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IONOSPHERIC DATA IN JAPAN

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CONTENTS

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INTRODUCTION

This Series contains data on ionosphere (I) , solar radio emission (S) and radio propagation (P) obtained at the following stations under the Communications Research Laboratory, 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. 2003

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	53	48	47	43	32	42	54	65	70	79	70	83	94		83	91	82	76	72	68	63	68	54	53
2	54	44	44	46	44	47	51	66	76	85	93	93	83	93	93	94	93	93	84	77	72	62	54	52
3	54	64		60	50	54	53	62	70	68	90	84	90	94	92	94	80	89	84	81	76	66	66	54
4	54	53	53	58	53	54	74	70	83	93	93	92	94	93	92	94	92	84	77	81	80	72	66	66
5	52	54	61	58	50	53	62	74	85	93	92	93		92	92	93	92	85	83	66	66	63	54	54
6	53	32	52	52	50	59	64	77	67	82	84	93		84	93	93	92	91	84	77	73	66	53	53
7	52	54	50	53	53	54	74	80	83	82	93	93	82	93	95	93	92	93	85	71	74	54	63	54
8	63	54	54	64	57	54	66	81	81	84	94	94	93	82	91	91	91	85	83	84	83	80	52	54
9	54	54	54	55	43	34	52	63	63	72	68	73	76	83	82	76	80	76	83	83	61	53	53	50
10	51	44	53	40		36	45	50		57				49	61	63	63	66	66	62	53	48	48	52
11	45	51	46	44	41	51	58	72	85	83	79	84	85	83	83	85	91	85	76	81	70	54	60	43
12	53	52	44	46	44	52	61	58	73	77	80	71	82	84	78	83	84	84	84	78	55	54	41	53
13	54	52	52	54	47	54	57	68	74	80	84	76	93	83	84	82	78	72	68	66	70	64	66	54
14	60	58	55	52	52	57	65	77	85	82	79	92	85	82	82	80	81	78	76	80	66	63	53	52
15	44	53	43	45	36	30	44	52			57				61	58	61	55	58	61	53	54	44	44
16	47	43	44	42	42	52	64	80	73	70	66	66	67	72	77	70	68	75	78	78	66	52	54	53
17	44	46	48	46	44	47	45	53	57		58	62	63	70	72	71	73	76	70	71	54	53	53	52
18	53	44	28	43	49	42	53	55	57	68	73	78	82	76	67	72	71	75	72	66	54	54	54	44
19	54		52	53	41	54	55	57	63	68	76	70	82	84	82	77	76	80	71	66	54		54	61
20	53	55	56	55	50	54	55	54	60	66	A			81	76	82	79	81	71	77			54	51
21	50	58	54	54	50	62	70	80	85	84	81	80	83	93	86	93	84	74	71	77	80		63	63
22	54	52	54	61	58	59	68	70	76	94	81	93		91	85	92	93	85	83	78	66	64	64	72
23	66	64	52	45	44	50	55	61	72	62	68	72	71	71	82	82	83	85	85	72	54	54	61	54
24	55	54		48	43	46	47	49						67	66	72	68	68	68	71	74	54	54	54
25	51	54	43	52		42	50	42	56	63	66	81	80	80	90	83	81	84	83	81	77	53	53	61
26	66	54	54	55	52	61	62	56		39			63	68	65	67	67	68	72	66	66	52	54	52
27	50	51	51	51	46	45	57	57	57						64	63	68	66	74	79	71	54	60	54
28	62	54	53	51	54	54	54	64	62		76	72	78	66	77	82	82	84	82	84	68	66		63
29	52	56	60	62	54	73	84	83	84	91	83	81	83	78		82	82	86	82	79	72	66	54	53
30	52	54	47	52	44	54	57	50		64	56	56	66	68	68	72	76	68	67	79	66	79	64	66
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	28	30	28	30	30	30	25	25	25	24	22	27	29	30	30	30	30	30	29	27	29	30
MED	53	54	52	52	48	54	57	64	73	79	79	81	82	82	82	82	81	80	76	77	66	54	54	54
U Q	54	54	54	55	52	54	64	74	83	84	87	92	85	91	90	92	91	85	83	80	73	66	62	54
L Q	51	49	46	46	43	46	53	55	62	67	68	72	76	71	70	72	73	74	71	68	58	54	53	52

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

APR. 2003

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	26	G	G	G	G	G	G	G	43	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	51	G	G	G	G	G	G	26	G	G	G	G	G
3	G	G		G	G	G		G	G	G	G	G	46	G	G	G	36		G	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G		47	G	40	36	G	G	25	25	G	G	G
6	G	G	G	G	G	G	36	G	52	G	G	G		G	G	G	G	G	G	30	26	G	G	G
7	G	G	G	G	G	G	G	36	G	G	46	G	G	G	G	G	36	34	31	32	34	G	34	G
8	G	G	25	G	G	G	G	G	G	G	G	46	G	G	G	40	G	G	G		G	G	G	G
9	G	27	G	G	26	29	32	41	48	G	G	G	G	G	G	G	G	32		G	24	G	G	27
10	G	G	G	G		G	G	G	G	47	50	78	52	42	48	40	G	38	35	40	G	G	30	26
11	G	G	G	G	G	G	G	G	G	49	G	G	G	G	G	G	G	42	32	28	G	G	G	27
12	29	25	G	G	G	G	G	G	46	G	48	G	G	G	G	G	G	38	38	34	38	32	G	G
13	G	26	G	G	G	G	G	40	G	46	G	46	G	G	G	G	G	34	G	28	28	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	30	G	G	G	29
15	G	G	G	G	G	G	G	G	G	G	G	G	G	46	46	G	G	G	29	26	G	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	50	46	46	G	39	G	32	28	25	G	24	29	G
17	G	G	G	G	G	G	G	G	G		G	46	44	G	G	G	36	G	31	G	G	G	G	33
18	G	G	G	G	G	G	G	44	G	46	G	G	G	G	G	G	G	39	33	35	31	28	25	G
19	28	G	G	G	G	G	G	G	G	G	52	G	G	49	48	G	G	G	G	G	41	41	28	G
20	G	G	G	G	G	G	G	G	G	51	81	75	79	G	G	G	G	G	38	43	106	64	34	G
21	G	G	29	28	25	G	G	43	47	47	47	G	44	G	G	G	G	G	33	30	59	60	26	28
22	38	G	28	29	28	G	54	58	64	52	48	G	G	G	G	G	G	G	G	35	38	26	G	G
23	G	G	G	G	G	G	38	43	47	48	G	G	G	G	G	G	G	40	48	30	G	29	G	G
24	G	39		25	33	30	G	G	G	G	G	50	51	G	G	G	39	G	G	26	G	G	24	24
25	G	G	G	40	G	G	G	G	G	G	G	G	61	G	55	45	48		43	31	40	G	G	G
26	G	G	27	27	34	41	39	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G
27	34	G	33	41	G	G	G	45	G	49		G			G	G	G	G	40	G	G	26	G	34
28	G	G	G	G	31	G	G	G	G		G	G	G	G	G	G	G	40	34	G	41	G	G	G
29	G	G	G	26	G	G	G	G	G	G	58	G	G	G		G	G	G	G	G	G	G	G	G
30	G	G	G	G	G	29	G	G	G	G	G	G	G	G	G	G	G	32	35	30	32	32	G	25
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	28	30	29	30	29	30	30	28	28	30	27	28	29	30	30	28	29	29	30	30	30	30
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	26	G	G	G	G
U Q	G	G	G	G	G	G	G	36	G	46	46	46	44	G	G	G	G	34	34	30	34	26	24	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 Wakkanai

APR. 2003

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	15	15	15	15	20	16	16	14	17	17	21	21	39		21	21	14	15	18	15	14	15	15	15
2	15	15	15	15	17	14	15	15	15	18	22	21	22	21	18	18	14	22	18	15	15	15	14	17
3	14	15		15	15	15	14	16	18	17	20	26	21	22	22	17	17	14	18	15	14	15	15	15
4	15	15	15	15	15	15	23	14	17	18	18	21	23	23	22	20	15	15	18	14	14	15	15	14
5	15	15	15	14	15	15	16	14	18	20	16	24		16	18	17	17	15	18	14	15	14	15	14
6	14	20	16	14	14	16	14	14	14	18	18	21		21	21	14	15	14	16	14	15	15	15	16
7	15	15	14	14	15	15	14	15	18	18	20	18	22	21	20	16	15	14	14	14	14	15	14	15
8	15	15	15	14	15	15	21	14	15	17	17	20	22	22	21	16	14	14	17	14	15	17	14	20
9	15	15	15	15	14	15	15	14	16	16	21	23	22	23	18	20	16	14	17	15	14	15	15	16
10	15	15	14	15		15	15	15	15	20	20	21	15	21	16	15	14	14	16	14	14	15	16	15
11	15	14	15	18	14	17	15	14	15	20	18	20	20	21	14	15	14	14	15	15	14	15	15	14
12	15	15	15	15	14	16	23	15	15	18	18	20	21	21	20	18	17	14	14	15	15	14	15	15
13	14	15	14	14	14	15	15	15	15	18	20	18	18	18	15	14	14	14	18	15	16	15	15	15
14	14	15	14	14	15	17	24	14	15	18	21	18	21	15	20	18	16	14	14	14	14	15	16	15
15	18	14	17	14	14	23	14	20	16	18	21	21	22	23	21	20	15	23	14	15	15	14	16	14
16	14	14	15	14	14	16	14	15	15	16	20	18	20	21	20	20	14	15	14	15	14	16	15	18
17	17	14	14	18	17	16	14	15	18		18	18	17	18	16	15	14	14	14	14	14	14	15	14
18	15	15	20	15	17	16	20	14	17	20	18	22	23	22	20	17	17	14	15	14	15	15	15	15
19	15	14	15	17	17	20	20	14	15	21	24	24	20	21	21	18	16	14	20	14	14	14	14	15
20	14	15	14	15	15	18	14	14	17	17	21	16	22	17	20	14	17	18	15	14	14	14	14	17
21	15	15	14	15	14	20	14	15	15	16	18	18	18	20	20	17	16	14	14	15	15	14	17	15
22	14	15	14	15	14	18	14	14	16	18	22	20	22	24	21	20	15	26	22	14	14	14	14	15
23	15	15	15	18	14	20	20	16	17	20	21	22	24	21	21	21	21	16	14	14	14	15	14	14
24	14	15		14	14	14	22	18	20	21	21	22	21	26		22	18	15	20	15	16	15	17	17
25	16	15	18	14	16	21	23	17	22	22	22	23	34	34	21	28	18	14	16	14	15	15	20	14
26	15	14	17	15	14	18	21	22	22	20			24	22	21	18	20	26	20	15	14	21	15	15
27	15	14	14	14	17	16	20	20	20	22		23			22	21	22	20	20	18	16	15	15	14
28	15	14	14	15	14	18	15	18	21		23	24	23	29	24	22	21	17	14	15	15	15	15	15
29	14	14	14	15	14	21	17	15	16	20	20	22	21	21		20	18	16	22	14	14	14	18	14
30	15	15	15	16	15	14	15	20	20	22	22	22	23	49	22	18	15	15	14	14	14	15	15	18
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	28	30	29	30	30	30	30	28	28	29	27	28	28	30	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	16	15	15	16	18	20	21	22	21	20	18	16	14	16	14	14	15	15	15
U Q	15	15	15	15	15	18	20	16	18	20	21	22	23	23	21	20	17	16	18	15	15	15	15	16
L Q	14	14	14	14	14	15	14	14	15	17	18	19	20	21	19	16	14	14	14	14	14	14	15	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

APR. 2003

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	76	54	54	55	53	53	69	92	94	88	118	132	137	130	117	111	94	82	82	71	54	54	66	54
2	54	53	54	53	45	51	66	82	91	102	111	118	128	128	122	114	110	110		86	63	54	64	54
3	54	65	70	54	46	48	81	88	105	107	112	127	117	130	123	115	111	110	104	85	64	73	64	64
4	66	54	54	54	53	53	81	100	102	111	117	113	117	122	117	112	110	101	87	90	78	78	73	53
5	54	66	69	53	52	53	77	88	104	117	120	116	123	130	126	112	108	111	90	82	54	54	54	54
6	54	53	54	53	50	52	67	93	100	97	116	128	124	130	122	118	117	114	107	87	54	61	54	54
7		52	54	54	52	52	77	81	88	101	101	115	118	118	123	120	118	113	101	85	54	63	66	64
8	54	54	54	66	51	55	73	80	90	101	105	105	112	117	117	112	109	104	111	111	85	66	66	73
9	71	54	54	66	49	42	58	77	90	101	111	116	116	112	112	108	85	98	105	90	52	44	53	48
10	45	51	51	49	34	32	59	66	69	77	84	80	90	90	76	80	84	101	90	65	47			52
11	53	51	54	42	43	45	62	76	87	97	87	104	102	110	117	111	101	105	107	91	72	54	52	53
12	52	51	53	45	41	47	76	77	78	98	90	97	105	110	102	98	104	108	96	78	54	54		59
13		54	54	51	46	51	66	76	85	93	97	101	112	111	108	108	98	98	98	86	74	52	52	52
14	53	53	53	46	40	44	62	81	91	96	107	105	107	101	101	94	100	97	91	90	70	53	54	52
15	52	48	54	44	47	42	52	41	66		64	69	70	72	68	69	71	77	72	82	54			43
16	42	39	42	42	39		66	77	90	82	72	63	83	88	90	88	90	91	98	101	80	54	53	51
17		53	52	49	46	52	64	65	74	75	67	71	78	86	98	104	91	101	100	72	53	53	52	47
18	54	42	42	48	47	48	63	71	76	76	84	84	90	94	98	93	86	97	97	78	52		51	47
19	47	49	48	47	42	52	69	63	75	90	97	95	100	104	95	96	91	91	90	81	72	66	63	
20			54	54	46	47	67	84	80	82	82	88	100	92	100	104	101	96	90	81	66	53	53	
21	48	54	53	42	41	46	66	80	91	97	100	95	104	123	131	104	98	86	90	89	84	64	64	73
22	54	63	64	62	55	54	76	84	95	100	112	106	106	117	114	113	113	102	97	87		74	74	71
23	73	72	70	62	57	58	73	85	97	91	86	92	101	110	107	111	101	100	97	90	90	73	52	54
24			62	57	55	55	53	53	54		62	69	85	95	100	96	84	81	86	83	78	A		66
25	54	54	54	52	51	55	62	71	72	73	90	104	115	124	126	120	125	110	111	96	54	64	66	
26	66	76	69	66	64	64	82	85	78	83	97	101	103	96	87	91	91	88	90	87				54
27		54	51	51	48	59	58	59	64	73	78	78	83	84	88	83	80	86	97	97	63	53	54	61
28	54	55	59	53	54	59	66	73	78	68	80	90	94	98	100	103	104	111	117	101	80	54	54	66
29	53	64	64	54	54	68	85	88	96	88	101	A	103	113	102	117	105	107	109	104	80	54	54	54
30	52	53	42	54	55	58	62	78	67	77	77	85	96	97	101	98	90	86	86	90	83	77	73	73
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	28	30	30	30	29	30	30	30	28	30	29	30	30	30	30	30	30	29	30	28	25	25	27
MED	54	54	54	53	48	52	66	79	88	92	97	101	104	110	104	106	100	100	97	87	65	54	54	54
U Q	54	54	59	54	53	55	76	85	94	100	111	114	116	122	117	112	109	108	104	90	79	66	66	64
L Q	52	51	53	48	45	47	62	71	75	79	82	84	94	95	98	96	90	91	90	82	54	53	53	52

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Kokubunji

APR. 2003

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	G	G	G	G	G	30	43	G	G	G	G	G	G	49	42	42	G	G	G	G	25	23	G
2	G	28	G	G	G	G	G	G	G	G	G	G	47	G	G	G	61	35		G	G	G	G	G
3	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G	G	G
4	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
5	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	26	G	G
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	G	G	G	G	32
7	46	G	G	G	G	G	G	G	G	G	G	G	G	46	G	G	G	G	27	41	29	34	38	G
8	G	G	G	G	G	G	G	G	G	46	48	49	53	52	G	40	G	G	G	G	G	G	G	G
9	G	G	G	G	G	24	G	G	G	G	G	60	43	62	G	G	G	42	35	36	G	G	G	23
10	G	25	23	G	G	G	G	G	46	50	45	G	G	53	G	52	G	42	43	52	29	59	58	38
11	26	G	G	30	G	G	G	40	G	G	G	G	G	51	53	63	49	70	68	42	25	32	G	G
12	G	G	G	G	G	G	G	48	50	59	73		80	89	49	46	G	G	29	43	23	G	57	48
13	59	36	32	32	33	G	35	40	47	48	59	64	60	61	55	52	G	39	33	37	29	28	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33	G	30	G	26	30
15	26	G	G	27	G	G	G	G	G		50	G	G	G	G	G	G	G	31	G	G	46	29	G
16	G	G	G	G	G	G	G	G	G	G	G	47	46	G	46	G	G	G	34	29	41	G	G	G
17	31	G	27	G	G	G	33	G	G	57	G	52	G	G	G	G	G	37	39	35	30	G	G	G
18	G	G	G	G	G	G	G	47	45	62	61	59	G	G	G	G	G	G	29	56	34		G	40
19	39	28	G	G	G	G	G	G	G	G	G	53	G	G	G	G	G	G	36	G	33	G	G	30
20	48	30	G	G	G	G	34	44	G	G	G	G	48	60	73	G	G	G	39	47	G	G	G	G
21	G	G	G	G	G	G	33	61	52	53	55	G	62	G	G	G	G	G	40	68	59	26	G	G
22	G	G	G	G	28	G	G	G	47	53	54	G	53	G	43	53	G	G	G	37	80	32	G	G
23	32	35	G	G	G	G	G	G	47	51	G	65	46	G	G	G	G	72	42	72	G	38	26	G
24	G	G	G	G	G	G	G	G	45		G	50	53	G	G	G	G	G	G	G	24	82	54	G
25	G	G	G	G	26	G	G	46	47	G	G	54	52	G	G	G	G	G	G	G	24	G	G	48
26	26	G	G	G	G	26	G	47	G	52	G	G	G	44	G	G	48	50	42	49	58	59	71	G
27		G	G	G	31	G	34	41	42	52	G	57	62	50	57	50	72	41	40	37	46	36	G	33
28	40	49	G	31	35	G	G	47	G	G	G	G	G	G	G	G	G	G	G	36	31	G	40	27
29	29	29	30	G	G	G	G	46	49	51	94	175	49	G	51	55	76	60	50	50	G	G	G	G
30	G	G	G	G	G	G	G	G	47	55	58	G	50	50	47	66	75	72	69	72	84	48	27	27
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	30	30	30	30	30	28	30	29	30	30	30	30	30	30	29	30	30	29	30	30
MED	G	G	G	G	G	G	G	G	G	G	G	G	22	G	G	G	G	G	33	36	26	G	G	G
U Q	30	25	G	G	G	G	G	44	47	52	50	53	52	50	47	46	G	41	40	47	33	35	27	30
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. 2003

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

HOURLY VALUES OF foF2 AT Yamagawa

APR. 2003

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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	146	146			129						
3	66	66	73	52	36	37	53	80	87	90	90	129	128	129	144	133	133	124		87	76	76	77	74
4	73	72	66	66	51	43	54	81	88	90			111		137	129	121	114		87	80	76	79	72
5	52		71	63	52	48	54	81	97	111	111	88	115	132	131	127	116	110	116	87	66	52		53
6	54	53	55	52	53	44	53	81	85	84	110	127	129	129		129	129	130	111	87	77	66	66	54
7	54	66		63	58	53	63	78	84	86	88	110	115	128	129	129	128	126	111	88	78	75	78	76
8	76	76	77	77	56	51	50	73	84	87	89	88	115	130	128	130	129	111	129		78	66	74	77
9	77		77	80	64	34	46	72	86		111	113	128	127	125	118	112	110	110	85	76	62	53	52
10	64	66	53	72	54	34	53	82	84	87	111		113	114		86	90	106		80		A	63	
11	64	53		55		52	61	81	82	81	84	87			127	112	88	110	112			61	64	54
12	52	53	54	51	51	44	54	78	79	85	82	85	113		114		111	111	113	86	81	77	75	72
13	66		54	54		45	54	79	77	86	105		110			114	111	110	111	109	78	53	54	35
14	36	52	61	52	46	44	50	84	86	88	88	86	89	111		111	112				49			54
15	44	51	53	52	53	36	44	77	81	84	84	91	110	106	85	85	81		86	86	76	34	34	36
16	42	36	43		37	36	53	81	84	77	76	77	88	86	108	110	114	110	111	119				54
17	53	53	36	52	46	37	66	76	78	85	75	76	85		126	129	111	99	114	81		A	66	62
18	64	55	54	54	48	46	53	73	80	80	76	81	86	88	100	112		127	111	86	52		53	54
19	52	54	53	51	52	36	54	70	78	86	88	85	106			88	109	110	110		80	52	56	51
20	54	65	66	55	48	43	60	81	81	80	81	86	97	88	114	115		108	106	88	78	53	50	53
21	37	53	52	48	41	37	54	75	84	87	84	80	87		114	89	88	88	88	93	87	52	54	66
22	66	54	52	58	53	49	67	80	86	88		110		114	113	109	113	110	88	87	78	77	78	
23	74	76	78	67	52	53	70	80	85	85	85	79		130	130	130	127		113	88		78	52	53
24	52	52	53	54	49	36	60	67	78	75	73	85	84	110		112		92			86	80	66	52
25		67	66	66	54	44	58	68	71	77	78	86		128	130	128	134	124	110	100	78		54	
26	73	74	74	64	52	58	66	74	77	86	82		115	115	114	126	114	114	115		63		54	65
27	54	63	64	59	52	48	52	64		84	87	81	99					110	124		78	66	74	73
28	64	54	54	54	56	52	66	73	78	78	80	87	88		90		115	129	130		81	77	65	
29		66	77	73		63		78	81	81	A	86		112		113			124	87	77		54	71
30	65		66	54	53	53	67	81	76	78	80	89				109	94	90	109	108		78	77	77
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	26	24	26	27	25	28	27	28	27	27	25	24	22	19	20	25	23	25	23	20	22	20	25	24
MED	59	54	58	55	52	44	54	78	82	85	84	86	110	115	126	114	113	110	111	87	78	66	64	54
U Q	66	66	71	66	53	51	63	81	85	87	89	90	115	129	130	129	127	124	115	90	80	77	74	72
L Q	52	53	53	52	48	37	53	73	78	80	80	83	88	110	113	109	109	109	110	86	76	53	54	53

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamagawa

APR. 2003

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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	43	50	35					G	G
3	G	G	G	G	G	G	G	G	G	G	G	44	52	G	G	G	G	G		G	27	G	G	G
4	G	G	G	G	G	G	G	G	G	G			G	G	G	G	G	G		28	G	G	G	G
5	G	G	25	G	G	G	G	34	G	G	42	44	G	G	G	G	G	G	G	G	G	G	27	29
6	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	26	G	G	G	G
7	G	G	G	29	G	G	G	31	G	G	G	G	G	G	G	55	G	G	G	28	25	23	G	G
8	G	27	38	30	G	G	G	G	G	G	G	G	G	G	G	44	G	40	39		29	G	G	G
9	G		G	G	20	29	G	G	G		G	G	G	G	G	G	G	G	G	32	32	32	G	23
10	G	30	26	24	G	G	G	G	G	40	49	53	G	G		43	G	G	42	49	72	104	57	40
11	40	41	54	34	43	40	28	36	47	51	50	57	70	G	43	52	66	71	84		43		34	30
12	G	G	G	G	G	G	G	G	44	57	48	G	46	113	63	61	44	G	60	56	60	104	50	40
13	60	59	43	50	52	28	29	44	58	54	G		53	G		G	40	43	38	40	36	31	26	G
14	27	24	G	G	G	G	G	G	42	G	G	G	G	G	G	G	G	G	42	70	28	39	29	32
15	G	G	G	G	G	G	G	36	41	49	G	G	50	50	G	G	G		29	39	32	G	G	G
16	G	G	G	G	G	G	G	G	G	G	G	G	G	G	44	42	70	80	49	72	110	57	59	G
17	G	G	G	G	G	G	28	36	45	43	G	G	G	G	43	G	73	55	49	42	57	94		34
18	G	G	G	G	G	G		37	55	46	62	77	G	G	G	G		42	42	32	92	40	26	G
19	34	52	60	29	G	G		G	44	48	G	G	G	44	48	G	G	G	39	36	23	39	29	39
20	29	26	28	31	G	G	31	42	44	48	44	52	G	G	G	G	G	G	61	79	43	40	30	33
21	29	G	G	G	G	G	G	G	45	53	G	G	53	G	G	G	G	G	43	40	28	43	54	G
22	27	24	G	G	G	G	G	38	38	50	43	G	49	G	50	44	G	G	G	36	27	30	42	84
23	40	60	29	G	G	26	G	G	44	48	G	48	48	G	54	68	G		36	G	24	28	G	35
24	26	26	26	G	G	G	G	G	G	G	G	G	G	G	G	G		G		G	G	G	G	G
25	91	33	40	G	24	G	G	G	47	51	54	72	146	57	G	G	54	G	G	27	35	51	78	27
26	30	28	G	G	G	G	G	35	39	G	G	G	G	G	G	G	50	46	53	42	45	66	40	28
27	G	27	26	27	G	G	28	G	66	56	G	G	G	G	G	G	56	76	91	56	53	34	39	24
28	32	26	34	33	G	28	G	G	G	G	G	50	G	G	G	G	G	G	45	32	G	27	G	G
29	39	32	25	32	34	27	G	G	G	G	130	44	G	52	G	48	53	62	48	40	36	26	33	40
30	41	32	G	26	G	G	G	38	39	G	G	G	G	G	G	G	G	54	54	66	71	47	40	30
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	27	28	28	28	28	26	28	28	27	27	26	28	29	27	29	27	27	25	26	28	27	28	29
MED	14	26	G	G	G	G	G	G	39	40	G	G	G	G	G	G	G	G	42	38	32	32	28	24
U Q	33	32	28	29	G	G	G	36	44	50	44	48	48	G	43	43	50	46	51	49	49	47	40	33
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	28	24	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Yamagawa

APR. 2003

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

HD \ 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	34	30	28	20	17						
3	15	15	15	15	15	16	15	14	17	21	23	29	33				18	14		16	15	15	15	15
4	17	15	15	15	15	15	16	21	18	20				49		44		17		14	15	15	15	15
5	15	15	15	15	15	15	18	15	17	22	24				28	26	20	17	16	15	15	15	15	16
6	15	15	15	15	15	17	17	26	18	18	23	28				18	20	20	18	15	15	15	15	15
7	16	16	15	15	16	15	17	15	17	20	23		48	28		27	20	18	22	14	16	15	15	15
8	15	15	15	15	15	15	16	27	17	20	27	23		32		26		15	17		14	15	15	17
9	15		15	15	15	15	16	26	16		22	22		45			23	18	16	14	14	15	16	15
10	16	15	15	14	15	18	18	15	17	20	22	26				28	22	17	15	15	15	14	15	15
11	14	15	17	15	15	15	14	15	17	20	22	27	27		27	35	18	16	14	14	15	14	14	14
12	16	15	16	16	15	15	16	15	17	15	20	27	29	29	28	23	18	17	15	15	15	15	14	14
13	14	14	15	15	14	15	14	15	16	20	23		28	23		22		17	16	14	15	14	15	16
14	15	15	15	16	17	16	16	15	17	22	29		29				17	16	15	17	16	15	14	14
15	17	16	20	15	15	15	17	16	18	18	32		33	29	28	22	15		14	15	15	18	15	20
16	16	14	15	15	15	17	17	15	18	20					28	34	18	16	15	15	14	14	16	15
17	15	15	16	16	16	18	14	14	17	20		29	22	28	26	18	17	17	16	14	15	15	15	14
18	16	21	15	16	14	15	16	15	17	20	22	34		27	23			17	16	14	16	14	16	16
19	15	14	14	15	15	15	14	15	18	34			26	29	24	22	20	16	15	14	15	14	14	14
20	15	16	14	15	15	15	15	15	17	18		32		30	24	27	20	18	17	15	15	14	14	15
21	14	15	15	15	15	15	17	14	17	22		24	39				24	18	15	14	15	15	14	16
22	15	17	14	15	15	15	15	15	18	21	27		33		36	34	21	20	24	15	14	15	15	14
23	15	14	15	15	17	16	20	17	17	22		40	39	50		39	22		17	17	15	15	15	14
24	17	15	17	16	15	15	20	15	17	22			52	54	60			17		18	15	15	16	17
25	14	15	15	17	15	15	18	17	20	30	29	42	39	33	30		23	17	15	15	14	14	14	16
26	15	16	15	17	17	15	21	16	21	30	54	55	54				20	18	16	14	15	15	14	15
27	16	15	16	15	20	14	14	17	20	26	63			64	52		21	21	17	15	15	15	14	15
28	15	15	15	15	16	15	22	27	21	23		34			58		22	21	20	15	15	15	17	15
29	15	14	15	15	15	16	22	18	20	33	33	33		33	66	26	23	18	16	21	14	16	15	15
30	15	14	17	15	15	20	22	17	18	27						22		17	16	15	16	15	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	28	27	28	28	28	28	28	28	28	27	18	16	15	17	16	19	23	27	25	27	28	28	28	28
MED	15	15	15	15	15	15	16	15	17	21	24	29	33	32	28	26	20	17	16	15	15	15	15	15
U Q	16	15	15	15	15	16	18	17	18	23	29	34	39	47	44	34	22	18	17	15	15	15	15	16
L Q	15	15	15	15	15	15	15	15	17	20	22	26	28	28	26	22	18	17	15	14	15	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Okinawa

APR. 2003

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	87	80	66	65	59	61	64	88	100	104	131	147	152	171	170	151	148	146	147	142	106	87	88	90
2	88	88	80	67	42	42	45	75	88	110	117	138	147	170	174	173	170		151	147	131	87		
3	76	87	88	52	29	34	41	76	87	107	106	131		147		169		151	145	128	110			107
4	88	88	86	84	74	40	48	82	95	96	C	C	C	C	C	C	C	C	C	123	88	87	87	82
5	77	66	77	66	47	46	52	85	104	118	C	C	C	C	C	C	C	150	144	108	86	66	66	65
6	53	66	66	66	50	42	46	75	98	90	106	135	132	145	147	146	147	148	144	128	106	86	85	81
7	76	74	78	84	66	53	58	75	87	100	105	117	132	141	148	156	152			144	145		128	126
8	107	88	108	88	83	48	46	70	86	100	104	115	141	148	168	171	172	172	146	135	98	86	86	84
9	88	84	88	88	66	35	42	65	90	112	111	125	136	140	138	136	137	136	110	109	88	86	87	87
10	81	85	88	79	65	54	65	77	91	104	117	125	126	131	128	120	108	112	110	90		81	76	75
11	72	63	61		54	55	73	85	82	88	104	98	124	146	146	128	123	128	142				76	80
12	83	78	72	57	55	44	48	72	97	90	C	98	114	131	141	C	131	131	125	121	107	102	87	80
13	87	82	79	76	60	58	63	78	92	104	102		128	141	147	146	144	148	147	130	87	72	54	48
14	53	55	58	52	52	44	52	86	90	100	95	107	126	137	146	141	144		146	126	88		60	73
15	66	66	88	88	64	50	38	70	90	107	110	121	134	145	142	142	131	133	141	141	84	74	65	66
16	61	65	66	50	42	37	48	81	90	84	84	97	108	122	137	146	146	146	148		126	81	73	
17	66	64	62	53	54	47	65	71	82	86	82		108	134	145	152		148	140	126	108	87	79	80
18	81	77	60	55	54	50	54	78	80	85	84	97	105	121	128	141	147	151	147	121	86	65	73	73
19	66	66	66	60		48	52		86	93	96	105	116	124	122	131	142	135	137	136	104	77	82	86
20	87	79	87	72	52	44	52	78	84	85	100	102	112	130	140	143	146	137	131	123	87		54	54
21	63	54	60	54	44	42	52	76	87	97	97	92	113	135	131	123	131	136	130	134	108	76	65	65
22	75	83	64	58	58	52	52	80	90	104	111	115	124	126	130	131	137	134	128	110	102	85	86	87
23	82	86	88	71	50		58	88	88	86	104	110	127	146	148	149	156	143	148	142	137	88	84	76
24	76	72	74	68	61	38	52	70	88	80	81	102	125	131	131	137	140	143	146	144	130	110	89	88
25	86	86	84	83	66	54	51	66	75	76	80	103	128	136	138	147	145	145	140	131	88	82	81	84
26	83	86	86	63	53	50	57	68	76	97	105	121	134	145	146	157	171	157	163	143	108	90		88
27	86	86	87	72	53	47	51	68	77	100	97	97	107	138	136	134	138	142	145	144	105		87	86
28	87	84	78	63	63	64	73	81	81	84	90	110	108	123	126	134	146	147	146	129	110	87	87	88
29	87	88	88	88	75	63	68	81	87	92	91	106	120	130	131	141	146	141	131	111	88	79	82	87
30	80	68	72	66	61	61	76	78	86	82	98	122	127	136	141	138	138	134	147	145	131	107	107	101
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	29	29	30	29	30	30	27	26	27	28	27	27	26	26	28	28	28	24	27	28
MED	81	80	78	66	55	48	52	77	88	96	102	110	126	136	141	142	144	143	144	130	106	86	82	83
U Q	87	86	87	81	64	54	63	81	90	104	106	122	132	145	147	151	147	148	147	142	110	87	87	87
L Q	72	66	66	57	51	42	48	70	84	86	91	102	113	130	131	134	137	135	134	122	88	78	73	74

