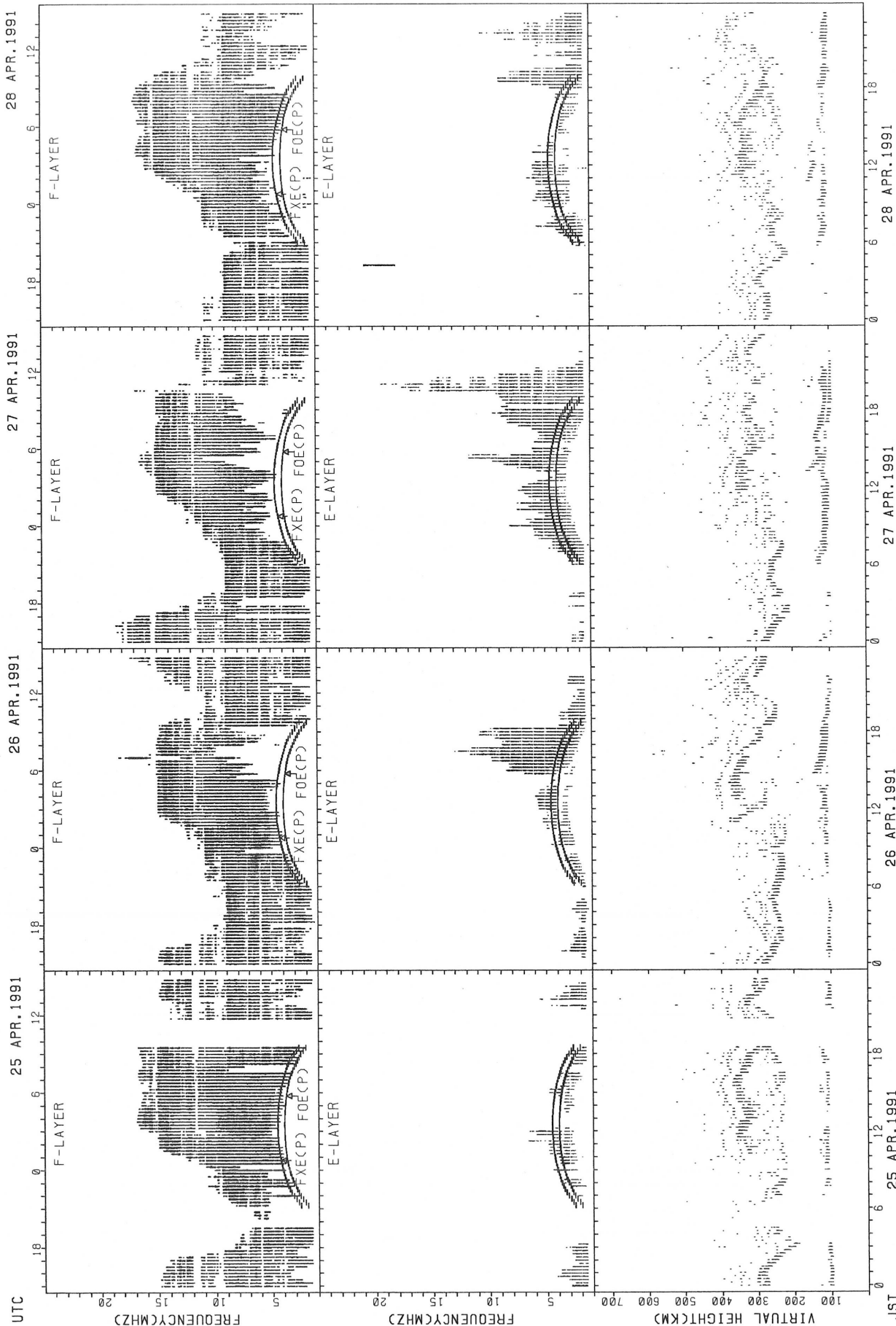
FXECP: PREDICTED VALUE FOR Fx
 FOECP: PREDICTED VALUE FOR F0E

SUMMARY PLOTS AT OKINAWA



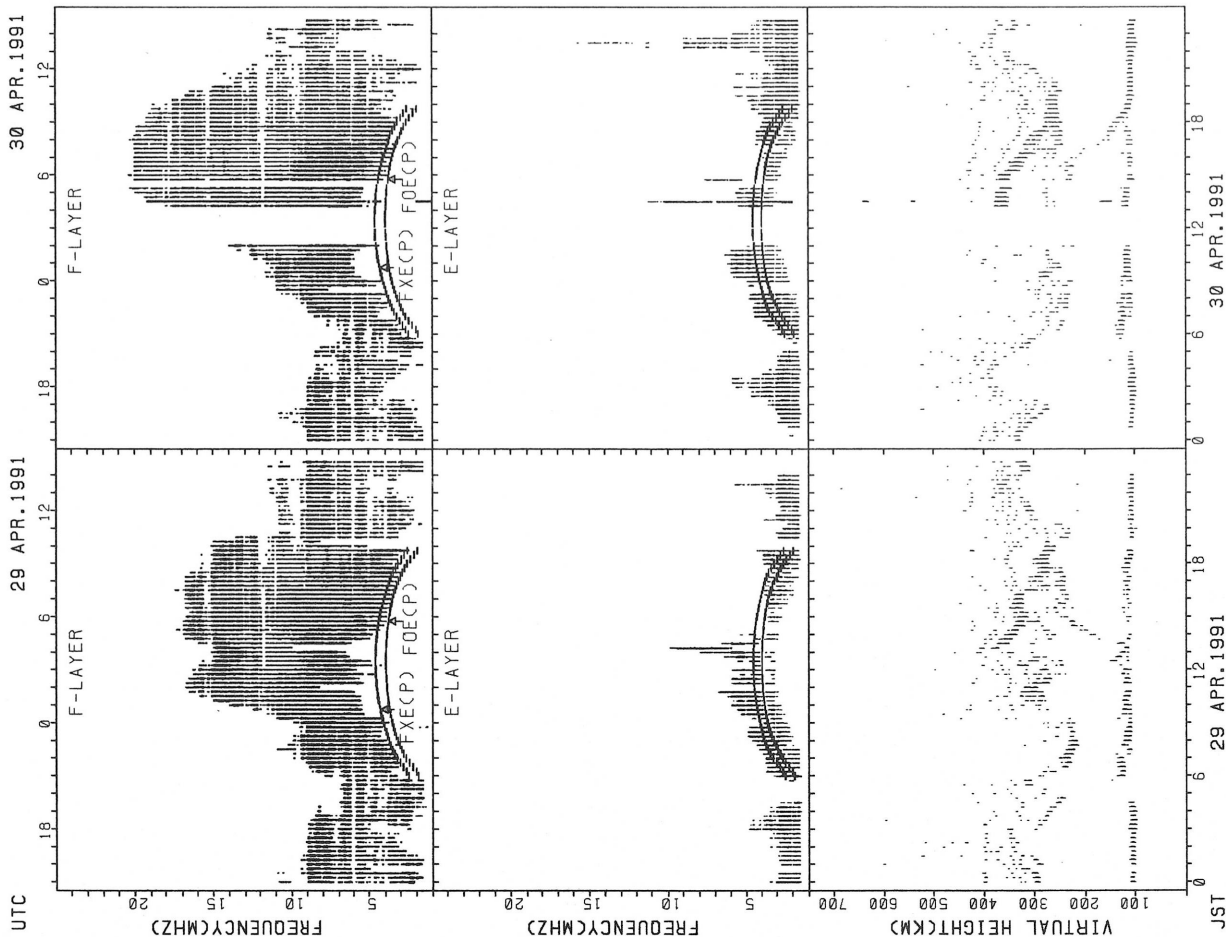
FXECP; PREDICTED VALUE FOR FXE
 FOECP; PREDICTED VALUE FOR FOE

SUMMARY PLOTS AT OKINAWA



FXECP: PREDICTED VALUE FOR Fx
 FOECP: PREDICTED VALUE FOR F0E

SUMMARY PLOTS AT OKINAWA



FXECP: PREDICTED VALUE FOR Fx
FOECP: PREDICTED VALUE FOR F0E

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	14	17	10		11	27	25	23							19	30	31	31	31	26	20	18	13
MED	355	362	378	351		342	278	260	258							276	281	290	286	296	331	352	365	356
U O	362	374	386	372		350	294	287	278							292	294	312	302	316	344	360	376	372
L O	344	342	354	332		306	262	247	252							270	272	274	274	286	310	333	342	341

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	16	15	14			
MED																		133	125	121	117			
U O																		137	129	125	123			
L O																		125	112	117	115			

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	12	11				17	17	25							14	25	23	28	18	10			12
MED	340	350	332				278	266	256							330	290	298	299	126	176			371
U O	354	369	372				305	285	271							382	326	340	310	298	386			394
L O	115	205	111				259	250	248							310	276	137	289	121	117			347

H'ES

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16		10					17	13	11	10					11	12	18	25	22	16	12	10	
MED	228		210					266	131	121	116					312	283	216	121	122	115	116	116	
U O	354		372					285	269	123	119					352	319	340	216	292	119	367	394	
L O	113		107					128	124	115	111					159	134	123	115	115	112	112	109	

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	24	23	21	14		14	29	29	28							21	29	30	30	29	22	13	22	20
MED	339	322	328	347		382	268	248	254							338	290	286	296	298	357	360	362	354
U O	353	352	357	384		402	283	257	259							376	342	314	310	316	382	378	380	368
L O	325	310	307	336		344	260	242	244							304	277	272	274	273	326	348	346	343

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	18	14	13					18	24	21	17	10	17	19	13	16	15	23	23	28	26	23	18	16
MED	108	107	109					119	122	121	117	114	115	115	117	125	123	125	117	115	111	111	109	107
U O	111	109	144					143	128	125	123	115	118	117	127	176	133	133	127	119	117	117	113	118
L O	101	101	103					111	114	117	115	109	110	109	108	108	107	119	113	109	105	107	103	102

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	26	24	14		23	29	31	29							28	29	30	31	28	19	24	26
MED	320	305	305	302	348		314	252	246	250							308	304	289	280	319	340	352	336
U O	342	331	326	316	402		346	263	254	263							347	350	304	326	348	358	360	352
L O	308	289	276	286	310		298	244	240	240							272	287	268	266	288	330	339	326

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									18	17	18	12	10	11	14	16	13	16	23	27	25	22	15	12
MED									120	121	123	120	117	117	114	127	123	121	121	113	109	109	107	105
U O									129	125	127	121	123	125	127	142	133	128	129	115	112	113	109	111
L O									115	118	117	113	113	113	113	109	106	113	115	105	106	107	103	102

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	28	30	29	29	13		12	30	31	28							29	30	30	30	23	25	29	28
MED	291	288	262	286	310		317	267	256	259							370	329	306	300	312	346	342	319
U O	311	294	307	304	336		350	286	266	295							389	368	332	336	358	364	361	341
L O	280	268	251	265	299		294	254	246	249							331	296	286	270	298	309	319	303

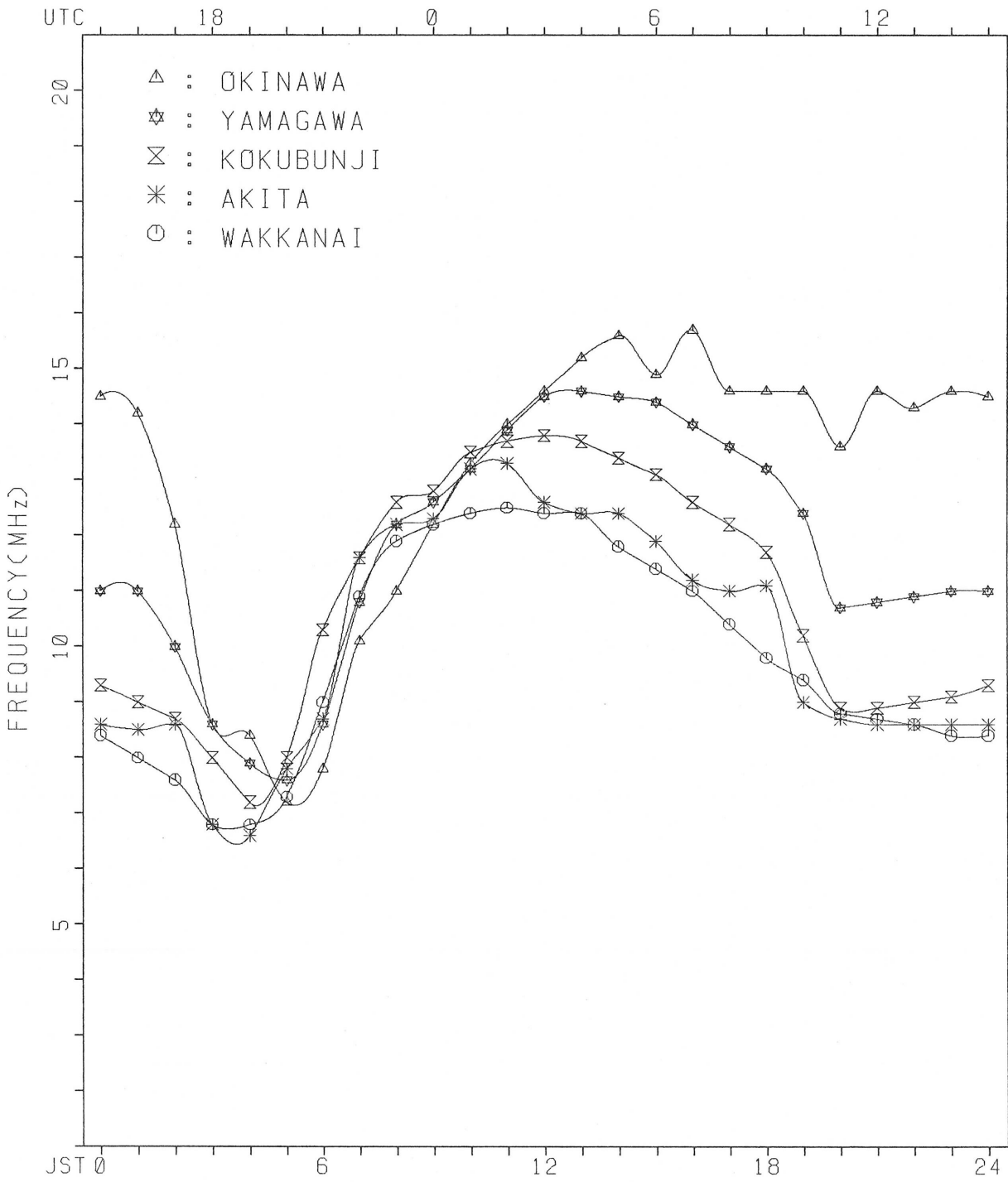
H'ES

	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	24	19	18	12	16	14	12	11	13	20	25	26	23	14	16	11
MED			109					125	119	117	115	118	126	124	124	117	121	125	117	113	109	104	107	107
U O			109					145	138	123	119	122	137	159	157	139	157	132	130	115	111	109	110	111
L O			107					121	114	113	111	114	120	115	115	111	109	119	115	111	101	99	103	103

MONTHLY MEDIANS PLOT OF FOF2

APR. 1991

AUTOMATIC SCALING



IONOSPHERIC DATA STATION KOKUBUNJI
 APR. 1991 FXI (0.1MHZ) 135° E MEAN TIME (G.M.T. + 9H)
 LAT. 35° 42.4' N LON. 139° 29.3' E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 82	X 79	X 77	X 75	X 71	X 70														X 104	X 96	X 92	X 93	X 91	
2	X 85	X 91	X 96	X 77	X 72	X 78														X 110	X 97	X 97	X 91	X 91	
3	X 91	X 84	X 82	X 83	X 83	X 83														X 111	X 100	X 96	X 90	X 97	
4	X 102	X 98	X 91	X 89	X 89	X 92														X 109	X 84	X 79	X 76	X 65	
5	X 69	X 72	S	X 62	X 62	X 64														X 111	X 92	X 87	X 86	X 88	
6	X 87	X 89	X 91	X 86	X 71	X 75														X 108	X 99	X 100	X 104	X 104	
7	X 105	X 102	X 94	X 82	X 81	X 88														X 116	X 111	S	X 115	X 111	
8	X 105	X 101	X 96	X 94	X 87	X 90														X 115	X 106	X 112	X 116	X 112	
9	X 113	X 106	X 102	X 95	X 88	X 87														X 125	X 107	X 106	X 107	X 104	
10	X 105	X 99	X 97	X 87	X 84															X 105	X 102	X 104	X 102	X 104	
11	X 106	X 102	X 98	X 92	X 86															X 112	X 108	X 115	X 119	X 122	
12	X 117	X 118	X 110	X 97	X 87															X 111	X 103	X 110	X 113	X 113	
13	X 105	X 105	X 106	X 99	X 89															X 112	X 106	X 110	X 111	X 111	
14	X 111	X 108	X 100	X 95	X 90															X 117	X 113	X 118	X 124	X 122	
15	X 117	X 113	X 108	X 98	X 89															X 114	X 112	X 117	X 118	X 119	
16	X 117	X 114	X 106	X 97	X 83															X 116	X 112	S	S	X 117	
17	X 110	X 108	X 100	X 87	X 83							C								X 119	X 104	X 115	X 122	X 123	
18	X 113	X 103	X 102	X 100	X 98															X 112	X 107	X 106	X 108	X 104	
19	X 103	X 106	X 101	X 95	X 87															S 103	X 98	X 103	X 106	X 108	
20	X 107	X 100	X 90	X 87	X 85															X 114	X 103	X 108	S	S	
21	X 112	X 106	X 98	S 83	X															X 118	X 107	X 103	X 103	X 106	
22	X 101	X 104	X 100	X 84	X 79															X 125	X 112	X 110	X 112	X 109	
23	X 116	X 119	X 104	X 85	X 86															X 130	X 117	X 107	X 107	X 106	
24	X 106	X 106	X 99	X 87	X 78															X 126	X 116	X 102	X 101	X 101	
25	X 102	X 100	X 99	X 82	X 76															0 116	X 100	X 103	X 109	X 104	
26	X 109	X 101	X 94	X 88	S							C	C							X 121	X 96	X 99	X 102	X 104	
27	X 105	X 104	X 98	X 89	X 83															0 112	X 94	X 97	X 99	X 98	
28	0 95	X 95	X 86	X 89	X 92															X 114	X 94	X 99	X 94	X 93	
29	X 96	X 86	X 86	X 81	X 77															X 126	X 106	X 90	X 92	X 93	
30	X 85	X 89	X 76	X 75	X 72															X 120	X 95	X 95	X 95	X 91	
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	9														29	30	28	28	29	
MED	X 105	X 102	X 98	X 87	X 83	X 83														X 114	X 104	X 103	X 105	X 104	
U 0	X 111	X 106	X 102	X 95	X 88	X 89														X 120	X 108	X 110	X 112	X 112	
L 0	X 96	X 95	X 91	X 82	X 78	X 72														X 111	X 97	X 97	X 94	X 95	

IONOSPHERIC DATA STATION KOKUBUNJI

APR. 1991 FOF2 (0.1MHZ)

