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IONOSPHERIC DATA IN JAPAN

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《 Real time Ionograms on the Web····· *http://wdc-c2.crl.go.jp/index_eng.html* 》

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INTRODUCTION

This Series contains data on ionosphere (I) , solar radio emission (S) and radio propagation (P) obtained at the following stations under the Communications Research Laboratory, Independent Administrative Institution in 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)
Kokubunji	35°42.4'N	139°29.3'E	25.5°N	205.8°	Vertical Sounding	(I)
Yamagawa	31°12.1'N	130°37.1'E	20.4°N	198.3°	Vertical Sounding	(I)
Okinawa	26°40.5'N	128°09.2'E	16.5°N	161.7°	Vertical Sounding	(I)
Hiraiso	36°22.0'N	140°37.5'E	26.3°N	206.8°	Solar Radio Emission	(S)
Inubo	35°42.2'N	140°51.5'E	25.6°N	207.0°	Radio Receiving	(P)

A. IONOSPHERE

Ionospheric observations are carried out at the above four stations in Japan by means of vertical sounding using ionosondes. The ionosonde produces ionograms, which are recorded digitally on computer storage medium. 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*).

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 Hand-book of Ionogram Interpretation and Reduction (Second Edition) 1972 " and its revision of chapters I-4, published in July 1978.

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *Es*.

B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.

C Measurement influenced by, or impossible because of, any non-ionospheric reason.

D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.

E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.

F Measurement influenced by, or impossible because of, the presence of spread echoes.

G Measurement influenced by, or impossible because the ionization density of the layer is too small to enable it to be made accurately.

H Measurement influenced by, or impossible because of, the presence of a stratification.

K Presence of particle *E* layer.

L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.

M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.

N Conditions are such that the measurement cannot be interpreted.

O Measurement refers to the ordinary component.

P Man-made perturbations of the observed parameter; or spur type spread *F* present.

Q Range spread present.

R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.

S Measurement influenced by, or impossible because of, interference or atmospherics.

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

V Forked trace which may influence the measurement.

W Measurement influenced or impossible because the echo lies outside the height range recorded.

X Measurement refers to the extraordinary component.

Y Lacuna phenomena, severe layer tilt.

Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.

D Greater than.

E Less than.

I Missing value has been replaced by an interpolated value.

J Ordinary component characteristic deduced from the extraordinary component.

M Mode interpretation uncertain.

O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

U Uncertain or doubtful numerical value.

X 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 part *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 200, 500 and 2800 MHz are carried out at Hiraiso. The observation equipment consists of three parabolic antennas, one with 10-meter diameter for 200 MHz Measurement, one with 6-meter diameter for 500 MHz measurements and one with 2-meter diameter for 2800 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 are tabulated for 500 MHz measurements. The intensities are expressed by the flux density in 10^{-22} Wm^{-2} Hz^{-1} unit.

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 200, 500 and 2800 MHz during a month.

Listed in the table are the date, frequencies, the type of event, the start time and the time of maximum, both in U.T.

expressed in hours, minutes and tenths of a minute, the duration in minutes, the peak and mean flux densities in 10^{-22} Wm^{-2} Hz^{-1} unit, and the polarization.

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

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

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

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

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.

B3. Summary Plots of F10.7 at Hiraiso

The 10.7 cm solar radio flux at Hiraiso is plotted over a one month period. The 10.7 cm flux ($F_{10.7}$) is determined by adjusting the 10.7 cm radio flux measured at Hiraiso to the Pentincton 10.7 cm radio flux. The figure on the right-hand side shows the $F_{10.7}$ index estimated at Hiraiso.

The following symbols are used in the $F_{10.7}$ index:

*	Measurement made not at 3h U.T..
B	Measurement affected by bursts.

C. RADIO PROPAGATION

C1. 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.

C2. 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	/N	13.6	10	7820
Liberia	06°18'N	010°40'W	/L	13.6	10	14480
Hawaii	21°24'N	157°50'W	/H	13.6	10	6100
North Dakota	46°22'N	098°20'W	/ND	13.6	10	9140
La Reunion	20°58'S	055°17'E	/LR	13.6	10	10970
Argentina	43°03'S	065°11'W	/AR	13.6	10	17640
Australia	38°29'S	146°56'E	/AU	13.6	10	8270
Japan	34°37'N	129°27'E	/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. 2002

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

APR. 2002

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G		G	G		52	G	G			G		G	G	36	G	G		G
2	G	G	G	G	G	G	G	G	G	G	G		G	G	51		G	G	G	G	G	G	G	G
3		G	G	G	G	G	G		G	G	G	G	G	G	G	G	G			G	G	G	G	G
4	G	G	G	G	G	G		G		G	G	G	G	G	G	G	G	38	32		G		G	G
5	G	G	G	G	G	G	G	35		G	G		G	G	G	G	G	G	G	G	G	G		
6	G	G	G	G		G	G	G	G	G	G	G	G	G	G		G	32	G	G	G	G	G	
7	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	40	G	G	G	G	G
8	G	G	G	G	G	G	G	39	G	G	G		G	G	G	G	G		G	G	G	G		G
9	G	G	G	G	G	G	G	38	40	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
10	G	G	G	G	G	G		39	G		G		G	G	G	G	G	G		G	G	G	G	
11	G	G	G	G	G	G		40	40	G	G	G	G	45	G	G	62	32			G	G	G	G
12	G		G	G	G	G		37	39	G	G		G		G	G	G	G	G		G	G	G	
13	G	G	G	G	G	G			39	G	G	G		G	G		G		44	G		G	G	G
14	G	G	G	G	G	G	G	G	G	G		G		G	G		G	G	30	G	G	G	G	G
15		G	G	G	G	G	33	38	50	42	G	G	G	G	G	G	44	G	G	G	G	G	G	G
16	G	G	G	G	G	G	33	38	40	G	G	44	G	G	G	G	G	32	G	G	G		G	G
17	G	G	G	G	G	G	32	G	G	G	G	G	G	G	G	G	46		29	41	27	G	G	G
18		G	G	G	G	G			G	G	G	51	58	G	G	G	G		G	G	G		G	G
19	28	31	40	28	25	31	G	G	47	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	72	55	46	56	52	44	39	G	31		G	G		46
23	27	G	G	G	G	G	G	G	G	59	65	G	G	G	G	G	G	G	43	46	40	G	G	G
24		G	28	32	29	G	42	54	45	57	48	56	47	G	G	47	47	39	G	31	38	G	45	68
25	68	48	43	31	G	32		G	G	57	62	G	G	G	G	G	G	G	G	G	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	G	G	G	G
28	G	G	G	G	G	G	34		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
29	G	G		G	27	G	G		G	G	44	46	G	47	44	G	G	G	36	39	G	G	G	G
30	G	G	G	G	G	G	G	G	G	45	58	45	60	G	G	41	54	48	38	36	36		50	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	26	26	27	26	27	17	21	25	25	25	22	25	25	26	23	26	22	24	23	26	22	22	23
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	32	38	39	G	46	44	G	G	G	G	G	32	31	31	G	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Wakkanai

APR. 2002

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	18	18	17	16	16	20	15	17	20		21	23	24		22	20	18	15	20	15	17	16		17
2	17	17	21	15	21	18	27	18	17	20			23	22	22	18	20	16	20	15	15	18	17	18
3		17	17	17	18	18	27	16	18	20	22	23	23	21	21	21	17	16		17	18	17	18	17
4	18	18	17	16	20	20	28	17	18	21	23	23		21		23	20	14	15		18		18	18
5	18	16	16	15	20	20	26	16	21	21	20		23	22	20	18	20	16	20	15	17	17	16	17
6	18	16	17	20		20	15	15	18	20	22	24	23	29	20		20	15	18	15	18	16	18	28
7	17	16	15	20	17	20	15	15	20	18		24	48	22	22	20	17	15	20	15	16	16	15	17
8	16	17	17	17	17	20	27	16	18	18	21		24	28	21	20	17	15	20	15	17	16		17
9	16	18	16	16	16	21	15	15	18	20	34	24	27	22	22	20	20	16	21	15	16	21	22	16
10	17	18	17	16	17	20	15	17	20					26	20	21	18	16	20	15	16	16	16	
11	17	17	17	17	20	18	15	17	20	21	23		26	24	22	20	18	15	16	15	17	17	20	17
12	18		17	15	16	20	15	17	18	22	23		24			20	20	15	22	15	17	17	17	
13	20	18	17	17	17	20	15	16	18	20	23	23	23	21	21	20	16		21	15		17	17	17
14	20	18	17	20	17	21	15	20	18	20		24		50	23		20	16	15	15	17	16	17	18
15		18	17	18	20	21	15	17	20	27		34	34	53	49	27	20	16	22	15	17	17	17	17
16	17	20	18	20	17	21	15	16	20	22	23	28	23	33	22	21	18	15	22	15	17		18	18
17	17	18	18	17	17	21	15	16	20	20	21	21	23	20	20	18	16		20	15	17	18	22	20
18	20	18	20	20	18	22			18	22	21	20	22		23	20	24	15	21	15	16	17	23	22
19	17	18	15	16	20	17	16	18	18	21	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C		22	23	22	21	18	17	16	15	17	21	21		16
23	18	20	18	18	18	22	28	18	24	23	22	28	33		24	20	21	20	18	15	15	17		18
24	16	17	17	15	16	21	17	21	20		26	22		23	22	18	21	17	16	15	15	20	16	15
25	18	15	18	17	17	17	15		20	22		26	24	27	21	21	18	16	23	16	16			18
26	17	18	17	17	17	24	18	20	20	21	22		22	23	21	18	20	17	18	20	20	16	17	17
27	17	17	17	20	20	21	16	16	20	20		24		22	22	20	20	18	23	15	17	16	17	18
28	17	17	18	17	20	22	16	15	21	20	21	24	22	24	20	20	18	15	21	16	17	17	20	18
29	16	17		22	18	21	15	18	20	20		26	24	22	20	20	16	16	15	15	16	15	18	
30	18	17	17	18	20	21	15	17	18	20		23	20	24	21	22	20	15	17	15	17		15	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	25	26	26	27	26	27	26	25	27	24	17	20	22	23	25	25	27	25	26	26	26	23	22	24
MED	17	18	17	17	18	20	15	17	20	20	22	24	23	23	21	20	20	16	20	15	17	17	17	17
U Q	18	18	18	20	20	21	18	18	20	21	23	25	24	27	22	21	20	16	21	15	17	17	18	18
L Q	17	17	17	16	17	20	15	16	18	20	21	23	23	22	20	19	17	15	17	15	16	16	17	17

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

APR. 2002

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	94	94	94	68	67	94	85	117	150	150	138	152	151	154	134		126	126	116	92	80	94	87	93
2	81	93	95	73	59	55	92	116	132	126		136	131	137	141	151	126	122	115	99	81	95	83	87
3	83	91	94		95	70	94	115	118	122		134	136	129	129	131			123	93	82	94	91	91
4		114	94		69	67	94	104	116	113	123	123	123	131	122	122	123	124	116	84	95	88	100	115
5	94	100	95	91	94	66	92	104	121	126	124	127		118	126		123	117	113	93	94	95	100	97
6	94	93	93	82	92	68	92	114	116	114	117	120	118	121	122	123	120	123	117	101	94	100		94
7	94		94	77	90	68	93	113	118	115	125	136	132	130	130	126	127	118	116	103	94	101		92
8	98	95	93		93	84	98	112	113	122	115	126	123	123	124	119	112	114	118	95	92	92	85	93
9		115	112	81	94	95	95	112	125	118	122		132	130	132	120	117	115	109	115	92	96	97	98
10	98	94	90	94	73	95	101	116	126		127		133	126	126	124	117	115	121	114		115	91	97
11	115	81	82	82	80	80	114	120	123		117	127	130	126	127	120	116	111	110	115	84	94	85	92
12	94	81		81	95	89	104	116	117		127	128	133		132	121	121	118	118	117	115	92	92	95
13	94	94	94	73	69		95	116	123		133	133	134	135	135	132		124	112	99	86	94	93	
14		94	99	68	64		83	117	125	127	136	140	140	138	131	134	130	125	122	116	91	94	92	88
15	83	81	79	94	69	69	97	121	131	129	138	142	151			127	125	123	120	117	94	93	93	93
16	94	94	94	81	94	94	106	114	116	111	122	125	131	132	133	125	118	113	114	116	93	81		93
17	93		93	82	80	81	94	115	116	118	121	117	122	149	132	132	120	122	126	112	93	96	94	91
18	81	98	82	77	69	77			117	122	132	121	124	121	124	119	110	113	110	100	81	94	93	82
19	72	95	69	69	58	92	94	96	121	103		101	98	96	95	96	96	92	91	94	68		68	67
20	57	63	59			59	94		116	107	112	118	130	121	126	110	115	113	117	94	71	68	68	
21	91	69	58	51	54	63	59	68	75	84	98			108	102	105	91	96	101	94	80		94	69
22	93	95	95	71	63	69		87	116	102	107	111	118	121	117	114	123	114		97		92	92	93
23		93	94	81	76	95	114	113	116	114	115	118	125	129	150	132	132	126	116	124	81	92	95	67
24	71		68	56	64	74	94	95	103	116		129	132	127	153	134	127	123	118	116	93	86	93	90
25		94	95	94	73	95	94		102	103	104	110	112	110	113	115	114	114	116	116	84	59	95	81
26	94	95	94	81		94	94	102	105		116	120	127	129		130	132	126	124	116	96	96	92	94
27	93	91	94	91	70	75	98	114	116	117	116	117	120	123	128		126	126	131	118	99	98	94	116
28	93	92	94	93	80	93	98	116	117	117	112	112	117	118	121	106	107	105	103	92	81	83	82	94
29	81	99	95	71	53	69	92	113	114	97	101	117	113	116	119	110	116	117	116	116	93	94	90	82
30	94	94	94	68	58		115	116	114	103	110	112	107	111	113	103	100	96	94	92	92	74	79	92
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	25	27	29	26	28	27	28	27	30	25	26	27	28	28	28	27	28	29	29	30	28	28	27	28
MED	93	94	94	81	72	77	94	114	116	116	119	123	128	126	126	122	120	117	116	102	92	94	92	92
U Q	94	95	94	82	91	94	98	116	123	122	127	133	132	130	132	131	126	123	119	116	94	95	94	94
L Q	82	91	86	71	64	68	92	104	116	105	112	117	119	119	121	114	114	113	111	94	81	90	85	87

HOURLY VALUES OF fEs AT Kokubunji

APR. 2002

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	34	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	G	G	G	G
3	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	38	42	29	G	G	G	G	G
4	G	31	G	G	G	G	G	G	G	G	G	50	G	G	G	G	G	43	33	G	G	G	G	G
5	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	G	G	G		G
7	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	G	G	G	G	G	G
8	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	45	38	G	31	28	G	G	G	G
9	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33	30	31	G	28	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	23		G	G	G
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G		G
12	G	G		G	G	G	G	G	G	G	G	47	G	G	G	G	G	G	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	43	G	G	36	22	G	G	G
14		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	34	27	G	G	G	G
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	46	G	G	56	43	52	49	33	36	48	G	G	25
17	G	G	G	G	G	G	G	G	G	G	G	73	56	G	G	G	G	42	42	28	G	23	27	35
18	G	43	G	G	G	G	G	G	G	G	58	G	G	G	G	G	G	G	G	G	G	G	G	G
19	G	G	G	G	G	26	G	G	55	54		G	G	G	G	G	G	34	G	G	G		G	43
20	G	G	G			G	G	G	G	G	46	G	G	G	G	43	G	G	G	24	30	37	G	34
21	24	35	37	24	G	G	G	50	G	G	G			G	G	G	G	G	G	34	G	G	G	33
22	33	G	31	59	40	37	G	G	G	G	47	G	G	58	G	G	123	65	96	G		37	27	G
23	G	G	G	G	G	G	G	37	48	G	G	G	G	G	G	G	G	G	G	G	34	34	73	34
24	33	33	41	42	29	G	G	G	G	G	46	G	66	G	G	G	G	G	G	G	G	G	G	G
25	25	G	G	G	G	32	G	G	G	G	G	51	G	47	58	45	G	G	G	42	32	34	G	G
26	G	G	G	G	G	G	G	G	G		G	G	G	G		58	G	G	G	29	G	25	G	G
27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	25	G	G
28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	37	G	G	G	27	G
29	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	30	34	G	G	44	28
30	G	30	G	G	22	G	G	52	57	G	G	54	G	G	G	G	G	41	36	61	57	33	33	41
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	28	29	30	30	30	30	28	28	29	29	30	29	30	30	30	30	30	28	29	28	30
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	33	31	G	25	G	25
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Kokubunji

APR. 2002

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	13	13	13	13	13	14	24	13	17	22		48	49	47	44	18	14	14	22	13	14	13	14	13
2	14	14	13	13	14	14	25	14	15	18		44			46	21	14	15	20	14	14	14	13	14
3	13	13	14		14	14	17	14	17	20		46	43	42	46	20	20	15	14	13	14	13	14	15
4	14	13	13	13	13	13	17	14	18	22	18	33		26	25	21	18	14	14	14	13	13	13	13
5	13	14	13	14	13	14	25	14	17	20	23		53	45	44	20	17	14	14	14	14	14	14	13
6	13	14	13	14	15	14		18	17	24			48	44	26		18	15	14	17	13	14		14
7	13		14	14	14	14	25	18	17	24		49	47			22	17	13	18	14	14	15	14	14
8	13	13	13	13	13	14		17	17	18	23					46	20	15	14	13	13	14	14	13
9	13	13	14	14	13	13		21	20	23		45	54	44	44	23	25	15	14	13	14	13	14	13
10	14	13	13	13	14	14		21	21	18	47	47	45			17	15	14	14	14		13	14	13
11	13	14	13	13	13	14	21		18	18	21	50	48		25	20	17	14	13	14	14	13	13	14
12	13	14		13	13	15	26	18	17	20	46	47	47	47	48	26	17	18	14	14	13	13	14	13
13	14	14	14	14	13	15	26	17	21						25	22	17	13	21	14	14	13	14	18
14		13	13	14	15	15			21	25	47	68				22	21	13	15	14	15	13	14	14
15	13	14	14	13	14	15	13	20	18		50			65	50	26	20	17	21	14	14	14	14	14
16	13	13	13	14	13	17	18	14	18			48				25	17	15	15	14	13	14	13	13
17	13	13	14	14	14	17	15	17	15	17			42			22	17	17	14	14	13	14	13	14
18	13	14	13	14	14	14		15	20	18		48	49				40	18	22	14	14	14	14	14
19	14	13	14	15	13	17	22	13	17	18		56	48	46	44	17	18	15		14	14		14	13
20	14	14	13			18	13	15	14	20						30	18	14	23	14	14	13	13	13
21	15	13	13	14	17	24		18	17					71	60		25	15	22	13	13	13	13	14
22	13	13	13	13	13	13	18	23	26	23	40	55			47	46	14	13	14	13		13	13	14
23	14	14	14	13	14	15	18		21						30	25	13	14	22	13	13	13	14	13
24	14	13	14	13	13	17			22		47	48	31			46	22	14	25	14	14	14	14	13
25	14	14	13	14	14	14	14		17	18					39	28	20	17	22	13	13	14	13	13
26	13	14	14	13	13	20	30	40	23		48		31			22	20	21	13	14	13	14	13	14
27	14	14	14	13	13	20	15	20	17	18					24	17	17	13	22	15	13	13	13	13
28	13	14	13	15	15	18		18	17		25		48	22	21	17	17	14	14	14	13	14	13	13
29	14	14	14	14	14	18	13	17	17	14							15	13	15	14	14	13	13	13
30	14	14	14	13	14	21	18	18	17			28				26	22	13	14	14	13	14	13	13
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	28	29	30	21	25	30	21	12	16	15	11	18	26	30	30	29	30	28	29	29	30
MED	13	14	13	14	14	15	18	17	17	20	43	48	48	45	44	22	18	14	15	14	14	13	14	13
U Q	14	14	14	14	14	17	25	19	20	22	47	49	49	47	46	26	20	15	22	14	14	14	14	14
L Q	13	13	13	13	13	14	15	14	17	18	23	45	43	42	25	20	17	14	14	13	13	13	13	13

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Yamagawa

APR. 2002

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	109	99			94	89	76	119	119	119		119					123		122	109	94	99	80	82
2		119	96		99	99	67	95	98	98							123		113	119	94		115	
3	95		121		70		79		109	119								133		99	99		119	119
4	119	85	72	99	89		99	109								94	95	114		A	115	109		109
5		109	119	95		60		95	119							79		109		109	109	99	99	118
6					109		109	109		93								119	109	119	119	104		109
7	94		96		60	71		94	159	113						82		99		98			99	
8	80	109	119	99	81	99	80		117							79			119	119	119	94	81	71
9	82	99	109	98		99	99	98										119	119	95	93	69		99
10	99	119	94	97	63	99		109	109								99	126	133		109	119		99
11	99	72	95	70	82		99	109									124		159	94		83	80	89
12		99	95	96	94		115		109	119				119		119	132		151	119	109	85	99	93
13	78			95	99	89	94	109		124							87	112	121	119	82	80	93	99
14	99	109	99	62	99	70	99		119									122	108	109	97	86		109
15	94		96	94	61	79		119	124								149	130		109	102	99	94	109
16	99	94	99		109	93	94			122						92	126	125	159					
17							99	95		116	119			159			114	135						
18			72					116	117		159						95	149	155		75			
19		39						95	119			116	119				99							
20								99	104		109	115				134	126	159					
21								99	99							88	115		91					
22					69			109	109				126	150	152	127	116							
23								109		90	125	112	132	128		109		154	159					
24								92			159	115	133		132		159	114	151					
25								95	119				119					126	132					
26								159	118	C	C	C	C	C				149	149					
27								98	121		119					144	132	152	159					
28								116					115		132		96	132	104					
29								97		95	119	117	136		153		141	155	123					
30								79	115	122	115					88		104						
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	12	14	10	15	11	13	25	19	12	8	6	7	4	4	12	19	22	20	13	14	12	10	13
MED	97	99	96	96	89	89	99	99	117	118	119	116	126	139	142	93	123	126	128	109	100	96	96	99
U Q	99	109	109	98	99	99	99	109	119	120	142	117	133	154	152	123	132	149	153	119	109	101	99	109
L Q	88	89	95	94	69	71	79	95	109	96	117	115	119	123	132	85	99	114	116	98	94	84	81	91

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamagawa

APR. 2002

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	41	G		G	G	G				G							G	G
2	G	G				G		G		G	G						G	58			G			
3	G				G	G	G	G	G		G		G	G			G	G			G	G		G
4	G	G		G			G				G					G	58	62	86	80	G	44		
5				G		G				G					G	G	G		38		G			
6				G	G		G	119	G	G		G					G	48						G
7	G	G	G		G	G	G	48						G		43				44				
8	G		G	G	G	G		36	G	G						G	G	G	44	65				G
9		G					G	G					G					G			G			
10	G		G	G	G			G	G	G			G	G			G	G	G	G	G		G	G
11		G	G	G	G	G			G	G	G			G	G		G				G			G
12		G	G	G	G		G	G	G					G		G	G		G		G			G
13	G	G		G	G		G			G	G	G					G	G	48	G	26		G	G
14		G		G	G		G	G		G	G							G	44	G	G	G		G
15	G		G		G				44		G						G	G	G	G	G	G		G
16	G		G	G		G	42			G					G	G	G	G						45
17					G		G	45		G	G			52		G	G	G	G			G		G
18			G					G	G	G		G	G	74		62	G	G			G	44		G
19		G					G				G	G	G	G	57	G	49		44					
20							G	G		G	G	63	G			G	G		47		G			G
21			G					G		G	G			G		G	G		45				G	
22	G	G			G				G				G	G		76		73						
23							G	42	45			48		G		G		43			G			
24		G					G		G	G		G	G		G	G	G	G	G				G	G
25	G									G	G		G		G		G	G					G	G
26	G						G		G	C	C	C	C	C				G			G	G		
27							G	G	G	47	G			G	G	G			G					
28							G	G	G		G				G		42	G	G		G			
29		G					G	G		G	G	G	G		G		G	G	44	G		G		
30			G				G			G	G	G				G		38			G	35		
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	13	11	11	13	8	20	18	14	19	17	10	10	12	9	17	21	21	16	8	17	9	6	16
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	41	G	G	G	G	G
U Q	G	G	G	G	G	G	G	36	G	G	G	G	G	G	G	G	G	40	44	54	G	39	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Yamagawa

APR. 2002

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	16	15	16	15	16	20			33	52								14	15	17	14	15	15
2	15	14	15		15	14	21		35		56								29	16	15	16		17
3	14	14	16	14	14	24	21			48			76	71					14	14	15	22	14	14
4	15	15	14	14	14	14	18	15			58							34	16	23	14	14		14
5	16	14	14	14	14	16	24	32									16		14	20	14	15	14	14
6	14	18	14	15	15		21	29		54		63							23	14	15	18	20	15
7	14	15	14	14	14	14	16		16	14					34	33				20	14	16	15	14
8	17	14	14	14	16	14	23	32	42	52							54		18	14	14	17	18	15
9	15	14	14	23	17	18	21	33					67							16	16	14		14
10		15	14	16	14	15	21		20					74					29	22	29	27		16
11	18	14	17	18	18	18	16	18	18		54			15					14		14	15	18	17
12	18	18	18	14	18		22	14								51	59			14	14	16	23	18
13	14			18	18	18	21	18	24								14	34	20	18	26	14	20	18
14	16	21	15	15	18	18	24			46	51							36	14	27	21	20		16
15	18	14	21	16	18	21	14	15		49								23	27	14	17	14	14	14
16	14	14	17	16	14	16	14	14							18		50		14					14
17					36		33	14	15					34				46						
18			21					14			49	59	56	45					27			15		
19								14			44	46			46			20	18					
20								16	17				51				44	35	14					58
21								14	44	29								16	14					
22								20		30					45	33	34	23	14	20				
23							37	18	34			40	57	32		50	56	27	14					
24								17	24	18	36	54			63	52	67	38	14				58	
25									23		14		53		14			14	29					
26										C	C	C	C	C					14			42		
27								18	24	14				54				14	14					
28								14									14		14					
29		20					46	14			14							16	14					
30								21			60	57						14	23				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	15	16	16	15	17	14	19	22	13	11	11	6	6	7	6	5	10	15	26	15	15	17	12	17
MED	15	14	15	15	15	16	21	16	24	33	51	56	56	45	40	50	47	23	14	16	15	16	17	15
U Q	17	17	17	16	18	18	24	20	34	49	56	59	67	71	46	51	56	35	23	20	17	19	20	17
L Q	14	14	14	14	14	14	18	14	17	18	36	46	53	32	18	33	16	16	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT Okinawa

APR. 2002

LAT. 26°16.9'N LON. 127°48.4'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	95	99	115	99	94	94	99			117								120		116	109		99	119
2		109		82	70			94	122						152	152	150	135	150	119		109	116	113
3		95	115	93	70	71	63	109	100	94	113	124	152			137		169	134	A	94	119		91
4	99	116	99	96	62	79		94	95	123	114	115	152		128	135	152	126					99	
5	114		82	94	72			119	122		116			133				150			109		119	114
6	109	109		96	94			116	115	116		122	124	132		152		150	152			114		
7		119	109	71				95	124	117		127	152	152	174		150	150	159	119				116
8	109	116	115	96	71	89		134	119	129	117		115	133				150	158					
9	99		97		70			97	122	135		124		153				157						
10	69		109	116	82	70	109		124	120				153	150	154	139	151	137					
11		79	96			99	76	99	125	117	124			149	149				150		89		96	
12		99	92	109	94		99	109	116	115	132	121	150	138		150	140	159	142					
13			71	93		99	99			116		154	153	152				136					99	98
14		97	89	89			83	101	123		115		151	149		154	154		131					
15	79			92	99	95	99	101	127				153		133	152		174			99			119
16	119	109		109		94	94	134		106	118		159		121		154	159	150					
17								101	123	123				124			151		151					
18				95	93				137	126		153	152		150	132	150		152					
19								112		126	125			152	153	141		150	159					
20								74	107	124	125		169	175	150		142	150	151					
21								80		123				134										
22								116	116	104		126		179	134		126	131	150					
23								100	109	95	126	132	152	140	154		149	150	159					
24								95	116	117	115	124	126	153		152		151	169					
25				89									122	149	135		150	154	169					
26				89					123	114	131		151		149		150	174	153	A				
27							A	120	122	107	107	116			150	152		179	150					
28							99	134	123		118	116		154	155		124		150				95	
29				71				119	121	95	116		152	150	171		151	154	159					
30			79	72	69		94	116	116	118		132				152	151	134	149					
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	9	11	13	19	13	9	11	24	24	24	16	14	17	20	17	13	17	24	23	3	5	3	7	7
MED	99	109	97	93	72	94	99	105	122	117	118	124	152	150	150	152	150	150	151	119	99	114	99	114
U Q	111	116	112	96	94	97	99	117	123	123	125	132	152	153	153	152	151	158	159	119	109	119	116	119
L Q	87	97	85	89	70	75	83	96	116	110	115	121	138	136	134	139	141	143	150	116	91	109	96	98

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Okinawa

APR. 2002

LAT. 26°16.9'N LON. 127°48.4'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G		G		G	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
3		46	G	G	G	G		G	G	G	G	G	G			G	52		68	35	G		G	G
4	G	G		G	G	G	G	G		G	66	G	G		G	60	65	56			G	G	G	G
5	G	G	G	G	G		G	G	G		G		G	G			G				G	G	44	
6		G		G	G	G	G	G		G		G		G	G	G			62	G		G	G	G
7			G	G	G	G	G		G	G		G	G	G	G		G	G	36	G	G	G	G	G
8	46	G	G			G		G	G	G	G		G	G	G			G		34	G		G	
9	G	G	G	G	G		G			G				G				G		44				
10	G			G			G	G	G				G	G	G	G	G	G			G	G	G	G
11	G			G	G		G	G	G	G		G		G	G				36	G	G	G	G	G
12		G	G	G	G	G	G	G	G	G	G	G	G	G		G	48	G	G	G	G	G	G	
13	G		G	G		G		G		G		G	G	G				G			G			G
14	16	G	G	G			G	G					G	G	G	G	G			G	G	G		G
15	G		G	G	G	G	G	G					G	G	G	G		G		G	G	G	G	G
16	G	G	G	G		G	G	G		G	G		G		G		G	G				G		G
17	G	G		G					54					G			G		G				63	G
18			G	G	G	G			G	G		64	66	G	G	G	G	G	G		G			
19	G		G							G	G			G	G	G		G						G
20								G	G	G	G		G		G	G	G	G	60	G		66	62	G	G
21								34		G				G	81	71	G		80					G
22	G	G		G		G		75		G	46	G	G	80	G		G				G			
23		G	G							G	G	G	G	G	G		G	G	36		G			
24					34			35	42	48	G	G	G	G		G		G			G	G		
25	G		G	G						G		55	69	50	77		G	49	62					
26	G	G	G	G				G					G		G		G	G	G		G	G	G	
27			G	G				G	G	G	G	G			G	52		G	G	G		G	G	G
28	G	G	G				G	G			G	G		G	G				34		G		G	
29		G	G	G			G	64	G	G	G		G		G	G	52	40	43	51	G	G	G	
30		G	G	G	G		G		45	G		G					G	G	62			G	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	17	17	20	23	14	13	14	22	15	22	15	17	19	22	22	16	20	21	16	14	19	18	19	18
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	36	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	62	34	G	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Okinawa

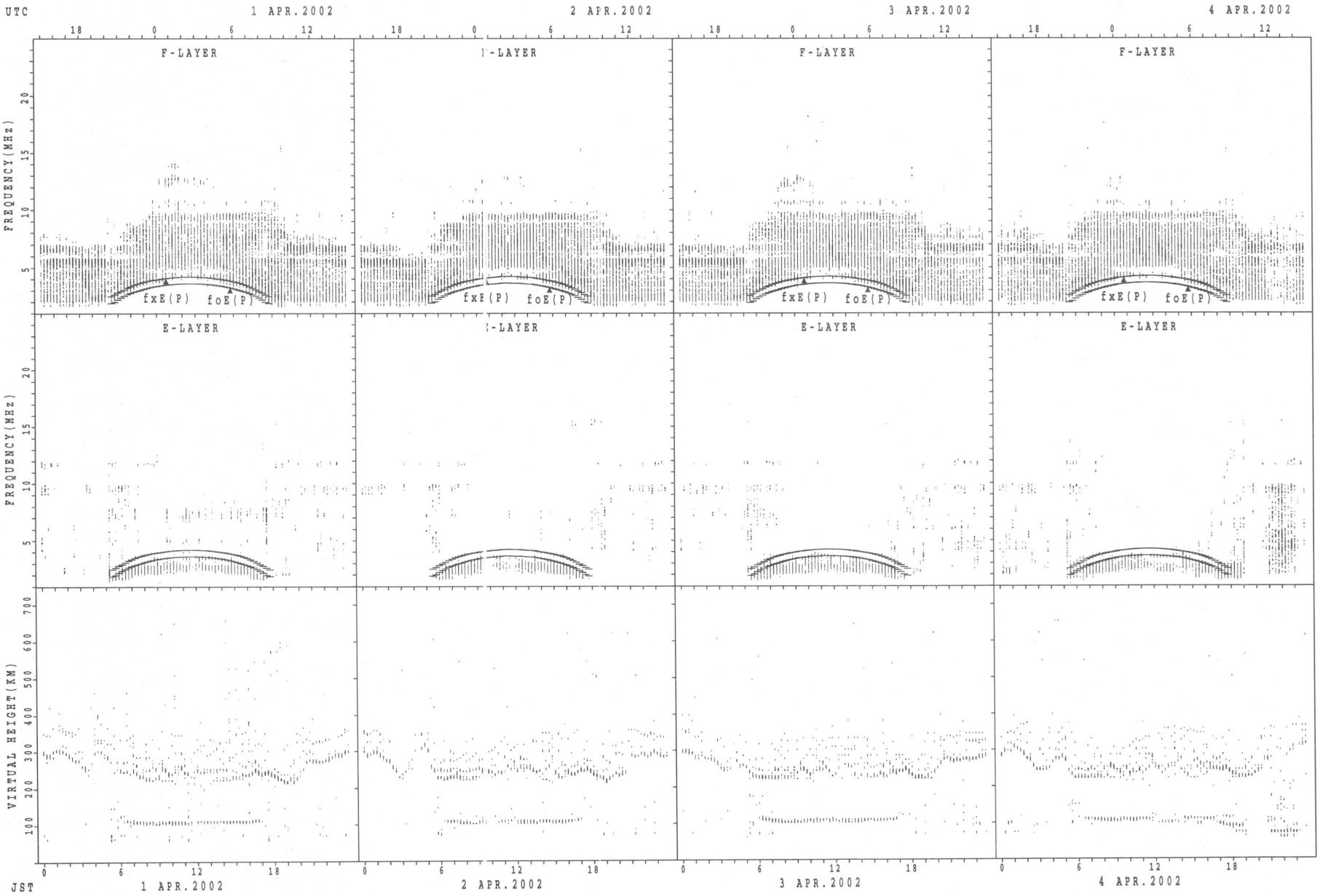
APR. 2002

LAT. 26°16.9'N LON. 127°48.4'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	18		22	28	27	21					69								29	30	28	35	
2	38	38	21	27		36		29				71								27		39	40	
3	39	29	21	23			38	29											20	20				
4	39	39	30	32	39	39	38	28	22		54						42	33	21		30	39	39	
5	20		35	27	20			29		44	48										38		33	
6	36	33	29	26	33	40				47								42	22			27		
7	41	36	30	39	40	40	40	27		27		30	54				24	49	21			39	42	
8	38	28	28	27		38		29					68	62	64			40	22	23			33	
9	22		21	21			56	30	40	49										29		44		
10	21		21		21	20		28	38	47									23		40	36	43	
11			39	40			28	28	22		59								29		42		33	
12		42	36	32	40	38		30	38							68	21	45		41	33	42	42	
13		30		29		32		29	39	48								44	26				42	
14		36	28	27						50						55			34	44			37	
15		38		42	28		41	29					69	76	72					29	39	36	33	
16		36	40	40		40	33	28		52	58		72		66									
17		68		59				14	22														36	
18			60	60					26			58	55											
19			57					37	35					58				43						
20								32	40		53		57	62	66		54	43			33	36		
21								20		50									14					
22						58		20					66	46			47	20	22					
23								34	42	43									20					
24					22			21	27	32								21	16					
25	42		41					39		44		44	44						22					
26								29	38									48	34					
27								30		55	48					38								
28							42	34	36	46	54	55					46	30	21					
29								29		48				43			28	22	26					
30		57		44			50	26	29									48	28					
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	11	14	16	18	9	11	10	26	15	15	7	6	8	6	4	3	7	14	18	8	8	10	13	
MED	38	36	30	30	28	38	39	29	36	47	54	56	62	60	66	55	42	42	22	29	36	38	37	
U Q	39	39	39	40	39	40	42	30	39	50	58	69	68	62	69	68	47	45	26	35	39	39	42	
L Q	21	30	24	27	21	32	33	28	26	44	48	44	54	46	65	38	24	30	21	25	31	36	33	