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Okinawa

APR. 2003

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		42	53	51	G	58	52	50	G	44	37	G	G	G	G	G	G
2	G	G	27	31	24	31	28	G	G	44	47	G	G	52	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	G	46	G	G	35	32	G	G	G
4	G	G	G	G	G	G	G	33	G	46	C	C	C	C	C	C	C	C	C	27	G	G	25	G
5	G	G	G	G	G	G	G	G	G	G	C	C	C	C	C	C	C	42	35	25	25	24	G	32
6	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G
7	G	G	G	G	G	G	G	G	G	G	G	G	47	45	G	G	G			G	G	36	G	G
8	G	G	G	G	G	29	30	34	38	G	47	48	G	G	G	G	G	73	40	36	41	113	23	G
9	G	G	G	G	11	G	29	G	G	G	G	G	G	G	G	G	G	45	48	66	50	29	40	G
10	26	G	G	G	G	G	G	38	50	55	44	G	G	47	G	82	G	39	43	72	116	27	27	36
11	78	40	52	71	32	G	28	48	52	44	56	67	58	G	72	70	87	115	133		94	113	84	50
12	56	47	26	24	27	G	G	G	53	62	C	64	57	68	67	C	66	96	84	58	33	40	24	50
13	82	48	33	37	34	35	G	42	46	54	60	162	115	G	G	G	G	43	51	44	55	31	40	24
14	G	G	G	G	G	G	G	33	42	46	46	G	51	G	G	G	G		33	39	G	60	33	32
15	40	29	23	G	G	G	G	G	39	G	G	G	G	G	G	G	42	48	48	50	34	30	26	G
16	G	G	G	G	G	G	25	37	G	G	G	51	48	G	G	55	49	44	G	80	11	35	67	83
17	29	34	27	G	G	G	28	47	60	50	57	108	78	62	G	G	G	46	56	56	44	37	59	92
18	39	26	23	G	G	G	24	36	50	60	75	62	63	54	G	G	48	47	38	37	55	51	30	67
19	G	G	G	26	58	41	31		G	47	55	58	77	48	G	G	G	48	47	35	29	G	G	28
20	34	28	G	29	34	27	G	G	47	56	42	G	78	78	58	G	G	G	39	45	52	93	58	33
21	32	23	G	G	G	G	G	33	G	42	49	61	53	G	G	G	G	G	40	39	59	G	56	41
22	46	G	29	26	G	G		38	49	57	60	52	G	61	G	G	G	G	G	27	32	38	28	47
23	40	36	39	47	57	40	45	G	43	49	G	46	G	G	54	53	50	54	39	32	28	G	28	30
24	50	G	G	G	G	G	G	36	46	48	G	52	G	G	G	52	G	G	36	29	25	G	G	28
25	G	G	89	G	36	39	G	35	44	48	48	52	G	G	G	G	53	G	G	G	G	82	50	60
26	24	G	G	G	G	G	G	32	46	54	66	G	55	G	68	44	G	G	93	137	103	34	57	58
27	40	28	G	G	G	G	G	37	62	68	62	78	74	G	G	G	40	50	59	68	93	92	60	51
28	35	29	G	G	24	33	32	G	G	G	G	G	G	58	89	52	80	45	G	27	G	35	49	G
29	G	G	G	G	50	42	G	G	G	G	G	47	G	G	G	G	G	G	57	78	71	36	36	45
30	34	G	G	46	43	30	29	47	G	48	56	57	G	G	G	G	G	G	G	G	G	50	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	28	30	30	27	28	28	28	28	27	28	27	28	29	30	30	30	29
MED	28	G	G	G	G	G	G	33	40	46	47	48	24	G	G	G	G	42	39	36	32	34	28	32
U Q	40	28	26	26	32	30	28	37	47	54	56	59	58	52	25	44	47	48	49	57	55	50	50	50
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

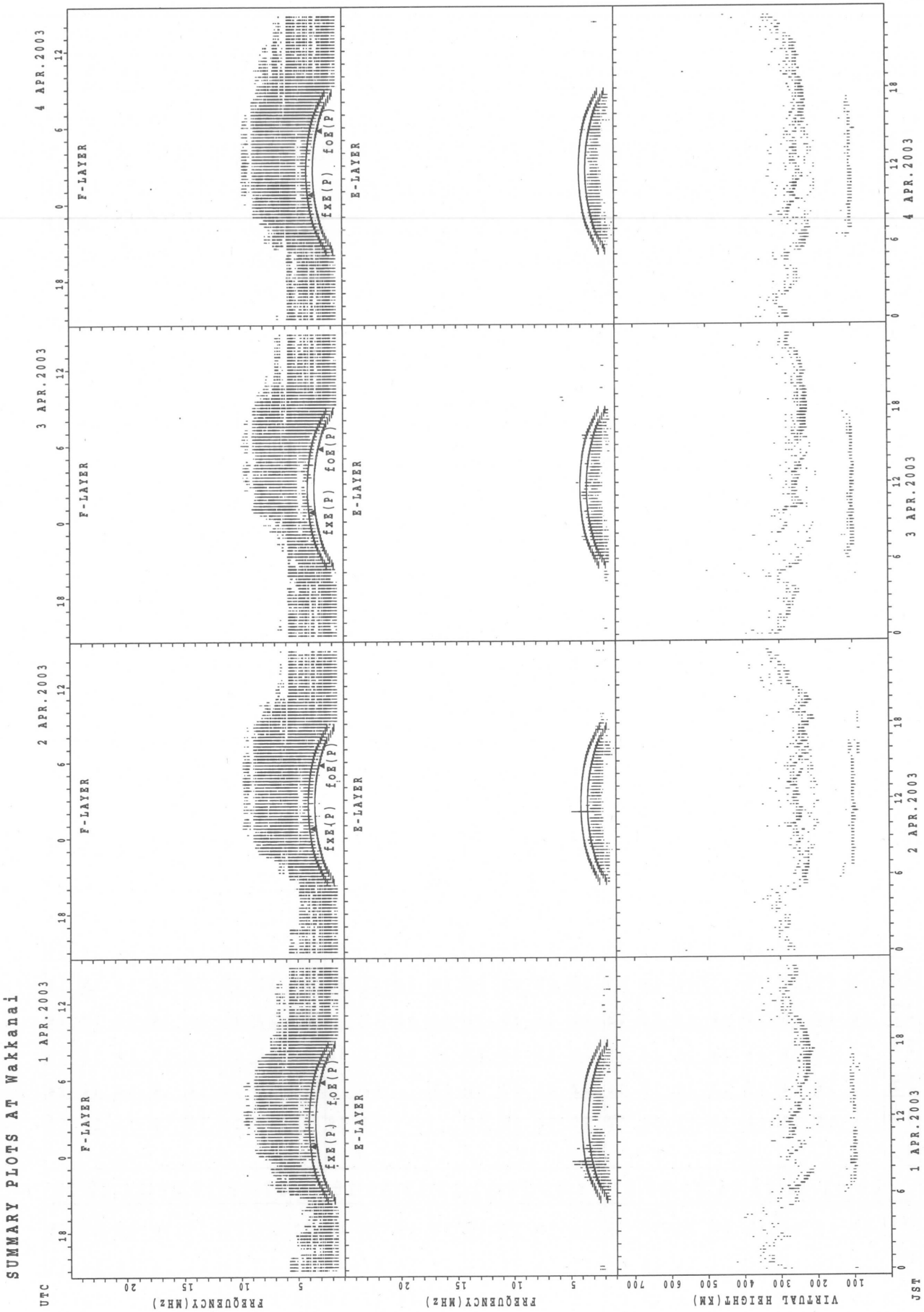
HOURLY VALUES OF fmin AT Okinawa

APR. 2003

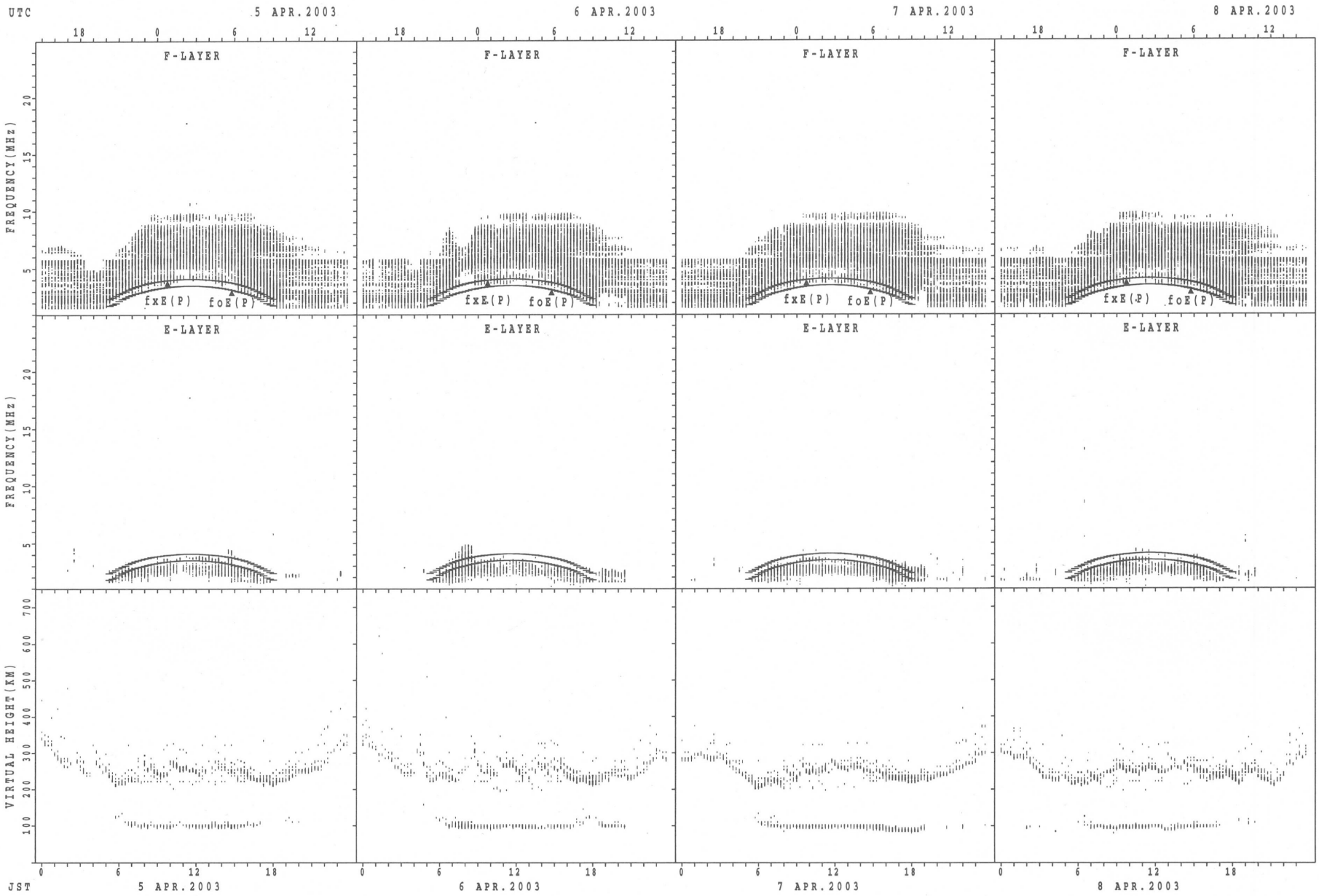
LAT. 26°16.9'N LON. 127°48.4'E SWEEP 1MHz TO 25MHz AUTOMATIC SCALING

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	16	16	14	16	16	15	14	15	20	22	34	33	38	36	38		14	18	15	15	14	15	15	15
2	15	15	14	14	14	14	14	24	16	18	26		50	36	42	39	36	18	23	15	15	15		
3	15	15	17	17	14	15	17	24	17				48	48	46	21	20	29	14	17	14	15	14	15
4	15	15	15	15	14	14	14	15	32	21	C	C	C	C	C	C	C	C	C	14	14	15	15	15
5	14	14	15	14	14	15	15	16	17	20	C	C	C	C	C	C	C	15	14	15	14	15	15	15
6	14	15	15	14	14	15	14	14	16	21				28		40	22	17	14	16	14	14	15	15
7	15	15	15	14	14	14	14	24	16	18	23		40	38			22			14	15	14	14	15
8	14	14	14	14	14	14	14	14	16	22	23	26		36		23	20	15	14	14	14	14	14	14
9	14	14	15	14	15	15	14	14	15	21	24				41		21	17	14	14	14	14	14	14
10	14	14	14	14	14	14	15	14	16	22	38	26	24			38	20	14	14	14	14	14	14	14
11	14	14	14	14	14	14	14	14	16	17	21	24		28	27	22	20	15	14		15	15	14	14
12	14	15	15	15	14	14	15	14	16	20	C	23	23	30	29	C	20	15	14	14	14	14	15	15
13	14	24	14	14	14	14	14	14	14	18	20	27	30	30		22		15	14	14	14	14	14	14
14	14	14	14	14	14	14	14	14	14	22	20		29				21		14	14	15	14	14	14
15	14	14	14	14	14	14	14	14	17	22	22		33		26	23	16	14	14	14	14	14	14	15
16		14	15	14	14	15	15	14	15	21	22	23	28		45	37	23	16	15	15	15	14	14	15
17	14	14	14	14	14	14	14	14	15	21	29	26	35	23		22		18	15	14	14	14	14	14
18	14	14	14	14	14	14	14		16	20	23	33	38	33	24		23	16	14	14	14	14	14	14
19	16	15	15	14	14	14	14	14	18	21	26	33	36	38		24	21	16	14	14	14	14	15	14
20	14	14	14	14	14	14	15	14	15	23	26		35	35	33		18	17	14	14	14	14	14	14
21	14	15	14	14	14	14	17	14	16	18	43		39				22	20	14	14	14	15	14	14
22	14	14	14	14	14	14	14	14	14	21	33	38		39		40		21	14	14	14	14	14	14
23	14	14	14	14	14	14	14	14	15	23	41		48	52	39	36	22	17	14	14	14	15	15	14
24	15	18	15	17	17	15	17	14	15	21	22	34		30	53	39	22	20	14	14	14	15	14	14
25	14	14	14	14	14	14	18	17	18	22	28	36				55	21	14	14	16	15	14	14	14
26	14	15	14	17	15	14	18	15	22	22	43	54	40	44	41	28	23	20	14	14	14	14	14	14
27	14	14	15	14	14	14	20	15	21	26	38	32	36	54	49		33	20	15	14	14	14	14	14
28	14	16	14	14	14	14	14	15	18	23	40	32	36	36	38	30	22	18	14	14	15	14	15	20
29	15	14	14	15	14	14	18	16	22	23	32	36	49		62		38	18	15	14	14	14	14	14
30	14	15	15	14	14	14	14	16	20	34	29	38			49	39	38	32	14	18	14	14	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	29	30	30	30	30	30	30	29	30	29	25	18	20	19	17	18	25	27	28	29	30	30	29	29
MED	14	14	14	14	14	14	14	14	16	21	26	32	36	36	41	33	22	17	14	14	14	14	14	14
U Q	15	15	15	14	14	14	15	15	18	22	36	36	40	39	47	39	23	20	14	15	14	15	15	15
L Q	14	14	14	14	14	14	14	14	15	20	22	26	31	30	31	23	20	15	14	14	14	14	14	14

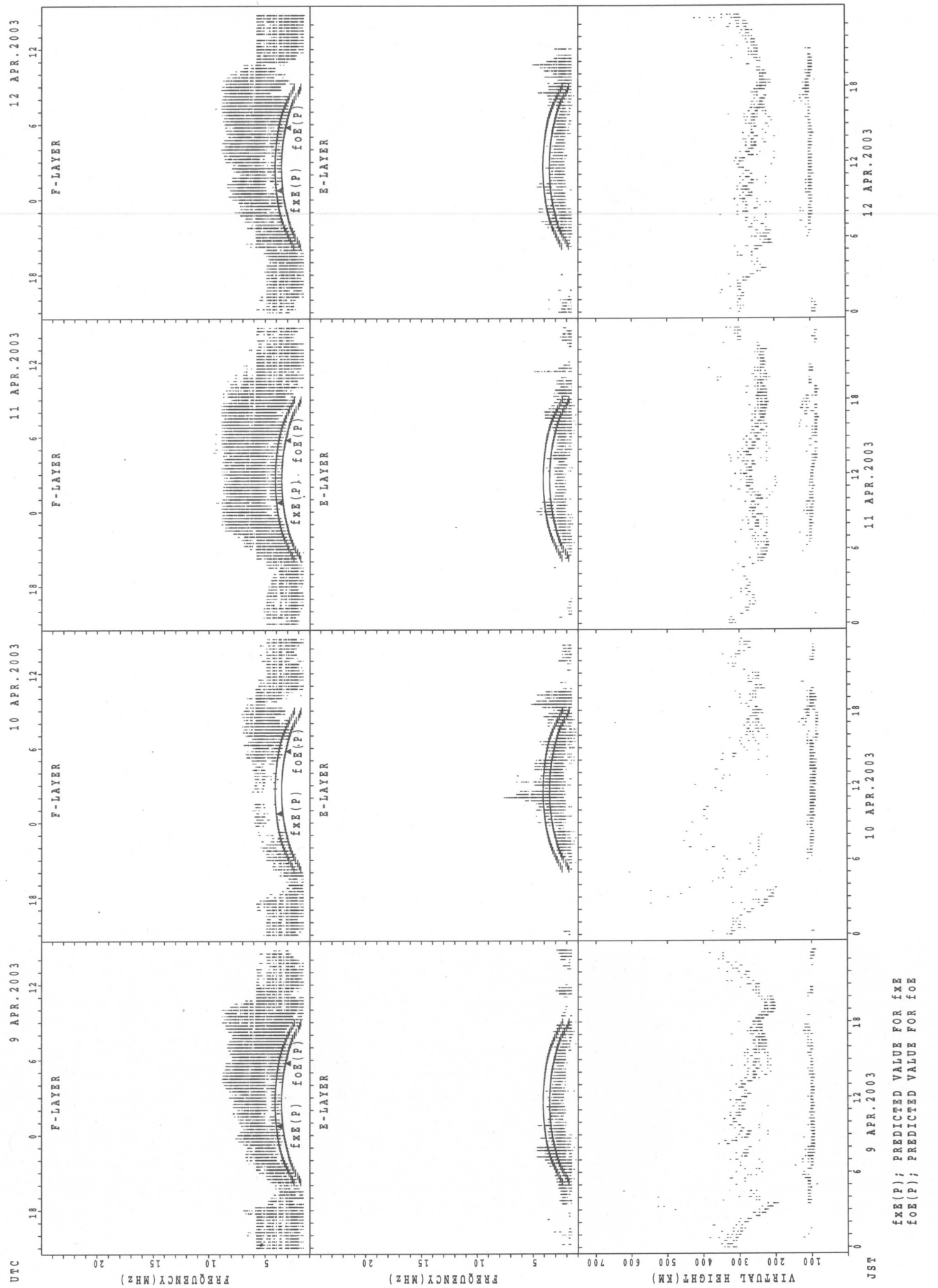
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT Wakkanai
UTC
1 APR.2003
2 APR.2003
3 APR.2003
4 APR.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

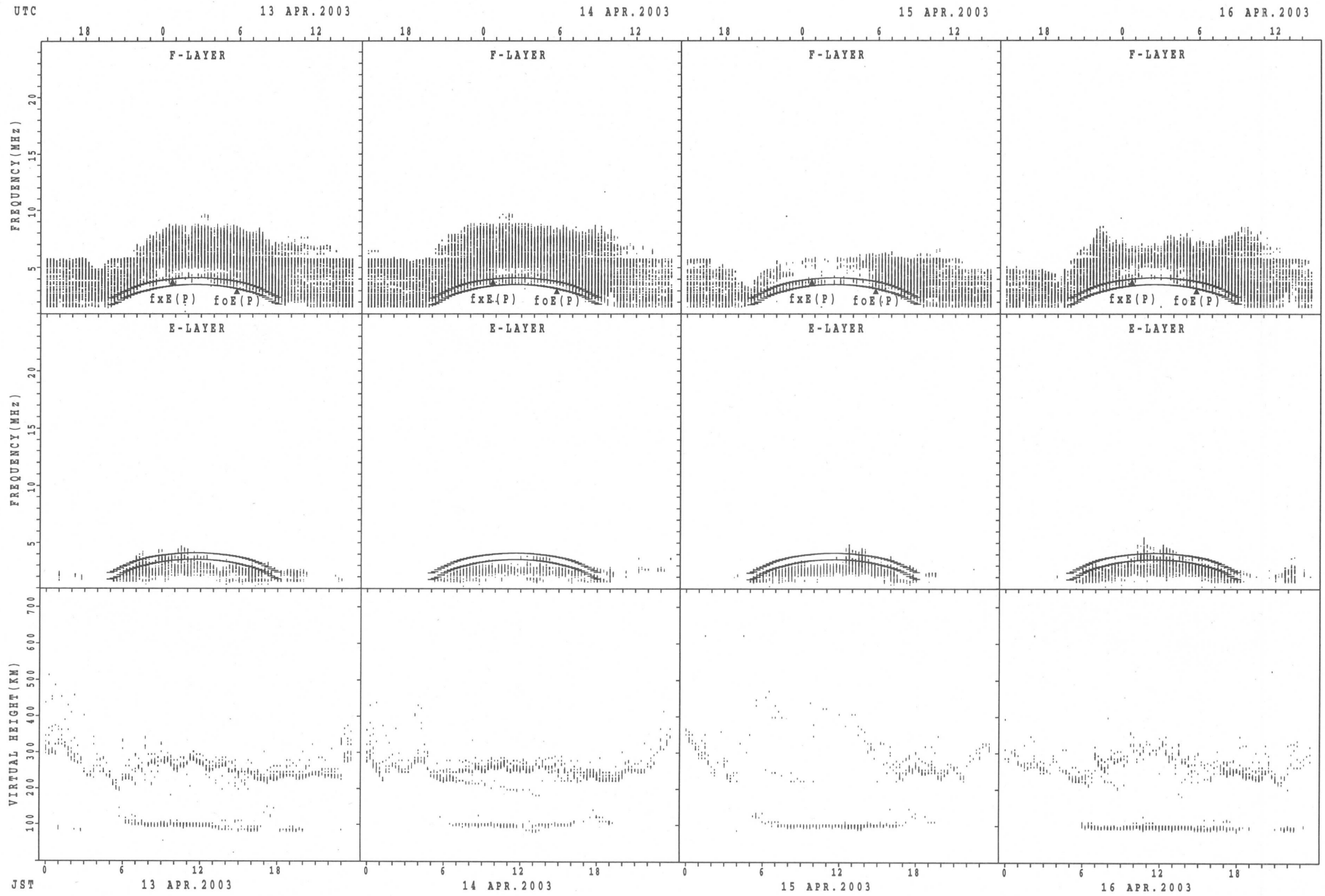
SUMMARY PLOTS AT Wakkanai



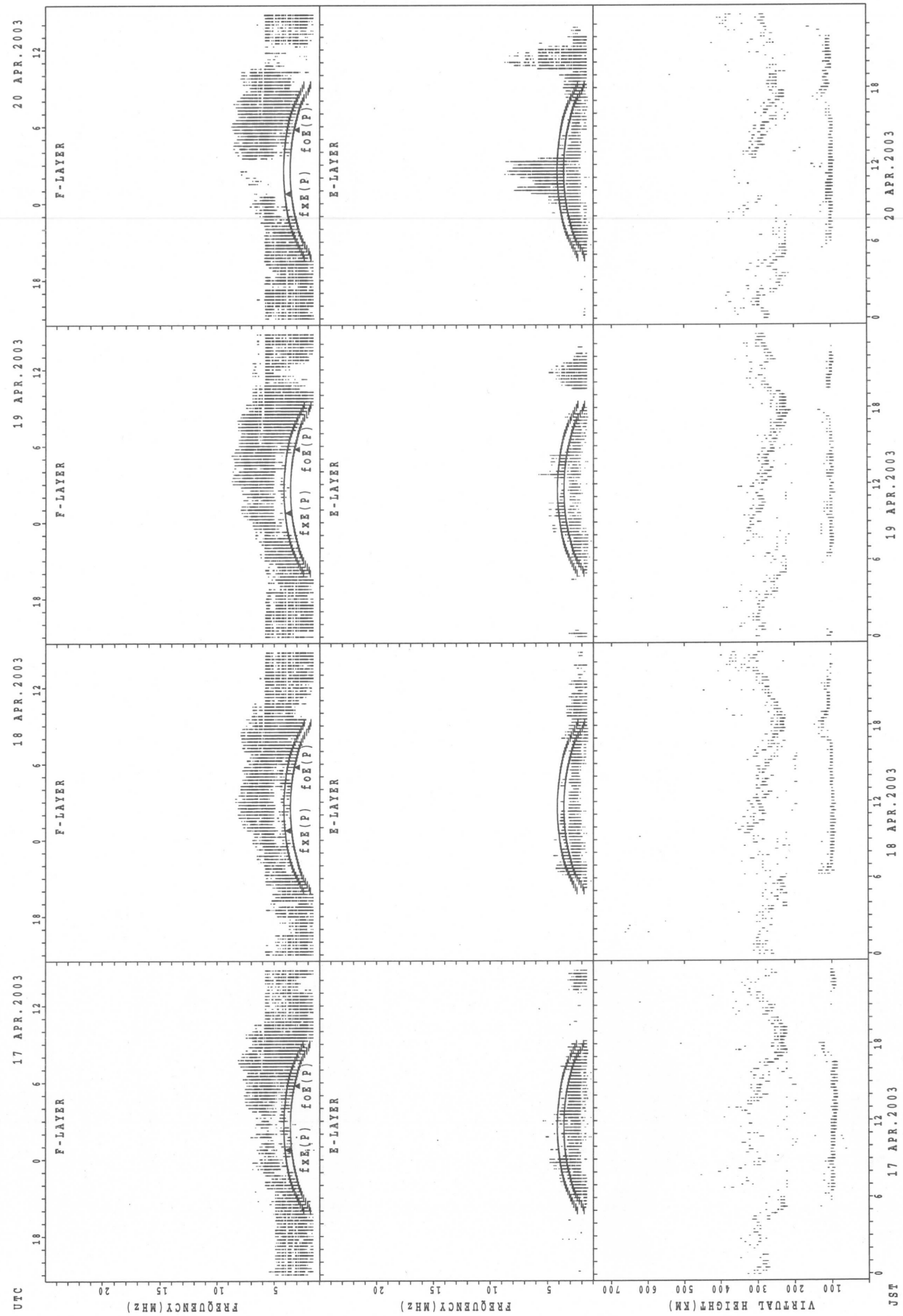
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Wakkanai
UTC
JST
9 APR.2003
10 APR.2003
11 APR.2003
12 APR.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

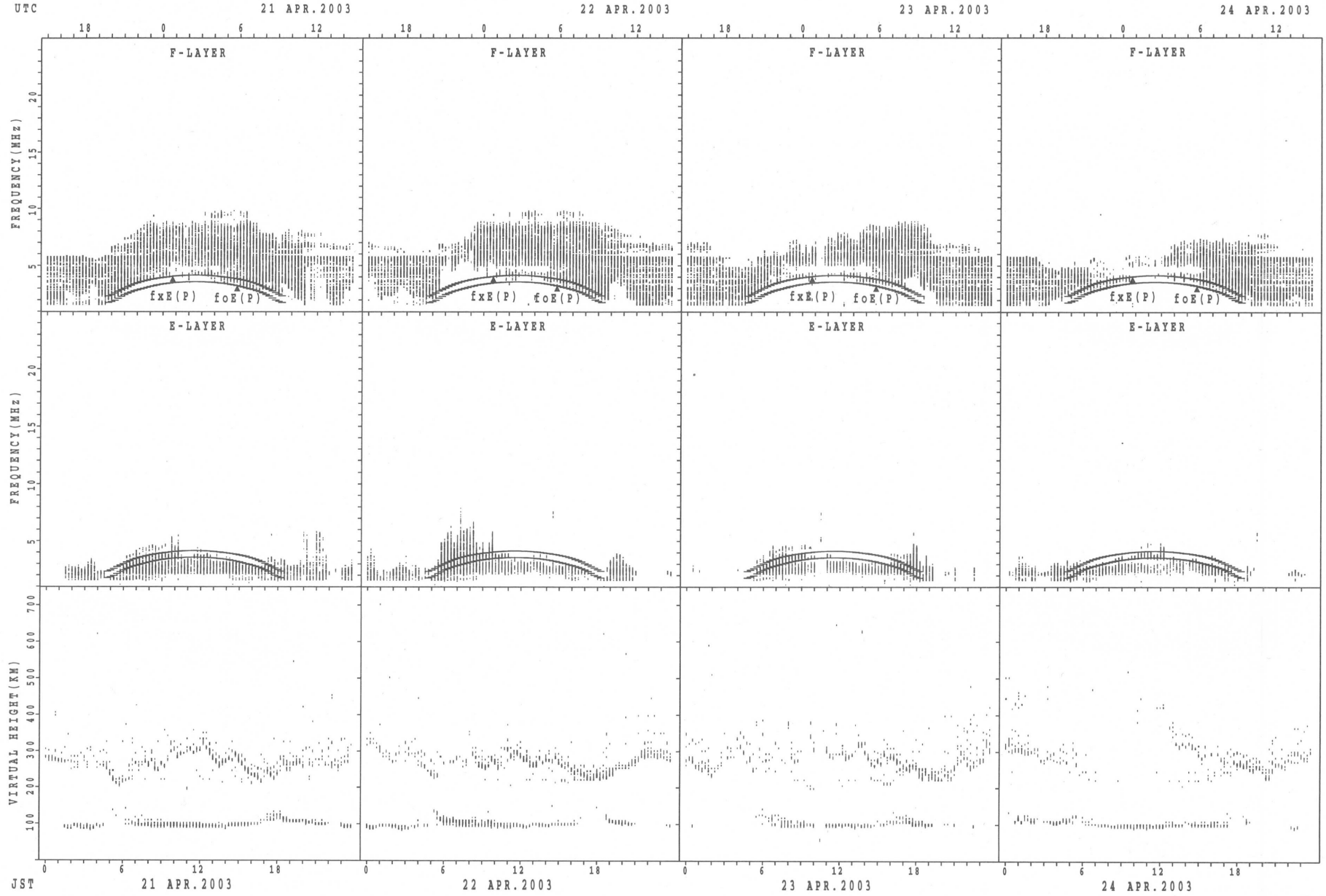
SUMMARY PLOTS AT Wakkanai



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

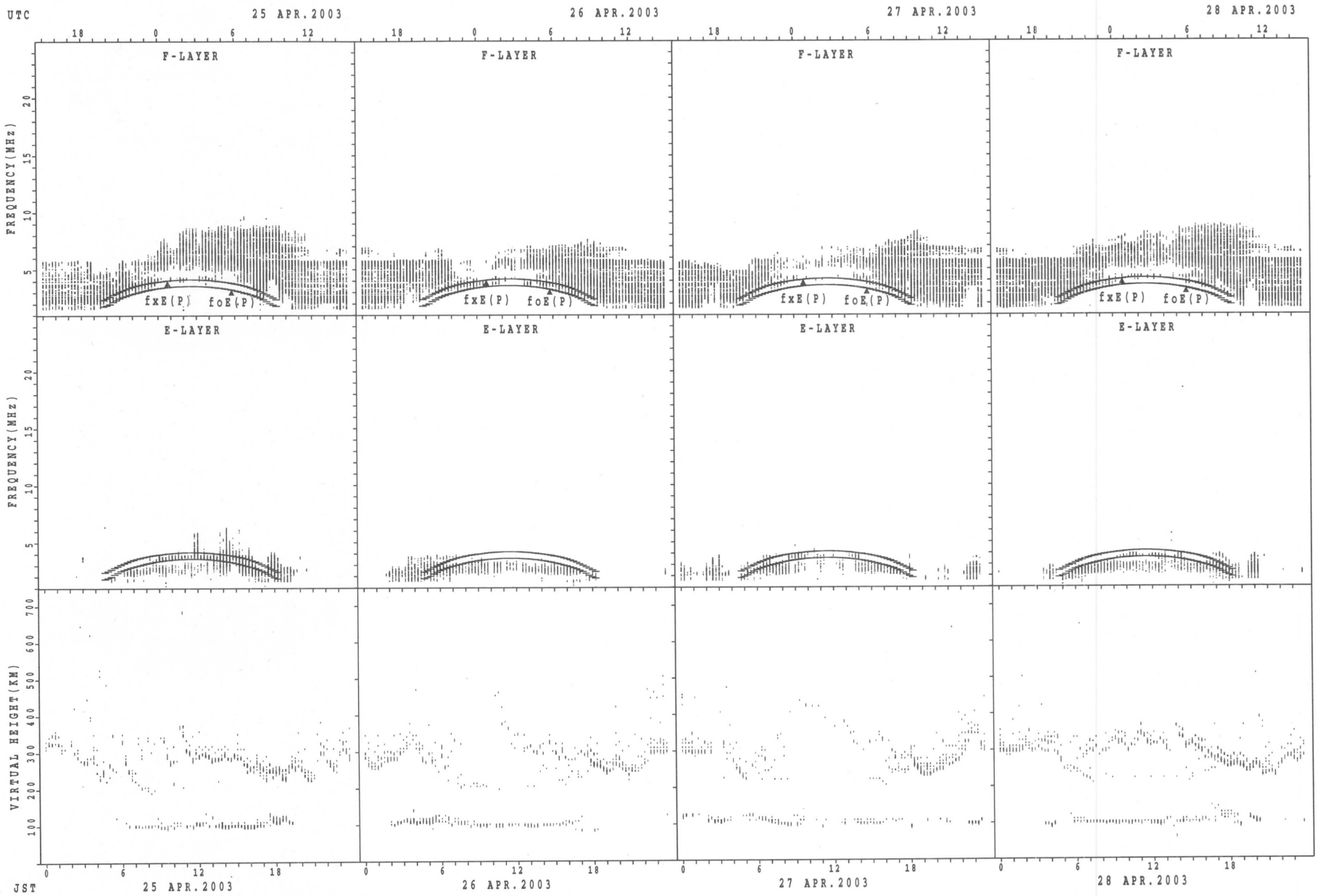

SUMMARY PLOTS AT Wakkanai
UTC
JST
17 APR.2003
18 APR.2003
19 APR.2003
20 APR.2003
F-LAYER
E-LAYER
fxE(P) foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



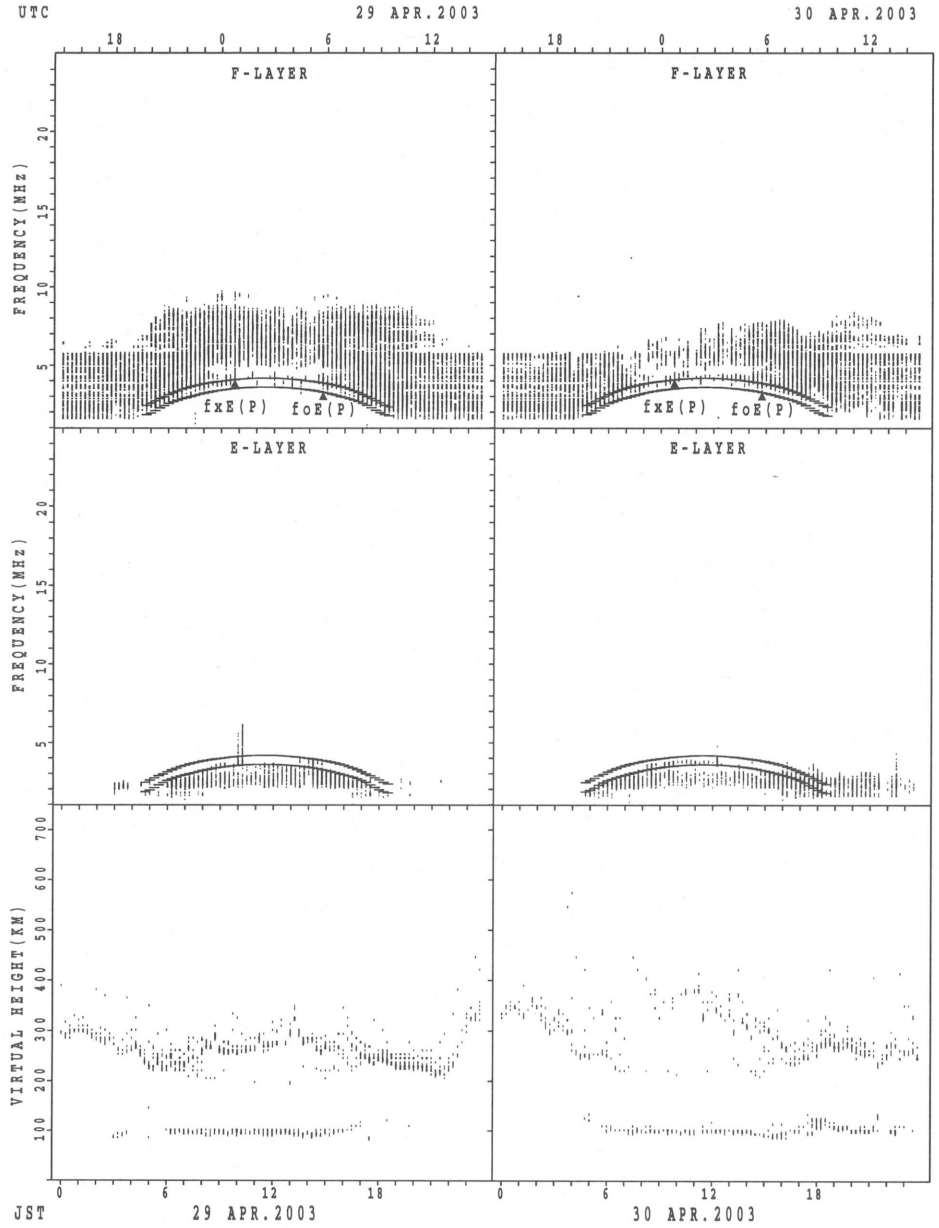
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