135° E MEAN TIME (G.M.T. + 9H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	76	73	71	69	65	64	79	97	111	124	133	145	148	145	140	131	127	115	108	98	90	86	87	S 85
2	79	85	90	71	66	72	92	113	128	134	135	139	140	138	135	138	133	120	114	104	91	91	85	85
3	85	78	76	77	77	77	101	122	129	134	139	144	148	147	147	146	137	131	128	106	94	90	84	91
4	96	92	85	83	83	86	107	116	118	113	129	137	143	144	142	139	133	123	116	103	78	73	70	F 58
5	63	66	I S 58	56	56	58	63	78	114	116	126	138	147	147	140	139	137	127	J R 115	105	86	81	80	82
6	81	83	85	80	65	69	87	114	126	128	141	142	147	143	142	143	140	133	123	102	93	94	S 98	S 98
7	99	96	88	76	75	82	102	119	129	133	140	141	146	144	142	144	136	127	124	R 110	I S 105	105	109	105
8	99	95	90	88	81	84	108	127	135	131	138	142	143	144	144	140	137	133	126	109	R 100	R 106	R 110	R 106
9	U S 107	U S 99	S 96	89	82	81	105	125	136	138	146	147	150	147	146	139	131	127	128	119	R 101	R 100	101	98
10	99	93	91	81	78	84	98	120	130	140	146	148	147	144	136	128	118	113	113	99	96	98	96	98
11	100	96	92	86	80	81	101	117	127	130	140	145	145	140	136	132	129	124	119	106	102	109	113	116
12	111	R 112	104	91	81	86	113	130	136	130	133	134	134	132	129	123	120	123	121	105	97	104	107	107
13	99	99	100	93	83	87	107	126	133	135	134	136	139	138	136	129	125	122	117	106	96	104	105	105
14	105	102	94	89	84	91	113	127	129	133	139	141	140	139	137	132	125	121	117	111	107	112	118	116
15	R 111	107	102	92	83	88	108	125	129	135	136	138	138	134	130	127	126	122	116	108	106	111	112	R 113
16	R 111	108	S 100	91	77	82	100	121	135	139	140	140	140	138	135	129	126	121	118	R 110	S 106	S 109	S 111	S 111
17	J S 104	J S 102	S 94	J S 81	U S 77	U S 76	U S 104	J S 129	U S 137	U S 138	U S 137	U S 136	U S 135	U S 134	U S 132	U S 124	J S 111	J S 117	J S 118	S 113	S 98	S 109	S 116	S 117
18	107	97	96	94	92	92	106	130	141	141	143	147	146	146	141	131	127	117	115	106	101	100	102	98
19	S 97	100	95	89	81	88	106	122	136	142	140	145	146	143	141	136	138	133	121	102	92	97	J S 100	J S 102
20	101	94	84	81	79	83	102	118	124	136	144	148	147	147	139	133	128	125	120	108	97	J S 102	105	106
21	106	100	I S 92	82	77	85	100	113	122	129	137	141	147	146	141	132	126	123	J S 122	112	100	97	S 97	100
22	95	98	94	78	73	85	108	119	119	127	136	140	141	146	147	139	139	136	134	119	106	104	107	103
23	110	113	98	80	80	92	108	113	126	129	133	138	140	137	135	133	129	123	123	J S 124	111	101	101	101
24	S 100	100	93	81	72	79	108	105	109	118	123	133	145	147	144	145	138	133	129	120	110	96	95	95
25	S 96	94	93	76	70	78	105	113	119	122	140	141	148	152	144	147	134	124	125	110	S 94	97	103	98
26	R 103	95	88	82	I S 82	88	103	109	110	118	I C I C 122	128	134	136	129	125	129	126	126	114	90	93	96	98
27	99	98	92	83	77	86	108	105	106	111	115	122	128	131	136	134	124	118	115	U S 106	89	91	93	92
28	U S 89	89	80	83	86	90	104	110	117	120	118	127	140	137	131	132	128	122	118	108	88	93	88	U S 87
29	90	80	80	75	71	78	83	91	92	100	123	142	144	136	138	136	129	120	124	120	100	84	86	87
30	79	S 83	70	69	U S 67	U S 68	68	78	89	99	106	119	139	137	137	138	131	R 132	127	U S 114	89	89	89	85
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	30	30	30	30	30	30	30	30	30	30	30	29	29	30
MED	99	96	92	82	78	84	104	118	126	130	136	140	144	143	138	134	129	123	120	108	98	97	100	98
U 0	105	100	95	89	82	87	108	125	133	135	140	144	147	146	142	139	136	127	125	113	102	104	107	106
L 0	90	89	85	77	72	78	100	110	117	120	129	136	140	137	135	131	126	121	116	105	91	91	88	91

IONOSPHERIC DATA STATION KOKUBUNJI
 APR. 1991 FOF1 (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)
 LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	A	L	L	L								
2									L			L	L	L	L	L								
3												L	L	L	L	A	L							
4									L	L	A	A	L	L	L									
5									L	L	L	L	L	L	L	L								
6									L	L	L	L	U L	L	L	L	L							
7									L	L	L	L	U L	U L	U L	L								
8									L	L	L	L	U L	U L	U L	L								
9									L	L	L	L	U L	U L	U L	L	L							
10									L	L	L	L	U L	L	L	L								
11									L	L	L	L	U L	L	L	U L	L							
12									L	L	L	L	U L	L	L	U L	L	L	A	A				
13									L	L	L	L	U L	L	L	U L	L	L						
14									L	L	L	L	U L	L	L	U L	L	L						
15									L	L	L	L	U L	L	L	U L	L	L						
16									L	L	L	L	U L	L	L	U L	U L	L						
17									L	L	L	L	U L	L	L	U L	L	L						
18								L	L	L	L	L	U L	L	L	U L	L	L						
19								L	L	L	L	L	U L	L	L	U L	L	L						
20								L	L	L	L	L	U L	L	L	U L	L	L						
21								L	L	L	L	L	U L	L	L	U L	L	L						
22								L	L	L	L	L	U L	L	L	U L	L	L						
23								L	L	L	L	L	U L	L	L	U L	L	L						
24								L	L	L	L	L	U L	L	L	U L	L	L						
25								L	L	L	L	L	U L	L	L	U L	L	L						
26								L	L	C	C	L	L	L	L	U L	L	A						
27								L	L	L	L	L	L	L	L	L	L	L						
28								L	L	L	L	L	L	L	L	L	L	L						
29								L	L	L	L	L	L	L	L	L	L	L						
30								L	L	L	L	L	U L	A	L	L	L	L						
31								L	L	L	L	L	U L	L	L	U L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												7	16	12	12	10	1							
MED												U L	U L	U L	U L	U L	U L							
U O												820	800	772	755	745								
L O												U L	U L	L	L	U L								

IONOSPHERIC DATA STATION KOKUBUNJI

APR. 1991 F0E (0.01MHZ) 135°E MEAN TIME (G.M.T. + 9H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						220	325	360	390	405	410		A	A	A	355	320	255		A				
2						190	280	335	365	385	390		A	A	360	355	310	245		A				
3						200	290	340		B	A	A	A	A	A	A	310	250		B				
4						200	285	340	370	385	385		A	A	370	350	305	255	150					
5						215	295	340	365	380	385		A		385	365	350	325	260					
6						215	305	360		A	A	R	405	400	385	355	325	260	170					
7						225	305	340	375	385		A	A	A		380	360	325	265					
8						225	290		A	R	A	A	A	U	A	410	390	370		A				
9						235	310	350	375	390		A	A		415	400	370	345	275					
10					B	245	315	355	390		R	R	A	U	A	405	400	370	335	275				
11					B	235	315	365	395		A	415	R	410	400	390	370	280						
12					B	H	250	320		A	A	R	A	425	425	430	395	355	280					
13					B	245	325	360	370		A	R	A	A	A	A	A	A	A					
14					B	240	325	375	390		B	A	A	B	R	410	400	340	275					
15					B	260	330	370	395	400	410	425	R	415	405	380	345	275	160					
16					145	260	315	370	395		A	B	A	A	R	A	350	295						
17					150	H	260	330		R	B	B	C	B	B	R		B	A					
18					B	260	335	370	405	415		B	420	410	390	370	340	290	160					
19					B	245	325	355	380		B	B	A	A	U	A	A		A					
20					A	A	A	325	360	390	400	400	410		A	385	365	340	275					
21					A	H	270	330	370	400		A	A	A	A	400	380	340	275					
22					B	255	305	365	380	390		A	A	A	A	A	A	A	A					
23					B	255	330	365	375	385	400		R	A	R	A	A		B					
24					155	255	315	350	365	385	385		A	A	A	A	A	A	A					
25					160	255	305	345	375	375	390	400	R	385	375	345		A	A	A				
26					170	245	310	340	370	375	380	390	I	C	I	C	I	R	380	365	365	325	275	
27					160	250	305	340	360	375	395		A		R	375	350	325	265					
28					B	255	300	345	380		A	U	A	R	400	375	360	335	275	185				
29					155	250	305	345	370		B	R	390	400	390	375	345	320	275	175				
30					150	H	250	300	335	365	390		A	400	380	365		A	A	A				
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					8	29	30	27	25	17	15		9	14	23	22	23	25	7					
MED					155	245	312	355	375	385	390	405	402	385	365	335	275	165						
U O					160	255	325	365	390	400	410	422	410	400	380	345	275	175						
L O					150	225	305	340	370	382	385	400	385	375	355	320	262	160						

IONOSPHERIC DATA STATION KOKUBUNJI
 APR. 1991 FOES (0.1MHZ) 135°E MEAN TIME (G.M.T. + 9H)
 LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	39	31	J A	E B	J A	J A	G	G	G	G	45	39	78	49	40	G	G	30	19	J A	55	60	J A	23
2	J A	J A	J A	J A	E B	E B	G	G	G	39	42	51	45	54	43	23	20	28	24	J A	J A	J A	J A	J A
3	J A	J A	J A	J A	J A	E B	G	31	38	45	43	42	43	45	40	69	26	28	34	J A	J A	J A	J A	22
4	J A	J A	J A	J A	E B	G	25	33	41	44	J A	65	78	84	57	40	G	G	31	22	18	E B	J A	20
5	E B	E B	E S	J A	J A	J A	26	35	39	39	40	42	48	48	30	41	38	37	26	J A	J A	J A	J A	J A
6	J A	J A	J A	E B	J A	J A	G	G	J A	44	40	G	43	43	G	G	G	G	G	J A	J A	J A	J A	J A
7	J A	J A	E B	J A	J A	J A	G	G	38	45	44	53	55	44	G	40	46	40	33	J A	J A	E B	E B	E B
8	E B	E B	E B	E B	E B	G	26	32	37	37	39	41	41	45	37	46	44	67	55	J A	J A	J A	E B	E B
9	E B	E B	E B	E B	E B	E B	G	36	43	46	47	44	45	46	G	G	36	31	20	13	23	13	13	13
10	E B	E B	E B	E B	E B	E B	G	34	43	43	G	41	43	46	G	G	G	J A	J A	J A	J A	J A	J A	J A
11	J A	J A	E B	E B	E B	E B	G	G	43	43	43	41	G	G	G	G	42	48	52	60	33	J A	J A	J A
12	J A	J A	J A	E B	E B	E B	37	41	44	40	47	47	G	54	51	67	91	78	87	35	J A	J A	E B	E B
13	E B	E B	E B	J A	E B	E B	G	G	45	48	G	46	48	43	50	56	55	78	90	41	49	35	27	27
14	J A	E B	E B	E B	E B	E B	G	35	42	43	45	49	45	47	34	32	57	42	33	J A	J A	J A	J A	J A
15	E B	J A	E B	E B	E B	E B	G	G	G	G	J A	G	G	G	G	G	G	33	21	18	23	34	14	14
16	E B	E B	E B	E B	E B	E B	G	G	G	44	43	46	44	50	41	42	G	G	19	E B	J A	E B	J A	J A
17	J A	J A	J A	E B	G	G	G	E B	E B	E B	E B	E B	G	E B	G	E B	G	30	34	J A	J A	E B	E B	E B
18	E B	E B	E B	E B	E B	E B	G	36	42	43	46	50	G	G	G	G	G	39	24	34	J A	J A	E B	E B
19	E B	E B	E B	E B	E B	E B	27	37	41	44	42	44	43	47	43	41	39	36	24	27	J A	J A	J A	J A
20	J A	54	20	21	19	J A	J A	J A	J A	J A	J A	45	64	45	47	56	64	J A	G	G	39	33	25	42
21	J A	J A	E B	J A	J A	J A	20	30	44	43	54	48	48	49	43	39	G	G	J A	47	40	47	70	32
22	E B	14	17	16	13	14	20	G	G	43	59	47	42	42	43	63	86	61	52	41	25	15	138	13
23	J A	E B	J A	J A	E B	E B	G	40	41	42	40	42	40	45	37	44	G	J A	G	J A	J A	J A	E B	E B
24	E B	E B	E B	E B	E B	E B	G	31	35	39	41	46	47	45	43	42	41	47	42	55	34	20	33	23
25	J A	E B	E B	E B	E B	E B	G	G	G	40	45	45	G	45	45	G	J A	J A	J A	J A	J A	J A	J A	J A
26	E B	E B	E B	E B	E B	E B	G	27	34	38	41	C	C	G	G	J A	J A	J A	J A	J A	J A	J A	J A	E B
27	J A	J A	E B	E B	J A	G	28	36	40	38	39	38	41	39	37	G	G	G	G	J A	J A	J A	J A	E B
28	E S	16	20	27	20	17	17	29	37	42	44	43	42	G	45	46	40	G	48	J A	J A	J A	J A	J A
29	E S	17	13	14	13	20	G	28	40	41	43	42	34	E B	G	G	G	G	G	35	45	18	J A	E B
30	J A	J A	J A	E B	E B	E B	G	30	43	J A	53	42	47	42	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
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	28	30	30	30	30	30	30	30	30	30	30	30	30
MED	17	18	14	14	14	G	G	34	40	44	43	42	44	45	G	G	38	36	33	J A	J A	J A	25	22
UQ	J A	J A	J A	J A	J A	J A	19	28	37	42	45	46	47	48	48	43	44	47	42	51	46	41	34	26
LQ	E B	E B	E B	E B	E B	E B	G	G	G	41	40	G	G	G	G	G	G	G	30	24	23	J A	E B	E B

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	30	24	17	E B	16	18	G	G	G	G	44	39	75	44	40	G	G	G	18	21	45	40	30	E B			
2	19	21	17	E B	E B	E B	G	G	G	38	41	49	43	49	42	23	18	27	23	51	19	20	17	15			
3	E B	14	17	14	E B	E B	E B	G	30	37	44	42	41	U Y	42	43	40	63	24	27	32	40	23	17	E B	E B	
4	17	20	19	15	E B	E B	23	33	37	39	63	71	76	48	39	G	G	29	19	16	E B	E B	14	13	17	E B	
5	E B	E B	E B	E S	E B	E B	14	14	25	33	37	39	40	41	45	47	29	40	38	34	24	27	23	17	18	17	
6	18	26	16	E B	16	14	20	G	G	40	39	G	43	43	G	G	G	G	G	16	E B	14	23	16	14		
7	21	21	E B	13	23	22	20	G	G	36	43	43	43	42	G	39	40	29	32	27	45	E B	E B	E B	E B		
8	E B	E B	E B	E B	E B	E B	25	24	35	U G	37	39	41	41	45	36	43	42	60	53	30	25	18	14	14		
9	E B	E B	E B	E B	E B	E B	G	34	42	44	46	42	45	45	G	G	36	29	18	13	E B	E B	E B	E B			
10	E B	E B	E B	E B	E B	E B	G	34	42	42	U G	41	42	45	G	G	G	29	48	22	18	33	34	31			
11	E B	E B	E B	E B	E B	E B	G	33	G	U Y	41	43	42	41	U G	G	G	G	40	39	48	52	24	20	29	E B	
12	20	24	E B	13	12	13	15	30	34	40	43	39	45	47	G	52	49	58	85	66	50	27	24	29	E B	15	
13	E B	E B	E B	E B	E B	E B	G	G	42	43	G	45	43	42	48	52	53	72	45	21	27	17	19				
14	E B	E B	E B	E B	E B	E B	G	34	41	43	E B	45	47	44	E B	G	G	53	39	25	40	20	E B	E B	E B	E B	
15	E B	15	17	13	13	13	15	G	G	G	G	G	G	G	G	G	G	29	21	16	E B	13	25	14	13		
16	E B	E B	E B	E B	E B	E B	G	G	G	43	43	46	44	48	37	41	G	U Y	G	U Y	E B	19	14	24	E B	17	19
17	17	16	15	13	13	G	28	G	G	E B	E B	C	E B	E B	G	G	E B	G	G	28	30	17	E B	E B	E B	E B	
18	E B	E B	E B	E B	E B	E B	G	G	40	42	45	50	E B	G	G	G	G	35	22	17	20	20	E B	13	16		
19	E B	E B	E B	E B	E B	E B	27	34	40	42	42	44	42	43	42	41	U Y	37	32	19	16	40	34	17	17		
20	E B	E B	E B	E B	E B	E B	G	G	44	44	43	45	54	51	G	G	37	33	24	37	30	E B	E B	E B	E B		
21	19	25	E B	13	18	37	20	28	42	40	52	47	46	47	42	38	G	G	46	38	39	68	20	17	E B	E B	E B
22	E B	14	16	16	13	14	16	G	G	41	56	45	42	41	43	61	66	43	35	28	22	E B	15	59	E B	E B	
23	E B	18	13	18	19	13	19	G	34	39	41	40	41	U G	40	43	37	43	34	21	21	17	16	16	E B	E B	
24	E B	E B	E B	E B	E B	E B	G	G	37	40	45	42	41	41	40	39	34	28	33	31	17	19	17	21			
25	E B	E B	E B	E B	E B	E B	G	G	38	43	41	G	44	44	G	G	30	37	31	26	20	16	19	21	50		
26	E B	E B	E B	E B	E B	E B	G	27	34	37	40	C	C	G	G	41	48	54	36	27	27	23	27	E B	E B	E B	
27	18	20	E B	12	13	13	G	27	34	37	38	39	38	U Y	G	G	G	G	36	36	27	21	15	E B	E B	E B	
28	E S	E B	16	16	14	13	17	29	35	41	42	42	41	G	44	45	39	G	45	41	44	31	16	17	34		
29	E S	E B	17	13	14	13	13	G	28	38	40	42	42	E B	G	G	G	G	32	37	18	21	E B	14	17	49	
30	23	17	20	E B	E B	E B	G	U Y	29	41	48	40	45	41	50	56	45	53	50	32	47	25	29	20	19	19	
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	28	30	30	30	30	30	30	30	30	30	30	30	30	30		
MED	E	E	E	E	E	E	E	G	33	37	42	42	42	42	43	G	G	36	32	27	26	20	18	16	E B		
UO	19	20	16	14	14	16	27	34	40	43	45	45	45	47	41	43	43	36	39	40	25	24	17	19			
LO	E B	E B	E B	E B	E B	E B	G	G	G	G	40	40	G	G	G	G	G	G	G	28	21	17	16	E B	E B	E B	