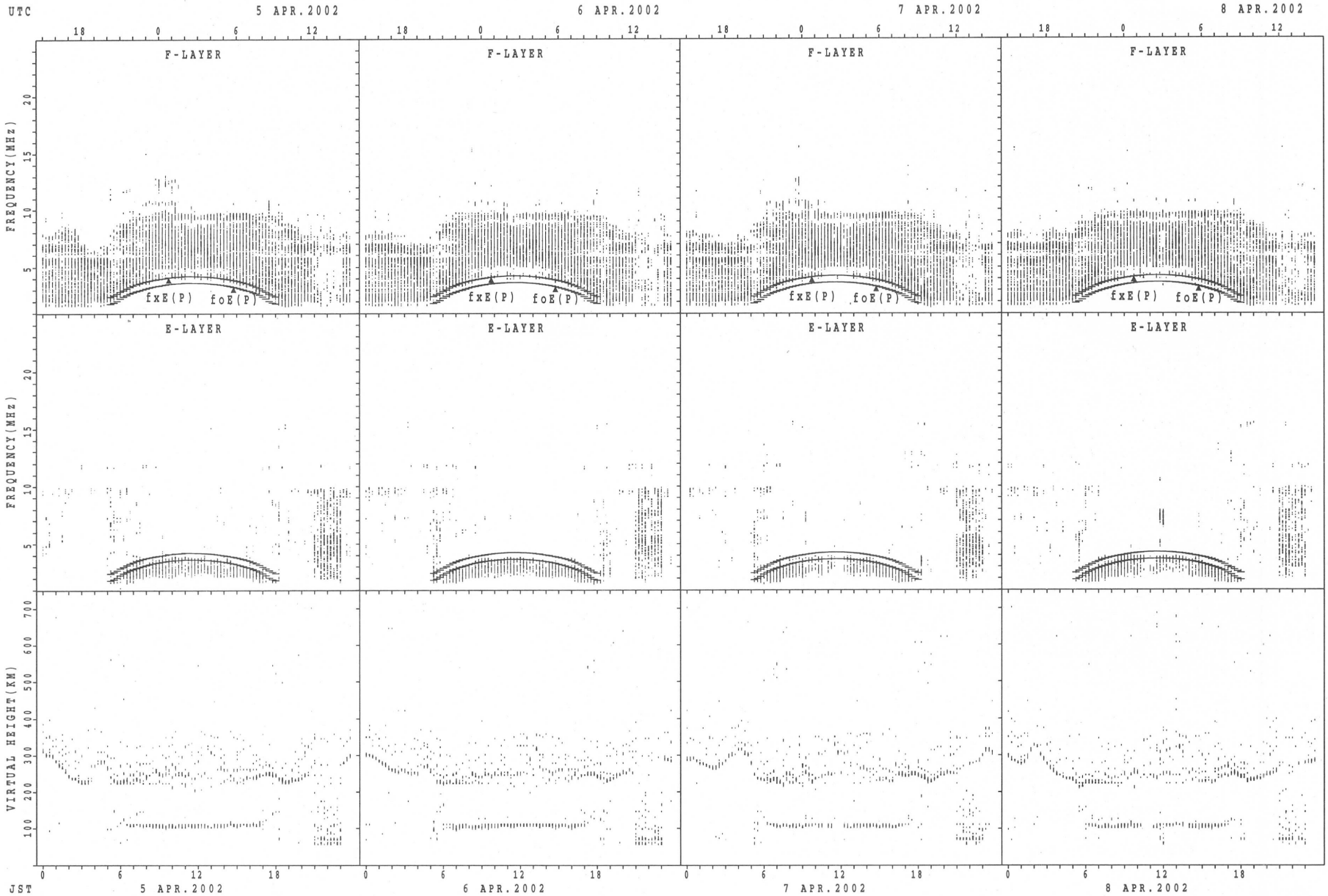
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

SUMMARY PLOTS AT Wakkanai

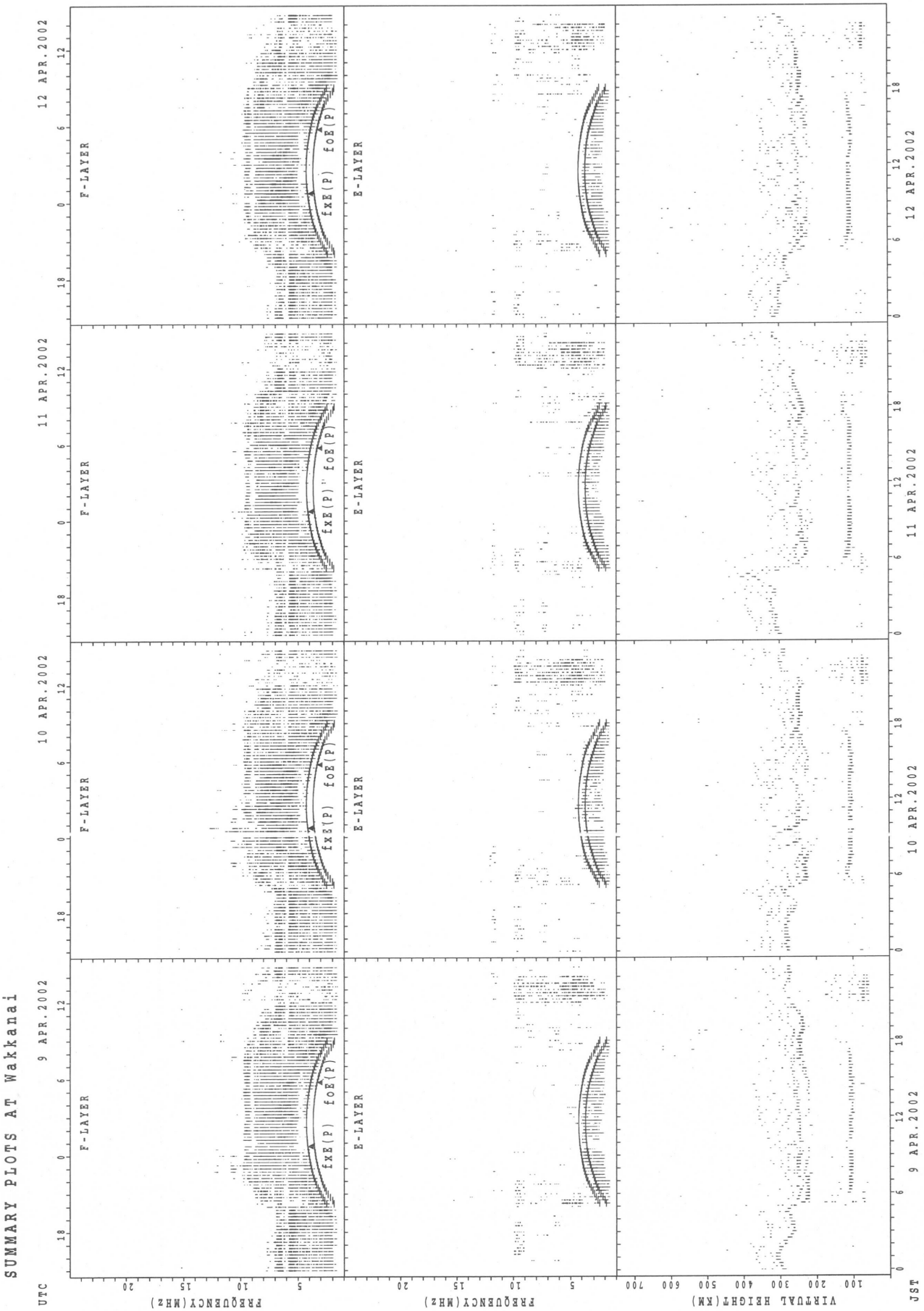


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

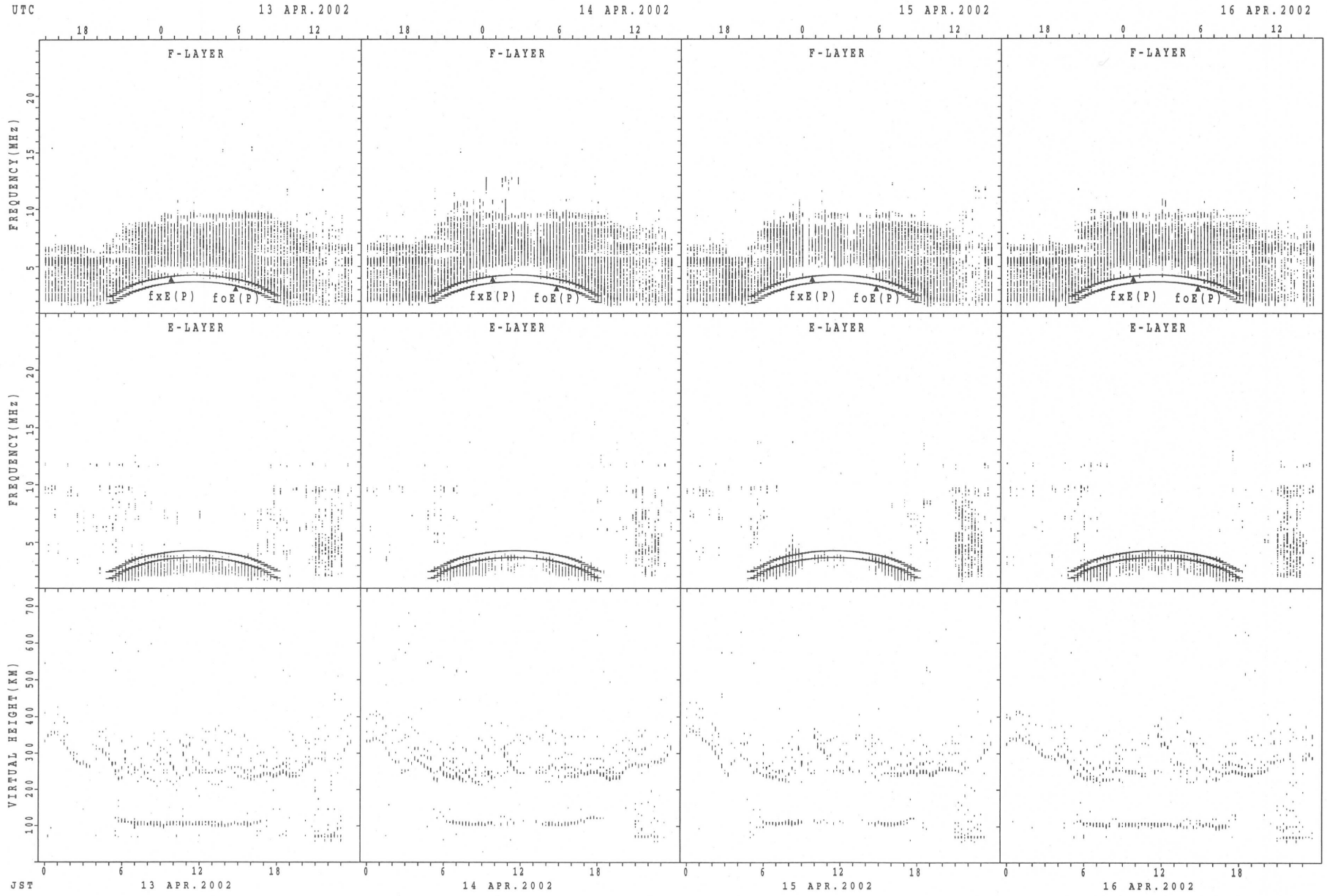
SUMMARY PLOTS AT Wakkanai



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

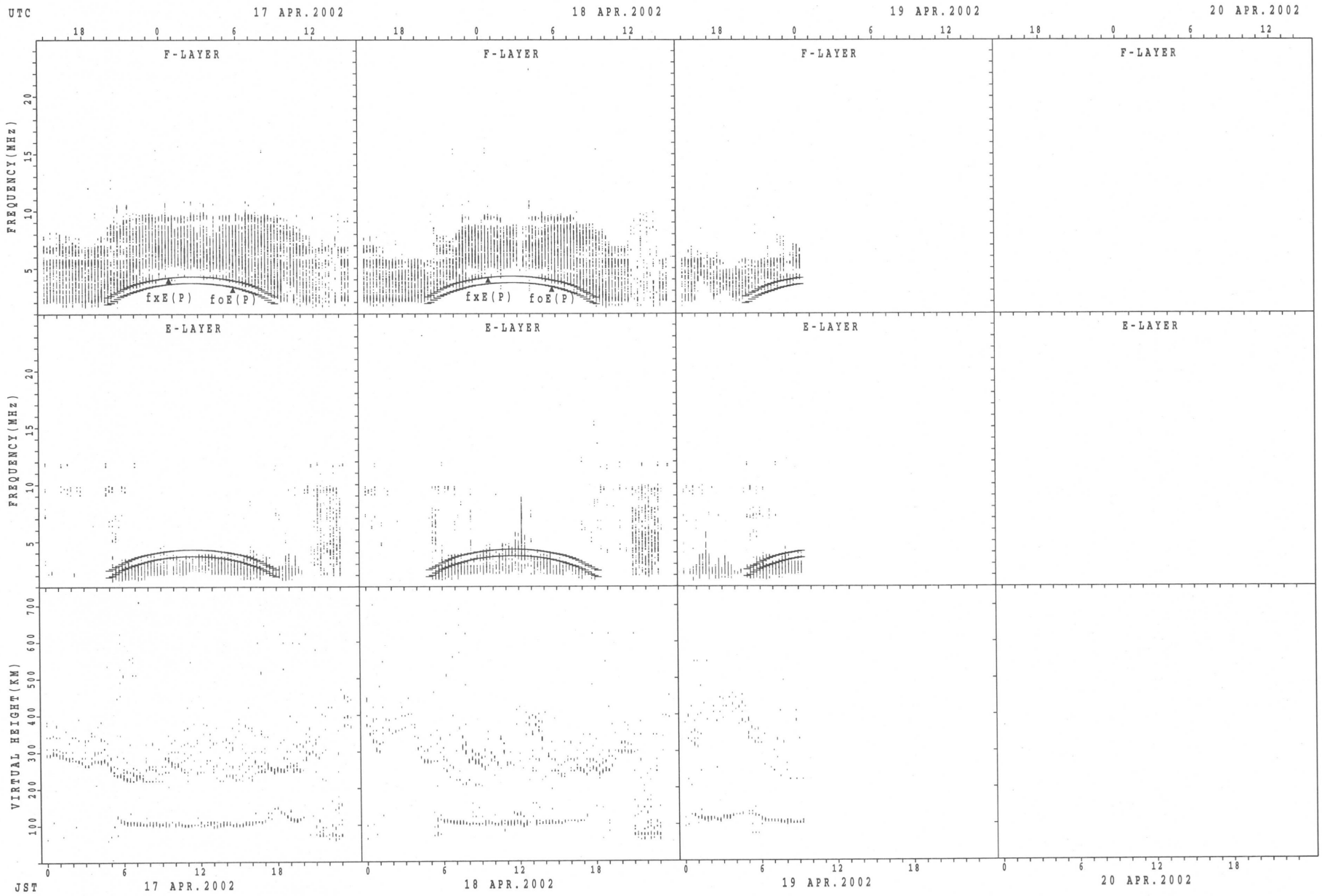

SUMMARY PLOTS AT Wakkanai
UTC
JST
9 APR.2002
10 APR.2002
11 APR.2002
12 APR.2002
F-LAYER
E-LAYER
fxE(P) foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



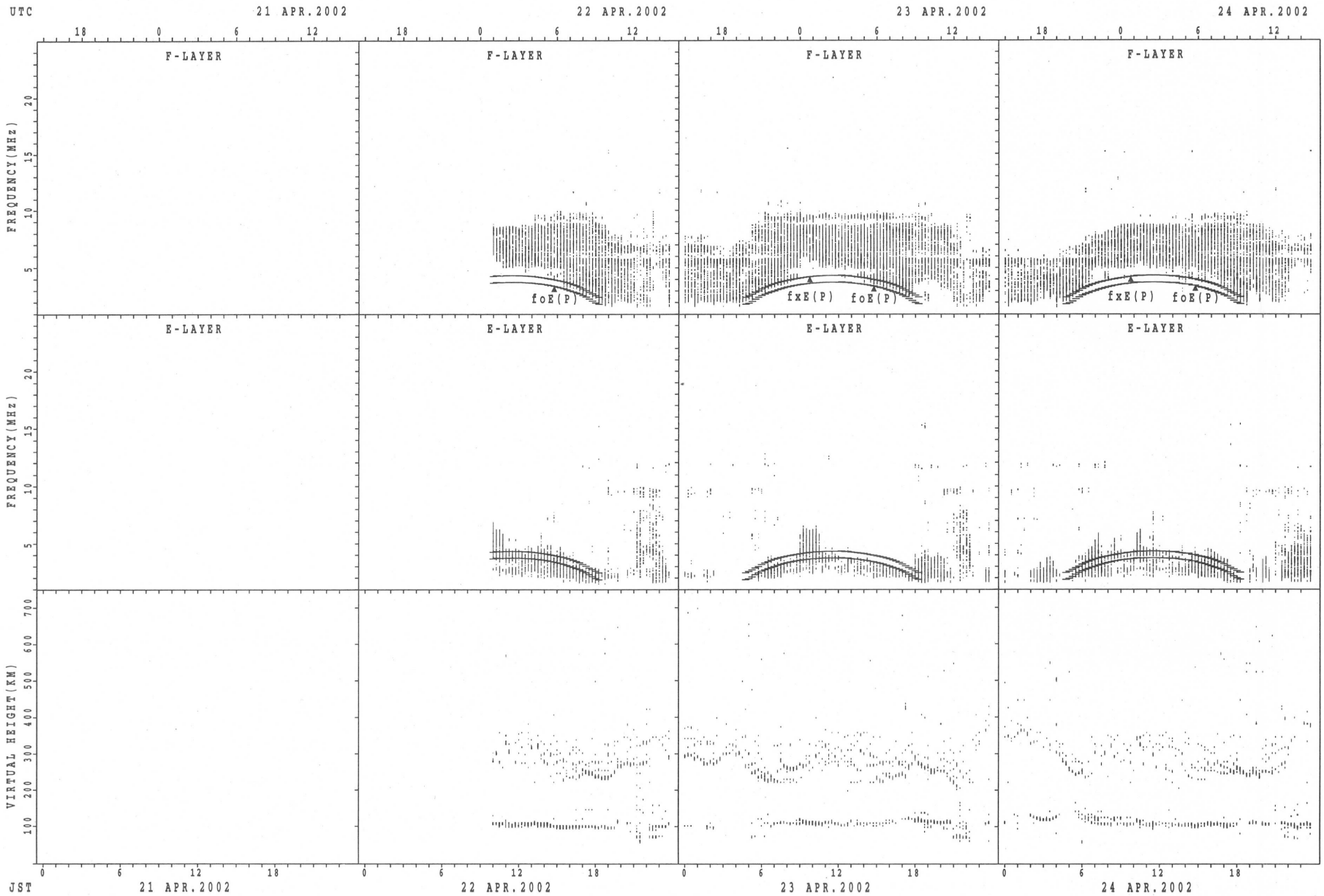
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



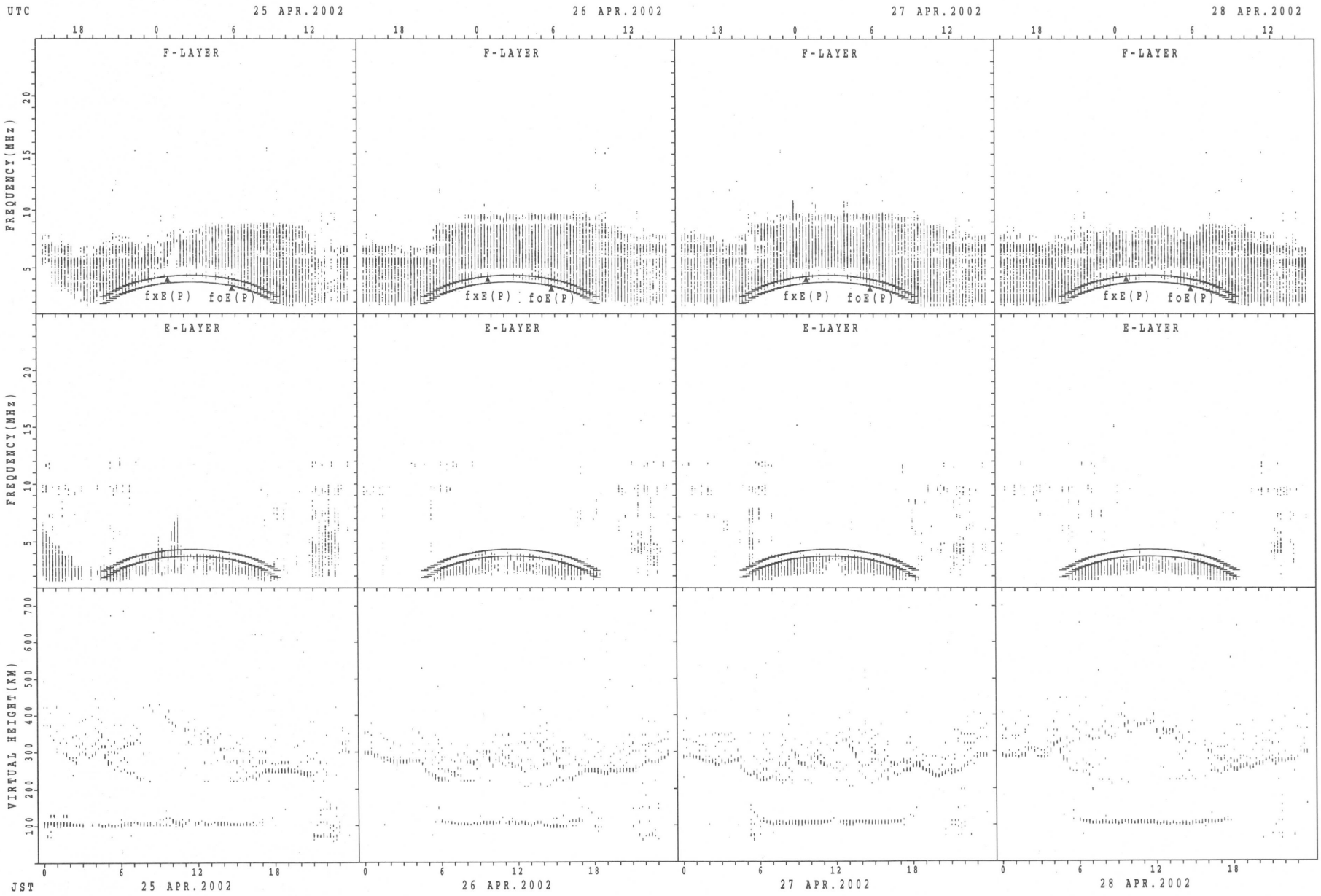
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



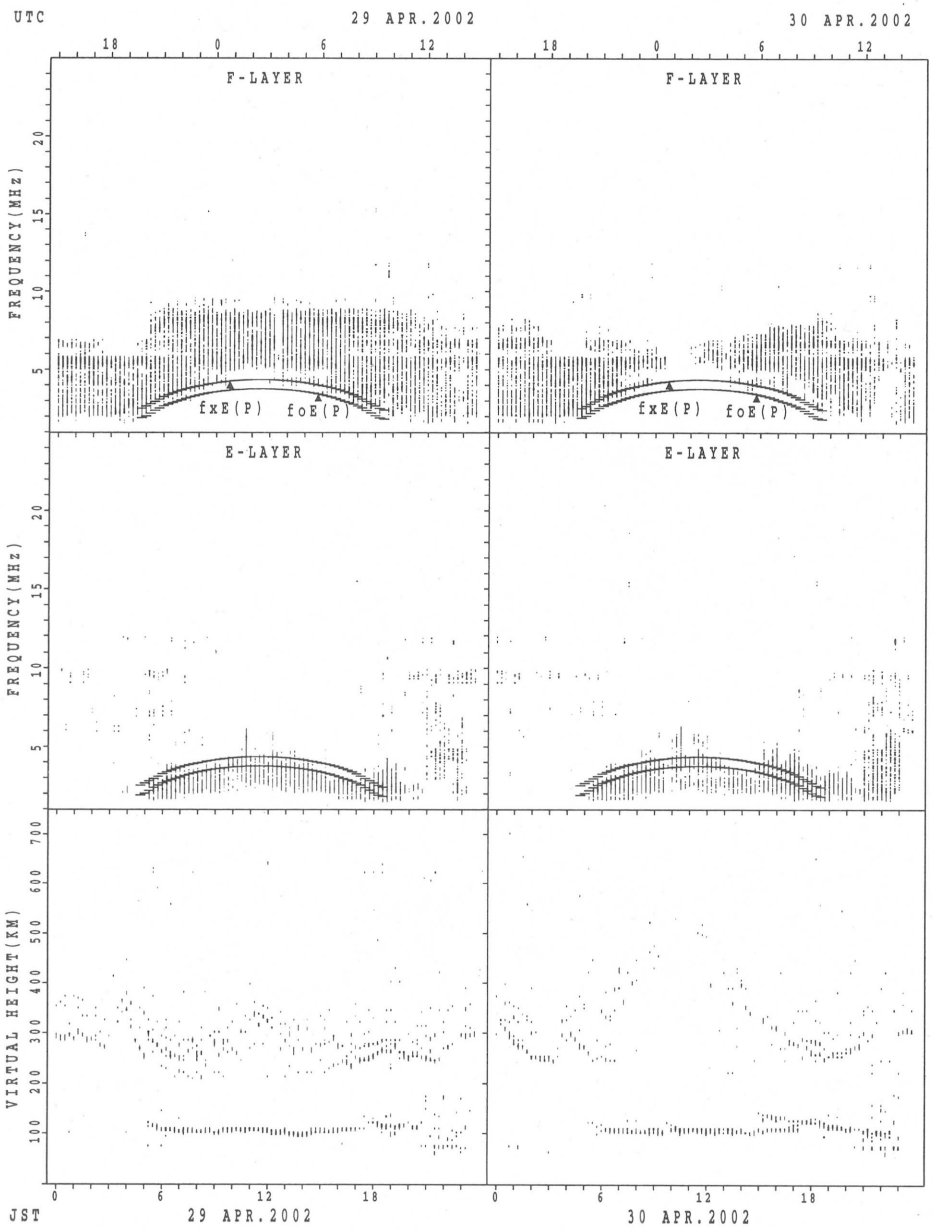
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



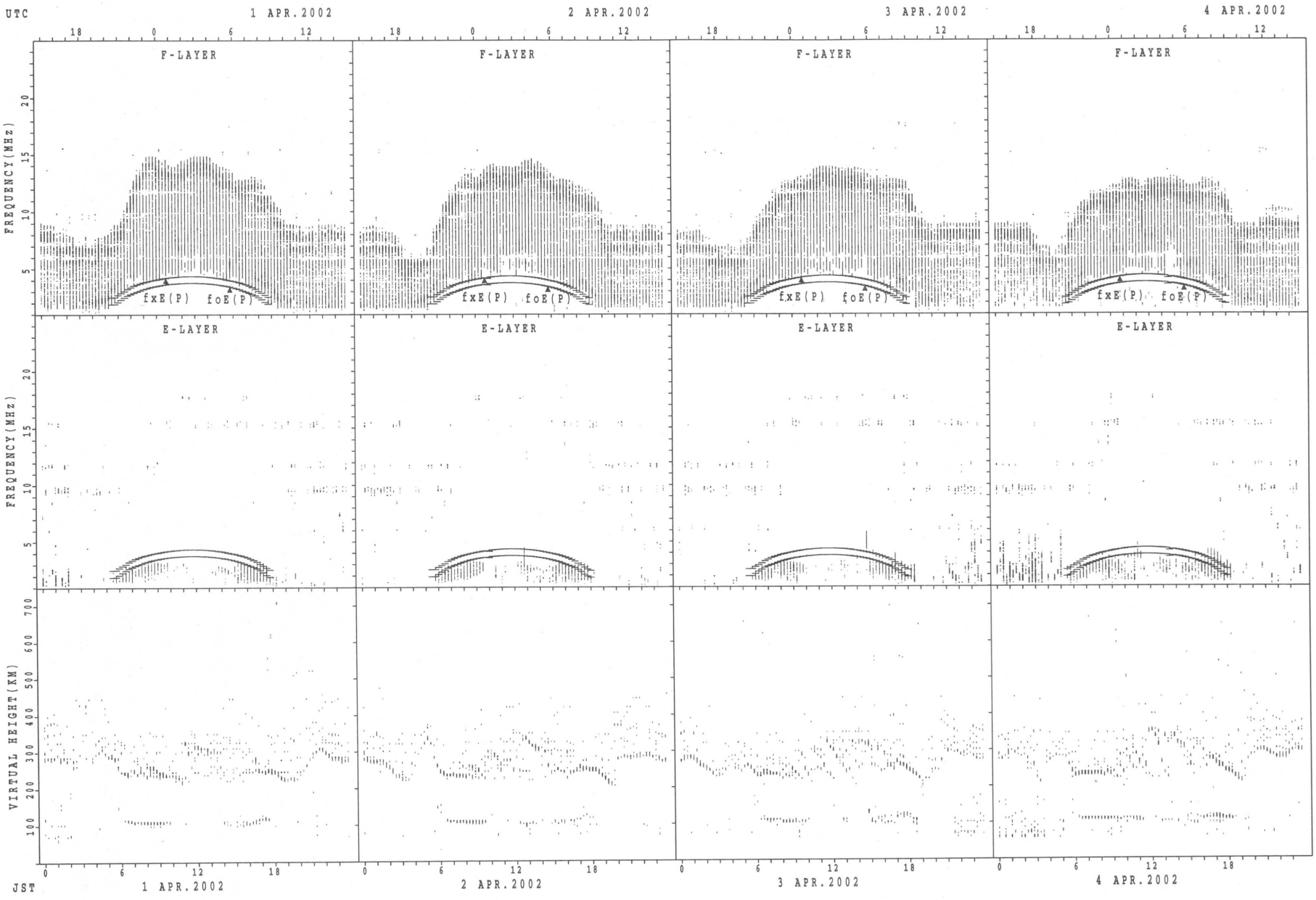
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



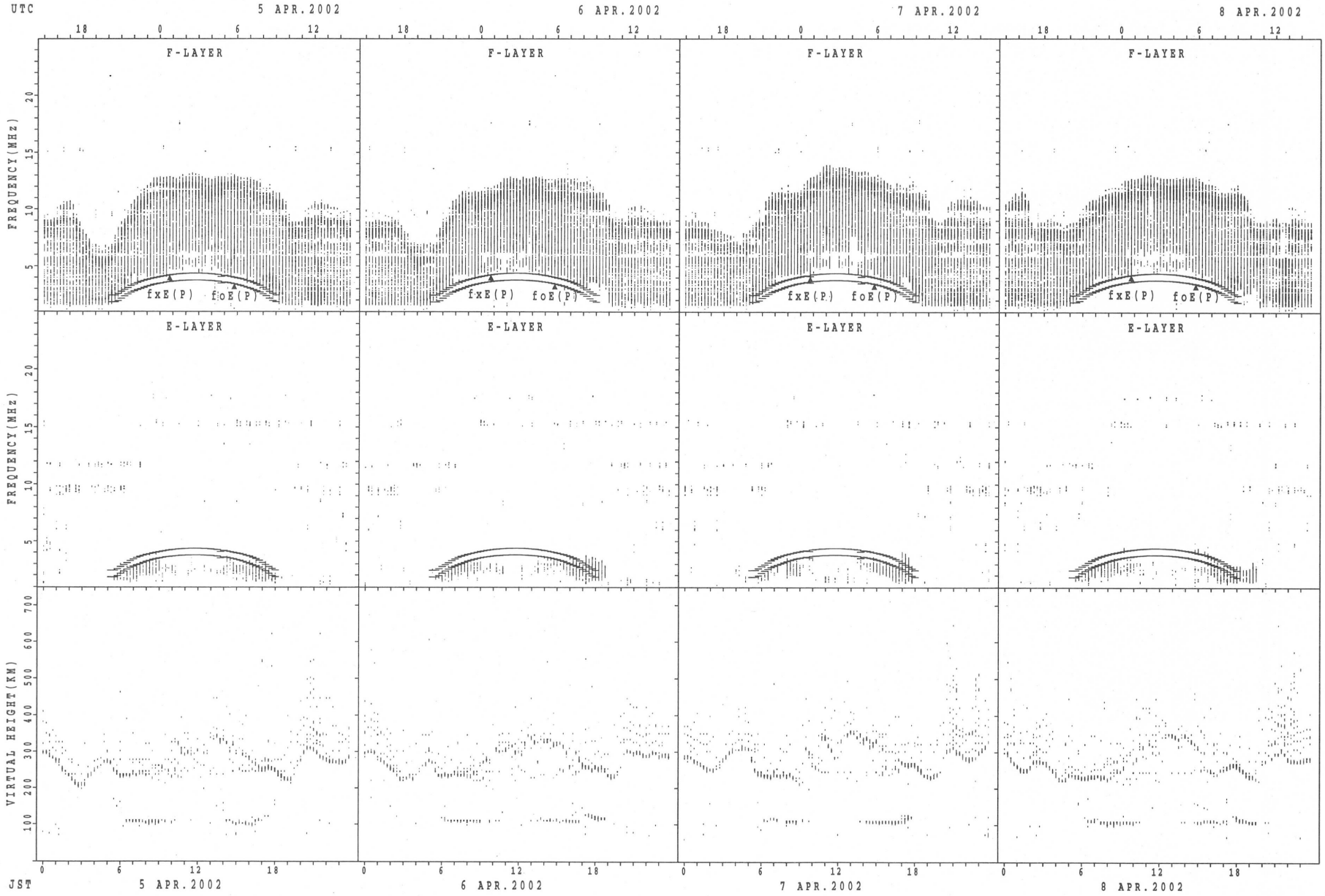
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