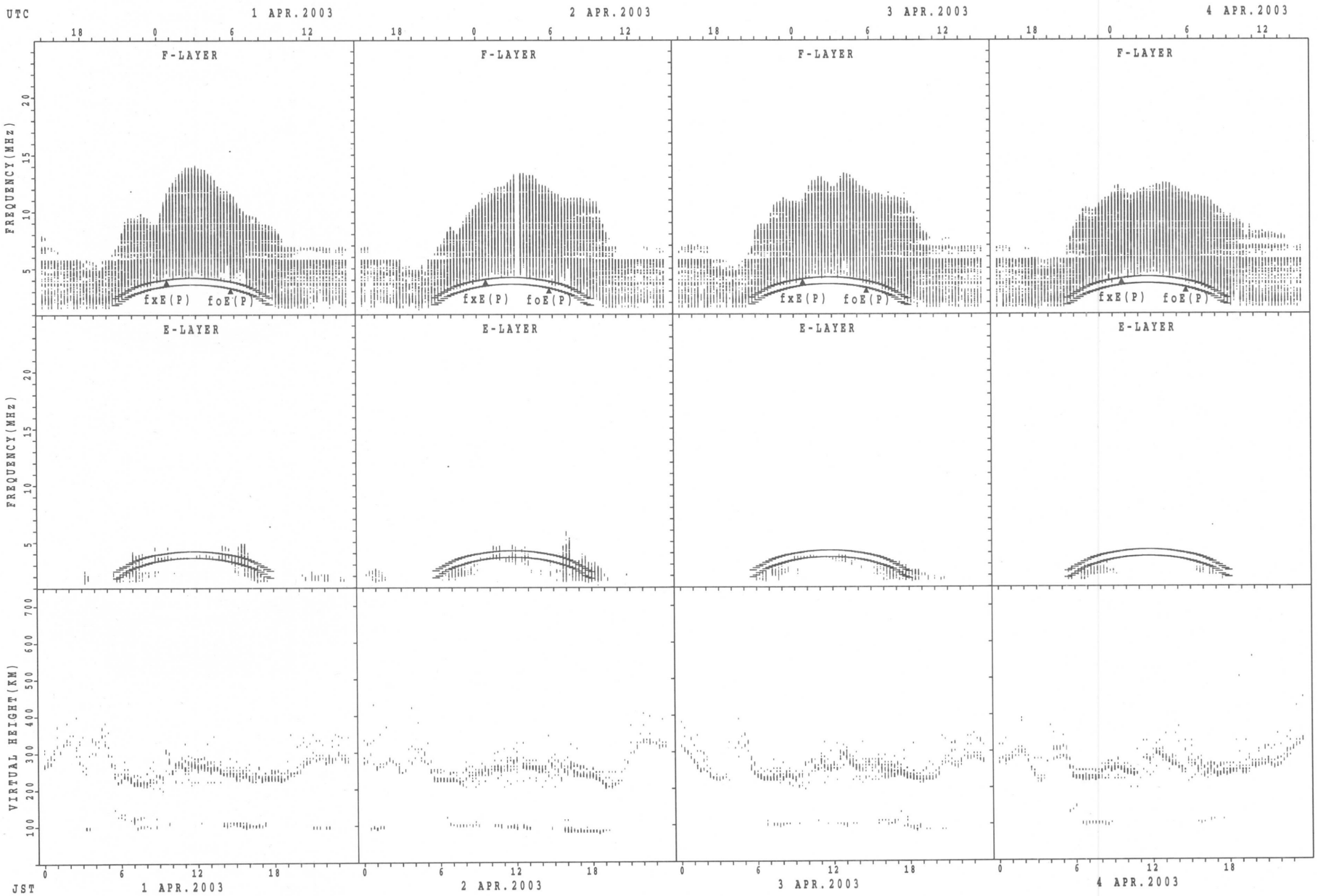
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



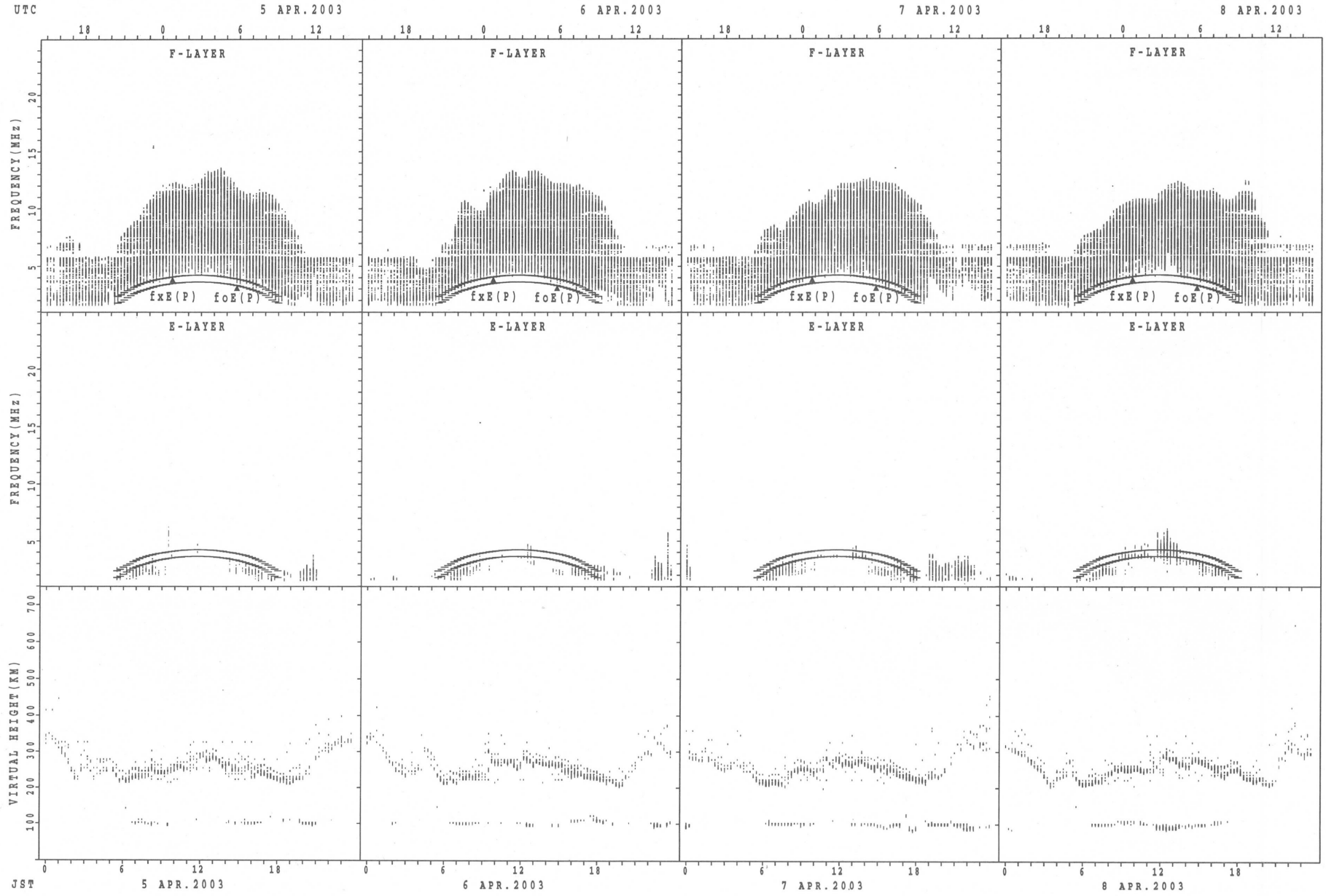
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



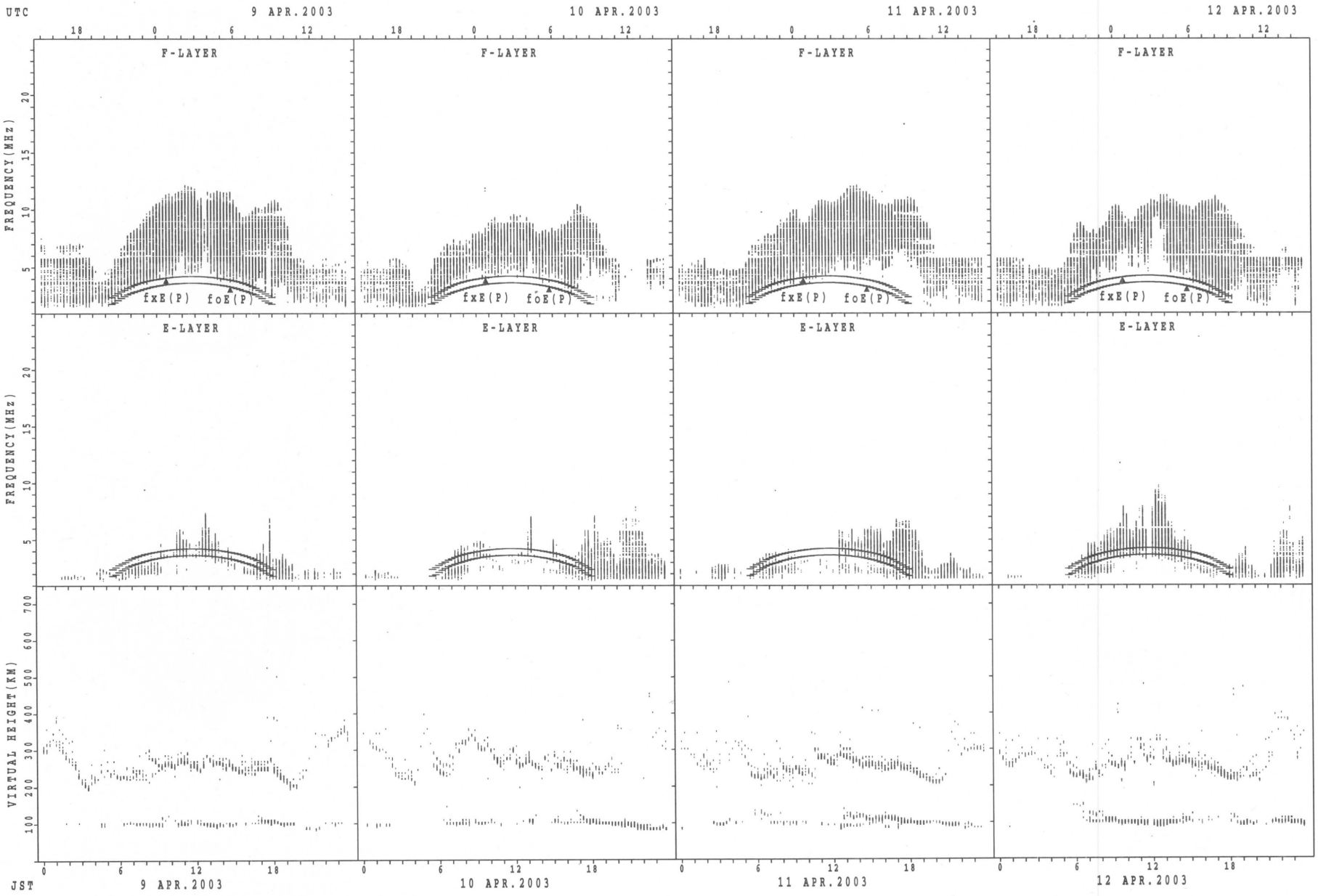
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



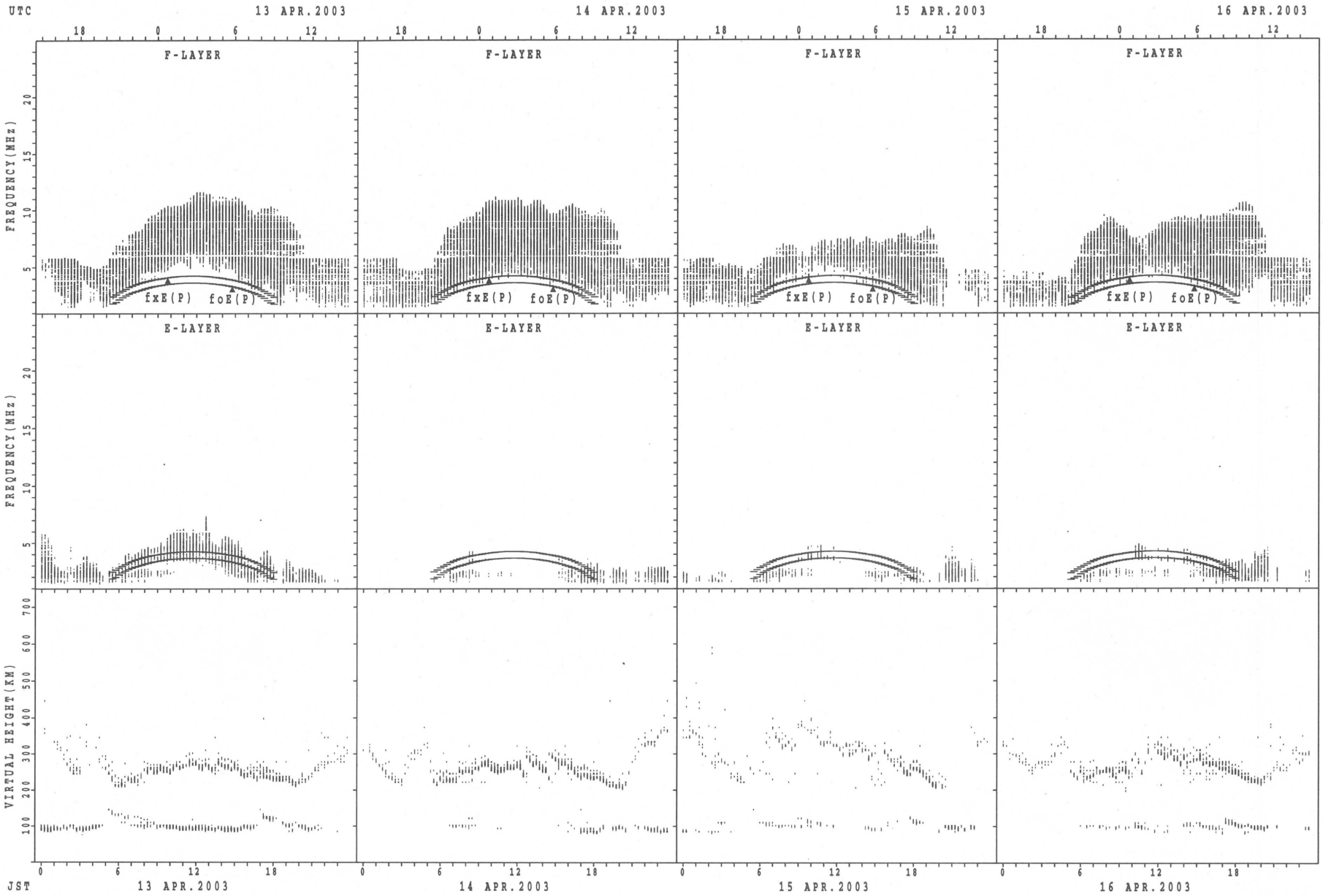
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



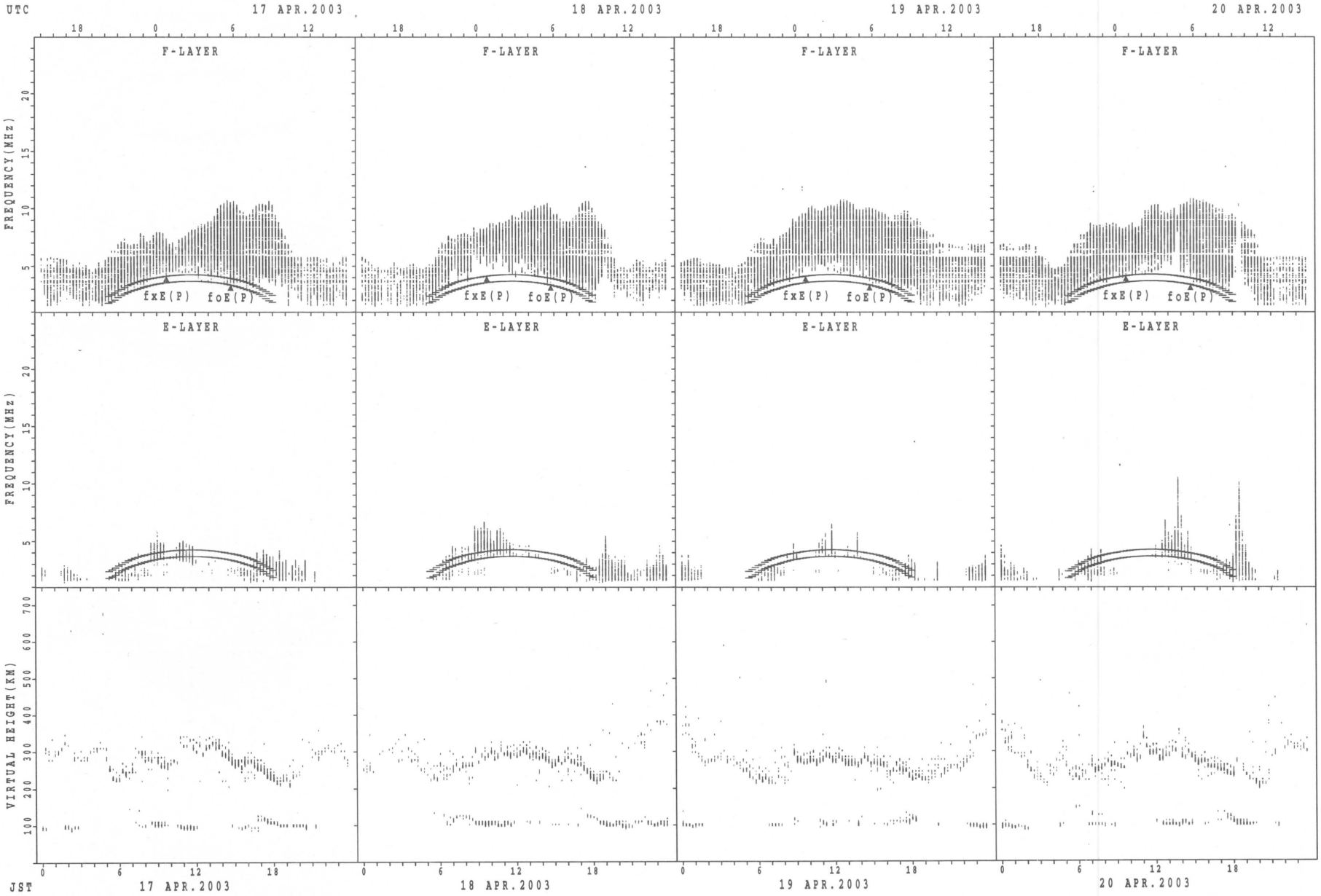
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



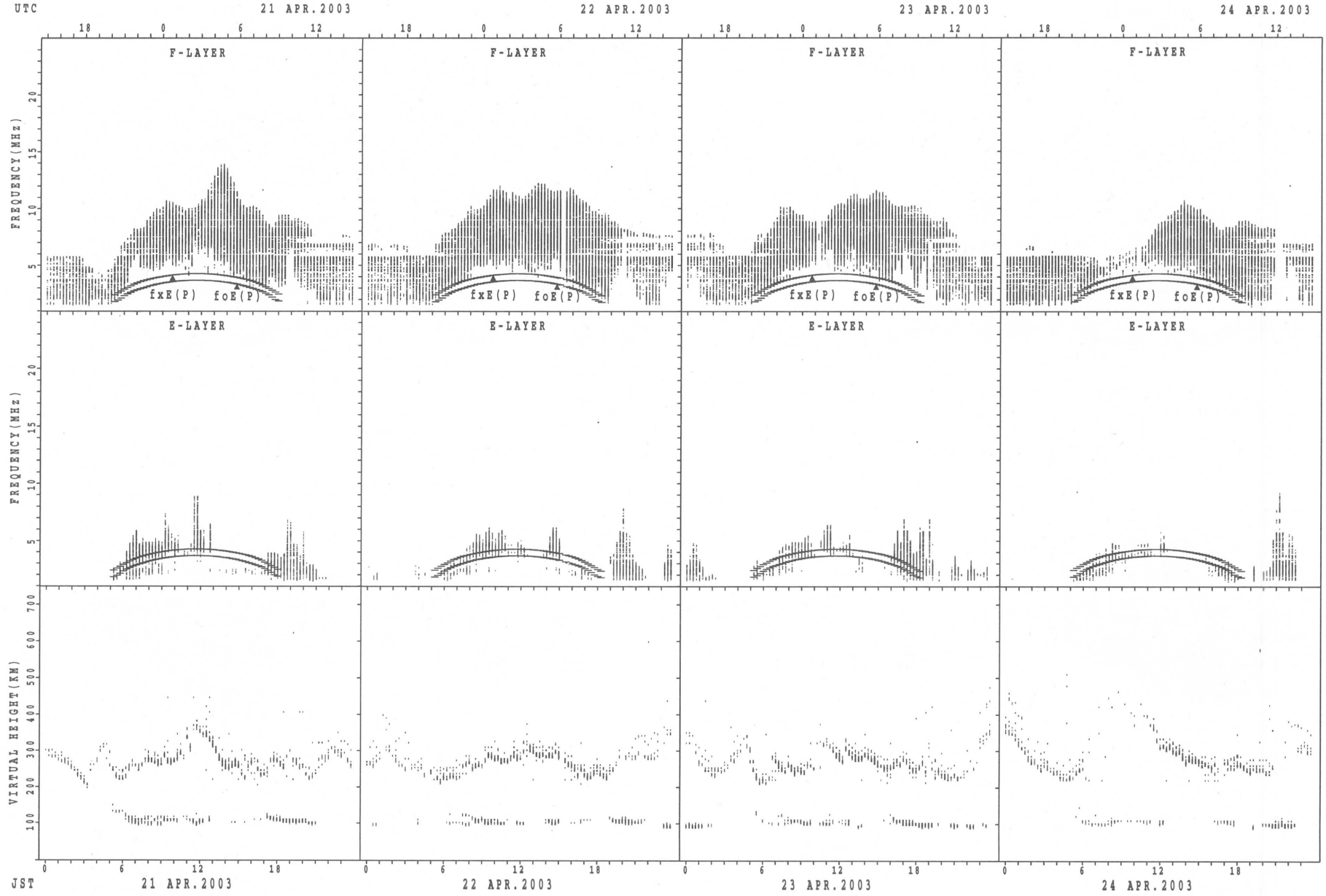
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



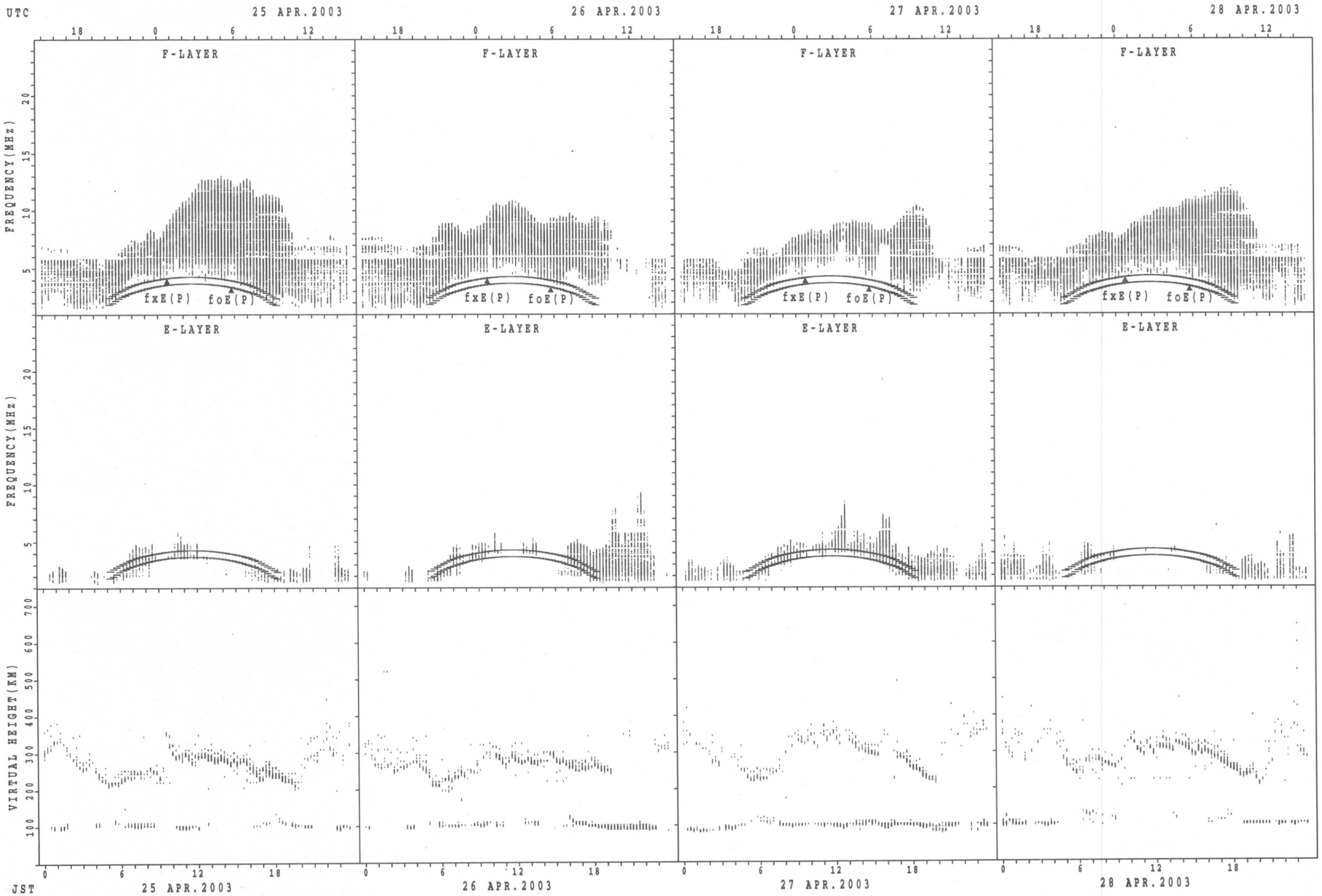
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



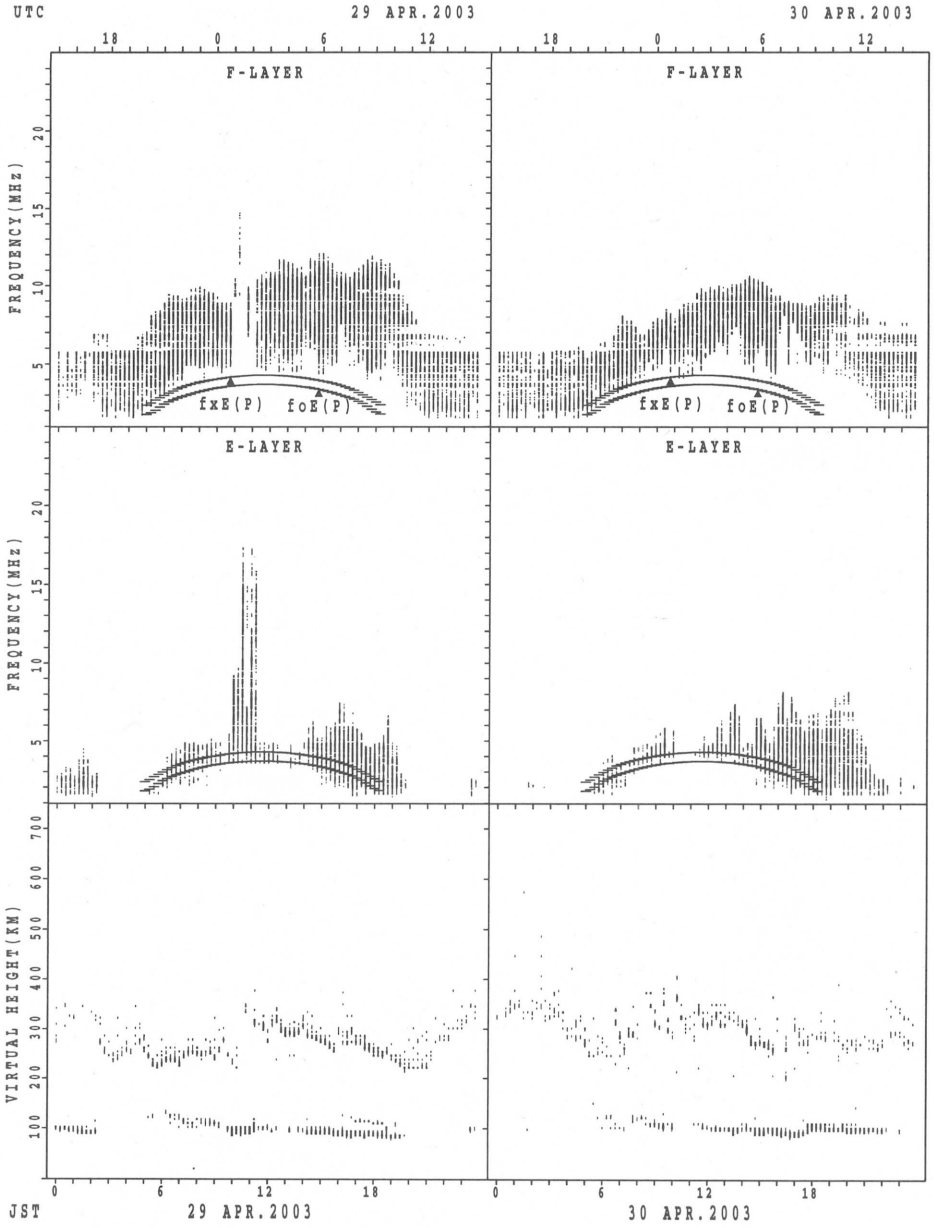
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



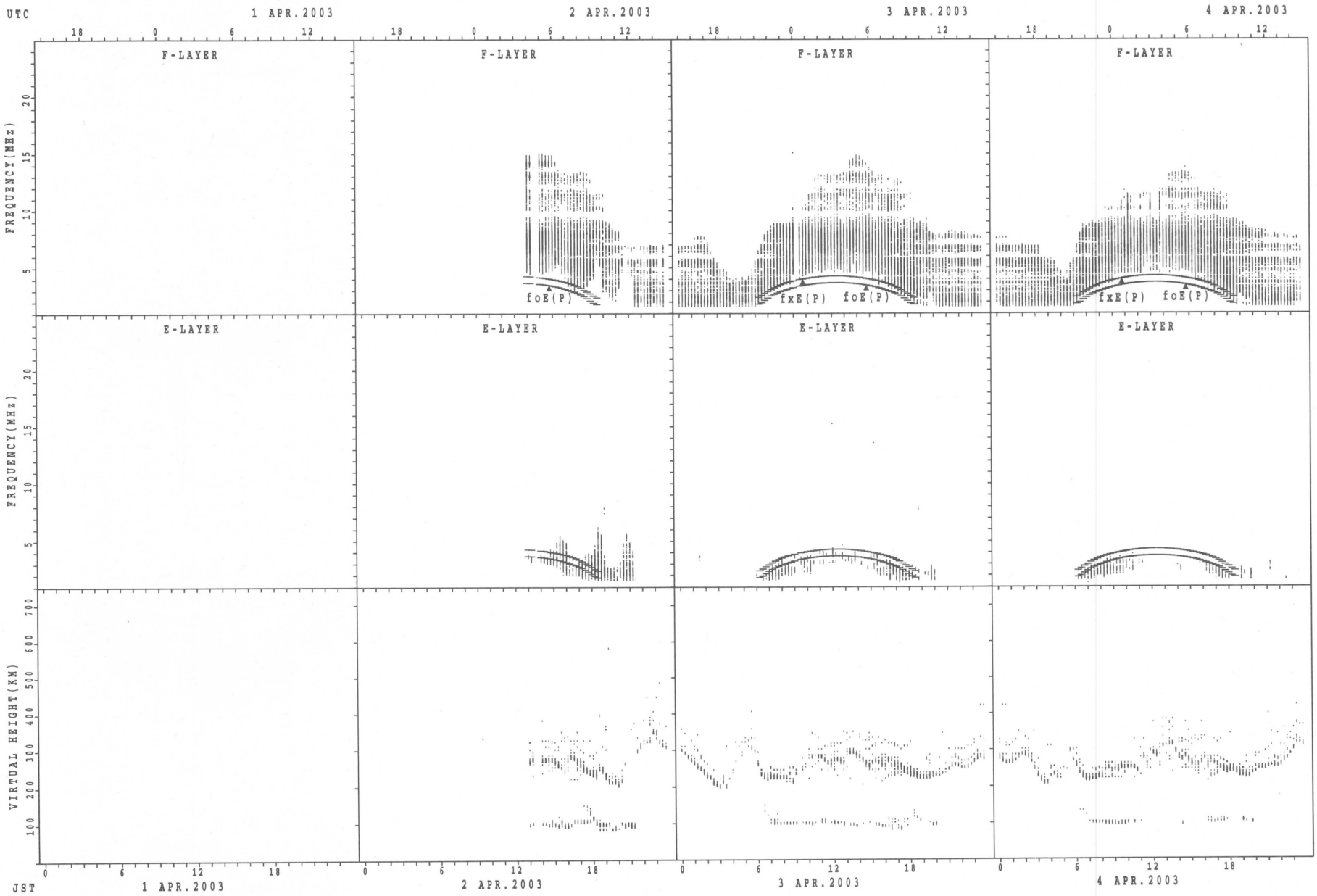
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