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

H D	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23																							
	1	13	14	13	14	13	13	17	20	23	27	33	34	38	34	33	21	21	16	14	14	14	14	14
2	16	13	13	13	13	14	15	17	19	25	25	31	30	34	20	15	13	14	14	14	14	13	14	
3	14	13	14	15	15	14	18	16	22	41	35	28	25	25	21	21	14	16	15	13	13	13	14	
4	13	12	13	13	13	14	17	17	18	21	26	30	29	33	24	20	15	14	13	12	14	13	14	
5	13	13	E S 27	14	14	13	14	17	18	20	21	24	34	26	22	18	18	15	13	13	13	13	13	
6	15	14	13	13	12	13	16	14	18	20	22	35	25	22	22	20	17	15	15	13	14	14	13	
7	14	13	13	13	13	13	14	17	19	20	24	28	33	21	26	19	19	13	14	13	E S 15	24	13	
8	14	13	13	13	14	14	15	14	18	20	20	33	34	27	24	19	16	15	13	12	14	15	14	
9	13	13	13	15	14	14	18	16	18	19	22	35	34	33	27	20	18	15	13	13	13	13	13	
10	14	14	13	14	13	14	14	16	18	26	34	33	34	37	27	25	20	15	17	13	15	13	14	
11	13	14	13	13	14	14	15	16	20	24	39	30	35	33	28	25	22	17	16	16	13	13	15	
12	13	13	13	12	13	15	15	17	21	23	33	33	32	33	35	23	16	14	16	13	15	14	13	
13	15	13	14	13	15	15	17	17	20	27	30	33	36	33	31	28	22	16	14	13	13	14	13	
14	13	13	14	13	13	16	17	20	19	23	45	28	35	47	30	20	16	13	20	13	12	13	14	
15	15	13	13	13	13	15	18	17	20	22	33	31	31	37	33	27	21	16	13	13	13	13	14	
16	13	13	13	13	13	12	17	18	24	26	37	42	38	34	34	34	21	18	13	14	14	14	15	
17	13	14	14	13	13	13	17	18	27	48	48	C	50	47	22	22	47	17	13	13	13	14	16	
18	13	13	13	13	13	17	17	19	23	30	33	50	34	34	27	24	20	15	14	13	13	13	13	
19	14	13	13	13	13	15	18	17	20	22	41	44	34	31	33	31	25	15	13	14	14	14	13	
20	14	14	13	14	13	13	17	17	23	28	35	33	33	32	30	25	20	18	16	13	14	13	15	
21	13	13	13	13	14	13	19	20	18	26	28	29	34	33	29	30	19	17	16	17	13	13	14	
22	14	13	E S 16	13	14	16	18	16	20	21	32	34	E S 32	35	28	24	18	13	13	15	15	13	15	
23	13	13	13	14	13	19	17	19	20	24	E S 27	30	34	31	25	22	20	16	18	13	13	14	15	
24	14	13	15	14	12	13	15	16	20	18	23	24	26	34	20	20	17	16	16	16	13	13	13	
25	12	13	13	14	14	14	18	15	17	19	22	31	27	29	22	18	18	14	14	13	12	13	13	
26	13	13	13	13	13	14	14	17	20	20	C	C	29	22	17	18	18	15	14	13	13	13	13	
27	13	13	12	13	13	13	15	18	18	21	22	26	26	33	22	18	17	14	13	13	13	13	14	
28	E S 16	16	14	14	13	17	16	17	19	30	26	26	26	23	24	27	20	21	14	14	14	13	12	
29	E S 17	13	14	13	13	13	18	18	18	22	42	22	31	20	22	19	16	17	13	14	14	14	13	
30	13	13	13	14	14	13	17	18	20	21	27	32	30	24	20	33	17	16	15	13	13	E S 15	18	
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	28	30	30	30	30	30	30	30	30	30	30	30	30
MED	13	13	13	13	13	14	17	17	20	22	30	31	33	33	26	22	18	15	14	13	13	13	13	14
U D	14	13	14	14	14	15	18	18	20	26	35	34	34	34	30	25	20	16	16	14	14	14	14	14
L D	13	13	13	13	13	13	15	16	18	20	24	28	29	26	22	19	17	14	13	13	13	13	13	13

IONOSPHERIC DATA STATION KOKUBUNJI

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	275	265	265	275	260	270	290	310	295	285	280	270	275	260	270	270	275	275	275	270	265	255	265	255	S	
2	220	245	280	260	255	265	300	300	305	280	285	275	275	260	270	275	280	285	280	285	250	275	260	260		
3	275	250	255	255	265	275	290	300	290	285	270	275	275	260	270	270	275	270	285	285	265	250	230	240	F	
4	265	290	250	240	255	255	290	305	300	295	285	275	275	275	275	275	270	295	295	305	285	250	240	210		
5	225	240	I S	235	220	220	245	295	270	310	275	275	275	280	275	270	275	280	280	J R	285	280	285	250	240	255
6	240	250	270	290	275	255	290	300	300	280	280	270	270	260	265	265	275	275	285	275	250	250	265	275	S	
7	285	295	285	255	255	260	295	305	295	280	275	260	265	250	260	265	265	260	275	270	R	I S	265	275	S	
8	260	280	265	275	250	265	295	295	300	275	270	260	250	255	250	255	265	275	280	270	240	250	255	265	R	
9	275	280	285	260	250	260	280	280	285	270	265	265	260	255	255	250	250	250	270	285	R	R	250	255	R	
10	250	255	265	240	245	240	285	285	275	280	275	265	270	265	260	265	265	265	275	265	245	240	245	255	S	
11	265	260	260	265	255	240	295	285	280	260	260	255	255	250	255	255	250	265	275	255	240	245	255	270	S	
12	270	285	280	270	255	255	280	285	285	260	255	250	245	245	240	235	245	255	265	265	235	245	250	255	R	
13	245	240	255	265	250	255	280	275	270	250	240	245	245	240	230	245	240	255	260	250	245	245	250	260	R	
14	250	260	270	270	250	265	290	280	280	255	255	250	245	240	240	245	245	240	250	255	230	245	255	265	R	
15	270	270	280	260	265	255	285	270	270	250	250	245	240	230	230	240	245	250	250	255	235	245	255	260	R	
16	265	270	270	265	250	245	280	260	260	260	250	240	240	230	230	230	235	245	255	250	R	S	S	J S	S	
17	J S	J S	S	J S	U S	U S	J S				U S	I C	U S				J S	J S	I S		S	U S		265	S	
18	265	255	245	255	260	255	270	265	265	260	250	250	245	245	245	250	245	260	265	250	245	250	255	250	S	
19	260	260	260	265	245	250	275	270	270	265	265	250	250	245	250	245	250	265	270	255	I S	U S	J S	J S	S	
20	285	280	265	250	250	250	270	280	270	260	265	265	260	260	260	255	260	265	280	280	250	255			S	
21	280	270	270	S	245	235	270	280	255	275	265	260	260	260	260	265	265	265	275	280	265	245	255	260	S	
22	260	270	290	275	245	255	295	290	275	265	265	265	270	260	265	260	265	270	280	280	265	255	270	255	U S	
23	275	300	305	255	240	270	305	290	285	275	270	270	270	270	270	265	275	275	285	290	J S	295	265	260	265	
24	280	280	295	290	260	265	330	315	270	270	265	270	275	275	270	275	280	280	285	285	285	265	265	270	S	
25	280	270	290	320	255	265	300	295	295	260	275	265	270	280	285	280	275	270	285	305	285	260	270	260	R	
26	280	270	285	255	I S	260	270	305	305	300	285		C	C	280	280	275	265	280	280	290	305	270	260	265	270
27	265	275	280	270	265	260	315	310	295	285	275	275	270	275	275	280	285	280	290	300	U S	260	250	255	265	
28	270	270	245	255	265	290	305	305	300	290	285	275	280	280	280	280	285	290	290	300	265	265	260	255	U S	
29	265	255	245	255	250	270	300	315	305	280	265	280	285	270	280	285	285	280	280	300	S	290	255	250	245	S
30	235	260	235	230	U S	230	255	250	250	260	280	255	260	280	270	275	275	280	290	295	U S	300	280	260	255	255
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	29	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	29	28	29	
MED	265	270	270	260	255	258	290	288	285	275	265	265	270	260	262	265	265	270	280	280	258	250	255	260		
U O	275	280	280	270	260	265	300	305	300	280	275	272	275	270	270	275	280	280	285	290	270	260	262	268		
L O	260	255	255	255	250	255	280	280	270	260	255	250	250	245	250	250	250	260	270	260	245	245	250	255		

IONOSPHERIC DATA STATION KOKUBUNJI
 APR. 1991 MC3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9H)
 LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	A	L	L	L								
2									L			L	L	L	L	L								
3												L	L	L	L	A								
4									L	L	A	A	L	L	L									
5								L	L	L	L	L	L	L	L	L								
6									L	L	L	L	U L 325	L	L	L	L							
7									L	L	L	L	U L 325	U L 320	U L 300	L								
8										L	L	L	L	U L 315	U L 315	L								
9										L	L	L	U L 310	L	U L 310	L	L							
10								L	L	L	L	L	L	L	L	L								
11									L	L	L	L	U L 315	L	L	U L 325	U L 330	L						
12											L	L	L	L	U L 320	U L 315	U L 335	U L 300	U L 290	L	A	A		
13									L	L	L	L	L	L	U L 310	U L 315	U L 295	U L 310	U L 310	L	L			
14									L	L	L	L	U L 310	U L 305	U L 310	U L 315	U L 320	L	L					
15									L	L	L	L	L	L	L	L	L							
16									L	L	L	L	U L 325	L	L	L	U L 315	U L 290	U L 280	L				
17										L	L	L	U L 300	L	L	U Y 335	U Y 325	U Y 305	L	L				
18								L	L	L	L	L	U L 320	U L 310	U L 305	U L 305	U L 310	L	L					
19								L	L	L	L	L	L	L	L	L	U L A	L	L					
20									L	L	L	L	L	L	L	L	U L 320	L	L					
21									L	L	L	L	L	L	L	L	L	L	L					
22											L	L	L	L	L	L	L	L	L					
23									L	L	L	L	L	L	L	L	L	L	L					
24								L		L		L	L	L	L	L	L	L	L					
25									L	L	L	L	L	L	L	L	L	L	L					
26									L	L	C	C	L	L	L	L	U L 320	L	A					
27								L	L	L	L	L	L	L	L	L	L	L	L					
28									L		L	L	L	L	L	L	L	L	L					
29								L		L	L	L	L	L	L	L	L	L	L					
30									L	L	L	L	L	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												7	16	12	12	10	1							
MED												U L 320	U L 315	U L 310	U L 312	U L 315	U L 280							
U O												U L 325	U L 325	U L 325	U L 315	U L 320								
L O												U L 310	U L 310	U L 310	U L 305	U L 305								

IONOSPHERIC DATA STATION KOKUBUNJI

APR. 1991 H⁺F₂ (KM)

135° E MEAN TIME (G.M.T. + 9H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											300	310	300	L	325	310								
2									260			320	L	L	325	325								
3												305	320	L	340	305	300	305						
4									260	L	315	290	A	A	L	L	310	310						
5									L	265	315	300	315	320	310	320	310							
6									280	310	330	320	L	330	345	320	305							
7									L	320	L	310	330	340	350	350	335							
8									L	315	L	320	355	355	365	350	355							
9											350	355	360	360	355	355		L						
10									L	340	L	310	330	350	335	360	335	340						
11									L	360	L	355	360	L	360	380	380	360	L					
12											375	385	400	380	410	410	410	L	A	E	A			
13									U	L	L	360	400	400	400	410	405	390	L	375	350			
14									L	360	L	380	370	395	405	400	380	L	390	360				
15									L	355	L	390	400	410	420	420	405	380						
16									L	350	L	370	380	405	415	410	415	L	390	365				
17											L	365	C	410	420	390	425	420	365					
18								L	L	315	L	360	385	390	395	390	395	390	355	355				
19								L	L	325	L	350	355	370	L	370	380	375	375	350				
20								L	L	350	L	305	350	360	355	350	360	L	335	300				
21								L	L	350	L	320	350	350	350	340	350	350	310					
22											330	330	350	355	335	355	320							
23										300	L	270	330	335	310	330	330	310	300					
24									235		L	305	335	330	315	L	315	300	290					
25										265	360	310	340	330	335	315	305							
26										260	I	C	I	C	305	320	315	340	A	300				
27									240	270	275	280	310	340	290	310	280	300						
28										250	L	275	335	320	305	310	305	290						
29										L	250	L	310	L	320	315	305	300	320	310				
30										370	310	360	355	335	285	315	330	305	280					
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								3	12	22	26	29	29	30	30	30	19	10	1					
MED								240	285	L	318	330	340	340	350	338	340	335	E	A				
U O								250	L	332	L	355	L	365	L	365	382	380	380	375	380	360		
L O								235	262	305	310	318	320	320	315	310	305	300						

IONOSPHERIC DATA STATION KOKUBUNJI
 APR. 1991 H'F (KM) 135° E MEAN TIME (G.M.T. + 9H)
 LAT.35° 42.4' N LON.139° 29.3' E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A 295	310	300	280	270	280	245	240	240	240	240	240	A 225	240	235	H 235	H 240	265	260	E A 305	A 330	A 320	A 330	
2	385	355	270	205	270	290	250	240	235	230	230	245	A 235	250	235	210	H 230	245	255	E A 290	260	280	295	290
3	260	285	315	315	280	250	245	240	235	235	235	225	245	225	220	A 235	260	265	A 255	A 300	A 290	335	325	
4	295	250	300	275	275	305	245	240	230	220	A 240	A 230	A 240	230	225	240	250	260	230	225	270	355	480	
5	410	355	E S 365	350	390	355	265	255	230	220	H 200	225	230	245	230	240	250	250	250	A 265	A 250	260	310	320
6	335	A 340	280	230	250	305	240	235	230	210	H 210	240	220	240	235	H 210	H 235	245	250	230	265	300	305	300
7	290	265	260	310	340	290	230	230	230	230	H 210	225	225	235	235	240	255	250	265	260	A 310	300	300	275
8	280	265	285	260	240	285	250	240	235	H 220	225	210	H 240	235	H 245	260	A 270	E A 260	280	305	305	290		
9	285	275	280	270	275	305	240	230	235	235	225	220	230	230	240	245	250	260	285	255	255	290	300	315
10	320	315	300	260	290	300	230	230	230	235	225	215	235	240	235	235	240	255	A 270	A 270	A 300	A 345	A 370	A 340
11	315	285	290	280	265	285	240	230	235	H 220	225	220	235	230	235	240	255	A 270	E A 280	A 315	335	330	300	
12	300	290	260	250	255	305	255	235	235	230	225	230	245	230	270	265	A 300	A 315	E A 340	A 330	A 330	A 305		
13	340	340	305	235	250	300	245	230	235	240	230	230	220	230	235	255	A 305	A 330	A 320	A 310				
14	300	300	265	255	270	290	235	235	235	225	225	230	230	245	245	245	A 275	A 285	A 315	310	335	320	290	
15	280	270	260	260	265	310	240	230	230	220	H 205	H 215	H 230	230	230	240	245	270	290	285	290	340	320	305
16	300	290	285	235	240	315	240	230	235	235	230	240	240	240	230	235	H 250	H 265	290	295	320	310	305	300
17	290	285	270	300	345	320	245	240	240	240	230	C 230	235	225	255	240	B 265	270	295	290	285	320	315	300
18	280	320	320	275	260	290	250	235	235	230	235	250	235	235	240	245	245	255	275	275	305	315	305	315
19	305	300	280	250	275	305	240	240	230	240	230	230	H 240	220	250	240	260	260	260	250	E A 335	E A 365	320	310
20	285	255	255	275	A 320	300	240	240	240	230	235	230	A 250	A 255	230	240	250	260	270	A 270	A 300	315	310	305
21	290	290	270	275	E A 360	315	245	250	240	270	245	240	220	230	240	230	H 260	A 255	A 270	A 275	300	320	305	
22	315	290	250	235	305	305	245	240	240	E A 270	235	225	220	230	H 265	A 270	A 260	A 270	260	260	A 260	300	310	
23	305	250	250	300	340	290	230	235	230	230	H 205	225	260	225	230	245	240	245	270	260	245	250	280	300
24	285	280	250	240	295	285	235	225	225	H 215	H 240	235	230	230	210	240	240	250	260	270	260	250	270	305
25	300	300	270	220	H 260	295	245	230	235	235	H 215	230	230	245	225	250	260	250	265	245	255	305	300	E A 360
26	280	270	250	275	300	275	230	235	230	H I C I C 205	220	215	215	245	235	250	A 270	A 260	250	260	325	310	305	
27	295	300	265	260	280	290	245	240	225	220	215	210	230	230	225	240	240	255	A 265	250	250	320	325	310
28	295	290	290	325	290	270	250	240	235	225	215	225	235	240	255	245	245	260	A 265	A 260	270	300	285	A 355
29	310	325	335	305	305	285	250	235	220	235	230	220	H 220	230	H 210	H 225	240	250	290	245	250	230	350	A
30	400	325	360	360	365	295	270	E A 275	E A 285	225	225	230	A 275	A 245	A 265	A 270	A 260	A 255	A 240	255	300	305	330	
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	28	28	29	29	28	25	27	28	27	30	29	30	29
MED	298	290	278	272	276	295	245	235	235	230	225	228	230	230	235	240	245	255	266	260	273	305	310	305
U O	315	315	300	300	305	305	250	240	235	235	232	232	238	240	240	245	258	A 265	278	275	305	330	320	322
L O	285	275	260	250	265	285	240	230	230	220	H 215	222	222	230	230	235	240	250	260	250	255	290	300	300

IONOSPHERIC DATA STATION KOKUBUNJI

APR. 1991 H'E (KM)

135°E MEAN TIME (G.M.T. + 9H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							130	120	115	120	120	A	A	A	A	115	115	120	A					
2							130	110	110	115	115	115	115	125	120	120	115	125	A	A				
3							E B 145	115	115	B	A	A	A	A	A	A	A	A	B					
4							B 140	115	115	115	115	120	A	A	120	115	115	120	A					
5							140	115	115	115	115	110	A	115	130	120	115	120	A					
6							E A 140	115	110	A	115	115	120	115	115	115	115	115	135	B				
7							E A 160	115	110	110	115	120	A	A	A	110	120	115	120	A	A			
8							A 120	120	110	A	A	A	A	A	E A 130	E A 140	A	A	A	A				
9							135	115	110	110	110	A	A	120	120	110	115	115	B					
10							B 130	115	110	120	125	125	A	B 130	120	120	115	120	A					
11							B 120	110	115	125	A	A	115	120	120	120	120	115	A					
12							B 120	115	115	A	130	A	115	120	125	120	115	120	A					
13							E A 135	H 115	H 115	H 115	H 115	120	B 130	125	A	A	A	A	A					
14							B 125	H 115	H 110	H 115	B	A	A	B	120	E A 130	A	A	B					
15							B 115	H 115	H 115	E A 135	A 120	A 125	115	125	125	120	120	120	130	A				
16							E B 180	120	120	115	115	A	B	A	A	A	125	110	115	120	A			
17							E B 185	H 120	H 115	120	B	B	C	B	B	115	125	A	B	A				
18							B 120	115	115	120	120	B	125	120	120	115	110	115	125					
19							B 120	115	115	115	B	B	120	115	115	120	115	115	120					
20							A 120	A 115	A 110	115	120	120	125	120	120	120	120	120	A					
21							A 125	110	110	115	A	A	A	A	A	130	115	115	115	A				
22							B 120	110	110	110	120	125	B	120	A	110	A	A	A	A				
23							B 120	115	115	115	115	115	A	A	A	A	A	A	A	B				
24							A 140	130	115	115	110	110	115	120	A	A	A	A	A					
25							E B 175	125	115	110	110	115	120	120	120	115	E A 140	115	A	A				
26							B 170	120	110	115	115	115	I C I C 115	115	110	115	115	130	135	A	A	A		
27							B 150	125	115	115	115	110	A 130	A	A	115	115	110	115	A				
28							B 115	110	110	120	115	115	115	115	115	115	125	120	125	140	B			
29							E B 170	120	115	115	115	B	A 125	120	110	115	110	110	120	130	A			
30							B 135	120	110	115	115	115	A	115	115	115	A	110	115	A				
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						8	29	29	30	25	21	18	16	17	25	24	23	25	6					
MED						U 154	122	115	115	115	115	120	120	120	120	118	115	120	130					
U O						E B 178	132	115	115	118	120	125	A	B	A	A	A	A	B					
L O						B 145	120	112	110	115	115	115	115	115	115	115	115	115	125					