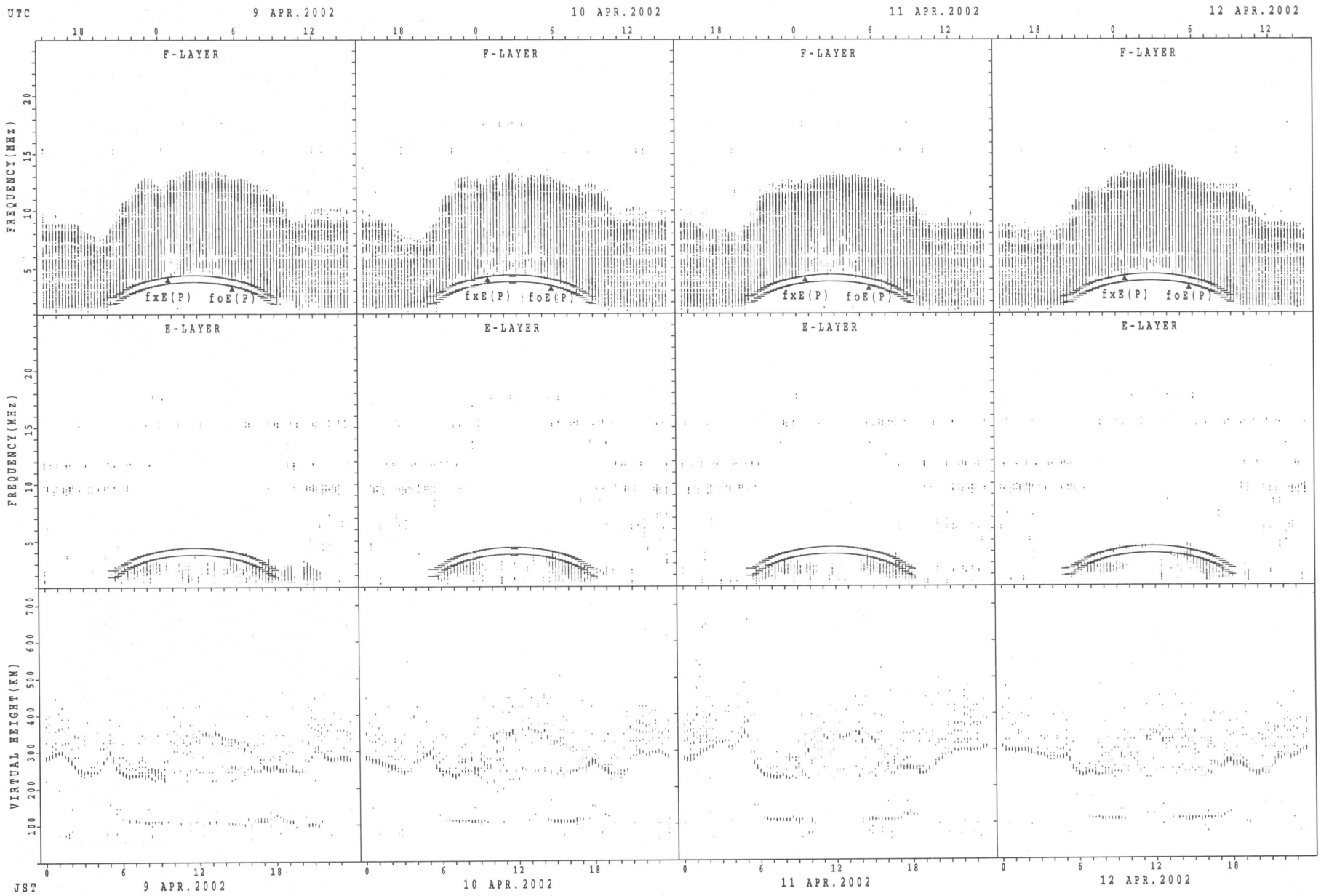
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



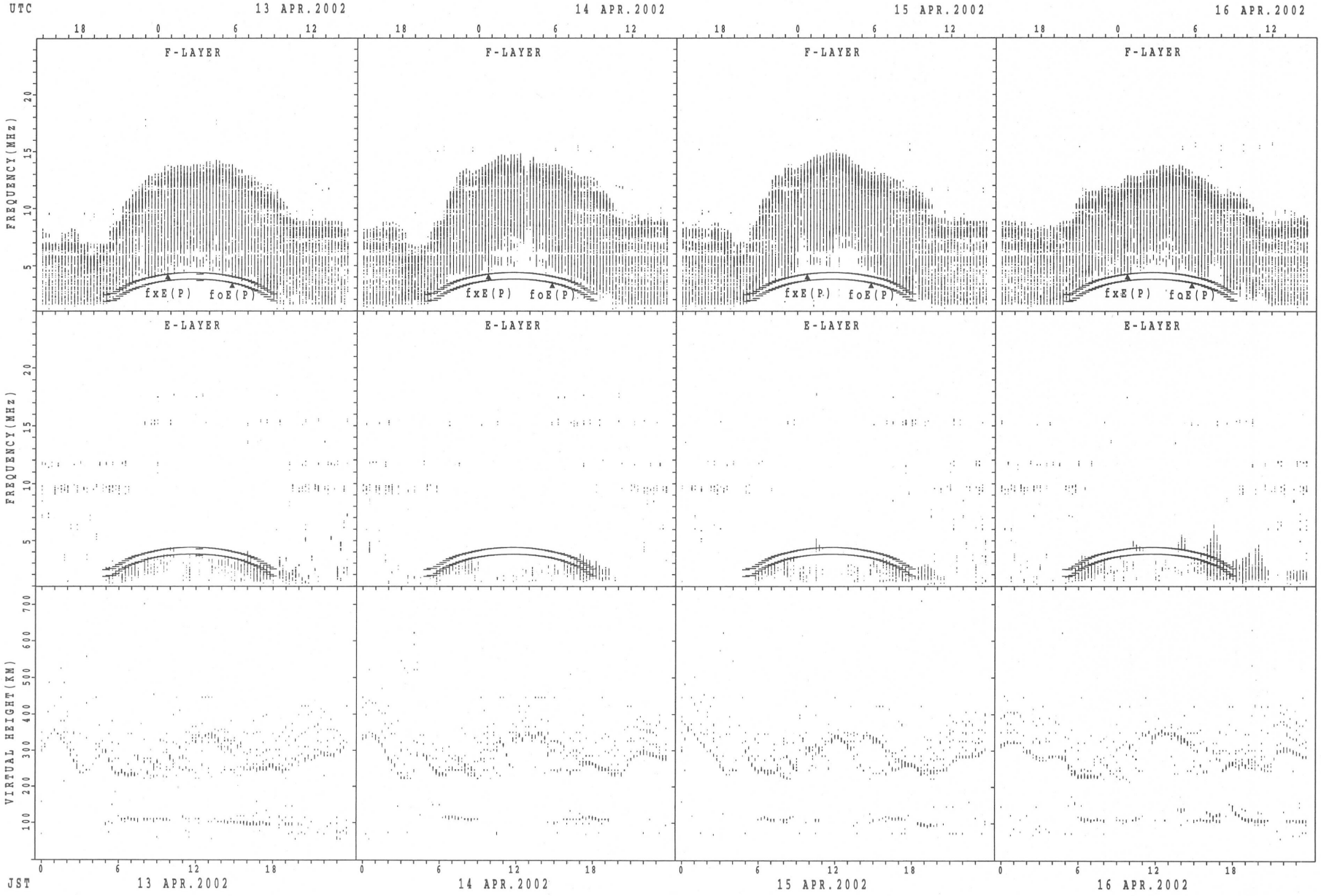
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



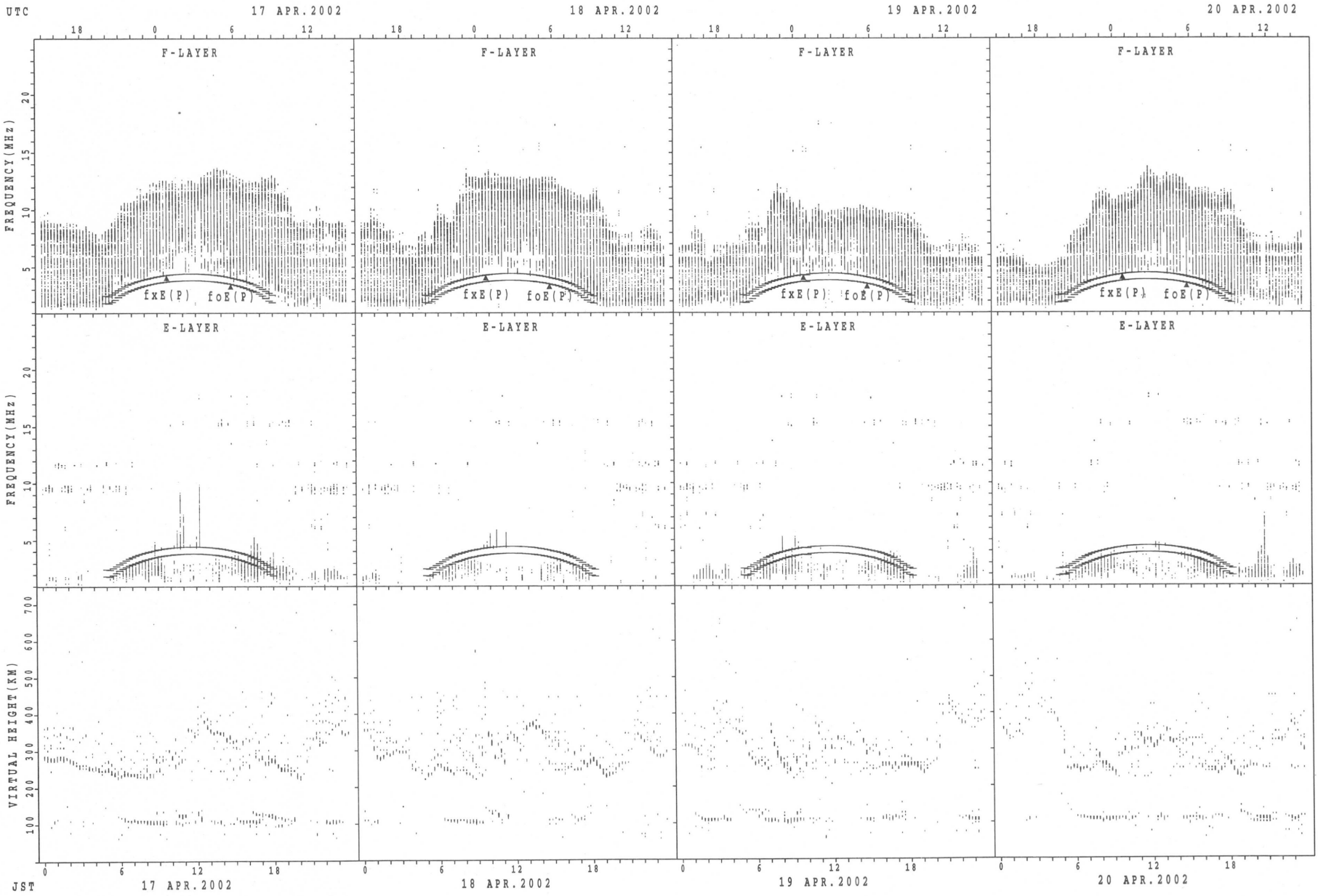
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



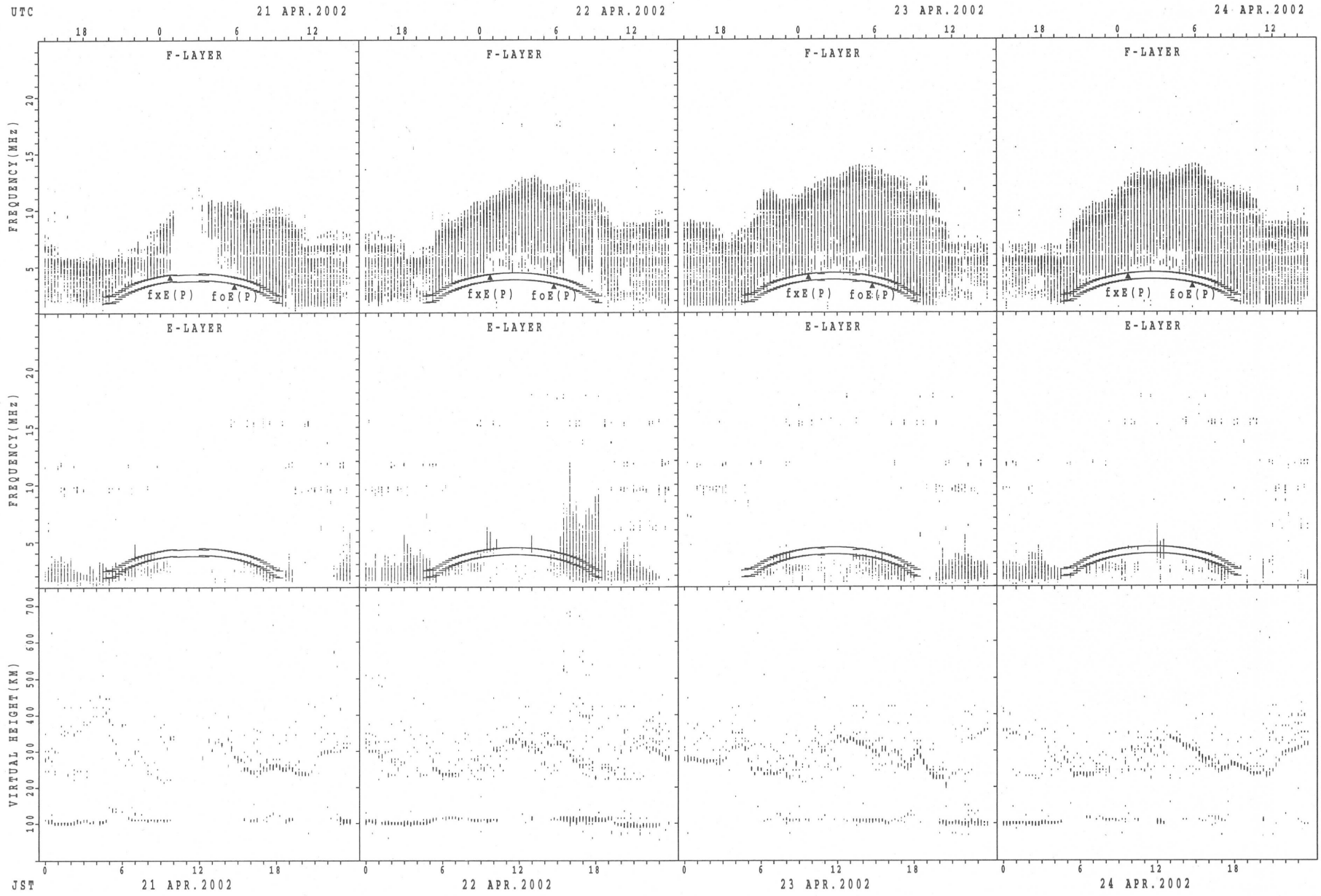
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



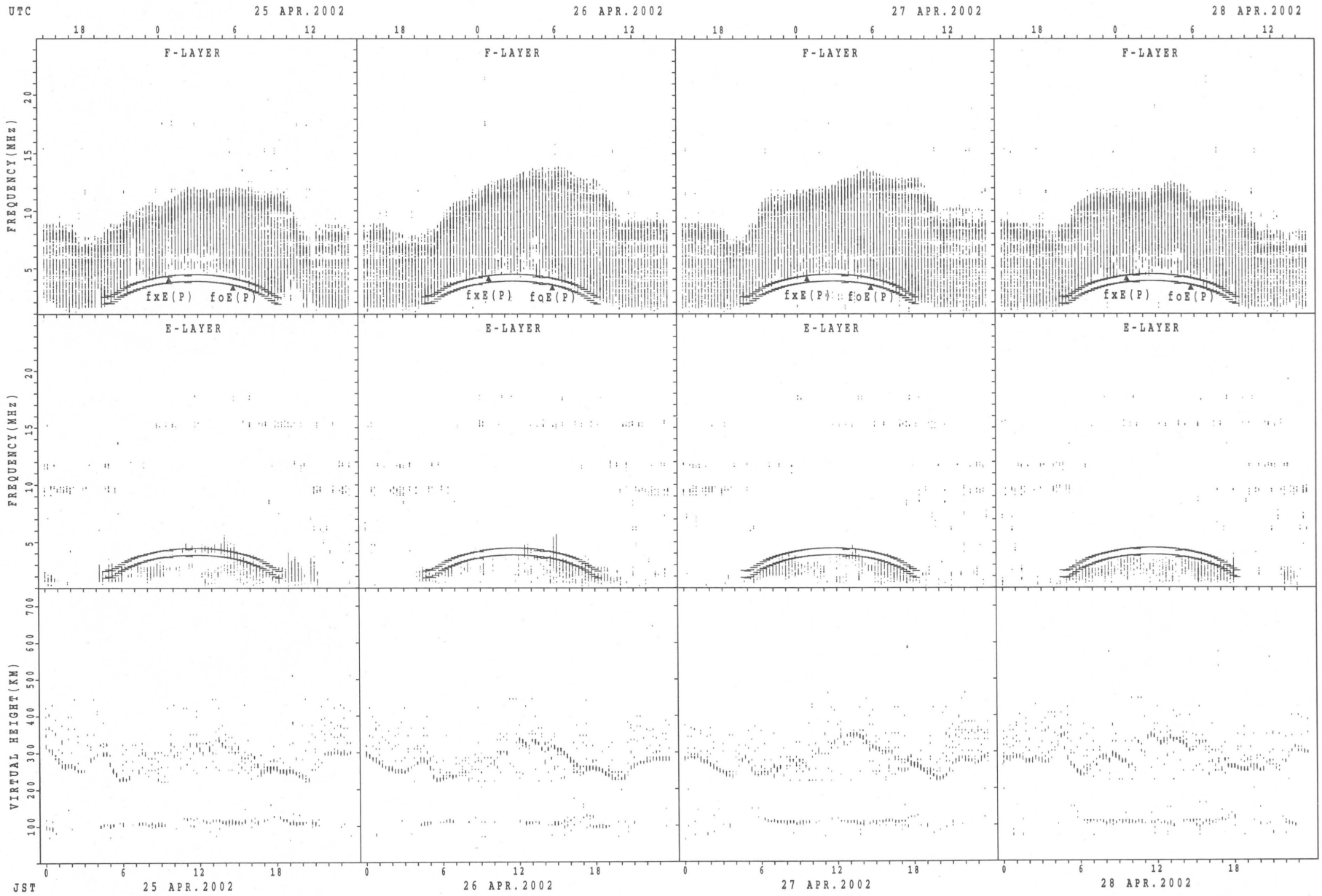
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



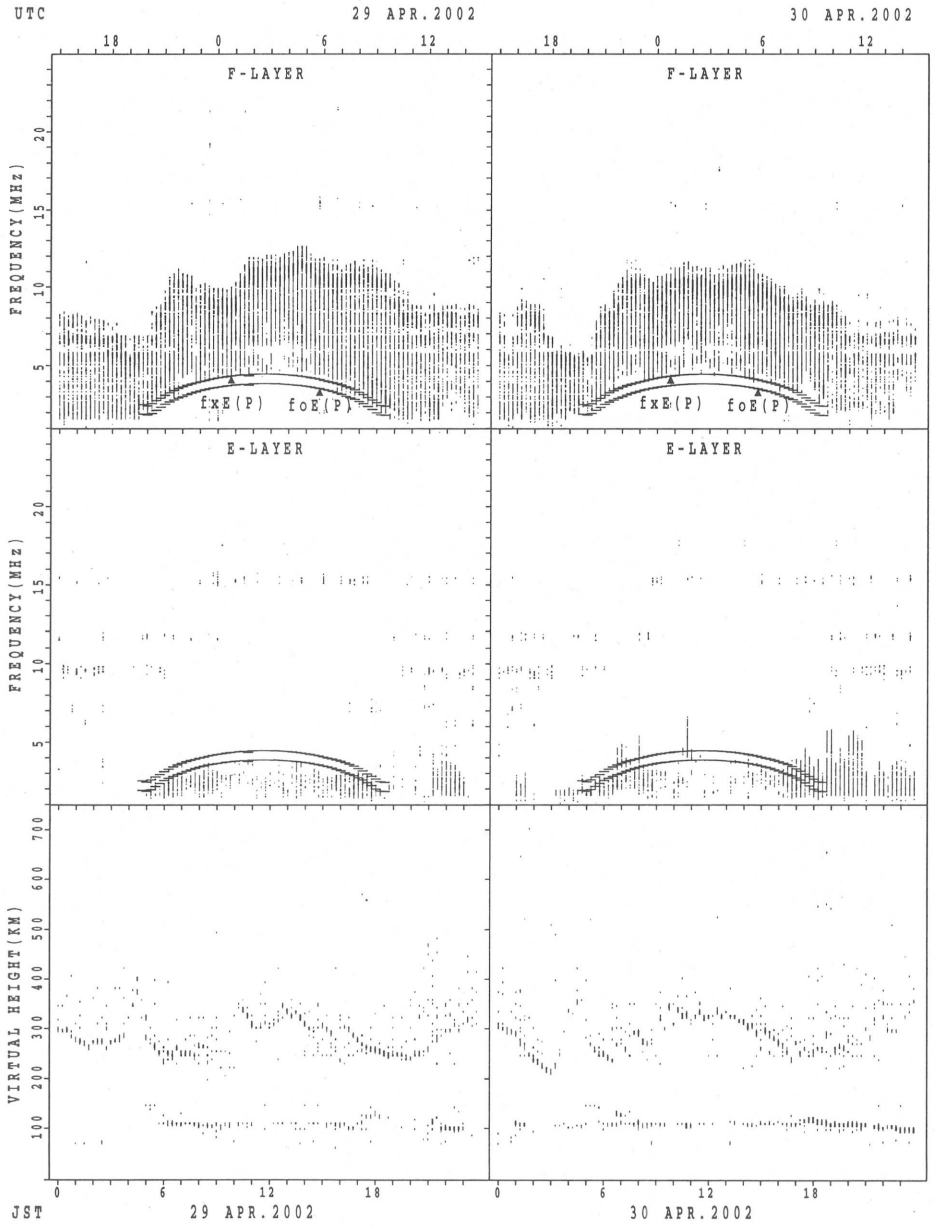
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



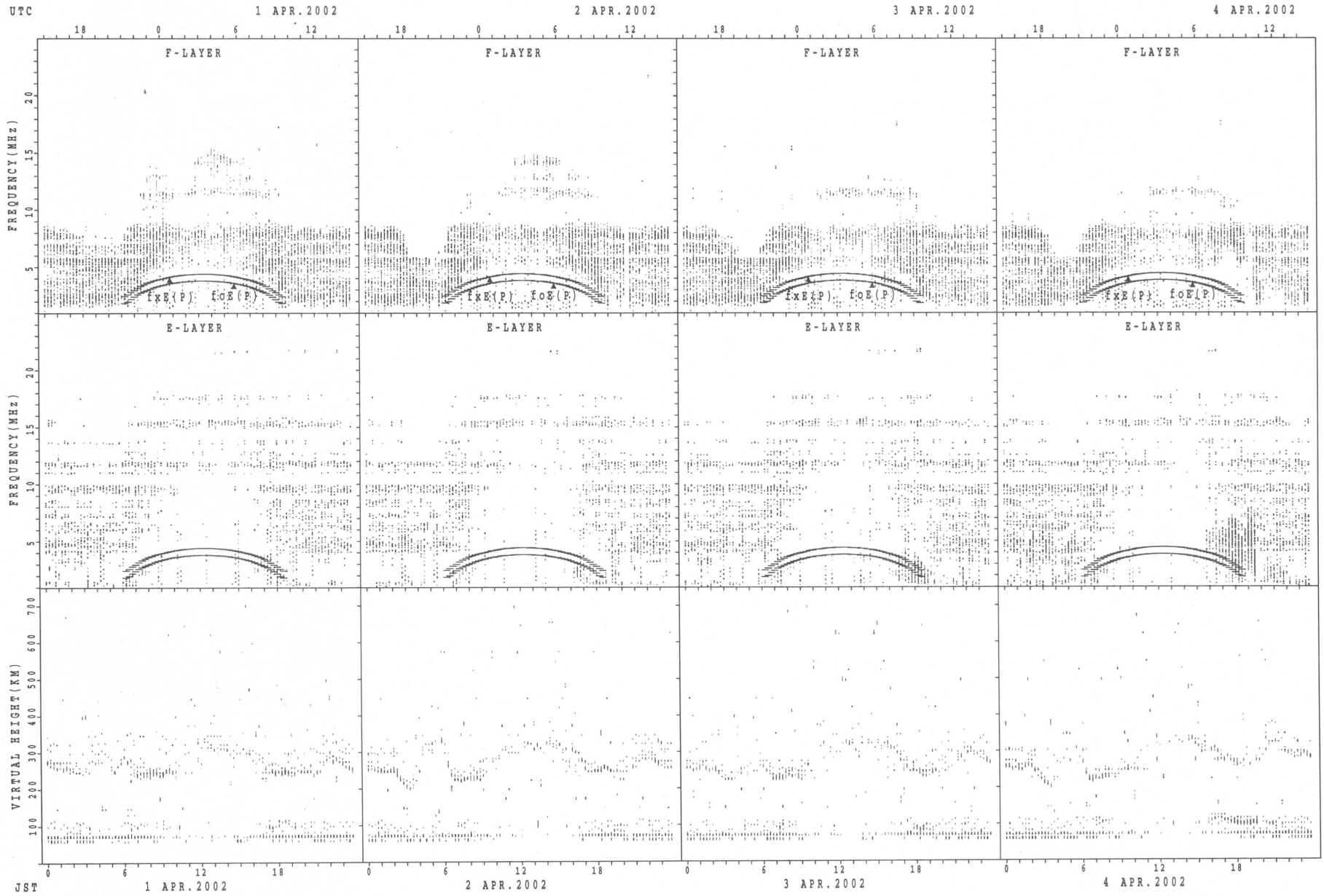
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



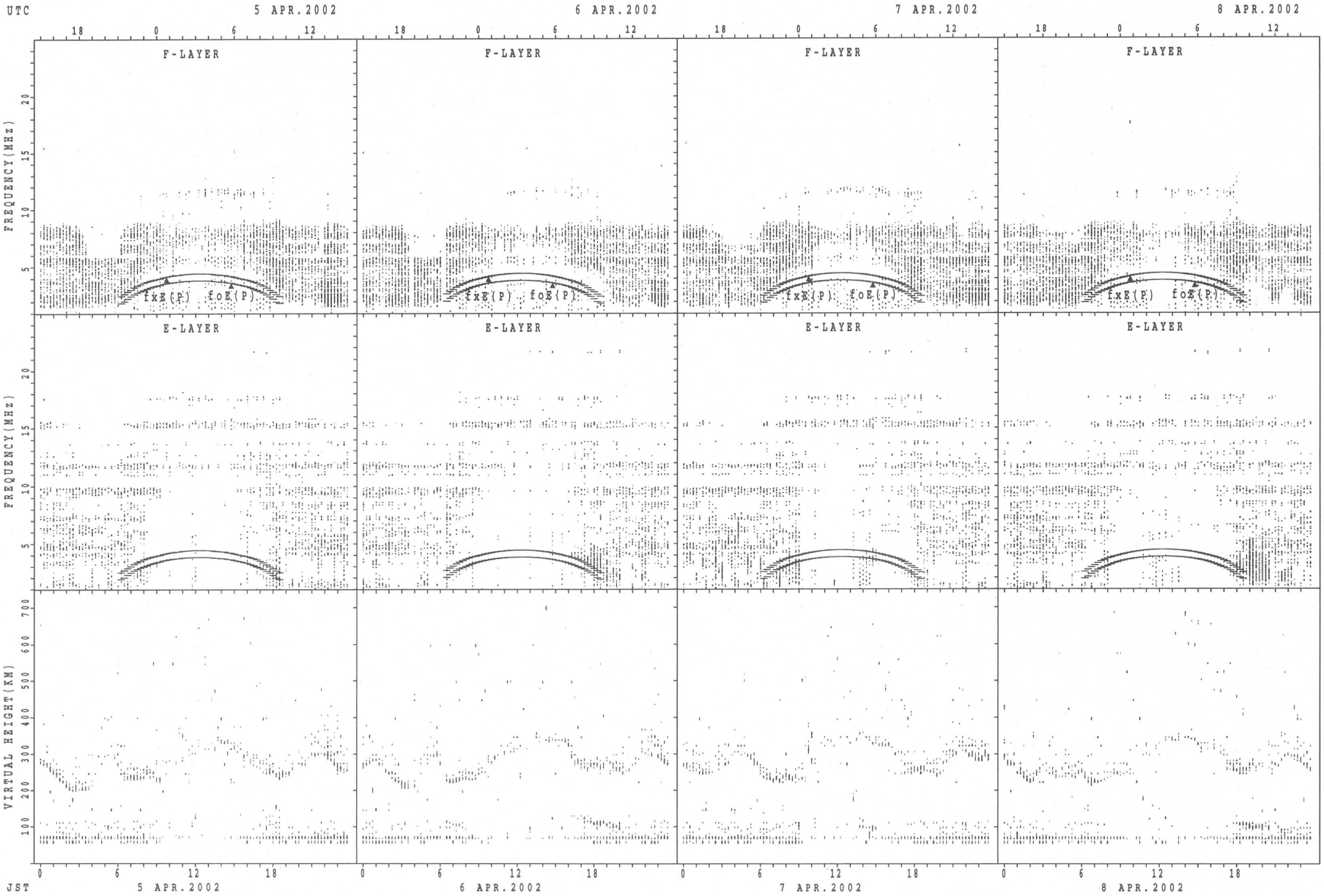
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



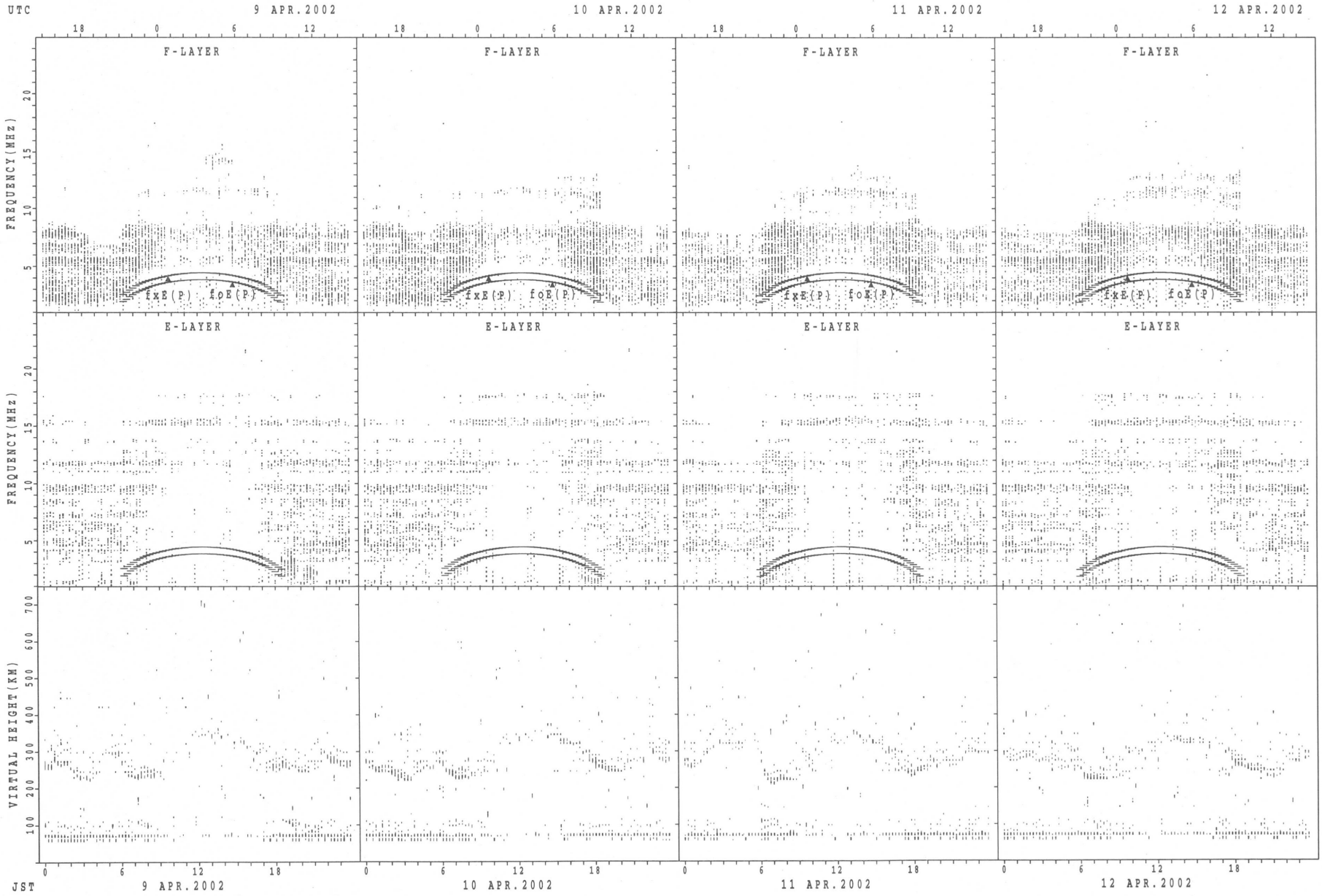
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