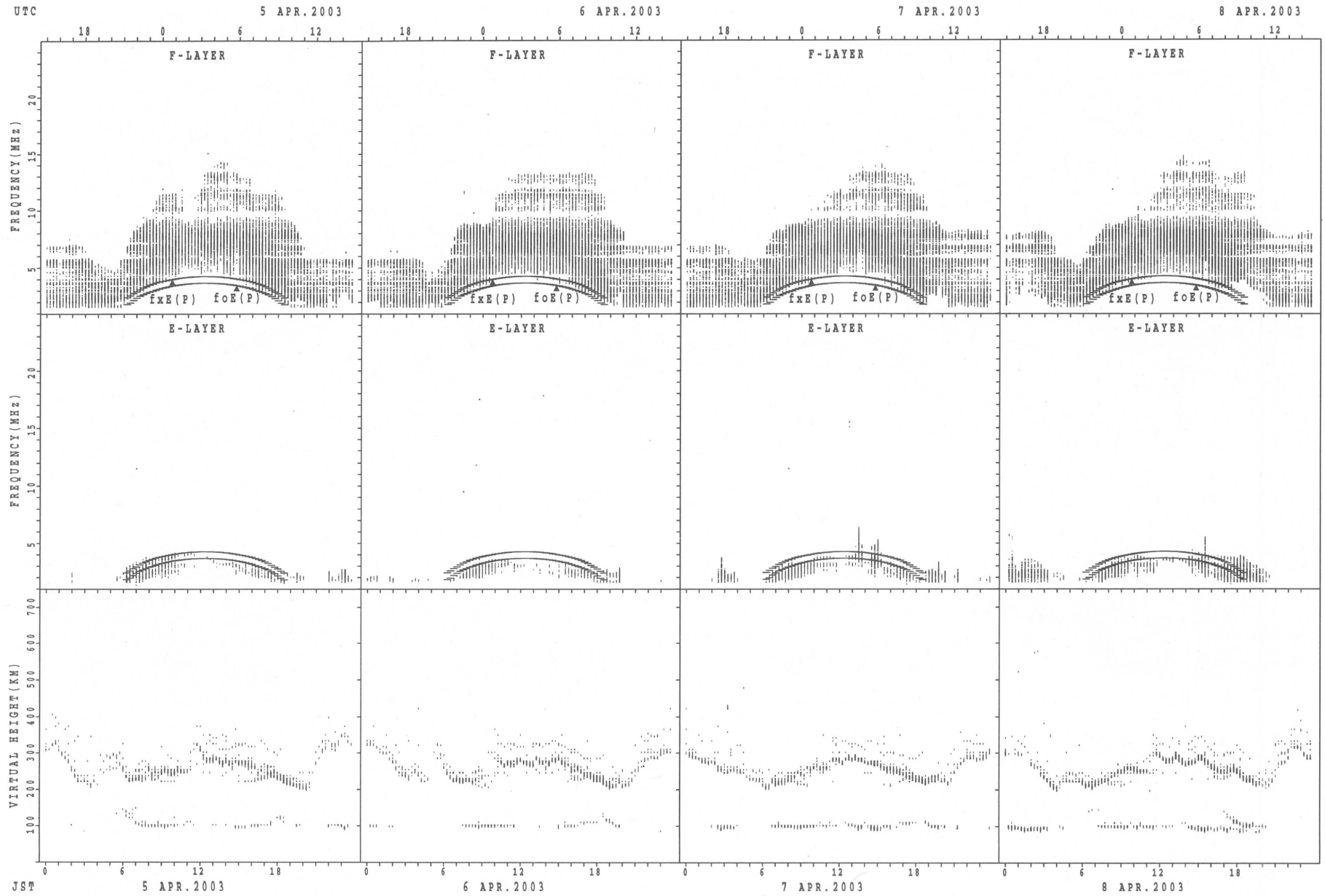
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

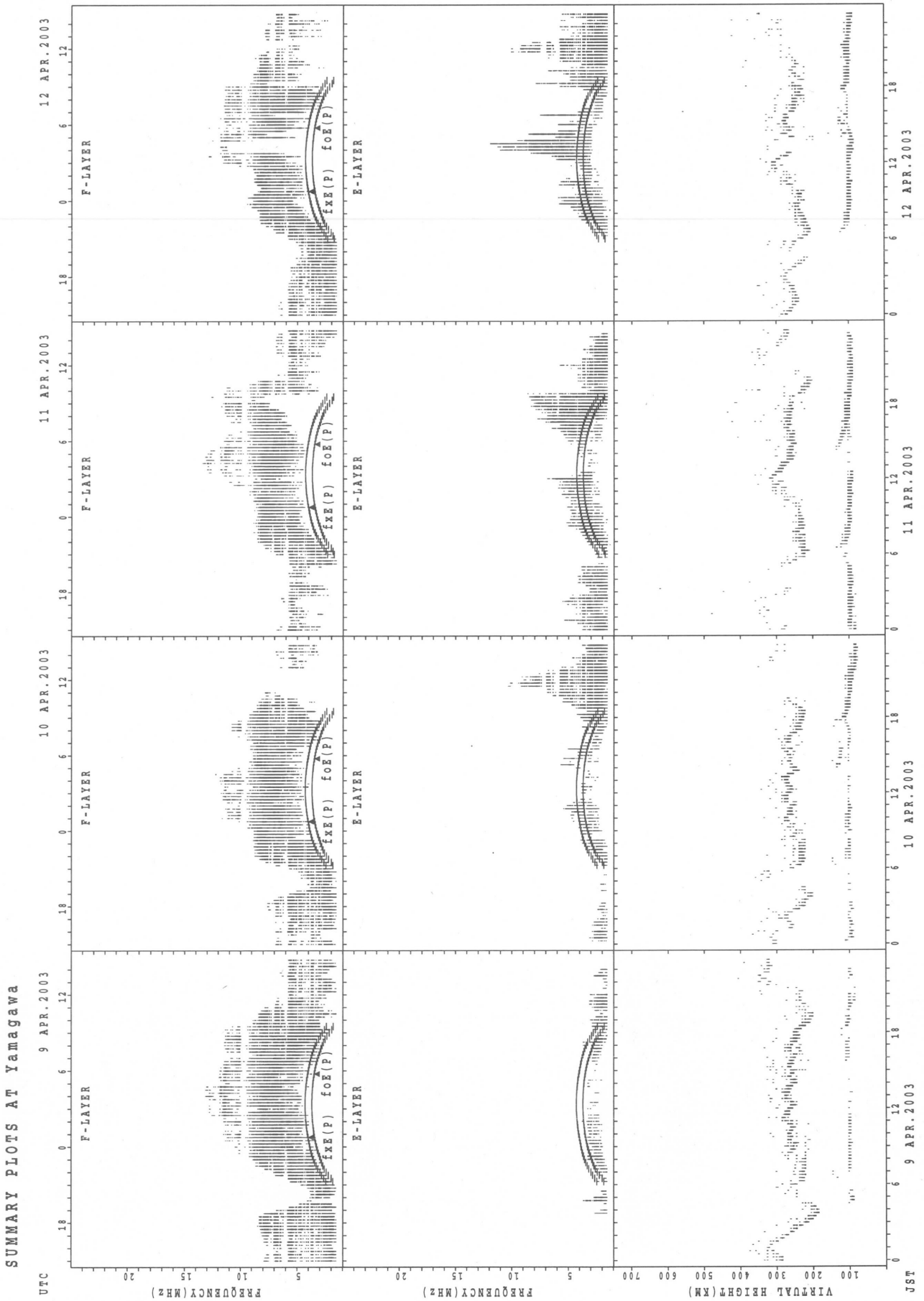


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

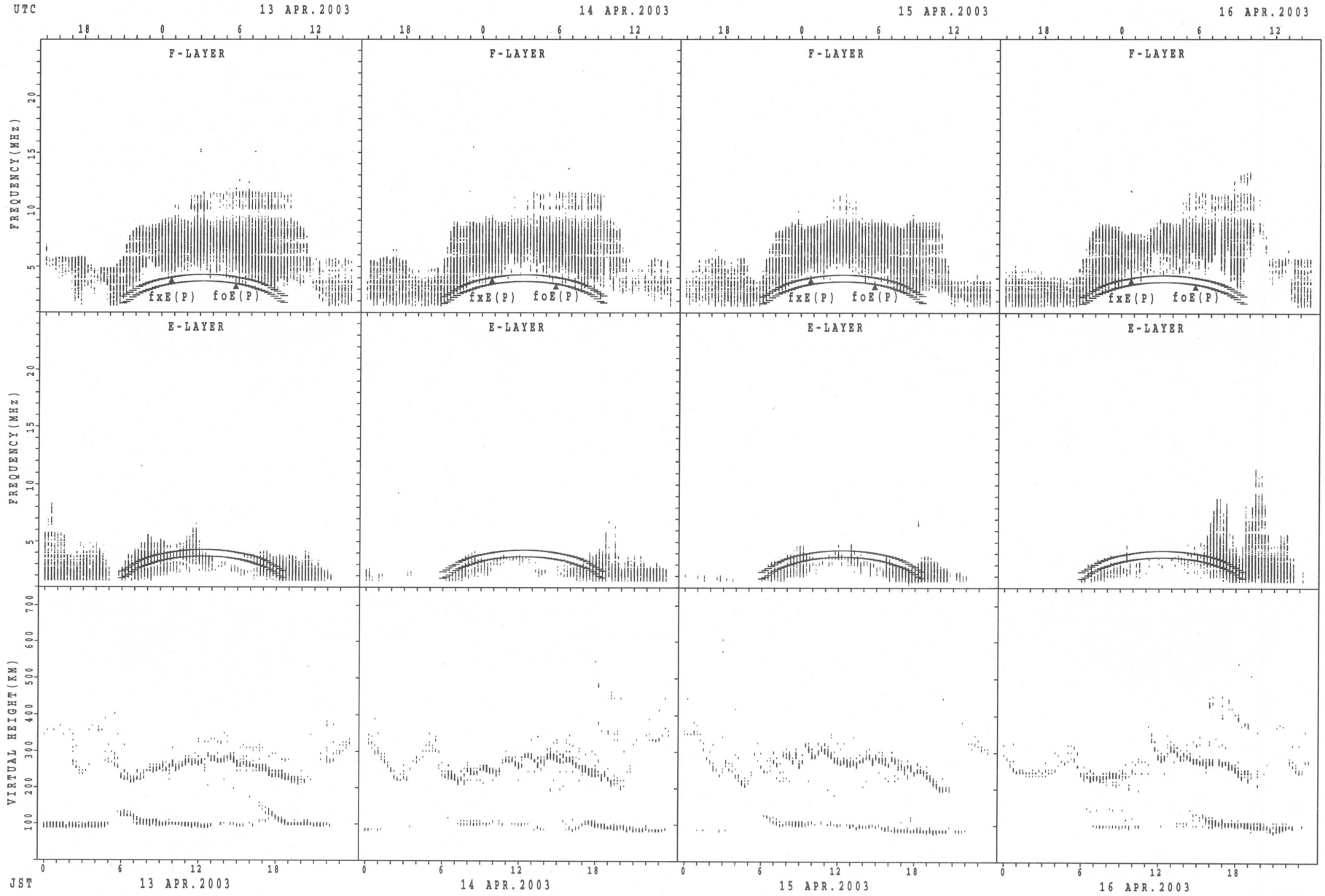
SUMMARY PLOTS AT Yamagawa



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

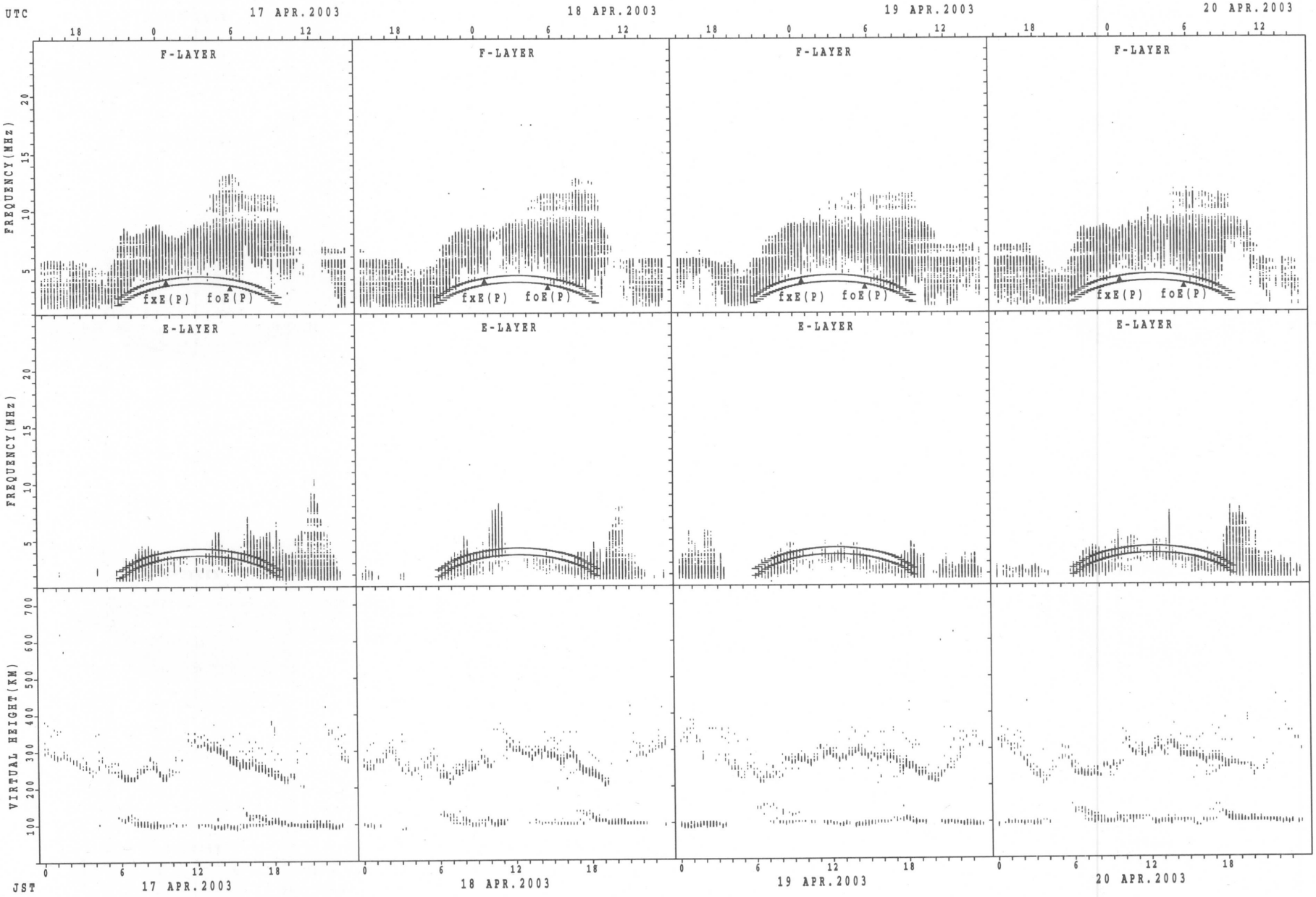

SUMMARY PLOTS AT Yamagawa
UTC
JST
9 APR.2003
10 APR.2003
11 APR.2003
12 APR.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



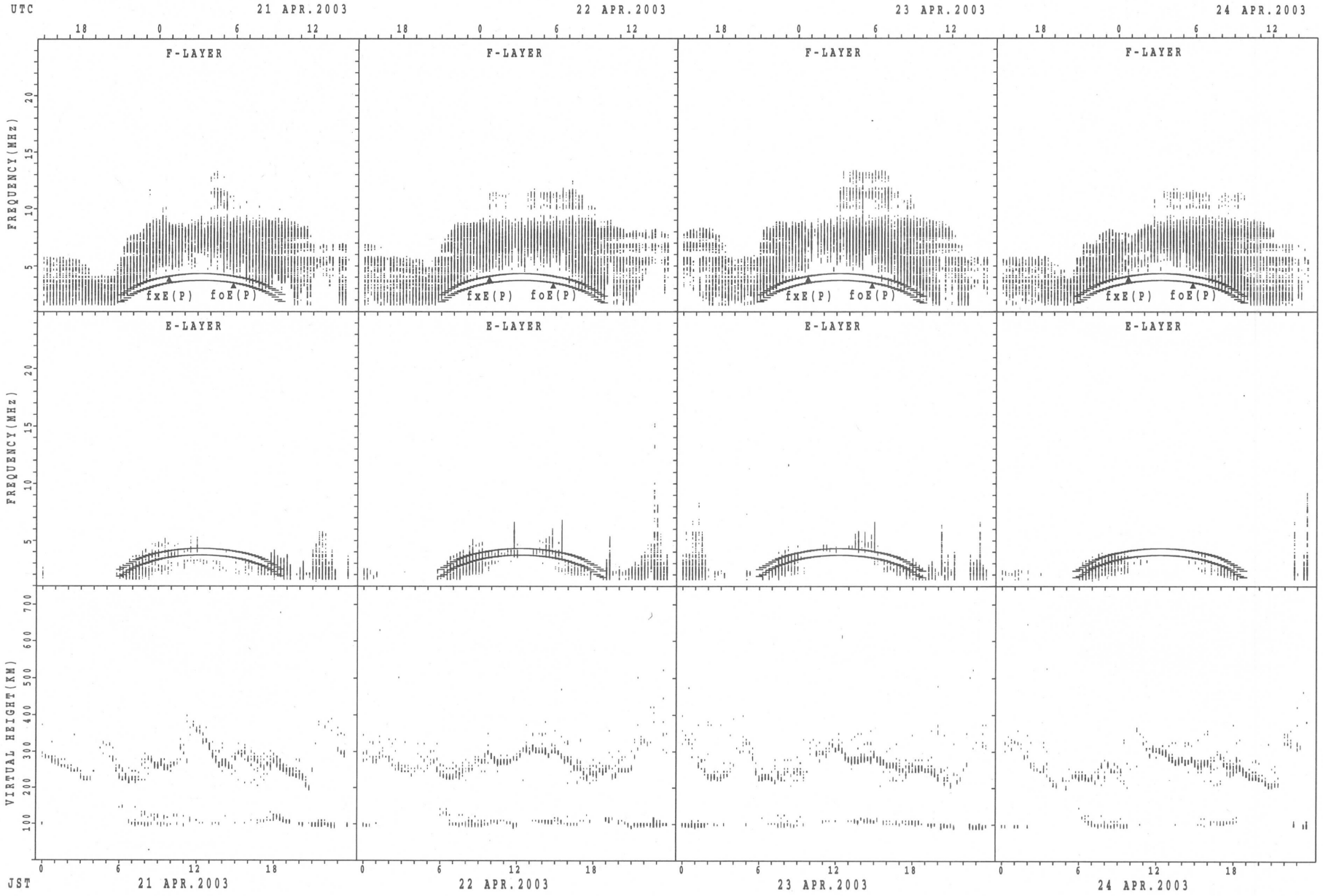
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



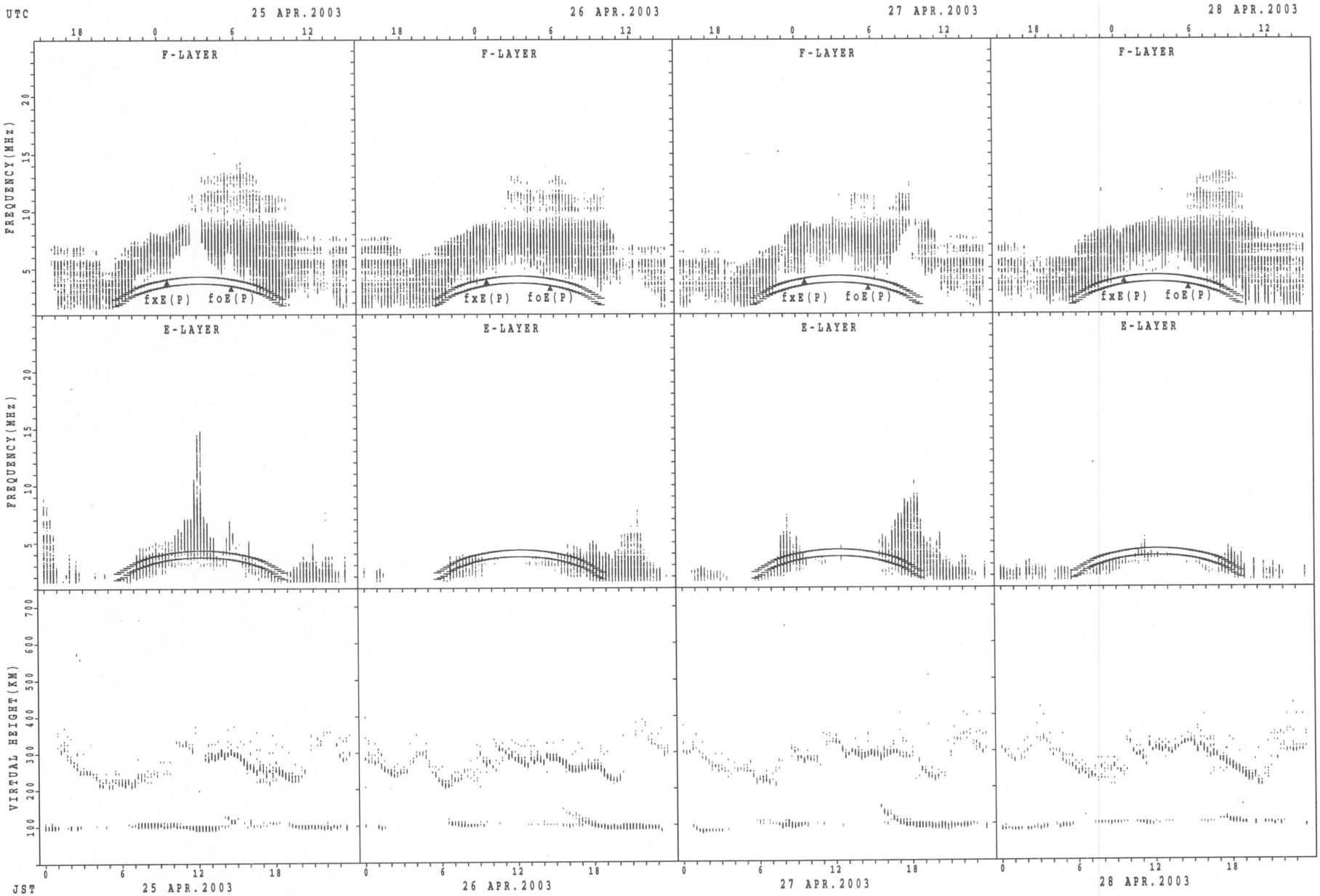
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



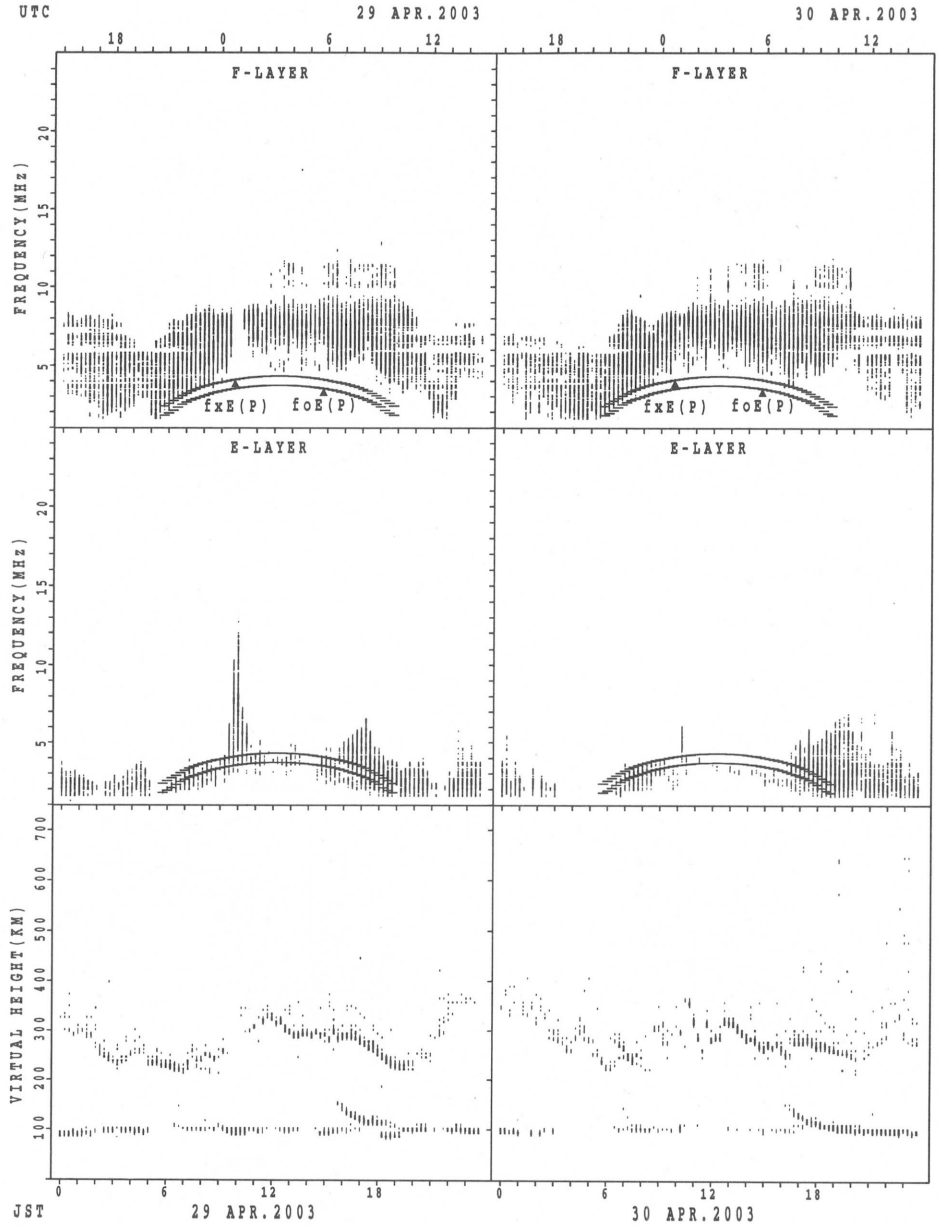
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



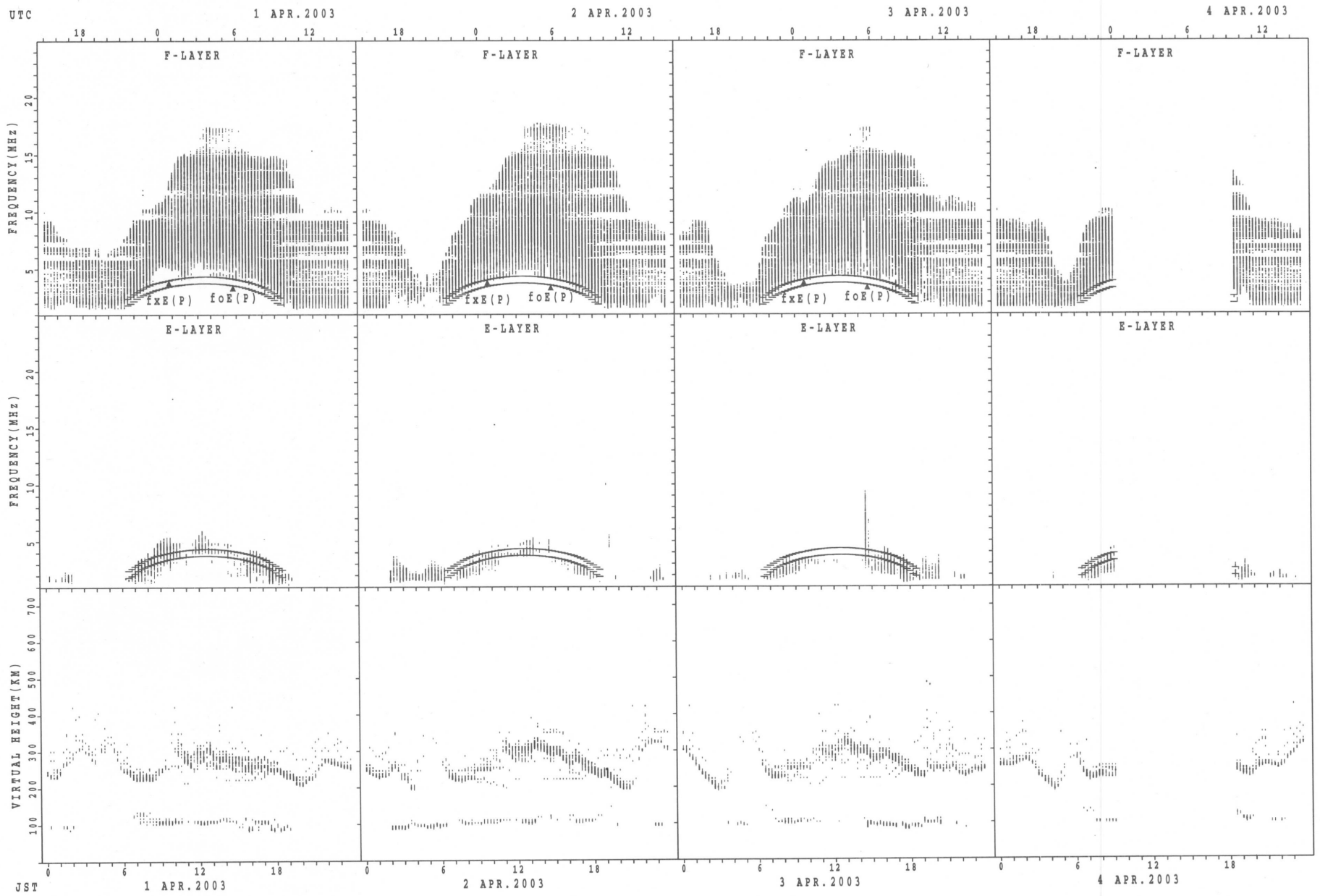
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



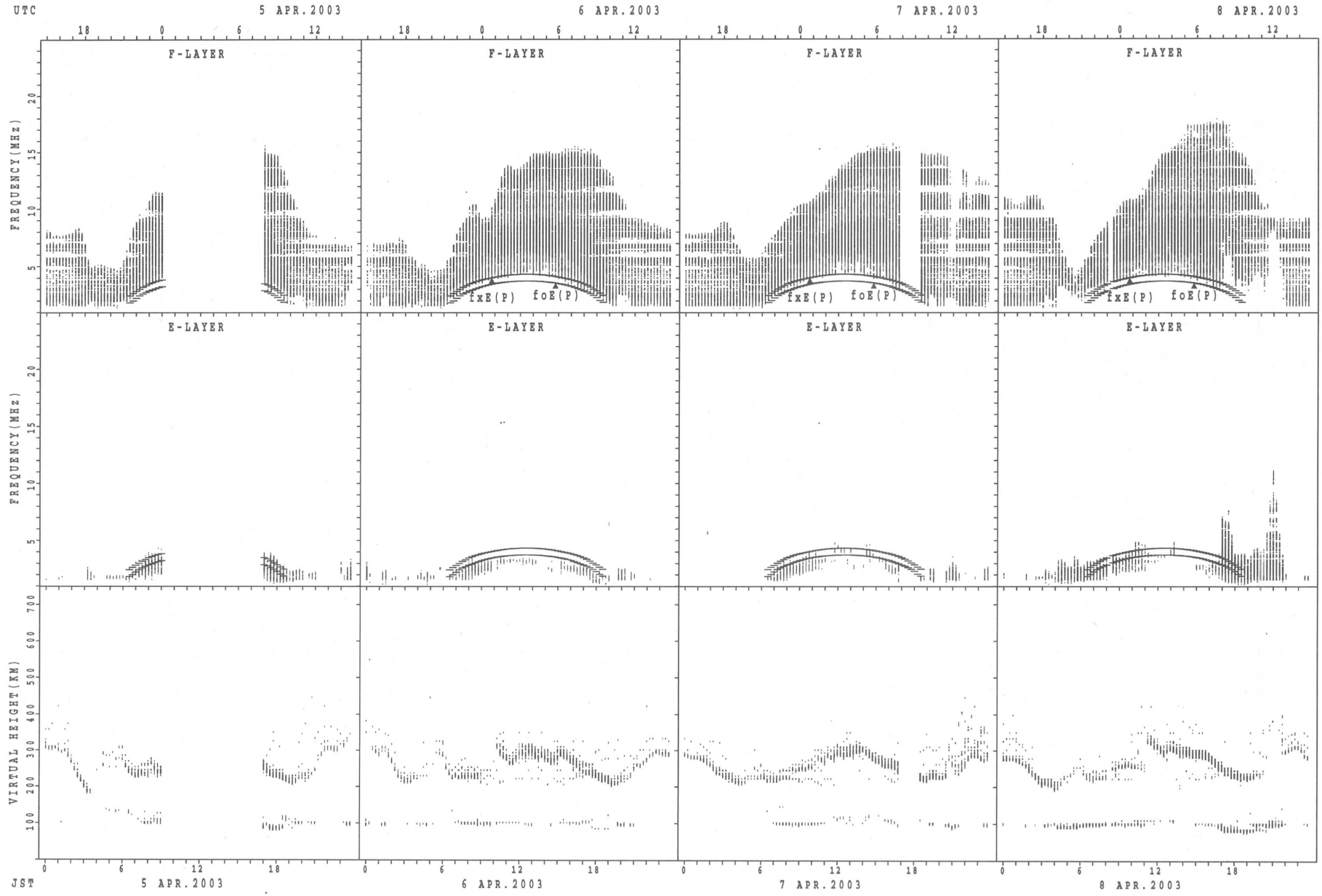
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



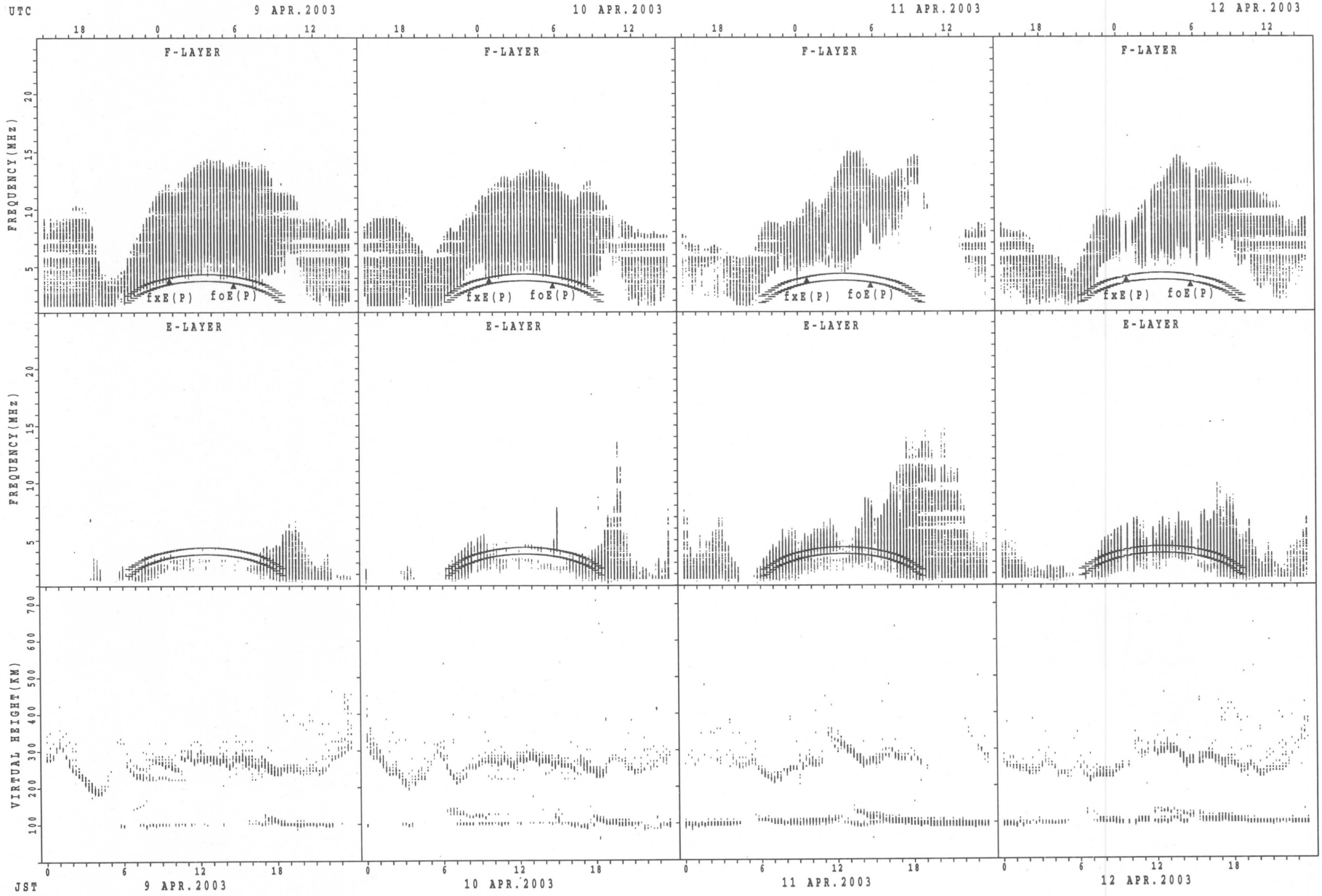
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