IONOSPHERIC DATA STATION KOKUBUNJI
 APR. 1991 H'ES (KM) 135°E MEAN TIME (G.M.T. + 9H)
 LAT. 35° 42.4'N LON. 139° 29.3'E SWEEP 1.0MHZ TO 25.0MHZ IN 24.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	110	110	110	B	110	110	G	G	G	G	130	120	110	110	115	G	G	140	120	110	110	110	110	110	
2	110	110	110	115	B	B	G	G	E G	G	155	130	115	115	115	100	105	E G	170	130	115	110	105	105	105
3	105	100	105	105	110	B	E G	G	160	135	125	120	115	115	115	110	105	E G	190	130	115	115	110	115	110
4	105	105	105	105	110	B	150	135	135	125	110	115	105	105	130	G	G	135	130	120	B	110	100	100	
5	B	B	S	115	120	155	155	145	130	150	135	125	120	120	110	180	150	140	140	125	120	120	115	100	
6	110	110	110	B	110	115	115	G	G	115	115	150	140	G	G	G	G	G	115	120	110	110	110	110	
7	110	110	B	110	110	110	115	G	145	120	120	115	115	115	165	130	130	125	120	110	B	B	B	B	
8	B	B	B	B	B	B	110	160	110	115	110	110	110	175	110	145	145	120	120	115	115	120	B	B	
9	B	B	B	B	B	B	G	135	130	120	120	120	125	130	G	G	150	140	120	B	110	B	B	B	
10	B	B	B	B	B	B	E G	G	160	135	140	G	125	120	120	G	G	G	160	120	115	115	110	105	100
11	100	115	B	B	B	B	E G	G	160	125	120	140	120	G	G	G	145	120	120	110	110	110	105	105	
12	100	110	105	105	B	B	155	150	110	115	115	120	125	G	135	130	125	120	115	110	115	110	110	B	
13	B	B	B	110	B	B	115	160	G	120	120	115	110	115	110	110	110	120	115	110	110	120	105	100	
14	105	B	B	B	B	B	E G	G	170	135	125	105	110	B	110	110	125	130	100	110	110	120	110	120	
15	B	105	B	B	B	B	G	G	G	110	110	110	G	G	G	G	150	130	115	115	110	B	110	110	
16	B	B	B	B	B	G	G	G	G	120	120	120	115	110	115	125	G	G	105	B	115	B	110	110	
17	110	110	110	110	B	E G	G	G	200	B	B	C	B	B	G	115	B	G	125	115	120	B	B	B	
18	B	B	B	B	B	B	E G	G	170	140	130	130	B	G	G	G	130	125	120	115	110	B	100	100	
19	B	B	B	B	B	E G	170	145	135	125	130	B	115	115	125	125	125	125	125	115	110	110	110	100	
20	110	95	100	100	105	110	105	110	130	115	120	115	110	110	G	G	165	140	125	115	110	115	115	115	
21	110	105	B	110	110	110	E G	190	140	150	120	130	110	105	110	115	G	130	115	110	110	110	110	B	
22	B	105	S	B	B	100	G	G	125	110	115	120	120	110	110	105	100	100	100	100	100	115	B	B	
23	105	B	105	105	B	B	G	155	135	130	140	130	125	110	115	105	105	105	105	135	105	100	115	B	B
24	B	B	B	B	B	G	155	155	140	130	120	120	120	115	110	120	110	105	100	100	100	105	115	115	110
25	110	B	B	B	B	G	G	G	130	125	130	G	135	125	G	115	140	115	130	120	115	115	110	110	
26	B	B	B	B	B	E G	185	155	150	140	C	C	G	G	130	135	125	125	120	115	110	110	110	B	
27	110	110	B	B	115	E G	155	130	120	125	120	120	120	120	115	G	140	125	120	115	115	120	B	B	
28	S	115	110	110	120	B	140	130	120	125	120	125	G	165	145	165	G	130	125	120	115	115	110	110	
29	S	B	B	B	110	E G	165	135	130	130	B	115	G	G	G	G	G	140	120	120	115	B	115	115	
30	110	110	110	B	B	G	130	115	115	120	115	120	115	115	115	110	110	115	110	120	130	115	115	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	16	16	11	12	11	8	17	21	22	28	25	23	24	23	19	18	20	27	29	28	28	25	21	20	
MED	110	110	110	110	110	110	U	135	140	132	125	120	120	115	115	115	118	125	128	120	115	115	110	110	110
U O	110	110	110	110	115	112	E G	168	160	135	130	130	120	120	120	125	135	142	140	128	120	115	115	115	110
L O	105	105	105	105	110	110	122	132	125	120	115	115	112	110	110	110	110	120	115	110	110	110	108	100	

IONOSPHERIC DATA STATION KOKUBUNJI

APR. 1991 TYPES OF ES

135°E MEAN TIME (G.M.T. + 9H)

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

H \ D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F6	F4	F2		F3	F3					H1	L1	L2	L2	L1			H1	C1	F4	F6	F3	F4	F1	
2	F3	F4	F2	F1					H1	H1	C2	C1	C2	CL11	L2		L1	HL11	C1	F5	F3	F4	F2	F1	
3	F2	F2	F1	F1	F1			H1	H1	C1	C1	C1	C1	CL11	C3		L2	H1	H3	FF51	F5	F2	F1	F1	
4	F2	F3	F3	F2	F1		H1	H1	H1	H1	C2	C2	C2	L2	H1			HL21	CL21	FF22		F1	F2	F2	
5				F1	F1	F1	H2	H2	H2	H2	H2	H2	C1	C2	L1	HL11	H1	H2	HL21	FF31	F3	F2	F2	F2	
6	F1	F3	F3		F2	F2	L2			C2	C2		H1	H1						F1	F1	F6	F2	F2	
7	F2	F4		F3	F4	F3	L1		H1	C2	C1	CL11	C1	CL11		HL21	H2	HL31	C4	F4	F6				
8					F1	H2	LH21		C2	L2	L2	L1	L1	HL11	L2	HL23	HL13	CL42	C5	FF24	FF32	FF11			
9							H1	H2	H2	C1	C1	C1	C1				H1	H1	C1		F2				
10							H1	H1	H1		L1	L1	L1	C1				H1	C5	F4	F3	F5	F3	F4	
11	F3	FF12					H1		CL11	L1	H1	L1					H1	C3	C3	F4	F4	F3	F4	F2	
12	F3	FF22	F2	F1		H2	H2		C2	C2	L1	L1	C1		H1	H2	H3	C4	C4	FF52	FF31	FF42	F5		
13				F1		L1	H1		C1	C1			C1	C1	L2		L3	CL33	CL43	FF53	FF22	FF14	F2	F2	
14	F1						H1	H1	H1		L2	L1			L1		HL33	HL33	L2	FF43	FF32	F1	F2	F1	
15		F1							L1	L1	L1							H1	C1	F2	F2	F4		F1	
16									H1	C1	C1		L1	L1	L1	C1			L1		F2		F2	F2	
17	F2	F1	F2	F1		H1													CL32	FF43	FF11				
18						H1	H1	H1	H1	C1			L1					H2	C2	F3	F2	F2		F2	
19						H1	H1	H1	H1	H1			C1	C1	H1	C1	H1	C1	C1	F2	F4	F3	F2	F2	
20	FF21	F2	F2	F1	F5	L4	L2	LH21	H2	C2	C1	C1	C2	C2			H1	H2	C1	F3	F4	F2	F2	F1	
21	F2	F4		F2	F4	L2	H2	H2	H2	H2	CL11	C2	L2	L2	L1		L2	C3	C3	F5	F3	F2	F2		
22		F1				L1			H2	C3	C1	C1	C1	C1	L2		L3	L3	L3	F1		F3			
23	F2		F2	F2				H1	H2	H1	H1	H1	L1	L1	L1		L2	L2	L1	L1	F2	F2	F1		
24						HL11	H1	H2	H2	C1	C1	C1	C1	L1	CL21		L2	L2	L3	F4	F1	F2	F3	F4	
25	F2							H1	C2	H1			H1	C1		LH21	HL11	C2	L2	F2	F2	F2	F4	F5	
26						H1	H1	H1	H1						C1	H2	HL32	CL32	C3	F4	F4	F4	F1		
27	F2	F4			F2	H1	H2	C2	C1	C1	L1	L1	L1	L1			H1	C3	C3	F4	F2	F2			
28		F1	F2	F2	F1	H1	H2	H2	C1	C1	C1			H1	H1	H1		H2	C5	F5	FF42	F2	F2	F4	
29				F1		H1	H2	H2	H1	H1		L1						H2	C3	F1	F2		F3	F4	
30	F3	F2	F3			H1	C4	C3	C2	C2	C1	C1	C2	C2	C2	C3	C3	C2	C3	FF24	FF23	F3	F1	F2	
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																									
U O																									
L O																									

f-PLOTS OF IONOSPHERIC DATA

KEY OF F-PLOT	
I	SPREAD
◇	F ₀ F ₂ , F ₀ F ₁ , F ₀ E
×	F _X F ₂
*	DOUBTFUL F ₀ F ₂ , F ₀ F ₁ , F ₀ E
⊗	FBES
L	ESTIMATED F ₀ F ₁
†, ‡	F _{MIN}
^	GREATER THAN
v	LESS THAN

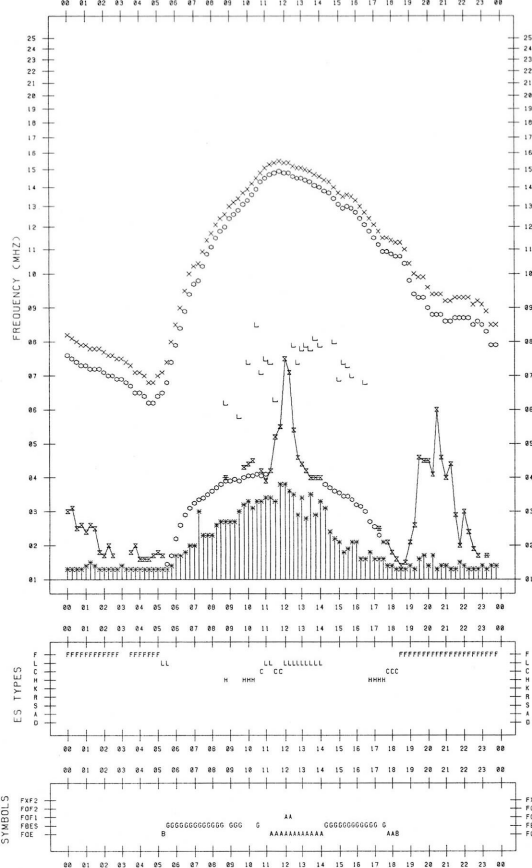
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/ 1

135°E MEAN TIME



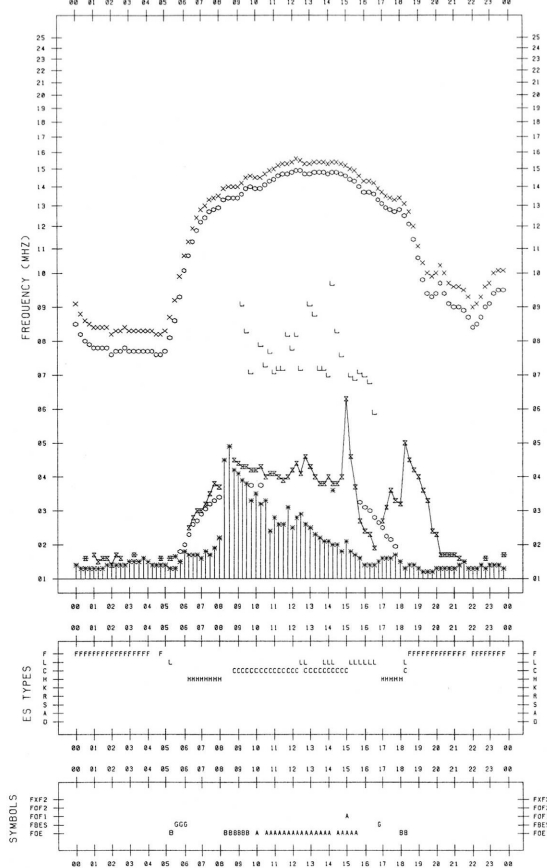
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/ 3

135°E MEAN TIME



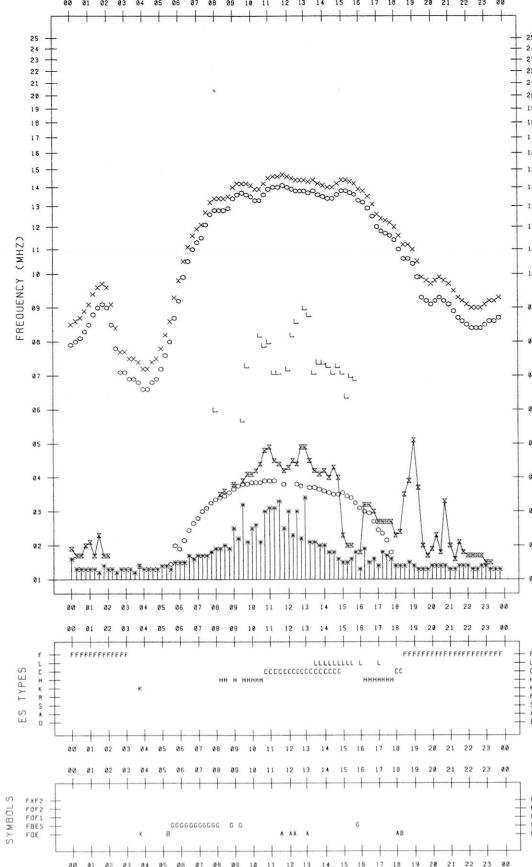
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/ 2