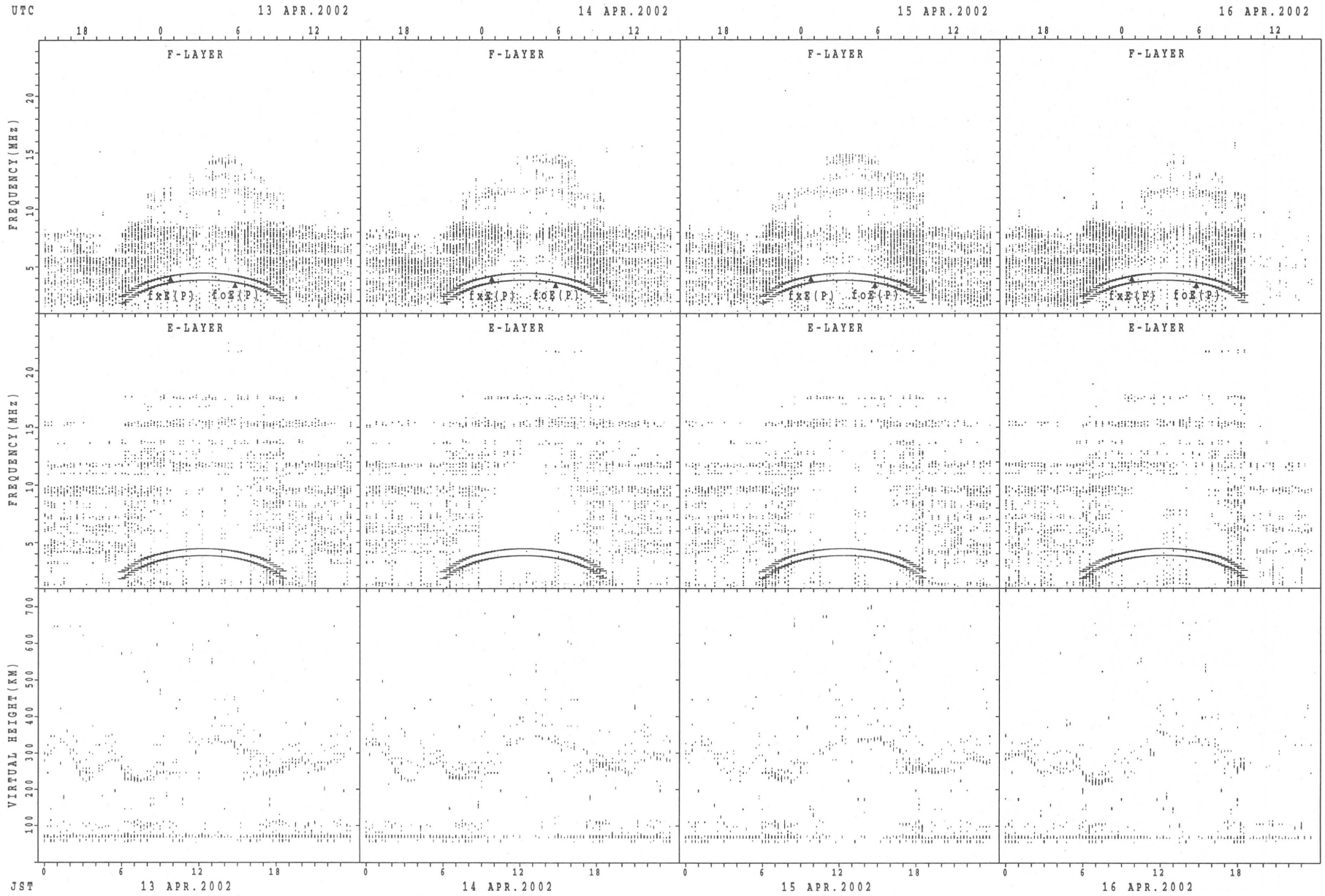
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



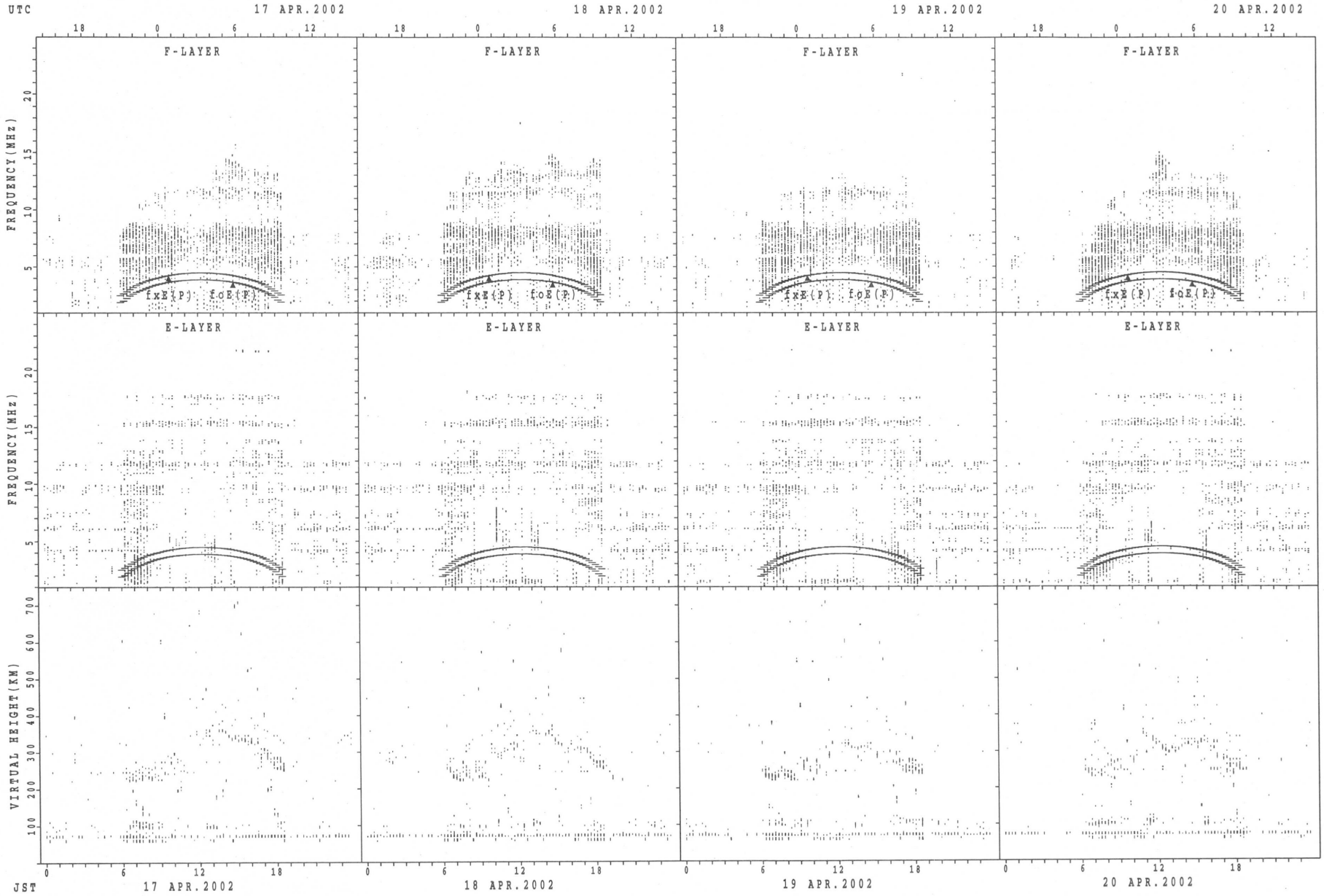
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



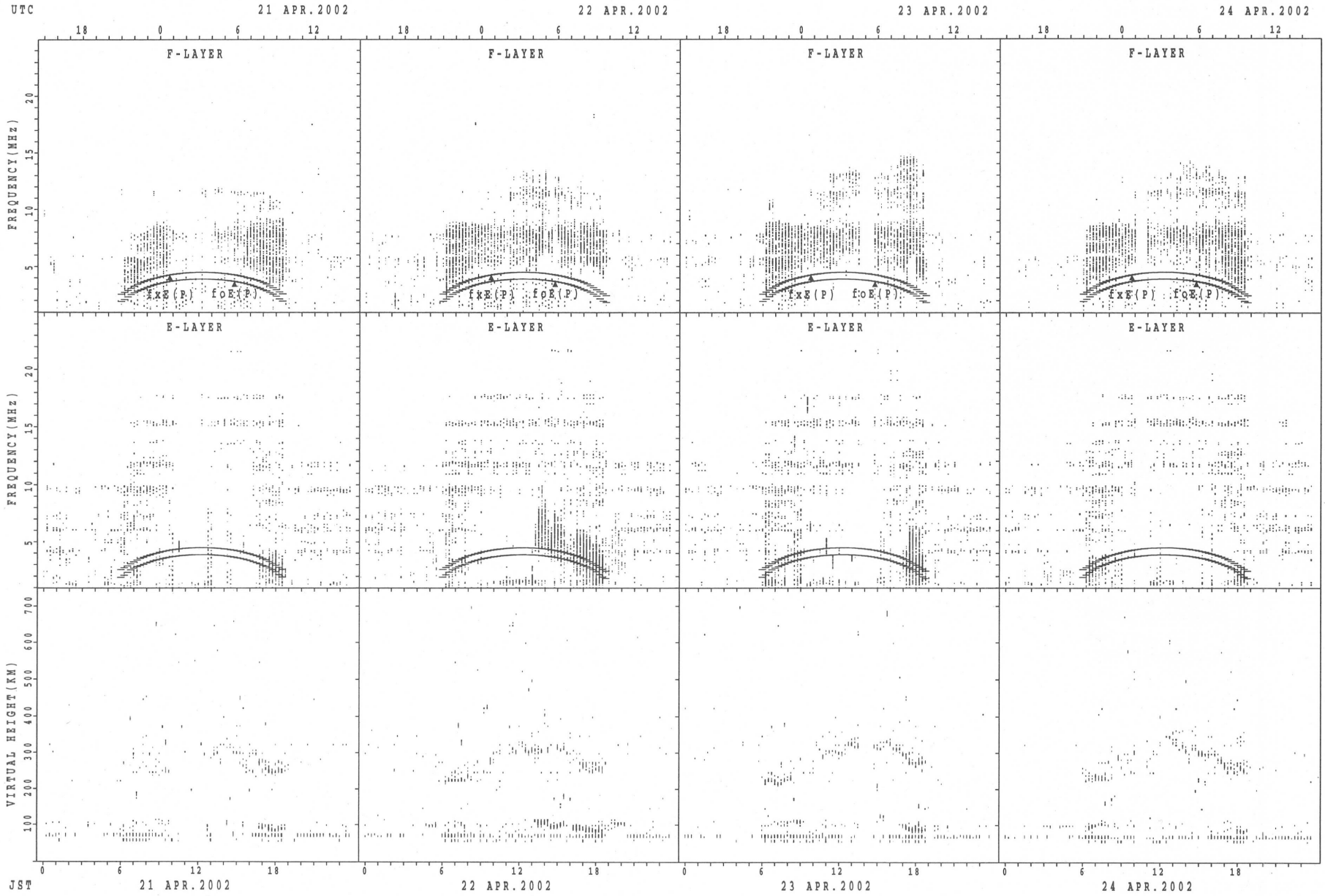
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



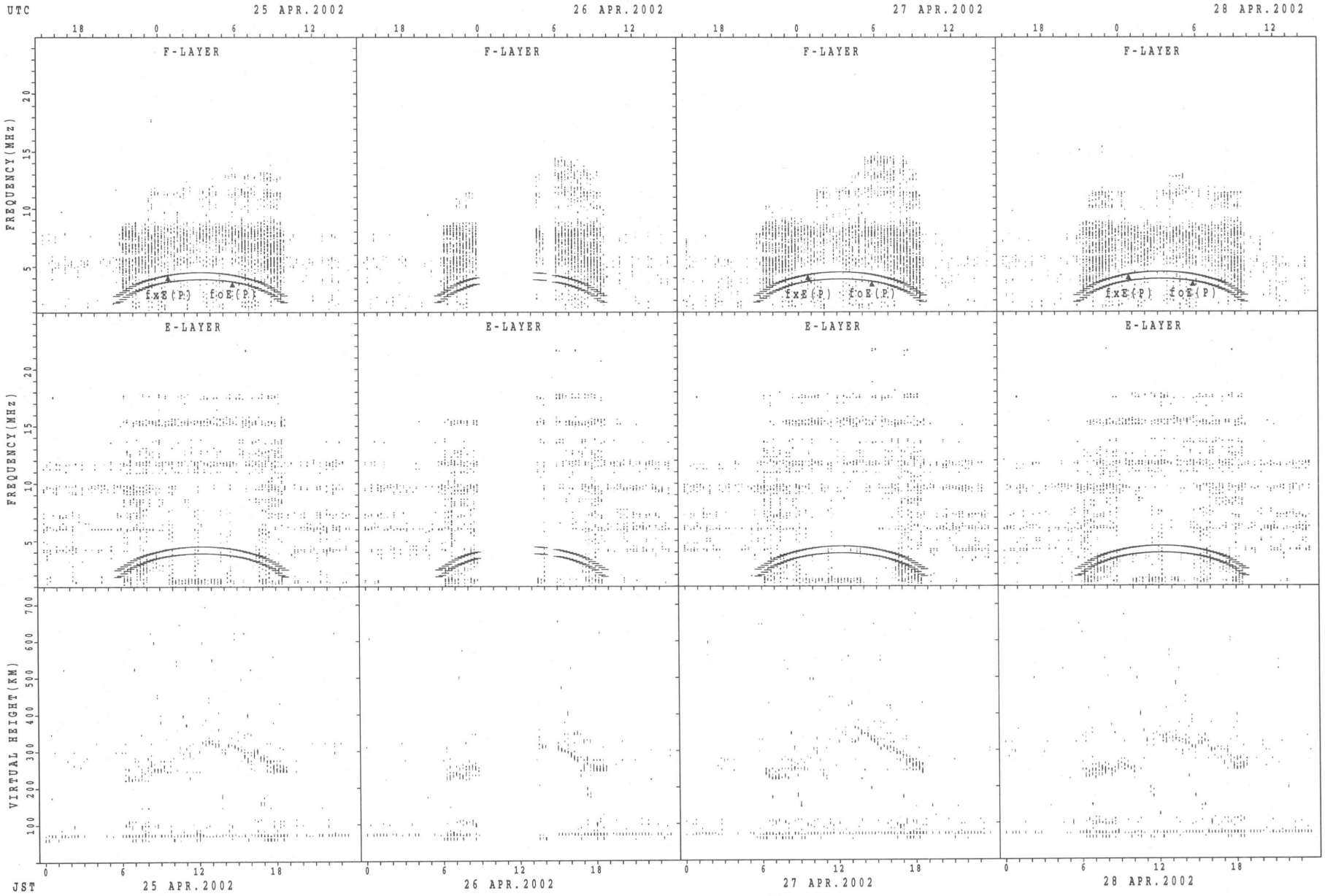
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



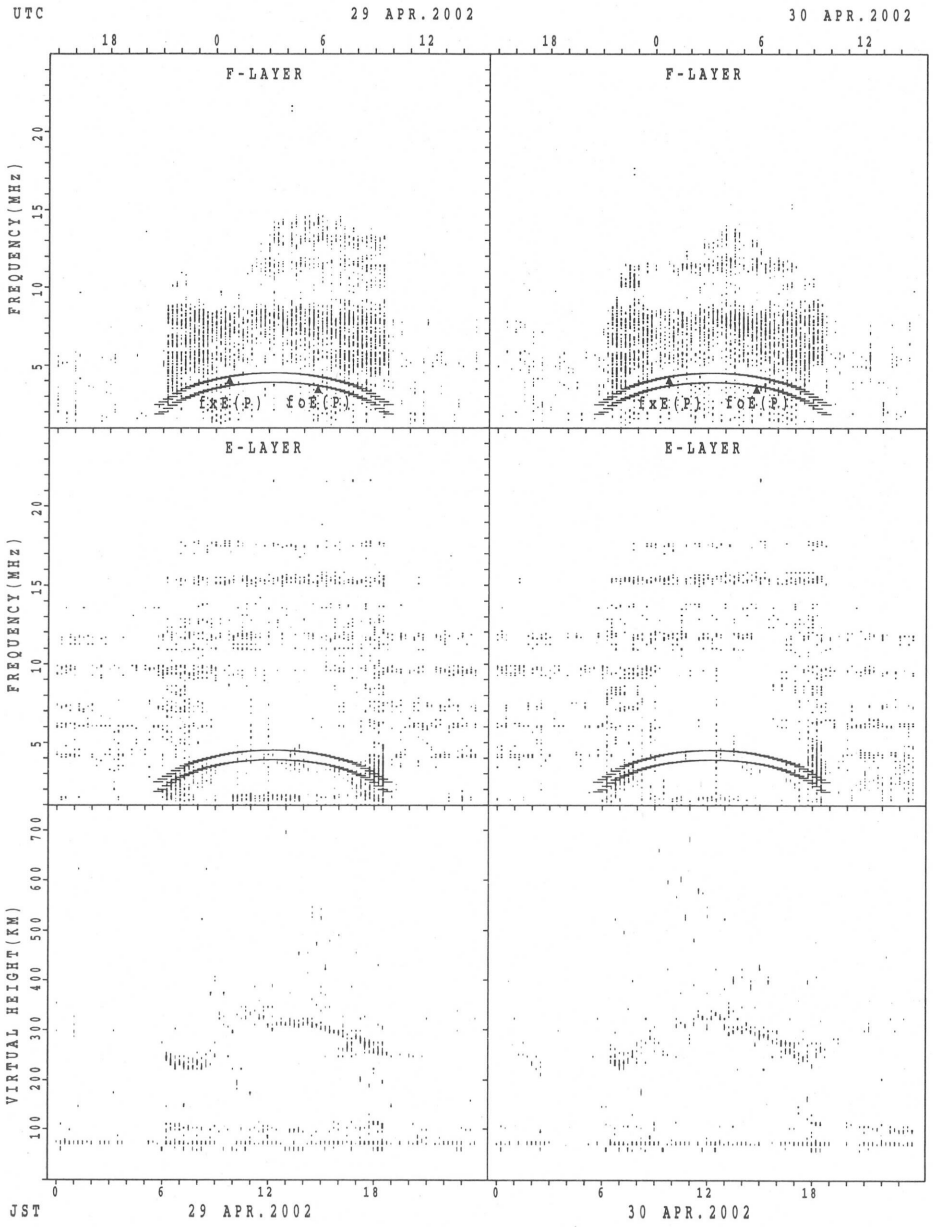
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



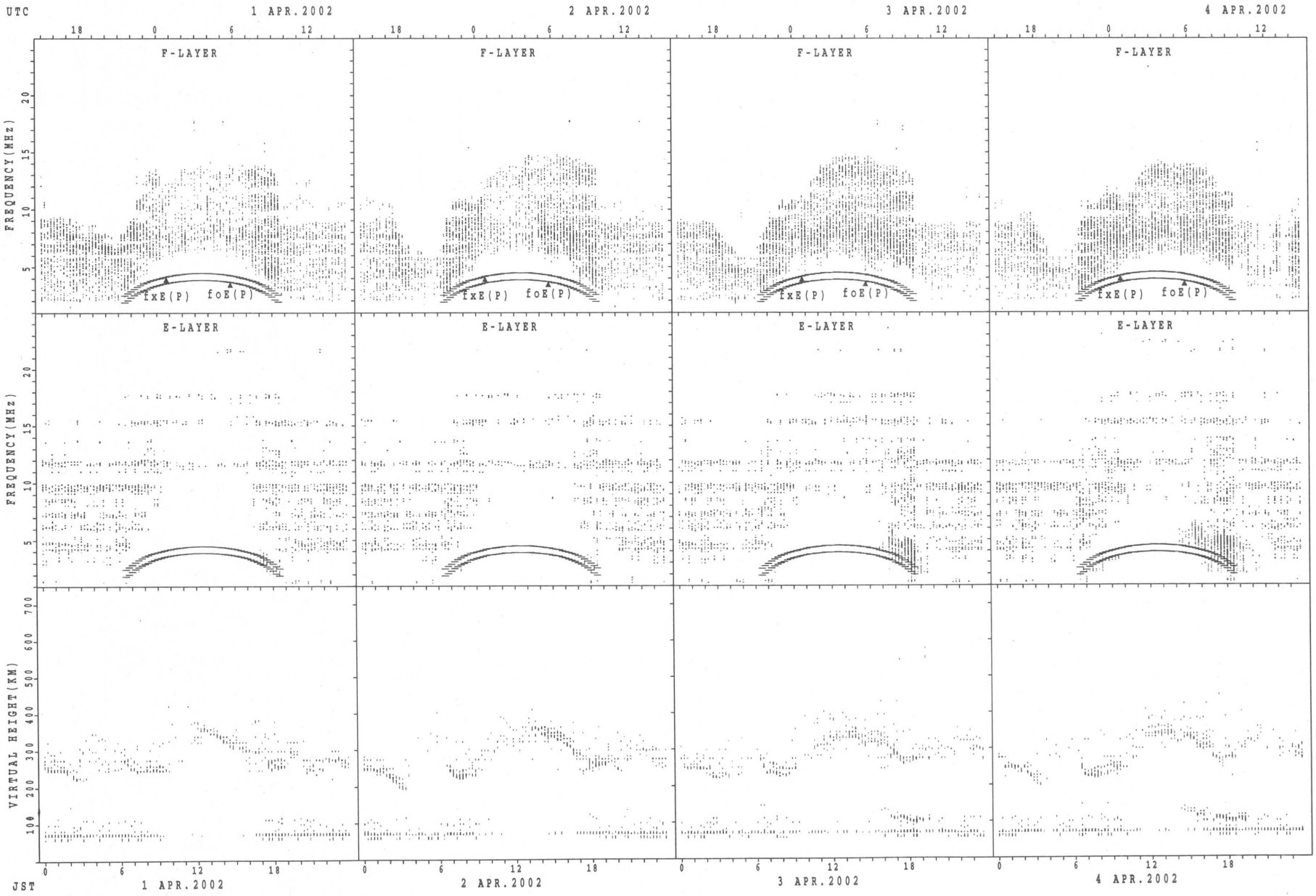
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



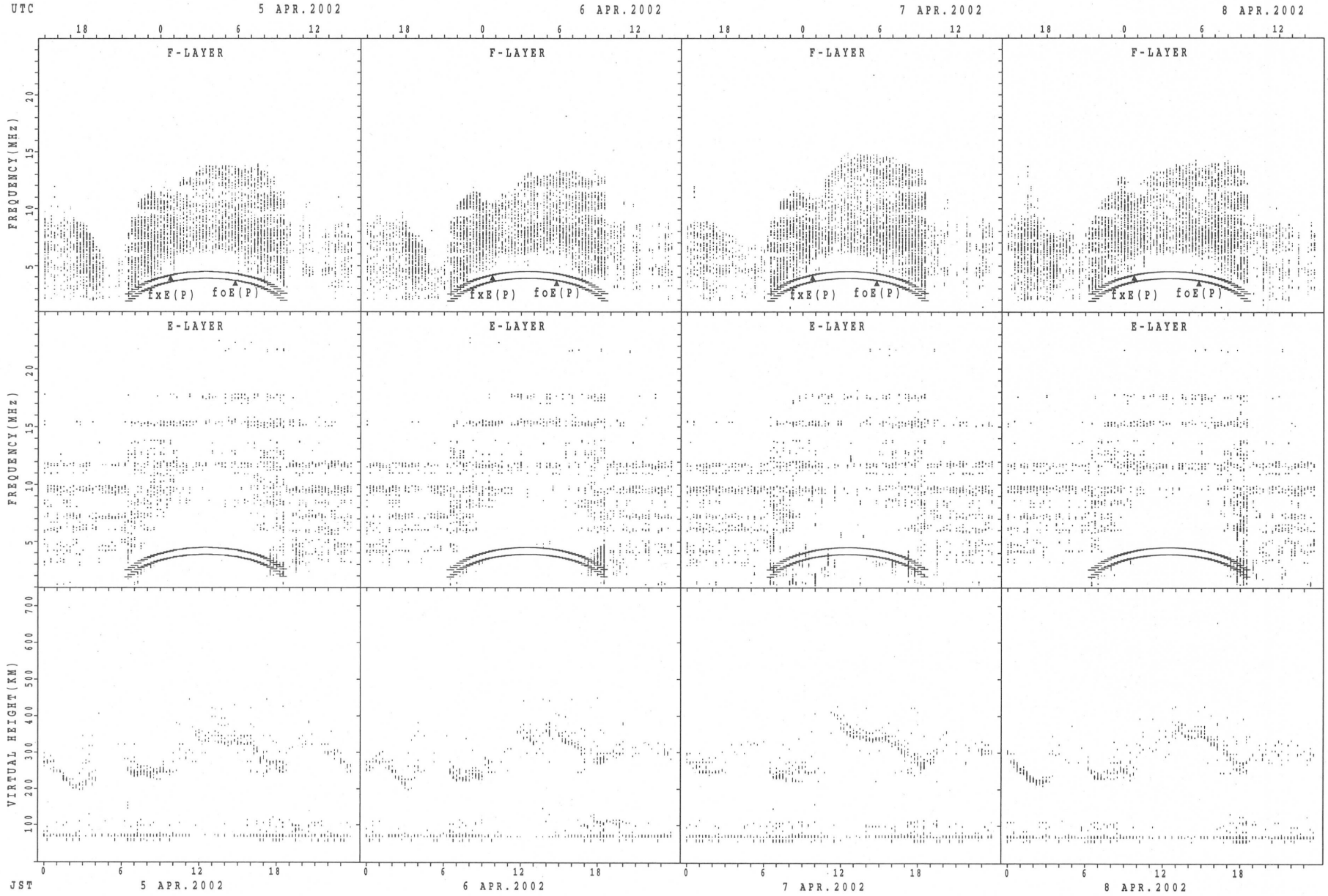
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



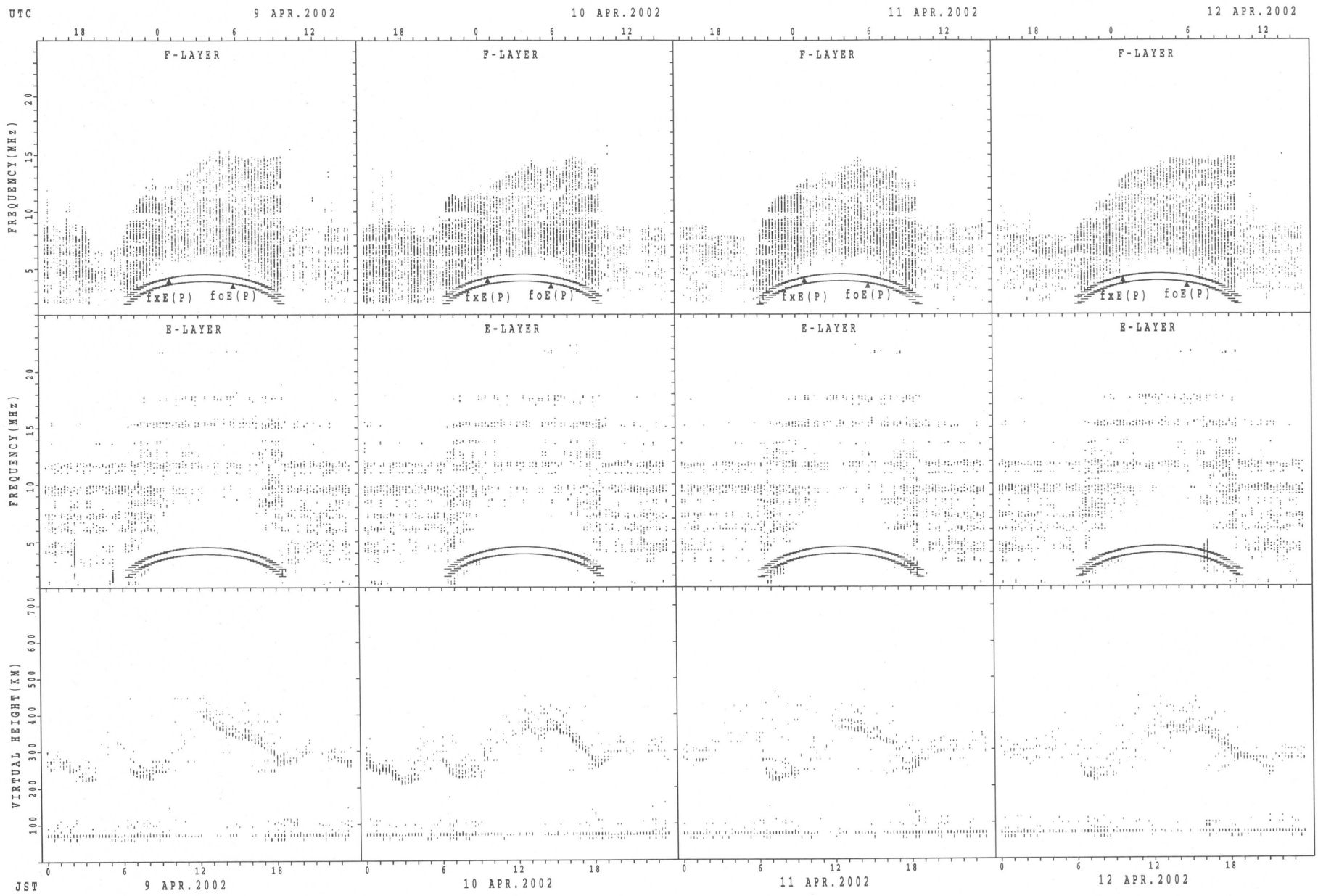
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



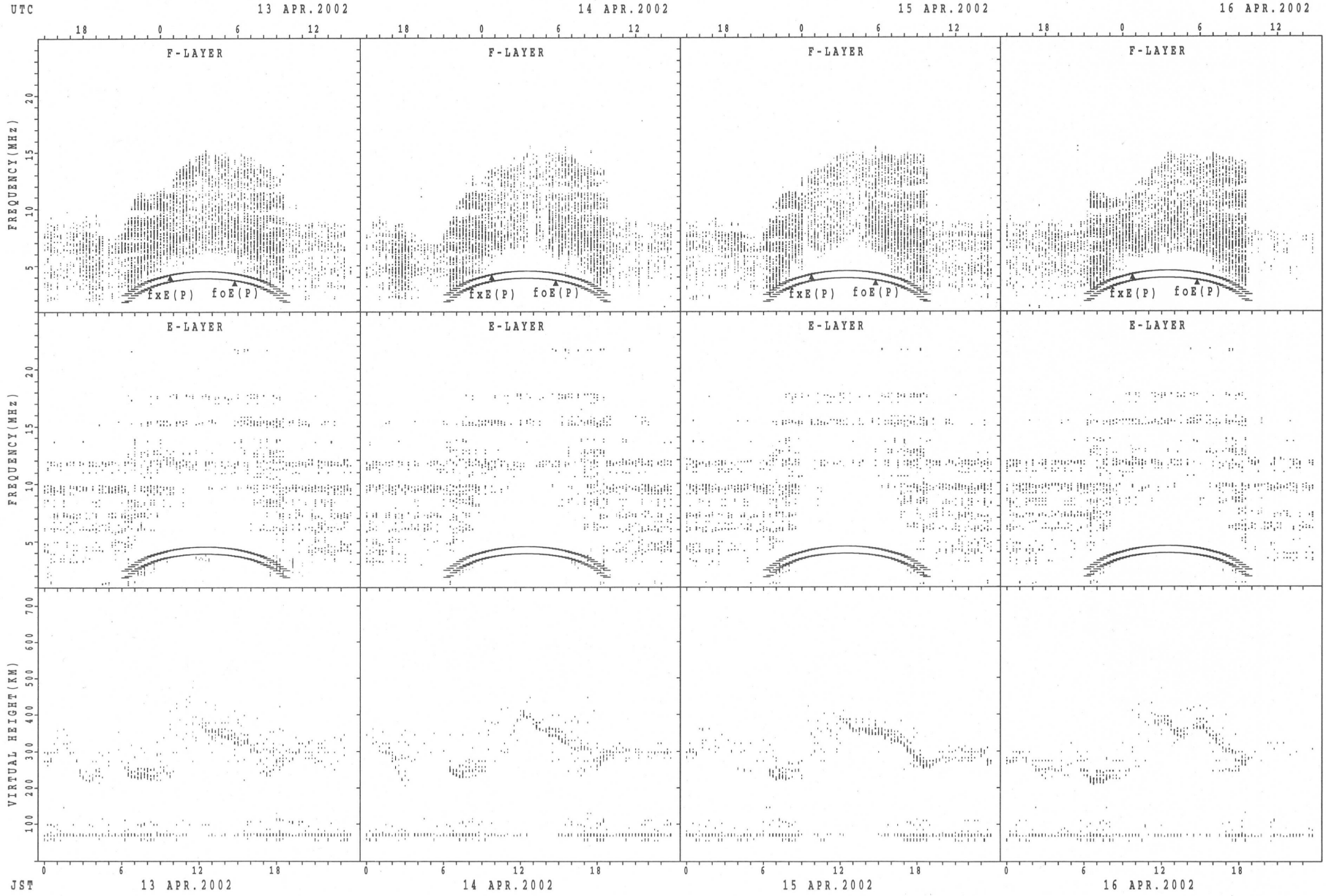
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