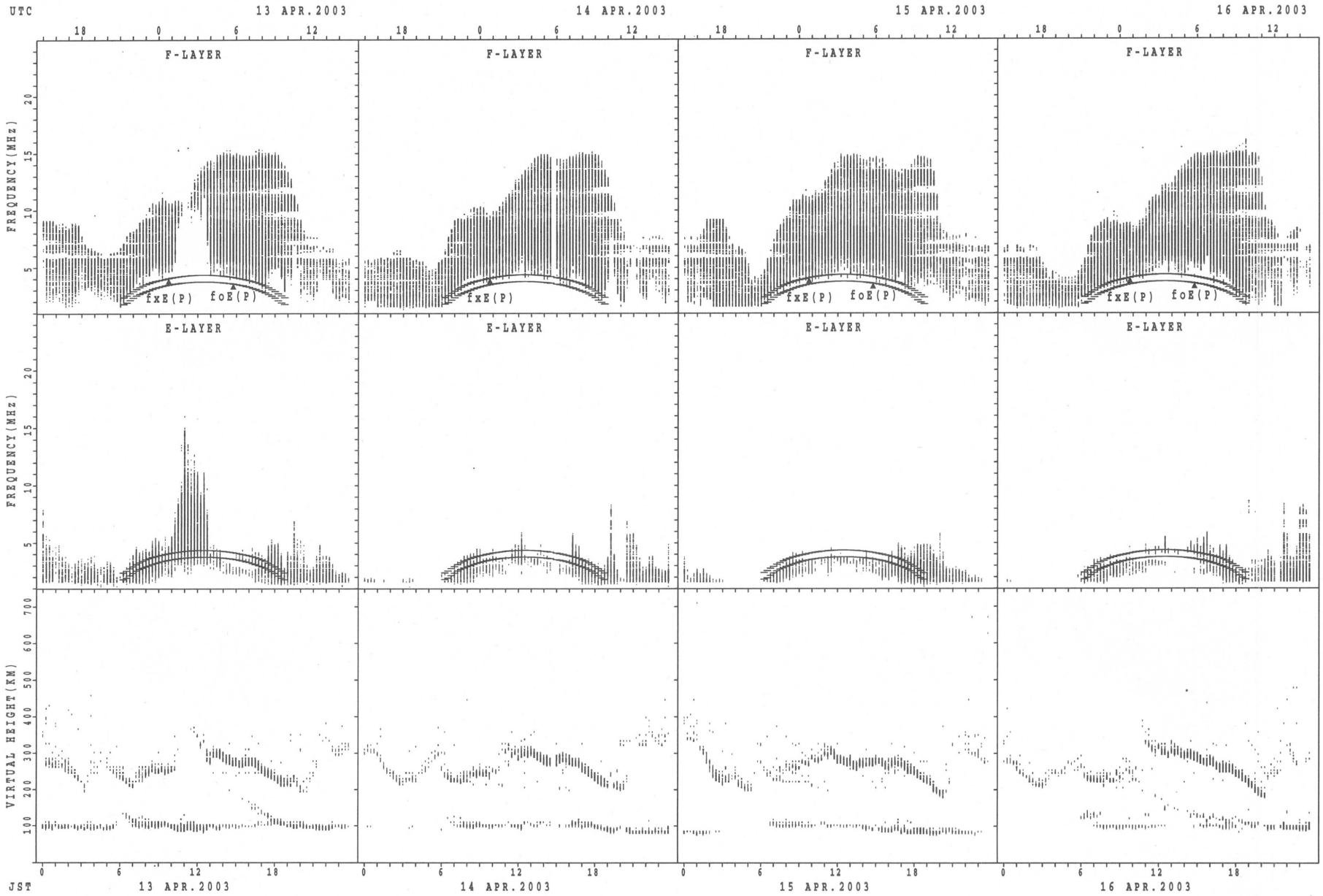
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



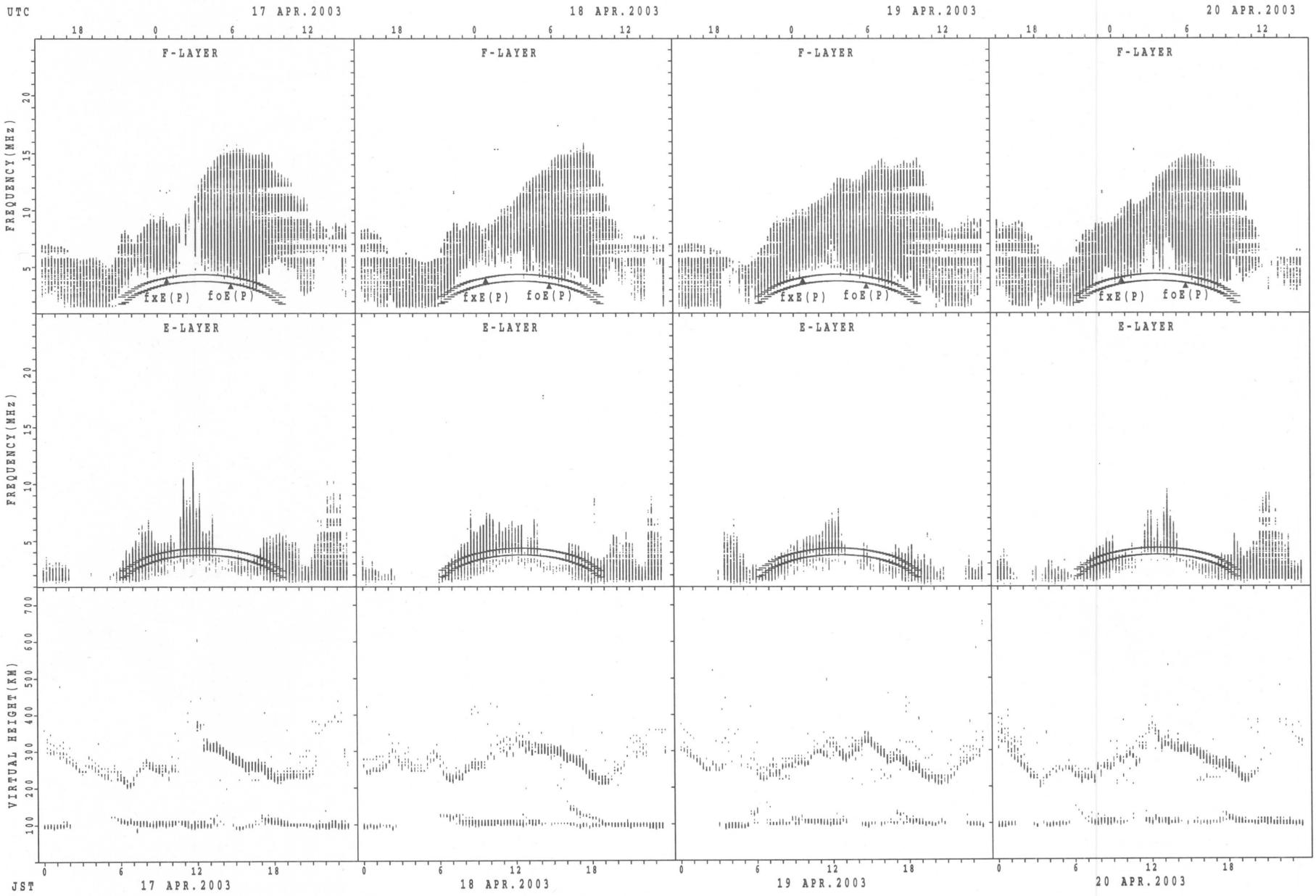
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



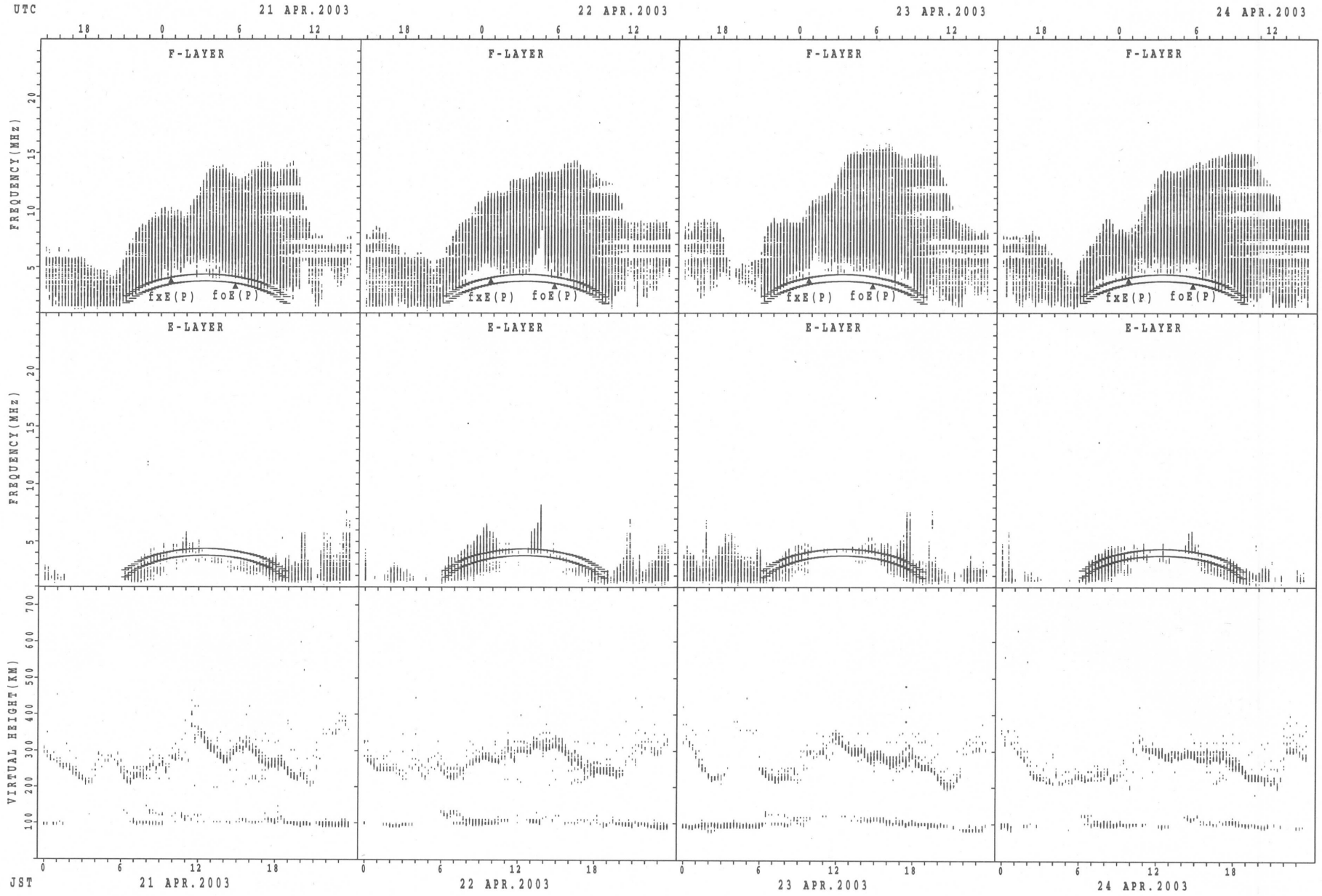
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa

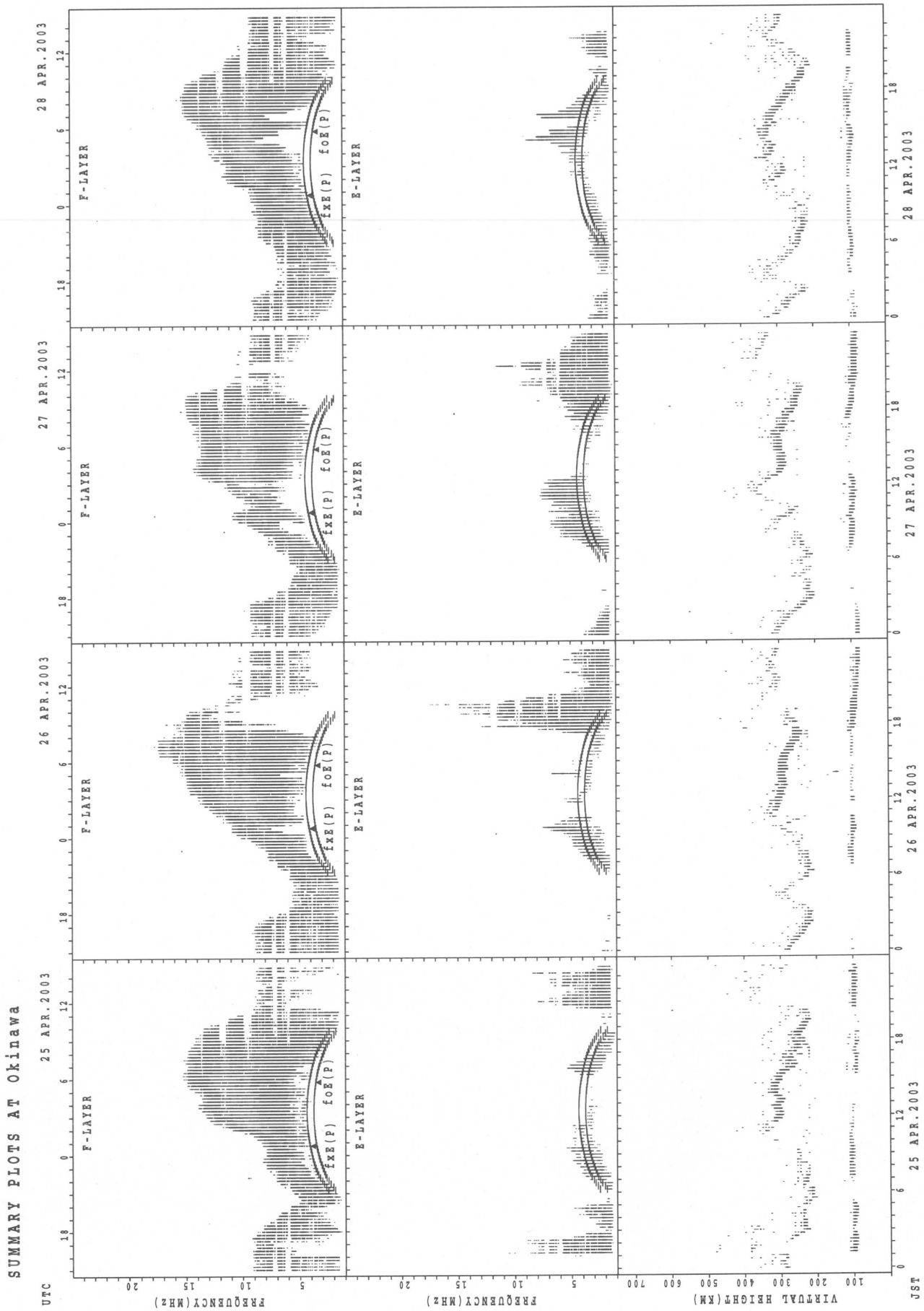


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

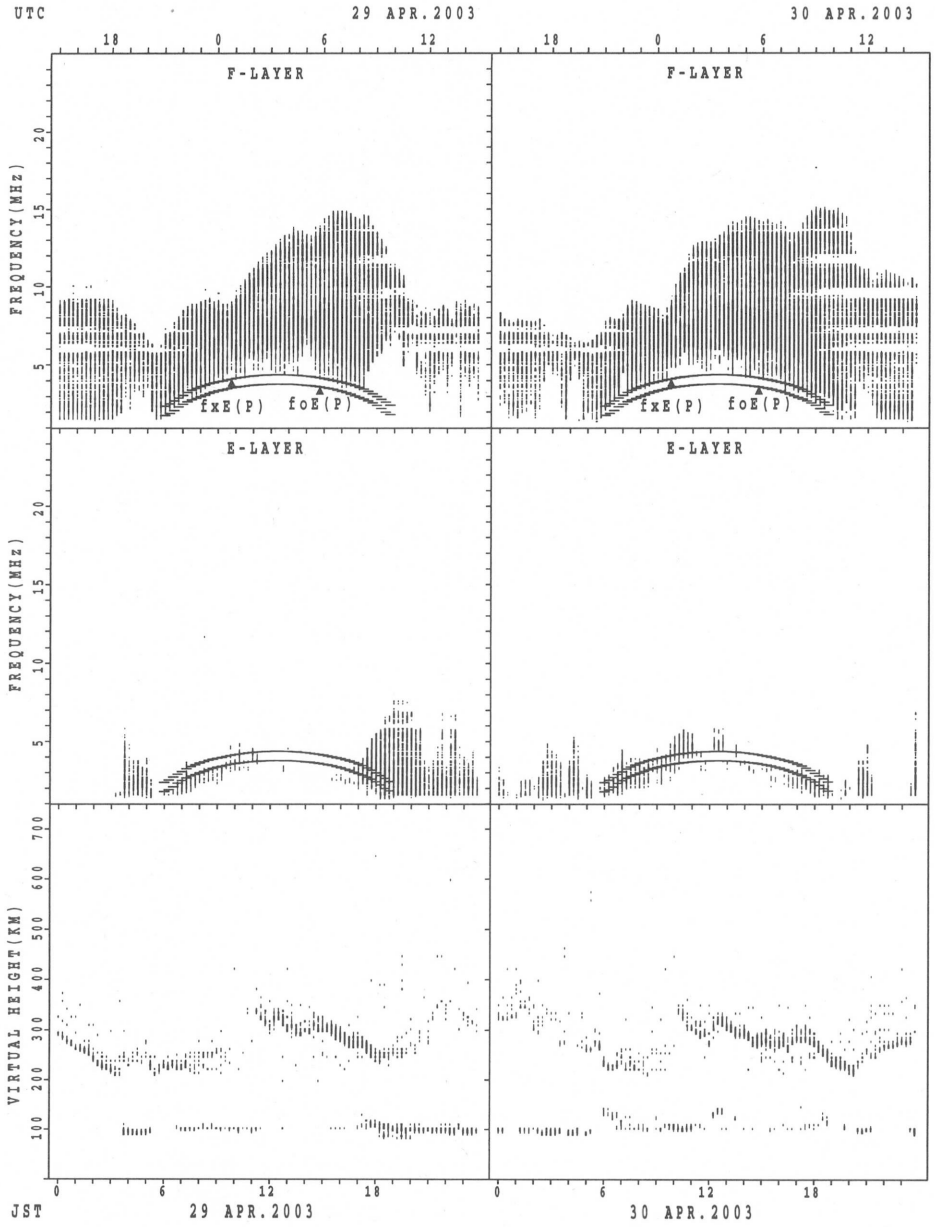
SUMMARY PLOTS AT Okinawa



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


SUMMARY PLOTS AT Okinawa
UTC
25 APR.2003
26 APR.2003
27 APR.2003
28 APR.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE
JST

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. 2003 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							6	16	11							10	26	28	25	22	12	6		
MED							259	272	270							262	260	260	262	270	280	316		
U Q							274	299	278							264	288	282	278	284	290	336		
L Q							252	251	256							246	250	246	248	256	274	266		

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	5	4	5	6	6	4	5	8	7	9	8	8	8	5	4	5	6	11	17	18	14	10	8	9
MED	97	103	97	111	101	112	121	116	107	111	104	101	100	99	101	101	101	119	111	110	105	105	101	99
U Q	114	117	110	113	107	121	128	122	113	115	106	102	103	104	101	102	103	125	122	113	113	107	107	107
L Q	94	92	92	95	93	109	112	111	107	107	101	98	96	95	101	98	91	107	97	97	103	103	99	94

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	1	2	2	1			19	25	23							8	29	30	29	28	9	2	1	3
MED	316	312	292	270			252	256	262							262	258	254	248	247	248	293	318	352
U Q	158	312	292	135			270	264	270							268	267	262	260	258	267	316	159	354
L Q	158	312	292	135			248	232	246							257	252	240	237	238	237	270	159	342

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	8	4	4	5	2	6	12	12	13	10	12	15	11	10	10	7	11	21	18	19	14	11	11
MED	97	95	97	100	103	109	136	116	118	107	105	103	103	103	105	106	97	107	107	102	103	99	97	99
U Q	103	101	98	108	106	113	137	120	121	112	111	107	105	109	107	111	115	121	111	105	105	103	103	103
L Q	95	95	96	96	96	105	129	112	112	105	101	100	95	97	101	95	89	105	101	97	99	95	95	93

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	1	2	2	2			3	23	27	11							27	27	26	28	15		1	1
MED	334	325	309	267			254	250	254	246							268	256	248	240	260		318	338
U Q	167	336	336	276			256	258	264	254							278	266	254	253	274		159	169
L Q	167	314	282	258			254	236	240	240							262	246	236	232	240		159	169

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	16	13	11	5	6	5	11	16	14	9	10	9	5	7	10	10	11	20	22	23	20	17	16
MED	97	97	97	97	99	100	121	113	107	107	103	103	103	97	107	112	119	121	107	106	103	100	101	98
U Q	103	99	103	99	106	101	128	119	112	113	106	111	109	99	139	115	131	131	117	109	105	103	103	103
L Q	89	93	95	95	97	95	110	107	104	103	98	103	97	97	95	95	111	105	102	103	97	96	98	95

MONTHLY MEDIANS OF h'F AND h'Es

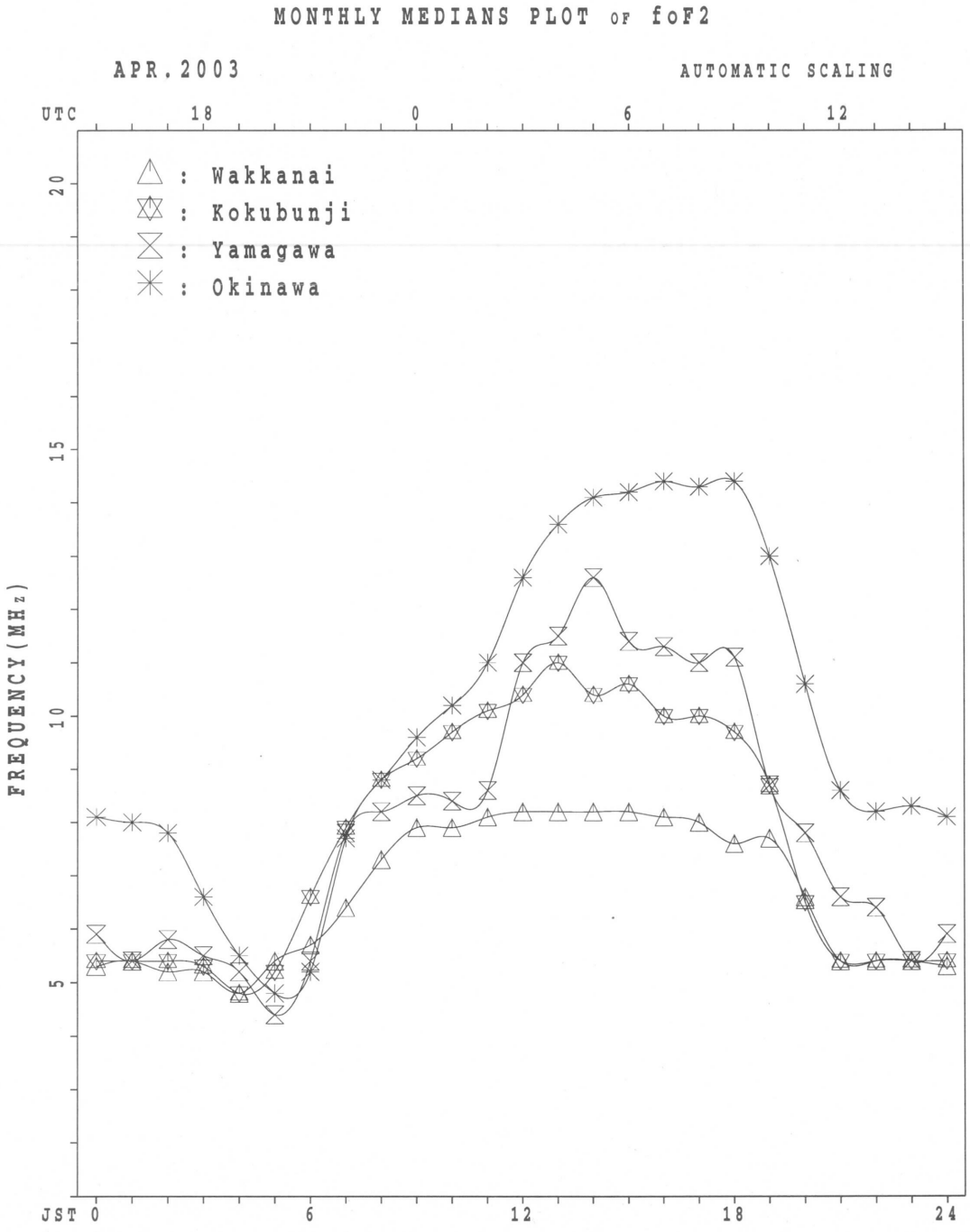
APR. 2003 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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	14	13	16	11	2		4	23	28	28							28	27	28	29	26	13	13	16
MED	319	300	279	240	242		261	238	246	256							270	262	240	232	238	290	312	338
U Q	352	320	293	268	270		271	256	259	267							278	268	252	239	254	308	350	348
L Q	288	290	263	232	214		253	230	239	247							262	252	230	222	230	256	300	328

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	17	11	10	9	11	10	11	16	17	20	17	16	14	11	7	7	11	16	19	23	21	21	21	19
MED	97	95	96	97	97	95	111	113	107	107	105	105	103	109	117	119	107	109	105	103	101	99	99	97
U Q	102	97	99	101	99	95	125	124	111	110	109	110	113	113	127	129	111	121	111	103	103	103	102	101
L Q	95	91	91	95	95	95	97	106	103	105	103	103	101	105	103	111	95	104	99	97	97	93	91	93


MONTHLY MEDIANS PLOT OF foF2
APR. 2003
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. 2003 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 82	X 72	X 66	X 64	X 60	X 61														X 76	X 72	X 74	X 75	X 74
2	X 72	X 69	X 66	X 60	X 55	X 57													C	X 92	X 75	X 69	X 72	X 73
3	X 73	X 76	X 76	X 64	X 58	X 60														X 91	X 76	X 80	X 76	X 76
4	X 76	X 72	X 70	X 66	X 60	X 62														X 94	X 88	X 86	X 84	X 79
5	X 73	X 75	X 76	X 65	X 64	X 62														X 88	X 69	X 68	X 71	X 69
6	X 66	X 67	X 68	X 62	X 57	X 58														X 94	X 71	X 67	X 71	X 71
7	X 72	X 72	X 71	X 67	X 63	X 64														X 91	X 73	X 74	X 75	X 75
8	X 73	X 73	X 74	X 75	X 64	X 61														X 119	X 92	X 78	X 77	X 78
9	X 76	X 73	X 73	X 74	X 55	X 46														X 99	X 64	X 56	X 60	X 58
10	X 58	X 58	X 58	X 60	X 42	X 39														X 76	X 61	X 56	X 56	X 58
11	X 58	X 57	X 58	X 47	X 50	X 50														X 100	X 78	X 62	X 65	X 65
12	X 65	X 62	X 60	X 56	X 54	X 53														X 84	X 70	X 63	67	X 68
13	X 63	X 60	X 60	X 56	X 52	X 55														X 98	X 81	X 65	X 65	X 65
14	X 62	X 64	X 65	X 52	X 51	X 50														X 100	X 76	X 62	X 61	X 62
15	X 59	60	X 59	X 54	X 54	X 47														X 89	X 69	X 46	X 50	X 50
16	X 48	X 47	X 48	X 46	X 45	X 46														X 106	X 87	X 67	X 63	X 61
17	X 60	X 59	X 58	X 56	X 53	X 58														X 79	X 61	X 62	X 58	X 60
18	X 62	X 55	X 52	X 54	X 56	X 54														X 84	X 57	X 55	X 57	X 56
19	X 55	X 57	X 55	X 53	X 53	X 57														X 86	X 78	X 72	X 69	73
20	75	71	X 68	X 65	X 53	X 53														X 88	X 72	X 60	X 61	X 62
21	X 61	X 61	X 60	X 54	X 46	X 50														X 96	X 92	X 77	X 77	X 79
22	X 76	X 69	X 70	X 68	X 64	X 68														X 95	X 85	X 82	X 82	X 78
23	X 78	X 80	X 78	X 68	X 64															X 97	X 96	X 80	X 66	X 62
24	68	68	X 68	X 64	X 61	X 61														X 90	X 86	A	X 76	X 75
25	X 75	X 70	X 70	X 66	X 64															X 102	X 76	X 79	X 77	X 78
26	X 77	X 81	X 76	X 74	X 71						X 103									X 95	X 72	X 67	X 62	X 62
27	O X 60	X 62	X 62	X 60	X 53															X 104	X 71	X 66	X 69	X 69
28	X 71	X 70	X 65	X 62	X 62															X 108	X 86	X 73	X 75	X 74
29	X 74	X 71	X 70	X 70	X 66															X 112	X 86	X 72	X 72	X 71
30	X 66	X 62	X 59	X 62	X 62															X 99	X 90	X 83	X 80	X 80
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	23					1									30	30	29	30	30
MED	X 70	X 68	X 66	X 62	X 56	X 57					X 103									X 94	X 76	X 68	X 70	X 70
U Q	X 75	X 72	X 70	X 66	X 63	X 61														X 100	X 86	X 78	X 76	X 75
L Q	X 61	X 60	X 59	X 56	X 53	X 50														X 88	X 71	X 62	X 62	X 62

APR. 2003 fxI (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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	76	66	60	58	54	55	69	92	94	88	119	132	136	130	118	110R	93	89	83	70	65	68	69	68
2	66	63	60	54	49	51	66	82	88	101	111	118	128	128	122	114	109	110	C	86	69	63	66	67
3	66	70	70	58	52	54	79	88	105	107	112	127	119	130	122	114	112	110	105	85	70	74	70	70
4	70	66	64	60	54	56	82	99	103	115	118	112	117	121	116	112	109	101	94	88	82	80	78	73
5	67	68	70	59	58	56	76	88	104	117	120	116	122	129	126	113R	109R	111	100	82	63	62	65	63
6	60	61	62	56	51	52	68	94	100	96	116	128	124	130	123	118	118	113	108	88	65	61	65	65
7	66	66	65	61	57	58	78	80	89	100	102	113	119	119	122	120	119	112	100	85	67	68	68	68
8	67	67	68	69	58	55	73	79	90	101	106	106	111	120	117	113	111	104	113	113	86	72	71	74
9	70	67	67	68	49	40	59	76	88	101	111R	114	115	112	113	108	91	98	104	92	58	50	53	52
10	52	52	52	54	36	33	60	65	68	76	85	87	92	89	75	80	83	101	89	70	54	50	50	52
11	52	51	52	41	44	44	67	76	88	96	88	104	103	112	118	110	101	105	107	94	71	56	59	58
12	59	56	54	50	48	46	76	76	78	99	90	97	105	109	102	98	103	108	96	78	64	57	F	62
13	57	54	54	50	46	49	65	75	84	94	100	101	113	111R	108	108	98	98	98	92	75	59	59	59
14	56	58	59	46	45	44	68	82	91	94	108	106	107	102	101	94	100	95	92	94	70	56	55	56
15	53	F 51	54	48	48	41	50	60	64	59	64	69	70	71	68	69	70	76	70	83	63	40	44	44
16	42	41	42	40	39	40	67	77	90	82	72	74	83	89	91	89	90	92	97	100	81	61	57	55
17	54	53	52	50	47	52	64	64	73	75	68	70	79	86	98	102	90	100	100	73	55	56	52	54
18	56	49	46	48	50	48	62	70	74	76	84	86	90	94	99	93	86	97	96	78	51	49	50	50
19	49	51	49	47	47	51	70	65	74	88	98	95	99	103	95	96	92	92	90	80	72	66	63	F
20	F	F	62	59	47	47	66	82	80	83	82	88	100	92	100	106	102	95	92	82	66	54	55	56
21	55	55	54	48	40	44	67	79	90	98	100	97	104	126	132	105	98	85	91	90	86	71	71	72
22	70	63	64	62	58	62	75	83	98	100	114	110	108	117	114	112	113	102	95	89	79	76	76	72
23	72	74	72	62	58	63	72	92	98	92	85	92	102	109	107	112	101	99	98	91	90	74	60	56
24	F	F	62	58	55	55	54	53	54	58	62	70	86	94	100	95	84	80	86	84	80	A	70	69
25	69	64	64	60	58	55	62	69	72	74	89	104	116	123	126	119	124	109	111	95	70	73	71	71
26	71	75	70	68	65	68	82	86	77	83	97	100	104	95	86	90	91	88	89	89	66	61	56	56
27	54	56	56	54	47	57	64	60	64	72	78	79	83	84	88	83	79	86	96	98	65	60	63	63
28	65	64	59	56	56	60	65	72	78	72	80	88	94	98	100	107	107	111	117	102	80	67	68	68
29	68	65	64	64	60	67	86	90	96	89	91	A	106	112	111	118	106	108	116	106	80	66	66	65
30	60	56	53	56	56	58	62	77	67	76	79	88	95	96	100	98	90	87	87	93	84	77	74	74
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	29	30	30	29	29	29
MED	62	62	60	56	50	53	67	78	88	90	94	100	104	110	108	108	100	100	96	88	70	62	65	63
U Q	68	66	64	60	57	57	75	86	94	100	111	112	116	121	118	113	109	108	104	94	80	72	70	70
L Q	54	54	54	50	47	46	64	70	74	76	82	88	94	94	99	95	90	92	90	82	65	56	56	56