135°E MEAN TIME



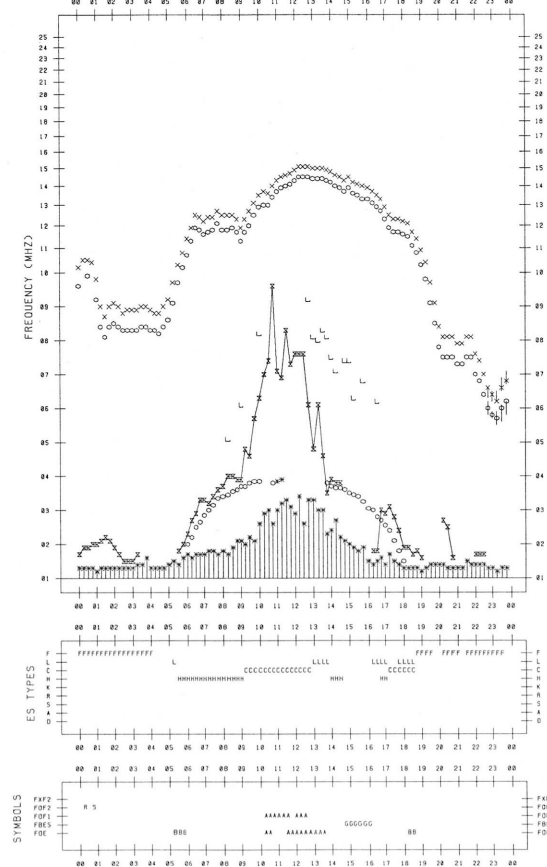
F-PLOT DATA

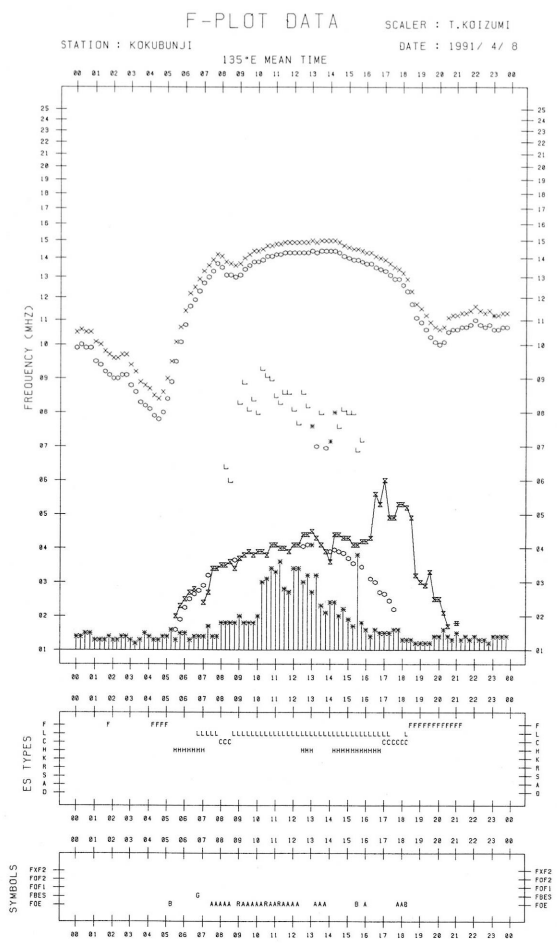
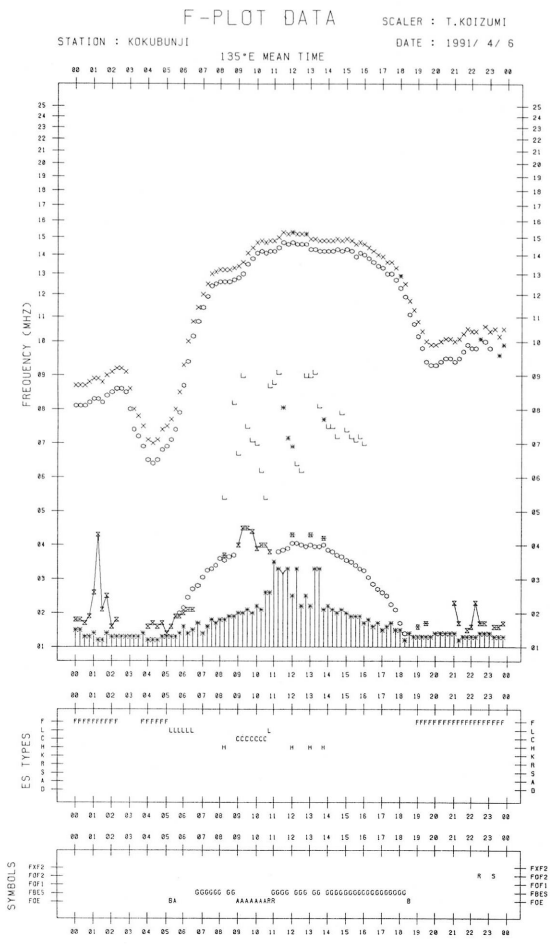
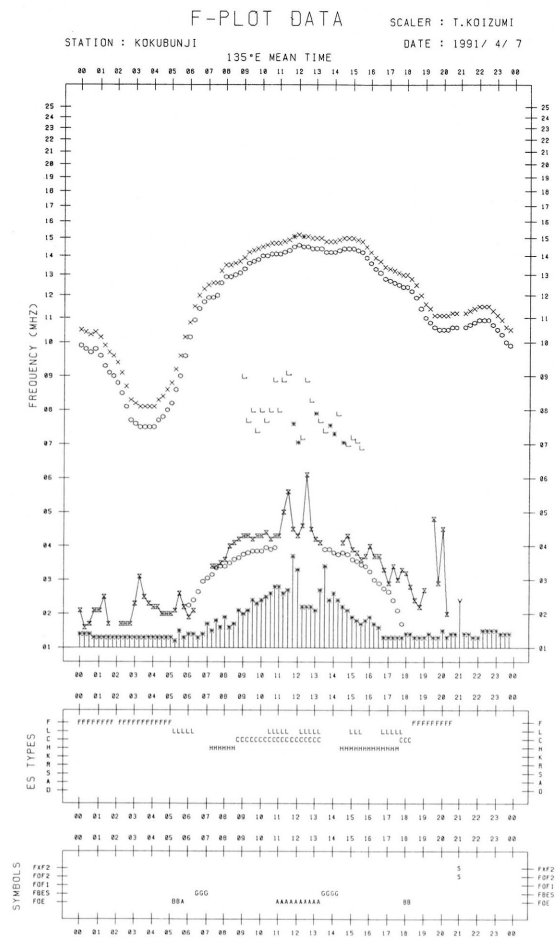
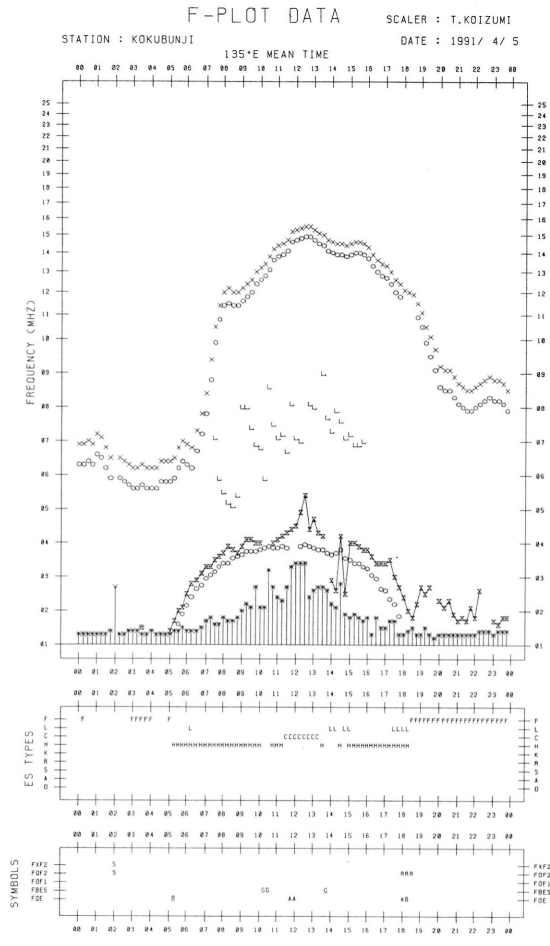
SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/ 4

135°E MEAN TIME





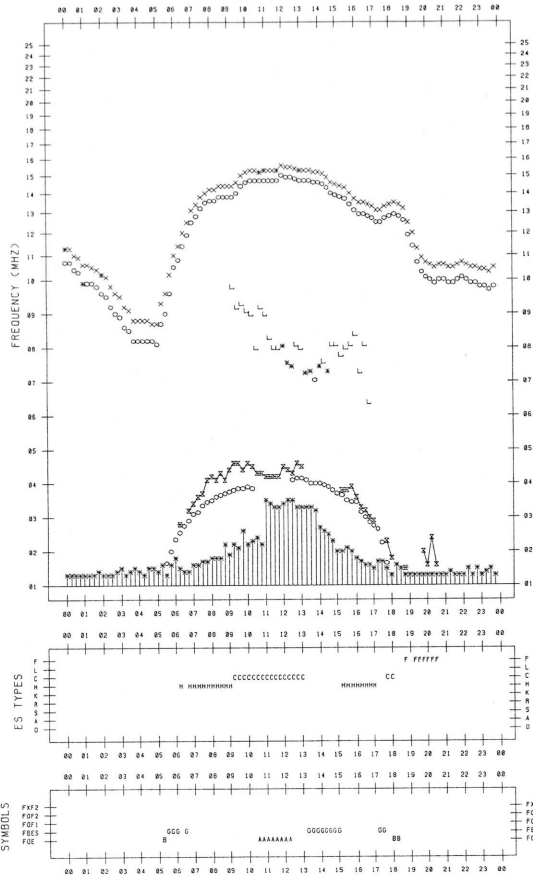
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

135°E MEAN TIME

DATE : 1991/ 4/ 9



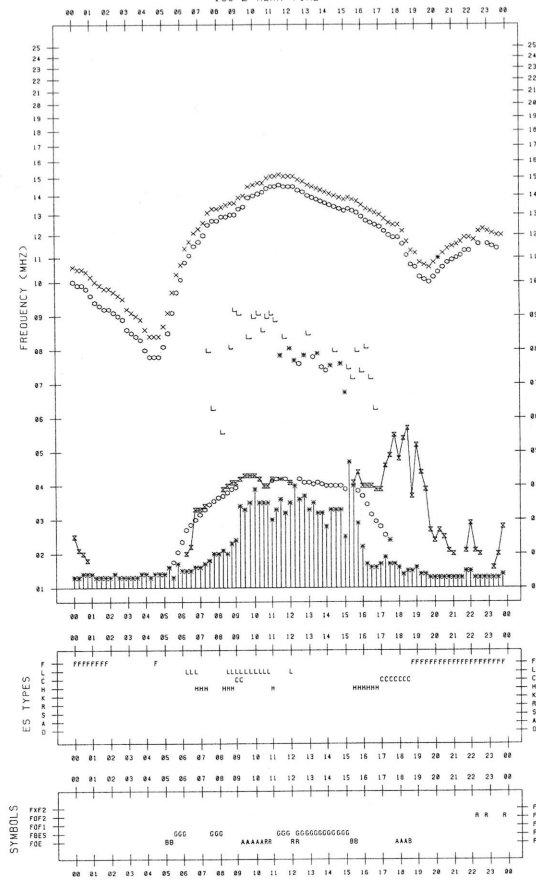
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

135°E MEAN TIME

DATE : 1991/ 4/11



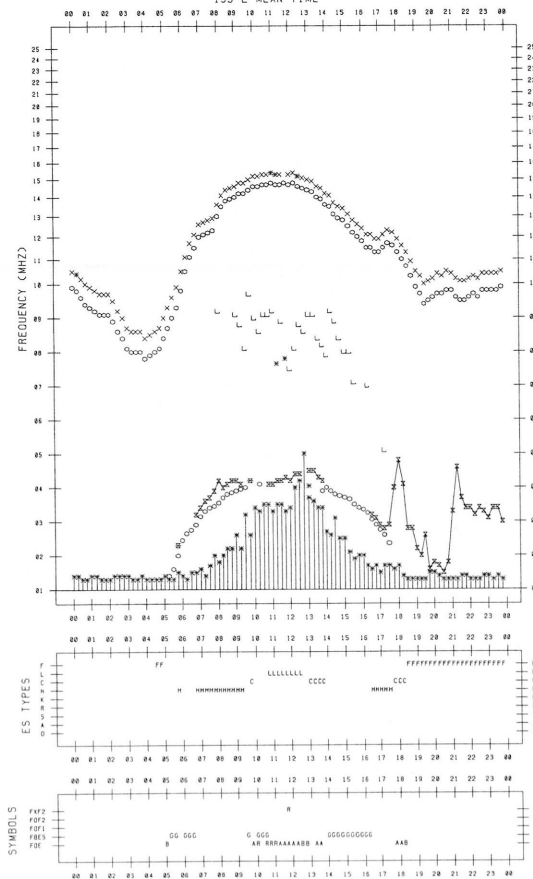
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

135°E MEAN TIME

DATE : 1991/ 4/10



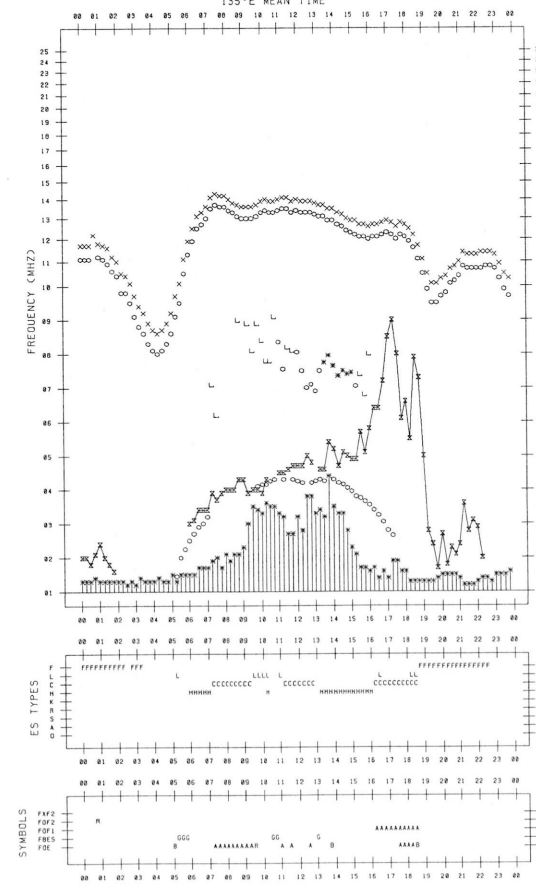
F-PLOT DATA

SCALER : T.KOIZUMI

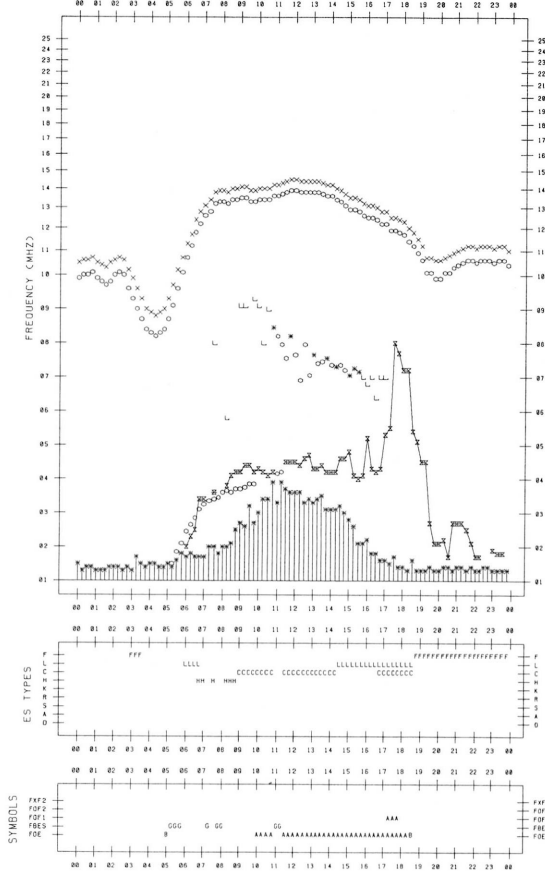
STATION : KOKUBUNJI

135°E MEAN TIME

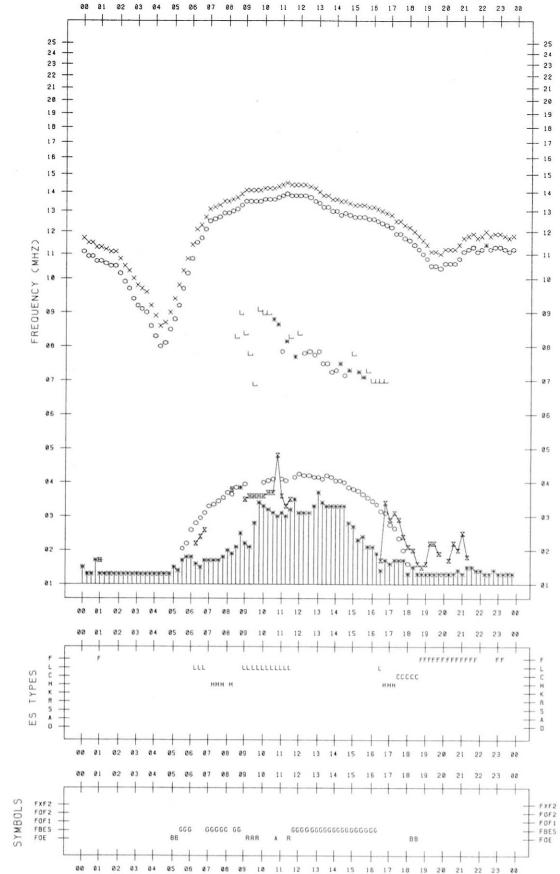
DATE : 1991/ 4/12



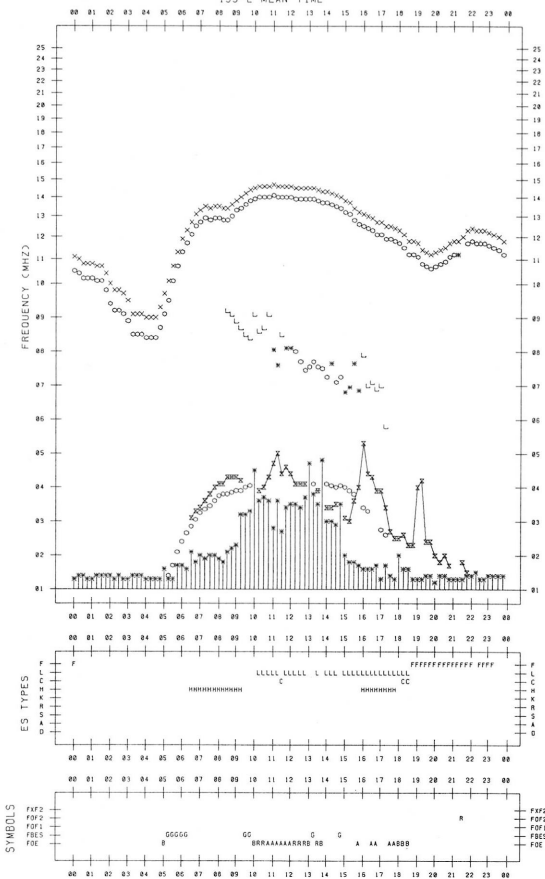
F-PLOT DATA SCALER : T.KOIZUMI
 STATION : KOKUBUNJI 135°E MEAN TIME DATE : 1991/ 4/13



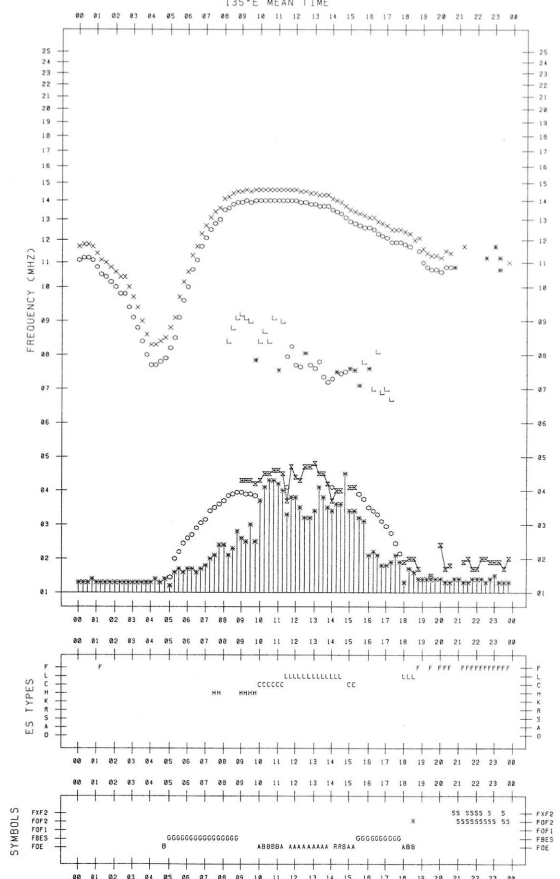
F-PLOT DATA SCALER : T.KOIZUMI
 STATION : KOKUBUNJI 135°E MEAN TIME DATE : 1991/ 4/15



F-PLOT DATA SCALER : T.KOIZUMI
 STATION : KOKUBUNJI 135°E MEAN TIME DATE : 1991/ 4/14



F-PLOT DATA SCALER : T.KOIZUMI
 STATION : KOKUBUNJI 135°E MEAN TIME DATE : 1991/ 4/16



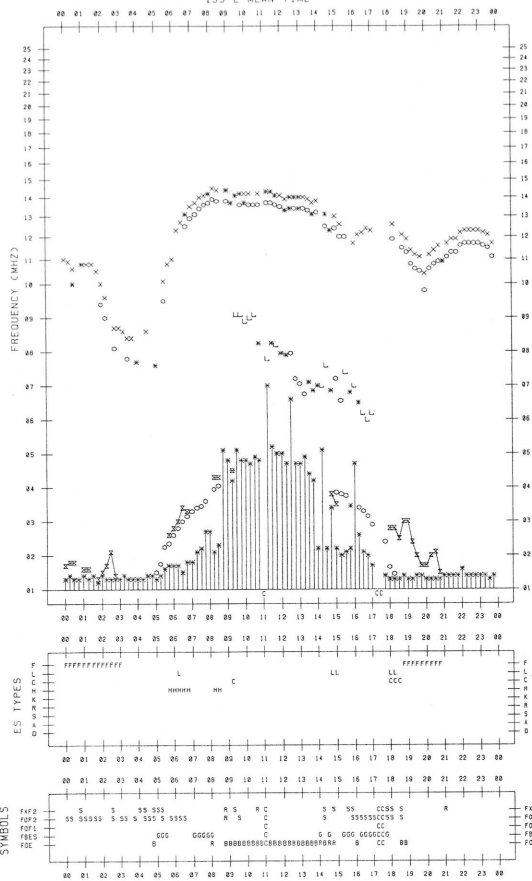
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