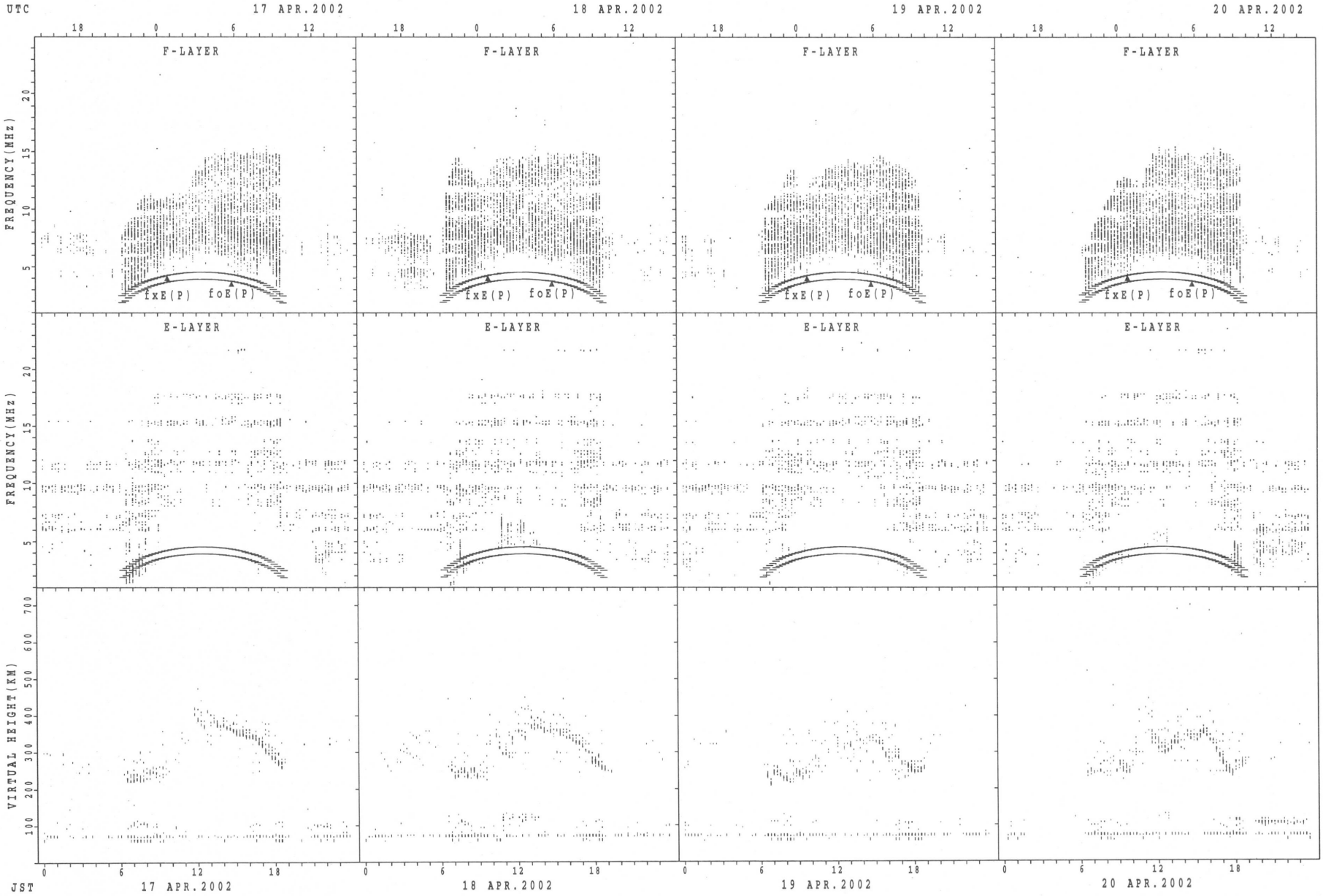
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



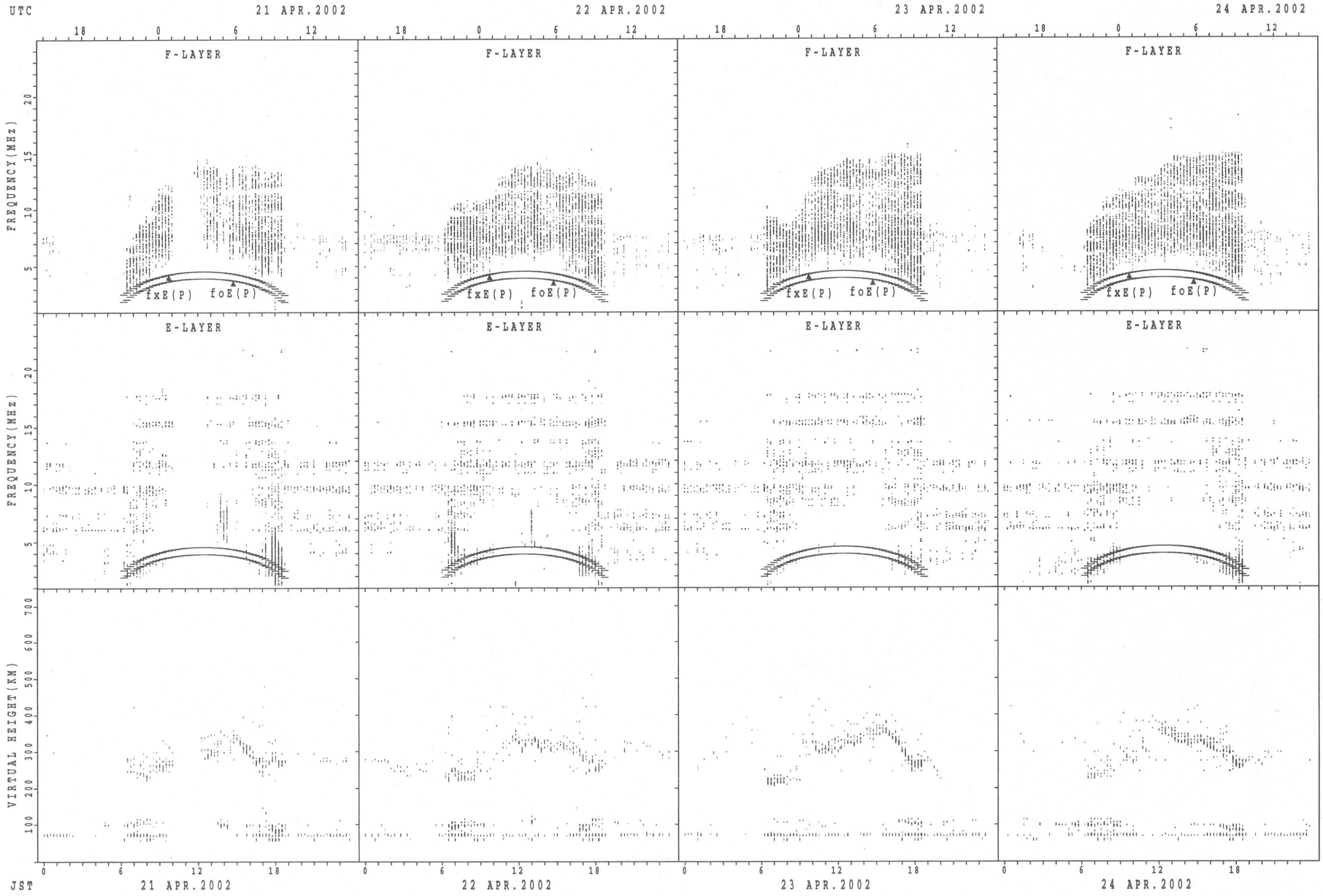
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



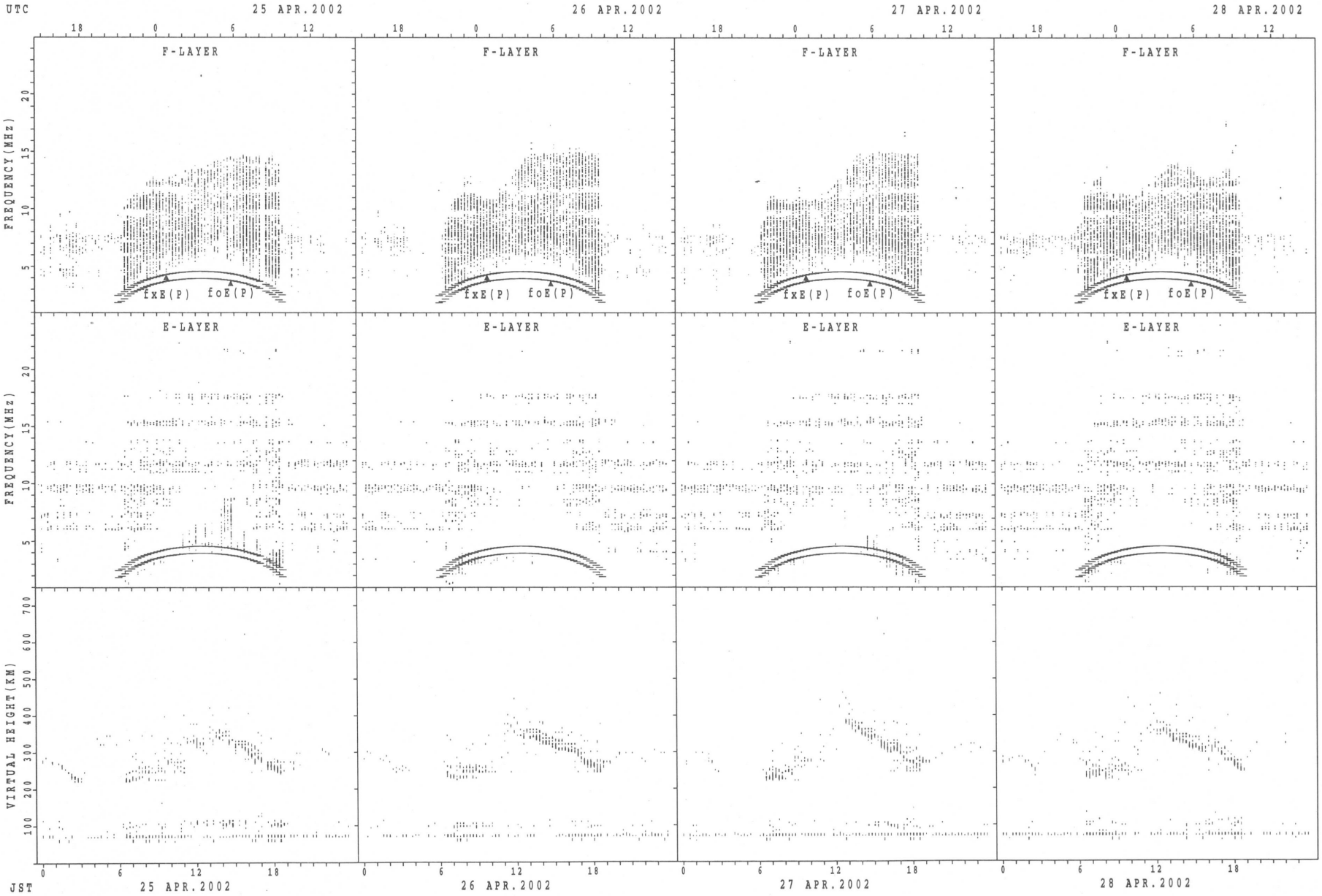
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



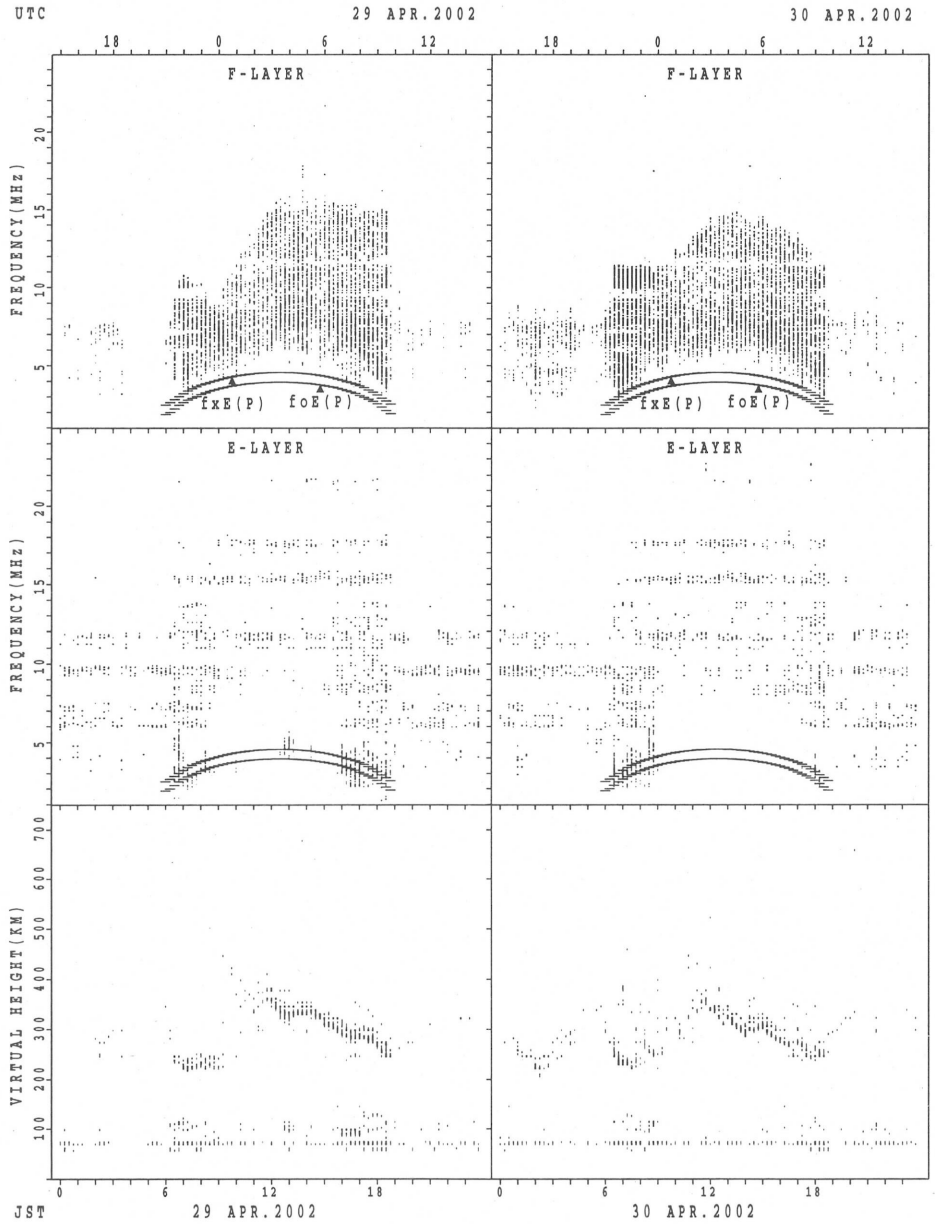
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

MONTHLY MEDIANS OF h'F AND h'Es

APR.2002 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION Wakkanai LAT. 45°23.5'N LON. 141°41.2'E

	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	9	8	10	5	5	14	22	23	19							16	26	25	26	26	22	19	13	8
MED	378	341	366	360	378	319	257	256	266							297	280	272	271	269	320	304	336	348
U Q	389	365	378	370	419	338	272	274	286							316	296	284	286	282	350	348	353	369
L Q	352	332	346	316	341	294	250	248	248							286	272	263	262	264	290	254	242	337

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	3	2	3	3	3	2	5	9	8	5	7	6	4	3	3	3	6	6	9	6	4		2	2
MED	111	114	115	121	131	118	111	109	107	119	111	110	110	109	105	105	129	113	123	114	111		98	105
U Q	123	119	135	123	131	131	128	125	113	123	113	113	121	113	157	145	147	121	136	115	118		103	115
L Q	105	109	107	105	105	105	108	107	107	110	109	107	108	105	97	103	107	105	103	101	111		93	95

h'F STATION Kokubunji LAT. 35°42.4'N LON. 139°29.3'E

	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	21	19	24	19	6	15	29	28	29							21	30	30	30	30	26	23	26	22
MED	356	324	333	340	356	362	266	260	264							312	294	280	272	278	338	354	359	341
U Q	368	342	370	378	364	394	279	281	273							321	302	288	280	292	362	370	378	352
L Q	327	316	307	312	344	328	256	251	255							297	284	272	266	266	288	338	332	332

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	6	3	3	3	3		3	3	1	4	6	2	2	2	5	5	11	13	14	6	9	6	8
MED	102	107	105	107	103	105		127	119	121	126	122	117	115	126	113	115	115	119	112	108	109	105	108
U Q	110	113	105	111	107	133		127	121	60	129	123	129	117	139	158	128	121	126	115	113	111	107	111
L Q	97	105	103	103	103	103		117	107	60	119	107	105	113	113	110	106	115	116	103	97	99	105	102

h'F STATION Yamagawa LAT. 31°12.1'N LON. 130°37.1'E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	14	16	14	10	8	14	30	29	22							25	27	29	14	15	15	11	15
MED	312	309	292	281	331	342	318	236	244	250							304	284	264	276	298	316	336	322
U Q	318	316	321	314	372	393	332	256	259	264							318	298	278	284	314	326	358	336
L Q	300	294	256	244	308	315	298	230	238	240							292	268	255	268	282	298	320	310

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	7	7	7	4	5	6	10	16	17	8	6	3	3	2	4	3	7	12	22	12	5	14	10	6
MED	77	83	83	143	95	80	113	89	101	101	87	113	101	103	113	107	113	107	119	105	115	106	101	84
U Q	95	137	109	155	104	115	137	113	122	132	143	167	161	107	135	131	155	128	131	146	132	119	137	101
L Q	77	67	71	110	89	75	95	77	77	82	83	67	71	99	97	97	89	84	101	93	89	77	77	71

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

MONTHLY MEDIANS OF h'F AND h'Es

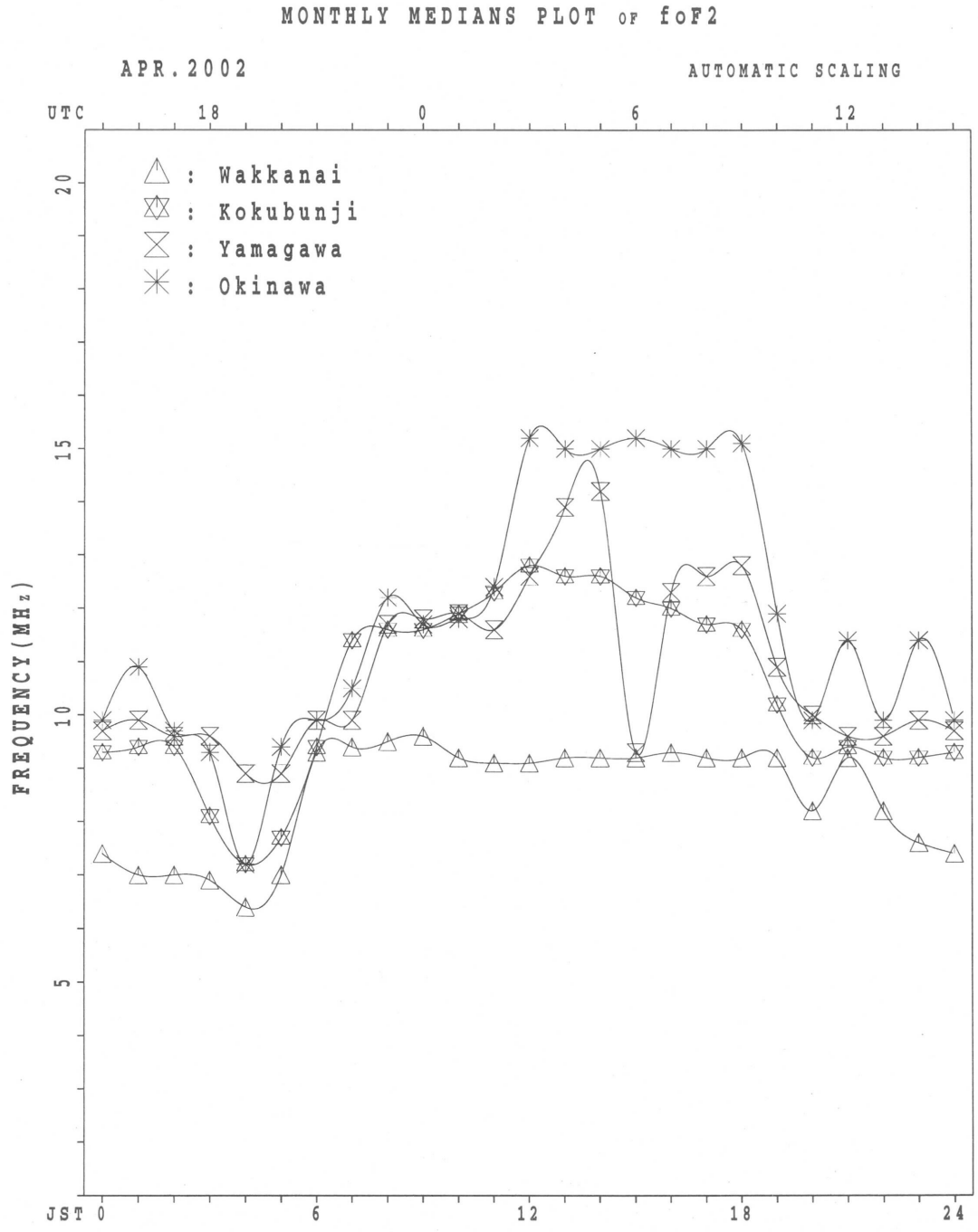
APR.2002 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION Okinawa LAT. 26°16.9'N LON. 127°48.4'E

	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	11	16	18	10	5	8	29	27	29							21	26	26	10	8	5	11	10
MED	290	280	259	250	324	312	314	250	246	254							314	288	272	298	320	302	306	298
U Q	298	298	291	300	342	313	327	267	254	272							339	300	284	298	330	326	312	310
L Q	278	258	246	230	306	305	305	241	236	247							295	278	266	284	311	281	296	204

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	1	1			1			4	3	1	2	2	2	2	2	3	4	3	11	4	1	1	2	
MED	73	67			101			101	119	103	101	127	118	110	104	111	104	109	109	111	99	105	94	
U Q	36	33			50			104	155	51	105	135	125	113	107	125	124	131	121	111	49	52	101	
L Q	36	33			50			95	103	51	97	119	111	107	101	101	88	93	101	108	49	52	87	


MONTHLY MEDIANS PLOT OF foF2
APR. 2002
AUTOMATIC SCALING
UTC
18
0
6
12
△ : Wakkanai
✡ : Kokubunji
⧖ : Yamagawa
✳ : Okinawa
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	X 94	X 90	X 82	X 79	X 78	X 82														X 100	X 90	X 89	X 92	X 92
2	X 88	X 89	X 88	X 78	X 66	X 69														X 104	X 89	X 89	X 89	X 90
3	X 88	X 88	X 84	X 76	X 74	X 71														X 102	X 92	X 95	X 94	X 95
4	X 95	X 94	X 92	X 84	X 75	X 76														X 90	X 94	X 102	X 106	X 104
5	O X 100	X 104	X 110	X 84	X 73	X 72														X 101	X 98	X 108	X 106	X 102
6	X 96	X 96	X 98	X 86	X 74	X 75														X 107	X 98	X 105	X 102	X 99
7	X 96	X 94	X 88	X 83	X 80	X 83														X 110	X 97	X 112	X 114	X 109
8	X 109	X 119	X 108	X 96	X 93	X 90														X 105	X 95	X 100	93	X 98
9	X 94	X 92	X 94	X 88	X 80	X 82														X 107	X 95	X 102	X 104	X 104
10	X 103	X 101	X 97	X 82	X 80	X 83														X 116	X 98	X 104	X 103	X 103
11	X 103	X 96	X 88	X 86	X 85	X 89														X 97	X 91	X 96	X 96	X 94
12	X 91	X 89	X 86	X 85	X 83	X 92														X 119	X 103	X 93	X 94	X 92
13	X 86	X 80	X 84	X 80	X 72	X 78														X 104	X 96	X 95	X 95	X 94
14	X 86	X 88	X 91	X 84	X 72	X 78														X 118	X 98	X 96	X 102	X 102
15	X 90	X 89	X 87	X 88	X 76	X 79														X 114	X 99	X 99	X 99	X 99
16	X 92	X 92	X 90	X 87	X 88	X 94														X 110	X 98	X 93	X 96	X 98
17	X 97	X 94	X 93	X 88	X 84	X 85														X 118	X 98	X 103	X 102	O X 98
18	X 94	X 104	X 88	X 83	X 74	X 83														X 105	X 83	X 82	X 85	X 88
19	X 78	X 85	X 75	X 76	X 72	X 82														X 86	X 75	X 72	X 76	X 75
20	X 69	X 67	X 62	X 54	X 56	X 66														X 94	X 81	X 77	X 79	X 78
21	X 83	X 72	X 66	X 62	X 62	X 61														X 98	X 86	X 78	X 83	X 86
22	X 84	X 84	X 81	X 72	X 68	X 74														X 103	X 91	X 94	X 98	X 100
23	O X 97	X 95	X 90	X 82	X 82	X 89														X 130	X 107	X 80	X 79	X 78
24	X 75	X 75	X 74	X 69	X 70	X 80														X 118	X 104	X 93	X 98	X 99
25	X 95	X 96	X 90	X 80	X 80	X 88														X 115	X 90	X 85	X 90	X 90
26	X 91	X 92	X 87	X 82	X 80	X 84														X 119	X 100	X 101	X 102	X 101
27	X 98	X 98	X 96	X 92	X 79	X 85														X 124	X 106	X 104	X 106	X 104
28	X 102	X 98	X 95	X 91	X 86	X 96														X 101	X 89	X 90	X 86	X 85
29	X 86	X 87	X 82	X 79	X 72															X 108	X 95	X 91	X 94	X 90
30	X 92	X 90	X 95	X 71	X 66	X 70														X 96	X 82	X 80	X 84	X 84
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29														30	30	30	30	30
MED	X 93	X 92	X 88	X 82	X 76	X 82														X 106	X 95	X 94	X 96	X 96
U Q	X 97	X 96	X 94	X 86	X 80	X 86														X 116	X 98	X 102	X 102	X 101
L Q	X 86	X 88	X 84	X 78	X 72	X 74														X 101	X 90	X 89	X 89	X 90

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	88	84	R 76	73	72	R 76	90	116	140	144	140	141	146	145	137	130	125	124	113	94	84	83	86	86
2	82	83	82	72	60	63	89	111	126	128	136	136	135	141	141	131	125	122	114	98	83	83	83	84
3	82	82	78	69	68	65	83	102	118	123	127	134	137	132	134	130	127	128	123	96	86	89	88	89
4	89	88	86	78	69	70	90	104	114	117	123	124	124	125	126	120	122	124	112	84	88	S 96	99	98
5	94	S 98	104	78	67	66	86	104	117	126	124	126	126	122	127	126	122	119	115	94	92	102	100	96
6	90	90	92	80	68	69	87	106	116	114	117	124	122	124	122	122	123	121	116	101	92	99	S 95	93
7	89	88	82	76	74	R 77	96	114	118	117	125	136	133	130	130	126	120	118	117	104	91	R 106	108	103
8	R 103	R 112	R 102	90	87	84	98	106	F 110	121	123	128	124	124	124	123	117	115	118	99	88	94	R	91
9	88	86	88	82	74	76	S 100	112	124	118	122	130	130	130	130	125	121	118	111	101	89	96	R 98	98
10	S 97	S 96	R 90	76	74	77	102	116	126	124	128	128	129	127	128	124	119	118	120	110	92	S 98	S 96	S 97
11	S 97	90	82	80	79	83	105	119	118	120	121	127	130	127	127	124	119	113	108	91	85	90	90	87
12	85	83	80	79	77	86	106	117	117	127	130	130	133	137	132	126	120	118	118	113	R 97	87	88	86
13	80	74	78	73	66	72	92	108	122	128	133	133	136	138	137	133	128	119	114	98	89	88	89	88
14	80	82	85	R 78	67	72	92	117	131	130	137	143	144	R 143	137	135	130	124	122	R 112	92	90	S 96	96
15	84	83	81	82	70	72	98	122	133	132	139	142	147	142	131	128	124	121	118	108	93	92	93	92
16	86	86	84	81	82	89	105	112	116	115	125	126	130	134	133	126	120	112	111	104	92	87	90	92
17	91	88	87	82	78	79	95	103	113	120	120	119	122	130	133	126	122	122	127	112	93	S 97	S 95	92
18	88	97	82	77	68	77	F	F	119	124	130	124	124	123	124	124	114	113	112	99	R 77	76	79	82
19	S 72	78	69	70	66	76	87	96	116	R 103	97	V 101	97	99	98	96	94	92	92	80	69	66	R 70	R 69
20	63	61	56	48	50	60	78	88	113	106	110	118	132	125	127	115	115	110	116	88	R 74	71	S 73	72
21	77	66	60	56	56	55	62	66	R 75	87	98	B	U R 116	105	102	104	89	94	100	92	80	72	77	79
22	78	78	75	66	61	68	85	89	97	103	110	115	121	124	121	116	122	115	A	96	85	88	S 92	94
23	R 91	89	84	76	76	83	108	112	105	110	116	122	126	132	134	133	125	124	118	124	R 101	74	73	72
24	69	69	68	63	64	74	93	101	103	114	126	131	129	127	133	136	126	119	117	112	98	87	92	92
25	R 89	90	84	74	73	82	90	94	101	101	106	113	115	112	116	119	117	113	115	109	84	79	83	84
26	85	86	81	76	74	78	91	102	107	113	120	123	128	132	134	133	131	124	122	113	94	94	96	95
27	92	92	R 90	86	73	79	98	R 112	112	117	117	118	120	124	131	131	126	123	126	117	100	98	99	98
28	S 96	92	89	85	80	90	104	114	116	116	112	112	118	121	120	108	106	109	104	94	83	84	80	79
29	80	81	76	73	66	70	95	106	100	96	101	116	117	119	121	114	110	115	111	102	89	86	88	84
30	86	R 84	89	64	60	64	86	104	109	103	109	109	109	110	112	104	98	93	91	90	R 76	74	78	78
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	29	29	30	30	30	29	30	30	30	30	30	30	29	30	30	30	29	30
MED	87	86	82	76	70	76	92	106	116	117	122	126	127	127	129	126	122	118	115	100	89	88	90	90
U Q	91	90	88	80	74	79	99	114	119	124	128	132	133	132	133	130	125	122	118	110	92	96	96	95
L Q	80	82	78	72	66	69	87	102	109	110	112	118	121	123	122	119	117	113	111	94	84	83	82	84

APR. 2002 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1												L 688	L		L									
2												L	L	L 668			L							
3													L	L	L	L	L							
4											L		L 684	L	L		L							
5										L		L	L	L	L	L	L							
6											L	L	L	L	L	L								
7										L	L 536	L 660	L	L 660	L	L	L							
8									L	L		L	L	L 672	L	L								
9											L		L	L	L	L	L							
10										L	L 696	L	L	L 632	L 672	L	L							
11										L	L	L	L	L	L	L								
12										L	L	L	L	L	L	L	L							
13									L	L	L		L	L	L	L	L							
14											L	B	L	L	L	L								
15									L		L		L	B	L	L	L							
16											L	L	L	L	L	L	L							
17												L	L	L 644	L	L	L							
18										L	L 572	L	L	L	L 624		L		L					
19								L 548		L	L	L	L	L	L									
20									L		L	L	L	L		L								
21							L 412	A		L 640	B	B	B	B	L	L								
22										L	L		L	L		L	A		A					
23											L	L	L	L 616	L	L	L							
24										L	L	L	L	L 636	L	L	L							
25									L	L	L		L	L 544	L	L	L							
26										L		L	L	L	L	L	L							
27									L	L	L	L	L	L	L	L								
28								L	L	L		L 576	L 632	L 616	L	L	L							
29									L	L	L	L 576	L	L	L	L	L							
30									L	L	L 576	L 616	L 580	L	L		L		L					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1		1	4	5	3	9	2									
MED							L 412	L 548		L 640	L 574	L 616	L 632	L 636	L 648									
U Q											L 636	L 674	L 684	L 664										
L Q											L 554	L 576	L 580	L 616										

APR. 2002 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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							220	280	316	R	R	U R 396	R	R	R	U R 332	304	248	B					
2							196	292	R	R	B	B	B	R	U R 380	R	U R 308	256	B					
3							188	U R 280	R	R	R	B	B	R	R	A	316	264	B					
4							188	U R 284	U R 324	R	R	A	R	R	R	348	U A 320	252	B					
5							200	288	R	R	R	R	B	B	R	R	U R 324	232	B					
6							196	U R 288	U R 344	R	R	B	B	R	R	U R 348	U A 324	268	B					
7							204	R	A	U R 368	U R 376	B	B	B	U R 380	R	U R 316	260	B					
8							196	300	352	R	R	B	R	R	R	368	336	264	168					
9							220	U R 316	U R 344	R	B	R	B	R	R	U R 368	R	272	160					
10							232	U R 300	R	R	B	R	R	R	R	360	U R 312	252	B					
11							220	U R 320	U R 348	R	R	B	B	B	U R 368	R 348	U R 316	264	B					
12							228	R	352	384	B	U R 400	B	R	R	A	316	268	B					
13							240	304	348	R	A	R	R	R	U R 368	U R 364	A	260	B					
14							260	U R 320	U A 372	U R 376	B	B	B	B	R	R	U R 320	268	B					
15							232	U R 316	R	R	B	B	B	B	B	R	340	272	B					
16							236	308	R	U A 392	R	A	R	R	U A 404	U A 376	336	280	176					
17							236	U R 320	U A 364	U A 384	R	A	B	R	R	U R 364	U A 324	268	B					
18							U R 216	U R 296	R	U R 364	U R 376	B	B	B	R	U R 360	R	U R 260	B					
19							236	304	U A 348	A	R	R	R	R	R	R	U A 316	260	B					
20							244	R	348	U A 376	R	R	R	R	R	A	U R 324	264	B					
21							240	304	348	R	B	B	B	B	B	R	R	268	U R 200					
22							U R 244	R	U R 360	A	B	B	B	U A 384	R	R	A	260	B					
23							252	U R 308	A	R	R	R	R	U R 380	U R 368	A	U R 324	268	B					
24							U R 272	R	U A 344	U A 380	U A 408	R	A	R	U R 380	R	U R 328	276	196					
25							248	B	348	R	R	R	R	U R 376	A	U A 316	312	268	U R 188					
26							U R 268	B	U R 376	R	R	R	U R 428	A	R	A	324	272	A					
27							260	U R 320	360	U A 376	U R 404	R	R	U A 396	A	356	R	R	180					
28							252	R	R	R	R	R	R	R	R	U R 344	U R 304	268	U A 184					
29						B	252	R	R	U A 368	R	R	R	R	U R 388	U R 356	U R 296	268	188					
30							248	316	A	U R 384	R	A	R	R	R	U R 356	U R 304	276	176					
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	21	18	11	4	2	1	4	8	16	24	29	10					
MED							236	U R 304	U 348	U A 376	U R 390	U R 398	U R 428	U 382	U R 380	U R 356	U 318	268	182					
U Q							248	U R 316	U 360	U A 384	U 406			U A 390	U R 384	U R 364	U R 324	268	U R 188					
L Q							216	290	U R 344	U R 368	U R 376			U R 378	U R 368	U R 348	U R 312	260	176					