APR. 2003 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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		L 600	L	L	L									
2									L	L	L	L	L	L	L	L			C					
3												L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5											L	L	L	L	L									
6												L	L	L 596	L	L								
7										L	L	L	L 520	L	L	L								
8									L	L	L	L	L	L 544	L	L	L							
9										L	L	A	L	A	L									
10								L	L 460	L 456	L 488	L	L 500	A		L								
11									L	L	L	L 540	R	L	A	A	A							
12										L	A	L	A	A	L	L	L							
13									L	L	A	A	A	A	A	L	L							
14									L	L	L 496	L	L 524	L 548	L 484	L 492	L							
15							L 360	L 424	440	U 468	L 480	L 492	500	L 496	L 472	L 496	L 452							
16								L	L	L	L	L	L 524	L 508	L	L	L	L						
17								L	L 448	L 480	L 480	L 528	L 508	L 536	L 496	L 452	L							
18									L	A	L 508	A	L 524	L 508	L 532	L 468	L	L						
19									L	L 504	L 508	L 516	L	L 504	L 512	L 508								
20								L	L	L	L 520	L 572	L 556	A	L	L 484	L							
21								A	L	A	L	L	A	L 556	L 484	L	L							
22									L	L	L	L	L	L 544	L 560	L	L							
23								L	L	L	L	A	L 544	L 548	L	L	L							
24							L		L 468	L 492	L 488	532	U L 512	L 528	L	L	L	L						
25								L		L	L 540	L	L	L	L 568	L	L							
26							L		L	L			L 560	L	L 532	L	L							
27							L	L	L 472	L 536	L 532	L 548	A	A	A	L	A	L						
28								L	L	L	L 568	L 516	L	L 544	L	L	L	L						
29									L	L	A	A	L	L 536	L	L	A							
30								L	L	L	A	L 564	A	L	L	A	A	A						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	5	6	11	10	11	14	9	6	1							
MED							L 360	L 424	L 460	L 486	L 508	L 536	L 524	L 540	L 512	L 488	L 452							
U Q									L 470	L 504	L 532	L 564	L 544	L 548	L 546	L 496								
L Q									444	L 468	488	L 516	L 508	L 508	L 484	L 468								

APR. 2003 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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							188	264	A	A	R	R	B	U A 348	A	A	A	U R 236	B					
2							U R 192	268	R	A	B	B	A	A	R	R	A	A	C					
3							192	R	R	A	R	B	A	A	R	R	U R 308	248	B					
4							188	U R 272	A	A	A	B	B	B	B	B	U R 304	U R 248	B					
5							228	284	R	R	R	B	A	B	U R 372	U R 344	R	U R 236	B					
6							200	276	R	A	A	A	A	A	B	R	U R 292	236	B					
7							196	R	U R 320	A	A	B	B	A	A	U R 332	R	240	B					
8							196	272	U R 312	A	A	A	A	A	R	A	U R 292	R	B					
9							204	R	A	R	A	A	A	A	A	A	R	U A 236	B					
10							212	R	A	A	A	R	A	A	U R 344	A	U A 284	240	B					
11							200	272	A	A	R	A	R	A	A	A	A	U A 236	B					
12							204	U A 276	A	A	A	A	A	A	A	A	U R 284	U R 248	B					
13							216	A	A	A	A	A	A	A	A	A	A	248	B					
14							212	272	R	A	R	U R 368	B	A	B	R	U R 292	236	B					
15							220	U R 284	A	A	A	R	A	R	R	R	R	U R 244	B					
16							196	U R 268	R	R	A	A	A	A	A	A	U R 288	236	B					
17							204	U R 284	A	A	A	A	A	U R 344	U R 332	R	U R 284	228	B					
18							224	A	A	A	A	A	A	A	R	R	R	U A 248	168					
19							212	300	R	A	R	B	A	A	A	R	R	236	B					
20							216	U A 284	A	R	A	B	A	A	A	R	U R 288	U R 248	168					
21							212	A	A	A	A	A	A	A	R	R	R	U R 256	168					
22							248	U A 296	A	A	A	A	A	B	A	A	R	U R 252	U R 164					
23						B	240	B	A	A	A	A	A	A	R	R	U A 312	U A 264	B					
24							228	A	A	A	A	B	A	B	B	B	R	U R 276	164					
25						B	U A 228	A	A	A	A	A	A	R	B	B	R	U R 260	164					
26						B	A	A	R	A		B	A	A	R	R	U A 296	256	B					
27						B	U A 236	A	A	B	B	A	B	A	A	A	A	A	B					
28						B	U R 252	A	A	A	B	B	B	B	B	B	R	U R 264	172					
29						U R 176	240	U A 296	A	B	A	A	A	B	B	A	A	A	A					
30						B	U A 244	A	A	B	B	B	A	A	A	A	A	A	A					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	29	16	2			1		2	3	2	12	25	7					
MED						U R 176	212	276	U R 316			U R 368		U 346	U R 344	U R 338	U R 292	U 248	168					
U Q							228	U 284							U R 372		U 300	U R 254	168					
L Q							198	272							U R 332		U R 286	236	164					

APR. 2003 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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	E B 15	E B 20	E B 14	21	E B 15	E B 16	23	37	35	39	39	40	41	40	42	J A 40	J A 37	G 19	E B 20	E B 15	19	J A 20	J A 18	J A 19
2	J A 17	J A 22	18	E B 15	E B 15	E B 14	G	30	G 26	37	40	E B 42	43	45	G 26	G 26	J A 44	J A 30	C	J A 21	E B 16	E B 16	E B 15	E B 15
3	E B 16	E B 15	E B 15	E B 14	E B 16	E B 15	22	G 25	G 27	38	40	E B 45	J A 42	45	G 34	G 24	G 23	28	22	24	J A 19	19	E B 16	E B 15
4	E B 15	E B 16	E B 16	E B 14	E B 14	E B 15	24	G 24	35	37	43	E B 41	E B 43	E B 42	E B 42	E B 36	G 27	G 19	E B 17	J A 17	E B 15	E B 17	E B 16	E B 15
5	18	E B 16	E B 15	E B 15	E B 15	E B C 28	26	32	G 28	39	40	E B 40	42	E B 42	G	G 29	G 27	G	E B 16	J A 17	J A 21	J A 20	E B 15	E B 14
6	E B 15	E B 15	22	E B 15	E B 15	E B 15	22	G 24	G 29	37	40	39	39	42	E B 39	G 25	G	28	24	19	20	E B 16	E B 15	J A 26
7	J A 42	E B 16	E B 15	E B 15	E B 16	E B 16	24	G 25	36	38	39	E B 41	41	41	40	G 27	G 29	28	J A 22	J A 38	J A 22	J A 28	J A 34	J A 21
8	23	18	18	E B 14	E B 15	E B C 28	23	32	35	41	41	J A 44	J A 47	J A 46	G 34	39	G 24	G	E B 18	E B 14	E B 15	E B 16	E B 19	E B 15
9	E B 15	E B 15	20	20	21	J A 19	G 18	G 21	35	G 31	41	J A 57	J A 44	J A 56	38	38	G 23	34	J A 29	J A 32	20	J A 21	J A 17	J A 20
10	E C 28	J A 19	J A 20	19	E B 14	E B 15	G	G 19	38	43	J A 42	G 26	42	J A 54	G 29	J A 46	33	34	J A 37	J A 46	J A 24	J A 62	J A 54	J A 39
11	J A 22	E B 16	E B 14	J A 28	E B 14	E B 15	24	32	35	38	G 34	42	G 25	47	48	J A 58	42	J A 63	J A 62	J A 38	J A 20	J A 26	J A 23	J A 18
12	21	20	19	E B 16	E B 15	E B 16	24	38	41	J A 56	J A 67	J A 54	J A 74	J A 86	J A 44	41	G 24	G 21	22	J A 38	18	20	J A 52	J A 46
13	J A 56	J A 35	J A 27	J A 28	J A 34	E B 15	29	34	39	40	J A 53	J A 58	J A 54	J A 55	54	J A 47	J A 39	32	J A 26	37	J A 23	J A 24	22	22
14	19	E B 16	E B 15	E B 15	E B 15	E B 15	24	G 20	G 26	38	G 26	G	E B 40	37	E B 36	G	33	28	J A 28	J A 20	J A 25	J A 16	J A 21	J A 24
15	J A 20	J A 16	J A 16	J A 20	20	19	G 19	G 18	35	38	42	40	40	G	G 26	G 23	G 18	G 20	24	J A 19	J A 20	J A 47	J A 27	J A 20
16	E B 15	E B 16	E B 15	E B 15	E B 15	E B 16	22	G 23	G 26	G 28	38	J A 41	40	40	J A 39	34	G 26	30	J A 28	J A 23	J A 37	J A 20	E B 16	E B 15
17	J A 28	E B 14	J A 23	J A 20	19	20	27	G 23	36	J A 53	38	J A 46	42	G 32	G 31	G 25	G 25	33	J A 33	J A 30	J A 25	J A 17	E B 16	E B 19
18	E B 15	E B 14	19	E B 15	E B 16	E B 15	27	J A 42	40	J A 56	J A 58	J A 54	42	J A 42	G 27	G 26	G	29	22	J A 50	J A 29	22	J A 24	J A 45
19	J A 36	J A 22	A E 16	B E 15	B E 15	B E 14	26	G 26	G 26	40	G	46	47	42	40	G 29	G	28	J A 30	J A 22	J A 28	E B 16	E B 16	J A 27
20	J A 45	J A 24	J A 20	J A 16	E B 16	E B 15	27	39	38	G 25	40	E B 42	J A 44	J A 54	J A 71	G	G	G 18	J A 35	J A 43	E B 16	E B 15	E B 16	E B 16
21	E B 16	E B 15	E B 14	E B 15	E B 14	E B 15	28	J A 56	45	49	J A 50	43	J A 63	42	G 27	G 26	G	G	J A 35	J A 62	J A 64	J A 22	E B 15	E B 16
22	E B 16	19	E B 16	E B 15	B J 29	A E 16	G 19	33	40	J A 48	J A 48	43	J A 48	E B 44	43	J A 47	G	G	G	J A 31	J A 76	J A 29	E B 14	25
23	31	J A 30	J A 19	A E 15	B E 14	B J 18	G	E B 35	41	J A 44	43	J A 60	46	43	G 31	G	36	J A 65	J A 37	J A 67	J A 16	J A 33	J A 20	J A 18
24	E B 14	E B 15	E B 16	E B 15	E B 14	B J 18	26	33	38	41	40	42	J A 53	E B 44	E B 46	E B 41	G	G	21	E B 14	J A 19	J A 87	J A 52	E B 16
25	19	E C 29	J A 16	E B 14	J A 20	E B 18	28	J A 39	J A 41	41	45	J A 52	51	G	E B 40	E B 41	G 27	G 19	22	E B 29	J A 18	E B 15	E B 15	J A 46
26	J A 21	21	E C 28	J A 19	E B 15	18	32	J A 42	G	J A 46	E C 58	44	44	44	G	G 26	42	J A 44	J A 37	J A 44	J A 53	53	75	20
27	24	J A 25	J A 22	33	J A 26	E B 19	28	35	42	J A 45	45	J A 52	J A 56	58	50	J A 43	J A 67	J A 35	J A 34	J A 31	J A 44	35	20	J A 45
28	J A 35	J A 45	J A 24	J A 26	J A 32	A E 20	G	J A 43	41	41	E B 44	E B 43	E B 42	E B 43	E B 46	E B 40	G	31	24	J A 31	J A 25	E B 15	J A 41	J A 39
29	J A 24	J A 35	J A 26	E B 15	J A 18	G	27	40	J A 44	45	J A 87	J A 118	J A 44	E B 40	50	J A 51	J A 70	J A 53	J A 43	J A 46	25	E B 16	E B 16	E B 16
30	E B 15	J A 18	J A 18	E B 15	E B 15	E B 16	31	36	40	J A 50	J A 52	E B 45	49	J A 49	J A 42	J A 60	J A 69	J A 66	J A 63	J A 70	J A 79	J A 42	J A 21	J A 22
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	29	30	30	30	30	30
MED	20	17	18	E B 15	E B 15	E B 16	24	32	36	40	41	42	44	42	38	E G 35	G	28	J A 26	J A 31	J A 22	J A 20	18	J A 20
U Q	J A 28	J A 22	J A 20	J A 20	J A 19	18	27	J A 38	40	J A 45	J A 48	J A 52	J A 48	J A 47	44	J A 41	J A 37	J A 34	J A 35	J A 43	J A 28	J A 29	J A 24	J A 26
L Q	E B 15	E B 16	E B 15	E B 15	E B 15	E B 15	G 22	G 24	G	38	40	41	42	41	G 34	G 26	G 27	G	22	20	19	E B 16	E B 16	E B 16

APR. 2003 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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 20	E B 14	E B 15	E B 15	E B 16	21	36	35	38	U Y 39	39	41	40	41	36	35	G 19	E B 20	E B 15	E B 15	17	E B 15	E B 16
2	E B 15	16	17	E B 15	E B 15	E B 14	G	30	G 26	36	39	E B 42	43	44	U Y 26	U Y 26	40	28	C	17	E B 16	E B 16	E B 15	E B 15
3	E B 16	E B 15	E B 15	E B 14	E B 16	E B 15	22	U Y 25	G 27	37	39	E B 45	40	42	G U Y 34	24	G 21	26	20	19	E B 15	E B 16	E B 16	E B 15
4	E B 15	E B 16	E B 16	E B 14	E B 14	E B 15	23	G 24	34	36	42	E B 41	E B 43	E B 42	E B 42	E B 36	G 27	G 19	E B 17	E B 14	E B 15	E B 17	E B 16	E B 15
5	E B 14	E B 16	E B 15	E B 15	E B 15	E C 28	25	30	U Y 28	37	40	E B 40	41	E B 42	G	G 29	G 26	G	E B 16	E B 15	E B 15	18	E B 15	E B 14
6	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	22	G U Y 24	29	36	38	38	38	40	E B 39	G 25	G	27	22	18	E B 16	E B 16	E B 15	20
7	33	E B 16	E B 15	E B 15	E B 16	E B 16	23	G 23	34	36	36	E B 41	40	40	38	G 25	G 28	27	20	34	20	21	28	E B 15
8	19	E B 15	E B 16	E B 14	E B 15	E C 28	22	31	34	39	40	42	46	42	U Y 34	36	G 24	G	E B 18	E B 14	E B 15	E B 16	E B 19	E B 15
9	E B 15	E B 15	E B 16	E B 15	E B 15	E B 14	G 18	G 20	34	U Y 31	41	53	40	55	36	37	G 23	34	23	20	E B 15	19	E B 15	E B 16
10	E C 28	16	E B 16	E B 15	E B 14	E B 15	G	G 19	36	40	37	U Y 26	40	49	G 29	41	32	29	34	34	21	40	40	30
11	20	E B 16	E B 14	18	E B 14	E B 15	23	30	34	36	G 31	40	U Y 25	46	46	54	40	57	54	34	E B 15	21	18	E B 15
12	E B 15	E B 16	E B 16	E B 16	E B 15	E B 16	23	36	38	44	66	49	65	55	38	39	G 23	G 21	20	33	E B 15	E B 15	22	27
13	24	22	16	23	18	E B 15	28	33	38	39	50	55	52	53	53	46	32	31	22	30	20	18	16	E B 16
14	E B 16	E B 16	E B 15	E B 15	E B 15	E B 15	23	G 20	U Y 26	36	U Y 26	G	E B 40	36	E B 36	G	33	26	26	18	18	E B 15	18	22
15	18	E B 16	E B 15	17	E B 14	E B 16	G 19	G 18	34	38	42	U Y 40	U Y 40	G	U Y 26	G 23	U Y 18	G 20	22	18	E B 15	30	17	E B 16
16	E B 15	E B 16	E B 15	E B 15	E B 15	E B 16	22	G 22	G 26	U Y 28	38	39	40	40	36	34	G 26	28	24	21	30	E B 16	E B 16	E B 15
17	18	E B 14	19	E B 15	E B 16	18	24	G 23	34	39	36	44	41	G 32	G 31	G 25	G 25	30	30	27	20	E B 15	E B 16	E B 19
18	E B 15	E B 14	E B 15	E B 15	E B 16	E B 15	26	37	38	55	42	49	40	40	U Y 27	G 26	G	29	22	44	23	18	19	E B 16
19	16	16	E B 16	E B 15	E B 15	E B 14	24	G 26	G 26	39	G	44	45	39	39	U Y 29	G	28	28	19	25	E B 16	E B 16	24
20	22	16	18	E B 14	E B 16	E B 15	26	36	36	U Y 25	39	E B 42	42	52	46	G	G	G 18	30	31	E B 16	E B 15	E B 16	E B 16
21	E B 16	E B 15	E B 14	E B 15	E B 14	E B 15	27	53	44	49	46	42	53	41	G 27	G 26	G	G	31	60	30	E B 15	E B 15	E B 16
22	E B 16	E B 16	E B 16	E B 15	E B 16	E B 16	G 19	31	39	46	46	U Y 43	45	E B 44	41	43	G	G	G	E C 28	63	22	E B 14	22
23	29	22	E B 16	E B 15	E B 14	E B 16	G	E B 35	39	42	42	59	44	43	U Y 31	G	35	63	32	58	E B 14	21	17	E B 16
24	E B 14	E B 15	E B 16	E B 15	E B 14	E B 15	24	32	36	39	39	U Y 42	47	E B 44	E B 46	E B 41	G	G	19	E B 14	E B 15	A A 87	34	E B 16
25	E B 15	E C 29	E B 15	E B 14	18	E B 18	28	35	38	39	44	48	48	G	E B 40	E B 41	U Y 27	G 19	21	E B 29	E B 15	E B 15	E B 15	37
26	E B 16	E B 16	E C 28	E B 14	E B 15	17	27	34	G	46	E C 58	44	U Y 44	44	G	U Y 26	38	42	35	32	44	48	22	E B 15
27	21	20	21	28	23	E B 19	27	34	42	43	44	48	55	56	49	42	61	32	30	28	38	26	19	22
28	24	30	21	16	E B 15	E B E B 20	G	36	39	40	E B 44	E B 43	E B 42	E B 43	E B 46	E B 40	G	30	23	30	23	E B 15	26	22
29	20	19	15	E B 15	16	G	26	38	37	43	86	A A 118	43	E B 40	50	41	64	50	39	39	24	E B 16	E B 16	E B 16
30	E B 15	E B 15	16	E B 15	E B 15	E B 16	30	34	39	47	50	E B 45	U Y 49	46	41	55	56	60	55	62	21	30	19	19
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30
MED	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	23	30	34	39	40	42	42	42	E G 38	E G 35	G	28	23	28	17	17	E B 16	E B 16
U Q	20	16	16	15	16	G	26	35	38	43	44	48	46	46	42	41	35	31	30	34	23	21	19	22
L Q	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	G 21	G 24	G 29	36	38	40	40	40	34	G 26	G 26	G	20	E B 18	E B 15	E B 16	E B 15	E B 15

APR. 2003 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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	20	14	15	15	16	15	14	16	20	24	20	36	30	25	22	16	15	20	15	15	15	15	16
2	15	14	14	15	15	14	15	16	17	21	35	42	30	27	19	24	15	14	C	14	16	16	15	15
3	16	15	15	14	16	15	14	20	15	21	23	45	33	30	26	19	15	15	16	15	15	16	16	15
4	15	16	16	14	14	15	14	14	19	20	22	41	43	42	42	36	18	14	17	14	15	17	16	15
5	14	16	15	15	15	28	20	16	20	23	22	40	36	42	32	20	20	15	16	15	15	15	15	14
6	15	15	15	15	15	15	16	15	18	26	29	30	34	28	39	21	20	16	14	14	16	16	15	14
7	16	16	15	15	16	16	15	14	18	20	21	41	37	21	23	20	16	14	12	16	15	15	13	15
8	15	15	16	14	15	E C 28	14	14	19	18	23	23	33	30	29	21	20	16	18	14	15	16	19	15
9	15	15	16	15	15	14	17	15	16	20	21	26	22	35	28	20	16	15	14	15	15	14	15	16
10	E C 28	14	16	15	14	15	16	15	15	23	21	23	22	22	23	20	16	15	13	14	14	16	16	14
11	15	16	14	14	14	15	16	14	14	19	20	21	21	20	20	17	17	14	14	14	15	15	16	15
12	15	16	16	16	15	16	15	16	15	20	35	23	32	29	22	20	20	14	13	15	15	15	16	14
13	15	15	14	14	13	15	16	15	15	20	23	24	32	21	23	20	15	14	15	16	14	13	14	16
14	16	16	15	15	15	15	14	14	18	20	20	32	40	28	36	21	16	12	14	15	14	15	15	15
15	15	16	15	14	14	16	15	15	21	22	20	23	33	30	23	16	15	16	15	15	15	16	15	15
16	15	16	15	15	15	16	14	16	15	20	19	20	22	20	18	17	16	14	16	15	16	16	16	15
17	16	14	16	15	16	16	15	15	17	22	21	21	20	22	24	21	12	16	15	15	14	15	16	19
18	15	14	15	15	16	15	14	15	22	20	24	26	27	25	24	20	18	14	14	14	14	15	15	16
19	15	14	16	15	15	14	16	15	19	22	30	40	32	30	20	21	17	15	14	14	15	16	16	16
20	16	14	14	14	16	15	16	14	14	20	20	42	35	23	22	22	19	13	13	15	16	15	16	16
21	16	15	14	15	14	15	15	15	20	20	20	22	24	22	20	23	20	16	14	16	14	15	15	16
22	16	16	16	15	16	16	16	20	20	22	22	36	35	44	22	16	18	16	14	E C 28	15	15	14	20
23	14	14	16	15	14	16	15	E C 35	20	20	35	36	36	34	24	29	20	16	14	15	14	14	14	16
24	14	15	16	15	14	15	16	14	20	26	23	38	36	44	46	41	20	15	13	14	15	15	15	16
25	15	E C 29	15	14	14	18	16	19	20	25	35	35	34	34	40	41	21	14	13	29	15	15	15	15
26	16	16	E C 28	14	15	14	16	28	31	32	E C 58	40	35	24	26	22	20	19	15	13	15	15	15	15
27	14	14	13	16	15	19	16	20	21	35	37	36	40	36	35	34	21	17	15	13	13	16	13	15
28	16	16	15	14	15	20	16	20	29	24	44	43	42	43	46	40	21	19	13	15	14	15	16	15
29	15	14	12	15	14	15	19	21	22	36	30	35	35	40	44	24	21	15	14	14	15	16	16	16
30	15	15	14	15	15	16	16	16	28	38	38	45	30	38	30	22	20	18	14	14	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	29	30	30	30	30	30
MED	15	15	15	15	15	15	16	15	19	21	23	35	34	30	24	21	18	15	14	15	15	15	15	15
U Q	16	16	16	15	15	16	16	19	20	24	35	40	36	36	35	24	20	16	15	15	15	16	16	16
L Q	15	14	14	14	14	15	15	14	16	20	21	23	30	23	22	20	16	14	14	14	14	15	15	15

APR. 2003 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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	285	266	253	286	265	279	324	341	338	314	300	305	308	306	305	320R	323	340	325	305	282	282	282	278
2	287	294	283	294	278	295	333	348	331	328	314	307	307	309	307	306	305	313	C	334	298	270	259	268
3	269	297	307	292	275	263	333	326	332	321	298	309	307	304	306	309	310	317	326	316	289	279	278	280
4	288	278	279	302	277	279	337	352	324	313	317	302	294	300	300	303	310	315	311	306	296	285	282	262
5	250	271	289	270	284	290	338	330	315	314	312	299	293	301	303	304R	305R	318	326	324	308	273	268	267
6	260	265	292	294	290	279	340	317	332	304	301	303	299	304	306	298	308	322	334	338	301	284	276	268
7	284	287	294	297	290	304	347	355	332	326	314	313	312	304	310	308	318	329	331	331	297	275	274	270
8	271	278	296	324	310	304	358	348	333	326	321	304	301	305	303	307	315	313	314	343	319	270	270	277
9	283	266	289	308	356	317	323	328	310	321	321R	316	324	315	319	334	317	324	327	352	305	275	271	266
10	267	275	288	320	363	278	335	314	297	306	305	295	340	341	321	322	311	336	341	334	312	276	256	287
11	285	287	283	302	279	293	355	347	340	334	308	319	306	305	319	331	326	327	339	332	351	278	283	279
12	284	308	290	286	299	294	330	351	330	330	311	308	317	310	314	316	327	331	337	329	314	288	F	285
13	289	271	286	303	291	299	344	347	324	328	321	310	317	314R	311	319	317	320	331	338	344	298	288	287
14	274	295	317	295	280	283	339	345	333	324	329	316	318	308	312	306	315	320	325	341	343	275	262	266
15	257	259F	281	277	295	293	294	272	305	291	298	300	312	327	313	317	315	325	318	333	342	261	286	273
16	276	287	317	308	286	306	341	331	339	338	335	299	306	304	311	306	316	320	317	334	345	287	282	279
17	277	279	281	292	277	301	330	339	334	337	321	307	302	289	306	318	310	326	345	330	290	277	276	282
18	304	281	281	290	285	304	335	331	319	329	314	301	308	308	310	303	310	312	343	341	307	275	266	254
19	258	275	287	280	300	310	355	330	327	316	313	308	309	315	312	320	316	310	328	320	303	290	289	F
20	F	F	296	329	304	293	331	332	329	326	308	289	306	301	303	315	313	319	330	333	332	277	274	266
21	280	294	304	326	301	292	342	336	315	294	303	281	267	289	321	316	300	311	296	301	303	275	276	287
22	295	277	282	292	285	300	333	317	319	288	301	301	295	299	301	302	311	315	307	303	290	274	275	268
23	277	292	309	293	274	281	327	319	322	321	322	288	309	309	304	319	307	306	307	301	312	316	287	274
24	F	F	291	287	318	339	324	302	272	259	295	281	300	306	317	327	317	306	300	296	289	A	264	268
25	271	268	277	299	304	323	336	338	319	331	309	296	297	308	306	293	311	299	317	326	271	272	260	277
26	268	290	295	293	286	317	325	342	322	304	294	301	316	321	316	325	324	325	306	311	282	266	261	269
27	278	273	288	302	287	342	348	330	303	299	289	292	294	289	304	307	304	299	310	331	292	260	262	263
28	263	278	279	264	268	303	326	305	325	326	296	300	295	299	284	282	289	305	311	320	301	268	270	269
29	277	265	273	296	299	309	329	320	329	304	284	A	282	299	299	306	299	299	319	327	315	281	278	268
30	262	256	261	260	275	289	307	319	302	305	274	281	288	292	299	314	312	308	294	296	303	291	271	278
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	29	30	30	29	29	29
MED	277	278	288	294	286	297	334	331	324	321	308	301	306	305	306	312	312	318	325	330	303	276	274	270
U Q	284	288	295	302	300	306	341	345	332	328	317	308	312	309	313	319	317	325	331	334	315	284	282	279
L Q	268	270	281	287	278	289	327	319	315	304	298	296	295	300	303	306	308	310	310	311	292	272	265	268

APR. 2003 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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		L 322	L	L	L									
2									L	L	L	L	L	L	L	L			C					
3												L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5											L	L	L	L	L									
6											L	L	L	L 317	L	L								
7										L	L	L	L 377	L	L	L								
8									L	L	L	L	L	L 346	L	L	L							
9										L	L	A	L	A	L									
10								L	L 341	L 369	L 381	L	L 383	A		L								
11									L	L	L	L 354	R	L	A	A	A							
12										L	A	L	A	A	L	L	L							
13									L	L	A	A	A	A	A	L	L							
14									L	L	L 381	L	L 371	L 345	L 381	L 357	L							
15							L 344	L 338	367	U 374	L	R 356	373	L 352	L 368	L 344	L 326							
16								L	L	L	L	L	L 364	L 360	L	L	L	L						
17								L	L 356	L 372	L 389	L 347	L 352	L 345	L 363	L 368	L							
18									L	A	L 368	A	L 369	L 371	L 347	L 377	L	L						
19									L	L 359	L 374	L 382	L	L 382	L 373	L 359								
20								L	L	L	L 373	L 347	L 351	A	L	L 354	L							
21								A	L	A	L	L	A	L 341	L 369	L	L							
22									L	L	L	L	L	L 367	L 337	L	L							
23								L	L	L	L	A	L 349	L 363	L	L	L							
24							L		L 369	L 368	396	356	U L 375	L 362	L	L	L	L						
25								L		L	L 367	L	L	L	L 335	L	L							
26							L		L	L			L 360	L	L 343	L	L							
27							L	L	L 363	L 342	L 375	L 356	A	A	A	L	A	L						
28								L	L	L	L 356	L 399	L	L 363	L	L	L	L						
29									L	L	A	A	L	L 364	L	L	A							
30								L	L	L	A	L 345	A	L	L	A	A	A						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	5	6	11	10	11	14	9	6	1							
MED							L 344	L 338	L 363	L 368	L 374	L 355	L 369	L 361	L 363	L 358	L 326							
U Q									368	L 372	L 381	L 356	L 375	L 364	L 371	L 368								
L Q									L 348	L 359	L 367	L 347	L 352	L 345	L 340	L 354								

APR. 2003 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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

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										258		268	278	276	274									
2									260	266	262	272	288	272	270	272			C					
3												282	272	292	274	280								
4									262	262	252	278	300	284	278	286								
5											266	280	298	290	270									
6											286	276	272	272	270	280								
7										266	272	288	276	276	276	268								
8									268	258	256	270	284	286	270	280	276							
9										278	274	268	266	276	268									
10								294	322	308	300	270	268	270		290								
11									256	260	262	284	266	286	266	260	248							
12										264	E A 264	310	282	266	272	264	270							
13									276	262	252	268	276	266	276	274	270							
14									266	268	264	260	268	290	258	292	278							
15							336	370	322	370	366	328	324	296	314	308	304							
16								260	256	256	272	276	306	304	290	294	278	280						
17								274	274	278	272	322	306	316	296	264	276							
18									270	270	302	292	290	292	286	274	288	282						
19									278	278	276	276	282	268	274	272								
20								276	264	262	294	340	298	292	286	278	274							
21								256	282	268	274	338	348	318	256	262	272							
22									278	270	288	278	288	304	290	288	266							
23								286	276	250	262	E A 312	286	290	292	266	272							
24							270		448	460	372	394	314	300	268	276	268	290						
25								258		242	300	300	292	290	288	278	270							
26							270		270	312			284	276	290	278	266							
27							240	258	308	336	344	350	336	332	304	296	312	298						
28								266	272	276	332	290	318	308	320	296	302	280						
29									256	264	E A 428	A	296	294	310	282	282							
30								286	296	314	282	308	306	312	314	280	274	E A 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							4	11	22	27	27	28	30	30	29	27	20	6						
MED							270	274	273	268	274	282	288	290	276	278	274	281						
U Q							303	286	282	278	300	311	306	300	291	288	280	290						
L Q							255	258	264	262	264	274	276	276	270	272	270	280						

APR. 2003 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

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APR. 2003 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	260	E B 314	E B 318	250	E B 294	E B 286	224	220	210	204	240	206	216	214	210	204	232	228	232	234	240	E A 280	266	276
2	272	252	276	234	268	258	226	226	210	206	198	208	216	222	206	208	236	236	C	208	214	E B 278	320	E B 312
3	E B 302	E B 268	238	210	246	E B 314	232	226	216	H 196	204	214	210	208	222	216	228	236	230	216	222	256	254	E B 274
4	268	272	E B 276	214	240	E B 276	228	224	220	204	206	188	208	214	214	216	226	232	236	232	248	262	252	E B 300
5	E B 316	E B 302	248	226	222	E C 264	220	228	230	218	204	208	218	220	214	214	224	238	220	214	212	E A 276	E B 300	E B 314
6	E B 322	E B 312	258	232	234	264	214	216	224	216	212	206	208	200	210	218	232	232	228	218	206	250	E B 282	314
7	E A 314	268	268	244	250	236	216	218	214	204	206	206	200	222	212	218	228	232	224	232	226	E A 280	E A 316	E B 312
8	E A 308	E B 288	268	234	218	E C 266	208	216	214	214	204	208	E A 240	218	210	222	226	234	250	222	214	214	E B 312	E B 284
9	E B 292	E B 310	268	210	212	244	228	222	216	220	218	A	212	A	208	234	230	242	240	210	202	E A 250	E B 318	E B 322
10	E C 340	E A 294	270	216	208	E B 302	242	230	226	E A 258	210	218	206	A	214	E A 242	238	240	224	232	222	E A 344	E A 432	E A 322
11	E A 276	272	256	244	262	E B 278	226	224	210	200	208	202	R	A	A	A	A	E A 256	E A 242	218	206	E A 250	E A 288	E B 276
12	E B 280	250	272	264	230	E B 274	226	214	218	A	A	E A 282	A	A	E A 206	240	226	236	222	222	216	250	E A 336	E A 292
13	E A 300	E A 314	E A 274	240	E A 266	252	214	224	220	216	A	A	A	A	A	A	224	232	232	232	216	230	250	274
14	E B 294	E B 276	238	216	E B 282	E B 278	230	220	220	206	204	222	210	200	204	202	236	230	236	222	206	258	E A 312	E A 330
15	E A 342	E B 348	E B 274	E A 280	226	250	256	230	226	226	242	E A 296	206	238	200	212	214	232	254	230	204	E A 380	E A 306	E B 324
16	E B 308	E B 276	250	254	270	E B 278	236	216	206	204	194	202	206	208	218	214	222	232	248	232	218	232	240	272
17	E A 296	E B 280	E A 296	264	E B 286	E B 282	228	234	226	212	196	E A 254	216	214	198	H 196	226	252	226	222	230	E B 280	E B 284	E B 296
18	250	260	288	270	272	236	234	242	230	A 226		A	212	214	214	208	240	236	228	226	222	E A 308	E A 316	E B 326
19	E A 316	E A 290	262	266	254	248	226	222	214	208	212	220	220	190	200	H 196	232	232	224	220	240	246	254	E A 330
20	E A 336	E A 284	262	220	228	260	228	224	218	208	H 194	204	202	A	E A 262	208	224	244	236	232	198	248	E B 294	E B 302
21	E B 290	E B 268	252	214	240	256	222	A	E A 258	A	E A 254	204	A	218	198	214	216	238	E A 272	E A 294	244	224	E B 278	E B 282
22	256	276	E B 278	248	244	240	224	224	230	230	E A 240	232	220	224	208	E A 254	224	234	240	236	E A 328	280	E B 278	E B A 312
23	E A 320	E A 264	234	236	270	268	216	220	226	A	208	A	224	222	214	212	228	E A 274	248	E A 288	228	224	238	E B 294
24	E B 346	E B 314	264	240	234	228	222	220	214	216	204	E A 254	216	230	E B 254	E B 236	216	228	252	240	242	A	E A E 332	E B 292
25	E B 290	E C 328	E B 284	254	244	214	220	E A 212	216	208	H 198	E A 260	E A 252	U R 260	228	228	222	230	238	214	218	E B 276	E B 314	E A 310
26	E B 292	258	E C 272	258	270	238	H 198	H 178	H 192	252	E C 290	H 214	222	220	210	216	E A 242	256	262	246	E A 280	E A 368	E A 334	E B 298
27	E A 312	E A 310	E A 282	E A 272	262	232	206	198	E A 254	E A 262	218	E A 262	A	A	A	E A 248	A	E A 254	256	228	E A 252	E A 326	E A 322	E A 338
28	E A 320	E A 310	E A 284	E A 300	E B 300	266	226	E A 224	222	214	214	H 188	218	214	E B 256	244	220	240	252	232	206	258	E A 308	E A 308
29	E A 278	E A 304	E A 286	240	252	260	228	232	218	220	A	A	218	202	E A 266	E A 250	A	E A 274	246	240	218	222	E B 278	E B 296
30	E B 320	E B 336	E A 310	E B 310	E B 282	270	248	234	228	A	A	228	A	E A 282	234	A	A	A	E A 288	E A 306	240	256	E A 264	E A 286
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	25	26	25	24	23	27	27	26	29	29	30	30	29	30	30
MED	E 301	E 286	U 257	238	244	U 249	226	224	218	211	206	210	214	216	211	214	226	234	237	228	218	U 241	E 297	E B 301
U Q	E 320	E B 310	E A 282	264	E B 270	E B 276	228	227	226	220	218	E A 243	219	222	E 222	E A 236	232	243	251	234	240	E A 280	E A 316	E A 314
L Q	280	268	258	226	234	244	220	217	214	205	204	205	208	208	206	208	224	232	228	220	212	247	266	E 286