135°E MEAN TIME

DATE : 1991/ 4/17



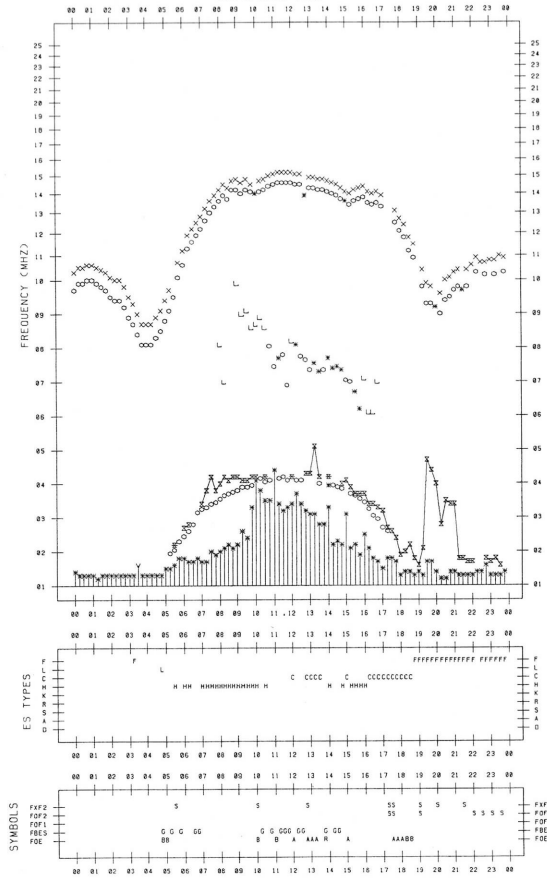
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

135°E MEAN TIME

DATE : 1991/ 4/19



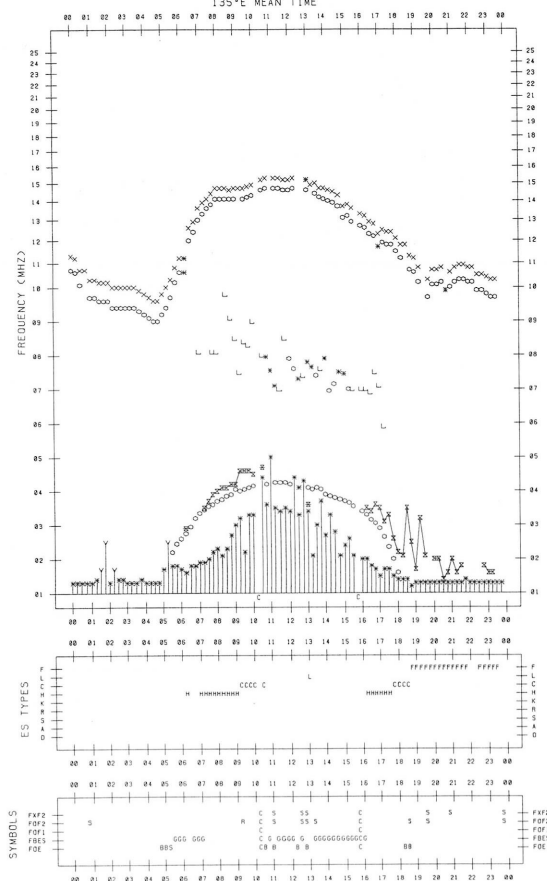
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

135°E MEAN TIME

DATE : 1991/ 4/18



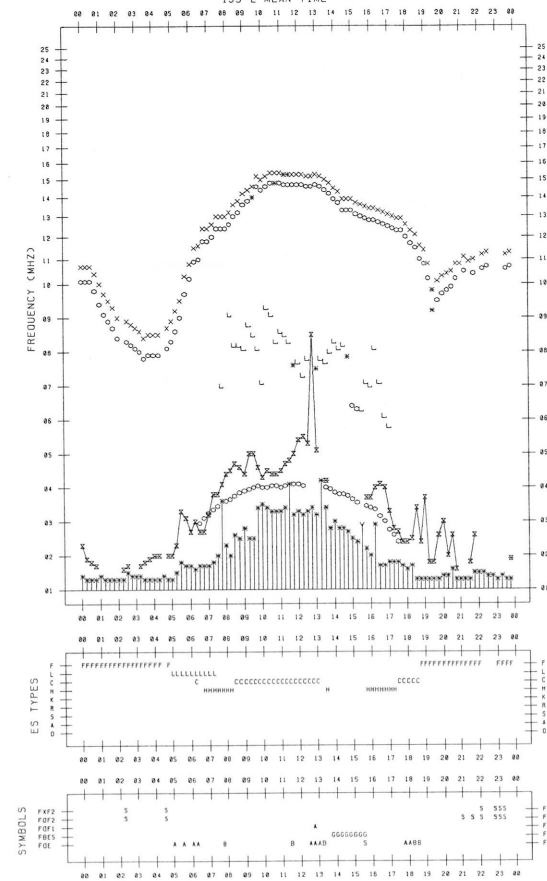
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

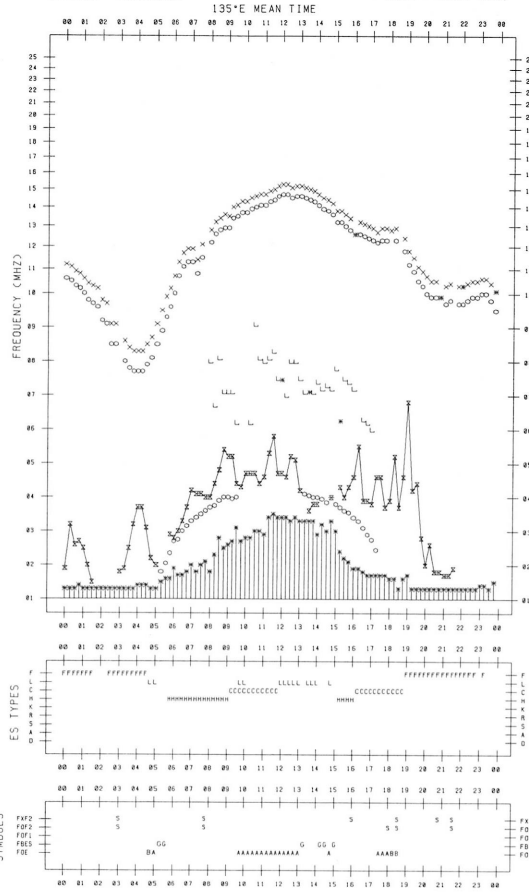
135°E MEAN TIME

DATE : 1991/ 4/20



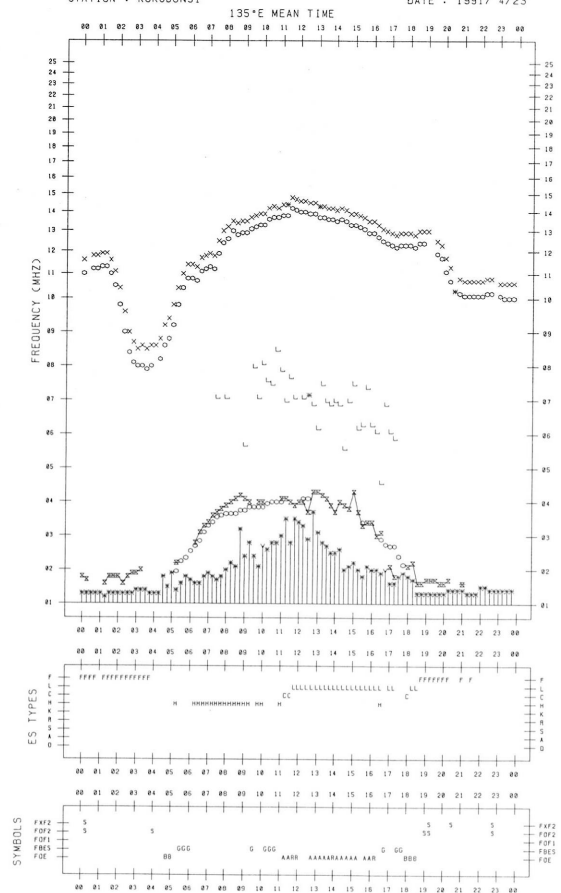
F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 4/21



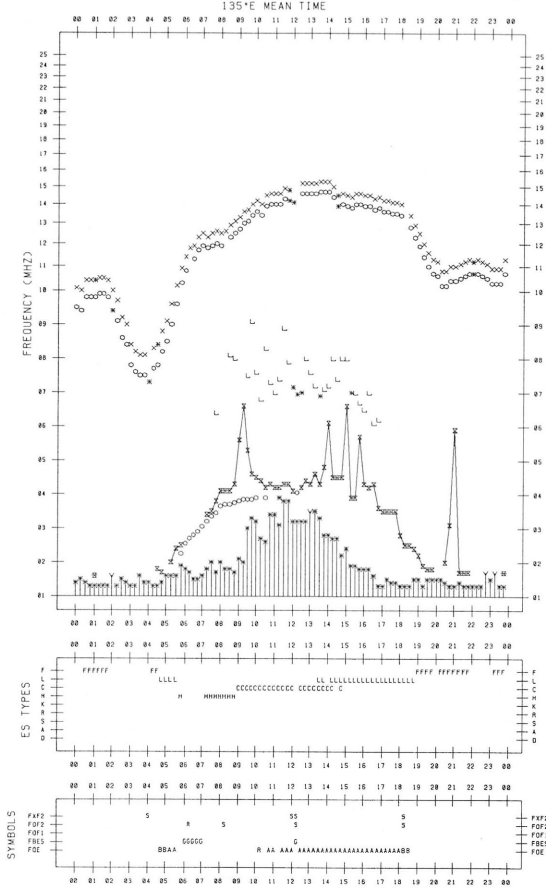
F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 4/23



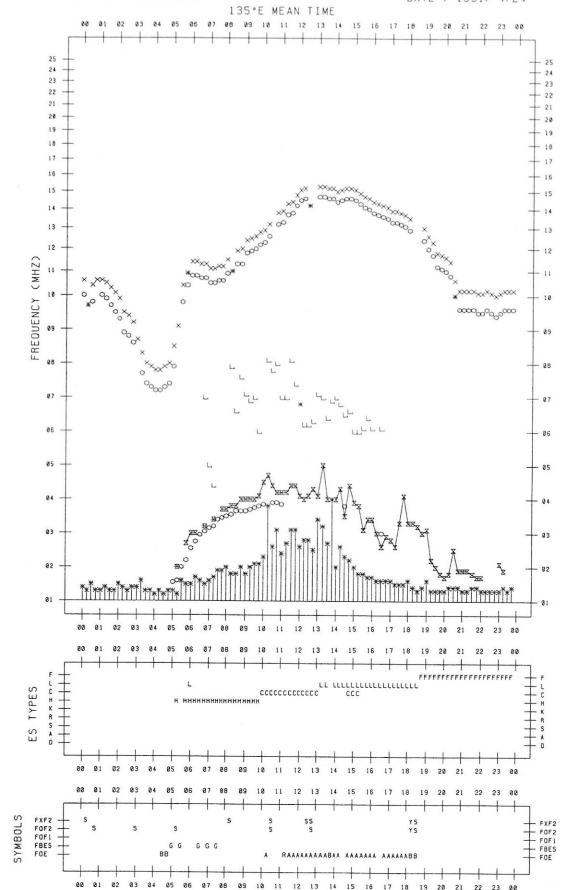
F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 4/22



F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI
DATE : 1991/ 4/24



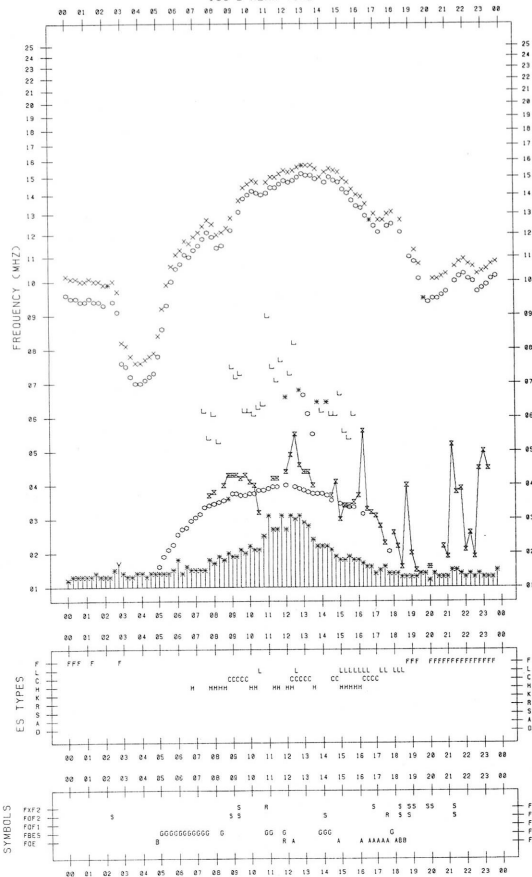
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/25

135°E MEAN TIME



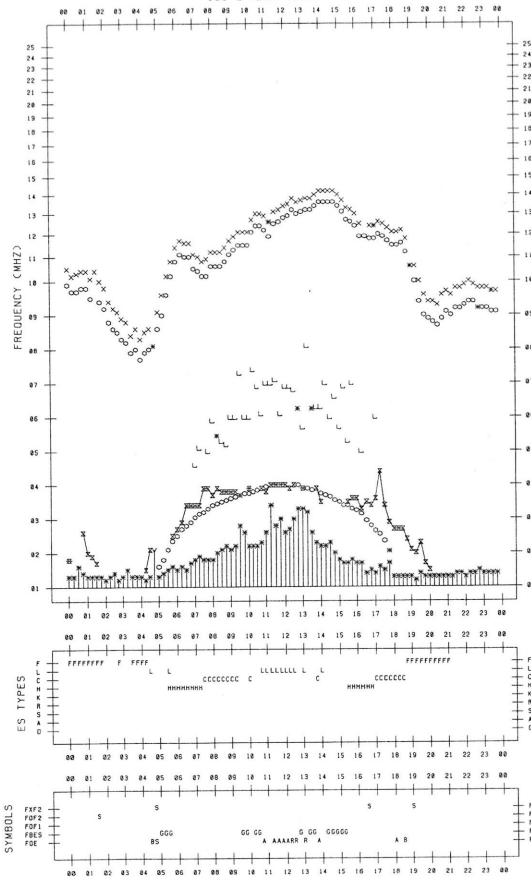
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/27

135°E MEAN TIME



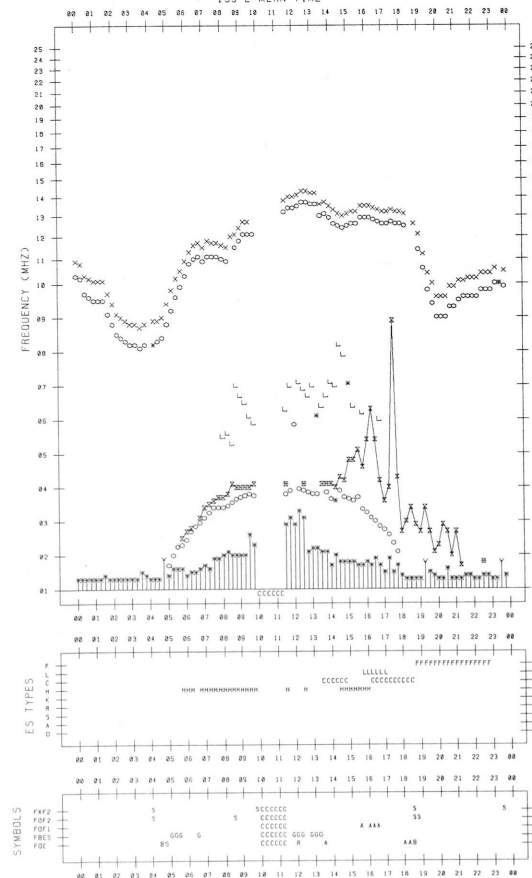
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/26

135°E MEAN TIME



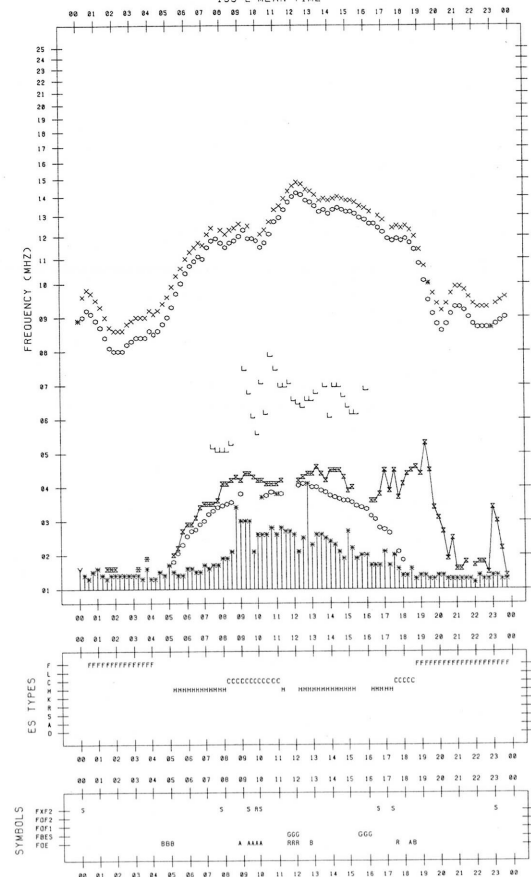
F-PLOT DATA

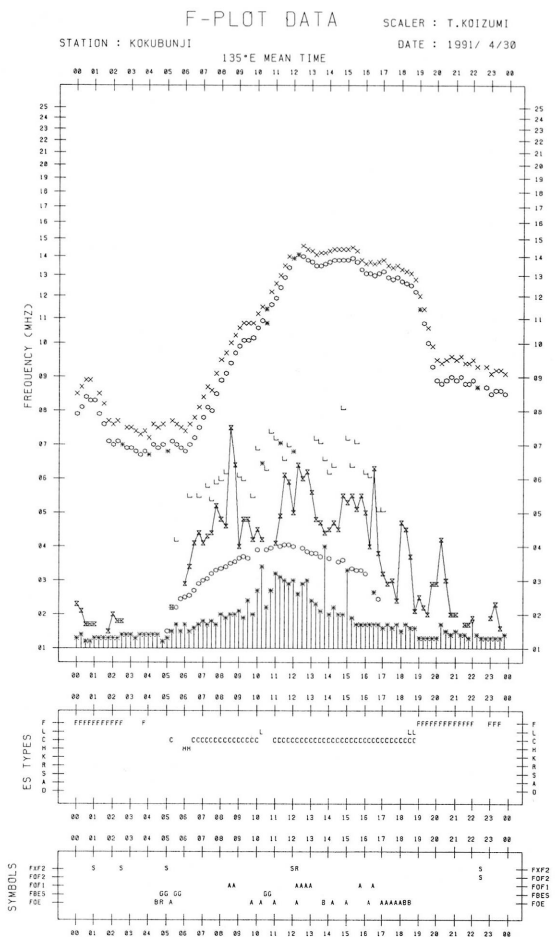
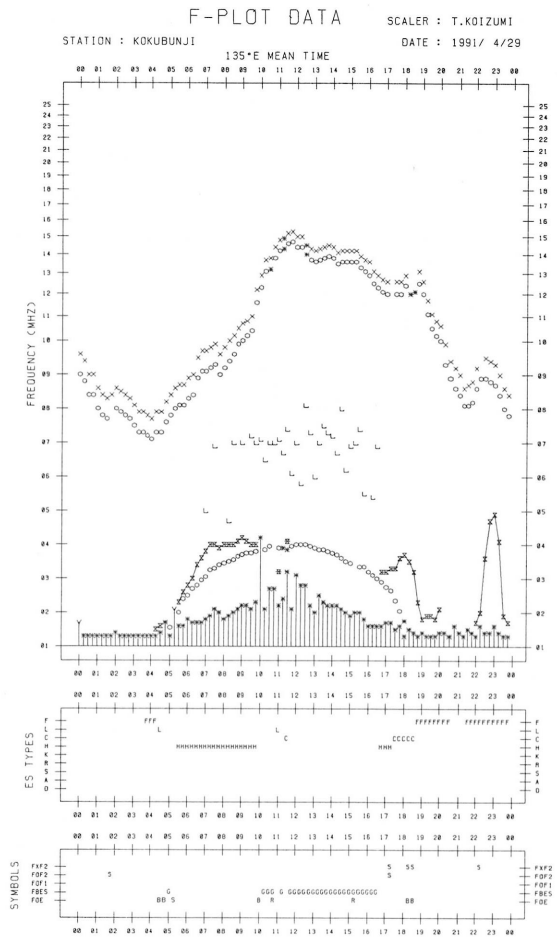
SCALER : T.KOIZUMI