APR. 2002 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A 26	E B 16	E B 21	E B 14	E B 14	E B 14	G	G 26	G 30	G 32	G 31	G 33	G	G 30	G 29	G 24	G 24	28	E B 18	19	E B 15	E B 15	E B 16	E B 16
2	E B 15	E B 16	E B 15	E B 14	E B 15	E B 16	24	G 25	G 31	G E B 33 47	E B 44	E B	E B 46	G 30	G 33	G 28	G 24	30	20	E B 15	E B 16	19	20	E B 16
3	E B 15	E B 15	E B 15	E B 16	E B 16	E B 13	24	G 25	G 30	G 32	G E 29	E B 46	E B 43	G 34	G 34	44	40	35	22	E B 14	E B 18	E B 14	E B 16	E B 16
4	E B 15	E B 16	E B 17	E B 16	E B 15	E B 15	25	G 26	G 32	G 34	G 37	43	G 31	G 34	G 33	G 27	36	36	J A 26	J A 19	E B 15	E B 16	E B 16	E B 12
5	E B 14	E B 16	E B 15	E B 13	E B 14	E B 14	25	G 26	G 32	G 33	G 30	G 29	E B 45	E B 47	G 32	G 30	J G 26	28	21	E B 16	E B 14	E B 15	E B 16	E B 15
6	E B 14	E B 15	E B 16	E B 15	E B 14	E B 16	24	G 28	G 32	G 34	G E 44	E B	E B 44	G 41	G 35	G 33	37	32	J A 31	E B 18	E B 15	E B 14	E B 16	E B 14
7	E B 16	E B 14	E B 16	E B 14	E B 16	E B 14	25	G	36	G 34	G E 30	E B 48	E B 46	E B 49	G 33	G 30	G 28	35	E B 18	E B 14	E B 15	E B 18	E B 16	E B 16
8	E B 16	E B 16	E B 14	E B 16	E B 15	E B 14	25	G 25	38	G 31	G E 33	E B 49	G	G	G 31	45	40	G	25	J A 21	E B 15	E B 15	E B 14	E B 15
9	E B 13	E B 16	E B 16	E B 16	E B 15	E B 14	26	G	G 30	G E 34	B 44	G	E B 47	G 34	G 29	G 32	G 21	32	24	J A 24	E B 15	J A 21	E B 15	E B 15
10	E B 15	E B 15	E B 14	E B 14	E B 16	E B 16	G	G 27	G 30	G E 34	B 47	G 33	G	G	G 32	G 40	G 28	30	22	J A 20	E B 23	E B 16	E B 16	E B 15
11	E B 14	E B 15	E B 16	E B 15	E B 15	E B 16	28	G 26	G 30	G 33	G E 32	E B 49	E B 47	E B 51	G 35	G 32	G 30	32	23	E B 16	E B 16	E B 16	E B 16	E B 16
12	E B 16	E B 15	E B 15	E B 16	E B 14	E B 16	28	G 25	40	44	E B 44	46	E B 46	G	G 38	36	G 30	G 22	E B 15	22	E B 15	E B 16	E B 16	E B 15
13	E B 16	E B 14	E B 15	E B 15	E B 16	E B 16	27	G 27	G 30	G 31	46	G	J G 33	G 36	G 34	G 33	J A 37	G 23	21	J A 22	J A 21	E B 16	E B 14	E B 16
14	E B 15	E B 16	E B 16	E B 16	E B 16	E B 15	G	G	42	G E 33	B E 44	B 65	E B 51	E B 54	G	G 30	G 29	33	J A 28	J A 20	E B 16	E B 14	E B 15	E B 14
15	E B 14	E B 15	E B 13	E B 15	E B 14	E B 14	27	G 29	G 31	G E 32	B 43	45	E B 48	E B 63	E B 49	G 32	G	G E 20	B J A 24	22	E B 15	E B 16	E B 16	E B 15
16	E B 15	E B 16	E B 15	E B 16	E B 16	E B 14	29	34	G 31	42	G 31	45	G 33	G	J A 51	43	43	J A 43	28	J A 30	J A 41	21	E B 16	J A 20
17	E B 12	20	19	22	E B 15	E B 17	G	G 30	41	46	G J 34	A 72	50	G 34	G 32	G 25	37	36	J A 37	J A 23	E B 16	22	25	23
18	20	22	E B 15	E B 16	E B 15	E B 16	G	G 27	G 30	G J 33	A E 52	B 48	E B 48	E B 45	G 30	G 32	G	G	20	E B 13	E B 16	E B 15	E B 16	20
19	E B 16	19	J A 25	20	E B 16	19	29	36	J A 48	J A 49	G 32	G 33	G	G	G	G 25	36	30	20	E B 16	E B 16	E B 15	E B J 16	A 37
20	E B 14	19	19	E B 15	E B 14	E B 17	G	G 27	38	41	45	G 28	44	47	G J 31	A 43	G 29	32	E B 22	J A 18	J A 25	37	E B 14	J A 28
21	J A J A 19 33		37	J A J A 20 16		J A 20	29	44	40	G E 33	B 64	B	E B 81	E B 64	E B 50	38	G 34	G	J A J A 24		E B 28	E B 14	E B 15	E B J A 16 29
22	J A J A 27 22		J A J A 26	J A J A 55		J A J A 36 32	G	G	G	42	46	E B 48	E B 48	J A 53	G	38	J A J A 116		J A 98	27	J A J A 38		J A 32	22 21
23	E B 14	E B 16	E B 15	E B 16	E B 16	E B 16	G	37	42	G 30	G 32	G 32	G 32	G J 36	A 39	38	G 24	G 20	22	E B 16	34	J A 28	J A J A 50	J A 28
24	J A J A 26 26		J A J A 34	J A J A 38		J A E B 22 17	G	G	38	42	46	43	J A 59	G 30	G 34	G 25	G	G	G E 14	B E B J 15	A E B 18	16	19	
25	J A 20	22	E B 14	E B 16	E B 15	J A 26	29	E B 38	38	G 31	45	51	46	47	J A J 52	A 42	35	G	G J 37	A J A 27	J A J 28	A E 12	B E B 15	
26	E B E B 15 16		21	E B E B 14 16		19	G E 23	B 39	G 32	G 31	G 34	G	G 32	46	G J 32	A 53	G	32	24	23	E B J 16	A E 18	B E B 16	16
27	E B 15	E B 15	E B 16	E B 16	E B 15	E B 18	G	G 29	40	41	G 34	G 40	41	G 38	39	G 30	G 27	G 25	21	J A 21	E B J 16	A E 21	B E B 16	16
28	E B 16	E B 16	E B 15	E B 16	E B 15	E B 18	30	G	G 30	G 34	G 36	G 31	G 31	G 29	G 32	G 23	G 25	32	29	18	E B E 13	B J 15	A E B 22	14
29	E B 15	E B 16	E B 15	E B 14	E B 16	20	30	G 27	G 30	41	G 32	G 38	G 32	G	G 30	G	G 27	33	24	J A 18	E B 14	E B 15	B J A 37	J A 23
30	E B 15	J A 25	E B 15	E B 12	21	20	29	45	J A 50	G 26	G	47	G 34	G	G 28	G 34	G 23	34	J A 32	60	J A 51	32	J A J 27	A 31
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	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 15	E B 16	E B 16	E B 16	E B 15	E B 16	25	G 28	G 32	G 34	G	U 41	U 38	G	G 34	G 32	G 32	31	22	20	E B 16	E B 16	E B 16	E B 16
U Q	J A 16	19	19	16	16	18	28	G	40	41	45	E B 48	E B 47	E B 47	G	38	36	33	J A 26	J A 23	J A J 22	A J A 21	J A 16	J A 21
L Q	E B 14	E B 15	E B 15	E B 14	E B 15	E B 14	G	G 26	G 30	G 32	G 32	G 36	G 34	G 34	G 32	G 30	G 27	G	20	E B 16	E B 15	E B 15	E B 16	E B 15

APR. 2002 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	E B 15	E B 16	E B 21	E B 14	E B 14	E B 14	G	G 24	G 30	U Y 32	G 30	G 33	G	G 30	G 28	G 22	G 24	27	E B 18	16	E B 15	E B 15	E B 16	E B 16
2	E B 15	E B 16	E B 15	E B 14	E B 15	E B 16	24	G 25	G 31	U Y 33	E B 47	E B 44	E B 46	U Y 30	G 32	G 28	G 22	28	18	E B 15	E B 16	16	E B 14	E B 14
3	E B 15	E B 15	E B 15	E B 16	E B 16	E B 13	23	G 24	G 30	G 32	G 28	E B 46	E B 43	G 33	G 34	42	37	30	20	E B 14	E B 18	E B 14	E B 16	E B 16
4	E B 15	E B 16	E B 17	E B 16	E B 15	E B 15	24	G 26	G 32	U Y 34	U Y 37	U Y 43	G 30	G 32	G 33	G 27	36	34	24	E B 12	E B 15	E B 16	E B 16	E B 12
5	E B 14	E B 16	E B 15	E B 13	E B 14	E B 14	24	G 26	G 31	G 33	G 30	G 28	E B 45	E B 47	G 32	G 30	G 24	28	19	E B 16	E B 14	E B 15	E B 16	E B 15
6	E B 14	E B 15	E B 16	E B 15	E B 14	E B 16	24	G 28	G 31	G 33	G	E B 44	E B 41	G 35	G	G 33	36	29	28	E B 18	E B 15	E B 14	E B 16	E B 14
7	E B 16	E B 14	E B 16	E B 14	E B 16	E B 14	24	G U Y 36	G U Y 34	G U Y 30	E B 48	E B 46	E B 46	E B 49	U Y 33	G 30	G 28	33	E B 18	E B 14	E B 15	E B 18	E B 16	E B 16
8	E B 16	E B 16	E B 14	E B 16	E B 15	E B 14	25	G 24	G 37	U Y 31	E B 33	E B 49	G	G	U Y 31	44	37	G	23	17	E B 15	E B 15	E B 14	E B 15
9	E B 13	E B 16	E B 16	E B 16	E B 15	E B 14	26	G	G 30	G E B 34	44	G	E B 47	U Y 34	G U Y 29	32	G 21	31	22	21	E B 15	17	E B 15	E B 15
10	E B 15	E B 15	E B 14	E B 14	E B 16	E B 16	G	G 26	G 29	G E B 34	U Y 47	33	G	G	U Y 32	38	G 28	28	19	E B 15	E B 16	E B 16	E B 16	E B 15
11	E B 14	E B 15	E B 16	E B 15	E B 15	E B 16	27	G 25	G U Y 30	33	G E B 32	49	E B 47	E B 51	G 34	G 32	G 30	30	22	E B 16	E B 16	E B 16	E B 16	E B 16
12	E B 16	E B 15	E B 15	E B 16	E B 14	E B 16	27	G 25	40	42	E B 44	45	E B 46	G	U Y 38	U Y 36	G 29	G 21	E B 15	E B 15	E B 15	E B 16	E B 16	E B 15
13	E B 16	E B 14	E B 15	E B 15	E B 16	E B 16	26	G 27	G 30	G 31	45	G	G 26	G 34	G 34	G 32	G 36	G 20	20	E B 14	E B 14	E B 16	E B 14	E B 16
14	E B 15	E B 16	E B 16	E B 16	E B 16	E B 15	G	G	41	U Y 33	E B 44	E B 65	E B 51	E B 54	G	G 27	G 29	31	24	E B 14	E B 16	E B 14	E B 15	E B 14
15	E B 14	E B 15	E B 13	E B 15	E B 14	E B 14	27	G 26	G 31	G 32	E B 43	U Y 45	E B 48	E B 63	E B 49	G 32	G	G	E B 20	20	17	E B 15	E B 16	E B 15
16	E B 15	E B 16	E B 15	E B 16	E B 16	E B 14	28	G 34	G 31	42	G 31	45	U Y 33	G	48	42	40	39	27	18	24	16	E B 16	16
17	E B 12	E B 15	E B 16	E B 15	E B 15	E B 17	G	G 29	40	46	U Y 34	53	47	U Y 34	U Y 32	G 25	34	34	34	18	E B 16	E B 15	19	E B 16
18	E B 16	16	E B 15	E B 16	E B 15	E B 16	G	G 27	G 29	G 32	48	E B 48	E B 48	E B 45	G 30	G 30	G	G	U Y 20	E B 13	E B 16	E B 15	E B 16	16
19	E B 16	E B 14	18	E B 14	E B 16	18	28	34	39	41	G U Y 32	33	G	G	G	G 25	34	29	19	E B 16	E B 16	E B 15	E B 16	18
20	E B 14	E B 16	15	E B 15	E B 14	E B 17	G	G 27	38	40	44	U Y 28	44	44	U Y 31	39	G 29	28	E B 22	E B 16	21	33	E B 14	25
21	E B 12	20	32	E B 16	E B 13	18	28	43	39	G E B 33	64	B	E B 81	E B 64	E B 50	U Y 38	U Y 34	G	22	22	E B 14	E B 15	E B 16	E B 14
22	21	E B 14	20	25	23	28	G	G	G	42	44	E B 48	E B 48	48	G U Y 38		65	44	A A 98	23	33	28	18	16
23	E B 14	E B 16	E B 15	E B 16	E B 16	E B 16	G	36	40	G U Y 30	32	G 32	U Y 32	G 36	G 35	38	G 24	G 19	21	E B 16	32	26	41	19
24	19	20	23	18	19	E B 17	G	G	36	40	45	43	56	U Y 30	G 34	G 25	G	G	G	E B 14	E B 15	E B 15	E B 16	E B 15
25	E B 15	E B 16	E B 14	E B 16	E B 15	22	E B 28	38	36	G 30	44	49	45	46	47	42	33	G	G	34	20	E B 17	E B 12	15
26	E B 15	E B 16	E B 14	E B 14	E B 16	18	G E B 23	39	G 31	G 30	G 34	G	G 32	U Y 46	U Y 32	46	G	32	22	18	E B 16	E B 15	E B 16	E B 16
27	E B 15	E B 15	E B 16	E B 16	E B 15	E B 18	G	G 28	38	40	G 34	G 40	40	G U Y 38	G 39	G 30	G 27	G 24	20	17	E B 16	E B 16	E B 16	E B 16
28	E B 16	E B 16	E B 15	E B 16	E B 15	E B 18	29	G	G 30	G 33	G 35	G 29	G 31	G 29	G 28	G 23	G 25	32	26	16	E B 13	E B 15	E B 12	E B 14
29	E B 15	E B 16	E B 15	E B 14	E B 16	16	27	G 27	G 30	41	U Y 32	G 38	U Y 32	G	G 30	G	G 27	28	22	E B 14	E B 14	E B 15	29	E B 15
30	E B 15	20	E B 15	E B 12	E B 13	18	28	43	43	U Y 26	G	46	G 32	G	G 27	G 34	G 23	32	27	55	44	28	23	26
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	29	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 15	E B 16	E B 15	E B 16	E B 15	E B 16	24	G 28	G 32	33	G U 41		U 38	G	G 33	G 32	G	28	22	E B 16	E B 16	E B 16	E B 16	E B 16
U Q	E B 16	16	16	E B 16	E B 16	E B 18	27	G	38	40	44	E B 48	E B 47	E B 46	G	38	34	32	24	18	17	16	16	16
L Q	E B 14	E B 15	E B 15	E B 14	E B 14	E B 14	G	G 26	G 30	G 32	G 32	G 36	G	G 34	G 31	G 28	G 27	G	19	E B 14	E B 15	E B 15	E B 15	E B 15

APR. 2002 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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	15	16	21	14	14	14	14	15	16	20	28	23	30	27	23	18	16	15	18	14	15	15	16	16
2	15	16	15	14	15	16	15	15	14	18	47	44	46	25	21	19	17	17	14	15	16	14	14	16
3	15	15	15	16	16	13	16	14	18	16	22	46	43	24	22	21	18	14	14	14	18	14	16	16
4	15	16	17	16	15	15	14	16	20	21	27	25	28	27	26	22	19	15	14	12	15	16	16	12
5	14	16	15	13	14	14	15	16	17	17	23	22	45	47	23	22	17	15	12	16	14	15	16	15
6	14	15	16	15	14	16	13	15	16	24	26	44	41	26	26	28	19	17	14	18	15	14	16	14
7	16	14	16	14	16	14	14	18	20	21	21	48	46	49	26	23	18	15	18	14	15	18	16	16
8	16	16	14	16	15	14	14	18	16	19	19	49	26	30	21	25	21	15	14	14	15	15	14	15
9	13	16	16	16	15	14	14	21	16	22	44	35	47	23	22	21	16	16	13	13	15	15	15	15
10	15	15	14	14	16	16	13	18	19	18	47	22	30	35	25	18	16	15	14	15	16	16	16	15
11	14	15	16	15	15	16	16	16	20	17	26	49	47	51	20	20	20	16	15	16	16	16	16	16
12	16	15	15	16	14	16	17	17	17	19	44	34	46	34	29	23	20	16	15	15	15	16	16	15
13	16	14	15	15	16	16	16	16	22	24	25	28	24	22	26	24	18	14	13	14	16	16	14	16
14	15	16	16	16	16	15	15	22	20	21	44	65	51	54	33	20	21	16	16	14	16	14	15	14
15	14	15	13	15	14	14	15	19	19	27	43	41	48	63	49	28	24	16	20	12	15	15	16	15
16	15	16	15	16	16	14	16	16	21	29	21	28	29	27	28	23	17	14	14	14	15	13	16	14
17	12	14	16	15	15	17	14	18	17	16	26	23	41	27	28	20	18	16	16	13	16	15	16	16
18	16	14	15	16	15	16	15	15	18	17	22	48	48	45	25	22	21	16	15	13	16	15	16	13
19	16	14	15	14	16	13	16	15	18	19	21	26	28	29	26	17	21	15	14	16	16	15	16	15
20	14	16	13	15	14	17	15	17	15	18	24	27	26	28	27	23	18	16	22	16	16	14	14	16
21	12	16	12	16	13	13	16	13	18	24	64	B	81	64	50	22	19	19	15	14	14	15	16	14
22	15	14	16	13	13	16	16	18	23	22	39	48	48	24	31	24	15	15	16	14	16	16	16	14
23	14	16	15	16	16	16	14	21	22	23	26	29	29	22	25	19	14	15	15	16	14	16	16	16
24	15	15	16	15	14	17	17	22	22	23	30	25	26	26	24	20	21	16	16	14	15	15	16	15
25	15	16	14	16	15	13	14	38	18	20	23	22	26	20	22	23	20	17	14	15	15	15	12	15
26	15	16	14	14	16	13	14	39	22	22	23	34	23	30	23	24	20	21	12	14	16	15	16	16
27	15	15	16	16	15	18	16	18	17	20	22	31	29	20	20	19	19	13	13	13	16	16	16	16
28	16	16	15	16	15	18	15	18	20	18	22	21	17	22	20	16	18	16	14	12	13	15	12	14
29	15	16	15	14	16	12	14	15	15	19	16	19	23	30	24	26	15	14	14	14	14	15	15	15
30	15	16	15	12	13	13	16	16	20	22	29	24	24	35	20	23	16	15	14	15	14	16	14	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	16	15	15	15	15	15	17	18	20	26	30	30	28	25	22	18	16	14	14	15	15	16	15
U Q	15	16	16	16	16	16	16	18	20	22	39	46	46	35	27	23	20	16	16	15	16	16	16	16
L Q	14	15	15	14	14	14	14	15	17	18	22	24	26	24	22	20	17	15	14	14	15	15	15	14

IONOSPHERIC DATA STATION Kokubunji

APR.2002 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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	276	273	R 262	253	253	R 273	280	287	304	307	290	277	278	278	275	277	278	296	297	289	266	260	274	274
2	275	277	284	292	262	253	295	311	303	296	286	279	272	278	277	278	282	290	292	298	262	270	270	276
3	278	278	288	277	275	278	310	305	298	282	280	278	278	274	271	275	278	285	303	281	268	266	269	279
4	279	280	283	295	272	274	311	318	311	284	286	279	269	270	272	273	278	296	308	265	257	S 270	274	270
5	268	S 281	309	299	282	274	305	305	295	300	285	281	279	268	270	280	286	291	298	284	265	263	278	281
6	268	277	297	289	267	270	304	312	310	289	278	276	269	271	266	272	278	288	293	293	260	265	S 270	271
7	271	280	285	273	266	R 270	304	312	304	282	273	278	265	262	267	271	272	280	297	291	252	R 261	269	261
8	R 260	R 295	R 288	270	285	281	302	303	F 303	284	278	273	265	265	266	272	275	283	292	301	258	262	R	277
9	273	267	281	281	273	270	S 301	301	305	285	271	266	264	263	265	270	273	283	290	285	264	258	R 270	273
10	S 278	S 284	R 293	281	269	264	291	292	298	289	273	263	260	262	263	268	272	276	289	296	271	S 262	S 270	S 265
11	S 279	271	258	251	249	243	291	297	290	284	276	268	265	267	270	272	277	287	293	286	258	262	262	264
12	262	264	258	259	263	272	294	308	289	283	276	267	268	270	265	269	271	276	283	298	R 283	267	271	271
13	263	242	259	275	263	268	300	297	292	289	286	269	267	267	269	270	277	281	291	279	269	260	268	267
14	247	248	265	R 281	260	272	292	290	302	278	271	277	263	R 264	265	268	273	277	287	R 289	276	259	S 264	273
15	262	247	253	274	273	260	293	291	284	279	276	269	269	272	263	267	276	284	295	285	278	263	270	272
16	258	252	256	261	261	272	297	295	295	274	277	263	265	267	268	271	271	277	284	285	273	258	260	272
17	277	275	276	280	287	287	304	301	295	288	281	260	263	259	264	269	267	273	292	291	267	S 246	S 256	242
18	239	276	258	258	244	277	F	F	280	280	285	271	271	259	263	273	274	280	286	297	R 268	243	246	265
19	S 247	259	270	245	241	250	290	276	309	R 312	307	277	277	283	279	290	304	303	306	290	244	225	R 247	R 241
20	237	248	237	226	230	277	314	297	313	295	289	274	286	270	276	274	271	284	301	288	R 272	257	S 254	255
21	282	269	254	235	240	258	269	297	R 294	283	289	B	R 307	299	289	311	299	296	304	305	293	261	262	265
22	269	276	290	291	270	277	318	315	301	293	283	275	278	279	273	276	293	298	A	288	267	262	S 267	272
23	R 280	285	284	274	261	271	307	311	284	283	274	274	269	274	281	281	273	284	270	306	R 319	256	260	258
24	256	262	259	259	264	277	318	305	298	273	281	282	278	273	281	291	295	288	295	297	301	265	265	261
25	R 267	276	275	267	264	275	302	290	294	290	286	279	286	273	281	281	286	293	307	306	289	263	265	268
26	272	290	296	278	275	284	297	303	297	285	284	279	271	278	279	279	292	292	299	309	285	273	273	280
27	278	281	R 295	304	276	272	303	R 312	292	299	276	273	264	265	273	279	277	285	296	299	286	264	273	270
28	S 274	274	282	270	254	262	286	292	294	290	277	267	270	276	280	274	275	290	293	291	280	270	259	257
29	264	273	271	276	253	273	296	308	306	289	267	287	278	276	290	285	278	296	301	298	284	263	269	259
30	268	R 289	309	301	266	256	311	292	302	268	270	279	281	278	288	282	304	304	304	302	R 293	268	268	268
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	29	29	30	30	30	29	30	30	30	30	30	30	29	30	30	30	29	30
MED	268	276	278	274	264	272	301	301	298	285	279	275	270	270	272	274	277	286	295	291	270	262	268	269
U Q	277	280	288	281	273	277	306	310	304	290	286	279	278	276	279	280	286	293	301	298	284	265	270	273
L Q	262	264	259	259	254	264	292	292	294	282	276	268	265	265	266	271	273	281	290	286	264	259	261	261

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1												L 343	L		L									
2												L	L	L 311			L							
3													L	L	L	L	L							
4											L		L 339	L	L		L							
5										L		L	L	L	L	L	L							
6											L	L	L	L	L	L								
7										L	L 385	L 334	L	L 343	L	L	L							
8									L	L		L	L	L 330	L	L								
9											L		L	L	L	L	L							
10										L	L 341	L	L	L 328	L 321	L	L							
11										L	L	L	L	L	L	L								
12										L	L	L	L	L	L	L	L							
13									L	L	L		L	L	L	L	L							
14											L	B	L	L	L	L								
15									L		L		L	B	L	L	L							
16											L	L	L	L	L	L	L							
17												L	L	L 330	L	L	L							
18										L	L 344	L	L	L	L 318		L	L						
19								L 329		L	L	L	L	L	L									
20									L		L	L	L	L		L								
21							L 306	A		L 338	B	B	B	B	L	L								
22										L	L		L	L		L	A		A					
23											L	L	L	L 331	L	L	L							
24										L	L	L	L	L 329	L	L	L							
25									L	L	L		L	L 367	L	L	L							
26										L		L	L	L	L	L	L							
27									L	L	L	L	L	L	L	L								
28								L	L	L		L 352	L 337	L 334	L	L	L							
29									L	L	L	L 343	L	L	L	L	L							
30									L	L	L 343	L 319	L 345	L	L		L	L						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1		1	4	5	3	9	2									
MED							L 306	L 329		L 338	L 344	L 343	L 339	L 330	L 320									
U Q											L 364	L 348	L 345	L 338										
L Q											L 342	L 326	L 337	L 328										

APR. 2002 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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												328	326		316									
2												304	328	330			306							
3													302	324	330	316	304							
4											304		356	340	326		306							
5										278		312	312	344	338	308	298							
6											328	306	308	344	340	326								
7										312	304	340	338	358	340	332	318							
8									296	318		326	326	352	352	326								
9											324		338	356	348	330	324							
10										302	342	354	316	358	360	330	318							
11										280	284	338	352	346	332	328								
12										314	318	358	346	332	336	324	316							
13									280	274	290		332	348	318	328	304							
14											342	318	346	344	352	338								
15									318		314		342	318	342	340	306							
16											318	352	344	352	340	332	322							
17												356	354	360	350	326	334							
18										314	322	300	336	372	354		324	314						
19								352		270	304	326	328	330	346									
20									266		302	340	310	346		326								
21							376	308		348	324	B	302	306	296	286								
22										274	316		334	328		326	292		A					
23											310	310	342	336	324	310	298							
24										302	316	324	342	340	318	306	286							
25									298	294	302		314	298	320	318	306							
26										300		302	342	340	330	314	288							
27									284	284	310	316	334	350	338	314								
28								296	292	284		302	340	340	326	330	330							
29									268	274	340	312	312	340	314	314	312							
30									296	350	318	324	328	340	318		280	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							1	3	9	18	22	22	30	29	27	24	21	2						
MED							376	308	292	297	316	324	334	340	336	326	306	297						
U Q								352	297	314	324	340	342	351	346	330	320							
L Q								296	274	278	304	310	316	331	320	314	298							

APR. 2002 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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	278	282	274	276	E B 290	E B 288	248	244	230	232	232	218	244	240	232	226	244	250	248	224	240	E B 286	E B 296	E B 282
2	280	270	258	228	262	338	248	240	232	232	248	232	230	220	262	242	228	258	252	230	E B 280	E A 282	286	280
3	272	276	250	232	256	250	234	238	228	224	236	214	224	240	250	E A 258	236	248	246	206	244	E B 298	E B 284	E B 284
4	272	282	274	222	256	278	232	236	234	224	222	246	222	238	252	258	232	260	240	212	E B 288	E B 292	276	E B 290
5	E B 296	274	238	204	238	274	238	242	236	220	230	220	228	E B 242	236	222	242	250	252	224	276	E B 306	278	268
6	E B 290	E B 288	254	224	230	274	238	240	234	224	218	204	216	236	236	238	258	260	256	238	256	E B 294	E B 286	E B 286
7	E B 286	270	252	276	E B 304	308	242	234	232	212	202	240	244	236	224	248	240	254	268	234	246	E B 320	280	E B 292
8	E B 306	260	258	270	240	238	232	234	228	218	214	242	222	228	232	250	250	250	266	230	258	E B 290	Q 280	274
9	278	E B 294	274	242	242	298	246	238	236	230	204	238	232	226	248	234	238	258	258	248	242	E A 300	E B 280	278
10	276	266	256	246	270	294	240	234	238	228	218	246	228	212	222	238	240	256	270	242	236	E B 290	288	E B 298
11	276	276	E B 304	E B 318	E B 312	E B 338	244	230	228	228	228	236	234	242	232	232	246	254	250	236	266	284	E B 298	E B 300
12	E B 306	E B 292	292	282	264	284	236	236	232	234	226	232	240	242	234	232	238	254	256	250	230	232	272	276
13	E B 300	E B 354	E B 308	240	258	294	236	232	216	230	224	H 204	224	236	224	242	240	250	258	244	266	274	286	288
14	E B 330	E B 338	276	228	220	282	234	236	242	224	224	B	254	254	242	244	248	248	266	244	236	270	E B 294	284
15	E B 294	E B 348	E B 298	258	244	300	244	240	230	234	226	254	238	B	244	228	236	252	262	238	244	260	284	284
16	E B 312	E B 318	E B 300	278	280	282	232	232	226	230	218	236	242	244	250	250	242	264	266	258	260	260	E B 304	E A 292
17	282	274	270	252	250	248	236	238	230	244	H E 216	A 254	242	244	242	228	H 218	258	274	248	226	E B 328	E A E 326	B 366
18	E B 354	286	290	E B 294	248	236	260	238	236	232	E A 262	B	246	256	242	242	242	252	276	232	252	E B 300	E B 326	E B 286
19	E B 308	E B 308	274	E B 342	E B 360	318	260	232	236	222	214	228	214	240	242	242	230	246	260	240	266	E B 420	E B 372	E A 354
20	E B 380	E B 328	E A 342	E B 424	E B 396	292	252	242	E A 240	226	228	222	236	226	244	234	240	234	260	232	260	E A 342	E B 320	E A 352
21	280	E A 296	E A 360	E B 372	E B 350	344	278	A	238	226	B	B	B	B	E B 266	242	244	246	264	250	236	252	E B 300	E B 300
22	E A 316	E B 288	276	260	E A 302	E A 288	238	230	222	218	234	238	E B 254	E A 248	H 222	E A 250	A	260	A	240	E A 284	E A 296	E A 300	E A 294
23	276	272	268	270	E B 314	272	246	238	234	226	218	232	218	H 198	264	236	234	258	274	254	226	232	E A 346	E A 318
24	E A 344	E A 332	E A 318	E B 298	274	268	238	234	234	228	230	226	E A 284	222	228	240	242	246	262	246	236	236	E B 292	E B 304
25	E B 310	276	266	252	292	270	230	246	230	222	228	242	220	214	246	248	228	248	258	244	232	250	E B 296	E B 298
26	292	270	252	242	264	260	232	236	226	H 210	226	232	234	232	224	E A 266	238	246	258	236	222	264	272	282
27	280	282	268	248	242	272	242	234	210	224	218	222	224	224	226	228	238	254	268	242	228	270	278	272
28	278	282	274	274	E B 304	284	240	234	230	220	226	198	210	220	242	238	240	240	262	248	246	266	264	298
29	E B 298	278	270	266	E B 312	284	236	232	230	218	220	208	236	220	222	236	238	252	260	248	240	252	E A 294	E B 308
30	E B 304	292	238	216	E B 288	282	250	256	242	234	236	238	228	230	226	252	228	232	248	E A 286	E A 284	E A 294	E A 310	E A 310
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	29	30	30	29	27	29	28	30	30	29	30	29	30	30	30	30	30
MED	E 293	276	266	250	U 254	282	239	236	232	226	225	232	230	234	238	240	240	252	260	240	242	E 285	E 290	E 291
U Q	E B 308	E B 296	E 292	E B 278	E B 304	294	246	240	236	230	230	240	242	242	246	248	242	258	266	248	266	E B 298	E B 300	E B 300
L Q	278	274	258	240	248	272	236	234	228	222	218	220	223	223	226	234	235	248	254	232	236	260	280	282

APR. 2002 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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							122	118	120	R	120	126	120	124	120	118	122	124	B					
2							E B 134	122	124	R	B	B	B	120	124	122	120	118	B					
3							122	124	122	R	118	B	B	120	120	A	122	122	B					
4							122	124	124	R	R	A	118	120	120	120	120	120	B					
5							122	124	124	120	120	118	B	B	118	118	122	120	B					
6							120	126	120	126	122	B	B	124	118	124	124	120	B					
7							124	120	116	124	120	B	B	B	124	120	124	124	B					
8							120	122	120	122	120	B	120	122	124	124	122	120	124					
9							122	120	122	124	B	124	B	120	120	120	120	126	130					
10							124	122	126	124	B	120	118	122	124	120	124	128	B					
11							124	122	122	118	122	B	B	B	124	126	130	126	B					
12							134	120	122	122	B	120	B	120	R	A	122	128	B					
13							118	122	124	120	120	120	122	124	118	118	A	118	B					
14							124	120	122	124	B	B	B	B	124	122	124	126	B					
15							126	126	122	122	B	B	B	B	B	122	124	122	B					
16							122	120	124	124	118	122	124	122	124	122	122	122	128					
17							122	124	124	120	120	122	B	124	R	122	122	122	B					
18							120	122	122	122	124	B	B	B	124	124	124	120	B					
19							120	120	126	122	124	120	118	120	118	120	124	122	B					
20							120	126	122	124	122	122	124	120	122	A	124	120	B					
21							120	118	124	124	B	B	B	B	B	122	A	124	126					
22							120	120	120	122	B	B	B	118	120	118	A	122	B					
23							122	122	124	122	122	120	120	120	126	A	120	124	B					
24							122	120	124	120	124	120	A	118	120	120	122	122	122					
25							E A 134	B	120	122	124	122	118	116	116	120	128	124	128					
26							126	B	122	122	120	120	120	A	118	A	120	126	A					
27							122	122	124	124	122	126	A	122	A	122	122	E A 132	132					
28							120	118	122	122	120	116	118	116	126	120	120	120	120					
29						B	126	124	122	120	120	122	120	118	120	118	126	122	134					
30							126	124	118	124	122	A	124	118	120	124	120	122	124					
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	28	30	26	21	17	14	22	25	25	27	30	10					
MED							122	122	122	122	120	120	120	120	120	120	122	122	127					
U Q							124	124	124	124	122	122	122	122	124	122	124	124	130					
L Q							120	120	122	122	120	120	118	118	119	120	120	120	124					