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IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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							114	118	110	112	116	R	B	114	112	A	A	118	B					
2							124	116	118	114	B	B	A	A	R	114	A	A	C					
3							122	124	110	114	114	B	A	A	116	116	114	114	B					
4							116	114	112	112	A	B	B	B	B	B	116	116	B					
5							E B 134	114	R	R	R	B	112	B	112	114	116	114	B					
6							124	122	R	110	110	114	A	A	B	110	110	114	B					
7							112	118	114	116	110	B	B	A	A	112	114	114	B					
8							120	116	112	A	A	A	A	A	A	A	116	114	B					
9							120	124	116	112	108	A	A	A	A	A	116	120	B					
10							122	120	114	A	A	112	A	A	112	A	114	118	B					
11							120	114	108	108	116	A	R	A	112	116	114	110	B					
12							112	114	116	A	A	A	A	A	A	A	116	118	B					
13							114	110	112	112	A	A	A	A	A	A	A	116	B					
14							120	114	118	110	R	110	B	112	B	110	112	110	B					
15							124	112	118	116	114	114	A	112	R	110	116	114	B					
16							122	116	112	R	A	A	A	A	A	110	110	108	B					
17							114	112	114	A	A	A	A	110	114	112	114	110	B					
18							116	108	112	A	A	A	A	A	112	114	110	116	120					
19							108	114	114	114	120	B	A	114	A	A	110	114	B					
20							110	118	114	R	110	B	A	A	A	112	108	118	118					
21							112	112	114	116	A	A	A	114	114	114	112	114	116					
22							120	118	112	112	A	A	A	B	110	A	110	114	118					
23						B	112	B	116	A	A	A	A	A	R	118	122	114	B					
24							122	114	114	110	110	B	A	B	B	B	110	114	108					
25						B	112	A	A	A	A	A	A	114	B	B	R	114	122					
26						B	110	A	122	A		B	A	108	112	116	110	108	B					
27						B	116	114	A	B	B	A	B	A	A	A	A	A	B					
28						B	112	116	108	110	B	B	B	B	B	B	112	116	120					
29						120	114	116	118	B	A	A	A	B	B	A	A	A	A					
30						B	112	116	118	B	B	B	116	A	A	A	A	A	A					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	30	27	26	16	10	4	2	8	10	15	23	26	7					
MED						120	116	116	114	112	112	113	114	113	112	114	114	114	118					
U Q							122	118	116	114	116	114		114	114	116	116	116	120					
L Q							112	114	112	110	110	111		111	112	110	110	114	116					

APR. 2003 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 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	B	B	B	98	B	B	128	114	120	112	112	112	110	110	110	106	102	104	B	B	104	98	94	92
2	98	94	96	B	B	B	G	146	100	114	112	B	98	98	98	96	90	88	C	86	B	B	B	B
3	B	B	B	B	B	B	168	108	98	114	112	B	102	102	102	100	98	136	116	94	90	86	B	B
4	B	B	B	B	B	B	138	100	122	114	106	B	B	B	B	B	104	104	B	106	B	B	B	B
5	118	B	B	B	B	C	156	144	102	118	126	B	114	B	G	98	106	G	B	110	104	102	B	B
6	B	B	102	B	B	B	164	106	102	120	124	120	102	100	B	96	G	138	114	108	106	B	B	100
7	96	B	B	B	B	B	160	104	138	122	114	B	110	104	106	100	92	128	90	104	102	102	98	94
8	94	92	90	B	B	C	156	142	138	106	104	104	98	94	98	100	102	G	B	B	B	B	B	B
9	B	B	102	104	102	98	100	106	124	102	114	104	106	102	98	162	100	116	108	102	96	92	104	102
10	C	96	98	100	B	B	G	102	116	106	102	98	100	108	104	104	168	122	106	104	98	98	90	90
11	88	B	B	100	B	B	138	124	122	112	100	98	96	118	118	114	116	108	100	100	104	96	98	90
12	90	86	90	B	B	B	140	124	120	106	102	102	98	98	104	118	102	108	112	96	96	92	102	100
13	96	96	96	96	98	B	134	124	116	110	100	96	98	98	96	92	98	144	122	106	106	94	98	92
14	88	B	B	B	B	B	158	102	100	112	98	G	B	112	B	G	156	142	90	102	98	94	98	92
15	90	92	88	112	88	92	106	100	124	120	114	108	106	G	96	94	94	110	116	112	90	102	98	90
16	B	B	B	B	B	B	156	104	98	98	102	102	98	98	106	110	94	120	108	106	98	100	B	B
17	94	B	96	94	92	98	130	106	126	104	106	100	98	102	102	100	98	120	112	104	102	100	B	B
18	B	B	92	B	B	B	140	118	122	106	104	102	108	110	102	100	G	140	124	104	106	98	116	106
19	106	100	B	B	B	B	144	102	100	116	G	108	106	112	106	104	G	120	118	108	106	B	B	100
20	98	94	90	92	B	B	144	126	122	100	112	B	106	104	108	G	G	104	114	106	B	B	B	B
21	B	B	B	B	B	B	132	110	116	116	108	106	106	128	98	108	G	G	114	108	106	102	B	B
22	B	96	B	B	100	B	106	126	116	112	104	104	104	B	116	108	G	G	G	116	108	106	B	100
23	96	94	98	B	B	178	G	B	116	106	104	104	104	108	98	G	126	110	104	100	104	96	98	98
24	B	B	B	B	B	116	136	120	116	114	110	108	106	B	B	B	G	G	132	B	100	100	100	B
25	102	C	106	B	106	B	114	100	102	108	110	98	102	G	B	B	102	106	128	B	106	B	B	94
26	100	100	C	104	B	106	112	104	G	104	C	110	110	110	G	102	122	112	98	96	94	96	98	98
27	92	92	90	92	96	B	118	114	170	100	106	102	102	102	104	108	100	102	118	98	98	100	100	102
28	102	106	100	104	104	B	G	130	120	128	B	B	B	B	B	B	G	142	116	104	104	B	102	104
29	102	98	94	B	98	G	150	122	120	114	96	96	102	B	98	98	92	116	112	110	94	B	B	B
30	B	104	102	B	B	B	134	128	120	112	108	B	106	104	106	98	98	92	112	102	102	98	98	98
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	18	15	17	11	9	6	26	29	29	30	27	21	27	22	22	23	22	25	24	26	26	21	16	19
MED	96	96	96	100	98	102	138	114	120	112	106	104	104	104	103	100	101	116	113	104	102	98	98	98
U Q	102	100	101	104	103	116	156	125	122	114	112	108	106	110	106	108	106	132	117	108	106	101	101	100
L Q	92	92	90	94	94	98	128	104	102	106	102	99	98	100	98	98	98	105	107	100	98	95	98	92

APR. 2003 h'Es (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

APR. 2003 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

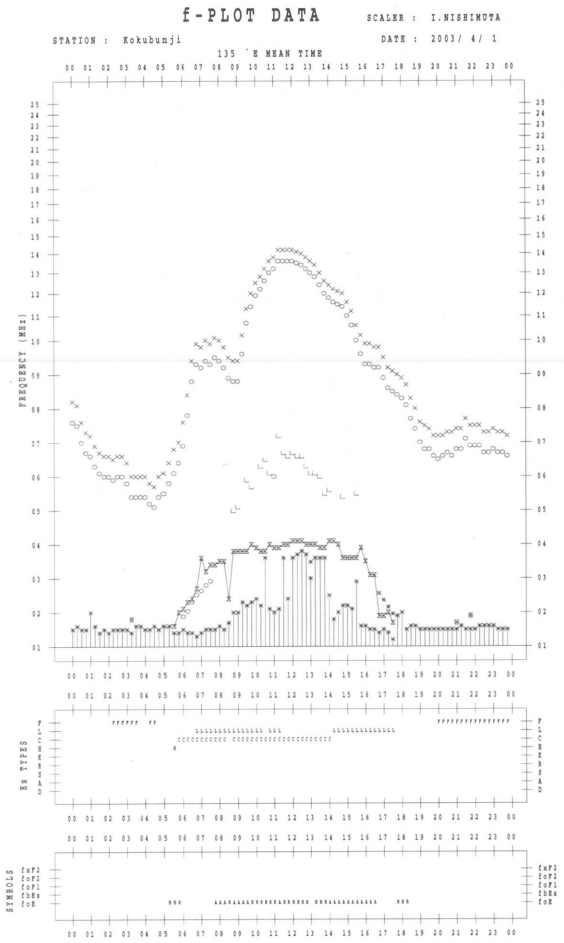
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 25.0MHz IN 24.0SEC IN MANUAL SCALING

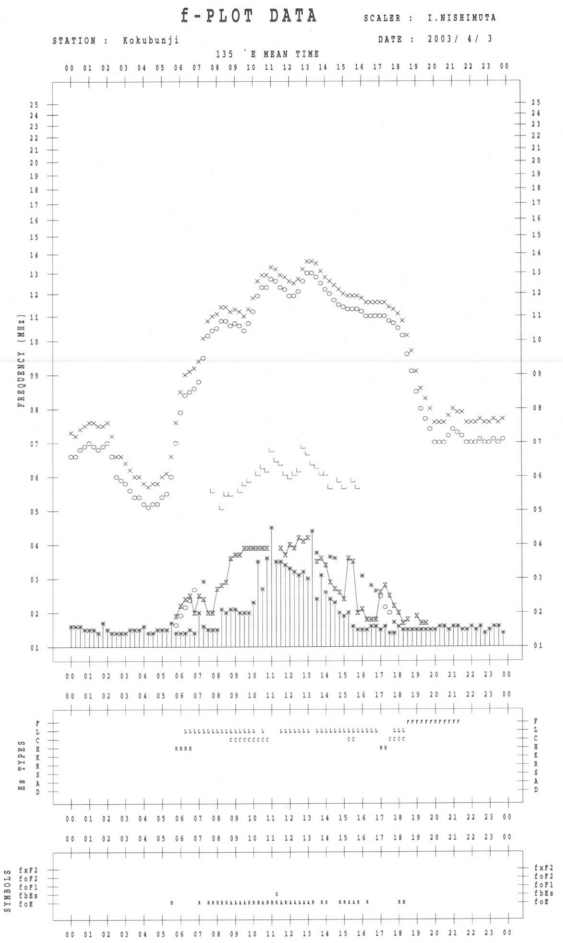
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				F1			C2	CL11	CL11	CL11	CL11	CL11	C1	C1	C1	L1	L1	L2			F1	F3	F2	F2
2	F1	F2	F1					HL11	L1	CL11	C1		L2	L1	L1	L1	L3	L2		F1				
3							H1	L1	L1	CL11	CL11		L1	L1	L1	L1	L1	H1	CL21	F2	F1	F1		
4							H2	L1	CL11	CL11	L1						L1	L1		F1				
5	F1						H1	HL11	L1	CL11	CL11		C1			L1	L1			F1	F3	F4		
6			F2				H1	L1	L1	C1	C1	C1	L1	L1		L1		H1	C2	F1	F1			F4
7	F3						H1	L2	HL11	CL11	CL11		C1	L1	L1	L1	L2	CL11	L2	F3	F3	F3	F4	F2
8	F2	F2	F1				H1	HL11	HL11	L1	L1	L1	L2	L2	L1	L1	L1							
9			F2	F1	F1	F2	L1	L1	CL11	L1	CL11	L2	L1	L2	L1	HL11	L1	CL21	L3	F2	F1	F2	F2	F3
10		F2	F2	F1				L1	CL11	L1	L1	L1	L1	L1	L1	L2	HL11	CL11	L3	F4	F4	F4	F4	F3
11	F2			F3			C2	CL21	CL11	CL11	L1	L1	L1	CL11	CL11	CL21	CL21	CL31	L5	F5	F1	F3	F2	F2
12	F2	F2	F1				H2	CL11	CL11	L2	L2	L2	L2	L2	L1	CL21	L1	L1	CL11	F6	F2	F2	F3	F2
13	F3	F2	F2	F2	F2		H1	C2	CL11	CL21	L2	L2	L2	L2	L2	L2	L2	HL11	C1	F3	F3	F2	F1	F1
14	F1						H1	L1	L1	CL11	L1			C1			HL11	HL11	L2	F4	F2	F1	F2	F3
15	F2	F2	F1	FF22	F1	F1	L1	L1	CL11	CL11	CL11	C1	L1		L1	L1	L1	L1	C2	F1	F2	F3	F2	F1
16							HL11	L1	L1	L1	L1	L1	L1	L1	L1	CL11	L1	CL11	C4	FF31	F3	F2		
17	F3		F3	F1	F1	F1	H2	L1	CL11	L1	L1	L2	L1	L2	L1	L1	L1	C1	C3	F2	F3	F1		
18			F1				H2	C1	C1	L2	L2	L1	L1	L1	L1	L1		HL11	C2	F3	F2	F1	F2	F2
19	F2	F2					H1	L1	L1	CL11		C1	L1	C1	L1	L1		C1	C3	F1	F3			F2
20	F3	F2	F2	F1			H2	CL11	CL11	L1	CL11		L1	L2	L2			L1	C2	F3				
21							H2	CL21	CL21	CL21	L1	L1	L1	CL11	L1	L1			C2	F7	F3	F3		
22		F1			F2		L1	CL11	CL11	CL11	L1	L1	L1		C1	L2				F1	F5	F3		F2
23	F4	F5	F2			H1			CL11	L1	L1	L1	L1	L1	L1		CL11	C3	L3	F4	F1	F4	F3	F1
24						C1	HL11	CL11	CL11	C1	C1	L1	L1						H1		F2	F5	F3	
25	F1		F1		F2		C1	L1	L1	L1	L1	L1	L1				L1	L1	C1		F1			F3
26	F1	F1		F2		L1	C1	L1		L1		L1	L1	C1		L1	C1	C3	L2	F4	F3	F4	F3	F2
27	F2	F3	F2	F1	F3		C1	C1	HL11	L1	L1	L1	L1	L1	L1	L1	L2	L2	CL12	F4	FF22	F2	F1	FF12
28	F2	F3	F1	F2	F2			CL11	C1	C1								H1	C1	F5	F3		F3	F2
29	F2	F2	F2		F1		H1	CL11	CL11	C1	L3	L2	L1		L1	L2	L3	CL22	CL22	FF22	F2			
30		F1	F2				C1	CL11	C1	C1	L1		C1	L2	L1	L3	L3	L3	CL32	F5	F3	F4	F3	F2
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

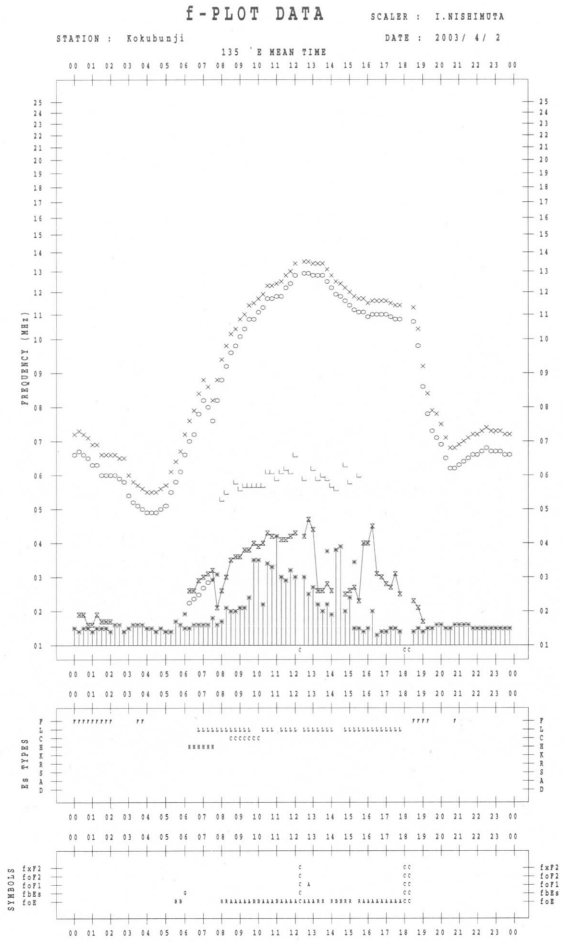
APR. 2003 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

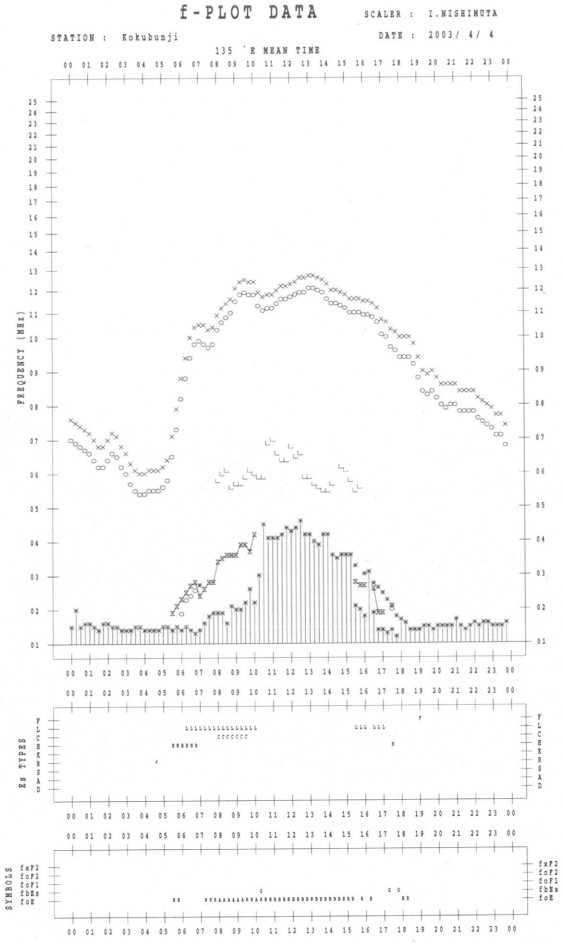
f-PLOTS OF IONOSPHERIC DATA

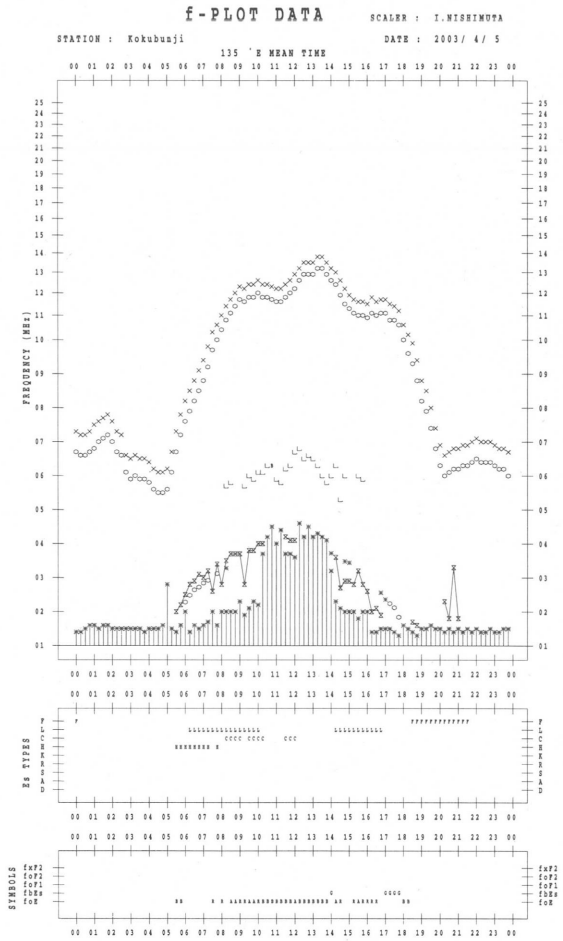
KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

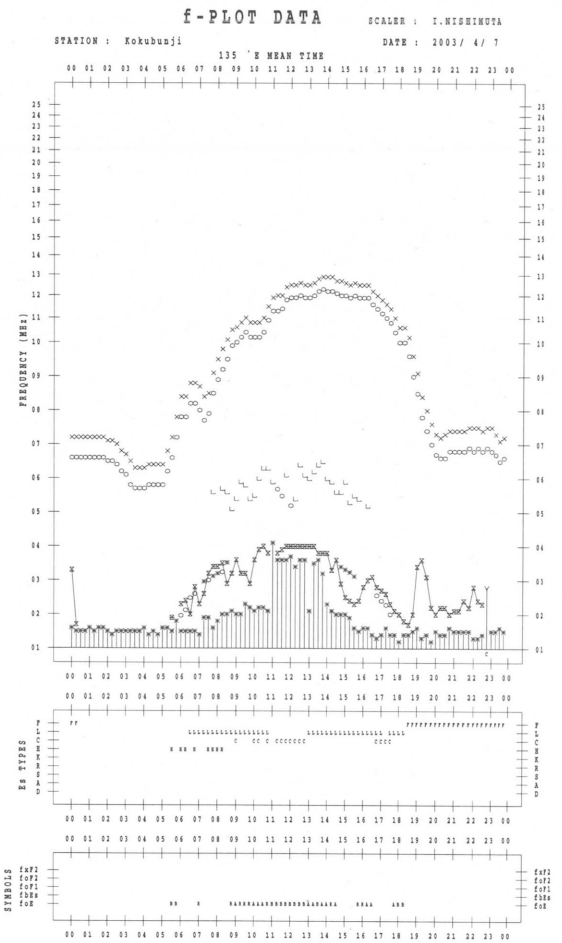

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

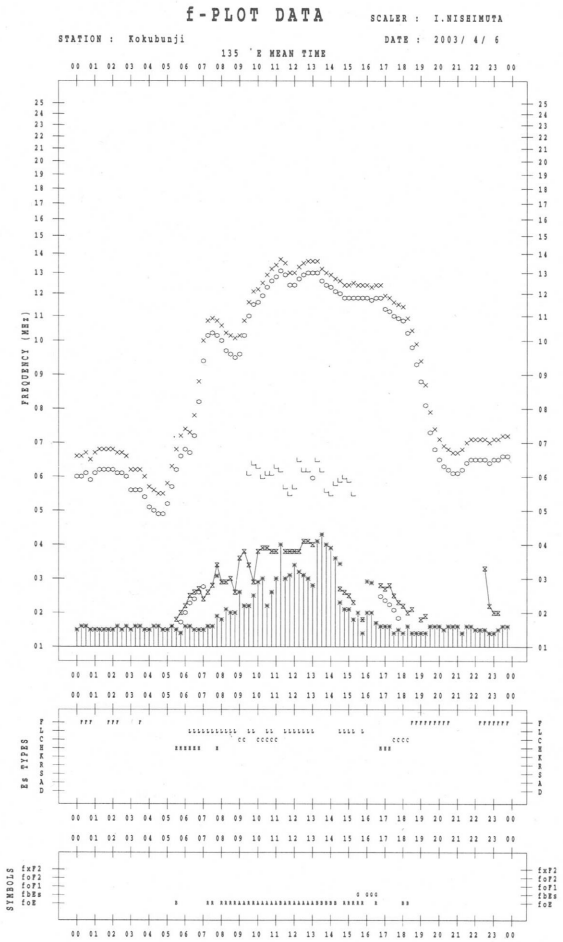

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 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 : 2003/ 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 : 2003/ 4/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
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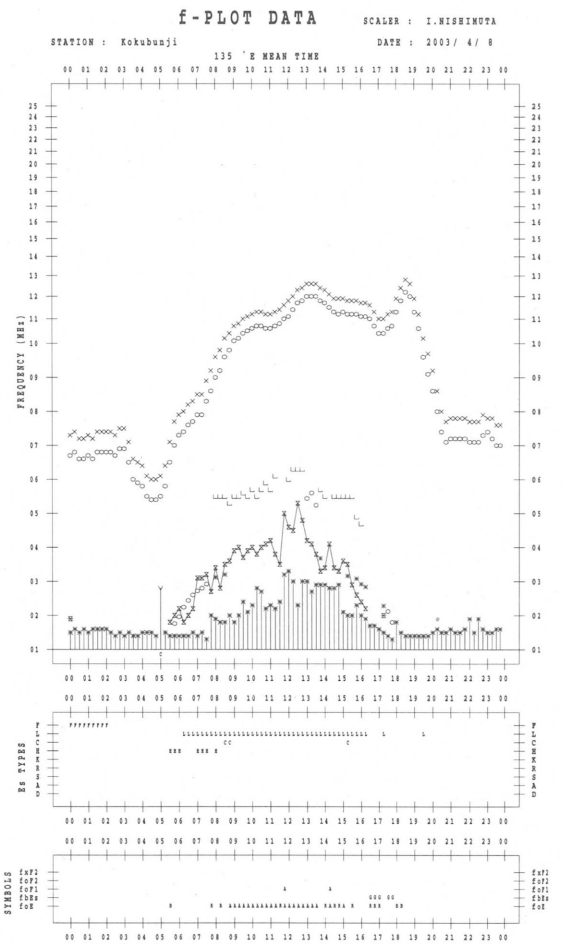
STATION : Kokubunji
DATE : 2003/ 4/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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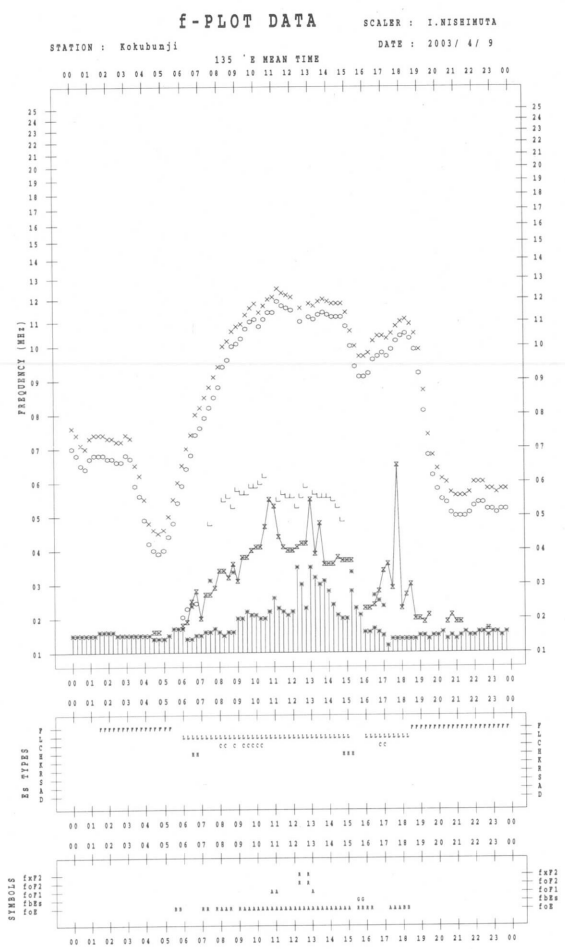
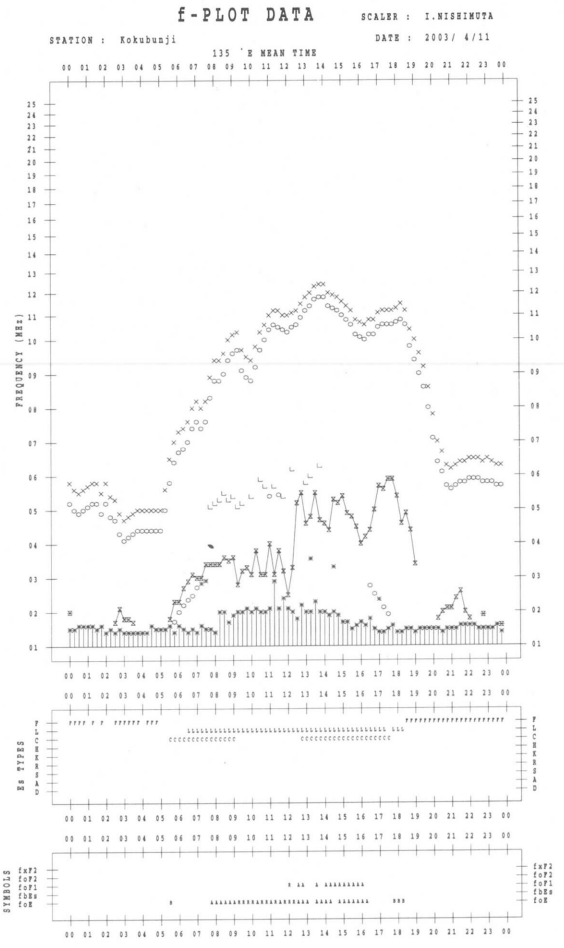
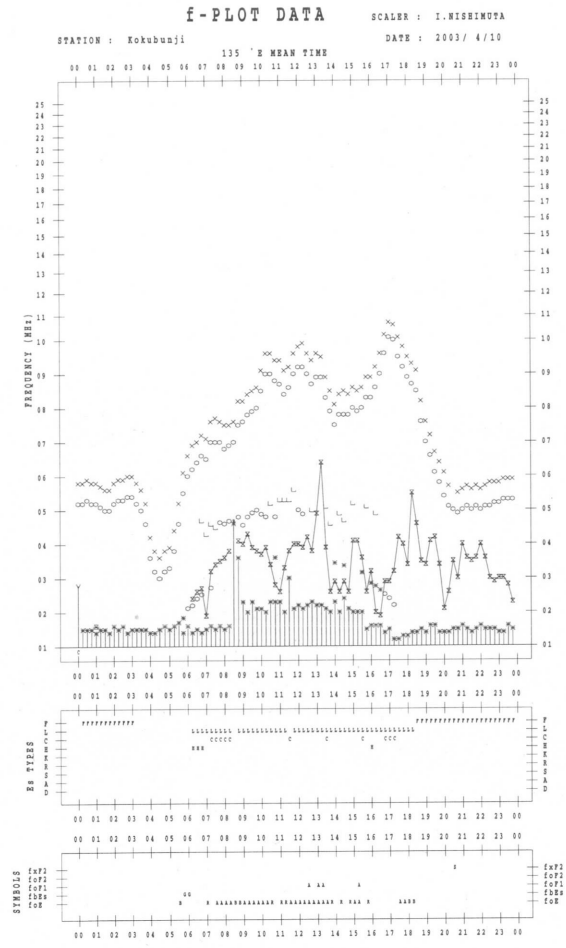
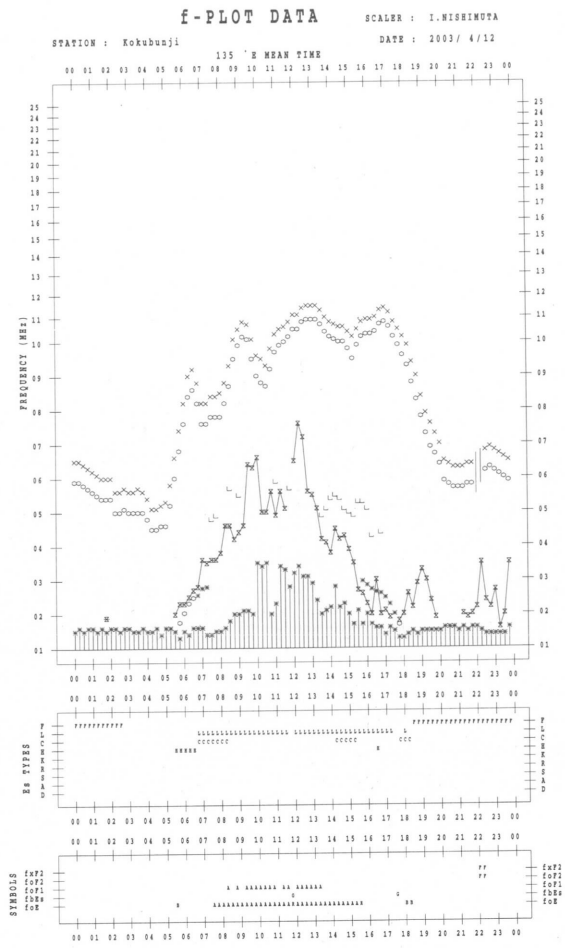
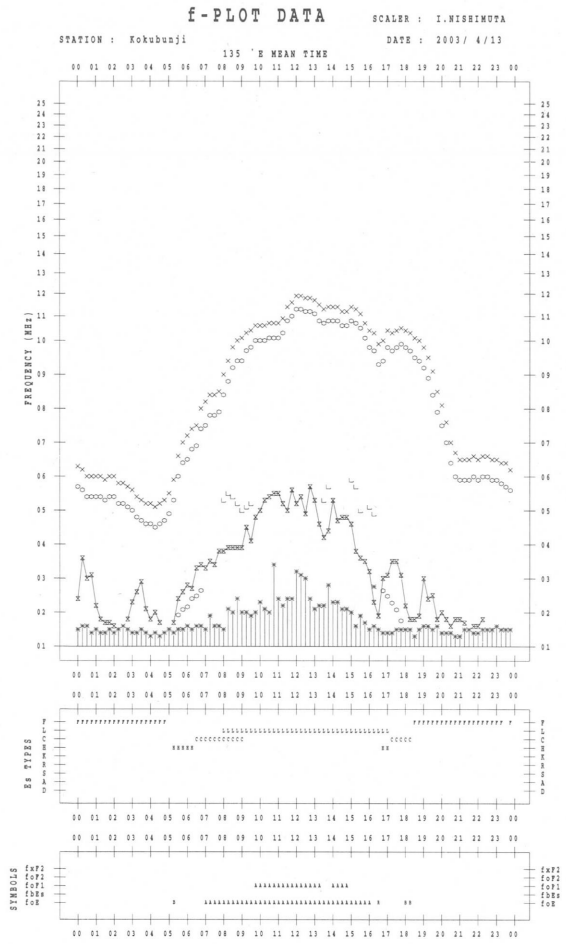
STATION : Kokubunji
DATE : 2003/ 4/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