STATION : KOKUBUNJI

DATE : 1991/ 4/28

135°E MEAN TIME





B. Solar Radio Emission
 B1. Daily Data at Hiraiso
 200 MHz

Hiraiso

April 1991

Single-frequency total flux observations at 200 MHz

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

VARIABILITY: 0 TO 3

UT DATE	00-03	03-06	06-09	21-24	DAY	00-03	03-06	06-09	21-24	DAY
1	12	11	11	11	12	0	0	0	0	0
2	12	12	12	13	12	0	0	0	0	0
3	14	13	13	12	13	0	0	0	0	0
4	12	11	12	12	12	0	0	0	0	0
5	12	11	12	12	12	0	0	0	0	0
6	11	12	12	12	12	0	0	0	0	0
7	12	12	12	10	12	0	0	0	0	0
8	*	12	12	*	11	*	*	0	*	0
9	*	*	*	12	*	*	*	*	0	*
10	12	12	12	12	12	0	0	0	0	0
11	11	12	12	12	12	0	0	0	0	0
12	12	*	*	13	12	0	*	*	0	*
13	14	11	11	12	13	0	0	0	0	0
14	12	12	13	12	12	0	0	0	0	0
15	12	12	12	12	12	0	0	0	0	0
16	12	12	12	12	12	0	0	0	0	0
17	12	12	13	13	12	0	0	0	0	0
18	*	10	10	11	12	*	*	0	0	0
19	11	11	11	B	11	0	0	0	1	0
20	B	B	B	10	B	1	2	2	0	1
21	10	*	*	10	10	0	*	*	0	0
22	10	10	10	13	10	0	0	0	0	0
23	12	10	10	10	12	0	0	0	0	0
24	10	10	10	10	10	0	0	0	0	0
25	10	10	10	10	10	0	0	0	0	0
26	*	*	*	10	*	*	*	*	0	*
27	10	10	10	10	10	0	0	0	0	0
28	10	10	10	11	10	0	0	0	0	0
29	11	12	11	12	11	0	0	0	0	0
30	12	13	13	12	12	0	0	0	0	0

B. Solar Radio Emission
 B1. Daily Data at Hiraiso
 500 MHz

Hiraiso

April 1991

Single-frequency total flux observations at 500 MHz

UT DATE	FLUX DENSITY: $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$				DAY
	00-03	03-06	06-09	21-24	
1	50	49	47	-	49
2	52	52	51	-	52
3	53	53	52	55	53
4	55	55	55	55	55
5	56	55	54	-	55
6	55	55	54	-	55
7	-	53	54	-	(53)
8	55	55	54	-	55
9	57	56	56	-	56
10	59	58	58	59	59
11	61	-	60	-	60
12	-	(63)	62	-	(62)
13	-	-	-	60	-
14	61	63	64	61	62
15	61	61	60	59	61
16	59	61	61	60	60
17	60	60	60	-	60
18	58	58	57	57	58
19	57	57	56	53	57
20	54	54	53	51	54
21	51	51	49	51	51
22	51	52	51	52	51
23	50	50	49	48	50
24	49	48	47	46	48
25	46	46	46	46	46
26	46	46	46	47	46
27	46	47	46	-	46
28	46	46	46	49	46
29	49	49	49	49	49
30	49	49	49	50	49

Note: No observations during the following periods.

1st 2100 - 2347	2nd 2040 - 2345	5th 0653 - 0830
5th 2040 - 2350	6th 2040 - 7th 0341	7th 2040 - 2350
8th 2040 - 2356	9th 2040 - 2346	11th 0300 - 0629
11th 2040 - 12th 0442	12th 2040 - 13th 0835	17th 2030 - 2333
19th 0000 - 0042	27th 2025 - 28th 0006	

B. Solar Radio Emission
B2. Outstanding Occurrences at Hiraiso

Hiraiso

April 1991

Single-frequency observations

Normal observing period: 2010 - 0910 (sunrise to sunset)

APR	FREQ.	TYPE	START TIME	TIME OF MAXIMUM	DUR.	FLUX DENSITY		POLARIZATION REMARKS	
						$(10^{-22} \text{Wm}^{-2} \text{Hz}^{-1})$			
1991	(MHz)		(U.T.)	(U.T.)	(MIN.)	PEAK	MEAN		
	2	100	48 C	2257.3	-	57	1000D	500U	-
		200	48 C	2257.3	2314.0	55	10000	600	ML
	4	500	8 S	0016.5	0016.6	0.7	260	-	WR
		500	6 S	0126.7	0126.7	1.0	8	3	WR
	6	500	46 C	0809.5	0814.2	11.5	1500	150	WL
	8	200	46 C	0610.6	0611.3	2.6	25	10	-
		100	46 C	0610.6	0612.0	2.6	100	30	WL
		200	42 SER	0727.3	0727.3U	9	250	-	-
		100	42 SER	0727.3	-	8.6	1000D	-	WL
	9	500	46 C	0316.0	0317.0	2.2	200	50	ML
		200	6 S	0316.6	0317.3	1.0	200	80	-
	10	500	6 S	2218.5	2220.5	4.0	9	3	WR
		500	8 S	2248.0	2248.5	0.6	17	10	0
	12	200	6 S	0337.4	0337.8	2.0	200	70	-
	14	500	46 C	0029.5	0029.5	3.0	15	5	0
		500	46 C	0324.0	0327.1	8.0	8	5	WL
		500	46 C	0540.7	0541.0	1.5	1000	120	WR
		100	42 SER	2106.6	2114.6	8.6	280	-	SL
		200	42 SER	2109.3	2115.0	17	150	-	ML
	15	200	42 SER	0008.1	0041.6	15	290	-	ML
		100	42 SER	0008.6	-	17	1000D	-	SL
	16	500	46 C	0134.0	0134.5	16	1300	10	0
		200	7 C	0140.0	0140.2	28	170	14	0
				0149.3			40		0
		500	42 SER	2303.8	2308.0	5.0	80	-	0
	17	500	42 SER	0651.9	0654.8	4.5	170	-	0
	19	200	44 NS	2030E	0630	750D	15	4	WR
	21	200	6 S	0011.1	0011.4	1.0	300	50	0
	24	200	6 S	0056.6	0057.3	1.3	10	4	WR
	25	100	6 S	0654.6	-	1.3	1000D	-	WL
		200	6 S	0654.6	0654.9	1.3	1300	200	0
	29	500	45 C	0433.0	0443.2	48	80	30	WR
		500	7 C	0537.0	0537.4	8.5	23	3	WR
		500	46 C	0620.5	0622.6	6.5	24	8	WR
	30	500	42 SER	0231.4	0240.0	9.0	2200	-	WR

C. RADIO PROPAGATION

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

APR 1991	FREQUENCY 15 MHZ																				BANDWIDTH 80 HZ				RECEIVING ANTENNA ROD 4.5 M				MEASURED AT HIRAISSO			
UT DAY	00H 46M	01H 46M	02H 46M	03H 46M	04H 46M	05H 46M	06H 46M	07H 46M	08H 46M	09H 46M	10H 46M	11H 46M	12H 46M	13H 46M	14H 46M	15H 46M	16H 46M	17H 46M	18H 46M	19H 46M	20H 46M	21H 46M	22H 46M	23H 46M								
1	ES -25	ES -25	-12	-3	8	19	23	23	24	24	19	27	26	14	15	12	21	28	14	13	5	ES -25	-13	ES -25								
2	-15	ES -24	-6	6	14	19	25	25	28	23	25	32	27	26	26	17	25	18	14	7	0	ES -23	ES -23	ES -23								
3	ES -24	ES -24	-12	6	7	12	18	27	34	26	27	28	23	13	19	21	-4	10	18	-1	7	ES -24	-12	ES -24								
4	ES -24	ES -24	-3	0	5	13	17	27	26	24	24	19	24	-12	ES -24	6	-6	ES -21	6	6	-3	ES -21	ES -21	ES -21								
5	ES -22	ES -22	4	7	18	27	25	33	31	29	33	32	26	22	23	17	23	22	13	0	16	2	ES -23	ES -23								
6	ES -23	-11	0	-5	16	19	24	28	23	30	30	28	30	28	23	26	23	22	14	5	-5	0	ES -23	ES -23								
7	ES -23	ES -23	-14	7	11	17	22	25	29	29	24	27	21	21	30	19	24	21	19	8	1	1	ES -24	ES -24								
8	ES -24	ES -24	-12	2	10	19	22	28	26	27	27	20	24	22	20	23	22	11	17	2	2	ES -24	ES -24	ES -24								
9	ES -24	ES -24	-12	9	8	20	26	21	29	30	23	27	20	22	32	18	28	28	12	7	0	ES -24	ES -24	ES -24								
10	ES -24	ES -24	ES -24	ES -24	6	22	22	27	25	23	26	23	27	22	24	28	25	23	13	2	ES -24	ES -24	ES -24	ES -24								
11	ES -24	ES -24	ES -24	ES -24	9	13	18	23	26	26	28	25	21	25	21	23	18	22	12	2	-12	ES -24	ES -24	ES -24								
12	ES -24	ES -24	ES -24	-12	-2	21	20	24	26	30	25	20	26	26	21	21	12	23	13	2	ES -24	ES -24	ES -24	ES -24								
13	ES -24	ES -24	-1	ES -24	9	10	16	22	26	26	26	25	27	23	22	20	16	16	16	9	-5	ES -24	ES -24	ES -24								
14	ES -24	ES -24	ES -24	-12	-12	17	21	26	21	26	33	30	32	26	22	32	18	16	7	-12	-9	ES -24	ES -24	ES -24								
15	ES -23	ES -23	ES -23	6	3	17	18	27	21	28	22	23	17	22	21	24	18	21	18	-1	ES -24	ES -24	ES -24	ES -24								
16	ES -24	ES -24	ES -24	2	3	16	17	26	20	26	21	22	18	22	21	22	19	21	18	-2	ES -24	ES -24	ES -24	ES -24								
17	ES -23	ES -23	ES -23	-11	0	12	18	18	22	23	24	22	17	23	17	23	11	23	4	2	-9	ES -24	ES -24	ES -24								
18	ES -23	ES -23	-2	3	3	18	22	25	28	26	26	25	28	25	22	23	26	18	25	7	ES -21	ES -21	ES -21	ES -21								
19	ES -23	ES -23	ES -23	-1	7	15	23	23	23	26	21	28	34	24	19	23	15	27	0	5	-6	ES -21	ES -21	ES -21								
20	ES -23	ES -23	ES -23	3	10	16	19	26	25	27	26	23	24	23	25	22	29	20	0	3	ES -23	ES -23	ES -23	ES -23								
21	ES -24	ES -24	ES -24	-9	10	16	18	23	25	26	26	22	22	20	19	26	21	20	10	5	1	ES -23	ES -23	ES -23								
22	ES -23	ES -23	-11	-2	10	10	22	23	27	24	33	28	26	21	22	25	24	19	9	8	4	ES -23	ES -23	ES -23								
23	ES -23	-8	-8	5	15	18	23	31	30	25	30	31	24	27	14	21	20	20	16	9	4	ES -22	ES -22	ES -22								
24	ES -24	ES -24	-6	5	17	18	21	24	27	23	26	26	16	17	16	22	16	21	4	10	6	ES -24	-9	ES -24								
25	ES -24	ES -24	-12	7	4	20	20	23	21	27	24	25	23	21	21	14	19	19	7	8	2	-3	-12	ES -24								
26	ES -23	-5	-5	0	12	15	18	22	25	26	25	25	24	25	16	24	22	16	3	2	7	ES -23	ES -23	ES -23								
27	ES -23	ES -23	ES -23	-5	15	17	22	24	29	28	28	28	28	25	23	21	20	13	9	3	3	-8	ES -23	ES -23								
28	ES -22	ES -22	-7	7	13	24	25	27	25	27	31	28	27	23	22	18	ES -22	18	6	4	12	4	ES -22	ES -22								
29	-8	ES -23	5	2	11	17	27	25	22	23	25	25	25	23	8	20	11	13	10	14	0	-8	-2	ES -23								
30	-12	-12	-9	9	15	20	23	21	29	26	26	26	24	15	17	8	-12	-1	1	-2	-12	-9	ES -24	ES -24								
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 -23	ES -24	-12	2	10	17	22	25	26	26	26	26	24	22	21	22	20	20	12	4	0	ES -23	ES -23	ES -24								
UD	-15	-11	0	7	16	22	25	28	30	30	33	31	30	26	26	26	26	27	18	10	7	1	-12	ES -21								
LD	ES -24	ES -24	ES -24	ES -24	0	12	17	21	21	23	21	20	17	14	14	12	-6	10	1	-2	ES -24	ES -24	ES -24	ES -24								

C. Radio Propagation

C2. Radio Propagation Quality Figures at Hiraiso

Hiraiso

Time in U.T.

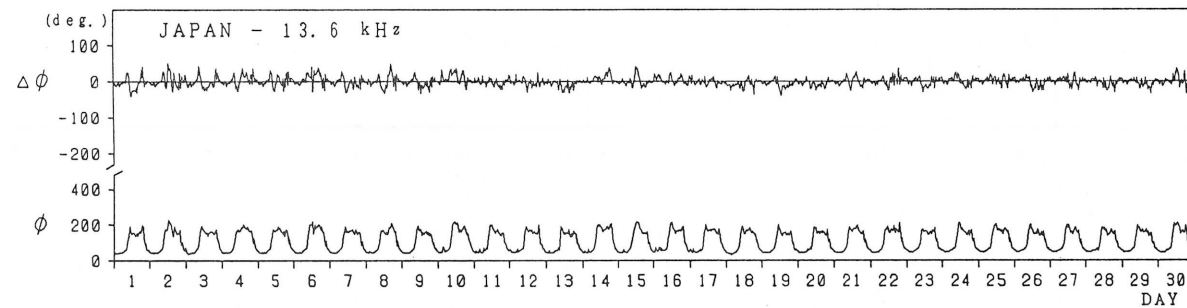
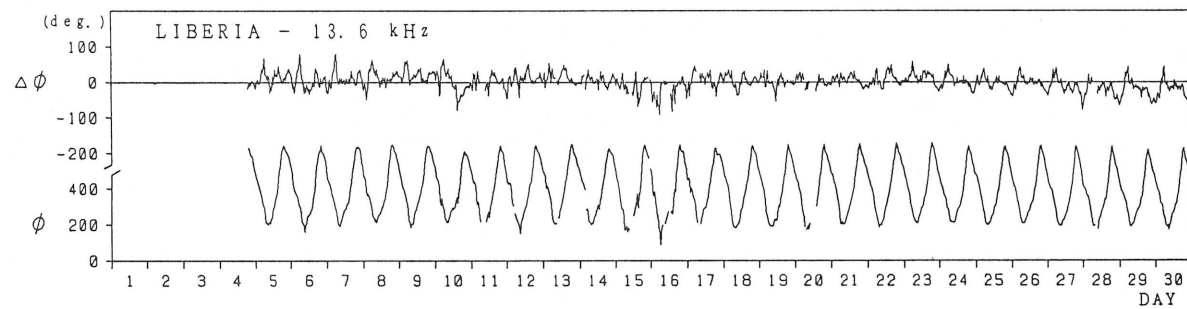
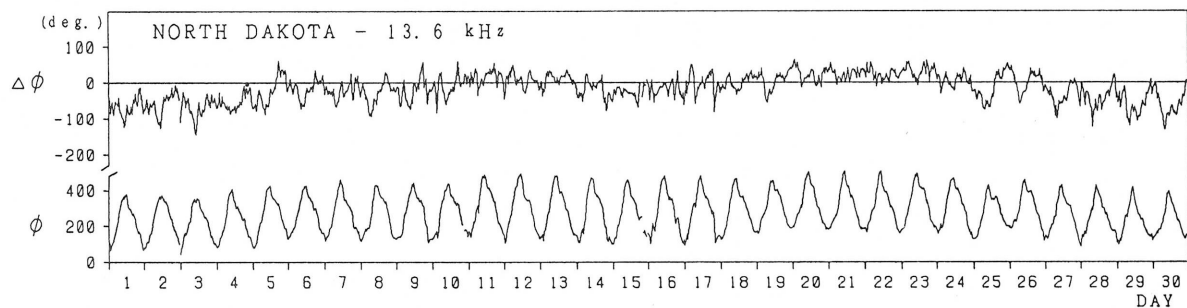
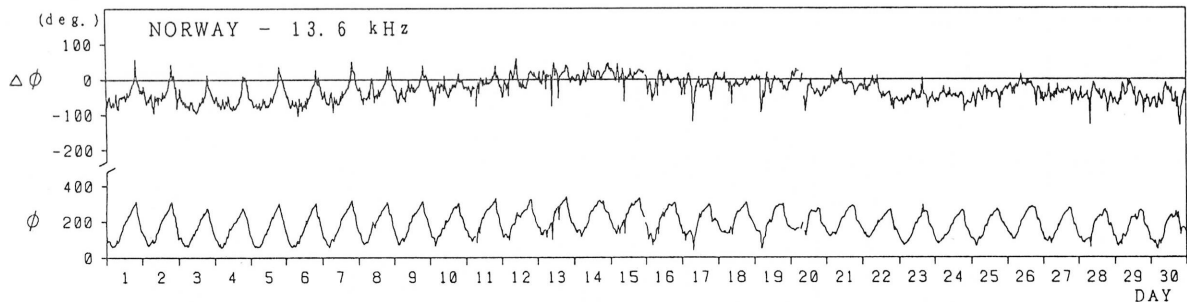
Apr. 1991	Whole Day Figure	W W V				W W V H				Conditions				Principal Geomagnetic Storms		
		00	06	12	18	00	06	12	18	00	06	12	18	Start	End	Range
														h m	h	nT
1	4o	3U	4	3	S	4	4	4	5	N	N	N	N			
2	3+	2U	2U	4	S	4	4	4	4	N	N	N	N			
3	3o	3U	1U	2U	S	4	4	4	4	N	N	N	N			
4	3+	4	3	2U	S	4	4	2	4	N	N	N	N	1122	----	153
5	4o	4	3	4	S	5	4	4	4	N	N	N	N	----	06	
6	4o	4	5	4	S	5	4	4	4	N	N	N	N			
7	4o	4	5	4	4U	4	4	4	4	N	N	N	N			
8	4o	4	4	4	5U	4	4	4	4	N	N	N	N			
9	4o	4	4	5	S	4	4	4	4	N	N	N	N			
10	3+	3U	3	4	S	3U	4	4	3	N	N	N	N			
11	4o	3U	5	4	4U	3U	4	4	4	N	N	N	N			
12	4o	4	5	4	S	3	4	4	3	N	N	N	N			
13	4o	4	5	4	S	3	4	4	4	N	N	N	N			
14	4-	3	4	4	4U	3	4	4	3	N	N	N	N			
15	4o	3U	5	4	4U	4	4	4	3	N	N	N	N			
16	4-	3U	5	4	S	3	4	4	3	N	N	N	N			
17	4-	3U	5	4	S	3	4	4	3	N	N	N	N			
18	4o	4	4	4	5U	4	4	4	4	N	N	N	N			
19	4o	4	5	4	S	4	4	4	3	N	N	N	N			
20	4o	5	5	4	S	4	4	4	3	N	N	N	N			
21	4o	3U	4	4	4U	4	4	4	4	N	N	N	N			
22	4+	4	5	5	S	4	4	4	4	N	N	N	N			
23	4+	5	5	5	5U	4	4	4	4	N	N	N	N			
24	4o	4	4	4	5U	4	4	4	4	N	N	N	N			
25	4-	4	2U	4	S	4	4	4	4	N	N	N	N			
26	4-	4	1U	3	5U	4	4	4	4	U	U	U	U			
27	4o	4	3	4	4U	4	4	4	4	U	U	U	U			
28	3o	2U	1U	2U	4U	4	4	3	4	U	U	U	U			
29	3o	3U	1U	2U	S	4	4	4	4	N	N	N	N			
30	3o	3	1U	3	4U	4	4	3	3	N	N	N	N			