APR. 2002 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR.2002 h'Es (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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	122	B	B	B	B	B	G	110	110	110	114	108	G	108	108	104	110	128	B	102	B	B	B	B
2	B	B	B	B	B	B	156	112	110	106	B	B	B	106	108	110	108	126	122	B	B	102	102	B
3	B	B	B	B	B	B	162	110	108	108	110	B	B	110	108	138	132	122	120	B	B	B	B	B
4	B	B	B	B	B	B	166	110	110	110	108	108	106	106	106	106	138	114	114	120	B	B	B	B
5	B	B	B	B	B	B	158	112	108	106	108	110	B	B	106	106	104	156	120	B	B	B	B	B
6	B	B	B	B	B	B	164	112	108	110	G	B	B	112	G	116	142	144	120	B	B	B	B	B
7	B	B	B	B	B	B	178	G	122	110	106	B	B	B	110	110	112	128	B	B	B	B	B	B
8	B	B	B	B	B	B	166	114	152	106	110	B	G	G	110	158	146	G	122	114	B	B	B	B
9	B	B	B	B	B	B	152	G	110	114	B	G	B	112	110	104	104	162	128	110	B	106	B	B
10	B	B	B	B	B	B	G	112	108	106	B	108	G	G	110	124	110	174	148	130	124	B	B	B
11	B	B	B	B	B	B	148	112	110	108	106	B	B	B	110	108	110	148	124	B	B	B	B	B
12	B	B	B	B	B	B	166	112	150	142	B	124	B	G	110	108	112	112	B	102	B	B	B	B
13	B	B	B	B	B	B	148	110	110	108	128	G	108	108	106	102	100	96	134	98	98	B	B	B
14	B	B	B	B	B	B	G	G	130	112	B	B	B	B	G	104	112	122	116	114	B	B	B	B
15	B	B	B	B	B	B	162	114	108	112	B	114	B	B	B	110	G	G	B	98	100	B	B	B
16	B	B	B	B	B	B	152	160	108	138	110	122	112	G	140	146	136	128	142	116	114	116	B	114
17	B	110	116	112	B	B	G	114	140	136	110	124	124	110	108	104	146	128	122	114	B	110	110	112
18	112	106	B	B	B	B	G	110	108	108	130	B	B	B	112	114	G	G	134	B	B	B	B	120
19	B	128	110	112	B	132	136	134	122	124	112	108	G	G	G	106	126	126	118	B	B	B	B	110
20	B	110	108	B	B	B	G	110	128	126	122	110	118	118	110	110	104	126	B	120	106	110	B	110
21	110	106	106	108	114	150	140	130	128	110	B	B	B	B	B	122	110	G	116	114	B	B	B	116
22	108	110	106	108	106	108	G	G	G	122	112	B	B	118	G	118	112	120	114	114	98	96	94	96
23	B	B	B	B	B	B	G	130	120	110	112	110	108	108	108	110	106	110	124	B	106	106	106	106
24	108	104	104	104	104	B	G	G	146	136	126	122	104	108	112	106	G	G	G	B	B	114	B	100
25	94	102	B	B	B	106	162	B	150	108	132	120	122	116	118	116	136	G	G	112	112	112	B	B
26	B	B	110	B	B	110	114	B	112	106	110	G	110	108	108	108	G	138	102	100	B	114	B	B
27	B	B	B	B	B	B	G	110	136	128	112	110	112	110	104	108	110	112	136	100	B	106	B	B
28	B	B	B	B	B	B	148	G	106	110	106	104	108	102	108	98	110	140	120	98	B	B	104	B
29	B	B	B	B	B	150	136	110	110	116	108	110	106	G	106	G	106	132	130	122	B	B	104	104
30	B	112	B	B	112	112	156	130	120	112	G	106	112	G	110	112	108	128	120	114	112	110	108	102
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	6	9	7	5	4	7	20	22	29	30	21	17	13	16	24	29	26	24	23	20	9	12	7	11
MED	109	110	108	108	109	112	156	112	110	110	110	110	110	109	109	110	110	128	122	114	106	110	104	110
U Q	112	111	110	112	113	150	163	114	129	122	118	121	115	112	110	116	132	139	130	115	113	113	108	114
L Q	108	105	106	106	105	108	148	110	108	108	108	108	107	108	108	106	108	121	118	101	99	106	102	102

IONOSPHERIC DATA STATION Kokubunji

APR. 2002 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

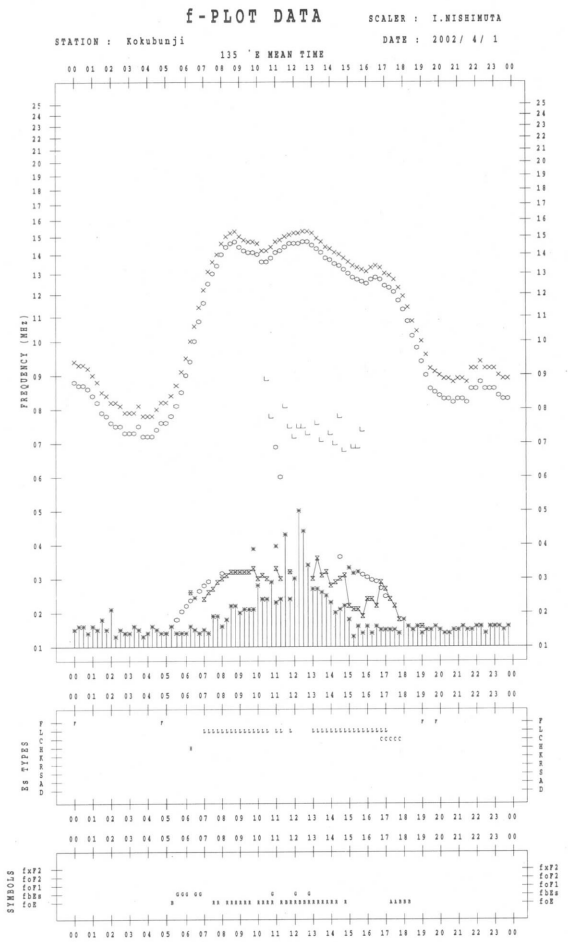
LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

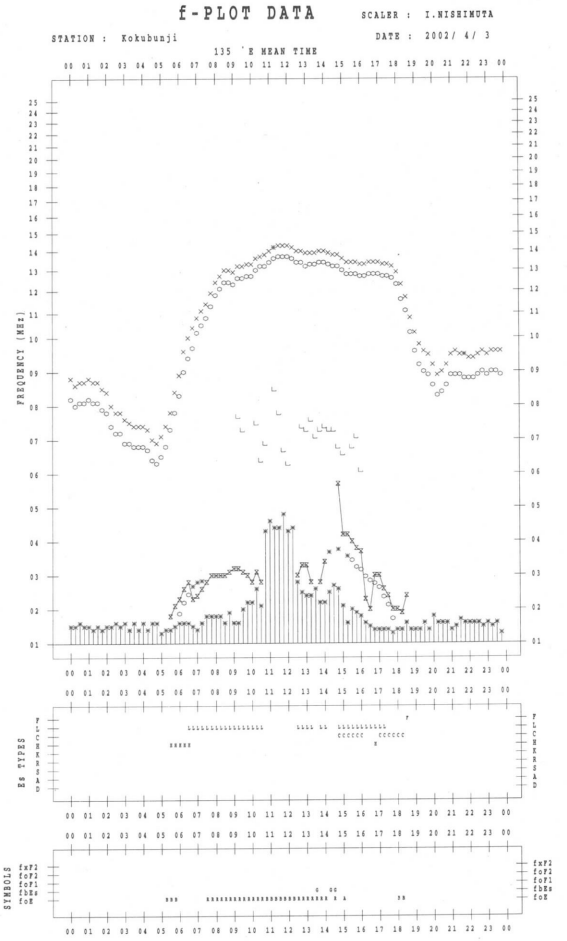
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 1							L 1	L 1	L 1	L 1	L 1		L 1	L 1	L 1	L 1	CL 11		F 1				
2							H 1	L 1	L 2	L 1				L 1	L 1	L 1	L 1	C 1	C 1			F 1	F 1	
3							H 1	L 1	L 1	L 1	L 1			L 1	L 1	CL 11	CL 11	CL 11	C 2					
4							H 1	L 1	L 1	L 1	L 1	L 1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

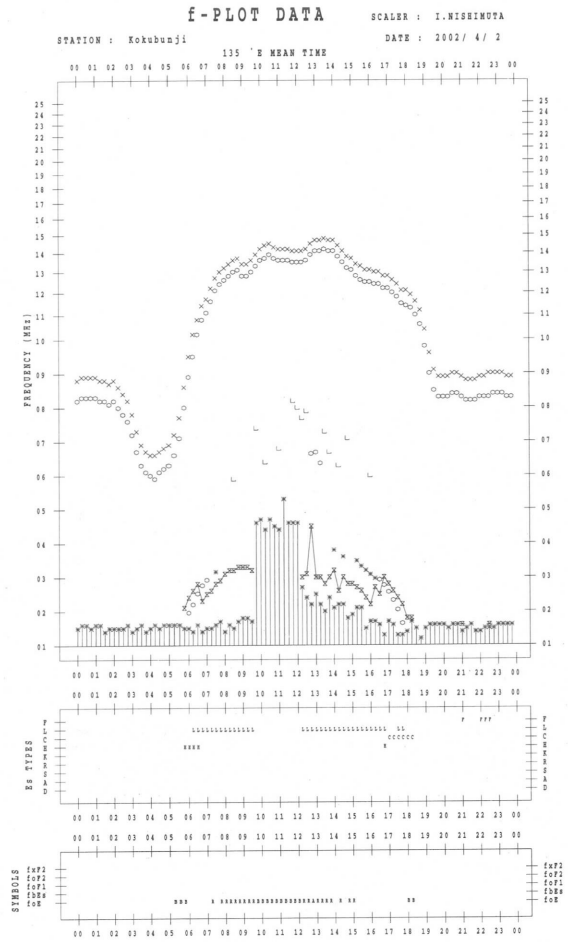
APR. 2002 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

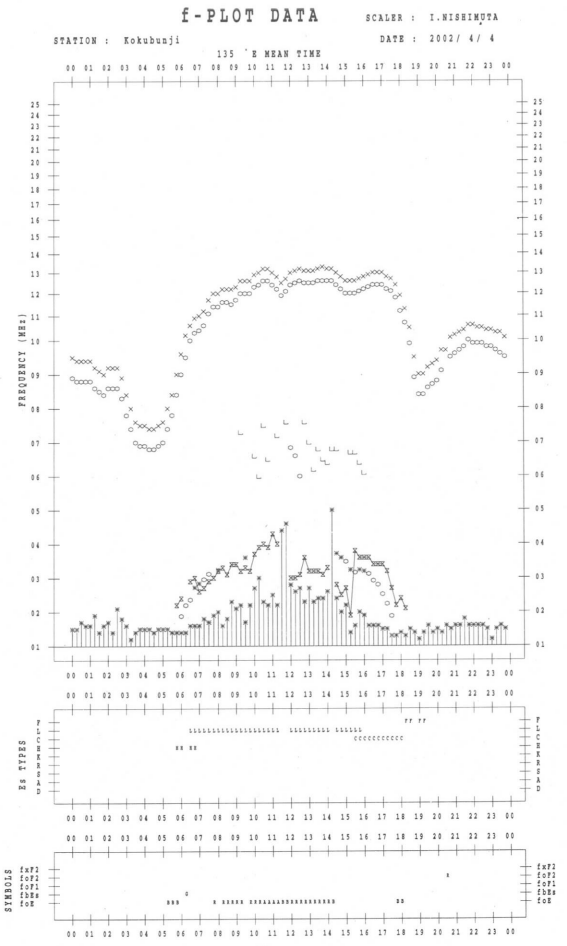
f-PLOTS OF IONOSPHERIC DATA

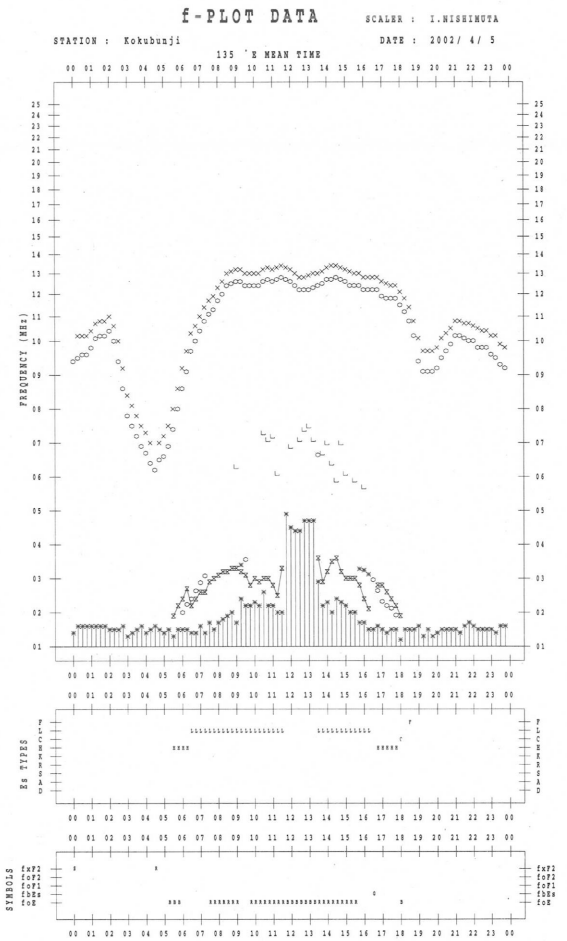
KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

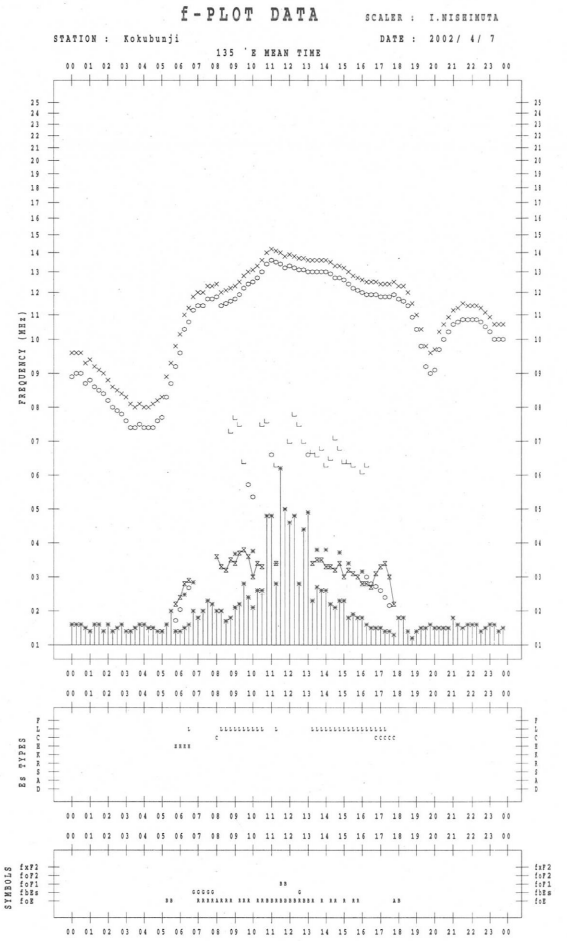

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

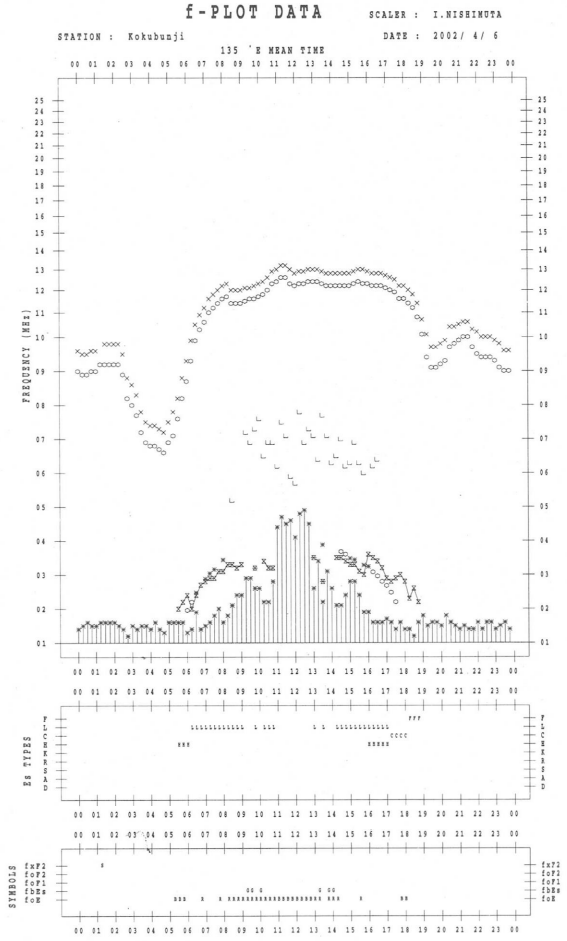

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

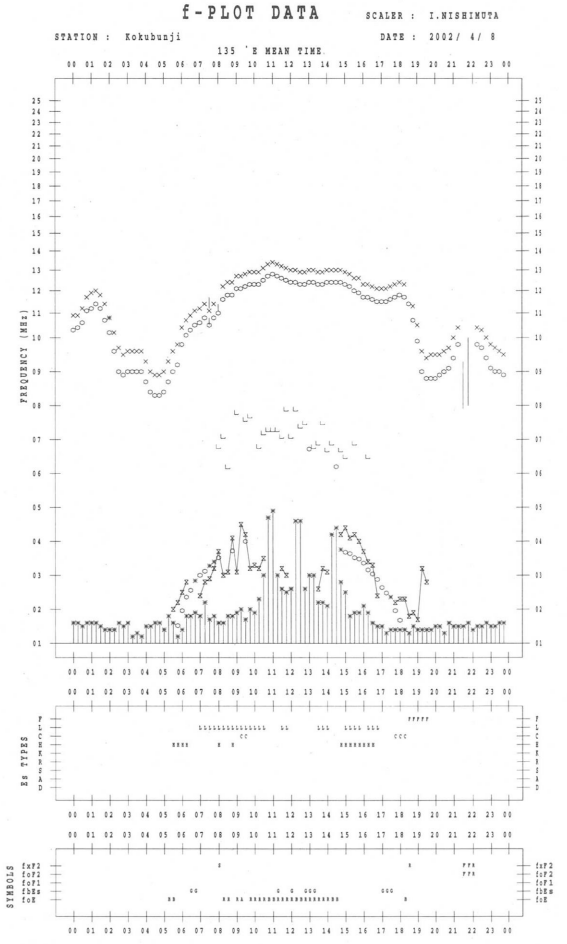

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

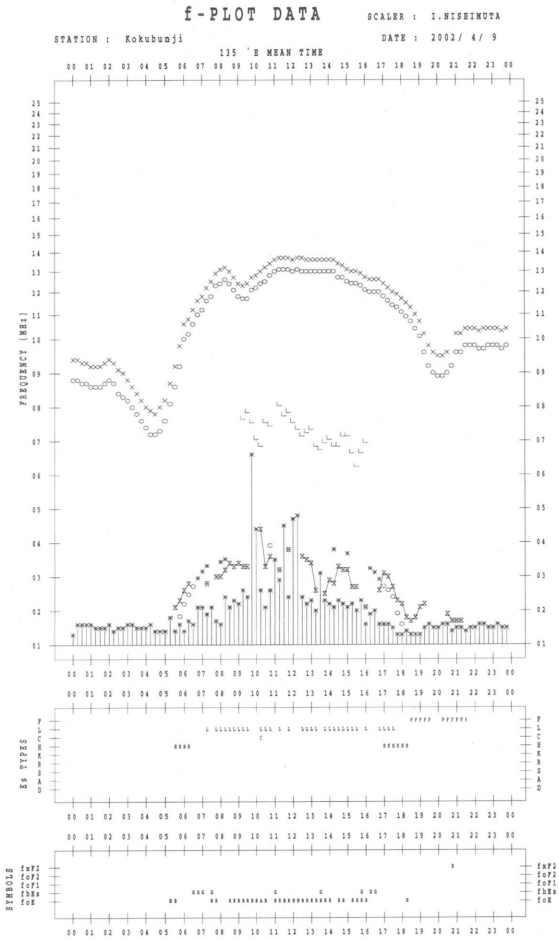

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

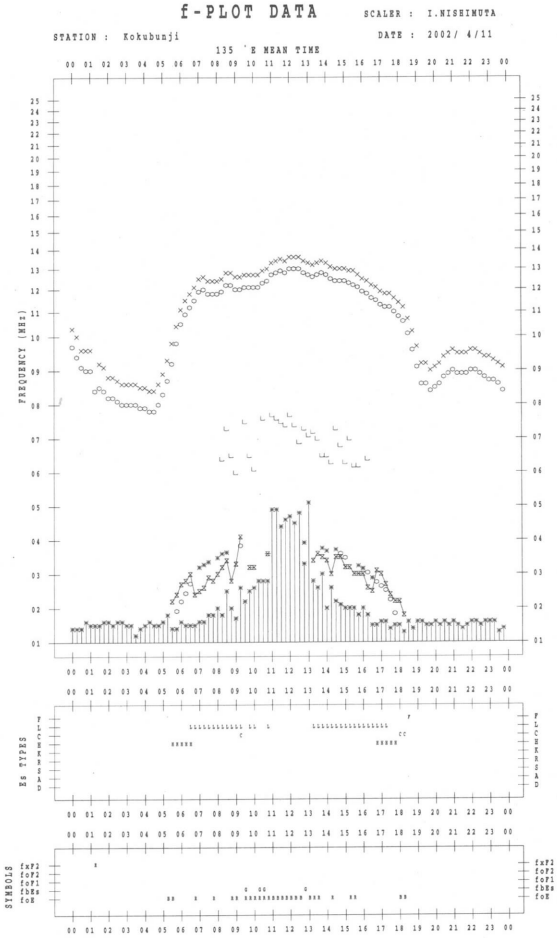

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 5
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

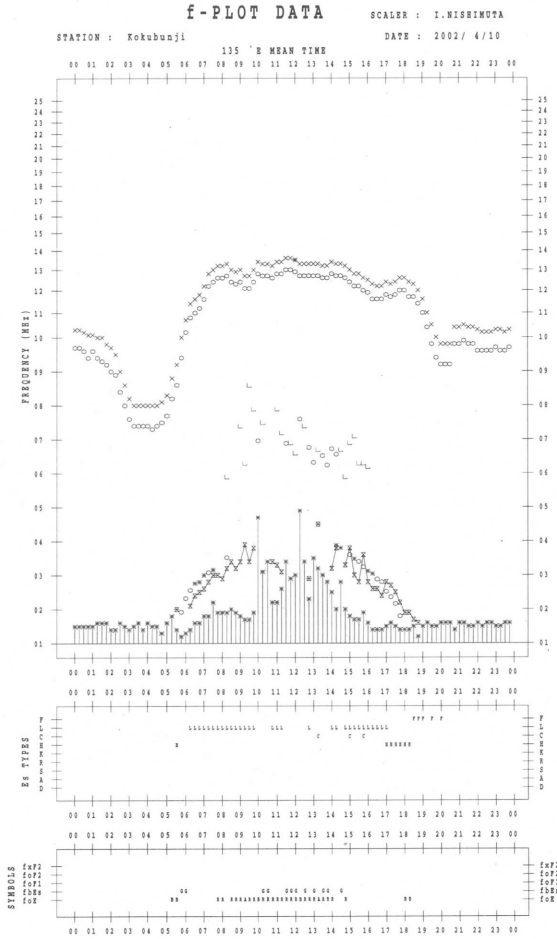

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 7
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

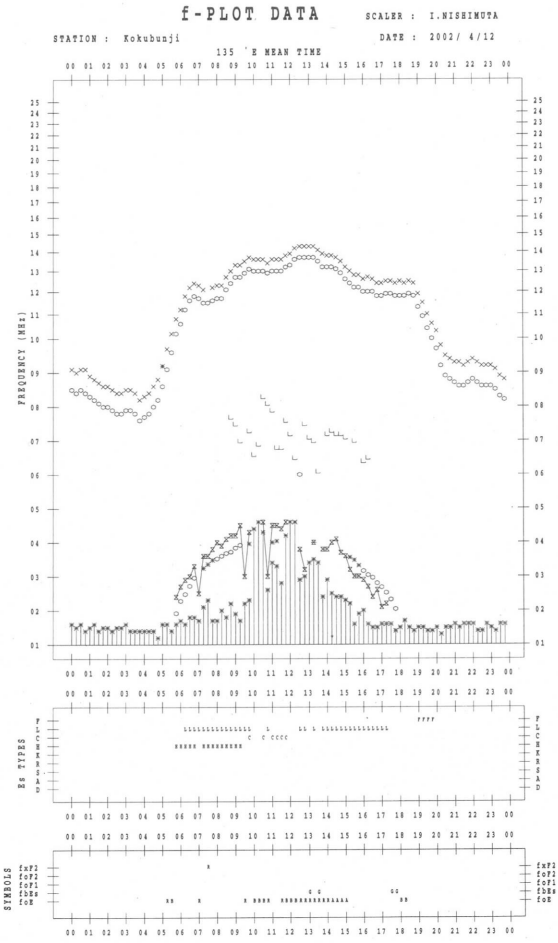

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 6
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

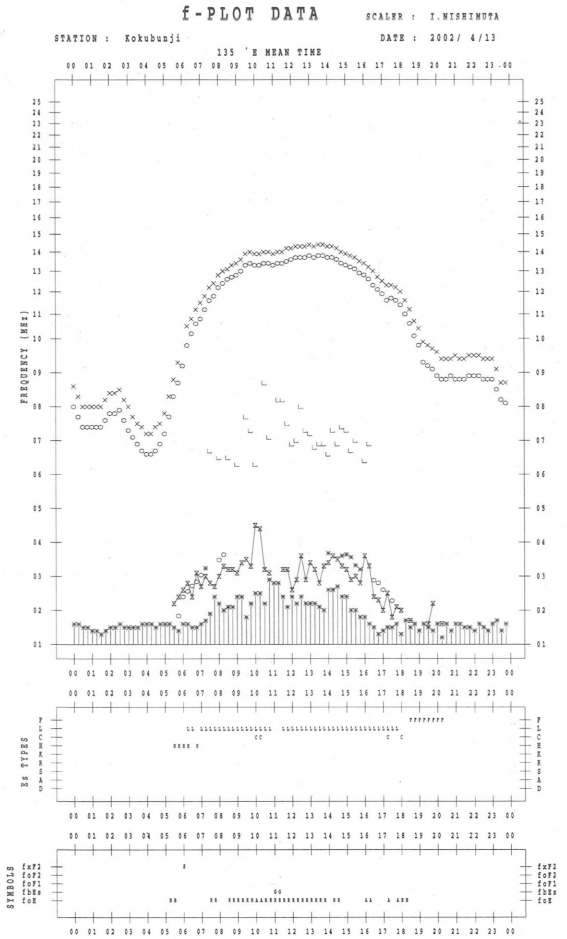

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 8
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

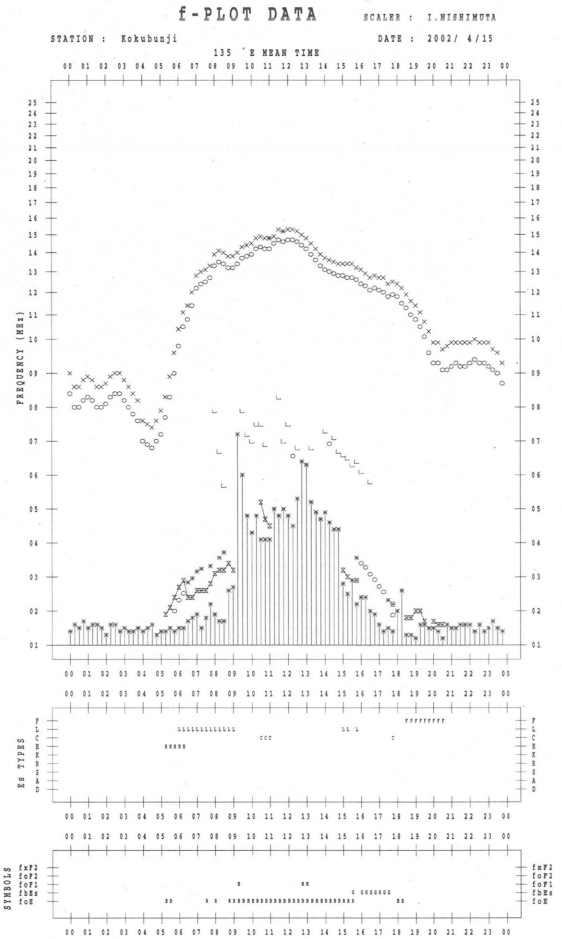

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

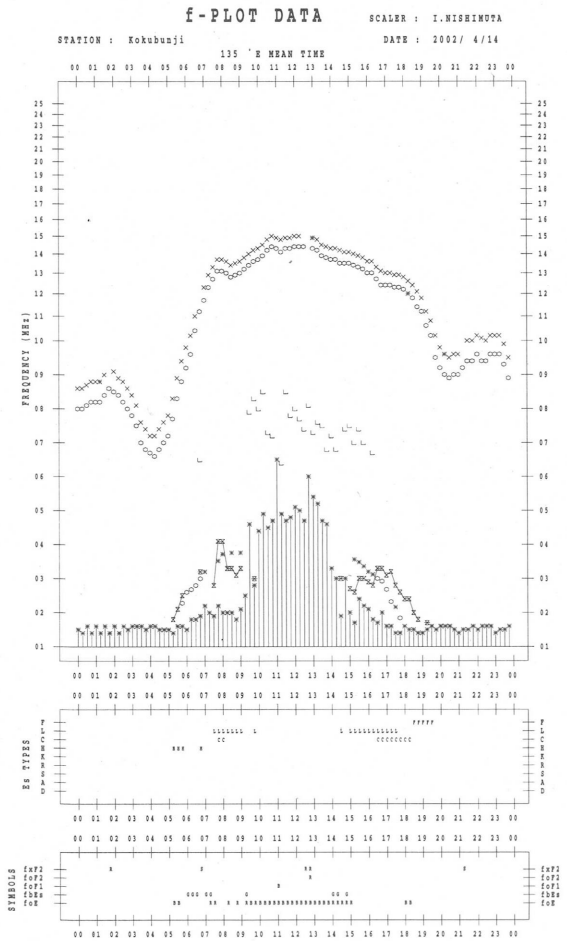

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

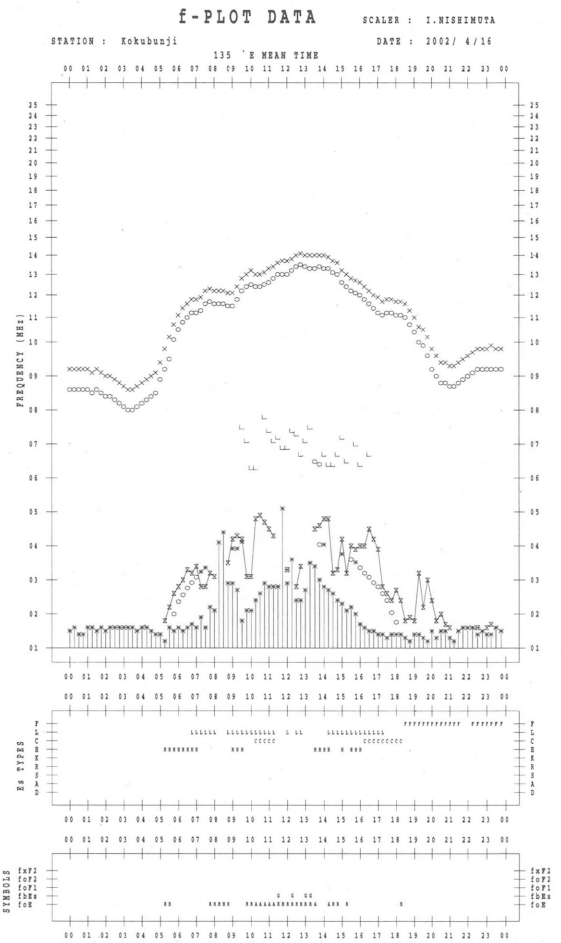

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

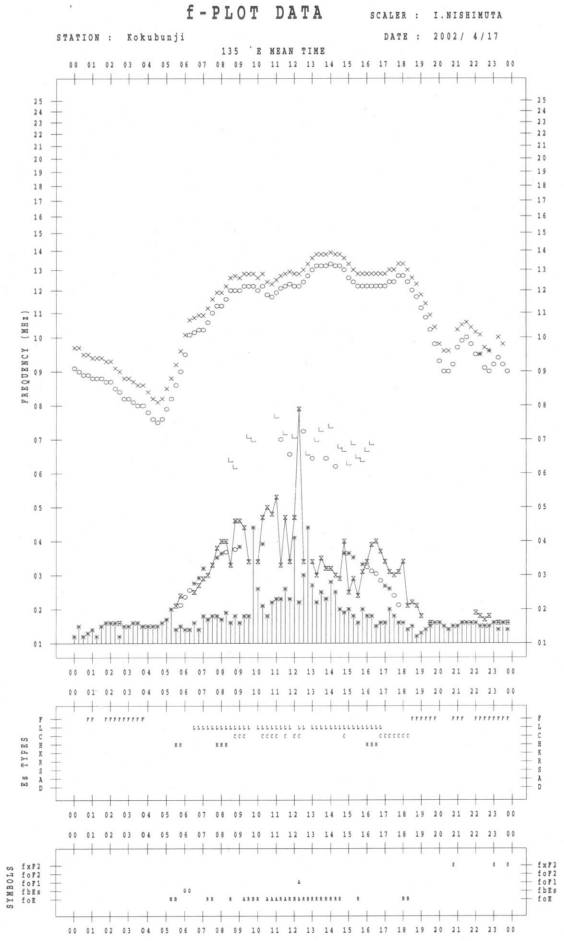

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

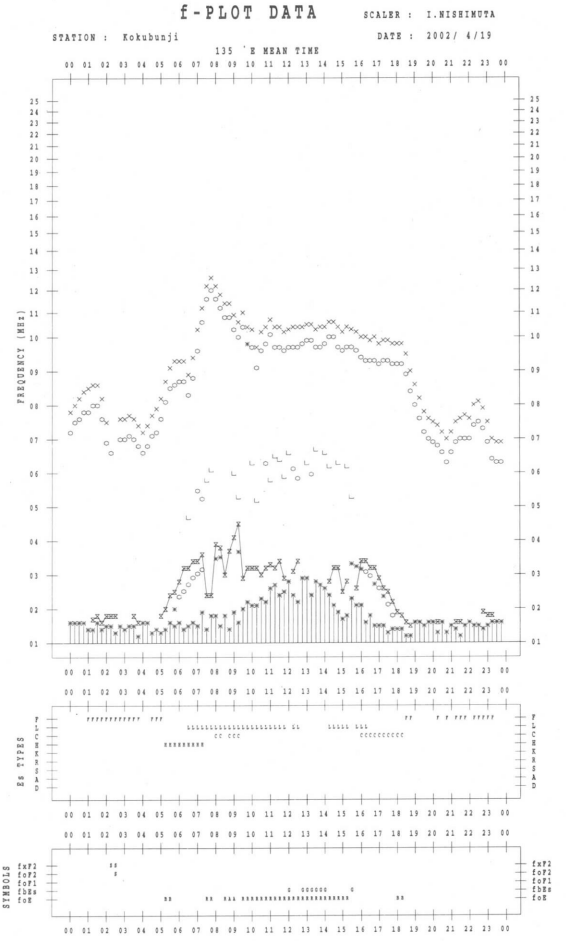

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

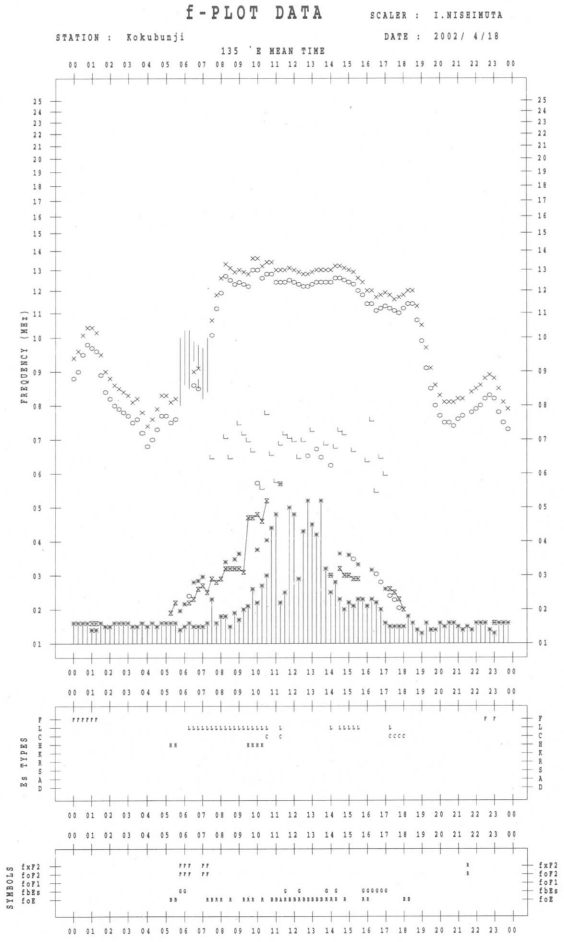

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

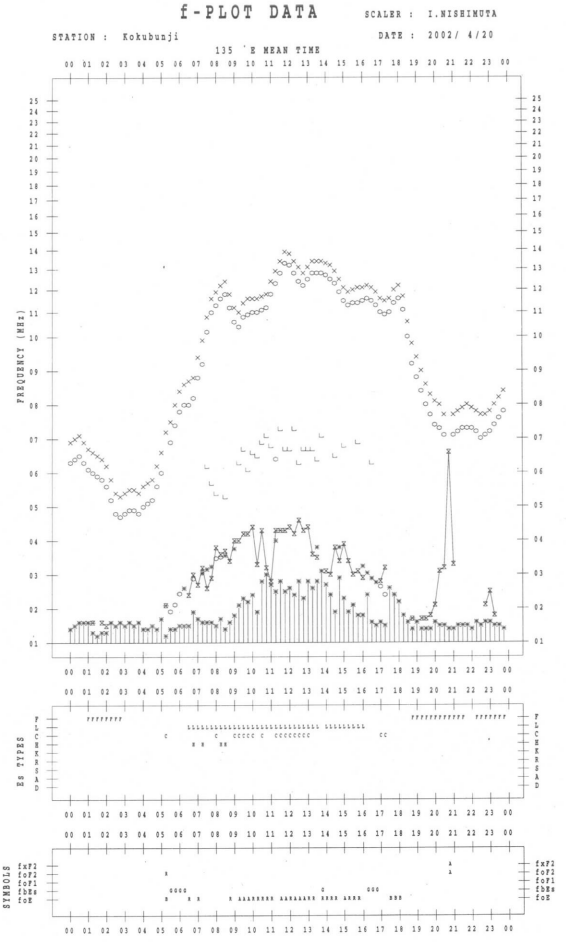

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

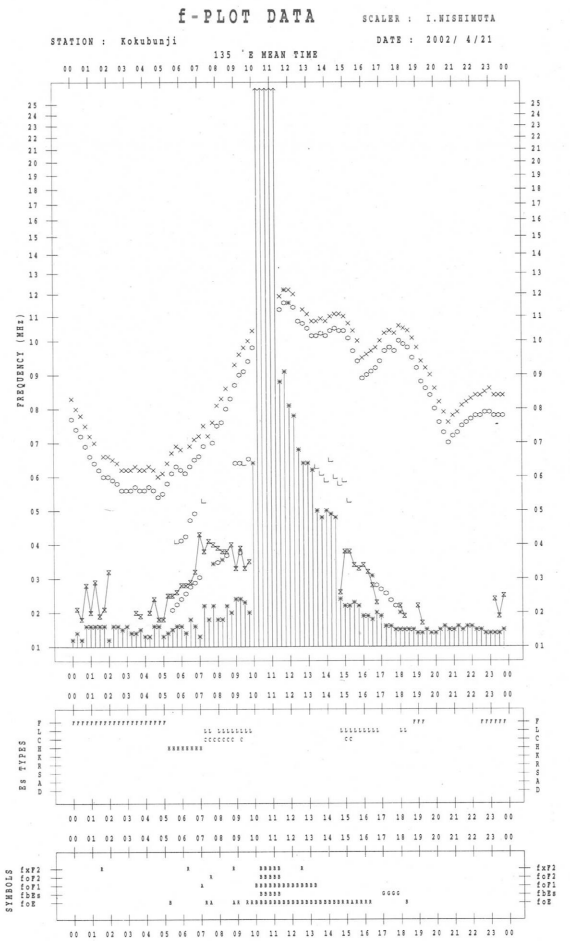

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

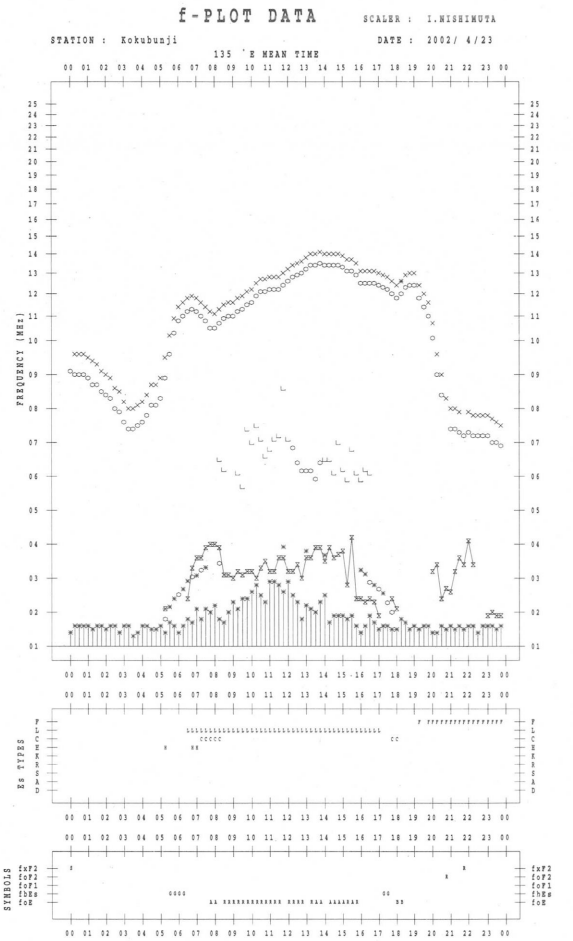

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

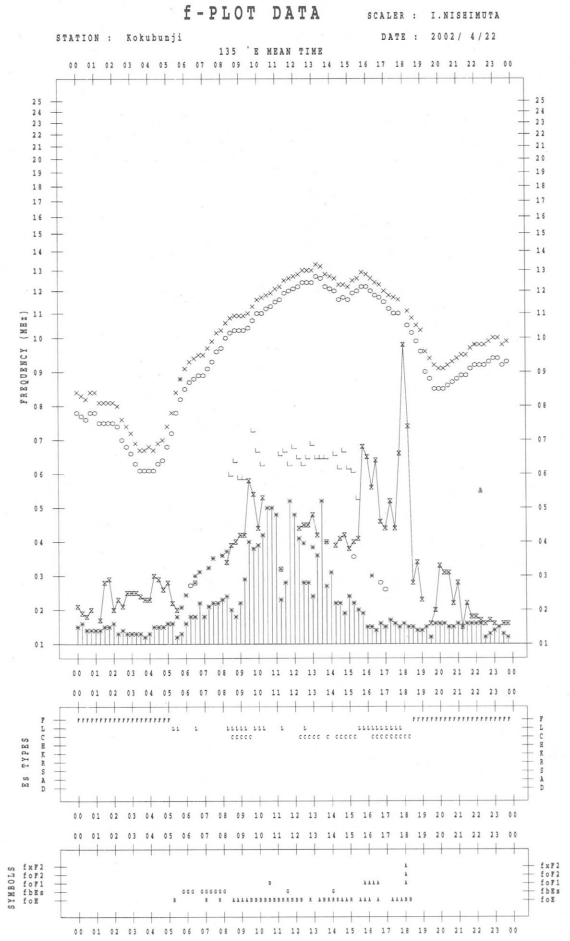

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

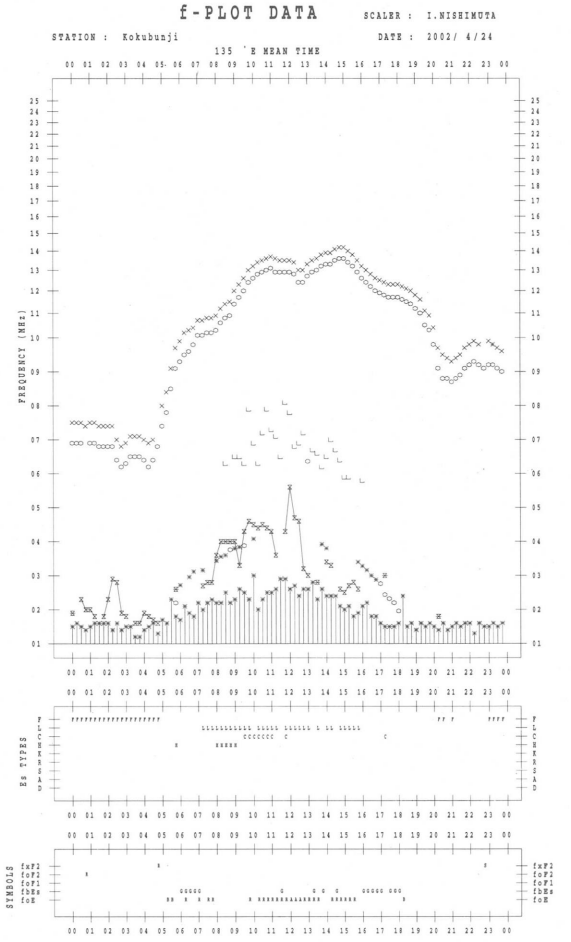

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

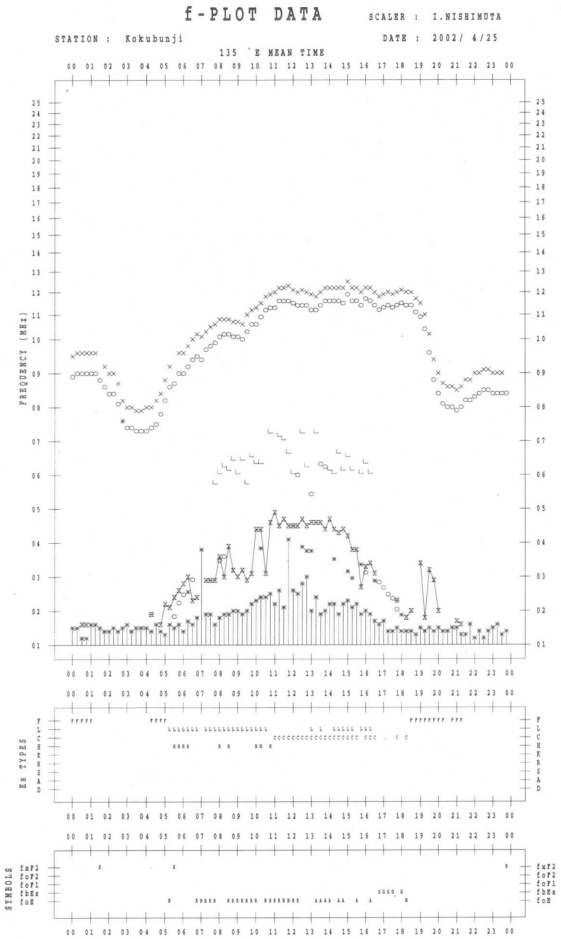

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

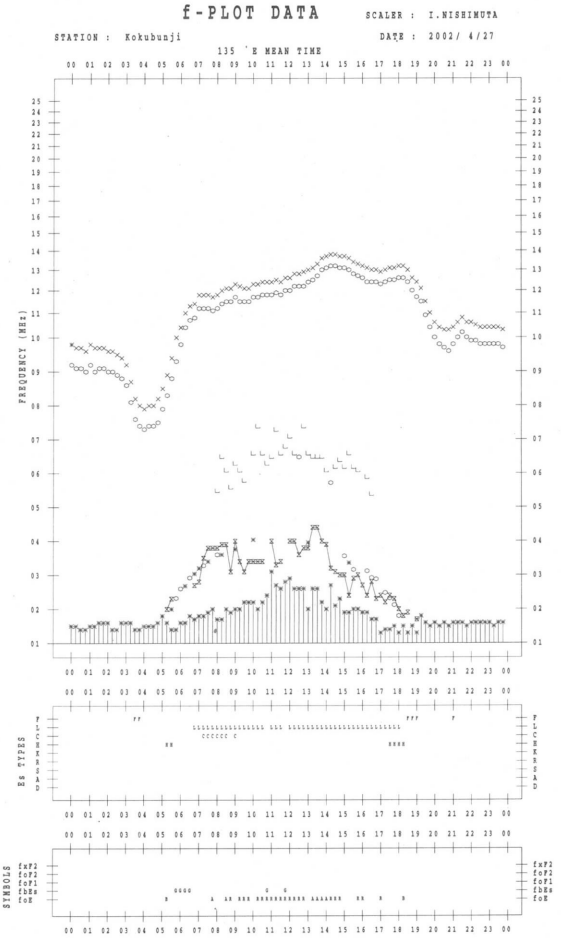

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

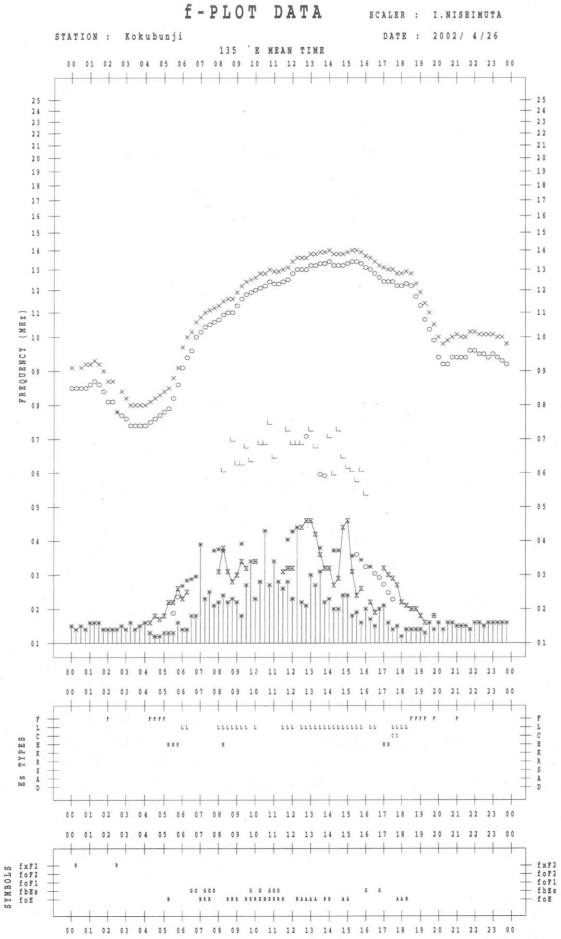

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

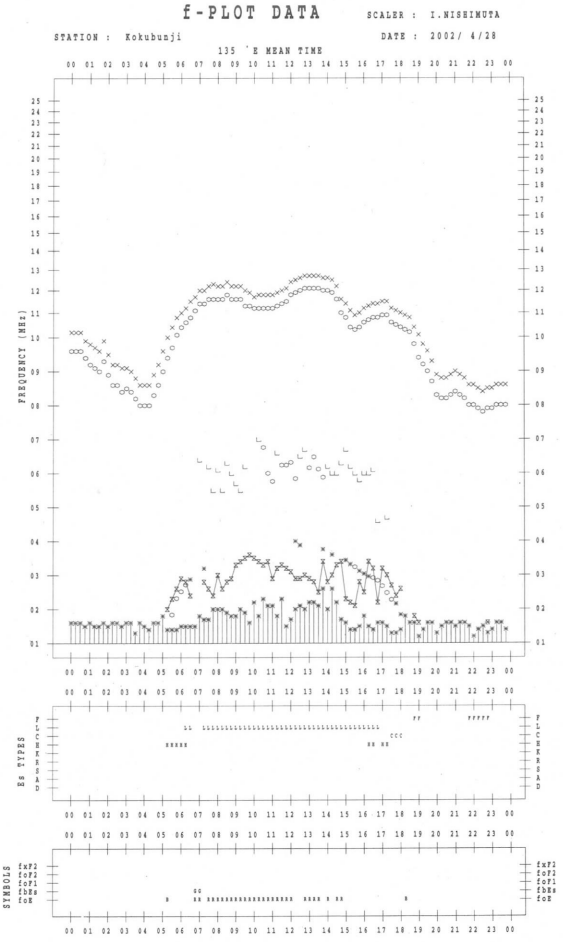

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

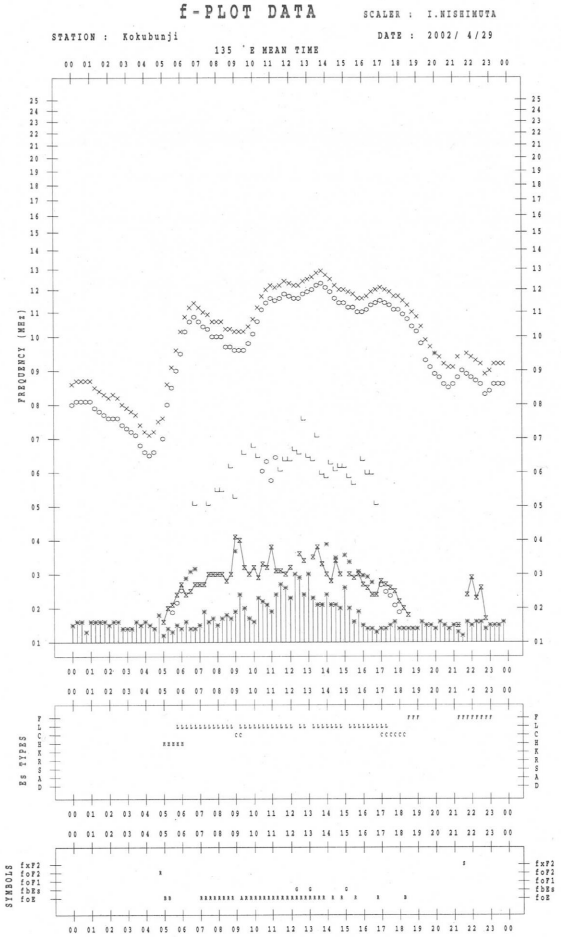

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

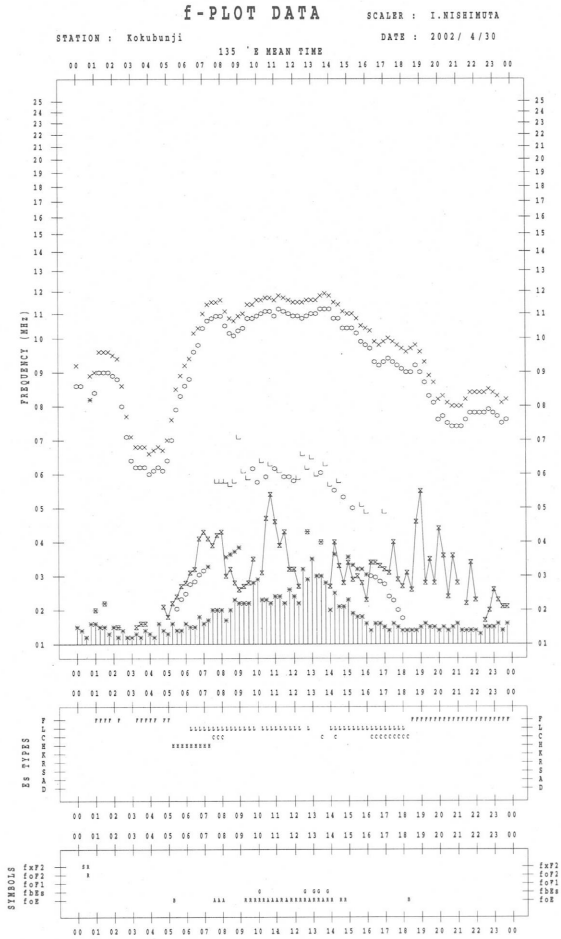

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2002/ 4/30
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

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

Hiraiso April 2002

Single-frequency total flux observations at 500 MHz					
Flux density: 10^{-22} W m^{-2} Hz^{-1}					
Date \ UT	00-03	03-06	06-09	21-24	Day
1	52	49	48	60	52
2	54	47	46	56	51
3	52	48	46	53	50
4	52	51	54	57	53
5	52	50	50	52	51
6	49	47	48	49	48
7	52	53	47	49	50
8	50	47	47	48	48
9	54	54	52	52	53
10	52	50	50	58	53
11	53	48	45	45	48
12	48	52	56	60	54
13	52	49	47	55	51
14	50	47	46	73	55
15	80	62	48	61	62
16	54	56	49	52	53
17	50	48	48	53	50
18	51	47	48	52	50
19	49	46	46	52	48
20	48	47	46	47	47
21	174*	48	44	47	46
22	44	42	41	47	44
23	46	43	43	48	45
24	46	43	42	43	44
25	43	44	45	49	45
26	48	47	46	50	48
27	50	51	49	54	51
28	51	47	46	–	48
29	–	–	–	–	–
30	41	–	40	45	42
31					

Note: No data is available during the following periods.
28th 2040 – 30th 0015 30th 0315 – 30th 0600
A superscript * stands for being superposed on a burst.

B. Solar Radio Emission
B2.Outstanding Occurrences at Hiraiso

Hiraiso April 2002

Single-frequency observations
Normal observing period: 2005 – 0915 U.T. (sunrise to sunset)

APR. 2002	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1}) PEAK	MEAN	POLARIZATION REMARKS
2	200	8 S	0055.0	0055.0	1.0	25	–	0
2	200	8 S	0222.0	0223.0	1.0	20	–	WR
2	200	8 S	2255.0	2255.0	1.0	15	–	0
2	200	8 S	2305.0	2305.0	1.0	15	–	0
3	200	42 SER	0101.0	0104.0	5.0	15	–	0
3	200	8 S	0212.0	0212.0	1.0	30	–	0
3	200	8 S	0315.0	0316.0	1.0	30	–	0
3	200	8 S	0402.0	0402.0	1.0	15	–	0
3	200	8 S	0412.0	0412.0	1.0	15	–	0
3	200	8 S	0424.0	0424.0	1.0	20	–	0
3	200	8 S	2024.0	2025.0	1.0	65	–	0
3	200	8 S	2315.0	2315.0	1.0	70	–	0
4	500	4 S/F	0651.0	0655.0	6.0	15	–	0
4	200	8 S	0651.0	0651.0	1.0	35	–	0
4	200	47 GB	0809.0	0809.0	1.0	755	–	0
4	200	42 SER	2303.0	2305.0	9.0	20	–	0
5	200	8 S	0559.0	0559.0	1.0	200	–	0
5	200	8 S	0630.0	0631.0	1.0	380	–	0
5	200	47 GB	0723.0	0725.0	6.0	575	–	WR
5	200	8 S	2248.0	2248.0	1.0	70	–	0
6	200	8 S	0618.0	0618.0	1.0	95	–	0
7	200	8 S	0003.0	0003.0	1.0	20	–	0
7	200	8 S	0159.0	0200.0	2.0	30	–	WR
7	200	8 S	2335.0	2335.0	1.0	15	–	0
8	200	8 S	0020.0	0020.0	1.0	105	–	0
8	200	8 S	0035.0	0035.0	1.0	35	–	0
8	500	8 S	0131.0	0131.0	1.0	25	–	0
8	200	8 S	0131.0	0131.0	1.0	190	–	0
8	500	8 S	0301.0	0302.0	3.0	215	–	0
8	200	8 S	0302.0	0302.0	1.0	20	–	0
8	500	8 S	0357.0	0358.0	1.0	465	–	0
8	500	8 S	0452.0	0452.0	1.0	415	–	0
8	200	8 S	0521.0	0521.0	1.0	10	–	0
8	500	7 C	0533.0	0534.0	2.0	45	–	0
8	200	8 S	0549.0	0549.0	1.0	20	–	0
8	200	8 S	0559.0	0559.0	1.0	15	–	0
8	200	8 S	2127.0	2127.0	1.0	10	–	0
8	500	4 S/F	2319.0	2321.0	3.0	45	–	0
9	2800	3 S	0039.0	0040.0	8.0	255	–	0
9	500	47 GB	0039.0	0041.0	13.0	785	–	0
9	200	47 GB	0039.0	0046.0	12.0	1135	–	0
9	200	8 S	0539.0	0539.0	1.0	345	–	0
9	500	8 S	0641.0	0642.0	1.0	35	–	0
9	200	8 S	0641.0	0642.0	1.0	15	–	0
9	2800	1 S	0727.0	0731.0	8.0	30	–	0
9	500	7 C	2325.0	2331.0	8.0	25	–	0
10	2800	7 C	0043.0	0100.0	19.0	150	–	0

B. Solar Radio Emission
B2.Outstanding Occurrences at Hiraiso

Hiraiso April 2002

Single-frequency observations
Normal observing period: 2005 – 0915 U.T. (sunrise to sunset)

APR. 2002	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1}) PEAK	MEAN	POLARIZATION REMARKS
10	500	7 C	0044.0	0056.0	19.0	20	–	0
10	500	4 S/F	0423.0	0424.0	5.0	40	–	0
10	2800	1 S	0424.0	0425.0	4.0	35	–	0
10	2800	3 S	0148.0	0150.0	8.0	80	–	0
10	2800	8 S	0305.0	0306.0	2.0	65	–	0
10	500	8 S	0305.0	0306.0	2.0	10	–	0
10	200	8 S	0305.0	0306.0	2.0	190	–	0
11	200	8 S	2300.0	2301.0	1.0	20	–	0
12	2800	3 S	0448.0	0454.0	14.0	125	–	0
12	500	7 C	0448.0	0454.0	32.0	170	–	0
12	200	42 SER	0448.0	0448.0	8.0	25	–	0
12	200	21 GRF	0448.0	0609.0	127.0	40	–	0
12	500	8 S	0558.0	0558.0	1.0	30	–	0
13	500	8 S	2132.0	2132.0	1.0	30	–	0
13	500	8 S	2135.0	2135.0	1.0	25	–	0
13	200	8 S	2213.0	2213.0	1.0	200	–	0
14	2800	3 S	0449.0	0451.0	4.0	55	–	0
14	2800	3 S	0536.0	0537.0	3.0	45	–	0
14	500	8 S	0536.0	0536.0	1.0	25	–	0
14	200	8 S	0728.0	0728.0	1.0	360	–	0
14	200	8 S	0735.0	0735.0	2.0	285	–	0
14	500	8 S	2312.0	2312.0	1.0	40	–	
15	2800	7 C	0000.0	0011.0	16.0	55	–	
15	500	7 C	0255.0	0331.0	60.0	245	–	
15	200	8 S	0325.0	0326.0	1.0	50	–	
15	2800	1 S	2309.0	2312.0	7.0	30	–	0
16	200	8 S	0114.0	0115.0	2.0	25	–	0
16	200	8 S	0214.0	0214.0	1.0	255	–	WL
16	200	8 S	0336.0	0336.0	1.0	200	–	WL
17	200	8 S	0126.0	0126.0	1.0	25	–	ML
17	200	8 S	0151.0	0151.0	1.0	120	–	WL
17	500	8 S	0655.0	0655.0	1.0	25	–	0
17	2800	47 GB	0744.0	////./	/./	///	–	0
17	500	47 GB	0753.0	////./	/./	///	–	ML
17	200	47 GB	0758.0	////./	/./	///	–	ML
17	200	47 GB	2010.0	2010.0	1.0	635	–	0
18	200	8 S	0101.0	0101.0	1.0	115	–	0
18	500	8 S	0109.0	0109.0	1.0	40	–	0
18	200	8 S	0143.0	0145.0	3.0	100	–	WR
18	200	8 S	0505.0	0505.0	1.0	155	–	0
19	500	8 S	0700.0	0700.0	4.0	25	–	0
19	200	8 S	0700.0	0700.0	5.0	60	–	0
20	200	8 S	2311.0	2311.0	1.0	10	–	0
21	2800	47 GB	0044.0	0131.0	178.0	1960	–	0
21	200	7 C	0102.0	0131.0	123.0	185	–	0
21	500	47 GB	0106.0	0212.0	160.0	2690	–	WL
21	200	8 S	2040.0	2040.0	1.0	35	–	0

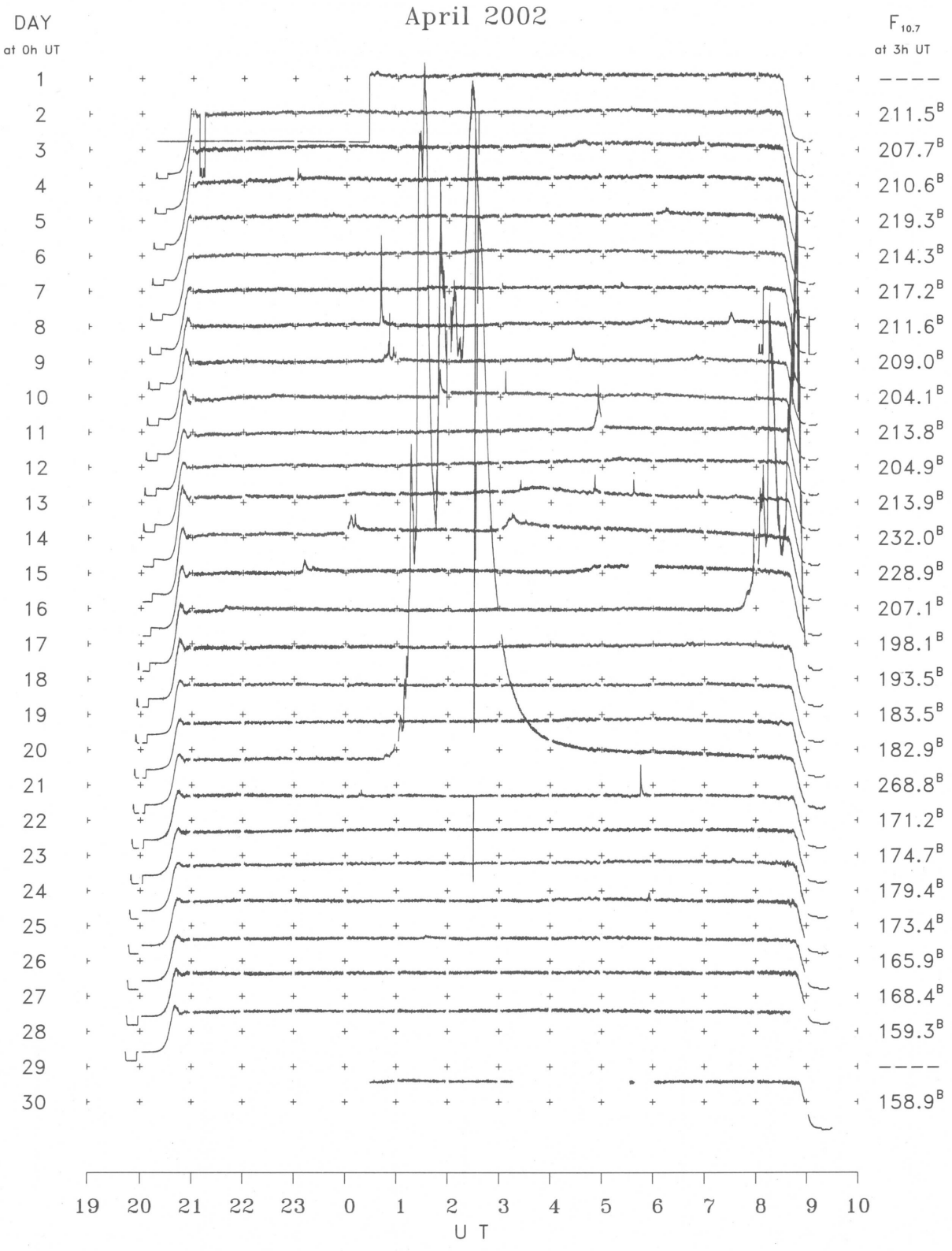
B. Solar Radio Emission
B2.Outstanding Occurrences at Hiraiso

Hiraiso April 2002

Single-frequency observations
Normal observing period: 2005 – 0915 U.T. (sunrise to sunset)

APR. 2002	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1}) PEAK	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1}) MEAN	POLARIZATION REMARKS
21	200	8 S	2211.0	2212.0	1.0	30	–	0
22	200	8 S	0039.0	0039.0	1.0	30	–	0
22	200	7 C	0515.0	0517.0	9.0	230	–	0
22	500	8 S	0517.0	0518.0	2.0	185	–	0
22	200	8 S	0543.0	0544.0	1.0	30	–	0
22	2800	3 S	0545.0	0546.0	4.0	90	–	0
22	200	8 S	0611.0	0611.0	1.0	10	–	0
22	200	8 S	0714.0	0714.0	1.0	15	–	0
22	200	7 C	0738.0	0740.0	4.0	110	–	0
23	200	8 S	0807.0	0807.0	1.0	180	–	0
24	500	4 S/F	0730.0	0730.0	5.0	25	–	0
24	200	7 C	0730.0	0732.0	7.0	40	–	0
25	2800	1 S	0555.0	0556.0	2.0	20	–	0
25	500	4 S/F	0555.0	0556.0	3.0	80	–	WL
25	200	47 GB	0555.0	0555.0	3.0	555	–	0
28	200	8 S	0541.0	0542.0	1.0	30	–	
30	500	7 C	0647.0	0651.0	7.0	20	–	0
30	200	7 C	0648.0	0648.0	4.0	30	–	WL

B. Solar Radio Emission
B3. Summary Plots of $F_{10.7}$ at Hiraiso



Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range ≧ 6°.

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