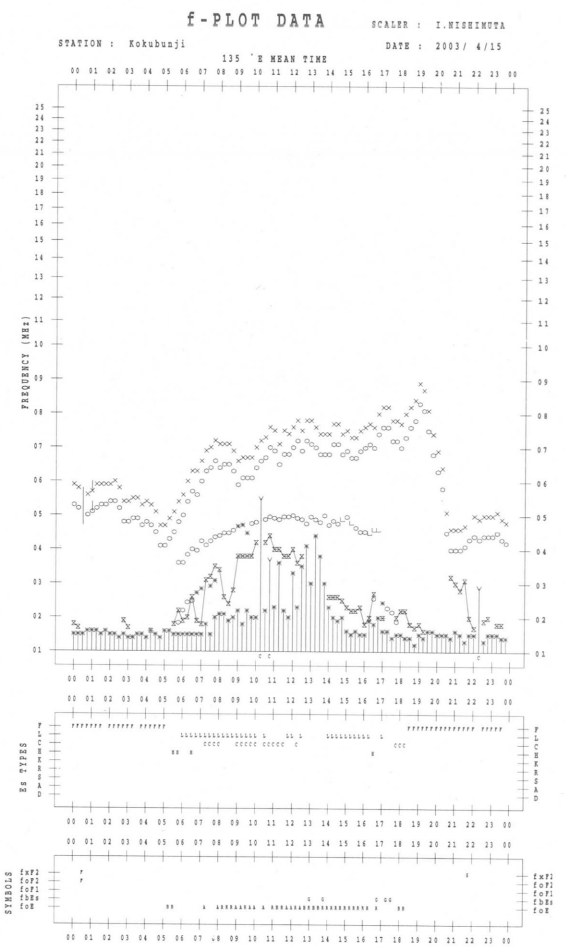

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

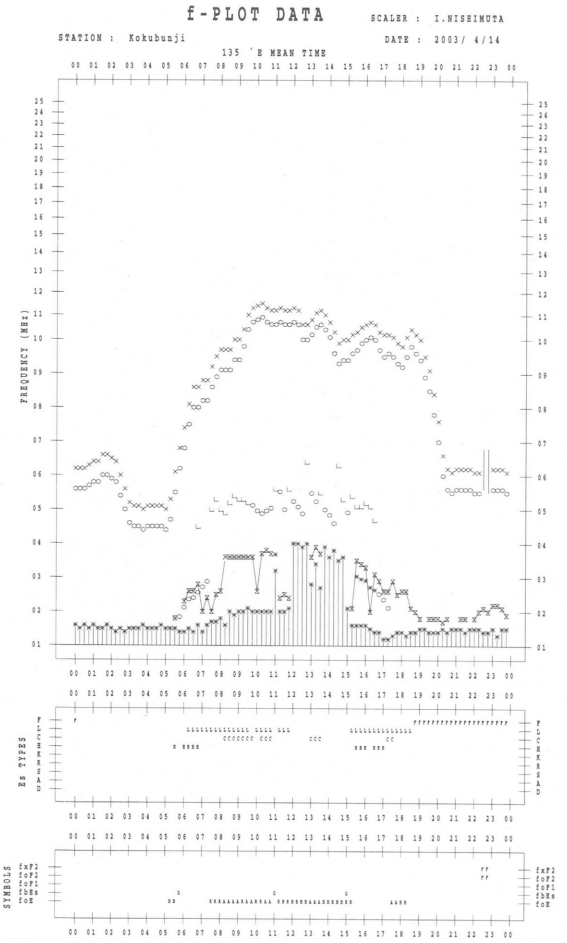

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

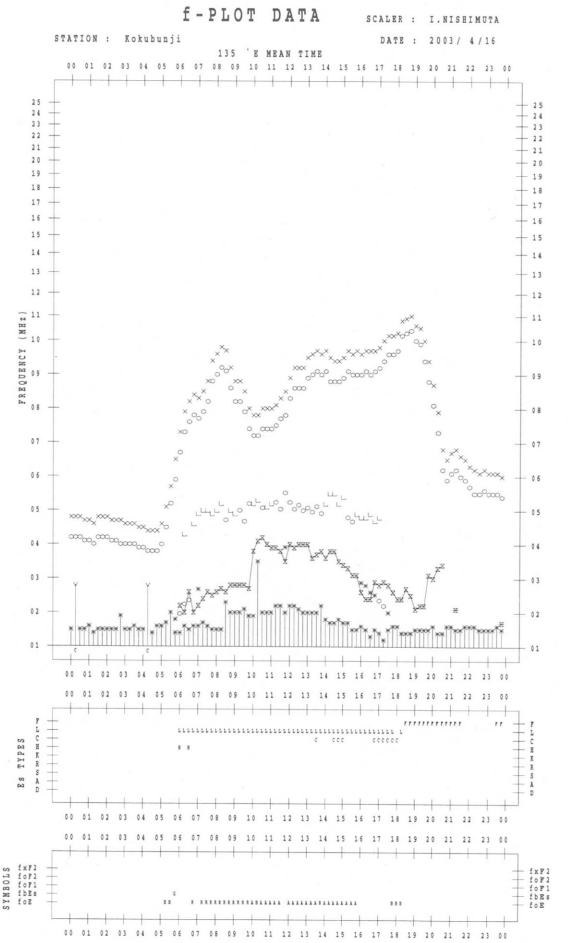

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 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 : 2003/ 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 : 2003/ 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 : 2003/ 4/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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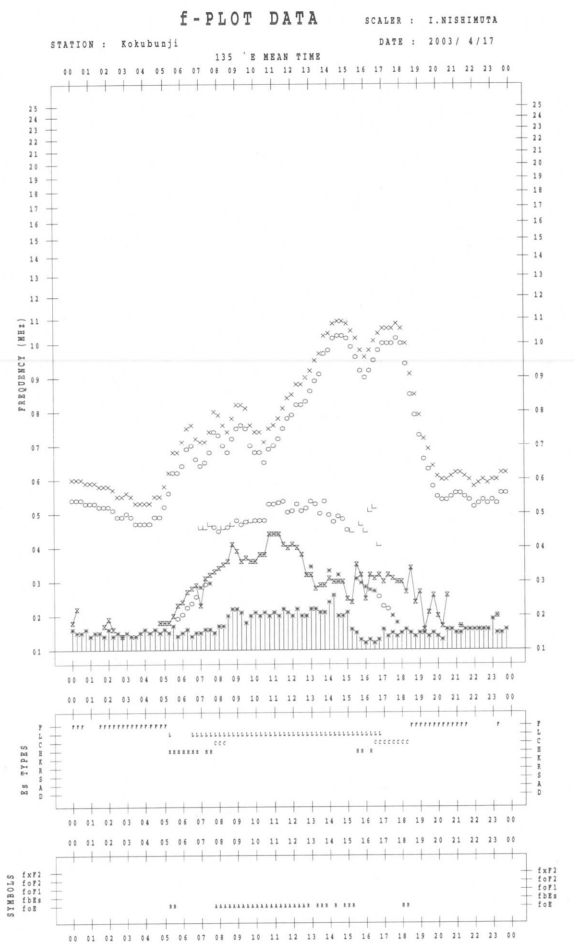
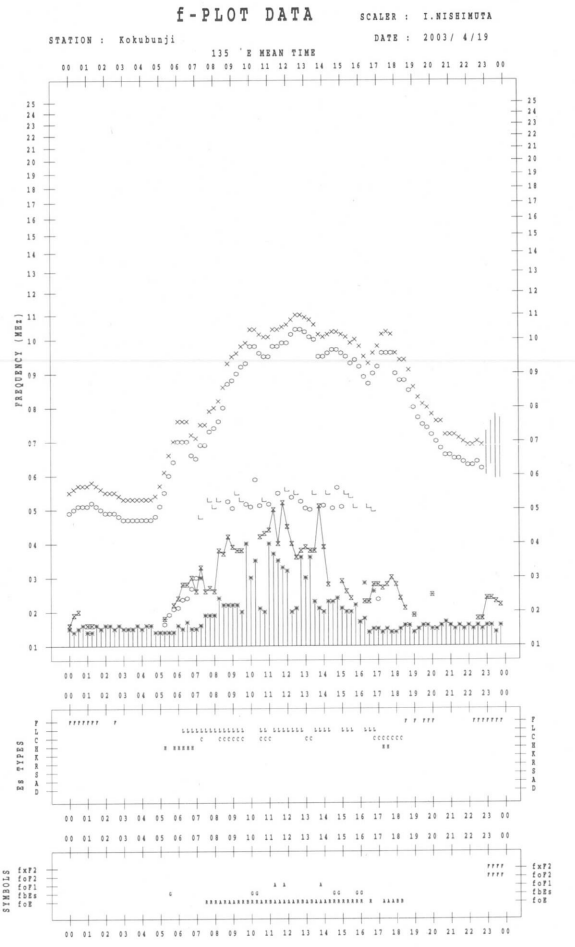
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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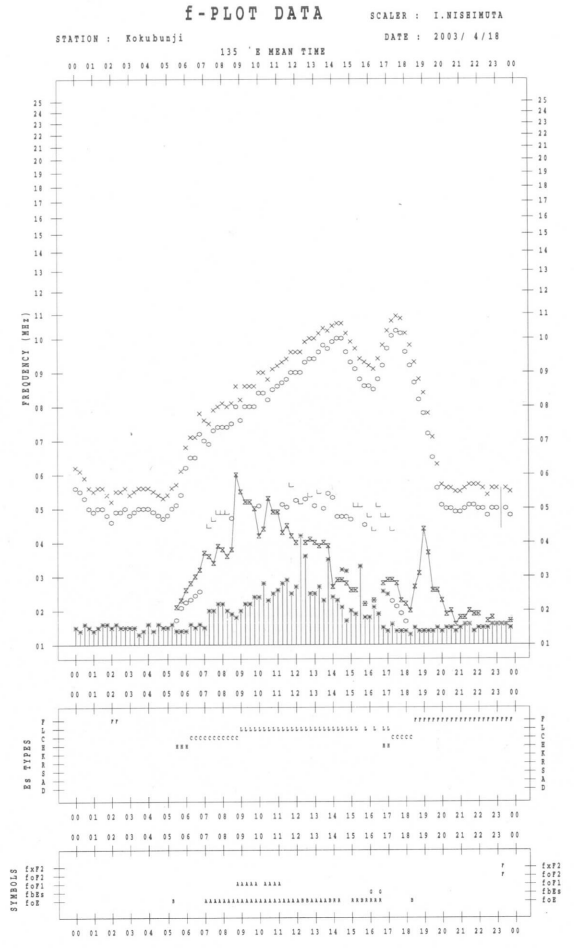
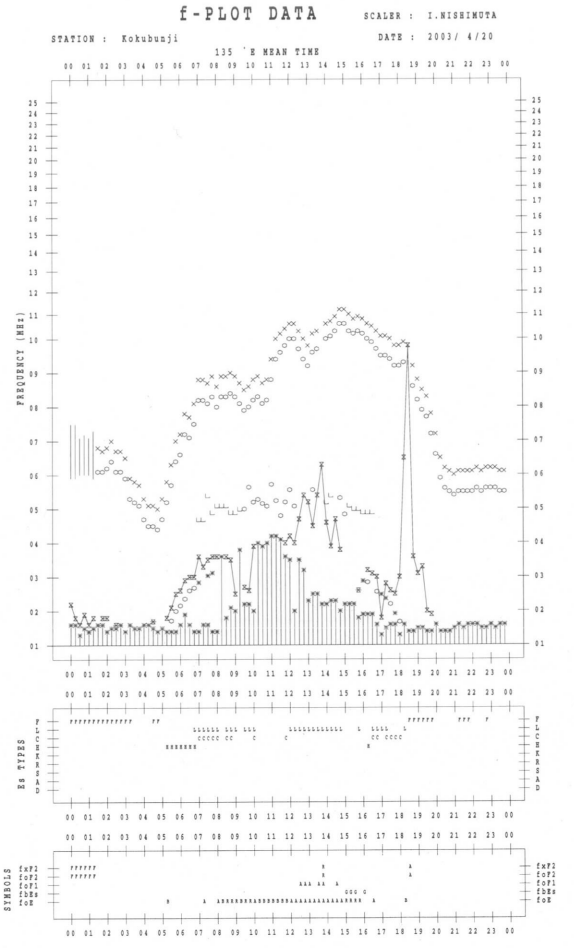
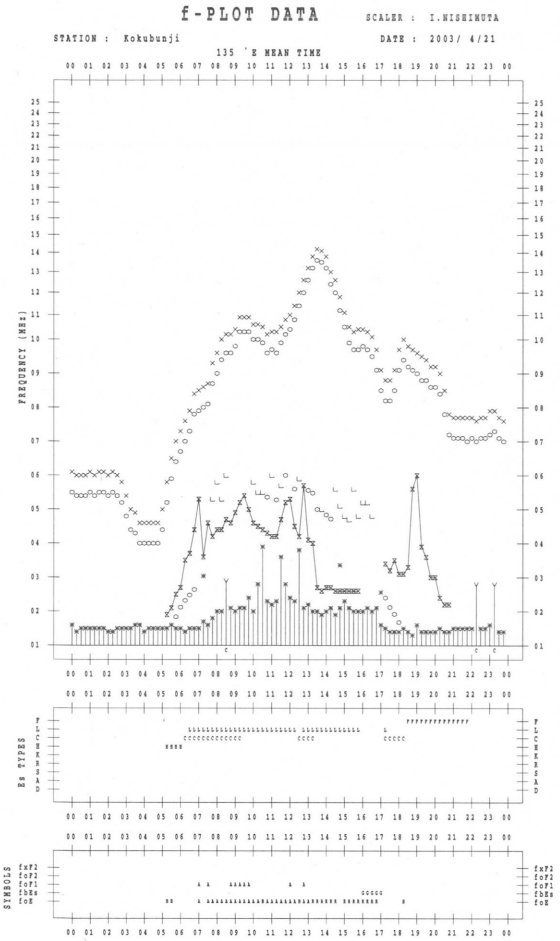
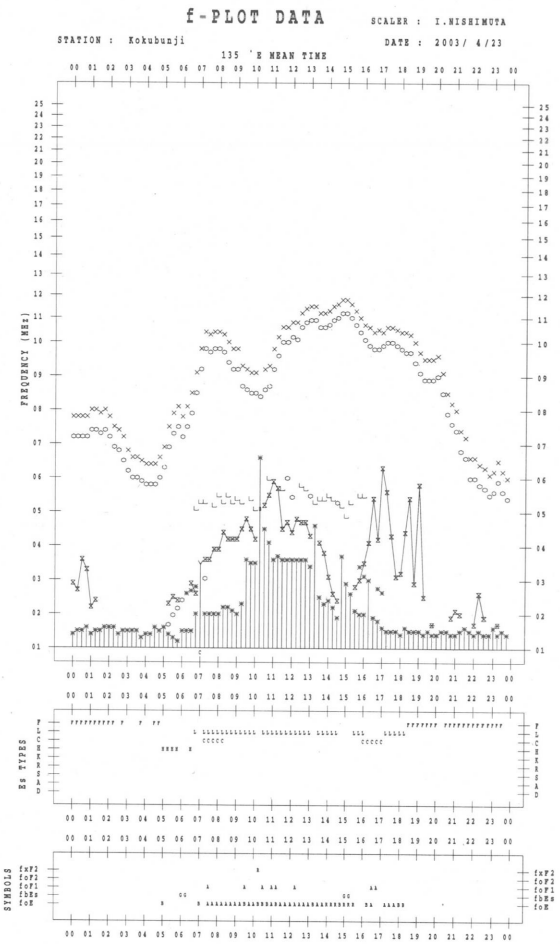
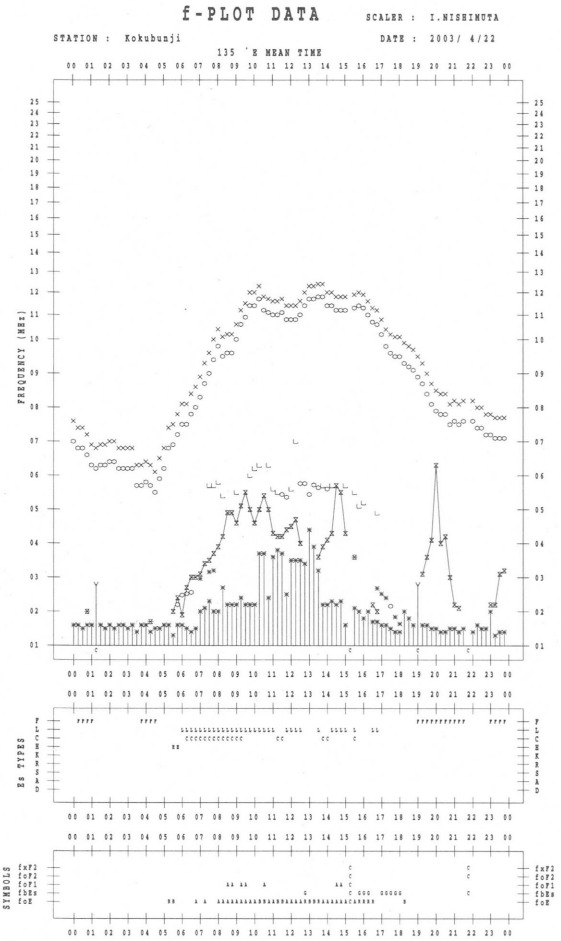
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

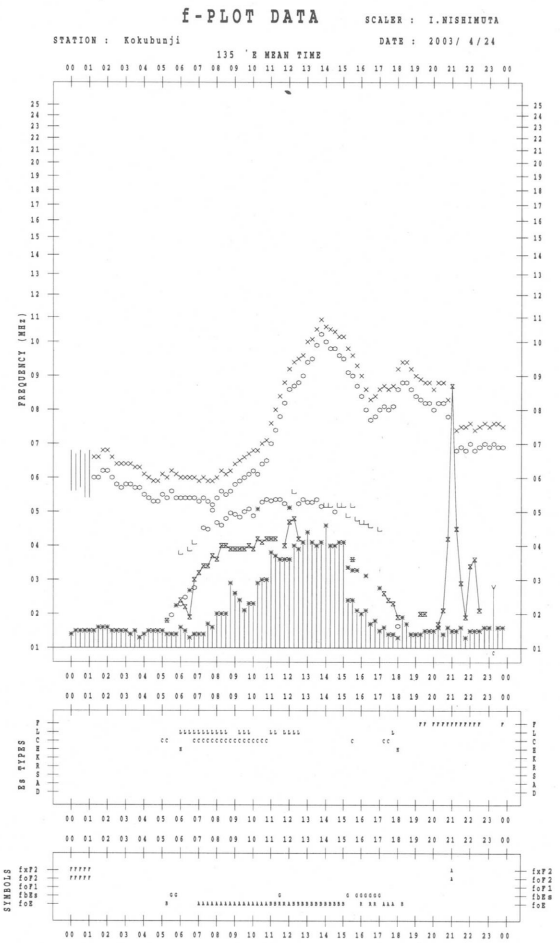

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

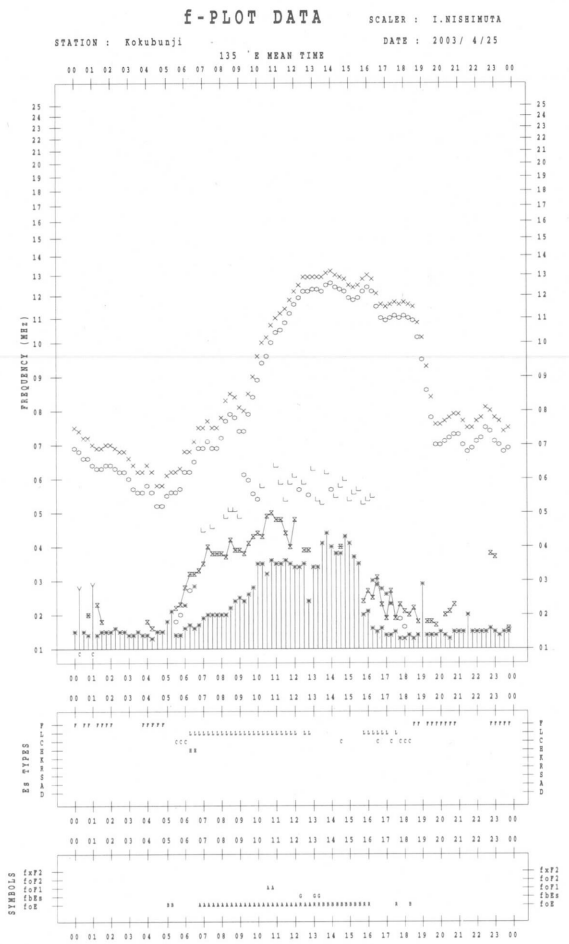

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/21
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

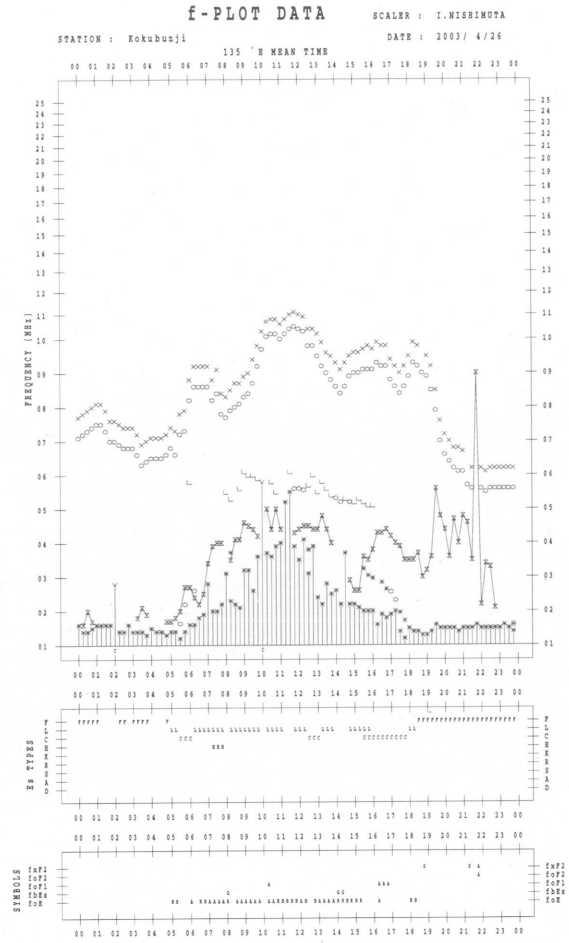

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/23
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

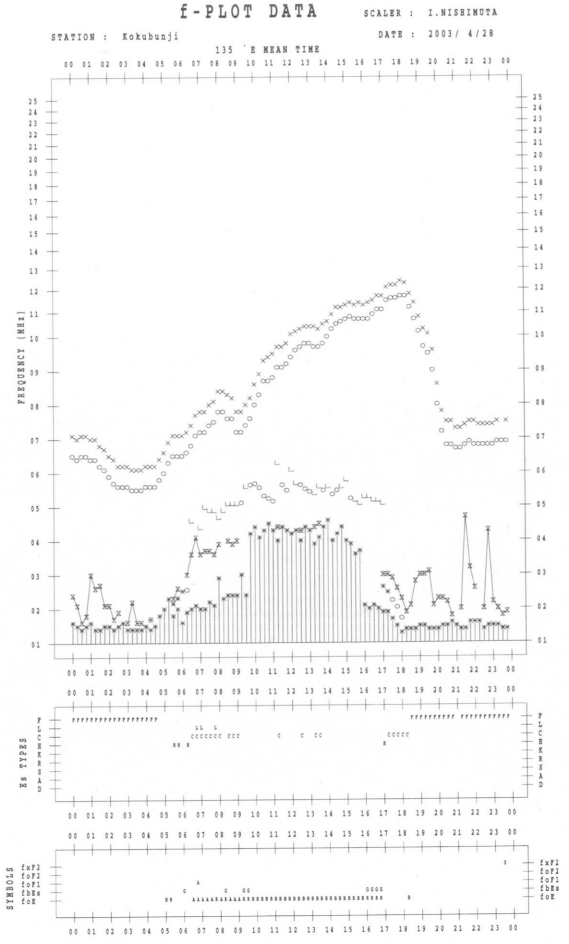

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/22
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

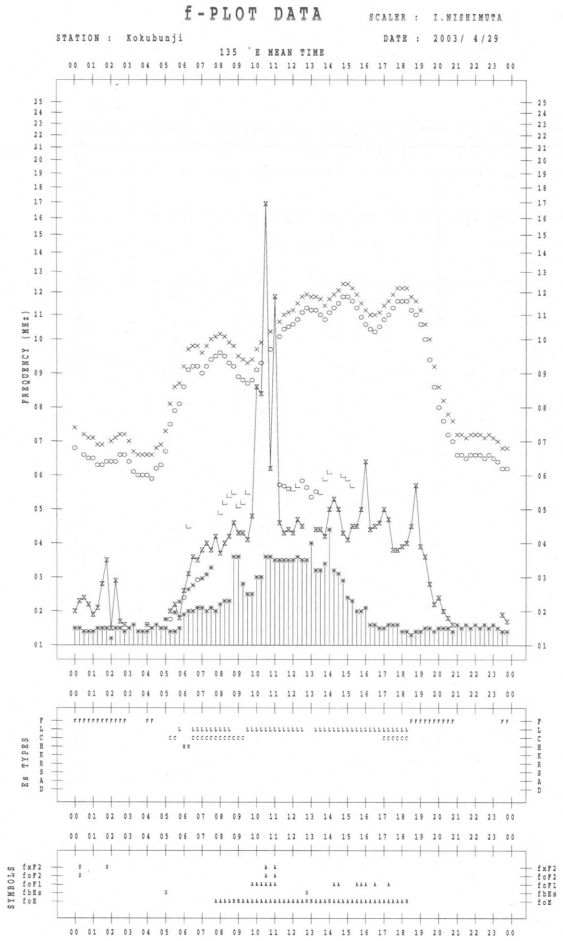

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 4/24
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 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 : 2003/ 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 : 2003/ 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 : 2003/ 4/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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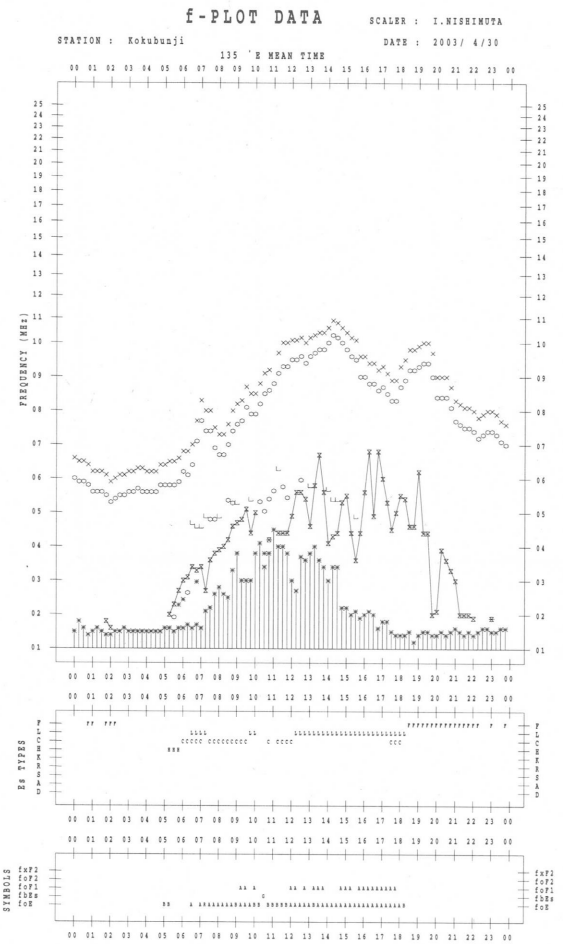
STATION : Kokubunji
DATE : 2003/ 4/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 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 2003

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	38	37	37	38	38
2	37	35	33	39	36
3	38	37	37	41	39
4	39	35	35	34	36
5	35	36	34	38	36
6	35	34	33	38	35
7	33	31	30	34	32
8	34	-	-	34	34
9	-	-	-	-	-
10	33	31	30	33	31
11	-	29	30	-	29
12	-	-	27	31	28
13	-	26	26	30	27
14	28	28	30	31	29
15	31	29	-	31	30
16	30	27	28	32	29
17	28	25	24	32	27
18	27	26	26	31	28
19	29	26	26	29	28
20	30	31	31	32	30
21	32	31	29	-	31
22	-	-	31	38	35
23	37	38	37	34	36
24	34	35	35	35	35
25	35	34	34	36	35
26	37	35	33	40	36
27	40	35	33	42	37
28	37	33	33	39	35
29	33	33	33	36	34
30	32	33	35	40	35
31					

Note: The symble '-' stands for no available data.

A superscript * stands for being superposed on a burst.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso April 2003

Single-frequency observations

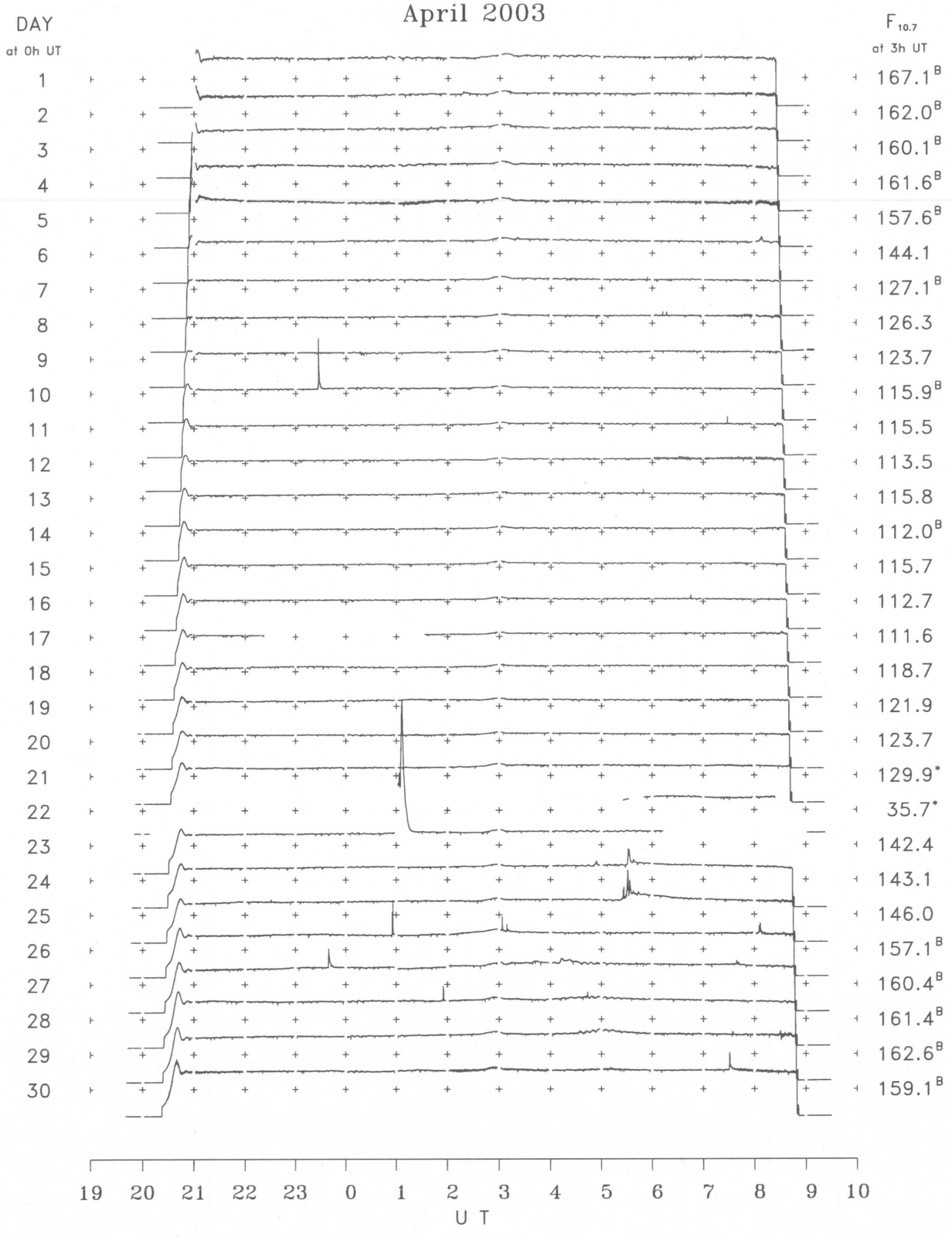
Normal observing period: 2005 – 0915 U.T. (sunrise to sunset)

APR. 2003	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
4	500	7 C	0239.0	0239.0	5.0	10	–	0
9	2800	8 S	2327.0	2327.0	4.0	140	–	0
11	500	8 S	0728.0	0729.0	1.0	15	–	0
11	2800	8 S	0729.0	0729.0	1.0	20	–	0
11	500	8 S	0807.0	0807.0	1.0	10	–	0
13	500	8 S	0430.0	0430.0	1.0	10	–	0
13	500	42 SER	2115.0	2115.0	4.0	65	–	0
17	500	7 C	2122.0	2123.0	3.0	15	–	0
22	500	7 C	2052.0	2057.0	13.0	35	–	0
22	500	8 S	2113.0	2113.0	1.0	40	–	0
22	500	8 S	2125.0	2126.0	2.0	305	–	WL
23	2800	4 S/F	0100.0	0107.0	17.0	370	–	0
23	500	47 GB	0100.0	0110.0	21.0	1970	–	WR
23	500	47 GB	0129.0	0131.0	3.0	970	–	MR
23	500	47 GB	0154.0	0301.0	126.0	3060	–	ML
24	2800	4 S/F	0531.0	0532.0	5.0	45	–	0
24	500	8 S	0729.0	0729.0	1.0	40	–	MR
24	500	8 S	0737.0	0737.0	1.0	15	–	MR
24	500	8 S	2149.0	2149.0	1.0	15	–	0
24	500	8 S	2231.0	2231.0	2.0	25	–	0
25	500	8 S	0443.0	0443.0	1.0	10	–	0
25	2800	7 C	0526.0	0531.0	10.0	85	–	0
25	500	4 S/F	0528.0	0538.0	23.0	65	–	0
26	2800	8 S	0055.0	0056.0	2.0	95	–	0
26	500	8 S	0235.0	0236.0	1.0	30	–	0
26	2800	8 S	0304.0	0304.0	1.0	40	–	0
26	500	8 S	0304.0	0304.0	1.0	15	–	0
26	500	4 S/F	0804.0	0807.0	5.0	215	–	0
26	2800	4 S/F	0805.0	0807.0	4.0	30	–	0
26	500	8 S	2313.0	2313.0	1.0	25	–	0
26	2800	3 S	2339.0	2340.0	6.0	55	–	0
26	500	4 S/F	2339.0	2339.0	6.0	190	–	0
27	500	42 SER	0354.0	0401.0	36.0	60	–	0
27	500	8 S	0646.0	0646.0	1.0	60	–	0
27	500	8 S	0739.0	0740.0	1.0	125	–	0
27	500	8 S	2147.0	2147.0	1.0	80	–	0
28	2800	8 S	0155.0	0155.0	1.0	40	–	0
28	500	8 S	0155.0	0155.0	1.0	20	–	0
28	2800	8 S	0400.0	0400.0	1.0	25	–	0
28	500	8 C	0443.0	0445.0	4.0	15	–	0
28	500	8 S	2212.0	2212.0	1.0	10	–	0

B. Solar Radio Emission

B3. Summary Plots of $F_{10.7}$ at Hiraiso

April 2003



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

IONOSPHERIC DATA IN JAPAN FOR APRIL 2003
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