C. Radio Propagation

C3. Phase Variation in OMEGA Radio Waves at Inubo

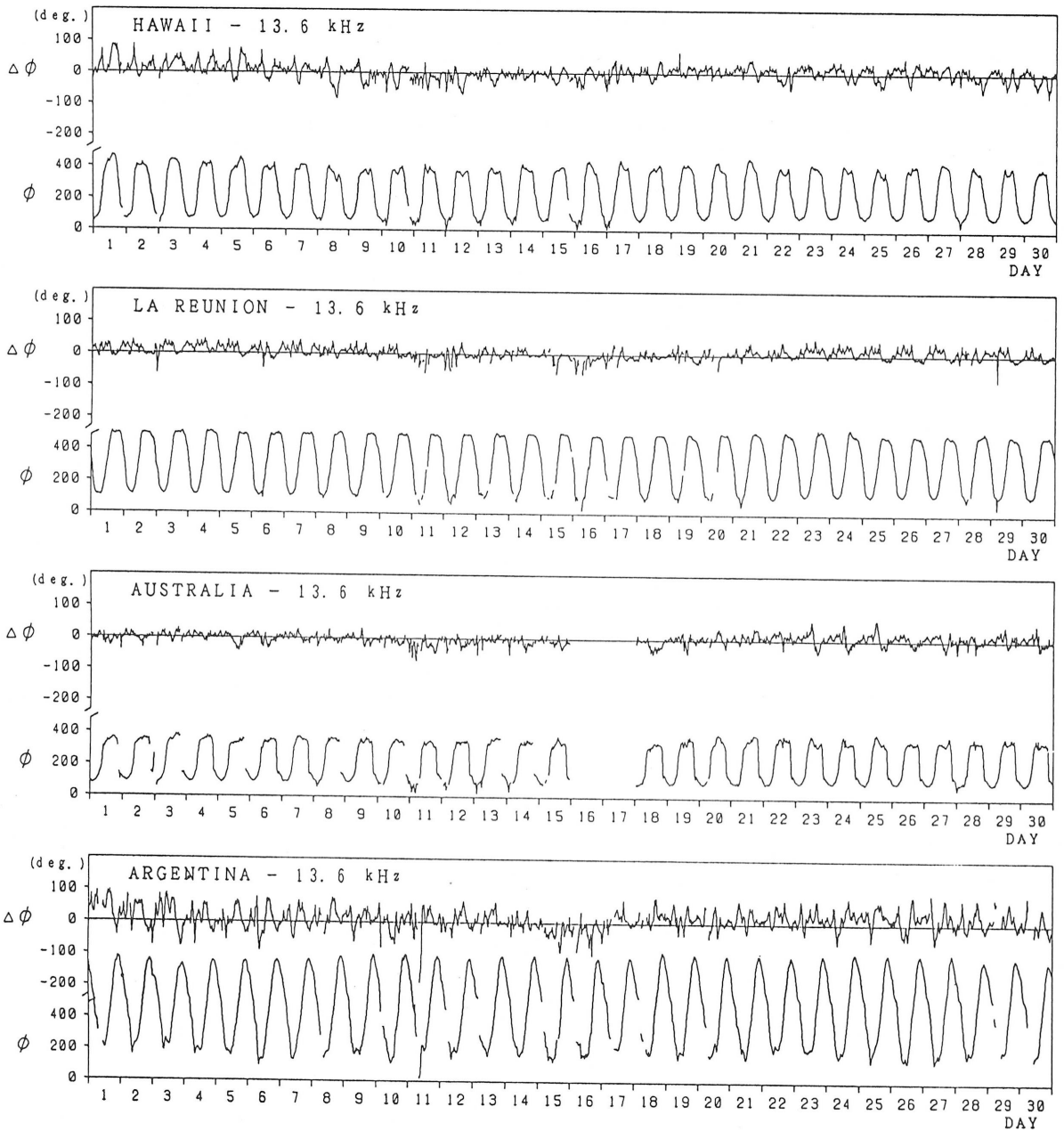
Inubo

April 1991



Inubo

April 1991



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

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Apr.01/2030	Apr.02/1823	Apr.02/1112	108.0
Apr.02/1848	Apr.03/1958D	Apr.03/1115	126.0
Apr.03/1958E	Apr.12/0600	Apr.04/1125	136.8
Apr.22/0853	Apr.25/1600	Apr.23/0207	88.2

C. Radio Propagation

C4. Sudden Ionospheric Disturbance

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

Hiraiso Time in U.T.

Apr. 1991	S					W				F				Correspondence	
	Drop-out Intensities(dB)					Start	Dur.	Type	Imp.	Solar * Flare	Solar Burst				
	CO	HA	1)	2)	3)										
2		x	6			0225	28	2	1-	x					
2			7			0305	19	2	1-						
2		22	27	15	16	2250	43	3	2	x	x				
2			17	x	x	2345	26	2	1+						
7			6	x		0028	19	2	1-	x					
8			16	8	8	0203	25	2	1+	x					
10			7			0045	17	2	1-						
10			7			0204	13	1	1-	x					
10		29	18	x	x	0320	17	1	1+	x					
10			8	x	x	0337	23	2	1-	x					
10					6	1509	17	2	1-	x					
11		10	18	x		0310	11	1	1+	x	x				
11	12	23	30	x	10	0608	44	2	2+	x					
11				x	16	0836	39	2	1	x					
11				x	17	1114	39	2	1	x					
13			13			0133	54	2	1-	x					
13				x	5	0520	20	1	1-	x	x				
13			22	x		0843	50	2	1+	x					
14			14			0114	29	2	1	x					
14			16	x		0326	54	3	1+	x					
14					10	1258	12	2	1-	x					
15			9	x		0345	30	2	1-	x					
15				15	18	0934	96	1	1+	x					
15					11	1430	23	2	1-	x					
15					13	1551	17	2	1-	x					
16			14	5		0103	31	2	1	x					
16			12	x		0134	25	1	1	x	x				
16			14	7		0305	20	2	1	x	x				
16			8	x		0344	17	2	1-	x					
16			6	x		0401	40	2	1-	x					
16				x	10	0814	26	2	1-	x					
16					14	1140	41	3	1+	x					
16					12	1344	34	3	1+	x					
16					10	1548	39	2	1-	x					
17			14	x		0021	29	2	1	x					
17			22	x		0141	35	2	2-	x	x				
17			22	x	9	0650	29	2	1-	x	x				
19					15	1047	23	1	1	x					
19				5	5	1257	10	2	1-	x					
20			15		11	0619	24	2	1	x					
20				20	x	0844	45	2	1+	x					
27			13			2336	10	2	1	x					
28	8		8			0012	32	2	1-	x					
28			7			0500	18	1	1-	x					
28			13		20	0748	37	1	1+	x	x				

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

(b) Sudden Phase Anomaly (SPA) at Inubo

Apr. 1991	S						P			A		
	Phase Advance (degrees)						Time (U.T.)					
	Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum		
1		—			9	6		0119	0144	0128		
1		—			5			0345	0402	0350		
1		—		9				0642	0702D	0654		
1		—		23	8			0702E	0744	0715		
1	33	—		13		117	112	2127	2308	2136		
1		—			7	3		2347	0017	2353		
2	6	—			—	3		0017	0046	0024		
2		—		14	—	10		0228	0302	0237		
2		—		31	14			0837	0917	0847		
2		—		11				1003	1057	1011		
2		—				15		2114	2151	2122		
2	42	—		71	120	133	100	2251	0307	2325		
3				14		18		2205	2310	2224		
4					11	3		0159	0226	0205		
4						9		2158	2225	2205		

Inubo

Apr. 1991	S P A						Time (U.T.)			
	Phase Advance (degrees)						Time (U.T.)			
	Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
5	12		9	<u>10</u>	7			0256	0314	0258
5		13	<u>12</u>					0949	1006	0956
6		47	<u>62</u>	54				0812	0951	0835
7	13		<u>26</u>	<u>29</u>	22	17		0024	0125	0036
7			11	10		<u>26</u>		0352	0451	0424
7			<u>15</u>	7				0814	0851	0822
7					22			2007	2033	2011
7					5			2320	2343	2327
7	8			—	<u>10</u>			2349	0030	0000
8	29	27	<u>62</u>	—	41	21		0203	0254D	0214
8	18*	11	<u>35*</u>	—	27*			0254E	0358	0321
8			<u>24</u>	—	5	10		0516	0547D	0523
8			17	—				0547E	0618	0554
8		16	<u>18</u>					0825	0852	0832
8		12						1502	1536	1518
9				—	5			0015	0038	0024
9	9			—	5	<u>15</u>		0103	0134	0115
9			16	—				0612	0711D	0623
9		10	<u>32</u>	15				0711E	0754	0721
9		<u>20</u>	15					0854	0938	0908
9		10						1500	1537D	1510
9		26						1537E	1627	1547
9					<u>50</u>	43		1844	1919	1852
9			6	6	<u>10</u>			2245	2317	2248
9				<u>8</u>	7			2355	0009	2359
10				<u>14</u>	12			0053	0126	0058
10			22	<u>18</u>	10	16		0202	0242	0212
10	50*	90*	<u>140*</u>	92*	68*	52*		0307	0456	0346
10		36*						1247	1346D	1319
10		25						1346E	1426	1358
10		53						1509	1607D	1526
10		24						1607E	1651	1615
10					<u>103*</u>	92*		2014	2119D	2034
10	24		7		<u>54*</u>	54		2119E	2221D	2139
10	22	12	27*	37*	<u>51*</u>	59*		2221E	2353	2246
11				<u>25</u>	17	20		0006	0034D	0023
11	20*	22*		<u>61*</u>	42*	46*		0034E	0221	0106
11		11	18	<u>21</u>	12	14		0224	0339D	0228
11	41	49	<u>102</u>	75	49	34		0311	0333D	0318
11	49	59	<u>109</u>	74	50	20		0333E	0453D	0346
11	25*	—	<u>98*</u>	58*	14	21		0453E	0602D	0536
11	114	—	<u>263</u>	143	51	70		0602E	0655D	0621
11	59	—	<u>131</u>	79		28		0655E	0809D	0659
11	89	—	<u>178</u>	51				0809E	1033	0846
11	39	—	<u>103</u>					1113	1249	1120
11		14						1434	1507	1446
11					21	<u>23</u>		1843	1947	1900
12	39	41	49	<u>86</u>	67	54		0007	0205	0040
12	30		<u>61</u>	55	29	25		0313	0419D	0338
12	22	15	<u>55</u>	47	23			0419E	0440D	0425
12	50	55	<u>127</u>	81	53	27		0440E	0711	0455
12	30	55	<u>54</u>	12				0801	0904	0818
12		25						1525	1647	1552
12					8			2033	2058	2038
12					15			2158	2241	2206

Inubo

Apr. 1991	S			P			A		
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
12	22*			<u>28*</u>	26*	24*	2320	0025D	2338
13	17	11	16	<u>24</u>	19	23	0025E	0116	0029
13	46	42	59	<u>95</u>	45	44	0136	0252D	0151
13	<u>28</u>	10	13	13	9		0237E	0313	0252
13	47	—	<u>93</u>	70	23	28	0519	0654	0526
13	130	—	<u>181</u>	63			0843	1021	0854
13		11					1528	1600	1542
13					9*	<u>15</u>	2147	2228	2200
13					6		2301	2328	2306
14				7	4	<u>13</u>	0011	0028D	0021
14	15	8	14	24	22	<u>36</u>	0028E	0102D	0045
14	32	20		51	33	<u>39</u>	0102E	0216	0131
14	53	66	<u>106</u>	74	54	33	0330	0541D	0403
14	22	22	<u>55</u>	38	21		0541E	0657	0546
14			10				0844	0904	0850
14		15					1032	1108	1044
14		14					1138	1213	1151
14		<u>52</u>	7				1300	1402	1313
14		12					1504	1539	1515
14					10		2035	2110	2044
14				13	<u>15</u>		2328	0009	2341
15	14		12		<u>15</u>		0039	0116	0050
15	<u>18</u>	11	12	—	4		0217	0241	0225
15	<u>15</u>	14	—	—	5		0312	0347	0329
15	31*	34	<u>72*</u>	—	27*	29*	0346E	0545D	0359
15	11		<u>20</u>	—			0545E	0612D	0557
15	43	52	<u>83</u>	—	23	27	0612	0658D	0627
15	23	37	<u>39</u>	—			0658E	0743D	0704
15	13	10	<u>15</u>	—			0743E	0814D	0747
15	31	44	<u>42*</u>	8			0814E	0904D	0825
15		48	<u>26</u>				0904	0930D	0918
15	129*		<u>249*</u>	36			0930E	1232	0944
15		25					1156	1250	1214
15		100					1400	1552D	1454
15		95					1552E	1717	1605
15					<u>100</u>	119	1859	2006D	1918
15					<u>33</u>	55	2006E	2102D	2019
15					17	<u>27</u>	2100	2140	2113
15			12	12	<u>15</u>		2337	0003D	2342
16				<u>12</u>	10		0003E	0036	0013
16	68	66	59	<u>87</u>	76	65	0057	0137D	0116
16	90	84	78	<u>100</u>	89	77	0137E	0248D	0143
16	24	9	<u>15</u>	13	10		0242E	0305D	0253
16	47	34	<u>67</u>	47	32	36	0305E	0342D	0311
16	99	64	<u>167</u>	104*	66*	64*	0342E	0510D	0414
16	64	84	<u>106</u>	67		10	0510E	0604D	0530
16	66	<u>126</u>	<u>118*</u>	69	16	14	0605E	0753	0625
16			<u>15</u>	5			0726E	0738	0730
16	61	60	<u>101</u>	28			0814	0852D	0825
16	36	52	<u>59</u>	24			0852E	0939	0857
16		10	<u>7</u>				1053	1112	1057
16		<u>83</u>	46				1141	1315	1217
16		53					1348	1508	1411
16		95					1547	1656	1613
16				—	14		2021	2048	2026

Inubo

Apr. 1991	S			P			A		
	Phase Advance (degrees)						Time (U.T.)		
Date	Ω/N	Ω/L	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
16					9		2128	2152	2134
16					6		2153	2209	2200
16	23		14	19	<u>43</u>	27	2217	2237D	2224
16	31		20	24	<u>54*</u>	42	2237E	2325D	2248
16	43*	33	29	61*	<u>63*</u>	48	2325E	0025D	0001
17	36	28	31	57	<u>53</u>	39	0025E	0126	0032
17	49	57	82	<u>76</u>	59	52	0146	0243D	0154
17			13	<u>18</u>	11		0243	0335	0256
17	75	134	<u>170</u>	102	28	59	0651	0934	0704
17		17					0949E	1025	1008
17		12					1619	1651	1638
17					6*	<u>18</u>	2142	2205	2146
17		9			6	<u>11</u>	2236	2300	2241
17	17			10	9	<u>21</u>	2348	0027	0005
18	21	13		<u>25</u>	19		0043	0130	0056
18	16	9		<u>20</u>	13		0140	0205	0147
18			<u>14</u>	10	4		0237	0302	0247
18	32	24	<u>40</u>	29	18	19	0526	0611	0535
18			<u>14</u>	8	12		0642	0717	0647
18					<u>16</u>	16	1842	1902	1847
19				<u>6</u>	4		0052	0100	0054
19	17	11	23	<u>22</u>	14		0109	0148	0115
19				<u>14</u>	7		0205	0233	0209
19			6	<u>8</u>			0320	0335	0323
19		10	18	<u>17</u>	9		0339	0409	0348
19			9	<u>11</u>			0454	0527	0507
19			<u>40</u>	18	17		0654	0757	0701
19	37	—	<u>76</u>				1048	1210	1056
19	9	<u>28</u>					1303	1353	1317
19					12	<u>13</u>	2111	2136	2115
19	14	11	18	<u>25</u>	16	18	0236	0308	0242
20			<u>15</u>	13			0503	0610	0532
20	112	—	<u>169</u>	97	59	35	0615	0757	0633
20	109	—	<u>168</u>	53			0842	0939D	0904
20	99		<u>211</u>				0939E	1243	1018
20					15	<u>20</u>	2139	2153D	2145
20					17	<u>23</u>	2153E	2223	2157
21	23	19	<u>44</u>	34	18	29	0450	0533D	0507
21	39	39	<u>74</u>	50	17	33	0533E	0715	0546
21					10	<u>16</u>	2117	2149	2121
22	21	10	9	—	23	<u>29</u>	0048	0147	0058
22		<u>18</u>	12	—			0711	0749	0719
22					9		2156	2214	2202
23			<u>13</u>	11	6		0403	0435	0409
27					4		2208	2230	2216
27	49	37	53	73	<u>77</u>	52	2328	0020D	2341
28	10	18	35	<u>45</u>	43	20	0020E	0122	0030
28			5	<u>6</u>			0431	0445	0437
28	22	46	<u>67</u>	55	23	24	0457	0543D	0506
28		32	<u>31</u>	26			0543E	0651	0600
28	79	—	<u>187</u>	100	17	35	0747	0932	0756
29			9				0920	0950	0927
30		11	<u>11</u>	<u>16</u>	9	19	0240	0316	0242
30		23	<u>29</u>	28	8	18	0459	0550	0505
30			<u>15</u>	6			0721	0750	0728
30		28	<u>47</u>	9			0826	0928	0832

IONOSPHERIC DATA IN JAPAN FOR APRIL 1991

F-508 Vol.43 No.4 (Not for Sale)

電離層月報 (1991年4月)

第43卷 第4号 (非売品)

1991年8月14日 印刷

1991年8月20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

☎ (0423) (21) 1 2 1 1 (代)

Queries about "Ionospheric Data in Japan" should be forwarded to:
Communications Research Laboratory, Ministry of Posts and Telecommunications,
2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN.