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IONOSPHERIC DATA IN JAPAN

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COMMUNICATIONS RESEARCH LABORATORY
INDEPENDENT ADMINISTRATIVE INSTITUTION
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INTRODUCTION

This Series contains data on ionosphere (I) and solar radio emission (S) 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°23.6'N	141°41.1'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)

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.

HOURLY VALUES OF foF2 AT Wakkanai

JUL. 2003

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1.0MHz TO 30.0MHz 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	55	54	54	53	51	57			A	A	A	A					56	A	A	60	67	65	68	71
2	60	55	52	53	54	53	A	A	A	A	A	A		A				A	A	65	77	71	74	66
3	71	66	62	63	54	61	54	78	84	75	A	A	A	62	56	A	A	A	A	70	74	75		63
4	54	53	45	52	55	55	A	A	A	A	A					56	55	58	57	58	A	A	67	66
5	54	55	54	51	45	55	63	A	A	A	A	A	A	A		A	A	A	57	A	A	73	74	66
6	63	64	63	54	61	A	62	A	A		A		A	A	A	A	A	A	A	A	55	74	61	66
7	66	55	63	54	54		62	73	A	70		62	66		56			62	A	A	76	66	63	54
8	66		54	55	55	A	A	A	A	A	A	A	A	A	A	A	57	A	51	A	A	A	72	72
9	66	63	54	55	A	58	68	A	84	A	A	A	A	A	65	70	A	A		A	A	75	A	A
10	72	67	74	61	52	51	A	A	A	A	A	A	A	A	A	57	57	58	A	57	54	A	A	A
11	61	52	54	55	54	63	77	77	72	A	A	A		67	67	70	72	69	67	75	77	66	78	72
12	54			55	54	70	60	63	A	A	A						A	53	57	57	47	55	53	54
13	51	A	48	54	48	A	A	A	A	A	A	A	A	A	A	A	A	A	60	A	A	73	A	A
14	62	55	55	52	55	60	A	A	A	A	A	61	A	67	A	64	65	A	A	A	A	A	A	A
15	A	61	63	57	62	61	A	71	A	A	A	A	A	A	59	57	A	71	A	66	64	73	77	72
16	66	64	51	55	51	61	64	A	A	59	A	A	A	A	A	57	70	70	76	83	76	76	78	65
17	73	72	71	66	65	65	54	A	A	A	A	A	A	A	A	A	A	A	A	A	58	61	61	58
18	55	55	55	54	47	47	55	61	A	A	A	A		A	A	66		A	A	64	A	63	66	65
19	50	54	54	55	48	60	61	67	82	72	A	74	77	74	74	70	71	66	65	77	A	53	A	71
20	54	67	65	61	54	55	A	66	A	A	A	A	A	A	67	A	A	A	A	A	76	79	A	A
21	A	71	71	61	55	60	A	A	A	A	A	63	A	72	71	66	A	A	71	A	76	76	76	72
22	65	65	72	66	62	68	77	77	70	A	A	A	A	A	A	A	67	A	71	A	A	A	A	76
23	A	65	64	58	54	53	58	64	A	A	A	A	A		A	A	65	67	68	77	72	A	71	66
24	65	A	A	50	46	48	57	A	62	A		69	67	67	61	A	68	68	75	77	A	76	77	72
25	72	66	66	65	56	58	73	71	66	A		67	62		58	63	A	A	71	A	A	64	66	66
26	66	58	C	58	55	A	58	56	55	A	A	A	A	A	A	A	63	70	77	81	76	77	75	
27	61	54	53	49	44	44	A	A	A	A	A	A	A			69	60	A	70	66	65	61	60	54
28	A	53	55	40	44	52	A	A	A	A	A				58	60	66	62	67		68	72	A	66
29	61	52	55	54	54	A	58	A	A	A			A			A	A	59	A	A	A	A	54	A
30	55	52		42	40		51	52	A	A	A	A				A	A	A	A	61	66	54	A	42
31	36	34	30	31	35	A			A	A	A						A	A		50	54	67	66	47
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	27	31	30	23	18	13	8	4		6	4	6	11	13	14	13	16	17	19	24	21	24
MED	61	55	55	55	54	58	60	67	71	71		65	66	67	61	64	65	66	68	66	68	72	68	66
U Q	66	65	64	58	55	61	64	75	83	73		69	72	72	67	69	68	69	71	77	76	75	75	71
L Q	54	54	54	52	48	53	57	62	64	64		62	64	67	58	57	57	58	58	59	58	63	62	60

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

JUL. 2003

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1.0MHz TO 30.0MHz 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	28	G	G	G	G	35	42		47	50	58	44	G	G	G	G	50	67	95	58	33	59	67	32
2	72	29	G	G	37	53	77	64	80	69	68	45	G	52	G	G		55	88	72	28	43	G	G
3	G	G	G	G	G	G	G	39	56	52	88	68	74	G	47	64	78	82	82	58	59	56	28	46
4	G	G	G	G	30	39	60	65	88	66	60	G	G	G	G	41	42	39	44	52	60	59		65
5	31	27	G	38	40	46	52	70	55	44	43	60	69	73	47	78	76	88	44	70	83	50	40	29
6	39	G	28	38	53	78	57	97	79	50	61	43	67	90	74	51	58		80	83	38	60	26	33
7	65	46	34	45	30		39	48	68	56	43	52	60	G	G			60	97	86	32	39	G	27
8	26	G	31	29	34	70	91	82	107	63	86	83	99	64	80	82	62	83	64	80	101	69	30	43
9	60	70	40	40	79	35	54	88	78		75	62	47	47	55	62	78	110		164		77	83	80
10	60	58	56	45	33	36	71	100	96	110	166	76	69	76	80	51	38	44	69	42	49	69	65	65
11	43	44	47	G	G	36	47	56	52	51	97	64	76	G	G	42	59	49	G	G	G	G	G	G
12	29		34	G	G	37	58	52	51	86	55	44	G	G	G	G	45	G	38	34	41	39	37	39
13	48	60	36	39	43	51	65	80	73	117	87	66	78	81	59	109	69	77	62	96		60	84	69
14	46	78	39	27	28	36	55	69	68	67	81	66	62	G	76	48	48	72	148		180	84	81	69
15	60	38	40	44	37	35	60	53	65	74	72	60	76	84	42	41	96	62	88	40	43	59	25	G
16	29	39	48	39	33	G	49	72	74	49	50	99	67	73	70	64	48	G	G	G	G	G	G	G
17	27	70	34	G	29	35	39	45	48	47	88	81	110	121	76	64	77	59	60	58	48	47	45	50
18	58	G	G	26	G	G	G	46	60	74	62	58		52	51	68	65		98	56	78	37	27	34
19	38	29	G	G	33	28	40	52	73	60	80	42	G	G	50	46	42	46	95		147		87	70
20	44	30	43	36	39	G	49	38	76	72	78	62	71	69	42	69	100	60	107	79	58	68	84	101
21	70	50	51	32	38	40	60	78	72	74	60	57	74	43	62	59	180	146			146	68	76	60
22	67	60	32	32	30	36	43	61	65	82	78	51	155	120	77	76		95	79	61	153	88	93	72
23	80	54	35	39	43	31	42	52	100	73	89	82	164	48	75	74	52	69	52	58	58	70	60	48
24	52	110	72	40	G	32	38	59	57	87	66	61	48	46	42	66	50	60	61	58	82	50	39	33
25	28	31	G	46	36	32	50	60	65	65	45	63	52	G	G	51	84		48	150	112	52	40	32
26	39	40	C	33	32	79	40	48	57	74	51	63	61	62	61	50	44	39	49	50	60	77	68	
27	G	G	G	28	G	34	50	68	83	69	61	73	65		59	50	52	76	53		41	30	38	51
28	81	33	43	27	28	34	46	60	71	70	85	42	G	G	G	G	60	50	46	60	52	59	60	39
29	27	26	32	32	38	70	44	64	77	67	G	G	48	47	44	95	83	50	104	78	80	82	36	72
30	33	36	44	44	31	47	44	44	52	67	73	79	G	G	41	53	58	54	54	43	39	39	77	32
31	34	27	24	G	32	39	44	50	60	68	72	51	46	G	G	41		77		G	G	G	34	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	31	31	30	31	30	31	30	31	31	30	30	31	30	27	28	28	27	29	30	30	30
MED	39	34	34	32	32	36	49	60	68	68	72	61	64	47	47	52	59	60	63	58	58	59	40	41
U Q	60	54	43	39	38	46	58	70	78	74	85	68	74	73	70	68	78	77	91	79	82	69	76	65
L Q	28	26	G	G	28	32	42	50	57	56	58	45	46	G	G	42	48	49	48	43	38	39	28	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Wakkanai

JUL. 2003

LAT. 45°23.5'N LON. 141°41.2'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

JUL. 2003

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 30.0MHz 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	72	59	64	54	54	64	65	62	A	A	A		A	A		A	67		69	66	61	66	66	66
2	A	54	55	53	53	69	63	A	A	A	A	A	A	A	A	A		A	A	A	A	71	A	A
3	74	A	75	54	46	A	67	91	85	A		A	72	78	76	75	75	76	77	A	A			66
4	62	55	54	55	54	50	A	A	A	A	A	A	A		A		58	67		63	A	A	65	63
5	54	61	61	53		58	75	71	70		73	63			67	67	64	A	A	77	A	71	66	72
6	73	72		53	62	66	75	A		69	A	63	A		74	72	70	A	76	70	54	63	54	54
7	A	A	A	66	62	A	75	88	91			A	A	90	83	A	A			A	A	64	66	A
8	61	66	61	54	54	58	69	85	76		A	A	68	68	66	68	67	63	67	77	76	66	66	73
9	74	72	66	65	54	A		81	101	71		A	A	A	73	77	78	A	80	90	76	66	63	66
10	72	72	66	66	57	47	54	64		66	A	A		A	91	A	A		61	97	A	A	A	A
11	A	62	63	A	54		A	79	69	69	70	77	83	90	84	90	87	80	72	86	86	75	53	77
12	78	73	58	53	73	76	76	69	A	A	A	A		A			A	59	66	60	A	A	A	A
13	55	54	47	42	42	53		84	65		A	A	A	69	67	A		67	66	75	86	A	A	A
14	A	A	A	A	55	51	71	71	66	A	A	A	A	A	A	A	66	73	85	A	81	77	74	76
15	75	73	75	A	61	78	81		A	A	A			77	77		82	91	91	77	74	72	81	77
16	A	63	55	54	52	59	67	78	75	A	A	A		A	86	88	81	81	A	85	87	88	101	87
17	86	88	100	88	88	79	82	76	74		A		A	A	A	A	58	56	A	59	A	A	A	54
18		55	63	55	66	61		A	54	A			A	A	A	77	85	81	70	61	54	72	52	61
19	64	64	54	A	A	51	66	69	77	71	A		97	A	85	81	81	87	91	84	73	A	67	74
20	75	74	76	66	58		62	72	78	75		78	69		71	80	84	78	75	81	81	76	66	71
21	71	A	73	71	72	72	84	86	90	A	A	A	72	80	81	81	A	78	77	77	77	66	74	74
22	62	66	A	64	63	69	76	96	94	91	77		74		80	80	76	A	A	77		82	72	A
23	A	66	73	66	A	58	76	85	62					71	76	77	78	90	86	77	76	76	72	66
24	61	53	55	51	54	A	66	A	A	66	A	A	A	A	68	68	72	76	80	78	A	A	75	77
25	85	80	75	66	61	66	86	76	86	A	A	A	A	69	71	72	A	88	87	A	87	83	75	77
26	75	77	74	69	67	66	73	A	69	A	61	A	A			A	A	82	97	A	A	63	72	75
27	73	66	64	55	52	52		64	A	A		72	66	67	A	72	67	A	67	78	73	54	A	62
28	A	54	54	54	51	48	57	77	99	69	59			76	72	78	73	67	69	73	77	77	65	
29	69	67	64	52	55	64	69	77	85			69	64			A	A	62	75	73	54	53	49	
30	54		51		45	45	54	A			A		62				56		57	65	A	A	54	54
31	52	A	47	A		41	A		A	A	A	A	A	A		A	A	58	61	64	63	54	A	66
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	25	27	25	27	25	24	22	20	9	5	6	10	11	19	17	21	21	24	25	19	22	23	23
MED	72	66	63	55	55	59	70	77	76	69	70	70	70	76	76	77	73	76	75	77	76	71	66	71
U Q	75	72	73	66	62	67	76	85	88	73	75	77	74	80	83	80	81	81	82	79	81	76	74	76
L Q	61	57	55	53	53	51	65	71	69	67	60	63	66	69	71	72	66	65	67	65	63	64	63	63

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Kokubunji

JUL. 2003

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 30.0MHz 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	30	45	43	40	40	G	56	50	68	49	106	50	83	98		60	G	84	32	G	24	36	35	49
2	70	72	57	G	G	33	52	105	108	74	60	90	118	96	73	89	53	64	63	65	59	31	91	78
3		85	81	G	G	60	45	66	58	76	68	72	48	G	49	65	G	60	94	94	100	59	104	83
4	39	82	50	43	33	28	57	65	94	124	94	102	90	128	118	73	41	G		92	84	77	49	43
5	40	59	46	40	29	38	45	70	49	55	43	45			G	47	50	72	82	92	150	83	60	58
6	45	40	36	40	24	48	57	92	84		91	82	89	80	G	52	57	115	55	G	40	49	40	49
7	102	60	108	51	50	72	47	86	124	142		178	145	81	60			75			160	84	57	71
8	47	39	26	26	51	69	40	54	59		96	132	48	G	70	56	G	G	G	G	29	G	G	27
9	60	46	36	39	57	63	67	69	109	59	63	68	96	103	G	76	G	122	41	39	37	46	34	33
10	G	40	G	28	G	G	43	63	77	50	163	91	76	80	116	112	100	62	55	92	106	85	82	92
11	105	60	52	83	70		93	69	60	42	G	46	G	G	G	G	49	47	43	38	36	G	G	34
12	G	G	46	38	G	42	55	59	70	82	97	69	60	74		58		39	125	49	94	104	86	94
13	35	37	G	31	28	41	57	72	50	62	90	133	82	G	47	96	71	G	43	85	80	80	103	91
14	94	83	92	55	57	G	52	69	61	64	92	107	99	104	99	104	53	51	61	115		79	46	36
15	G	G	31	85	33	G	48	61	85	95	92	45		80	74		53	44	34	34	37	49	50	71
16	90	49	G	G	33	47	59	50	70	148	118	71	62	80		49	G	60	95	G	G	G	G	23
17	50	53	33	G	37	60	53	70	71		83		124	60	50	68	38	G	64	61	169	71	59	33
18	59	43	60	61	40	47	45	62	57	78	68	53	67	120	95	80	48	65	43	43	40	30	29	44
19	72	48	82	92	70	G	G	55	66	62	83	73	67	132	84	61	53		61	70	46		40	41
20	31	G	G	25	G			50	G	50	47	G	50		G	G	G	G	31	36	31	G	G	41
21	59	102	69	46	G	35	61	68	79	104	61	103		G	62	60	83	64	60	54	40	34	41	48
22	58	80	80	56	53	34	47	48	50	57	57		47		G	50	61	102	96	47		54	46	
23	106	60	60	60	78	35	47	47	48	47		50		51	G	51	G	50	40	34	32	51	G	39
24	G	G	G	G	G	51	60	84	80	52	81	105	92	87	57	99	94	69	62	61	94	124	71	60
25	70	53	93	81	58	54	55	64	87	109	62	138		G	G	50	94	51	71	107	47	G	43	40
26	40	31	44	39	27	28	46	116	62	102	84	82	80	131	133	80	88	60	52	94	71	40	53	80
27	91	80		58	41	40	47	59	67	80	50	G	G	G	86	142	81	101	61	66	50	50	59	59
28	70	G	G	G	G	29	G	40	68	59	G			50	G	G	G		40	33	55	G	68	
29	39	G	G	G	G	G	95	45	48	G		G	53	51	58	90	81	95	78	40	30	G	G	
30	G	49	G	33	58	40	43	59	53	48	52		G				G	81	40	31	55	94	59	36
31	40	69	28	60	38	34	53	60	60	74	105	156	51	109		118	63	G	34	32	G	40	70	36
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	31	29	30	31	31	28	28	27	25	27	26	28	29	29	29	30	29	30	31	28
MED	48	49	44	40	33	38	52	63	67	63	82	73	67	80	58	63	53	60	55	48	47	49	49	46
U Q	70	69	60	58	53	49	57	70	80	88	93	105	91	103	84	89	76	78	67	85	89	79	68	71
L Q	35	37	G	25	G	28	45	54	57	51	58	50	49	G	G	50	G	41	40	34	34	30	34	36

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Kokubunji

JUL. 2003

LAT. 35°42.4'N LON. 139°29.3'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	33	17	13	33	25	21	33	35	35	35	36	36	39	37		29	13	30	17	14	15	18
2	13	17	13	34	14	15	14	20	20	33	36	37	36	34	35	34	33	28	14	14	15	15	15	14
3	18	20	17	33	15	14	24	31	33	34	35	34	35		40	38		29	17	17	14	17	18	15
4	21	15	13	13	14	15	17	21	21	36	37	38	36	43	31	30	23	18	17	13	21	14	14	15
5	14	14	22	14	14	15	17	20	33	35		37					34		15	18	17	14	14	14
6	17	15	14	13	20	18	31	20	33	34	40	34	42	37	54	35	34	33	20	30	14	17	22	18
7	20	17	14	17	13	18	14	18	34	34	35	34	34	31	29	23	34	34		18	17	33	17	14
8	15	14	17	17	17	13	18	20	30		34	33	34		42	35			34	21	14	17	33	18
9	23	18	15	17	13	15	17	20	34	35	34	34	34	33		38		33	34	20	18	14	14	17
10	15	17		15		36	18	34	34	35	43	37	37	35	33	34	28	21	17	30	34	13	14	18
11	34	18	15	21	34		15	23	34	35	53						33	33	20	15	15	20	36	18
12	14	18	14	14		18	14	34	34	36	34	36	44	34		34		18	25	15	13	13	15	15
13	18	15	18	15	14	17	20	28	34	34	34	36	35		34	36	33	40	18	18	18	15	20	18
14	20	15	14	14	34	15	22	34	34	34	37	39	39	36	35	34	33	17	34	20	14	14	14	14
15	33	33	14	17	17	28	20	29	33		34	37		36	38		34	18	18	14	14	20	20	31
16	15	20	14	22	15	13	15	15	30	33	34	34	31	34	30	36	21	21	13	17	15	21	14	14
17	14	15	13		13	14	14	20	18		36		34	34	34	31	25		21	13	17	18	13	13
18	15	15	13	13	13	15	17	29	33	37	36	42	39	38	34	33	24	17	14	17	14	13	17	14
19	14	14	15	14	14	21	31	22	33	35	37	36	36	37	34	29	34	22	18	28	17	14	28	17
20	15	18	18	18	33		18	37		35	39		38		52			21	14	17	15	14	40	13
21	21	36	15	13	21	18	18	20	34	34	37	39	39	55	39	36	34	21	22	13	14	14	15	14
22	28	14	18	14	15	14	17		33	34	39		40		54	37	34	18	17	13	15	15	15	14
23	15	34	15	25	17	15	15	30	33	34		43		39		38	44	18	17	17	15	15	20	23
24	17		13	20	13	14	15	29	18	35	37	42	39	38	38		35	20	15	23	18	14	13	14
25	29	17	13	14	15	13	25	18	20	34	34	34	35			35	34	34	18	14	15	17	20	15
26	17	15	14	13	17	18	13	34	31	34	34	35	35	34	36		24	24	18	17	14	17	21	22
27	15		34	17	15	17	21	21	33	34	34	52		50	34	35	21	18	18	13	15	14	15	21
28	15	18	18	17	21	17	14	20	20	33	44			38			21	23	15	14	17	28	13	
29	21		23	15		34	15	21	34				39	39	35	34	34	22	35	14	14			
30	34	33	40	14	34	18	33	34	34	34	34		52					24	18	14	15	17	14	14
31	15	28	20	34	13	17	33	20	34	34	36	34	39	40		34	30	21	18	14	29	13	26	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	28	30	30	28	29	31	30	30	27	28	24	25	22	22	23	24	28	30	31	31	30	30	29
MED	17	17	15	16	15	17	17	21	33	34	36	36	36	36	35	35	33	22	18	17	15	15	15	15
U Q	21	19	18	18	18	18	22	30	34	35	37	38	39	39	39	36	34	29	20	20	17	17	20	18
L Q	15	15	14	14	13	14	15	20	30	34	34	34	35	34	34	34	24	18	15	14	14	14	14	14

HOURLY VALUES OF foF2 AT Yamakawa

JUL. 2003

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1.0MHz TO 30.0MHz 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	54	65	66	66	57	58	66	66	A	A		A	A	A	78	A	A	80	80	76	66	54	63	67
2	66	55	66	54	50	52	57	82	76	A	A	A	A	A	A	A	A	70	68	67	68		53	66
3	A	55	72	A	34	36	65	79	63	64	A	67		A	80	85	79	78	90	A	A	66	A	A
4	54	A	A	A	55	55	60	A	A	A		A			67	67	72	80	78	A	A	53	54	66
5	A	66	66	67	61	64	60	68	A	A	A	A	A	A	A	A	81	85	86	84	79	54	65	66
6	77	74	55	54	51	52	74	71	A	A	A	A	A	A	80	78	82	86	78	80	66	A		73
7	64	61	55	34	52	52	73	80	73	64	54	76	80	79	78	A	80	77	77	A	78	66	A	A
8	A	71	66	57	55	62	67	67	62	A	78		73	75	76	80	77	72	78		79	53	53	54
9		52	55	61	54	51	51	80	78	65	A	A		73	78	78	85	A	A	86	67	67	54	66
10	72	70	66	63	51	43	59	74	82	71		A	A	A	73	75	A	70	70	A	A	72		
11	54	52	54	66	52	54	A	71	55	71	78	76	78	74		86	82	84	85	83	78	78	74	77
12	79	78	A		64	66	62	66	A	A	A	A	A		67		A	77	74	A	A	54	A	A
13	A	55	A	A	A		61	A	A	A	A	A		A	81	78	A	80	82	80	81	A	A	54
14	A	54	54	55	54	54	74	66	A	A	A	A	77	A	80	78	78	86			78	77	78	76
15	78	A	75	72	66	66	66	82	66	76	A	A	74		80	82	79	85		81	78	66	78	78
16	77	A	A	A	51	50	58	73	80	A	A	A	74	78	88	87	81	80	80	87	80	78	84	84
17	86	78	84	83	77		78	77	89	78	A	A	A				66		62	66	66	A	A	56
18	54	54	A	66	54	34	A	A	A	A	A	A	A			76	84	85	71	66	76	64	66	66
19	66	71	66	66	57	54	66	76	74	76		72	69	85	78	80	86	88	86	78	78	77	66	73
20	74	73	74	66	67	66	66	83	77			73			75	81	80	81	78	82	84	80	63	
21	55	66	66	66	65	70	77		A	A	A	A	74	78	81	81	A	81	80	78	79	77	A	72
22	A	72	67	66	60	54	70	80	86	80	68		78		78	80	81	82	82	77	78	80	73	A
23	63	A	A	A	53	A	78	78	71	A	66			73	78		84	81	81	80	78	77	66	66
24	77	72	64	54	60	62	59	63	65		A	68	68			72	78	80	80	80	80	A	A	77
25	76	78	76	77	67	63	66	76	A	68	74	A	A	A	A	85	81	84	82	80	84	84	77	76
26	77	72	66	67	71	58	67	82	71	A	A	A		73	76	78	82	84	86	81	55	59	A	66
27	54	54	54	53	48	43	38	54	A	A	72		66		80	79	68	71	72	85	81	63	54	58
28	54	53	54	51	46	52	A	76	78		56			78	80	78	78	71	67	66	77	77	54	51
29	55	53	61	51	52	52	63	72	64	55	75	81	76	77	73	71	78	86	78	88	A	54	66	54
30	66	53		46	50	36	32	A	A	A	A	A	67			49	64	67	67	71	42	41	50	A
31	A	A	A	38	37	36	A	53	A	A	A			A	70	63		68	77	74	63	54	54	66
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	26	23	25	30	28	27	26	18	11	9	7	13	11	23	24	24	29	28	24	26	26	21	24
MED	66	66	66	63	54	54	66	75	74	71	72	73	74	77	78	78	80	80	78	80	78	66	65	66
U Q	77	72	67	66	61	62	70	80	78	76	76	76	77	78	80	81	82	84	82	82	79	77	73	74
L Q	54	54	55	53	51	50	59	67	65	64	61	68	68	73	75	75	78	74	73	75	67	54	54	62

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamakawa

JUL. 2003

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	41	41	29	25	G	G	28	55	66	87	48	114	149	109	75	102	128	59	32	G	G	26	29	57
2	54	49	72	81	28	35	35	40	51	133	84	153	105	108	137	116	78	54	51	43	40	40	38	39
3	54	G	59	50	30	G	G	41	55	G	69	85		82	74	G	84	56	150	116	133	71	79	113
4	46	93	59	61	54	43	46	73	68	90	61	82			56	43	G	43	46	88	93	43	33	G
5	84	59	46	38	34	26	31	85	154	152	130	113	173	94	72	87	57	104	54	81	32	32	29	41
6	42	50	52	34	28	26	44	60	93	185	175	119	84	90	64	54	70	83	74	G	39	59	39	29
7	G	G	G	G	G	G	40	66	81	51	73	G	54	62	60	117	52	38	73	114	34	57	84	82
8	71	59	60	43	34	G	38	93	71	78	60		G	45	G	G	51	67	63		34	30	28	38
9		40	33	40	39	33	41	50	57	54	61	74		G	G	59	52	86	85	35	31	40	44	32
10	32	28	33	26	G	G	G	40	51	71	62	80	119	90	54	78	105	60	59	86	84	72	34	32
11		36	83	71	77	47	64	52	47	52	84	59	G	G	G	G	G	44	43	68	61	53	54	60
12	39	41	72	30	28	31	37	60	78	94	168	178	65	72	G		85	39	134	116	55	39	67	78
13	78	57	70	83	60	50	43	83	86	101	123	132	61	123	G	61	97	72	51	G	35	81	88	58
14	60	49	42	36	30	56	50	55	95	83	106	150	72	81	73	G	G	92		78	27	72	57	71
15	58	93	35	G	28	G	80	38	49	49	85	60	60		51	56	41	41		29	30	34	77	37
16	56	60	50	92	36	25	34	39	64	153	119	95	60	52	G	G	49	52	38	G	27	27	24	26
17	36	38	28	G	25		28	39	61	75	158	122	104		56	55	G	60	71	40	35	49	84	56
18	54	44	43	38	42	35	68	78	90	162	95	84	151	53		G	53	53	46	32	35	28	37	37
19	33	28	G	G	G	G	34	44	49	51	55	45	G	G	G	G	59	45	41	36	38	33	41	34
20	24	28	30	26	28	26	39		G	G		G	G		53	G	53	37	36	29	33	40	38	G
21	G	43	28	59	41	26	42	74	103		79	108	65	55	G	71	84	60	50	50	68	60	71	40
22	60	60	54	34	35	G	36	40	51	53	43		59		G	G	G	47	84	45	57		71	71
23	71	86	84		56	72	33	70	53	53	G	46		G	G	79	51	51	48	48	43	40	40	46
24	42	34	30	28	33	G	33	52	62	52	66	G	G		57	52	53	59	51	58	43	85		84
25	81	59	72	40	50	71	46	49	95	70	57	93	87	110	88	G	51	44	48	60	87	65	83	48
26	46	54	35	36	32	28	40	43	44	72	67	58	53	53	G	49	53	44	40	51	41	53	39	G
27	36	G	33	72	56	27	34	40	107	61	G	G	57		G	65	G	G	33	29	G	G	G	34
28	33	32	37	52	37	49	82	38	43	G	G		G	G	43	54	56	55	48	35	30	G	33	36
29	32	G	G	G	G	G	28	33	42	58	76	G	56	G	G	G	53	55	77	86	80	34	G	G
30	26	G	G	G	G	G	34	91	94	61	62	67	53	G		G	G	G	35	36	36	38	28	38
31	61	83	71	40	42	43	72	41	116	172	84			87	G	G	72	56	43	G	G	G	33	27
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	31	30	31	30	31	30	31	30	30	27	26	24	29	30	31	31	29	30	31	30	30	31
MED	46	43	42	37	33	26	38	51	64	70	71	82	60	58	43	50	53	54	50	44	36	40	39	38
U Q	60	59	60	52	42	43	46	70	93	94	95	114	87	90	62	65	72	60	72	78	57	59	71	58
L Q	33	28	30	26	28	G	33	40	51	52	60	46	53	G	G	G	41	44	42	29	31	32	33	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Yamakawa

JUL. 2003

LAT. 31°12.1'N LON. 130°37.1'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	15	15	16	14	17	22	22	33	40	38	42	39		24	18	18	20	16	17	15	14
2	15	14	14	14	14	15	15	15	17	30			40	35	29	27	23	23	17	17	15	15	15	14
3	15	16	14	15	15	15	23	17	21	26	40	47		40	43		22	20	16	15	16	14	15	14
4	15	14	14	14	14	14	16	17	20	24		45			40	35		22	17	15	14	14	14	15
5	15	15	15	15	15	17	16	16	20	21			35	43		37	33	17	17	16	15	15	15	15
6	14	15	14	14	16	15	15	16	18	32	41	35	33	34	38	33	23	23	15	18	14	14	15	14
7	20	15	16	17	20	18	15	15	18	21	34	32	33	35	30	34	23	18	15	14	15	15	14	14
8	15	16	16	14	14	16	15	17	21	24	28			29	29		34	16	16		15	15	16	15
9		15	15	15	14	14	15	17	18	29	33	32				39	26	27	16	15	15	14	14	15
10	16	14	15	21	16	16	15	18	24	26	42	40	36	44	33	33	32	18	15	15	15	16	15	15
11	14	14	15	14	15	15	15	17	21	32	28	29	26	24	22	26		22	16	14	14	15	14	15
12	14	14	15	15	15	15	15	16	17		36	44	48	45	56		24	22	17	15	16	16	15	15
13	14	15	15	14	14	14	15	18	20	26	29	41	38	45		35	24	20	17	14	15	15	15	14
14	15	15	15	16	16	14	21	26	30	24		43	36	39	36	28	18	16		14	15	14	15	15
15	15	14	14	15	14	14	15	18	21	26	33	35	35		34	28	21	17		16	15	15	14	15
16	14	14	16	14	15	15	15	16	21	22	22	30	30	27	23	24	20	17	16	18	15	16	16	15
17	15	16	14	14	15		15	16	18	30	33	33	36				20	22	14	14	15	15	15	14
18	15	15	14	14	15	14	18	18	18	28	33	39	39	38			22	20	17	16	15	15	14	14
19	14	15	14	15	14	15	15	17	20	24	30	38			52	29	22	20	14	16	14	14	15	15
20	15	15	16	15	16	20	22	21	20	27			66		42	55	38	21	26	16	15	14	14	15
21	15	15	15	16	15	15	17	16	20	27	27	36	38			38	34	17	20	15	14	16	15	15
22	15	15	14	15	16	15	15	15	18	28	28		42					20	16	14	21	15	22	14
23	15	14	15	15	14	15	14	17	21	23	33	33				43	21	18	15	15	15	15	15	14
24	14	14	14	15	14	17	18	16	18	22	29				44		34	18	16	14	15	14	15	14
25	15	15	14	14	14	14	14	15	20	26	23	34	40	36	32	29	21	18	17	14	14	14	15	18
26	15	14	16	15	15	15	15	15	17	22	29	30	34	36	32	32	26	20	15	14	14	15	14	21
27	14	14	15	14	15	17	15	15	18	23	27	33	44			39	20	20	22	15	15	16	16	15
28	16	14	14	14	14	15	15	15	17	22	29				33	38	26	18	16	14	14	18	14	14
29	14	18	16	18	15	17	15	15	17	22	27		33	29	29	27	20	18	16	15	15	15	16	15
30	15	18	18	17	16	16	14	15	17	22	30	33	34	32		23	20	15	17	15	15	14	15	15
31	14	14	14	15	15	14	15	15	18	21	28					35	32	27	15	17	17	16	14	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	30	31	31	31	30	26	22	22	18	20	23	28	31	29	30	31	31	31	31
MED	15	15	15	15	15	15	15	16	20	24	30	35	36	36	34	33	23	20	16	15	15	15	15	15
U Q	15	15	15	15	15	16	16	17	21	27	33	40	40	42	41	38	29	22	17	16	15	16	15	15
L Q	14	14	14	14	14	14	15	15	18	22	28	33	34	32	29	28	21	18	15	14	14	14	14	14

HOURLY VALUES OF foF2 AT Okinawa

JUL. 2003

LAT. 26°40.5'N LON. 128°09.2'E SWEEP 1.0MHz TO 30.0MHz 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	65	64	64	65	60	52	51	62	67	71		75	82	93	104	100	98	106	101	80	66	64	64	64
2	66	72		62	47	47	A	76	A	67		A	A	A	A	88	A	A	97	90	79	77	74	73
3	66		76	44	31	30	58	72	60	66	75	72	65			100	102	102	90	88	71	A	65	66
4	64	62	60	64	58	48	64	A	A	A	A	A	A	A	77	82	93	100	A	102	76	61	66	66
5	73	66	74	66	61	64	66	66	67	73	A		78	81		80	86	102	110	104	81	74	73	74
6	86	77	70	67	66	58	64	66	72	66	66		A	A	A	97	A	A	108	88	76	66	73	66
7	72	80	64	63	66	63	73	70	A	A	72	77	84	86	84	86	98	92	90	87	84	87	66	66
8	55	66	73	61	64	65	66	62	60	70	71	66	73	78	85	90	88	87	A	102	80	54	66	66
9	64	62	63	66	56		57	78	67	62	69	71	69	77	82	83	83	98	108	109	76	66	72	66
10	75	73	78	62	52	47	53	77	74	74	73	87	97	A	87	85	88	86	90	87	86	65	60	64
11	66	66	71	63	50	48	55	66	62	73	76	85	95	108	122	114	96	106	110	90	85	76	76	81
12	78	87	74	62	63	65	54	67	71	79	66	72			92	80	78	91	92	74	66	54	54	54
13	A	54	54	54	62	A	58	62	A	A	A	A	78	78	100	A	94	104	108	90	87	86	78	82
14	77	73	66	55	59	72	60	66	A	65	A	A	A	A	A	102	107	A		110	A	82	107	
15	102	81	87	81	73	72	86	80	64	68	70	70	82	81	95	100	98	94	98	100	86	84	76	82
16	86	64	55	47	54	55	66	71	68	A	A	A	A	86	105	102	88	90	105	90	105	104	108	110
17	87		87	85	84	84	82	80	90	100	87	72	71	71		71	71	75	75	71	65	66	66	65
18	66	65	69	71	57	40	47	64		A	A	A	A	76	A	90	100	A	A	84	76	81	83	83
19	86	84	88	82	75	66	73	85	78	75	78	76	96	96	84	98	110	123	111	107	84	80	78	76
20	66	71	74	78	75	61	66	77	76	76	77	70	76	74		100	108	95	111	110	108	78	66	66
21	66	67	66	66	60	66	66	77	77	77	71	73	78	90	93	96	96	102	91	87	85	73	66	64
22	71	75	72	72	66	60	66	84	88	A	A	A	87	88	90	100	97	94	96	90	87	77	66	A
23	A	A	64	64	A	58	60	A	74	65	67	66	74	77	85	101	86	89	102	102	87	A	77	81
24	76	84	87	73	64	66	66	67	A	A	68	72	80	76	71	78	86	90	87	87	80	76	66	65
25	66	A	74	70	72	64	66	84	75	72	A	A	A	88	96	A	96	105	104	103	87	87	A	81
26	76	72	77	75	72	65	66	76	66	68	72	76	78	84	91	102	107	97	100	87	72	59	66	66
27	72	64	57	A	45	43	61	48	44	59	78	74	77	67	82	101	85	74	80	100	88	64	66	63
28	54	63	62	58	47	50	45	65	71	A			71	77	93	90	81	82	71	78	83	77	55	52
29	54	61	52	43	52	55	55	66	60	68	72	87	96	89	80	78	92	108	110	73	A	A	74	66
30	73	76	64	66	72	40		50	57	A	A	72	62	A			77	90	90	64	50	53	50	42
31	42	43		44	41	35	41	48	A	A			66	67	74	78	77	87	92	76	73	66	64	66
	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	27	29	30	30	29	29	29	23	21	18	19	23	23	22	28	29	27	27	31	29	28	30	29
MED	71	67	70	64	60	58	64	67	68	70	72	72	78	81	88	93	93	94	98	90	81	75	66	66
U Q	76	76	75	71	66	65	66	77	75	74	76	76	84	88	95	100	98	102	108	102	86	80	76	78
L Q	65	64	63	61	52	47	55	64	62	66	69	71	71	76	82	82	85	89	90	84	74	64	66	64

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Okinawa

JUL. 2003

LAT. 26°40.5'N LON. 128°09.2'E SWEEP 1.0MHz TO 30.0MHz 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	45	58	46	46	43	43	35	42	70	90		G	66	66	G	G	48	64	63	40	36	54	53	41
2	40	26	27	24	34	34	93	43	127	59	53	91	112	113	117	81	152	114	87	85	44	31	41	G
3	29	29	G	G	28	G	G	40	G	G	G	57	44			G	51	51	59	34	G	70	68	39
4	33	49	34	39	35	34	48	83	144	142	84			78	71	66	66	66	126		32	56	50	70
5	39	72	56	56	37	57	38	36	70	64	115		56	G		G	59	51	106	103	59	24	27	G
6	60	35	32	28	G	G	27	78	104	84	66	116	150	114	152	54	130	177	88	48	50	36	28	33
7	26	G	G	26	28	G	33	G	86	90		89	83	G	G	55	104	54	40	70	83	70	56	34
8	27	29	46	30	30	27	37	49	43	46	57	63	55	54	55	76	40	65	146	58	32	45	28	G
9	G	G	28	40	47	32	34	34	40	G	G	47	51	G	G	56	73	56	53	111	67	46	36	46
10	33	25	G	G	G	G	G	40	69	G	51	60	67	98	72	48	64	51	34	27	27	56	56	32
11	29	G	27	39	39	33	30	34	G	82	47	G	G	G	46	G	43	G	49	67	78	52	38	32
12	37	39	44	G	G	G	28	G	G	70	G	50			G	G	47	68	92	32	G	32	47	40
13	78	56	59	40	58	79	83	72	113		104	111	88	71	82	113	50	71	84	50	24	49	34	72
14	55	39	28	48	28	G	26	35	66	72	94	84	91	110	113	48	50	121	148	116		60	58	
15	60	36	39	53	50	G	32	57	46	72	56	76	64	54	56	G	48	G	42	38	29	G	24	67
16	39	78	41	G	G	G	29	32	51	82	114	136	146	54	G	50	40	G	G	28	28	28	28	27
17	26	49	72	59	G	G	32	50	61	50	53	70	46	G		50	G	46	38	G	G	59	70	69
18	59	40	36	26	34	G	G	49	71	172	128	75	76	78	85	57	88	94	79	45	44	43	32	36
19	G	G	G	G	53	58	40	34	66	60	58	68	58	46	G	G	48	G	50	68	28	G	G	70
20	26	G	G	G	G	25	G	G	G	G	G	G	G	G		G	50	51	G	35	40	40	50	34
21	G	G	G	35	25	G	G	35	44	G	G	G	G	G	G	59	52	52	46	40	36	46	32	43
22	39	46	72		81	58	61	71	80	127	134	104	84	45	G	48	57	52	46	40	56	42	29	81
23	90	79	36	28	77	55	70	74	77	66	62	G	47	G	G	G	52	46	46	38	41	79	72	58
24	38	51	36	37	36	30	27	36	81	156	50	G	G	56	56	52	54	G	42	42	35	40	52	59
25	57	88	89	78	92	51	71	38	46	74	86	116	79	G	47	114	54	68	60	61	60	91	112	91
26	30	40	37	43	28	G	G	45	55	65	56	66	66	66	70	50	110	52	55	59	38	59	56	57
27	40	40	58	90	30	G		41	G	G	G	G	G	52	46	58	46	45	38	N	41	36	42	56
28	35	32	G	G	G	G	G	34	68	80	42		G	G	45	G	G	G	40	34	G	G	G	G
29	35	G	G	G	G	G	G	G	42	44	50	G	51	G	47	G	46	58	44	39	108	93	78	38
30	G	G	G	G	G	G	G	G	43	86	47	78	78	62	47	G	G	G	37	49	G	G	G	G
31	25	G		26	35	39	29	42	46	56	44		65	63	61	G	G	44	43	32	27	41	27	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	31	31	30	31	31	30	29	27	29	29	27	31	31	31	31	29	30	31	31	30
MED	35	36	35	29	30	G	30	40	61	68	53	66	64	54	47	48	50	52	49	42	36	45	41	40
U Q	45	49	46	43	43	39	38	49	77	84	85	89	81	68	71	57	64	66	84	64	50	59	56	59
L Q	26	G	G	G	G	G	G	34	43	46	43	G	45	G	G	G	46	44	40	34	27	32	28	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

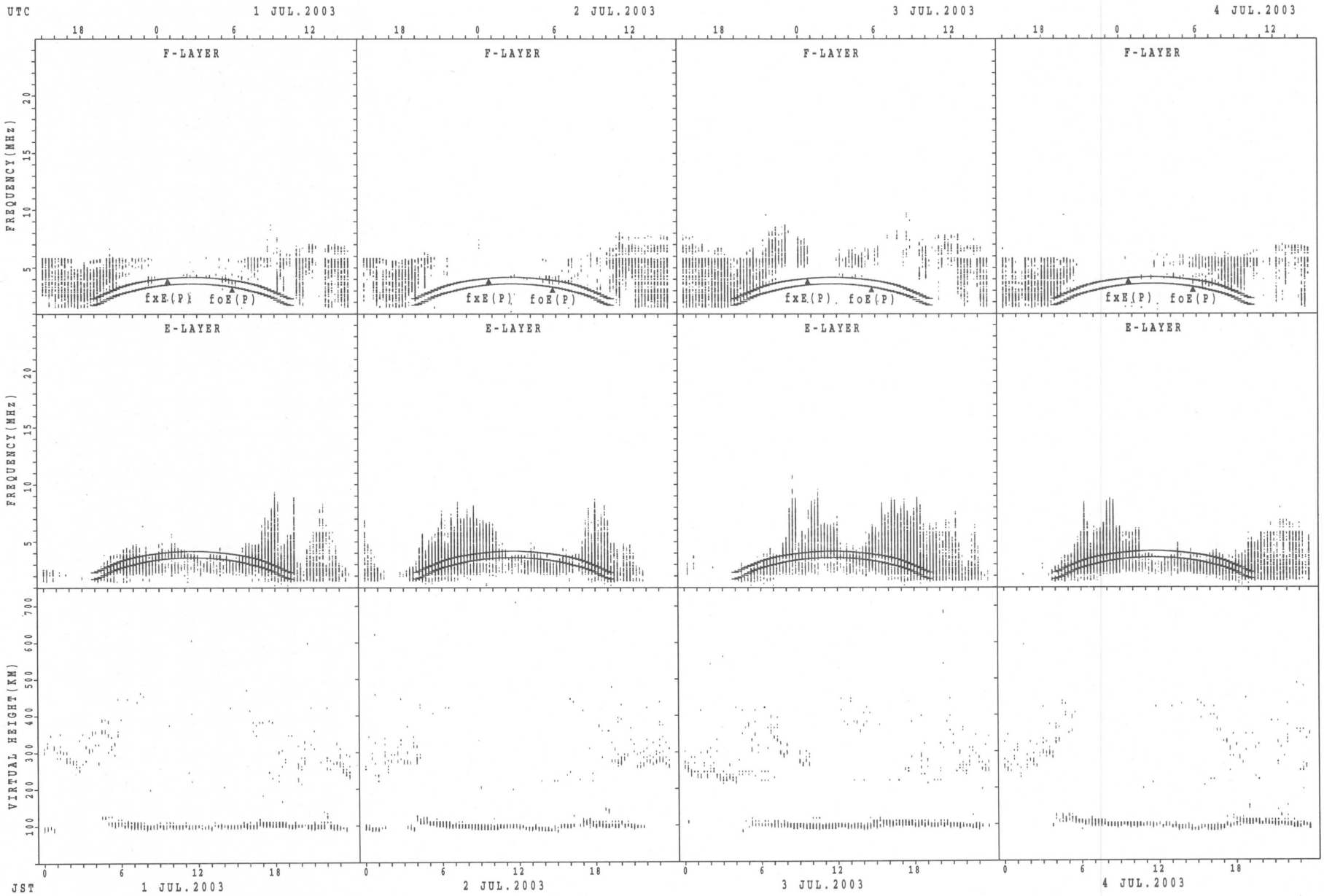
HOURLY VALUES OF fmin AT Okinawa

JUL. 2003

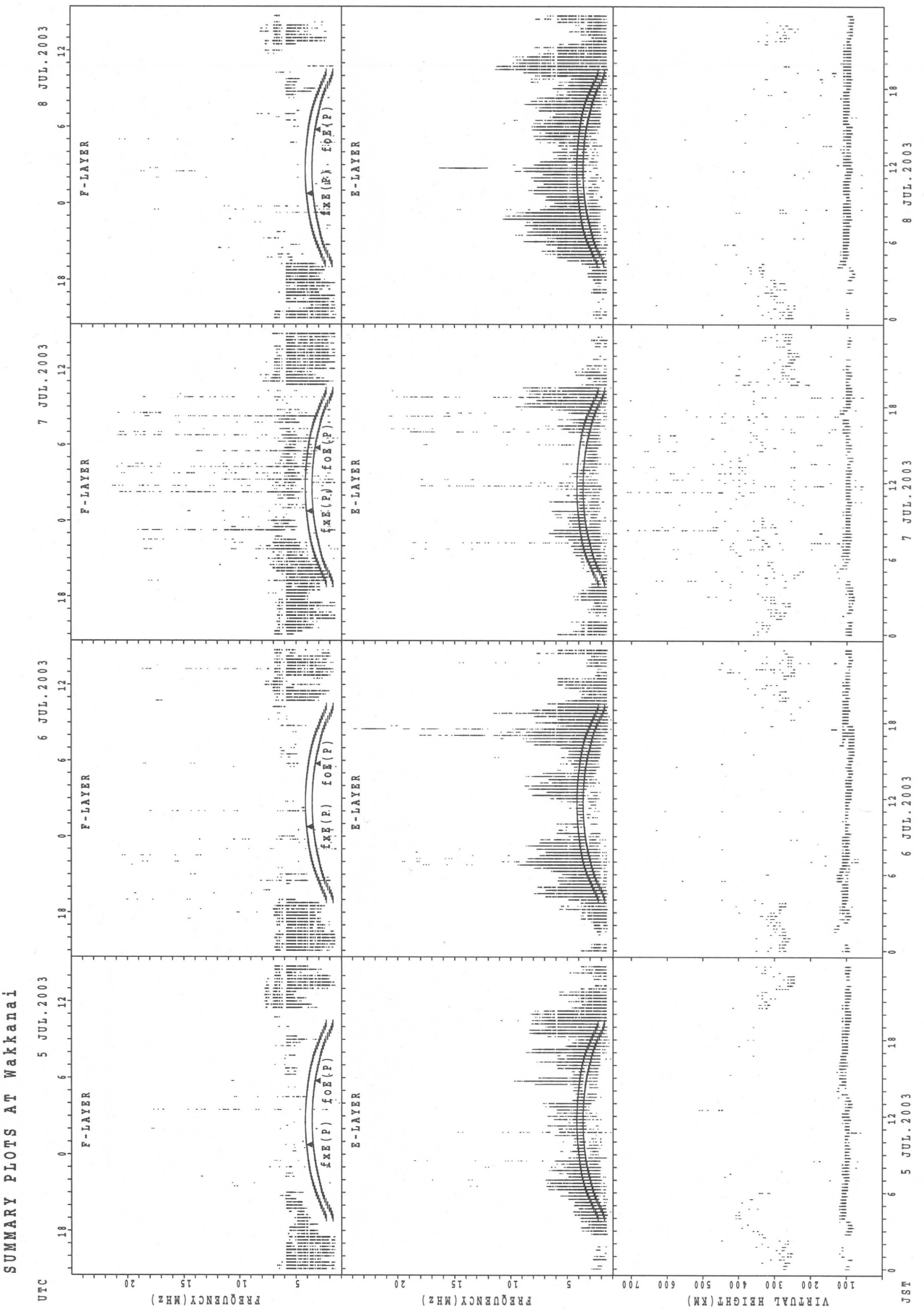
LAT. 26°40.5'N LON. 128°09.2'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

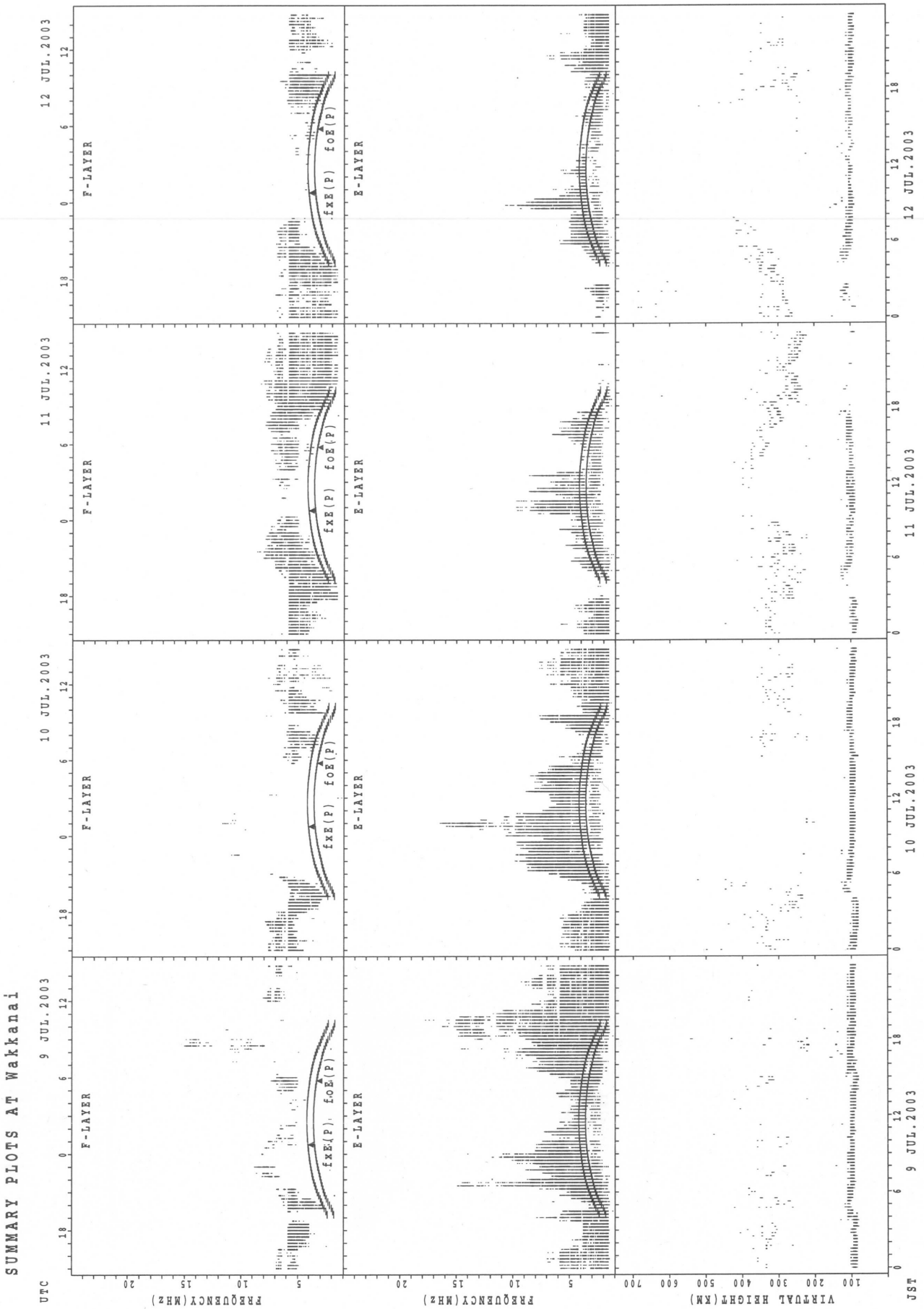
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	14	14	14	16	15	17	20			23	39			22	17	14	14	14	14	14	14
2	14	14	14	14	14	14	14	14	15	23	24		38	32	34	29	21	27	14	14	14	14	14	15
3	14	15	17	15	14	15	14	14	18	23	23	23	35				22	15	14	15	15	14	14	14
4	14	14	14	14	14	14	14	16	18	22	24	40	40	38	37	34	32	18	14	14	14	14	14	14
5	14	14	14	14	14	14	14	15	15	34	24		43	54		40	22	18	14	14	14	15	14	14
6	14	14	14	14	14	14	14	14	15	24	38	36	35	35	34	39	23	17	14	14	14	14	14	15
7	14	15	15	14	14	15	15	14	15	20	23	36	38	32	27	26	20	15	14	14	14	14	14	14
8	14	14	14	14	14	14	14	14	16	21	28	29	34	30	29	27	22	21	14	14	14	15	14	14
9	15	14	14	14	14	15	14	14	17		23	29	35			29	23	18	14	14	14	14	14	14
10	14	14	15	14	14	17	14	15	26	22	29	34	28	35	32	29	22	20	14	14	14	14	14	14
11	14	15	14	14	14	14	14	15	15	27	27	23	24	26	28	29	24	22	14	14	14	14	14	15
12	14	14	14	14	14	15	14	14	17	22		39					22	17	15	14	14	14	14	14
13	14	14	14	14	14	15	14	15	15	21	28	29	43	40	40	39	23	21	15	14	14	14	14	14
14	14	14	15	20	17	14	14	14	16	22		38	36	39	28		23	17	15	14	14	14	14	
15	14	14	14	14	14	15	14	15	20	21	29	32	29	34	32	23	23	18	14	14	17	15	14	14
16	14	14	14	14	14	15	14	14	20	21	21	21	30	30	28	26	17	15	14	14	15	14	14	14
17	14	14	14	14	14	14	14	15	17	20	23	29	38			22	22	18	14	18	15	14	14	14
18	15	15	14	14	14	17	15	14	16	33	34	35	38	36	33	33	24	18	14	14	14	14	14	14
19	15	14	15	14	14	15	14	14	20	22	28	33	35	36	33	28	23	18	14	14	14	14	14	14
20	15	15	15	14	14	14	14	14	17			53	30	58			23	18	14	14	14	14	14	14
21	15	14	15	14	15	14	14	15	21	22	30					23	22	17	14	14	14	14	14	14
22	14	14	14	14	14	14	14	14	17	26	30	39	39	56		32	23	20	14	14	14	14	14	14
23	14	14	14	14	14	14	14	14	17	23	27	32	34	34	33		21	20	14	14	14	14	14	14
24	14	14	14	14	14	14	14	16	18	20	29	29		42	39	38	26	20	15	14	14	14	14	14
25	14	14	14	14	14	14	14	14	14	21	22	36	35		33	26	22	17	14	14	14	14	14	14
26	14	14	15	14	14	17	17	15	15	22	28	34	30	32	32	33	23	17	18	14	14	14	15	14
27	14	15	14	14	14	14	14	14	16	21	26	30		35	30	39	22	17	14	14	14	14	14	14
28	15	14	15	14	14	15	17	14	15	21	23				29		22	17	14	14	15	15	16	15
29	14	15	15	14	16	15	16	15	16	21	24		34		28	26	21	17	14	14	14	14	14	14
30	14	15	15	14	15	15	18	14	14	21	21	29	33	28	26	23	21	14	14	14	15	14	15	15
31	14	14		14	14	14	15	14	14	18	30			38	26			21	14	14	14	14	14	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	31	31	31	31	31	31	29	27	24	25	23	22	23	30	31	31	31	31	31	31	30
MED	14	14	14	14	14	14	14	14	16	22	27	32	35	35	32	29	22	18	14	14	14	14	14	14
U Q	14	15	15	14	14	15	15	15	18	23	29	36	38	39	33	34	23	20	14	14	14	14	14	14
L Q	14	14	14	14	14	14	14	14	15	21	23	29	30	32	28	26	22	17	14	14	14	14	14	14

SUMMARY PLOTS AT Wakkanai

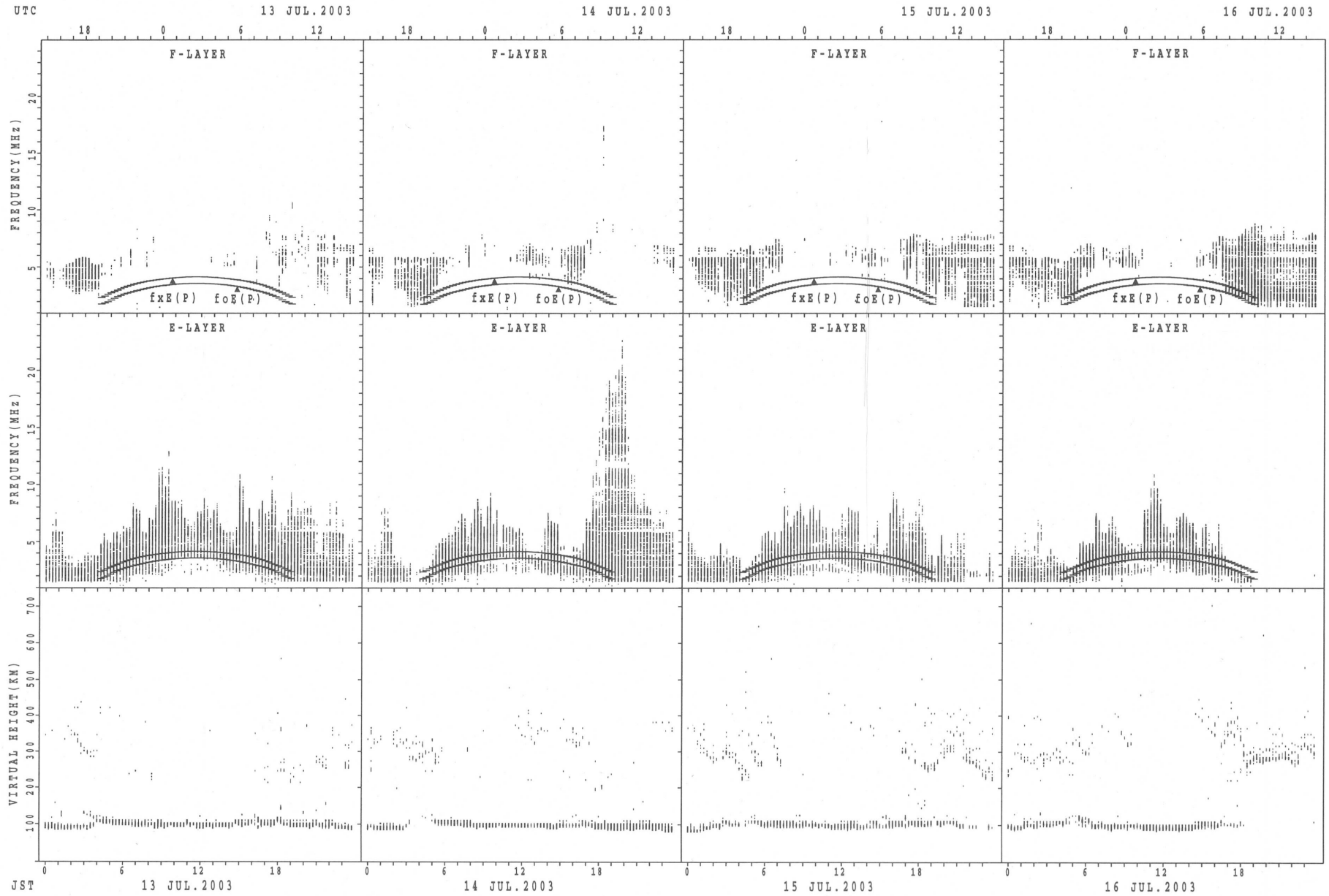


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

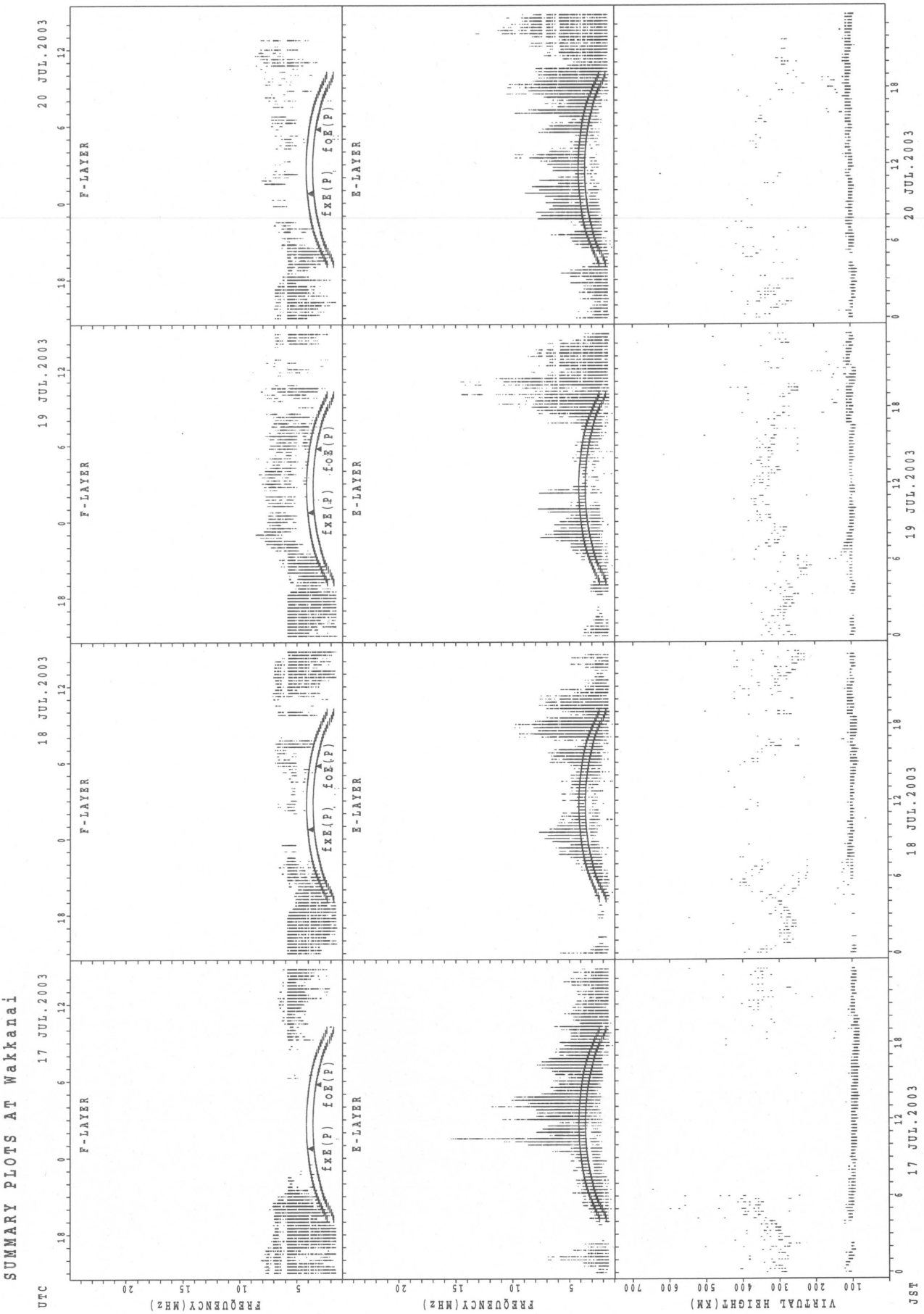

SUMMARY PLOTS AT Wakkanai
UTC
JST
5 JUL.2003
6 JUL.2003
7 JUL.2003
8 JUL.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Wakkanai
UTC
JST
9 JUL.2003
10 JUL.2003
11 JUL.2003
12 JUL.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

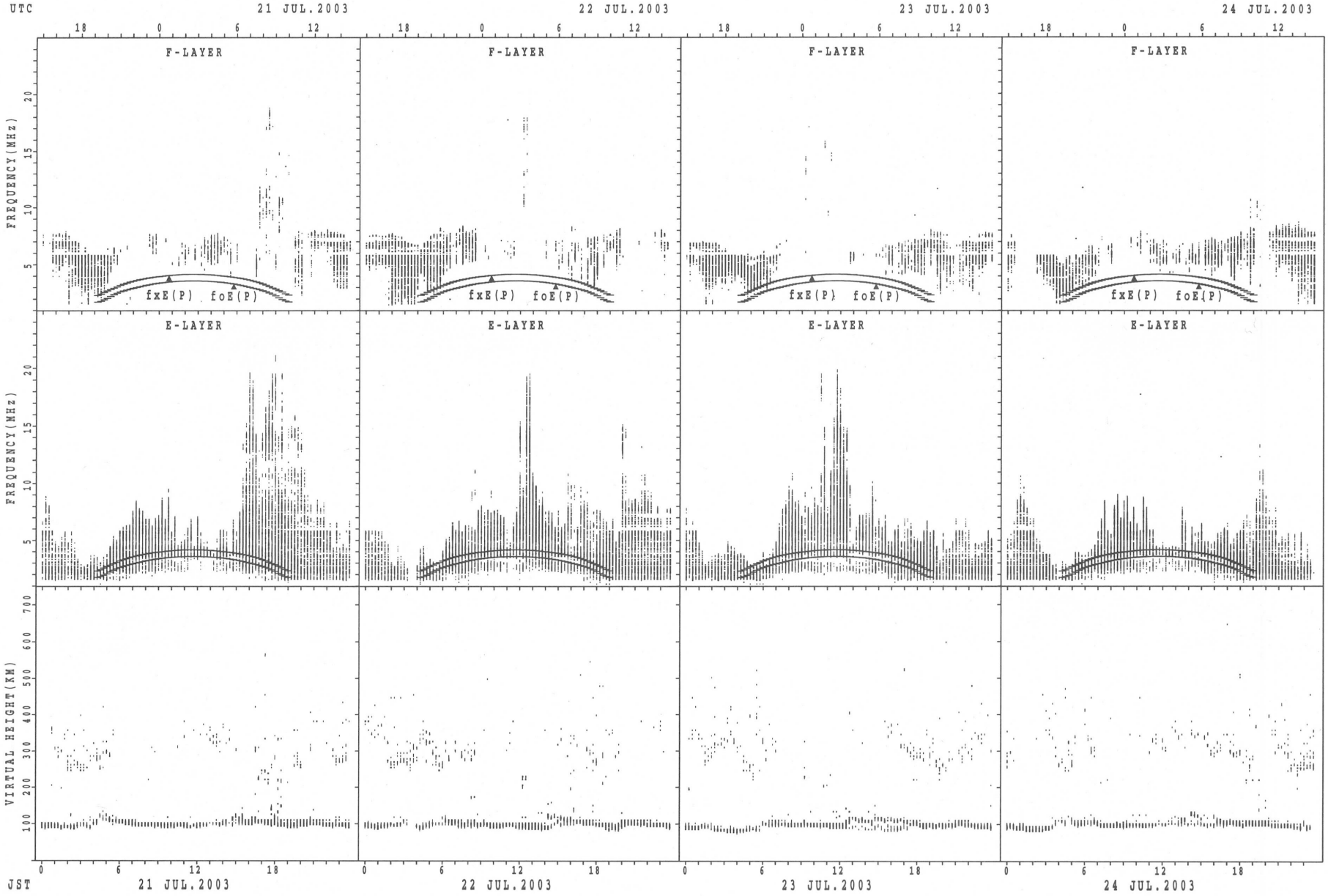
SUMMARY PLOTS AT Wakkanai



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

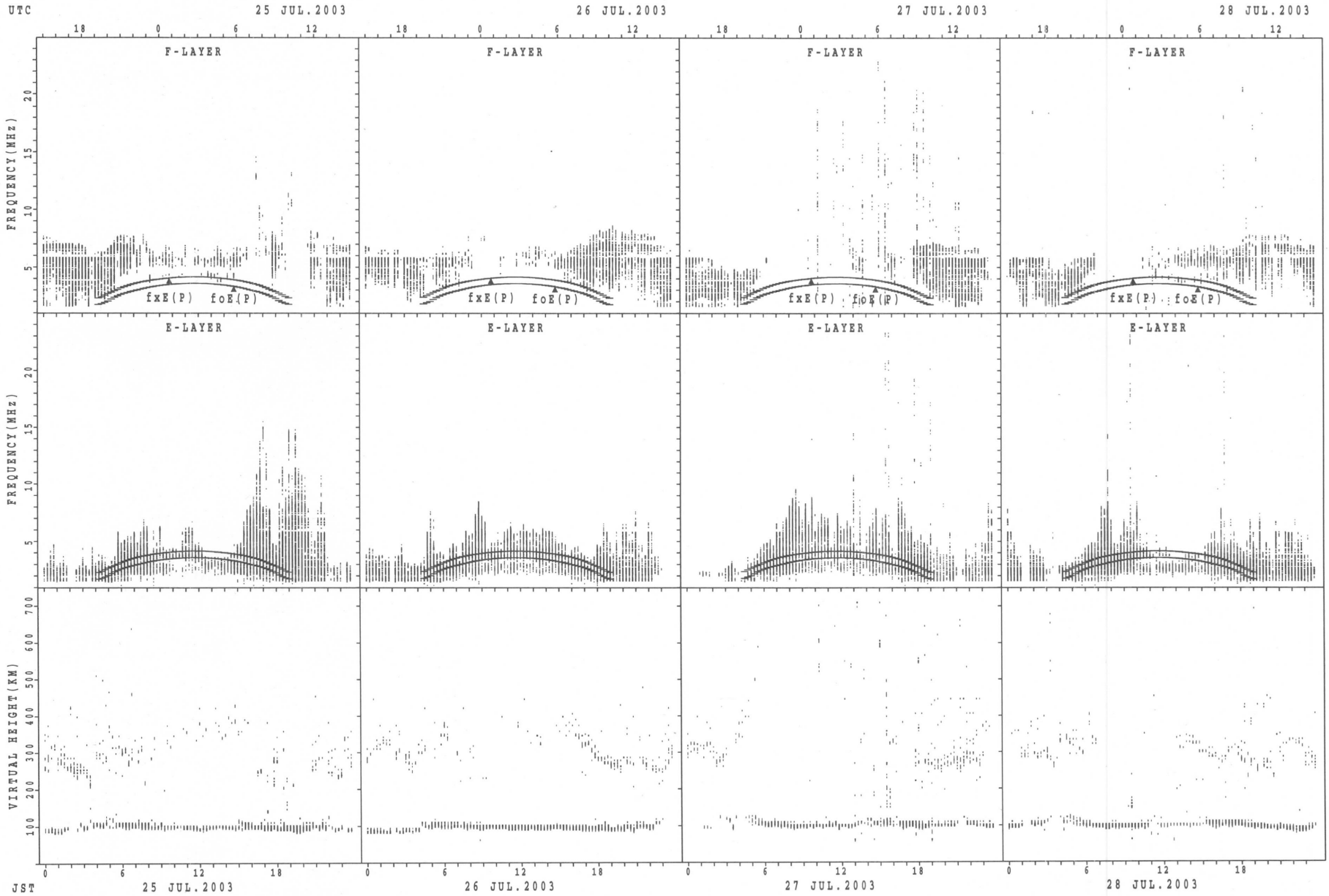

SUMMARY PLOTS AT Wakkanai
UTC
JST
17 JUL.2003
18 JUL.2003
19 JUL.2003
20 JUL.2003
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



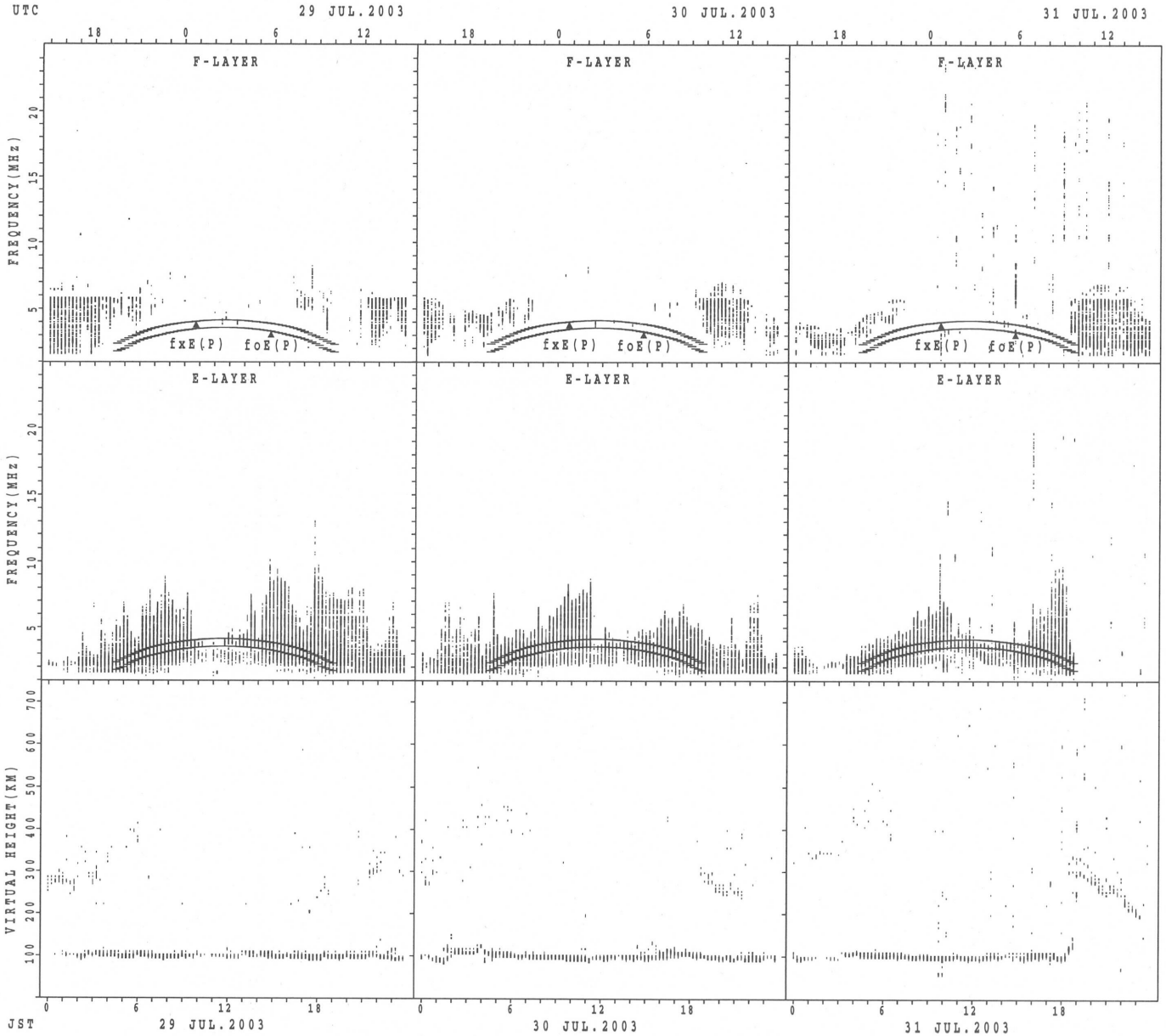
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



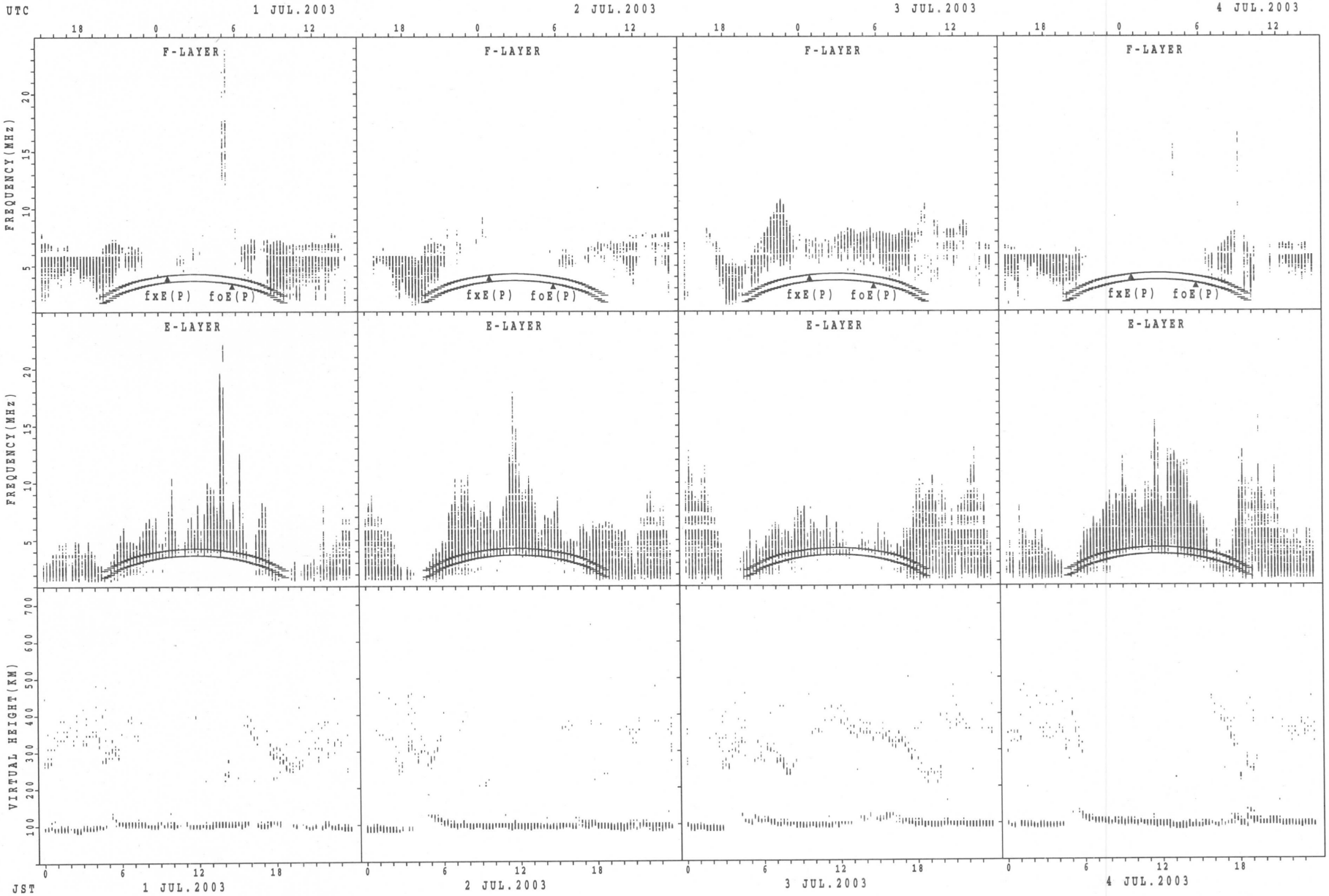
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



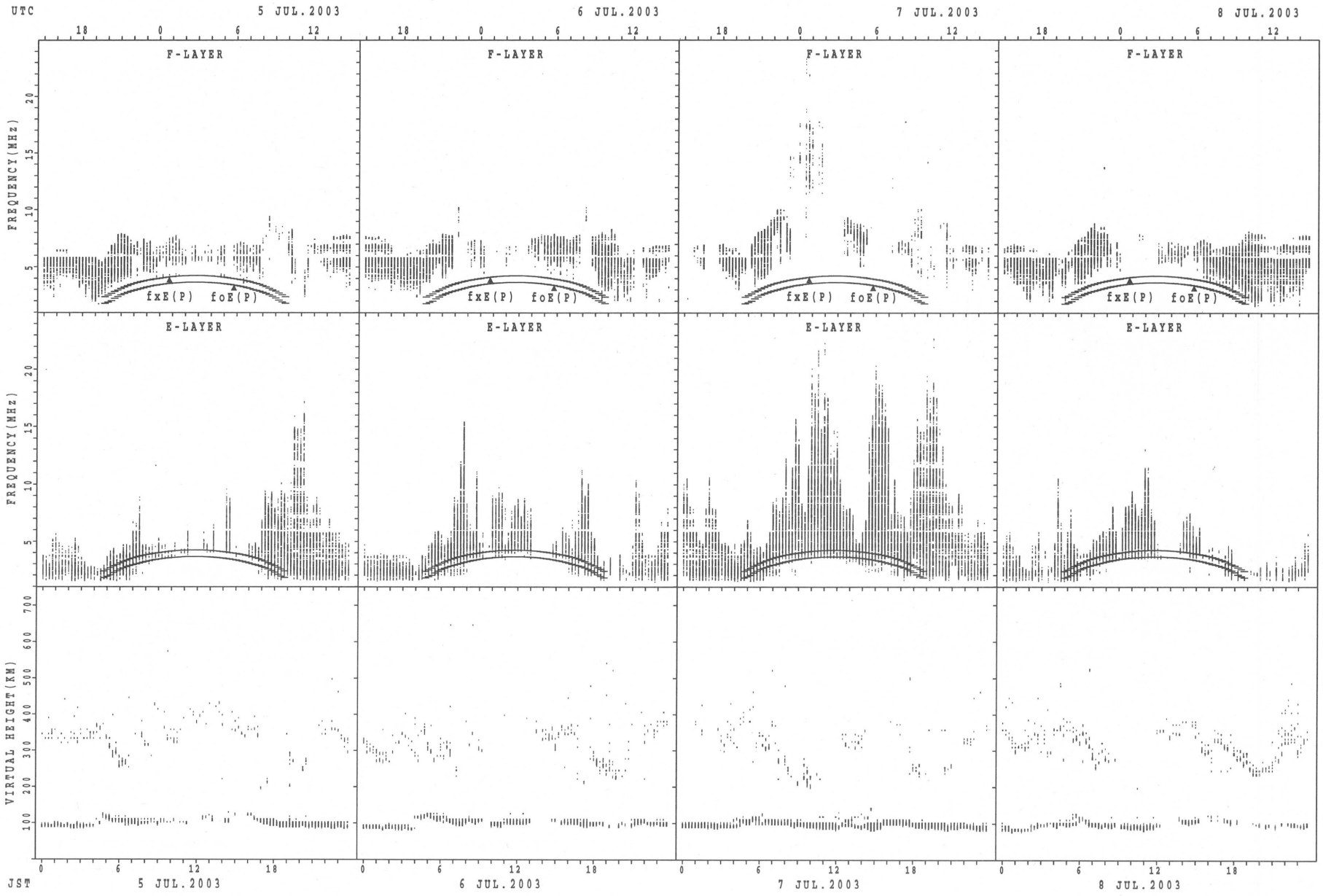
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

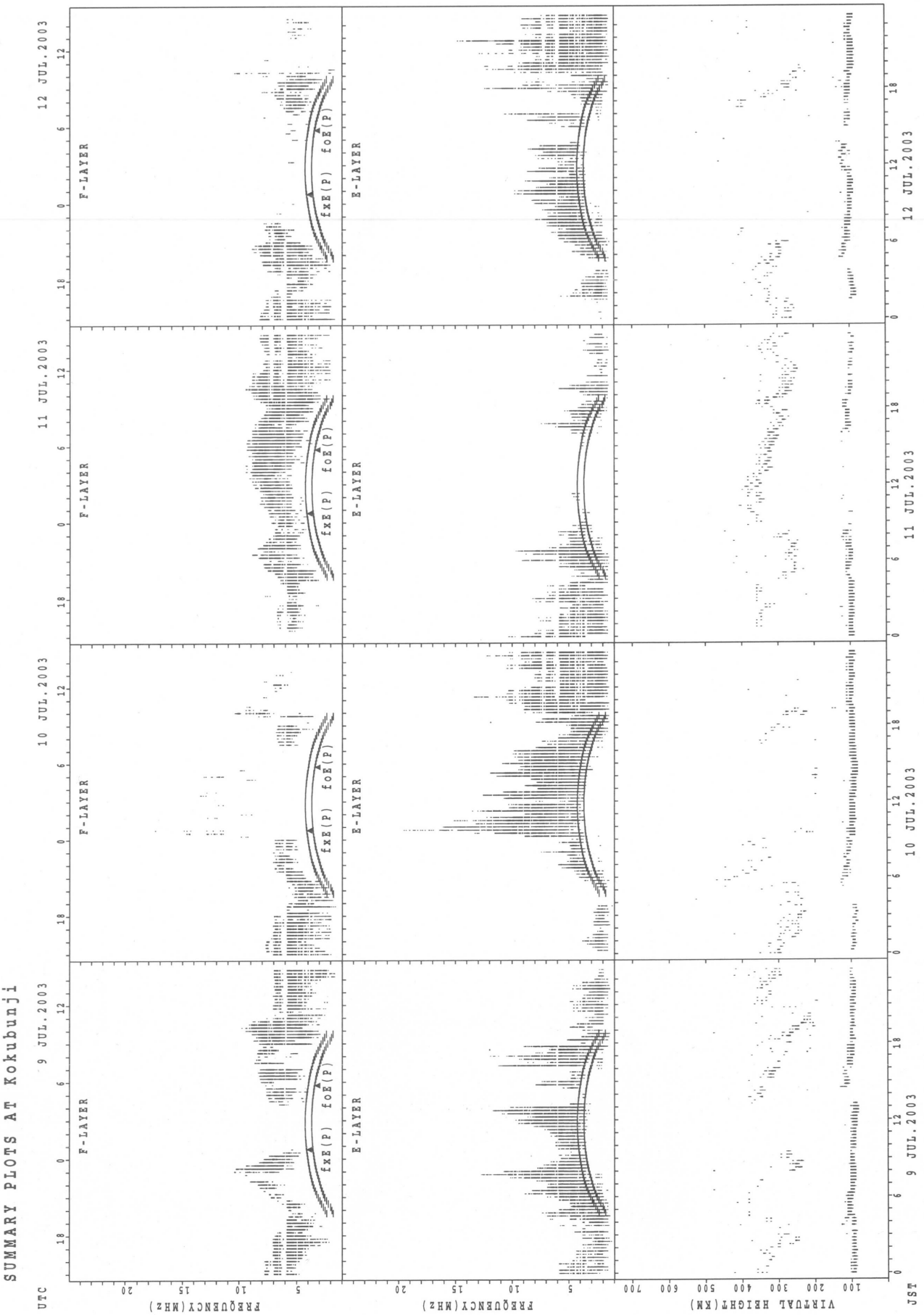


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

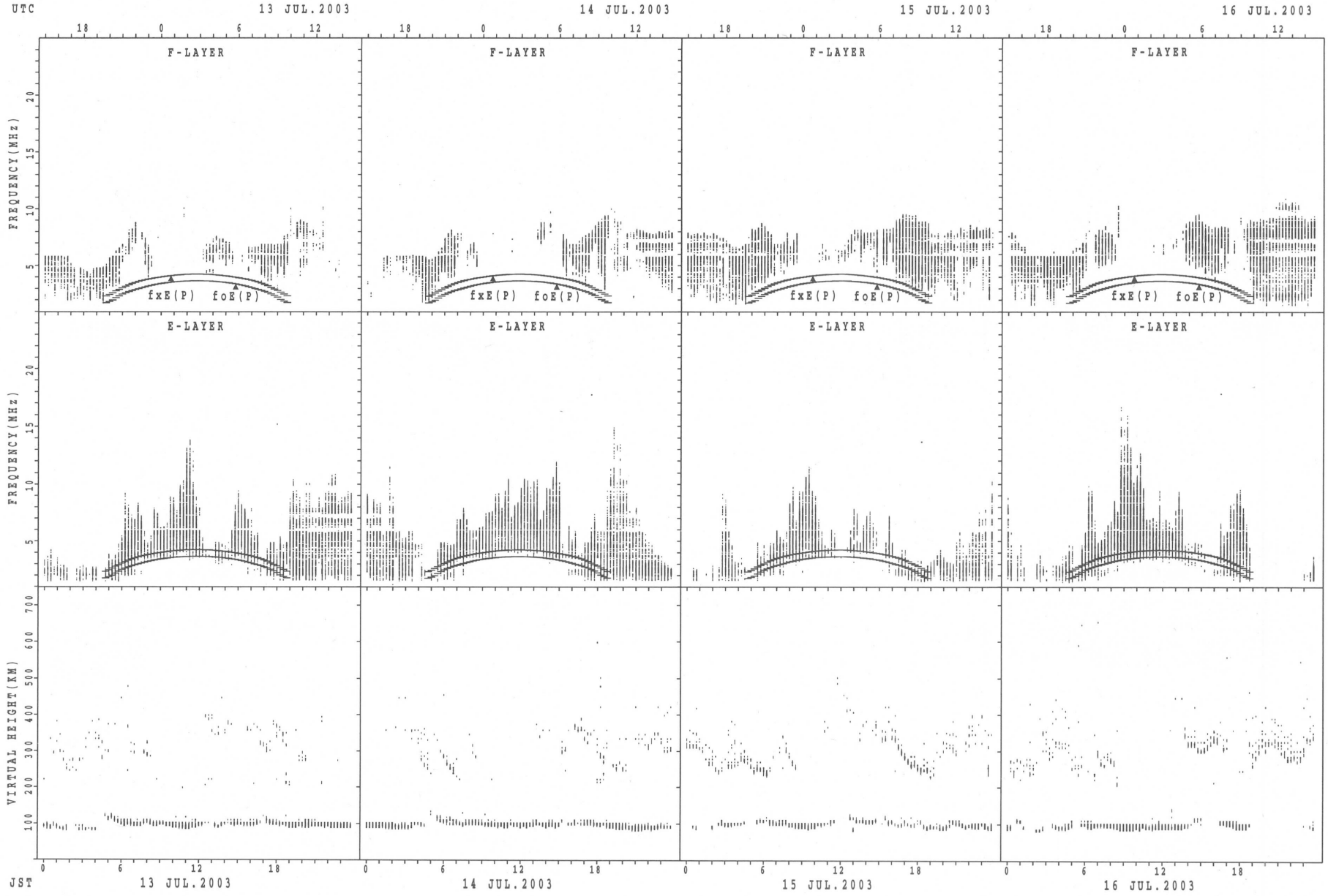
SUMMARY PLOTS AT Kokubunji



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

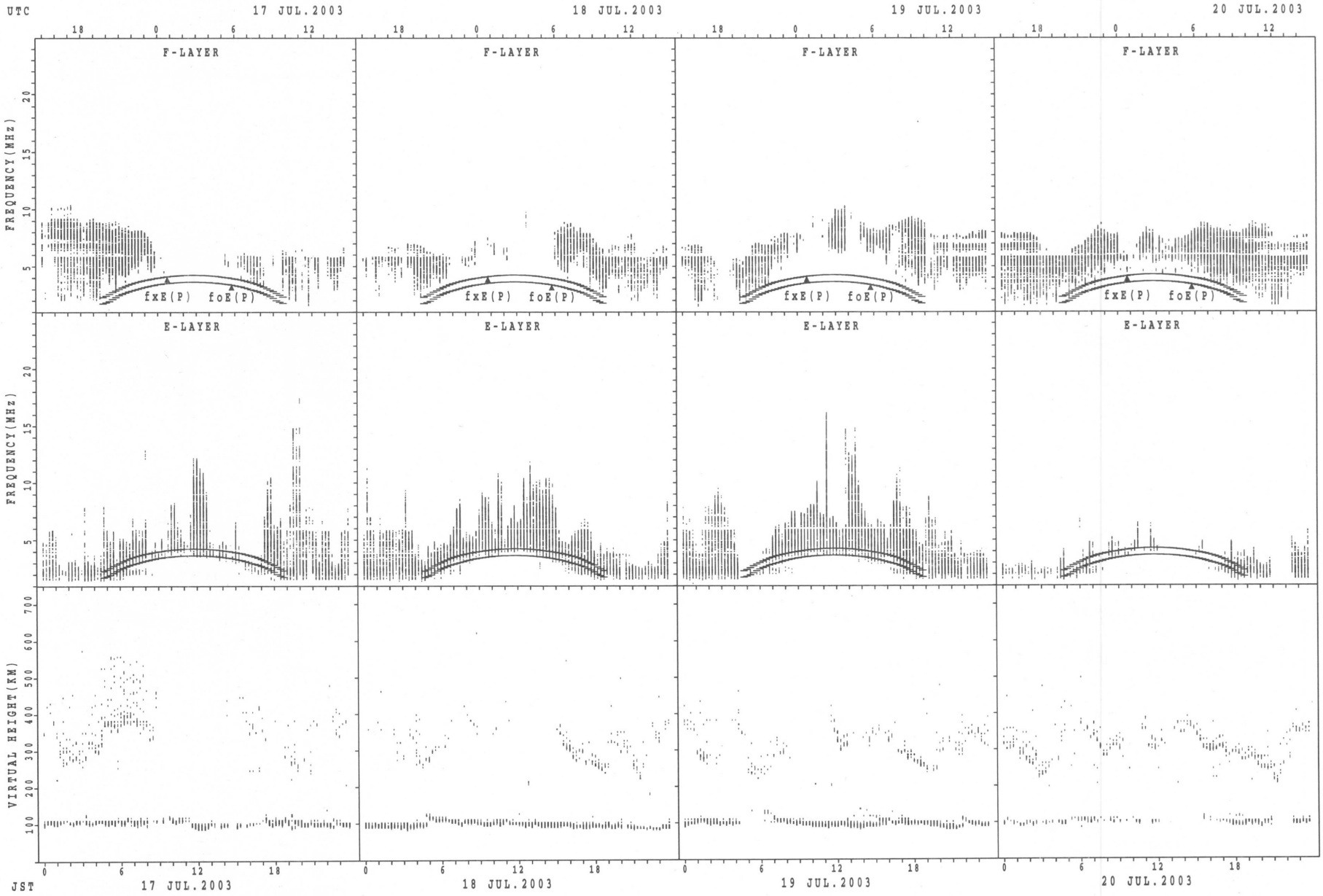

SUMMARY PLOTS AT Kokubunji
UTC
JST
9 JUL.2003
10 JUL.2003
11 JUL.2003
12 JUL.2003
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



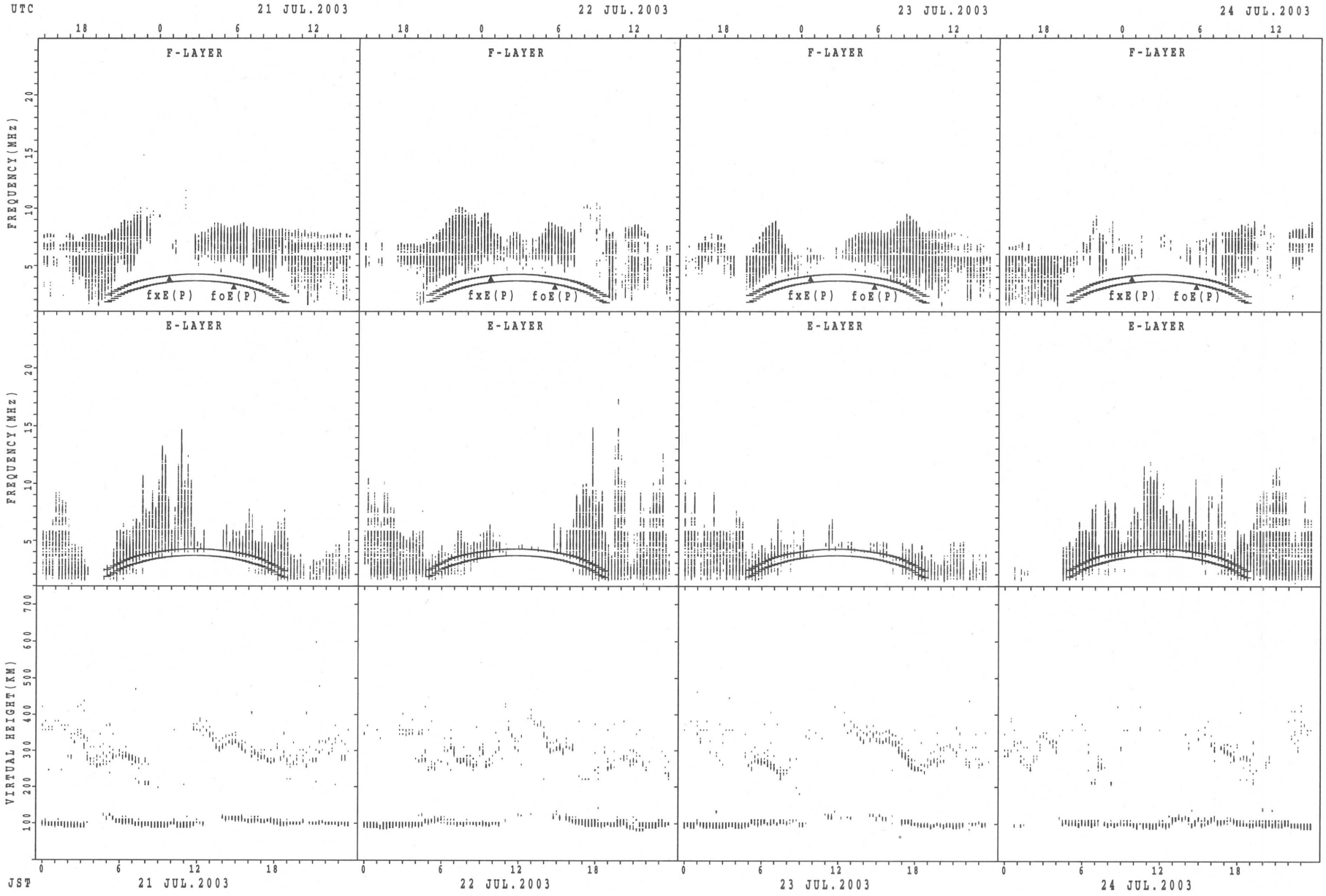
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

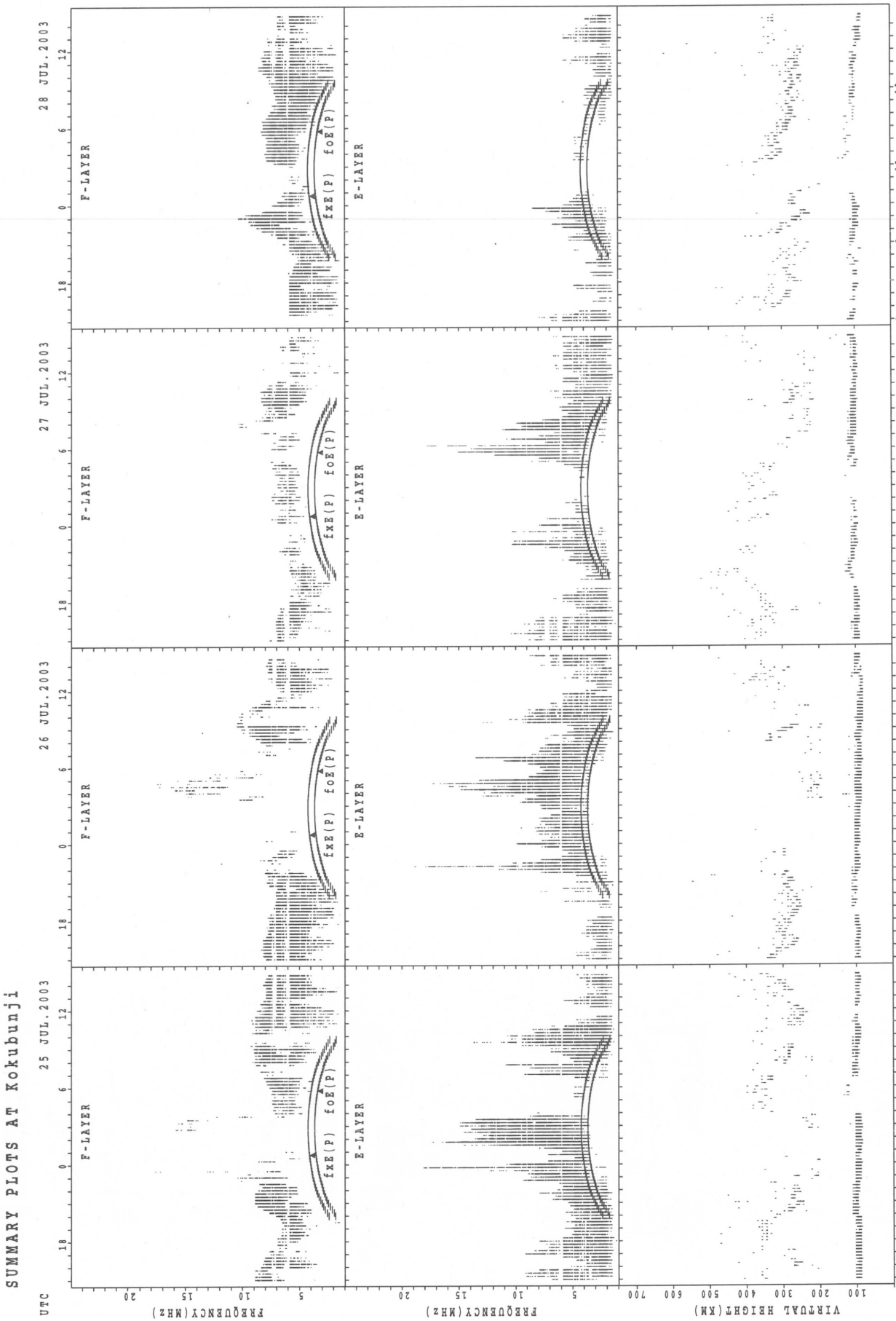


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

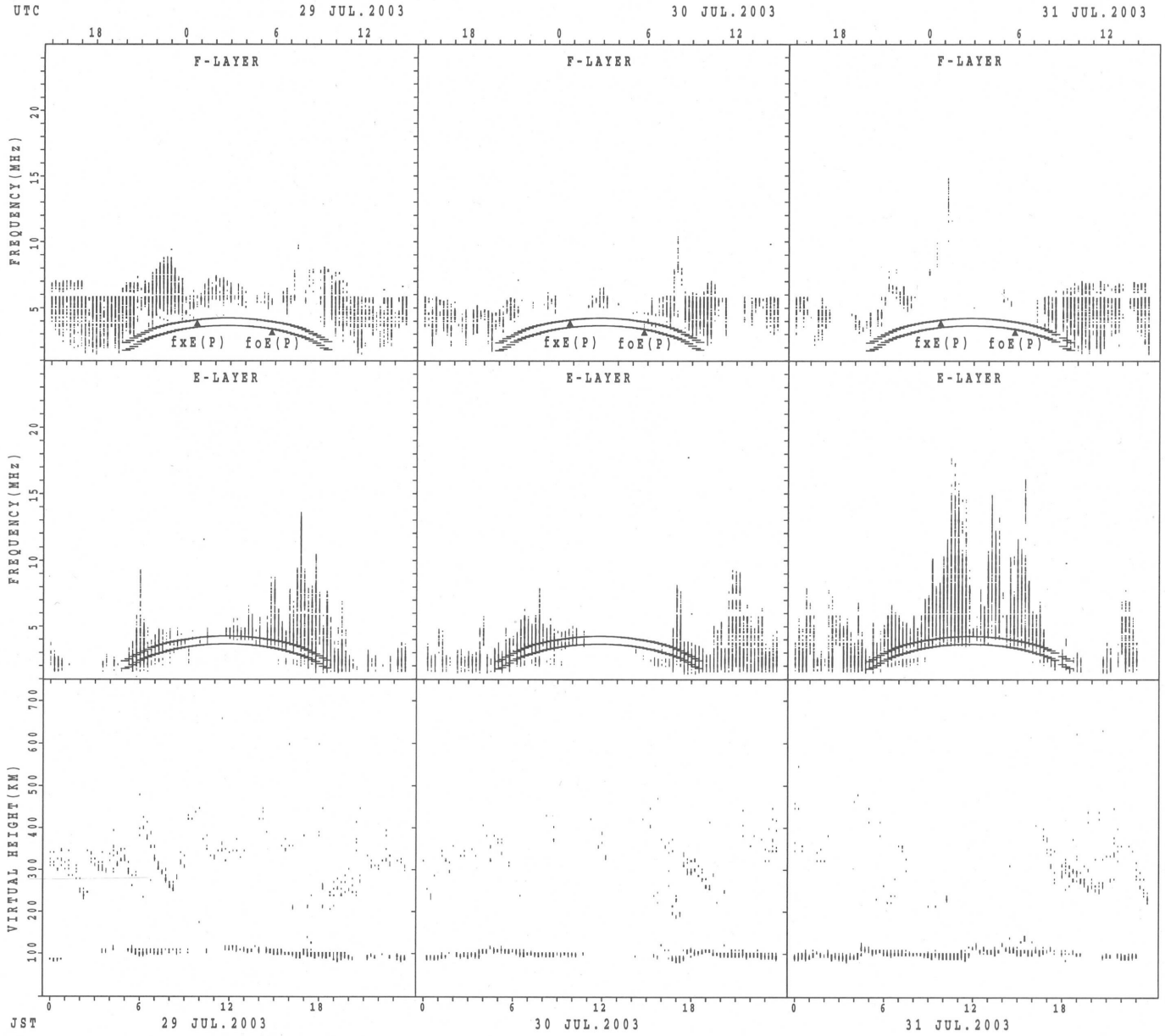
SUMMARY PLOTS AT Kokubunji



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

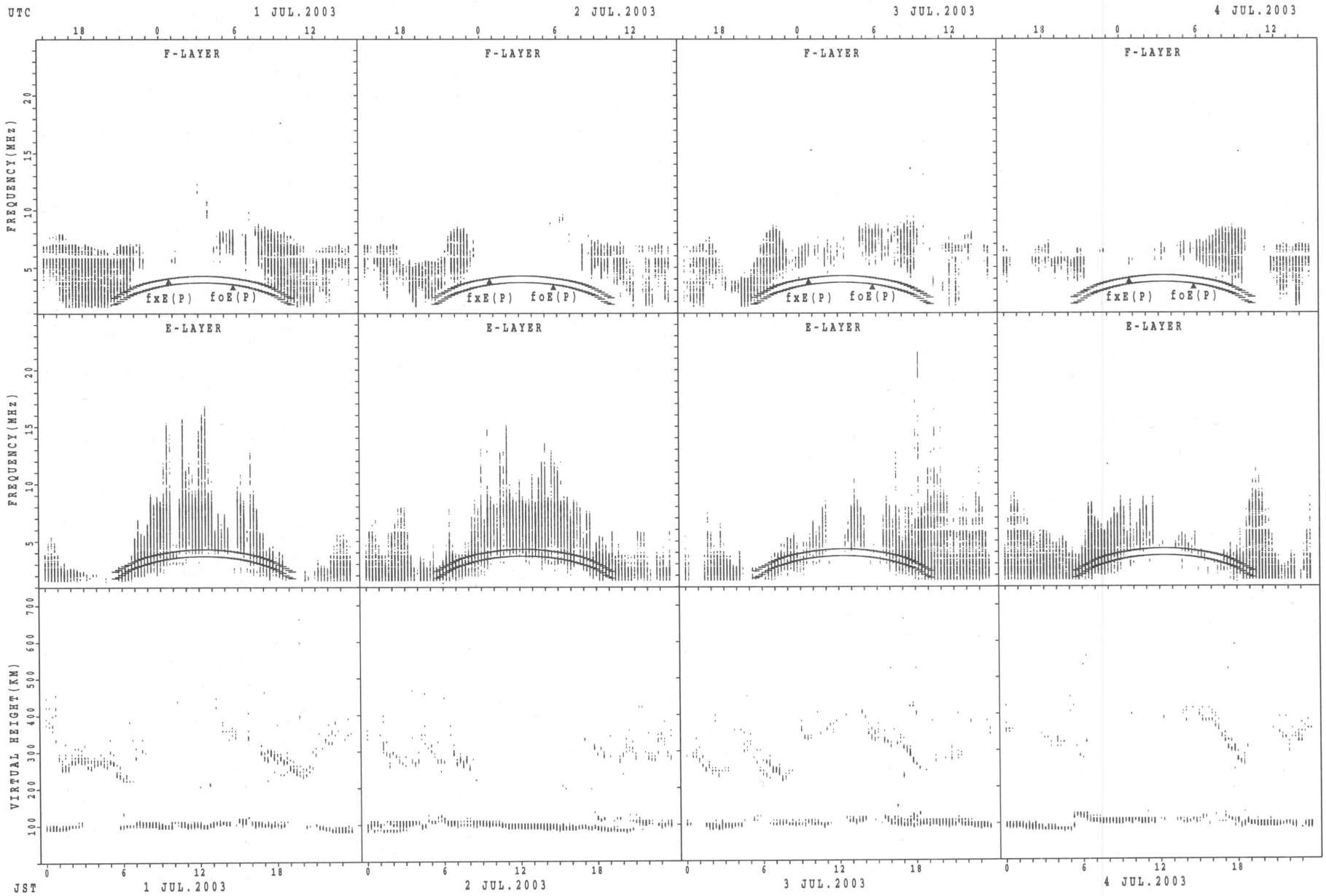

SUMMARY PLOTS AT Kokubunji
UTC
JST
25 JUL.2003
26 JUL.2003
27 JUL.2003
28 JUL.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



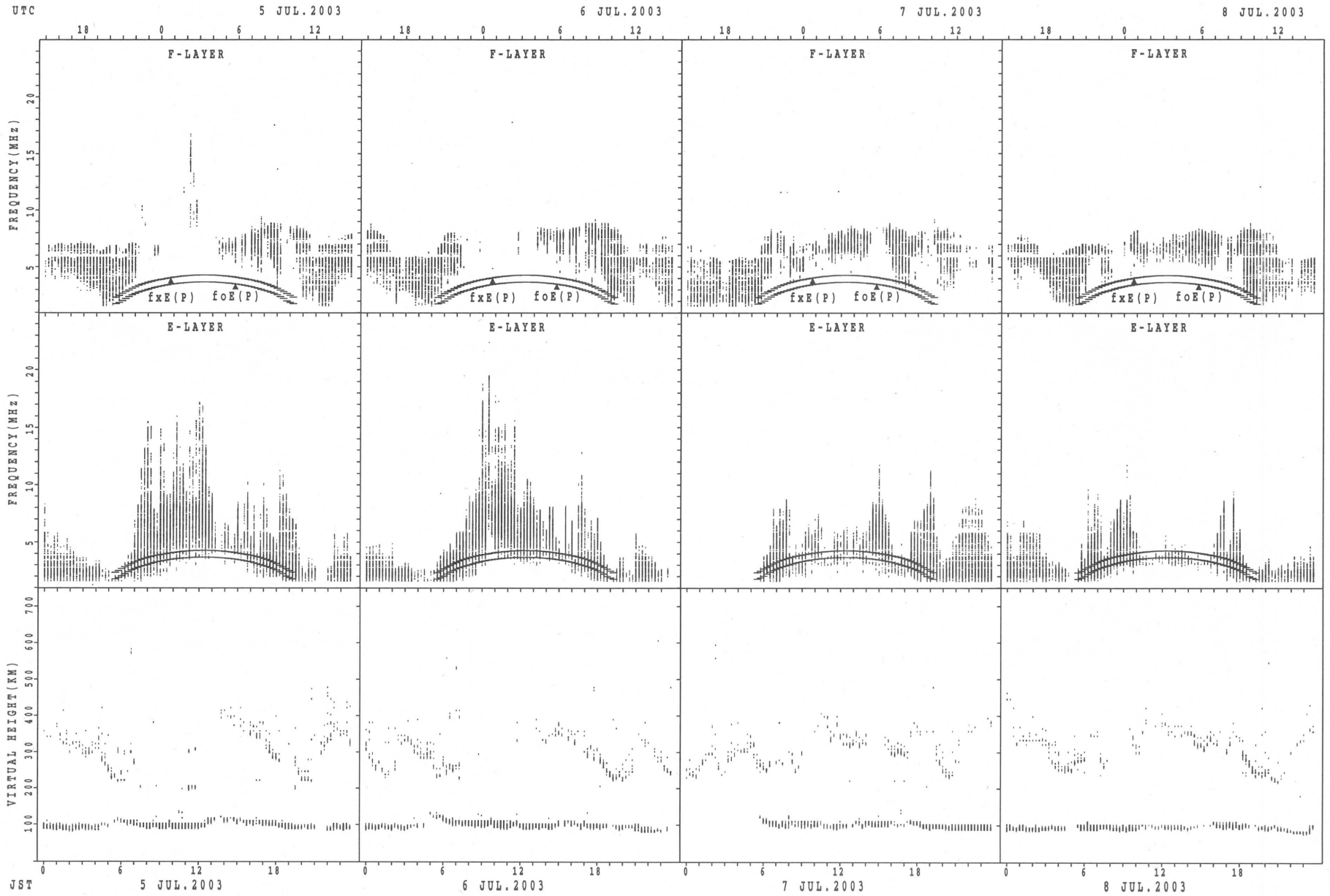
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

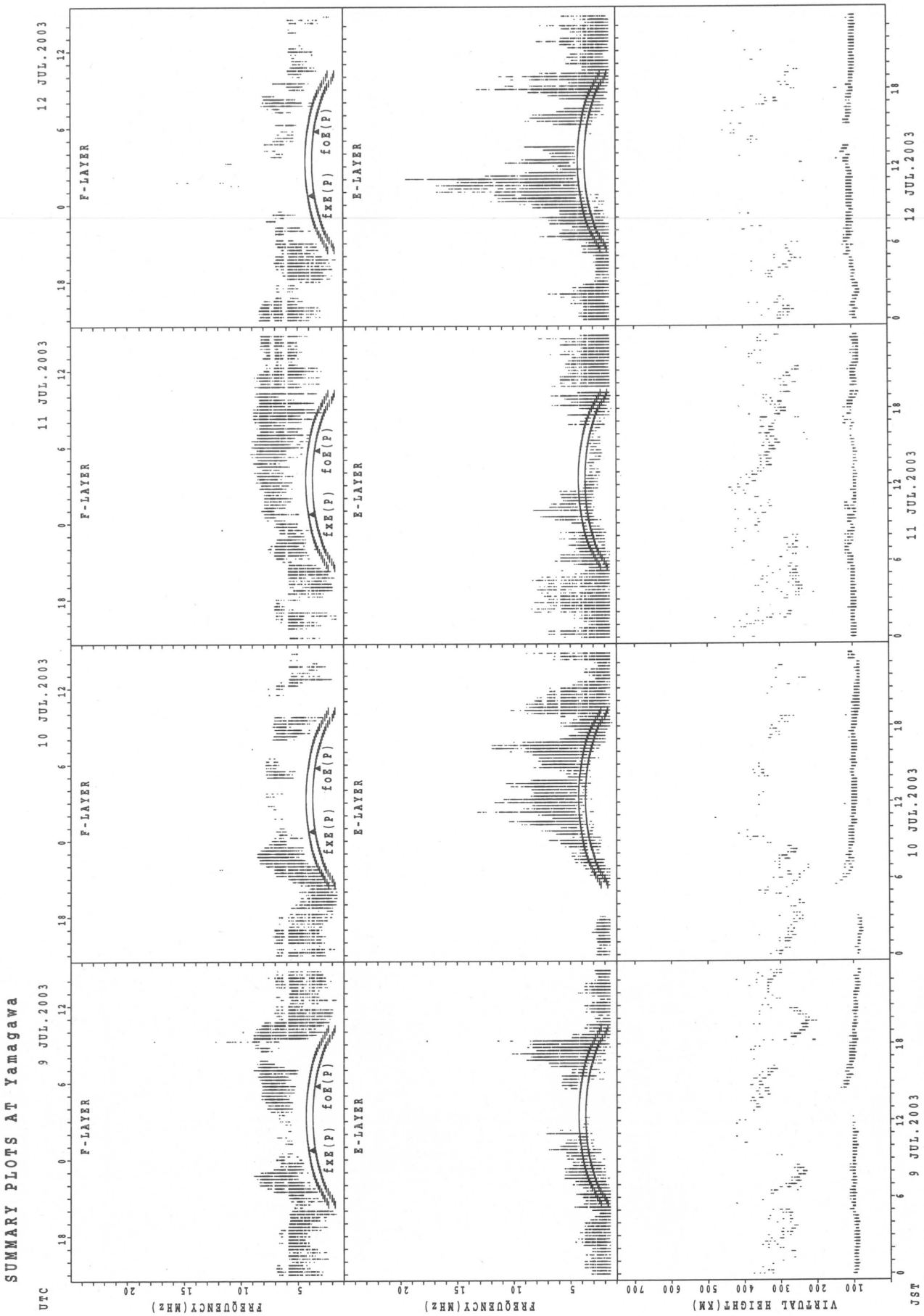


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

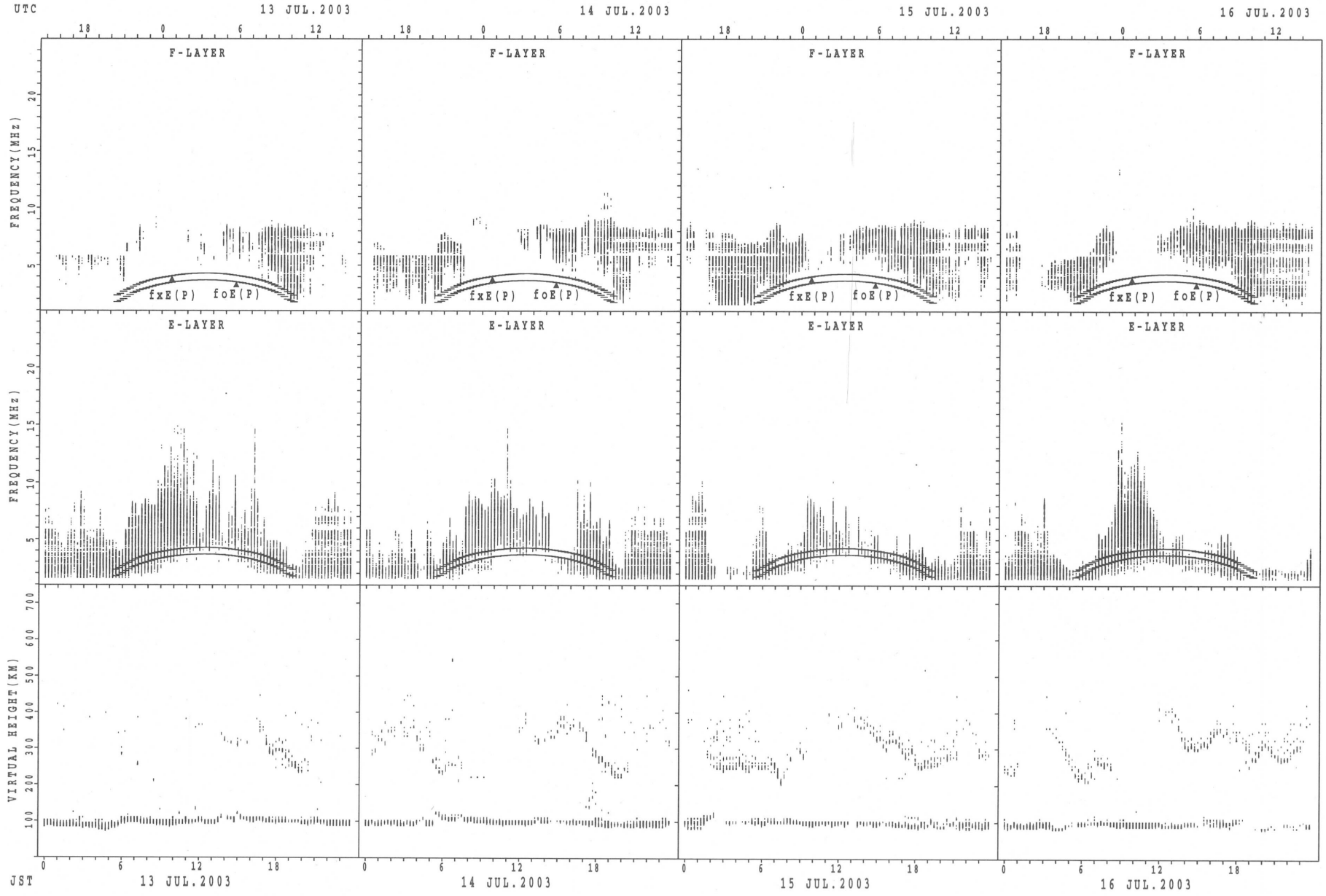
SUMMARY PLOTS AT Yamagawa



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

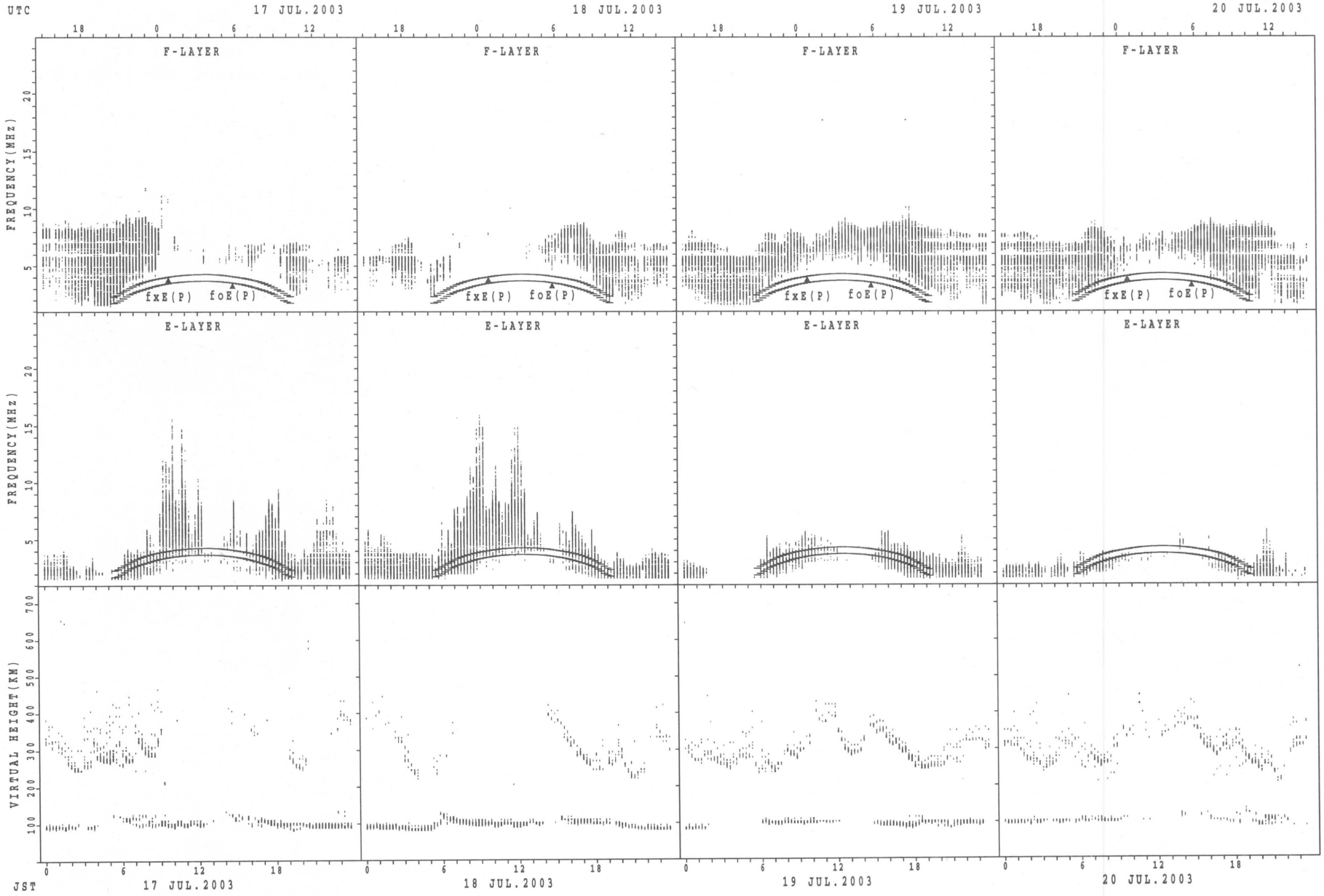

SUMMARY PLOTS AT Yamagawa
UTC
JST
9 JUL.2003
10 JUL.2003
11 JUL.2003
12 JUL.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



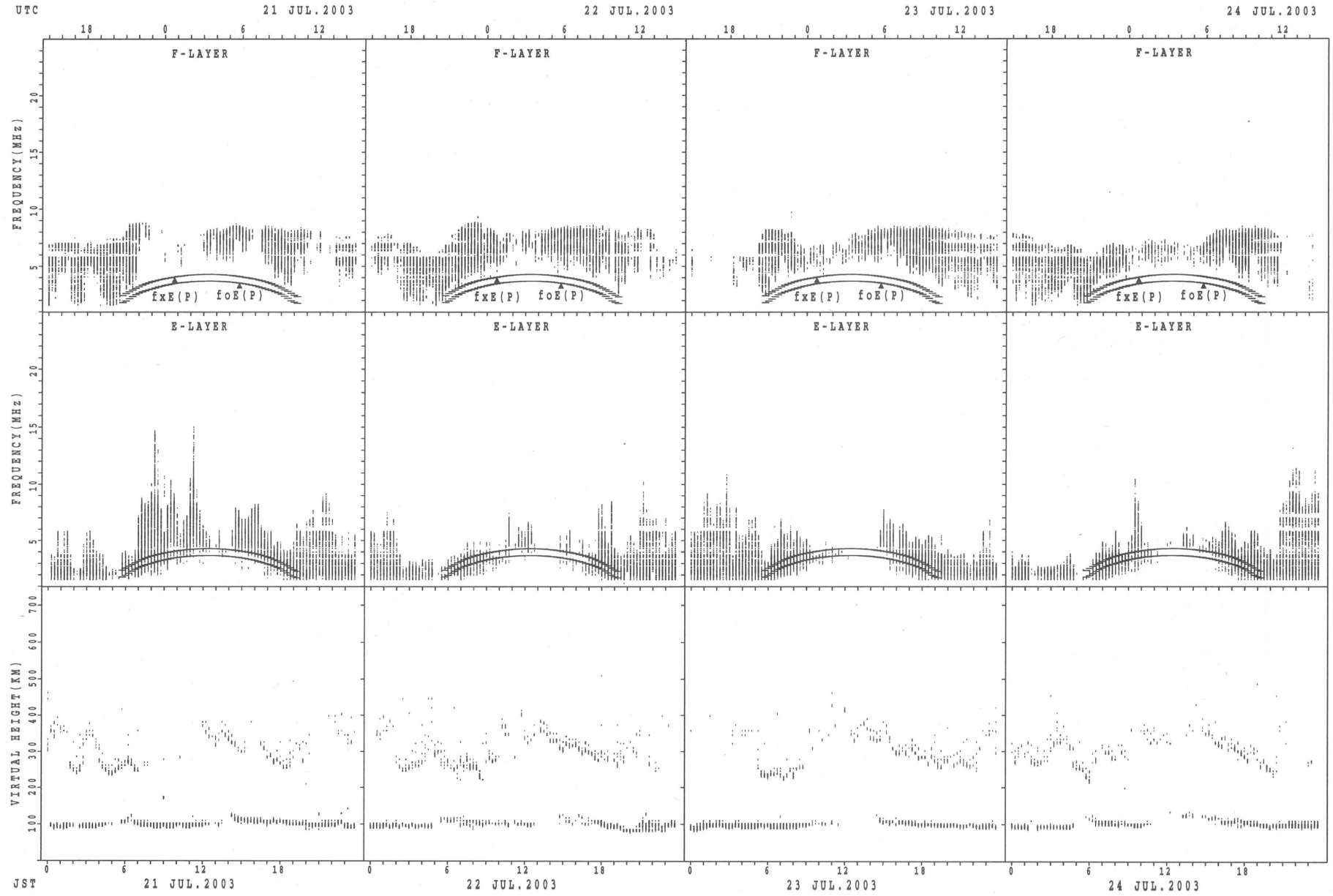
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



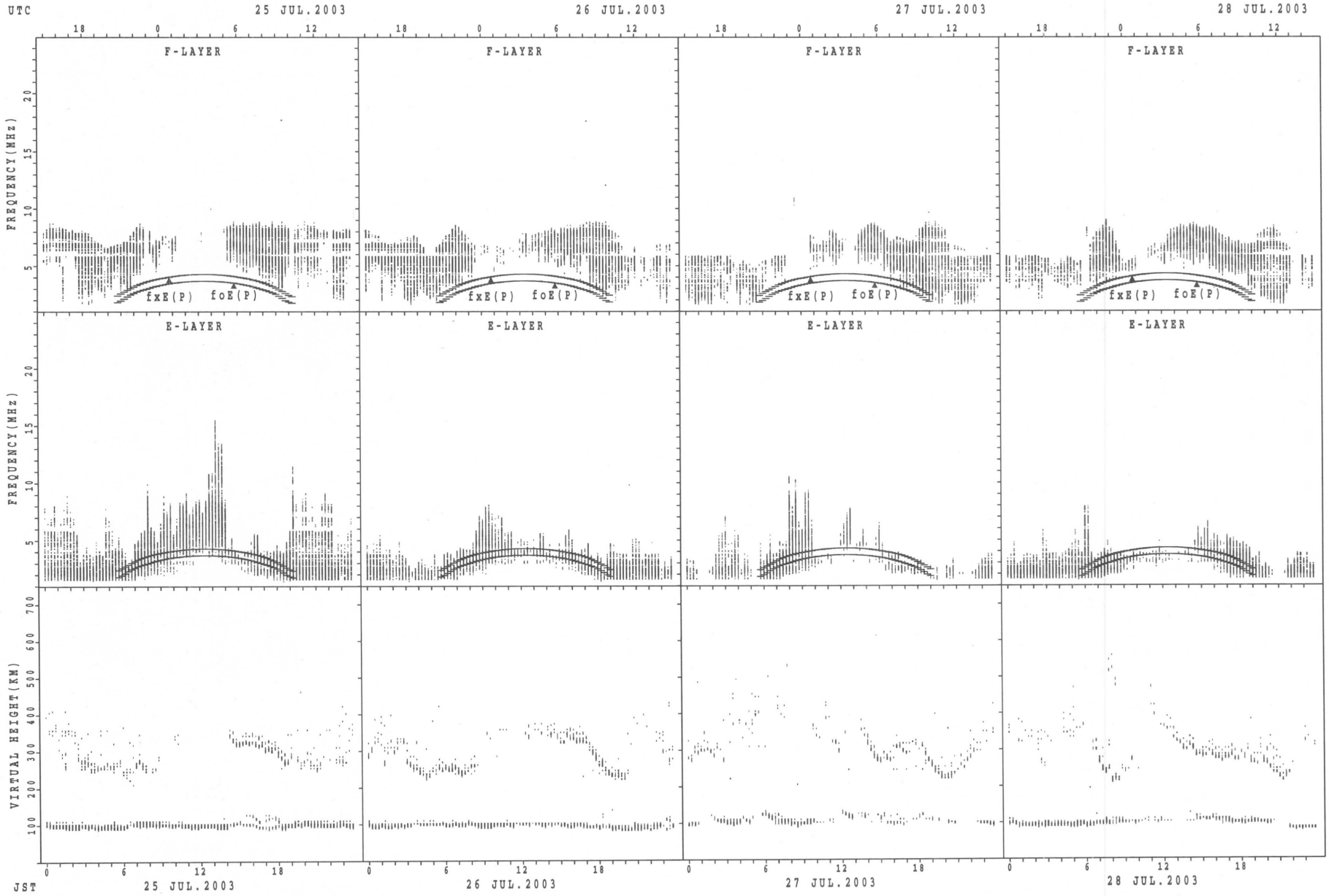
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



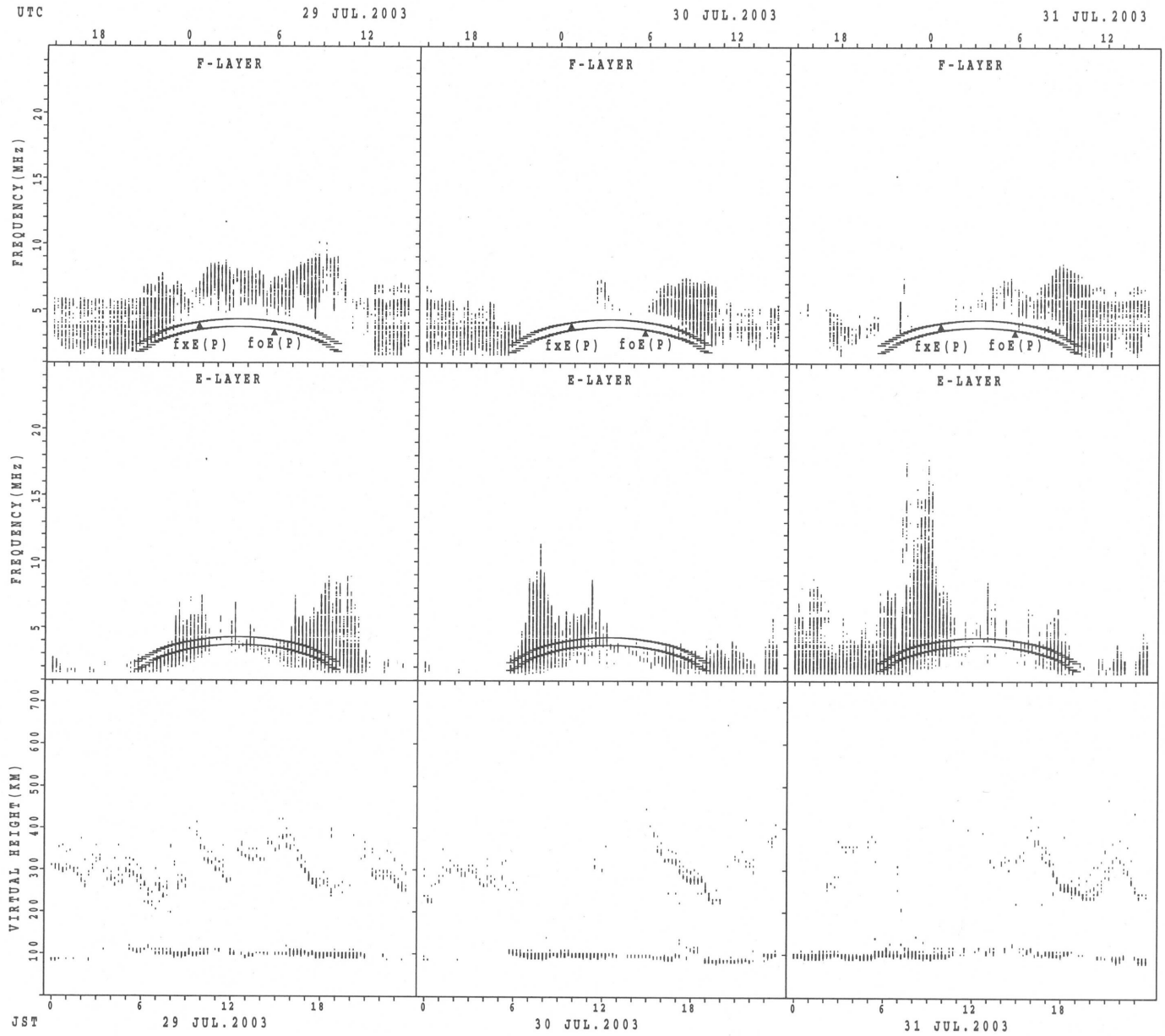
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



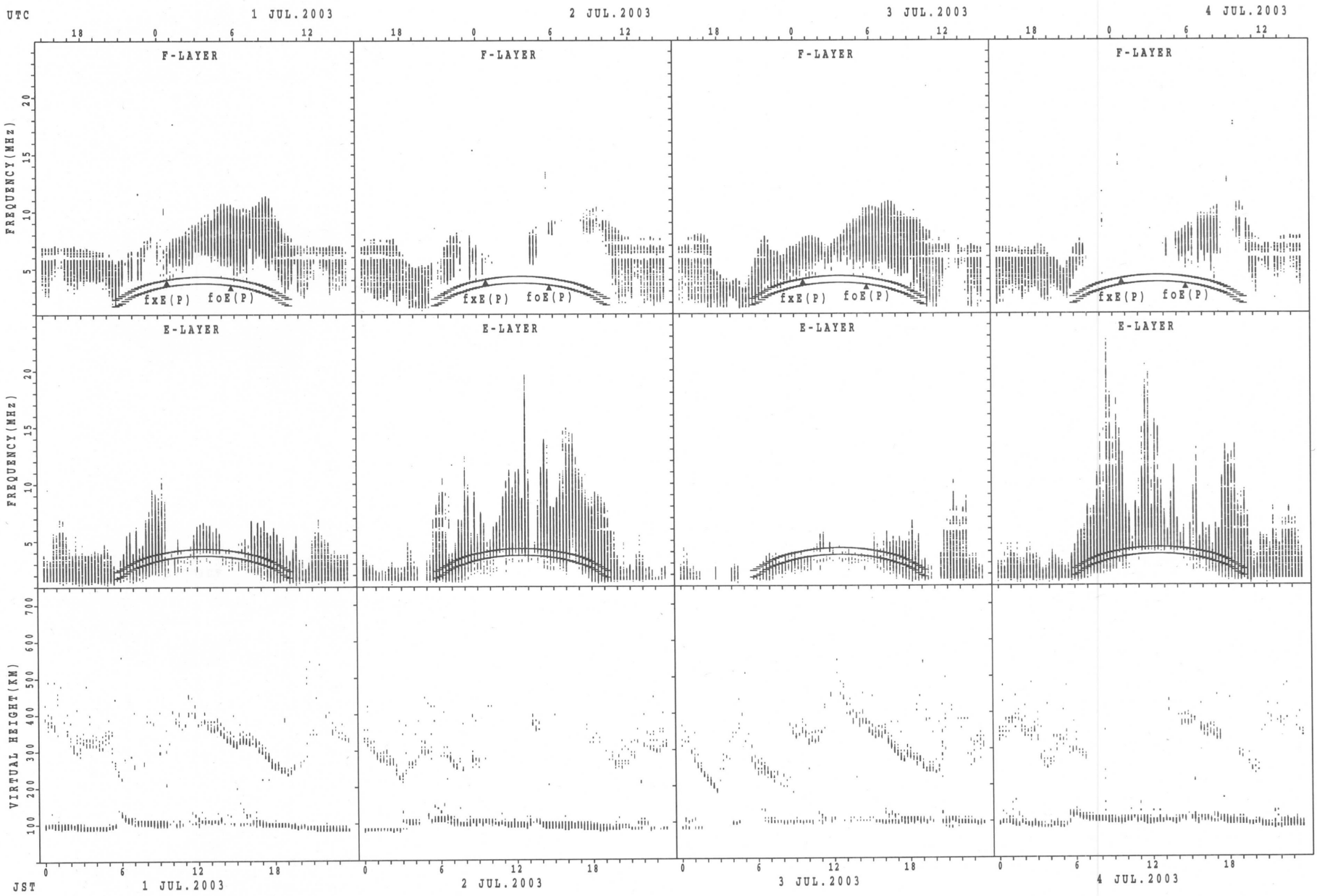
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



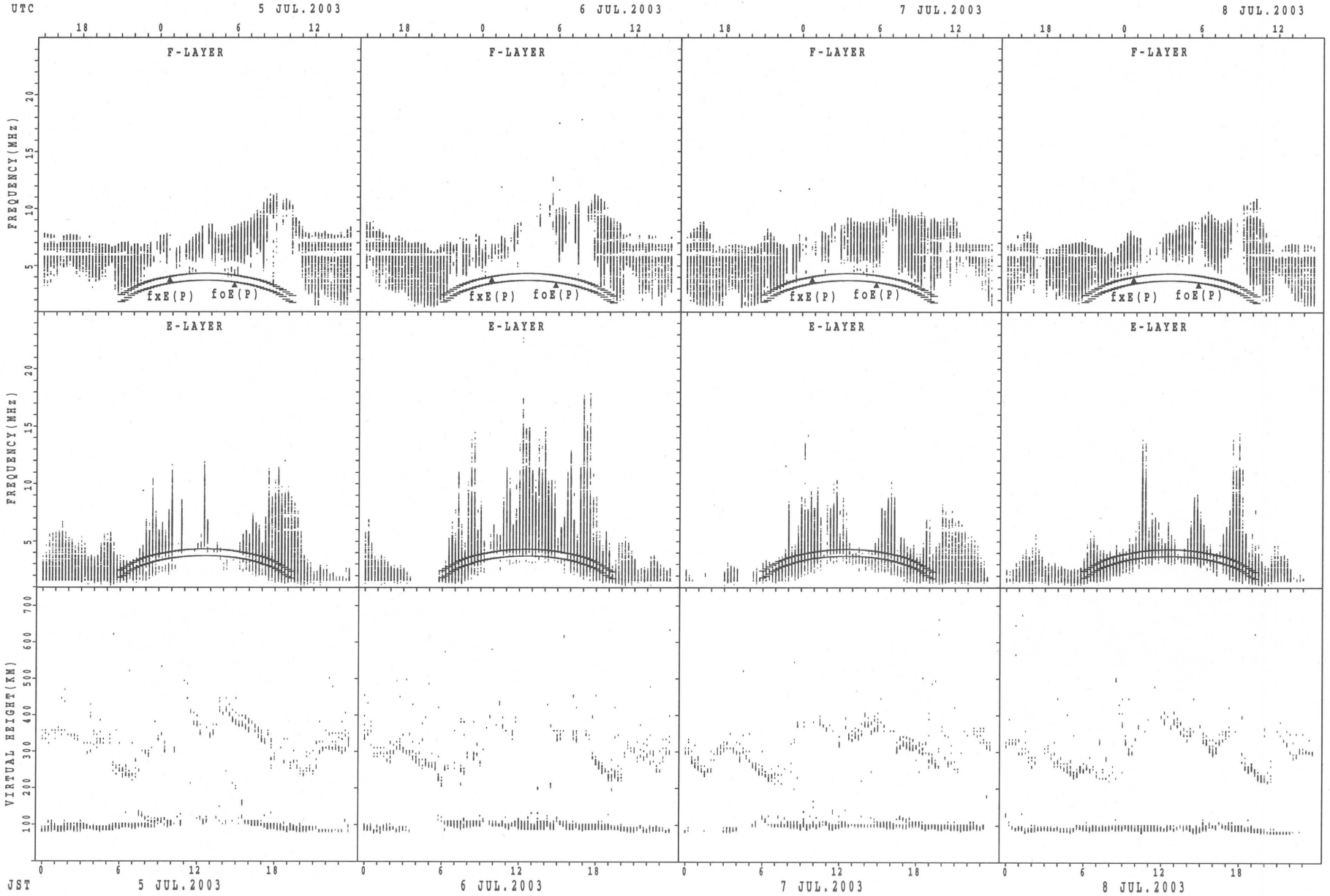
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa

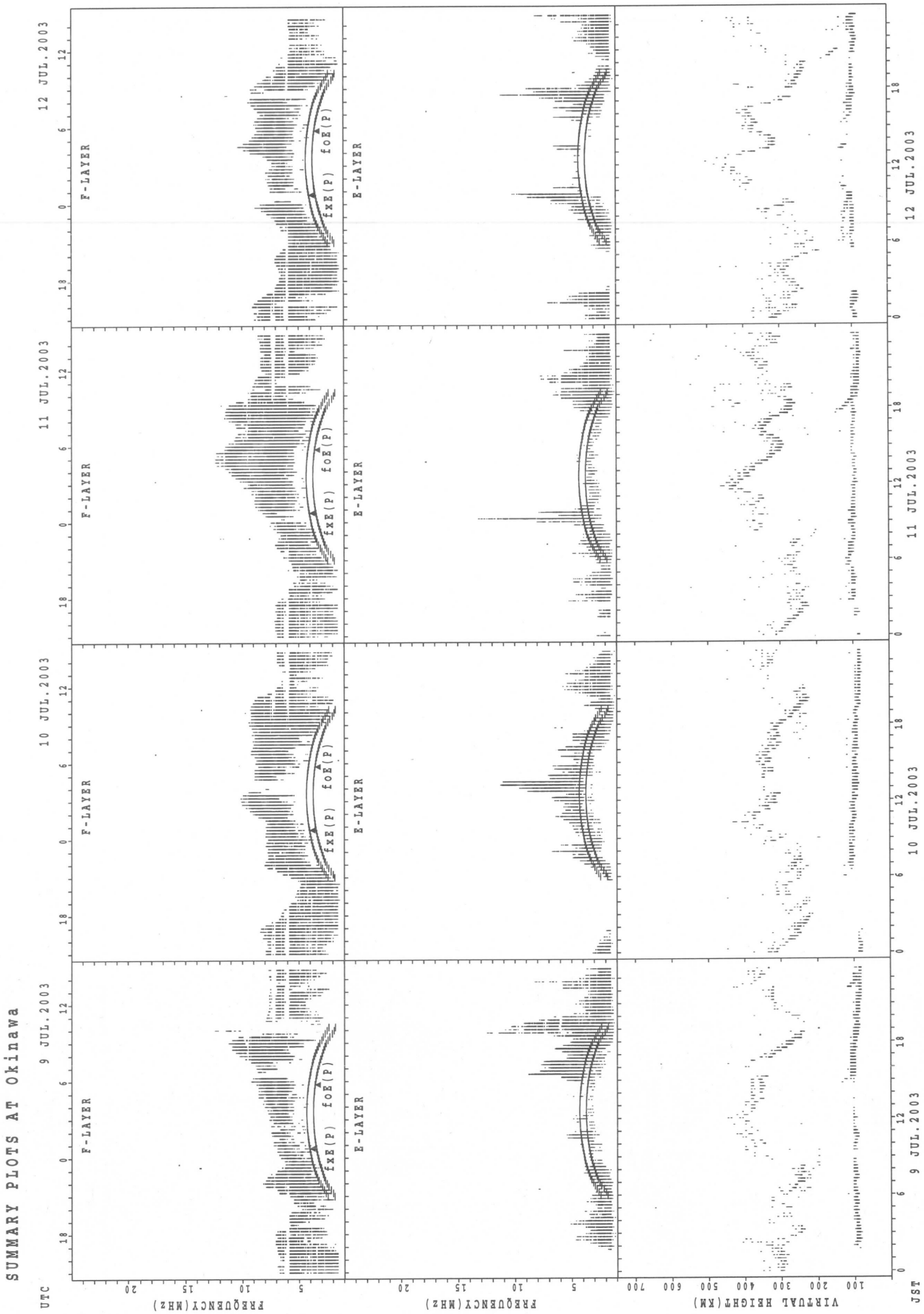


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

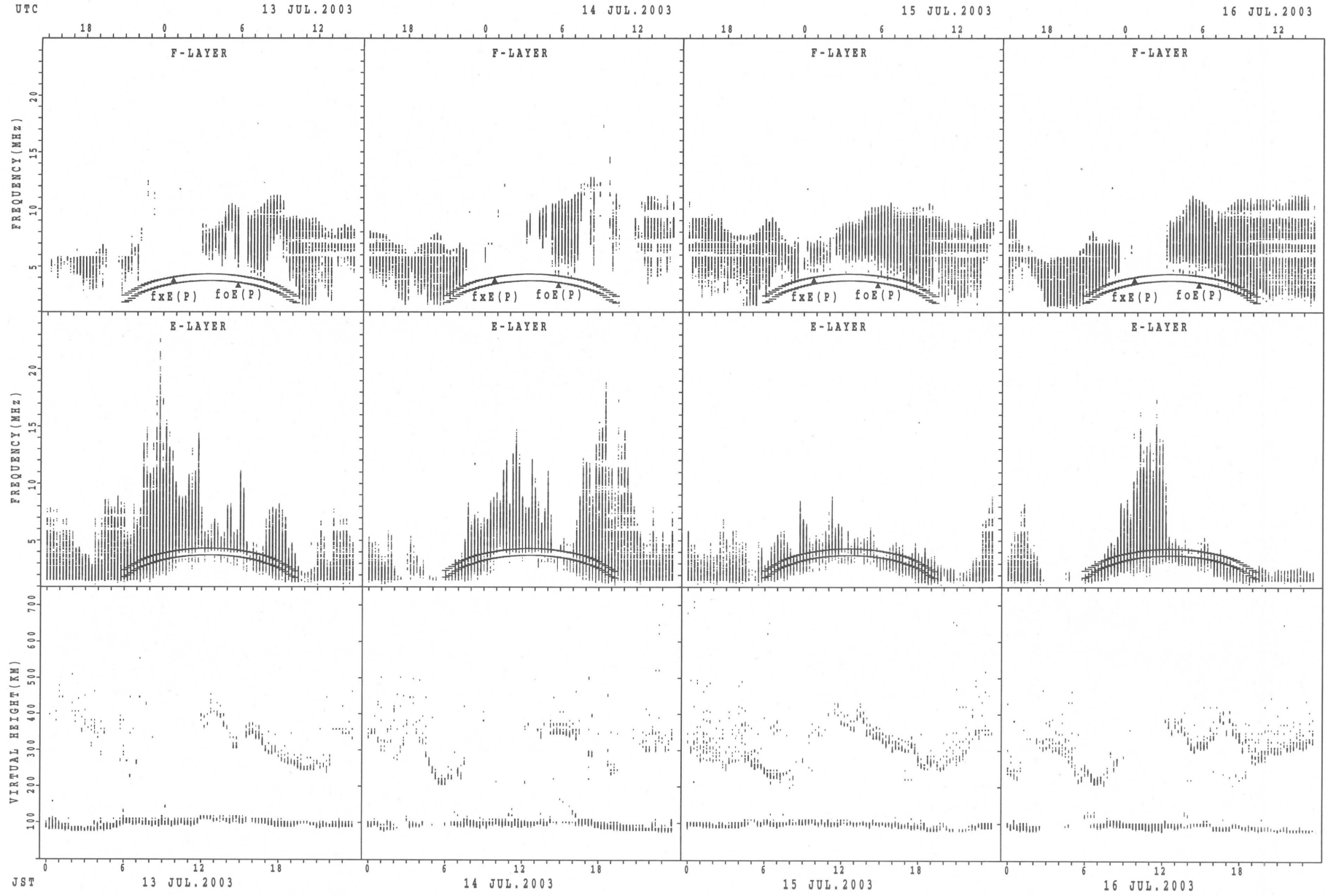
SUMMARY PLOTS AT Okinawa



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

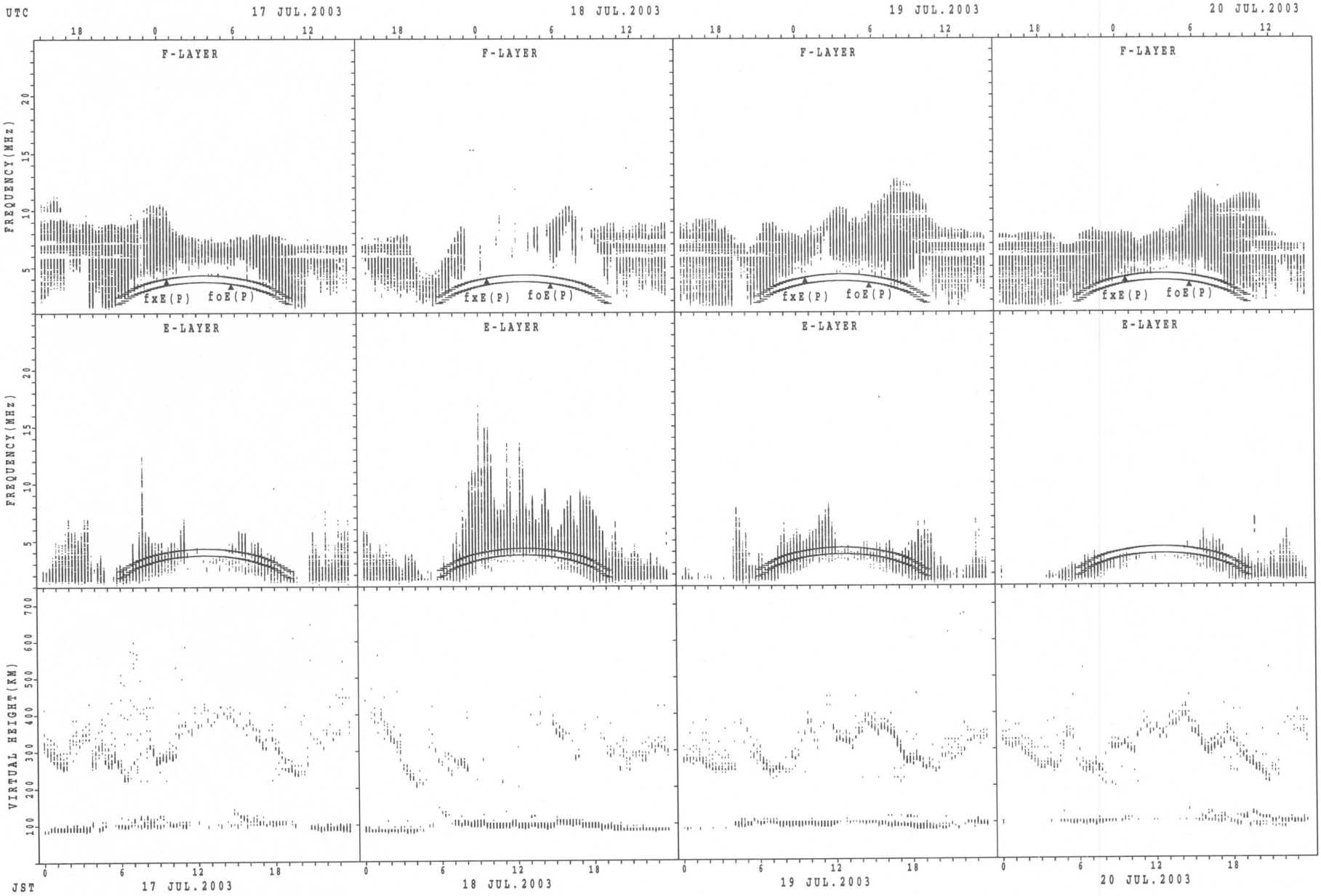

SUMMARY PLOTS AT Okinawa
UTC
JST
9 JUL.2003
10 JUL.2003
11 JUL.2003
12 JUL.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



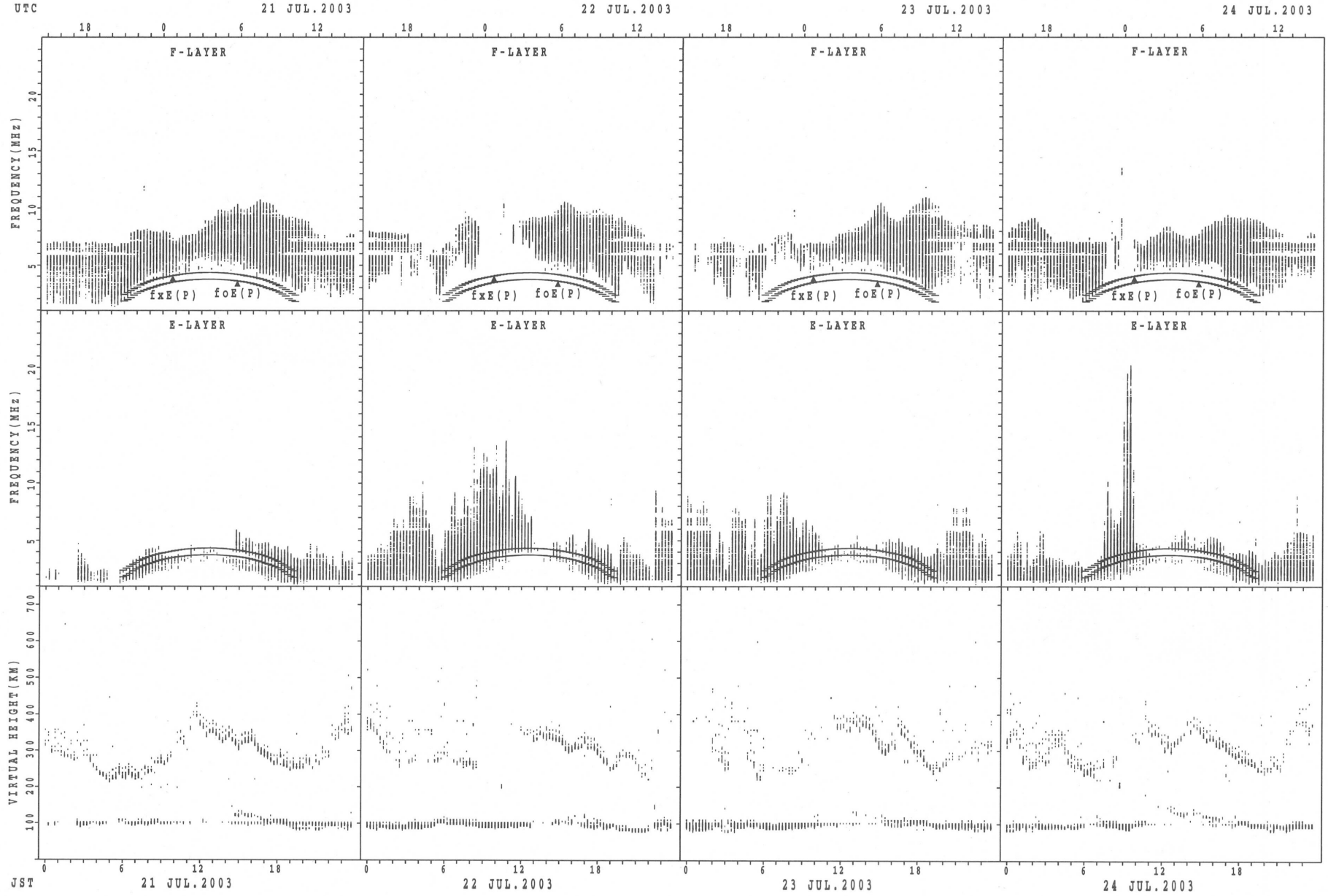
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



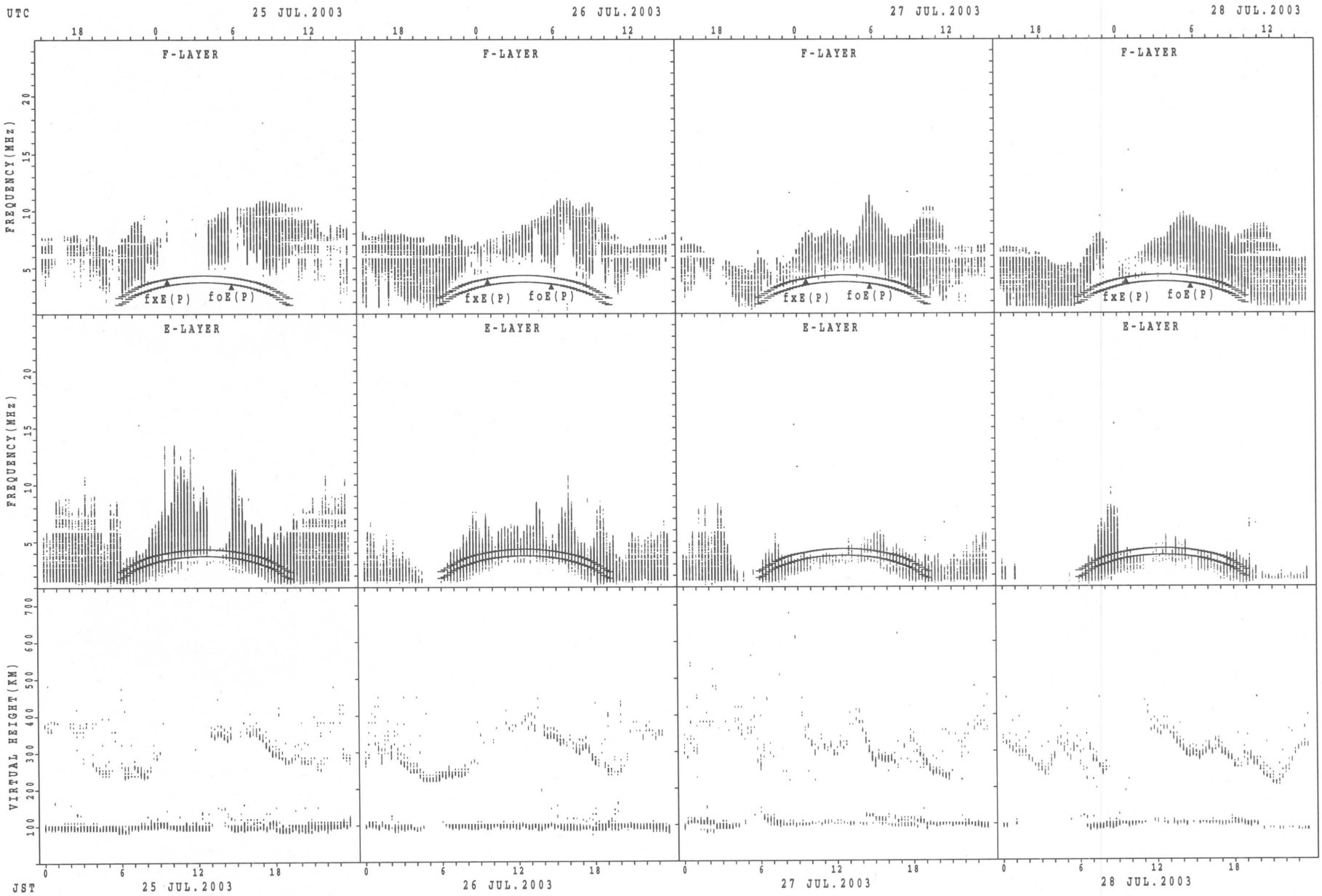
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



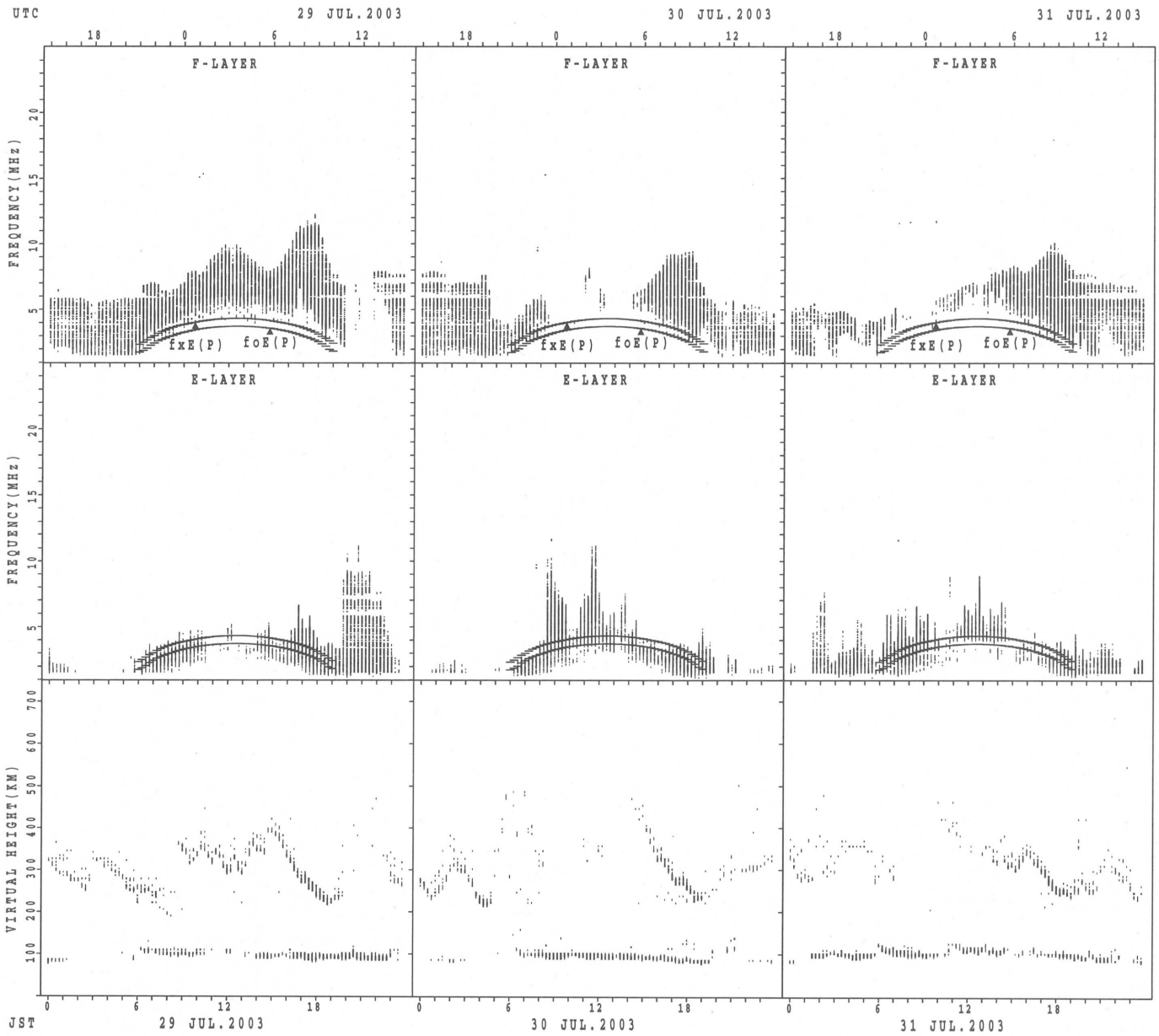
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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

MONTHLY MEDIANS OF h'F AND h'Es

JUL.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	5	3	2	3		2	5	8									1	7	11	9	8	9	8	6
MED	316	312	371	290		344	344	312									296	330	304	302	290	328	308	305
U Q	340	320	376	300		352	346	328									148	356	332	328	310	346	328	308
L Q	284	288	366	286		336	301	293									148	320	280	289	280	299	287	292

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	23	21	22	24	26	29	30	31	30	30	29	23	18	22	26	27	26	26	24	26	27	26	25
MED	97	97	95	98	108	110	107	104	103	103	99	101	97	100	98	107	107	107	103	103	104	103	102	99
U Q	100	99	104	107	114	115	110	107	103	105	103	103	103	105	107	113	111	111	105	105	107	107	107	103
L Q	95	91	91	91	97	103	103	103	101	99	97	97	97	97	95	97	99	105	103	101	99	101	97	95

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	7	6	6	3	6	7	14									17	13	18	15	7	5	9	7
MED	339	302	320	320	400	323	288	273									316	300	288	276	290	294	330	344
U Q	347	338	324	338	454	326	308	294									328	324	310	302	312	339	345	356
L Q	335	272	306	306	316	278	248	254									300	285	260	258	286	293	305	330

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	22	24	22	23	28	31	30	27	26	24	22	20	17	25	20	23	28	26	27	23	25	28
MED	95	97	95	96	99	111	109	105	103	101	99	99	99	103	99	109	103	105	103	102	99	101	101	99
U Q	100	104	101	98	105	117	113	107	105	105	103	105	105	111	108	113	112	107	105	105	105	105	105	103
L Q	95	95	93	95	95	103	105	103	101	99	97	95	95	97	95	99	99	103	99	99	95	97	97	97

h'F STATION Yamakawa 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	2	4	5	4	4		5	19	13									26	24	20	10	6	3	4
MED	341	313	336	344	325		280	270	264									305	290	285	290	273	330	351
U Q	344	358	387	362	340		305	278	300									334	313	310	302	328	370	372
L Q	338	291	284	326	312		240	254	244									294	277	265	270	272	330	332

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	26	27	24	25	19	29	30	30	27	27	22	20	17	15	17	24	29	29	25	28	27	28	27
MED	95	97	97	96	97	99	107	107	103	103	103	100	101	105	105	107	111	105	105	101	95	97	97	97
U Q	103	101	105	103	102	105	113	111	109	105	107	103	103	107	117	117	113	109	111	103	99	103	101	101
L Q	93	95	93	95	95	93	101	103	103	101	99	97	99	97	99	101	105	103	100	96	91	95	89	91

MONTHLY MEDIANS OF h'F AND h'Es

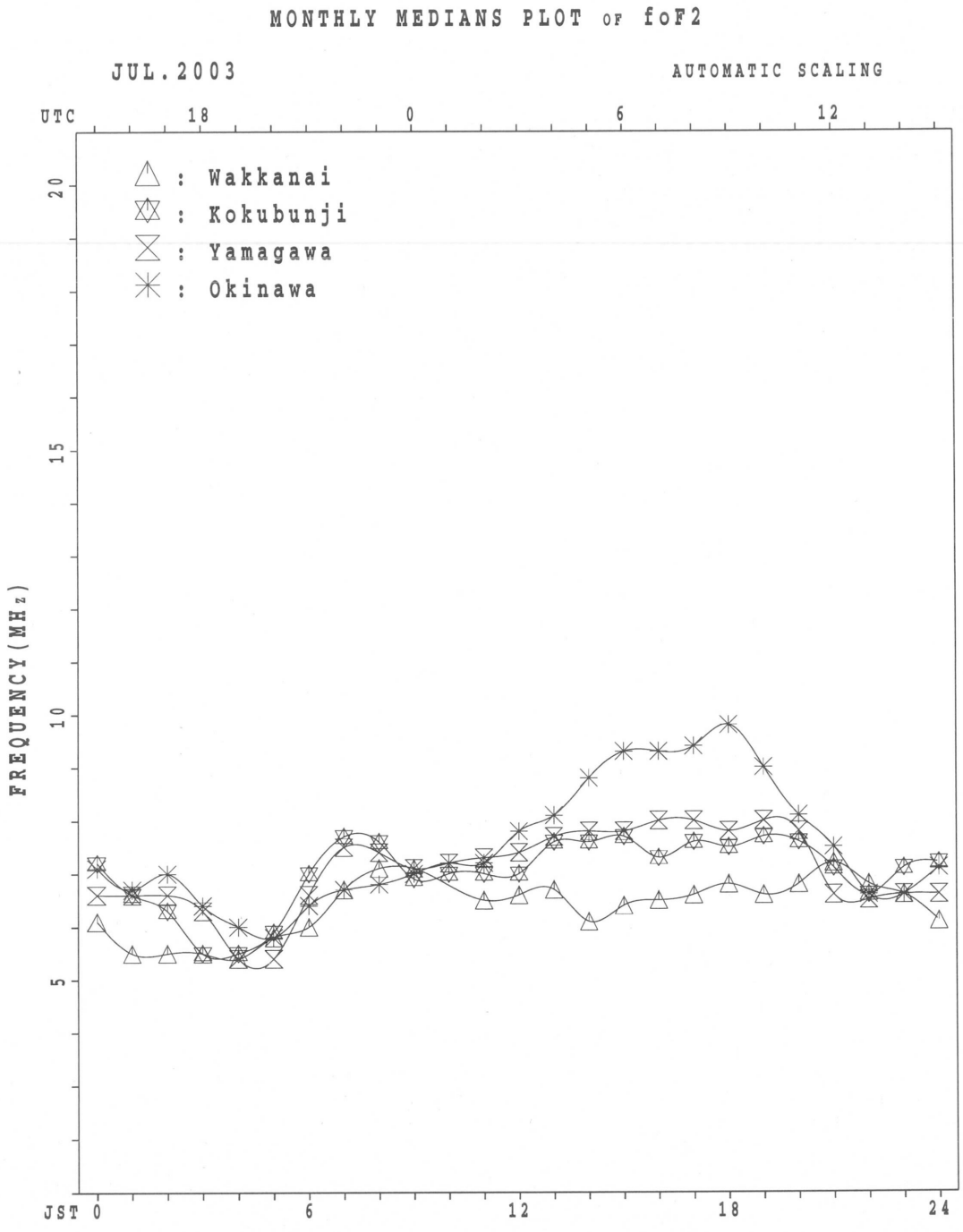
JUL. 2003 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h'F STATION Okinawa LAT. 26°40.5'N LON. 128°09.2'E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	9	11	10	5	8	4	6	17	16									25	27	26	16	11	6	7
MED	342	314	331	318	298	308	273	258	264									306	270	271	279	290	333	370
U Q	378	328	420	369	339	342	282	268	287									325	298	294	290	328	358	382
L Q	317	288	304	291	268	290	260	245	243									294	254	254	258	282	330	346

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	27	22	21	21	22	15	21	26	26	24	23	19	23	18	18	18	27	24	29	28	25	27	28	24
MED	95	97	93	95	97	97	109	103	104	103	103	99	103	103	101	107	107	106	103	97	95	93	96	97
U Q	99	101	97	100	101	103	119	113	107	110	105	109	115	111	107	119	113	111	107	100	99	99	103	101
L Q	87	93	89	89	95	93	98	97	103	98	97	97	97	95	95	99	103	102	95	95	91	89	89	92


MONTHLY MEDIANS PLOT OF foF2
JUL. 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

JUL. 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 30.0MHz IN 15.0SEC 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 78	X 70	X 69	X 65	X 63															X 72	X 72	X 72	X 76	X 75
2	X 70	70	68	63	62															X 74	X 74	X 77	X 80	84
3	83	81	81	65	61															A	X 82	86	95	X 74
4	X 67	66	X 64	66	X 62															X 69	X 68	X 68	X 70	X 69
5	X 67	X 66	X 66	X 62	60																A	X 77	X 76	80
6	X 78	X 77	71	X 62	X 69															X 82	X 70	X 69	X 69	76
7	A	76	A	75	70															X 83	X 92	X 75	X 73	71
8	74	73	X 68	68	X 66															X 84	X 82	X 75	X 73	X 78
9	X 78	80	78	X 72	64															X 98	X 85	X 74	X 75	X 75
10	X 76	X 77	X 72	X 72	X 58															A	A	X 76	74	73
11	A	71	71	68	X 64															X 92	X 95	X 87	X 83	X 85
12	X 85	X 80	X 79	X 72	X 80															X 64	A	A	67	X 62
13	X 62	X 62	X 56	X 48	55															X 86	X 92	X 83	A	A
14	X 68	70	70	67	X 60															X 103	X 92	X 83	X 80	X 83
15	X 80	X 80	X 80	X 74	X 68											C				X 82	X 82	X 86	X 88	X 84
16	81	X 67	65	69	X 64	69														X 96	X 100	X 110	X 112	X 97
17	X 100	X 103	X 107	X 97	98	92	88	84	83											X 66	RO X 64	X 65	X 61	X 65
18	X 66	67	72	70	X 72															X 67	X 75	X 80	X 64	70
19	X 68	X 69	X 65	X 60	65															X 92	X 78	X 82	X 78	X 82
20	X 82	X 80	X 80	X 73	X 64															X 86	X 90	X 83	X 75	X 76
21	X 77	78	X 80	78	X 78															X 85	X 85	X 84	X 81	X 80
22	X 74	X 73	X 73	X 70	X 68															X 82	X 86	X 87	X 81	75
23	71	X 72	82	75	66															X 83	X 85	X 82	X 78	X 73
24	X 71	X 71	X 67	X 61	X 61															O X 90	X 89	X 77	83	86
25	97	X 87	X 79	75	70															X 93	X 93	X 90	X 81	X 84
26	83	87	X 79	80	X 72															X 106	X 86	X 76	79	81
27	82	X 75	72	68	62															X 86	X 80	X 67	A	69
28	O X 63	X 64	X 65	69	X 56															X 82	O X 89	X 84	X 76	X 72
29	X 74	X 72	X 73	X 64	X 63															X 79	X 70	X 66	X 66	O X 71
30	X 67	X 57	X 58	X 54	X 51															X 71	X 70	X 64	66	X 60
31	X 58	X 61	60	O X 55	X 46															X 70	X 75	X 73	X 70	X 71
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	30	31	31	2	1	1	1											28	28	30	29	30
MED	X 74	X 72	X 72	X 68	X 64	80	88	84	83											X 83	X 84	X 77	X 76	X 75
U Q	82	X 80	X 79	73	X 69															X 91	X 90	X 84	X 81	X 82
L Q	X 68	X 67	X 66	X 63	X 61															X 73	X 74	X 73	X 70	X 71

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC IN MANUAL SCALING

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	72	64	63	59	57	62	62	62	63	A	55	59	R 64	61	A	63	66	70	67	66	66	66	70	69
2	S 64	F	F	F	F	68	63	A	A	A	A	A	A	A	A	61	58	60	64	68	68	71	74	F
3	F	F	F	F	F	52	63	93	88	68	70	70	74	79	76	76	75	76	77	A	76	F	F	68
4	61	F	58	F	56	53	59	A	A	A	A	A	63	A	R 63	61	60	67	A	63	62	62	64	63
5	61	60	60	56	F	58	73	70	68	65	72	64	66	63	67	68	65	69	A	77	A	70	70	F
6	72	71	F	56	62	66	74	71	68	68	66	65	A	72	75	74	70	A	74	76	64	Z 63	63	F
7	A	F	A	F	F	61	77	88	92	A	A	A	R 82	90	81	R 77	R 76	69	70	77	86	68	67	F
8	F	F	62	F	Z 60	58	69	83	77	S 68	A	A	68	69	66	68	69	65	68	78	76	69	67	72
9	72	F	F	66	F	54	66	83	100	76	61	63	A	67	74	77	80	82	80	92	79	68	69	69
10	70	70	66	66	52	51	59	64	68	65	A	A	60	A	A	A	69	64	S 64	A	A	70	F	F
11	A	F	F	F	58	64	76	78	68	68	74	80	86	94	89	90	86	80	S 74	86	89	81	77	79
12	79	74	73	66	74	82	74	71	A	59	A	A	59	A	57	55	57	63	66	58	A	A	F	56
13	56	56	50	42	F	52	64	82	64	60	S 62	A	64	70	66	66	S 64	68	66	80	86	S 76	A	A
14	S 62	F	F	F	54	50	69	H 71	67	A	A	A	A	78	83	78	66	74	84	97	86	77	74	77
15	74	74	74	68	62	78	80	66	76	A	S 63	65	63	78	77	C	81	92	91	76	76	80	82	78
16	F	61	F	F	58	F	68	77	80	A	A	64	66	72	88	89	81	81	77	90	94	104	106	91
17	94	97	101	91	F	F	F	F	F	54	A	54	A	54	57	A	58	57	57	60	R	S 59	55	59
18	59	F	F	F	66	59	57	55	60	A	69	62	65	A	66	78	85	80	72	61	69	74	58	F
19	62	63	59	54	F	55	66	68	76	76	A	74	96	103	87	80	81	86	90	86	72	76	72	76
20	76	74	74	67	58	56	63	72	81	75	63	78	74	70	71	80	84	80	76	80	84	77	69	70
21	71	F	74	F	72	72	83	91	90	A	A	A	75	80	82	82	R 78	79	78	79	79	78	75	74
22	68	67	66	64	62	67	78	95	94	90	76	70	74	70	80	80	76	A	78	76	80	81	75	F
23	F	66	F	F	F	57	72	84	62	56	61	58	64	71	75	77	79	88	86	77	79	76	72	66
24	65	65	61	55	55	53	65	A	A	67	67	79	75	A	68	70	76	76	80	84	83	71	F	F
25	F	81	73	F	F	64	85	81	85	A	S 63	A	A	69	70	73	80	88	88	87	87	84	75	78
26	F 75	F	73	F	66	66	71	75	70	A	62	A	A	A	A	74	71	81	99	100	80	70	F	F
27	F	69	F	F	F 50	47	50	64	58	A	68	72	66	68	72	S 76	68	A	69	80	74	61	A	F
28	57	58	58	F	50	48	58	77	102	69	61	60	63	76	75	78	74	68	69	76	83	78	70	66
29	68	66	67	58	57	63	68	78	84	59	61	70	66	60	58	A	S 62	62	75	73	64	60	60	S 65
30	61	51	52	48	45	46	54	A	55	53	A	55	64	56	50	53	55	A	58	65	64	R 58	F	54
31	52	55	F	49	40	41	53	60	56	A	A	A	56	A	62	A	53	57	S 62	66	69	67	64	66
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	20	19	16	21	29	30	26	26	18	18	19	24	23	27	26	31	27	29	29	27	29	23	20
MED	68	66	66	58	58	58	67	76	73	68	63	65	66	70	72	76	71	74	74	77	79	71	70	69
U Q	72	72	73	66	62	65	74	83	85	69	69	72	74	78	80	78	80	81	80	85	84	78	75	76
L Q	61	60	59	54	53	52	62	68	64	59	61	60	64	67	66	68	64	65	66	67	69	66	64	66

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							A	A	A	A	L 492	496	A	A	A	A	456	A	L					
2							A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A	A	A	A	A	A	A	512	500	A	A	464	L 456	A					
4						L 336	A	A	A	A	A	A	A	A	A	A	452	L 432	A					
5						L	L	L 436	464	A	U L 480	U L 488	512	L 480	492	476	L 476	A	A					
6						A	L	A	472	472	A	524	A	516	496	A	L 464	A	A					
7						A	L	A	A	A	A	A	A	A	A	A	A	A	A					
8						A	L 412	A	A	512	A	A	512	504	A	A	472	L 452	L					
9						A	A	A	A	A	L 512	L 540	A	A	508	A	456	A	A					
10						C	432	A	A	484	A	A	A	A	A	A	A	A	L					
11							A	A	A	500	532	512	512	U L 508	L 468	488	L	A	L					
12						A	A	A	A	A	A	A	A	A	484	A	456	L 424	A					
13						A	A	A	L 464	A	A	A	A	504	492	A	L 464	L 436	L					
14							A	A	A	A	A	A	A	A	A	A	L 500	L 440	A					
15							L	A	A	A	A	504	U L 528	496	A	C	A	L	L					
16							A	A	A	A	A	A	A	A	496	476	L 456	A	A					
17						A	A	A	A	U L 480	A	A	A	A	U L 448	A	440	420	A					
18						A	A	A	A	A	A	A	A	A	A	A	L 460	L 440	L					
19								A	A	A	A	A	A	A	A	A	A	L	A					
20							L 420	L 456	468	U L 488	L 520	512	U L 512	U L 536	L 492	496	L 468	L						
21							A	A	A	A	A	A	L 536	524	A	A	A	A	A					
22								U L 484	L 492	512	A	L 576	A	L 540	516	492	A	A	A					
23							A	L 440	L	U L 540	L 524	U L 528	L 520	A	488	A	L 472	L 432	A					
24						A	A	A	A	L 492	A	A	A	A	A	A	L 452	L	A					
25						A	A	A	A	A	U L 508	A	A	492	L 484	L 500	A	E C	L					
26							L	A	A	A	L 504	A	A	A	A	A	A	L 436	A					
27						A	A	A	440	A	L 544	496	504	492	A	A	A	A	A					
28								L 436	A	A	L 472	508	U L 512	A	488	L 476	L	L	L					
29						L	A	432	444	L 468	472	U L 492	A	A	A	A	500	L	A					
30						A	A	A	A	444	A	U L 480	472	452	452	444	412	A	L					
31						A	A	A	A	A	A	A	A	A	A	A	A	L 420	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	3	6	7	11	11	13	11	13	14	8	18	11						
MED						L 336	L 420	L 438	464	488	L 508	508	512	504	490	482	462	L 436						
U Q							432	L 456	472	512	L 524	L 526	L 520	520	496	494	L 472	L 440						
L Q							L 412	436	444	472	L 480	U L 494	512	492	484	476	456	L 424						

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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	A	A	A	A	A	A	A	A	A	A	A	A	A					
2						UA 196	A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A	UA 256	A	A	A	A	A	A	UA 384	B	A	328	UA 296	A					
4						UA 212	UA 260	A	A	A	A	A	A	A	A	A	A	UA 280	A					
5						UA 188	A	A	A	C	C	A	B	B	UA 360	A	A	A	A	B				
6						UA 200	A	A	A	A	B	A	A	A	B	B	A	A	A					
7						A	UA 260	A	A	A	A	A	A	A	A	A	A	A	C					
8						A	260	A	A	A	A	A	A	A	B	A	UA 324	UA 292	A					
9						A	A	A	A	A	A	A	A	A	A	A	A	A	C					
10						C	A	A	B	A	A	A	A	A	A	A	A	A	A					
11						C	A	A	A	A	A	A	A	A	A	UA 356	A	A	UA 224					
12						UA 200	248	A	A	A	A	A	A	A	B	A	A	A	A					
13						188	A	A	A	A	A	A	A	A	A	A	A	C	A					
14						176	A	A	A	A	A	A	A	A	A	A	A	A	C					
15						C	A	A	A	A	A	A	A	A	A	C	C	A	UA 212					
16						A	A	A	A	A	A	A	A	A	A	A	A	UA 280	A					
17						A	UA 248	A	A	A	A	A	A	A	A	A	A	UA 280	UA 212					
18						UA 208	UA 252	A	A	A	A	A	A	A	A	A	A	A	A					
19						UR 200	256	UA 308	A	A	A	A	A	A	A	A	A	A	A					
20						C	A	A	A	A	A	A	A	B	B	UA 352	A	R	A					
21						B	256	A	C	A	A	A	A	B	B	A	A	A	A					
22						A	UA 244	A	A	A	A	A	UA 404	B	B	UA 364	A	UA 292	A					
23						A	A	A	A	A	U 380	UA 408	UA 416	UA 392	UA 364	B	C	A	A					
24						B	UA 244	A	A	A	A	A	A	A	B	A	UA 328	UA 284	UA 220					
25						A	A	A	A	A	A	A	A	A	A	UA 344	A	C	A					
26						A	A	C	A	A	A	A	A	A	A	A	A	A	A					
27						B	UA 244	A	A	A	A	A	UR 400	A	A	A	A	A	UA 204					
28						B	UA 252	A	A	A	A	B	UR 384	A	UA 364	A	A	A	A					
29						B	A	A	A	A	UA 376	A	B	UA 372	A	A	C	A	C					
30						B	A	E	C	E	C	E	C	A	UR 380	B	B	UR 352	A	UA 304	A	UA 196			
31						B	A	A	A	A	A	A	UA 388	A	A	UA 328	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						9	13	1			2	2	5	3	4	5	4	7	6					
MED						UA 200	UA 252	UA 308			U 378	U 394	UA 400	UA 384	UA 362	UA 352	UA 326	UA 284	UA 212					
U Q						UA 204	UA 258						UA 410	UA 392	UA 364	UA 360	328	UA 292	UA 220					
L Q						188	UA 246						U 386	UA 372	U 356	UA 336	UA 314	UA 280	UA 204					

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A 33	J A 43	J A 42	J A 40	J A 36	E B 23	J A 50	J A 46	J A 63	49	J A 103	J A 45	J A 76	J A 92	J A 223	J A 54	40	J A 78	J A 26	E B 20	J A 22	J A 31	J A 33	J A 45
2	J A 77	J A 75	J A 54	E B 21	J A 18	26	J A 47	J A 100	J A 102	J A 71	J A 67	J A 85	J A 129	J A 97	J A 72	J A 91	J A 53	J A 58	J A 56	J A 61	J A 52	J A 43	J A 88	J A 76
3	J A 142	J A 88	J A 74	J A 31	J A 26	J A 54	40	J A 62	J A 54	J A 71	J A 66	J A 70	J A 47	44	J A 50	66	J A 42	J A 57	J A 98	J A 88	J A 97	J A 54	J A 100	J A 77
4	J A 40	J A 83	J A 46	J A 41	J A 32	24	J A 52	J A 60	J A 95	J A 118	J A 88	J A 99	J A 89	J A 122	J A 121	J A 74	J A 38	34	J A 98	J A 88	J A 87	J A 72	J A 45	J A 41
5	J A 37	J A 52	J A 41	J A 38	J A 25	J A 33	J A 40	J A 64	J A 43	56	J A 43	J A 45	E B 44	45	43	43	44	J A 69	J A 76	J A 98	J A 145	J A 79	J A 65	J A 56
6	J A 40	J A 37	J A 33	J A 37	J A 22	J A 43	J A 52	J A 87	J A 87	J A 75	J A 92	J A 91	J A 84	J A 96	E B J A 43	50	J A 52	J A 109	J A 50	E B 30	40	J A 47	J A 43	J A 44
7	J A 96	J A 66	J A 102	J A 44	J A 44	J A 66	J A 42	J A 81	J A 119	J A 156	J A 202	J A 175	J A 144	J A 74	J A 61	J A 208	J A 183	J A 72	J A 127	J A 202	J A 160	J A 85	J A 74	J A 74
8	J A 43	J A 33	J A 20	J A 41	J A 45	J A 66	33	J A 53	J A 56	J A 46	J A 91	J A 126	J A 55	J A 45	J A 70	J A 53	38	32	J A 31	J A 21	J A 23	J A 21	E B 16	J A 26
9	J A 62	J A 44	J A 32	J A 40	J A 68	J A 60	J A 60	J A 68	J A 104	J A 53	J A 61	J A 73	J A 96	J A 100	41	J A 74	40	J A 119	J A 45	J A 32	J A 32	J A 42	J A 34	J A 27
10	J A 18	J A 42	J A 24	J A 25	22	E C 36	36	J A 60	J A 74	J A 46	J A 156	92	J A 89	J A 74	J A 110	J A 108	J A 98	J A 61	J A 53	J A 98	J A 110	J A 94	J A 79	J A 100
11	J A 102	J A 76	J A 55	J A 89	J A 70	J A 36	J A 86	J A 63	J A 56	J A 42	J A 42	J A 46	44	41	43	44	J A 43	J A 48	J A 41	J A 34	J A 36	J A 19	E C 36	J A 30
12	J A 20	J A 18	J A 44	E B J A 36	13	J A 37	J A 49	J A 53	J A 63	J A 76	J A 96	J A 73	J A 60	68	E B 38	J A 52	J A 142	35	J A 122	J A 42	J A 97	J A 106	J A 83	J A 104
13	J A 29	J A 34	J A 22	J A 26	J A 27	J A 37	J A 52	J A 67	J A 48	J A 56	J A 86	J A 128	J A 61	44	J A 42	J A 93	J A 79	36	J A 42	J A 80	J A 98	J A 78	J A 99	J A 88
14	J A 89	J A 84	J A 99	J A 54	J A 56	23	J A 46	J A 63	J A 56	J A 60	J A 92	J A 103	J A 95	J A 115	J A 94	J A 100	J A 59	J A 45	J A 60	J A 118	J A 128	J A 74	J A 53	J A 32
15	E C 30	E C 30	J A 25	J A 84	J A 27	A E C 30	J A 42	J A 56	J A 82	J A 94	J A 91	48	42	J A 80	J A 70	C	J A 53	J A 39	28	J A 28	J A 35	J A 46	J A 46	J A 72
16	J A 88	J A 44	J A 21	J A 22	J A 29	J A 41	J A 53	J A 46	J A 63	J A 147	J A 126	J A 65	J A 75	J A 89	J A 70	44	38	J A 57	J A 95	E B 16	E B 15	E B 14	E B 15	J A 19
17	J A 47	55	J A 27	J A 24	J A 33	J A 55	J A 48	J A 66	J A 67	42	J A 79	J A 51	J A 124	J A 59	J A 46	J A 62	J A 38	32	J A 52	J A 56	J A 171	J A 75	J A 60	J A 30
18	J A 54	J A 46	J A 55	J A 74	J A 41	J A 42	J A 41	J A 55	J A 52	J A 75	J A 63	J A 66	J A 62	J A 116	J A 98	J A 97	J A 42	J A 67	J A 40	J A 38	J A 36	J A 32	J A 25	J A 44
19	J A 77	J A 47	J A 77	J A 98	J A 73	G	31	J A 49	J A 60	J A 58	J A 82	J A 69	J A 61	J A 130	J A 83	J A 56	J A 48	J A 85	J A 64	J A 66	J A 45	J A 88	J A 45	J A 42
20	J A 27	29	J A 26	J A E C 19	E C 24	E C 36	J A 31	J A 44	J A 40	J A 47	J A 52	44	J A 46	E B 43	E B 42	44	35	G J A 28	J A 39	J A 32	J A 25	20	E C 36	J A 40
21	J A 61	J A 99	J A 78	J A E B 40	J A 14	J A 32	J A 56	J A 64	J A 78	J A 98	J A 69	J A 100	J A 59	E B 42	J A 59	J A 54	J A 78	J A 58	J A 53	J A 48	J A 35	J A 28	J A 38	50
22	J A 54	J A 87	J A 78	J A 49	J A 52	J A 32	J A 40	J A 44	J A 44	J A 51	J A 55	J A 49	47	46	43	46	J A 57	J A 96	J A 100	J A 53	J A 154	J A 38	J A 42	144
23	J A 105	J A 75	J A 62	J A 54	J A 72	J A 34	J A 41	J A 42	J A 43	48	45	51	48	51	44	51	39	J A 46	J A 35	J A 29	J A 26	J A 49	J A 44	J A 36
24	J A 18	J A E 18	E B 15	E B 15	E B 14	J A 45	J A 60	J A 80	J A 74	J A 46	J A 78	J A 111	J A 90	J A 80	J A 59	J A 99	J A 90	J A 72	J A 54	J A 55	J A 98	J A 119	J A 72	J A 63
25	J A 65	J A 41	J A 97	J A 76	J A 52	J A 48	J A 49	J A 58	J A 89	J A 104	J A 56	J A 133	J A 126	J A 79	45	J A 47	J A 88	J A 47	J A 76	E B 110	J A 46	E B 16	J A 40	J A 39
26	J A 40	J A 27	J A 40	J A 33	J A 22	J A 29	J A 42	J A 110	61	J A 96	J A 95	J A 76	J A 78	J A 130	J A 136	J A 73	J A 91	J A 64	J A 47	J A 98	J A 77	J A 38	J A 61	J A 78
27	J A 87	J A 87	J A 74	J A 56	J A 43	J A 34	J A 42	J A 52	J A 64	J A 75	J A 53	J A 45	G	J A 55	J A 87	J A 141	J A 78	J A 95	J A 56	J A 60	J A 47	J A 44	J A 54	J A 53
28	J A 76	J A 22	J A 24	J A 19	J A 26	J A 29	27	J A 36	J A 68	J A 54	J A 41	45	G	49	J A 47	42	38	33	J A 33	J A 26	E C J A 50	29	65	47
29	J A 35	J A E 20	E B 14	E B 14	E C 31	J A 22	J A 98	J A 43	J A 43	J A 40	42	46	J A 53	J A 51	J A 52	J A 84	J A 75	J A 101	J A 72	J A 35	J A 24	23	J A 21	39
30	E C 36	J A E C 47	J A 36	J A 29	J A 54	J A 34	J A 38	J A 59	52	J A 44	J A 47	G	E B 38	E B 38	G J A 33	36	38	J A 76	J A 34	J A 24	J A 50	J A 90	J A 59	J A 34
31	J A 33	J A 75	J A 30	J A 56	J A 36	J A 30	J A 49	J A 55	J A 54	J A 72	J A 101	J A 168	J A 53	J A 114	J A 112	J A 112	J A 58	J A 41	J A 30	J A 28	E B 20	J A 37	J A 72	J A 38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31
MED	J A 47	J A 46	J A 41	J A 40	J A 32	34	J A 46	J A 59	J A 63	J A 58	J A 78	J A 70	J A 61	J A 74	J A 59	J A 59	J A 52	J A 58	J A 53	J A 48	J A 47	J A 44	J A 46	J A 44
U Q	J A 77	J A 75	J A 74	J A 54	J A 52	J A 43	J A 52	J A 66	J A 78	J A 76	J A 92	J A 100	J A 89	J A 97	J A 87	J A 93	J A 78	J A 76	J A 76	J A 88	J A 98	J A 78	J A 72	J A 74
L Q	J A 33	J A 33	J A 25	J A 25	24	29	40	J A 49	J A 52	J A 47	J A 53	46	47	45	43	47	39	39	J A 39	J A 29	J A 32	29	36	J A 36

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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	20	29	34	29	24	E B 23	47	42	57	A A 49	45	43	50	54	A A 223	51	37	55	24	E B 20	18	24	21	36
2	37	32	33	E B 21	E B 16	22	41	A A 100	A A 102	A A 71	A A 67	A A 85	A A 129	A A 97	A A 72	48	46	54	52	58	48	32	53	38
3	E B 16	40	38	23	16	46	37	53	50	62	56	62	46	42	48	61	39	39	44	A A 88	68	50	63	29
4	20	E B 16	36	30	28	22	46	A A 60	A A 95	A A 118	A A 88	A A 99	56	A A 122	55	48	34	30	A A 98	19	54	42	20	30
5	20	24	34	21	20	29	33	36	38	55	42	44	E B 44	42	41	41	42	58	A A 76	45	A A 145	40	33	20
6	36	28	26	24	20	36	36	64	40	41	57	46	A A 84	45	E B 43	45	38	A A 109	44	E B 30	36	24	29	30
7	A A 96	42	A A 102	34	21	55	36	71	62	A A 156	A A 202	A A 175	68	65	49	67	66	52	62	44	64	42	36	38
8	30	25	17	E B 15	24	31	31	44	45	42	A A 91	A A 126	44	41	54	47	37	31	28	20	20	E B 15	E B 16	18
9	36	35	22	27	28	44	56	54	54	51	45	47	A A 96	52	40	52	36	54	38	30	28	26	20	20
10	E B 16	25	18	17	20	E C 36	35	44	53	44	A A 156	A A 92	50	A A 74	A A 110	A A 108	64	44	26	A A 98	A A 110	51	42	45
11	A A 102	29	35	29	41	E C 35	55	47	46	40	41	44	41	38	42	40	41	39	33	23	28	17	E C 36	21
12	16	E B 15	37	32	E B 13	35	44	46	A A 63	52	A A 96	A A 73	53	A A 68	E B 38	47	37	33	42	38	A A 97	A A 106	39	41
13	21	20	16	20	19	29	42	62	39	54	49	A A 128	56	41	40	48	39	34	31	36	34	48	A A 99	A A 88
14	41	54	35	34	E C 35	21	42	57	49	A A 60	A A 92	A A 103	A A 95	70	62	71	41	35	54	68	38	46	24	24
15	E C 30	E C 30	21	21	16	E C 30	29	48	50	A A 94	55	46	42	47	65	C	51	33	26	23	30	E B 17	35	E C 30
16	48	30	E B 13	18	19	23	45	43	44	A A 147	A A 126	54	52	51	41	42	35	52	70	E B 16	E B 15	E B 14	E B 15	E B 14
17	41	54	25	17	20	36	41	42	47	40	A A 79	48	A A 124	50	36	A A 62	34	30	36	34	26	46	35	22
18	34	29	35	29	22	29	35	49	46	A A 75	57	50	58	A A 116	56	51	35	37	29	30	19	21	21	21
19	20	20	21	34	20	G	29	47	56	56	A A 82	62	58	92	63	53	44	34	35	31	32	34	E C 28	33
20	20	28	18	16	E C 24	E C 36	28	35	35	39	42	41	41	E B 43	E B 42	40	34	U Y 28	29	29	21	E B 15	E C 36	35
21	35	48	34	25	E B 14	28	53	48	71	A A 98	A A 69	A A 100	45	E B 42	53	49	67	42	40	44	32	26	29	46
22	35	36	48	36	20	29	35	36	38	44	51	41	47	45	42	43	54	A A 96	50	22	24	20	30	29
23	21	E C 36	40	36	36	31	38	38	40	45	43	48	45	49	41	49	38	37	33	29	25	47	E B 16	21
24	E B 16	E B 16	E B 15	E B 15	E B 14	43	52	A A 80	A A 74	42	48	63	63	A A 80	52	45	34	36	44	51	60	42	36	45
25	54	32	35	35	36	43	43	52	60	A A 104	44	A A 133	A A 126	44	42	43	65	41	28	43	E B 15	E B 16	32	30
26	20	22	32	24	16	18	24	55	57	A A 96	46	A A 76	A A 78	A A 130	A A 136	67	62	36	37	56	44	28	21	20
27	42	29	E C 35	23	21	32	37	47	38	A A 75	46	44	G	42	64	59	54	A A 95	45	44	40	39	A A 54	36
28	49	E B 14	17	E B 14	E B 14	19	26	31	43	49	38	43	G	48	40	40	36	32	29	20	21	E C 29	24	44
29	29	E B 15	E B 14	E B 14	E C 31	21	43	35	38	36	42	43	50	48	48	A A 84	47	36	56	24	20	20	18	E C 35
30	E C 36	35	E C 36	21	E C 35	29	35	A A 59	47	40	A A 47	G	E B 38	E B 38	G 33	29	35	A A 76	30	22	46	22	36	20
31	20	E C 30	20	44	20	26	43	45	47	A A 72	A A 101	A A 168	48	A A 114	47	A A 112	49	30	29	16	E B 20	24	33	25
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31
MED	30	28	U 30	24	20	29	38	47	47	54	55	54	50	49	48	48	39	37	37	30	32	27	30	30
U Q	41	35	35	32	28	36	44	57	57	A A 75	A A 88	A A 99	A A 68	A A 74	62	61	51	54	50	44	48	42	36	38
L Q	20	E B 22	18	18	E B 16	23	35	42	40	42	45	44	44	42	41	43	36	33	29	22	21	E B 20	21	21

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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	14	15	22	14	14	23	15	19	22	19	35	29	36	36	30	33	23	15	12	20	13	13	17	15
2	15	16	13	21	16	14	15	18	20	18	20	34	24	31	31	27	20	20	15	15	14	16	16	15
3	16	16	14	16	13	14	19	20	22	20	30	22	22	30	38	30	20	18	16	14	14	14	16	15
4	16	16	13	14	14	15	16	16	18	21	24	31	34	34	25	20	20	16	13	13	16	15	14	15
5	16	14	19	15	14	14	16	16	31	E C 35	E C 36	30	44	38	25	21	20	16	15	16	15	15	15	15
6	15	12	15	14	14	14	20	19	20	21	36	32	29	32	43	36	21	18	18	30	14	15	15	14
7	16	15	15	15	14	16	16	20	22	20	20	35	22	21	21	21	35	21	E C 36	16	15	18	16	16
8	14	15	15	15	16	16	17	18	21	18	35	32	34	31	38	21	18	18	21	14	14	15	16	14
9	17	14	14	14	13	14	15	18	21	26	28	28	30	23	19	21	20	30	E C 35	14	15	15	14	15
10	16	16	15	15	16	E C 36	15	23	36	21	35	24	35	34	30	35	22	19	13	22	20	14	16	14
11	E C 35	15	14	20	E C 35	E C 36	16	20	30	22	E C 36	27	24	22	34	20	20	19	15	17	15	15	E C 36	15
12	15	15	14	14	13	14	14	21	20	22	22	34	35	28	38	20	18	16	19	14	14	14	16	15
13	16	14	14	14	16	14	20	19	20	34	35	33	31	34	26	27	21	E C 30	15	16	14	15	18	14
14	15	15	14	13	E C 35	14	15	19	18	29	28	35	35	30	23	20	20	15	E C 35	15	16	14	14	15
15	E C 30	E C 30	14	14	12	E C 30	19	20	31	16	34	34	35	28	36	C	E C 36	16	15	14	14	17	15	E C 30
16	16	14	13	15	13	14	14	16	23	19	31	30	22	22	20	20	19	16	11	16	15	14	15	14
17	13	14	14	14	15	14	16	15	19	27	36	23	34	22	23	18	18	13	15	13	15	14	14	15
18	16	15	14	14	14	15	15	15	20	36	35	35	31	36	23	22	19	16	14	14	14	14	15	16
19	16	14	15	15	14	15	16	18	20	21	20	35	35	32	28	24	23	15	16	16	14	16	E C 28	15
20	14	15	15	14	E C 24	E C 36	15	20	22	24	23	35	32	43	42	22	19	18	13	13	14	15	E C 36	15
21	15	E C 35	14	14	14	16	17	21	E C 36	35	24	36	34	42	38	24	21	16	18	14	15	15	15	15
22	20	15	14	12	14	16	17	20	22	23	27	36	36	40	39	28	20	18	13	15	16	15	16	16
23	14	E C 35	14	21	15	15	14	21	23	23	29	32	35	30	31	37	E C 35	17	15	13	13	14	16	16
24	16	16	15	15	14	15	13	20	20	28	36	35	35	34	39	18	21	19	15	16	16	16	15	16
25	21	16	16	15	14	14	19	17	21	35	35	34	35	35	28	19	20	E C 36	15	13	15	16	15	15
26	16	15	16	15	14	13	15	E C 36	19	36	30	22	35	30	22	19	19	19	14	16	16	15	13	17
27	15	15	E C 35	16	14	14	16	21	23	25	28	36	32	36	34	21	18	14	14	13	15	14	15	E C 23
28	15	14	15	14	14	15	14	15	20	22	29	38	35	24	30	20	17	15	14	13	15	E C 29	14	E C 36
29	15	15	14	14	E C 31	13	16	20	20	24	22	36	38	34	22	25	E C 36	19	E C 35	14	15	15	15	E C 35
30	E C 36	22	E C 36	15	E C 35	15	22	E C 35	E C 35	E C 36	35	34	38	E B 38	29	21	18	14	14	14	14	15	14	15
31	14	E C 30	14	E C 35	14	12	22	16	20	22	27	32	23	35	30	22	20	16	15	12	20	14	E C 28	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31
MED	16	15	14	14	14	14	16	19	20	22	30	34	34	32	30	21	20	16	15	14	15	15	15	15
U Q	16	16	15	15	E C 16	16	17	20	23	29	35	35	35	36	38	27	21	19	18	16	15	15	16	16
L Q	15	14	14	14	14	14	15	17	20	21	24	30	30	28	23	20	19	16	14	13	14	14	15	15

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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	289	277	289	284	275	286	306	295	309	A	248	257	R 283	281	A	287	295	292	299	300	283	280	286	283
2	S 269	F	F	F	F	297	267	A	A	A	A	A	A	A	A	290	292	282	295	296	277	274	281	F
3	F	F	F	F	F	300	304	306	336	289	291	285	279	295	285	296	306	306	303	A	268	F	F	278
4	284	F	269	F	271	271	279	A	A	A	A	A	288	A	R 303	278	281	288	A	316	279	272	269	275
5	275	271	286	272	F	290	324	298	308	271	302	281	290	277	291	290	290	307	A	285	A	282	274	F
6	275	306	F	269	269	289	291	324	314	320	289	285	A	284	300	306	292	A	308	312	317	Z 285	267	F
7	A	F	A	F	F	269	276	292	313	A	A	A	R 291	305	298	R 310	R 307	308	304	292	295	322	281	F
8	F	F	274	F	Z 281	275	284	316	332	S 279	A	A	300	311	286	300	316	302	309	306	309	286	275	283
9	284	F	F	293	F	286	287	303	332	324	316	282	A	292	290	294	300	307	290	310	321	274	272	275
10	285	302	299	325	301	275	268	297	304	306	A	A	274	A	A	A	297	306	S 312	A	A	278	F	F
11	A	F	F	F	301	312	327	327	340	299	275	273	275	288	272	293	294	307	S 273	287	296	289	275	273
12	291	284	286	260	266	265	312	274	A	253	A	A	240	A	270	245	250	280	316	317	A	A	F	269
13	284	287	306	306	F	296	286	310	327	299	S 261	A	277	299	293	298	S 296	293	279	281	306	S 274	A	A
14	S 275	F	F	F	290	273	327	H 330	309	A	A	A	A	287	309	302	283	290	294	309	317	278	284	280
15	271	285	301	312	292	309	334	314	329	A	S 273	300	253	289	289	C	286	312	319	319	273	273	271	281
16	F	300	F	F	272	F	316	318	329	A	A	269	268	275	295	303	284	292	254	269	256	263	279	259
17	267	266	284	280	F	F	F	F	F	230	A	261	A	262	264	A	302	296	297	292	R	S 282	278	267
18	287	F	F	F	291	307	279	250	286	A	316	278	251	A	270	283	303	318	325	282	276	311	282	F
19	286	286	298	290	F	314	318	320	317	307	A	257	294	304	289	286	293	297	305	310	283	281	267	267
20	269	275	289	325	285	270	270	290	318	318	287	299	308	287	284	291	304	295	289	285	299	315	279	271
21	274	F	295	F	290	292	306	313	337	A	A	A	284	294	303	300	R 267	311	308	296	291	277	278	280
22	278	281	277	282	286	315	279	307	317	309	316	277	314	283	298	310	309	A	300	302	282	291	304	F
23	F	S 273	F	F	F	312	322	346	361	309	293	254	282	297	307	298	293	306	314	288	285	296	294	292
24	281	276	306	266	271	283	291	A	A	316	279	305	300	A	302	300	303	304	293	312	307	300	F	F
25	F	316	289	F	F	295	330	313	345	A	S 297	A	A	307	301	276	293	291	288	288	295	291	276	278
26	F 260	F	286	F	295	300	311	320	331	A	299	A	A	A	A	293	288	289	302	326	313	280	F	F
27	F	280	F	F	F 265	277	241	272	267	A	260	291	286	297	301	S 324	321	A	284	311	309	271	A	F
28	261	263	282	F	284	294	283	302	325	353	362	287	264	324	303	321	327	333	311	288	297	294	280	273
29	288	280	319	276	275	287	265	286	330	311	270	310	308	306	279	A	S 305	286	320	317	297	280	271	S 284
30	297	286	278	266	293	288	309	A	255	287	A	252	287	270	256	265	291	A	308	315	295	R 288	F	279
31	270	280	F	252	253	269	262	296	312	A	A	A	286	A	305	A	262	296	S 314	288	291	289	261	294
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	20	19	16	21	29	30	26	26	18	18	19	24	23	27	26	31	27	29	29	27	29	23	20
MED	278	280	289	281	284	289	291	306	322	306	290	281	285	292	293	295	294	297	303	300	295	282	278	278
U Q	286	286	299	300	292	300	316	318	332	316	302	291	292	304	302	302	304	307	312	312	307	291	281	282
L Q	270	276	282	268	271	275	279	295	309	287	273	261	274	283	284	287	288	291	292	288	282	276	271	272

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							A	A	A	A	L 400	386	A	A	A	A	361	A	L					
2							A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A	A	A	A	A	A	A	346	374	A	A	373	L 341	A					
4						L 293	A	A	A	A	A	A	A	A	A	A	353	L 341	A					
5						L	L 386	L 387	A	U 413	L	U 391	L	351	L 388	380	359	L 335	A	A				
6						A	L	A	399	399	A	355	A	371	387	A	L 353	A	A					
7						A	L	A	A	A	A	A	A	A	A	A	A	A	A					
8						A	L 344	A	A	369	A	A	370	375	A	A	362	L 339	L					
9						A	A	A	A	A	L 376	L 310	A	A	371	A	378	A	A					
10						C	326	A	A	380	A	A	A	A	A	A	A	A	L					
11							A	A	A	378	356	375	375	U 365	L 399	363	L	A	L					
12						A	A	A	A	A	A	A	A	A	371	A	336	L 350	A					
13						A	A	A	L 365	A	A	A	A	379	379	A	L 362	L 346	L					
14							A	A	A	A	A	A	A	A	A	A	L 341	L 337	A					
15							L	A	A	A	A	352	S 276	324	A	C	A	L	L					
16							A	A	A	A	A	A	A	A	350	369	L 380	A	A					
17						A	A	A	A	U 375	L	A	A	A	U 421	A	367	354	A					
18						A	A	A	A	A	A	A	A	A	A	A	L 357	L 356	L					
19								A	A	A	A	A	A	A	A	A	A	L	A					
20							L 349	L 361	378	U 395	L 361	L 412	U 390	U 358	L 390	363	L 370	L						
21							A	A	A	A	A	A	L 334	359	A		A	A	A					
22								U 344	L 362	392	A	L 355	A	L 366	376	364	A	A	A					
23							A	L 372	L	U 364	L 393	U 335	L 336	A	380	A	L 357	L 364	A					
24						A	A	A	A	L 394	A	A	A	A	A	A	L 355	L	A					
25						A	A	A	A	A	U 394	A	A	403	L 372	L 343	A	E C	L					
26							L	A	A	A	L 334	A	A	A	A	A	A	L 331	A					
27						A	A	A	367	A	L 329	368	366	375	A	A	A	A	A					
28								L 343	A	A	L 406	384	U 383	A	365	L 359	L	L	L					
29						L	A	380	386	L 398	391	U 364	A	A	A	A	331	L	A					
30						A	A	A	A	369	A	U 358	379	394	390	372	397	A	L					
31						A	A	A	A	A	A	A	A	A	A	A	A	L 336	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	3	6	7	11	11	13	11	13	14	8	18	11						
MED						L 293	L 344	L 366	378	380	L 391	364	366	374	380	363	359	L 341						
U Q							L 349	380	387	L 395	L 400	385	U 379	384	L 390	366	370	L 354						
L Q							326	L 344	L 365	369	L 356	354	L 336	362	371	L 359	353	L 337						

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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							300	346	E A 364	A	524	478	382	E A 410	A	376	354	E A 332	288					
2							370	A	A	A	A	A	A	A	A	374	370	E A 408	E A 342					
3						E A 352	264	276	240	E A 384	E A 354	E A 386	378	344	346	E A 334	314	310	276					
4						392	E A 384	A	A	A	A	A	E A 394	A	E A 348	400	402	356	A					
5						336	262	322	322	E A 412	338	390	378	402	372	356	360	E A 330	A					
6						306	314	E A 318	316	306	E A 374	400	A	370	334	304	340	A	278					
7						E A 432	346	E A 324	262	A	A	A	E A 354	308	310	E A 334	E A 350	E A 314	E A 332					
8						318	320	282	278	352	A	A	350	342	E A 356	344	294	328	292					
9						E A 352	E A 370	290	266	276	306	408	A	384	352	342	306	288	272					
10						330	412	334	332	340	A	A	432	A	A	A	E A 386	322	288					
11							262	256	274	350	374	356	354	330	318	312	314	284	314					
12						294	280	364	A	E A 476	A	A	E A 524	A	448	516	482	394	272					
13						294	330	290	292	E A 378	462	A	E A 408	352	350	348	334	320	344					
14							284	E A 258	324	A	A	A	A	E A 370	322	E A 352	356	336	304					
15							246	300	290	A	E A 412	358	506	356	E A 366	C	336	280	258					
16							274	288	274	A	A	E A 430	430	396	320	302	332	312	E A 486					
17						E A 340	366	376	338	576	A	498	A	E A 496	466	A	346	354	316					
18						276	E A 282	E A 488	392	A	E A 312	408	E A 492	A	E A 418	358	304	292	264					
19								286	292	318	A	E A 420	326	E A 350	E A 314	338	324	294	266					
20							376	340	286	306	326	358	308	380	348	342	298	308						
21							288	276	272	A	A	A	362	344	310		E A 426	284	266					
22								292	266	300	266	424	300	392	342	306	310	A	E A 286					
23							272	252	246	346	390	516	418	352	322	326	328	294	256					
24						E A 358	E A 356	A	A	310	322	326	E A 334	A	344	334	318	302	294					
25						E A 302	246	258	264	A	368	A	A	330	338	372	E A 338	298	282					
26							288	280	278	A	366	A	A	A	A	E A 376	E A 376	336	276					
27						E A 394	500	374	398	A	318	346	378	370	E A 344	278	284	A	E A 308					
28								306	252	270	250	404	452	302	318	286	276	268	282					
29						324	E A 348	328	264	316	420	332	338	328	414	A	350	330	282					
30						342	312	A	E A 476	398	A	492	364	438	504	452	380	A	298					
31						406	E A 414	E A 320	E A 316	A	A	A	404	A	348	A	E A 482	348	290					
	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	28	27	27	18	18	19	24	23	27	25	31	27	28					
MED						U 318	U 298	294	280	U 326	U 346	397	368	353	342	340	331	311	284					
U Q						E A 358	368	334	324	E A 384	390	430	424	392	366	373	370	336	306					
L Q						306	277	280	266	306	318	358	352	342	322	319	314	294	274					

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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 A 256	E A 304	E A 312	E A 316	E A 316	256		A		A		A		228	220		A		A			218		228	248	256	E A 286	E A 286	E A 288
2	E A 334	E A 322	E A 302	E B 278	266	252		A		A		A		A		A		A		A		E A 340	E A 336	E A 314	E A 334	E A 338
3	254	E A 302	226	E A 248	E A 292		A		A		A			A		A		A	E A 278		A		E A 404	E A 360	E A 316	E A 246
4	E A 286	E B 280	E A 366	E A 318	E A 334	E A 270		A		A		A		A		A		A		A		E A 390	E A 362	E A 278	E A 328
5	E A 288	E A 322	E A 300	E A 324	E A 326		A	E A 234	208	208		A		A		A	E A 246		A		A	E A 306		A	E A 298	E A 320	E A 316
6	E A 302	274	E A 260	E A 328	E A 266		A	E A 252		A	210	222		A	E A 266		A		A		A		236	238	E A 280	E A 318	E A 328
7		A	E A 320		A	E A 308	E A 296		A	E A 252		A		A		A		A		A		E A 292	E A 320	E A 240	E A 306	E A 338
8	E A 332	E A 286	E A 298	E A 288	E B 294		A	234		A		A		A		A		A	E A 242		234	E B 246	E B 304	290
9	E A 302	E A 304	E A 280	E A 272	E A 306		A		A		A		E A 324		A		A		A		E A 216	E A 304	E A 308	E A 300
10	E B 288	274	242	238	236	E C 270	E A 276		A		A		A		A		A			A		E A 344	E A 328	E A 334
11		A	E A 306	E A 306	E A 296	E A 314	A E C 250		A		A		H 196	214	214	E A 230	E A 246		E A 276	274	260	248	E C 294	E A 296
12	266	256	E A 288	E A 334	E B 282		A		A		A		A		A		A	E A 252		A		A	E A 392	E A 364
13	E A 278	E A 284	246	250	E A 314		A		A	E A 238		A		A		A	E A 252	E A 236	E A 266	E A 284	264	E A 296		A		A
14	E A 376	E A 440	E A 316	E A 322	E C 300	234		A		A		A		A		A	E A 252	E A 256		A	E A 284	248	E A 316	E A 278	E A 310
15	E C 312	E C 302	262	E A 278	258	256		A		A		A	E A 262	E A 308	E A 332		A		222	220	228	E A 286	E B 288	E A 318	E C 274
16	E A 278	E A 268	234	E A 254	E A 294	244		A		A		A		A	E A 230	E A 258	212		A		E B 260	E B 300	E B 312	E B 276	E B 288
17	E A 334	E A 342	270	252	E A 296		A		A		A		A		A		A	216	224		E A 282	E A 332	E A 346	E A 326	E A 334
18	E A 296	E A 378	E A 360	E A 274	256		A		A		A		A		A		A	218	E A 246		E A 258	E A 282	254	E A 260	E A 312
19	E A 308	E A 280	E A 268	E A 318	E A 318	E A 240	218		A		A		A		A		A	E A 262		A	242	E A 270	E A 298	E C 318	E A 340
20	E A 296	E A 312	266	226	E C 258	E C 348	226	226	206	212	234	200	194	216	H 192	222	216	224	E A 252	E A 270	250	218	E C 294	E A 324
21	E A 322	E A 376	E A 278	E A 316	246	E A 260		A		A		A	E A 260	220	A	318		A		A	E A 264	E A 278	E A 270	E A 290	E A 326
22	E A 308	E A 316	E A 378	E A 320	E A 280	248	E A 252	220	222	212		A H 228		A 230	222	E A 252		A		A	254	E A 276	E A 258	244	E A 308
23	E A 254	E A E C 316	E A 282	E A 262	E A 334	A E A 258		A E A 230	206	228	194	E A 296	E A 266		A 222		E A 226	E A 252		A E A 254	E A 268	E A 296	E B 262	E A 252
24	E B 282	E B 288	242	E B 328	E B 296		A	A	A	210		A	A	A	A	A	222	E A 252		A E A 276	E A 294	E A 320	E A 334	E A 314
25	E A 320	E A 264	E A 280	E A 298	E A 324		A	A	A	A	216		A	210	222	E A 270		A E C	E A 240	E A 290	246	232	E A 284	E A 288
26	E A 312	264	E A 272	E A 282	248	260	222		A	A	A	E A 304	A	A	A	A		A E A 272		A	238	E A 248	E A 282	E A 318	E A 284
27	E A 320	E A 294	E A C 292	E A 294	E A 340		A	A	A	220	A	E A 266	216	200	220		A	A		A	E A 270	E A 252	E A 340		A E A 310
28	E A 430	E A 320	E B 278	E A 244		E B 276	E A 258	220	210		A	A 210	200	194		A	228	216	E A 236	E A 226	E A 258	248	E A 254	E A E C 246	E A 270	E A 326
29	E A 304	E A 284	B 242	E B 300	E B C 310	E A 276		A	218	228	H 194	220	228		A	A		A	E A 330	E A 266		A 234	232	E A 274	E A 292	A E C 310
30	E C 276	E A 318	E A E C 332	E A 332	E A E C 358		A	A	A		A E A 270	A	226	212	216	208	202	216		A E A 276	254	E A 284	E A 284	E A 340	E A 286
31	E A 316	E A E C 326	E A 300	E A 440	E A 380		A	A	A	A		A	A	A	A	A		A	226		A 274	250	E A 262	E A 340	E A 272
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	30	31	31	16	10	6	8	11	11	13	11	13	14	9	20	17	10	29	28	30	29	30
MED	E A 302	E A 304	E A 280	E A 296	E A 296	247	226	216	212	216	213	220	U 212	220	220	222	219	E A 246	E A 247	A E 260	E A 266	E A 287	E A 306	E A 310
U Q	E A 320	E A 320	E A 302	E A 320	E A 318	E A 265	E A 252	226	225	228	E A 234	E A 264	E A 260	227	228	E A 264	E A 242	E A 259	E A 266	E A 279	E A 290	E A 314	E A 323	E A 328
L Q	E 280	280	262	262	266	249	222	210	207	H 210	206	215	200	214	208	215	217	224	230	248	249	258	E A 281	E A 288

JUL. 2003 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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	A 116	A	A	A	A	A	A	A	A	A	A	A	A					
2						A 126	A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A	A 112	A	A	A	A	A	A	112	B	110	108	116	A					
4						126	112	A	A	A	A	A	A	A	A	A	A	110	A					
5						120	112	A	A	C	C	A	B	B	114	114	120	A	A	B				
6						122	114	A	A	A	B	A	A	A	B	B	A	A	A					
7						A	114	A	A	A	A	A	A	A	A	A	A	A	C					
8						A	114	A	A	A	A	A	A	A	B	A	112	114	A					
9						A	A	A	A	A	A	A	A	A	A	112	116	A	C					
10						C	114	A	B	A	A	A	A	A	A	A	A	A	A					
11						C	A	A	A	A	A	110	114	112	112	112	112	A	114					
12						126	112	A	A	A	A	A	114	A	B	110	A	122	A					
13						120	A	A	A	A	A	A	A	A	A	A	A	C	A					
14						122	108	A	A	A	A	A	A	A	A	A	A	A	C					
15						C	A	A	A	A	A	A	A	A	A	C	C	A	112					
16						A	A	A	A	A	A	A	A	A	A	116	116	112	A					
17						A	112	A	A	114	122	108	A	A	A	A	A	112	114					
18						120	116	A	A	A	A	A	A	A	A	A	A	A	A					
19						120	114	114	A	A	A	A	A	A	A	A	A	A	A					
20						C	A	A	A	A	A	A	A	B	B	112	110	A	A					
21						B	112	A	C	A	A	A	A	B	B	110	A	A	114					
22						A	116	110	A	A	A	A	124	B	B	112	116	110	A					
23						A	A	A	A	A	114	120	118	118	122	B	C	A	A					
24						B	110	A	A	A	A	A	A	A	B	A	116	112	116					
25						A	A	A	A	A	A	A	A	A	A	112	A	C	A					
26						A	A	C	A	A	A	A	A	A	A	A	A	A	A					
27						B	112	A	A	A	A	A	112	A	A	A	A	A	114					
28						B	110	A	A	A	A	B	116	108	118	114	116	112	A					
29						B	A	A	A	A	116	A	B	116	A	A	C	A	C					
30						B	A	E C	E C	E C	A	110	B	B	116	A	112	A	112					
31						B	A	A	A	A	A	A	112	114	114	116	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						9	18	2		1	3	4	7	6	6	12	11	9	7					
MED						122	112	112		114	116	110	114	113	115	112	116	112	114					
U Q						126	114				122	115	118	116	118	114	116	115	114					
L Q						120	112				114	109	112	112	114	111	112	111	112					

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

IONOSPHERIC DATA STATION Kokubunji

JUL. 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 30.0MHz IN 15.0SEC 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	96	92	92	94	96	B	112	108	102	102	102	104	100	100	104	106	110	102	104	B	102	94	104	96
2	88	92	88	B	92	120	106	102	98	96	100	100	96	96	96	96	98	112	100	96	98	102	98	98
3	96	92	94	92	138	102	112	100	100	98	100	98	102	122	116	114	118	110	98	100	106	102	98	98
4	98	96	94	94	94	134	118	106	100	100	102	100	96	92	94	96	94	120	100	106	98	102	100	96
5	96	96	92	92	94	116	116	104	102	100	104	106	B	118	124	122	120	104	98	98	96	94	96	96
6	92	92	92	92	92	124	118	104	106	106	98	102	104	106	B	112	106	102	100	B	98	112	106	104
7	96	96	94	96	110	104	118	102	102	100	96	96	94	112	94	100	104	106	100	98	94	92	94	94
8	90	84	86	96	100	102	118	104	100	100	96	94	94	104	106	106	120	122	106	106	96	94	B	100
9	94	94	92	96	116	106	106	100	100	100	98	98	94	92	116	116	120	102	104	102	98	98	96	100
10	100	94	94	90	90	C	114	108	110	106	100	98	102	96	94	94	94	98	98	100	104	102	98	100
11	98	98	98	96	98	108	100	106	108	104	98	118	118	122	122	120	120	106	118	106	100	102	C	96
12	98	98	90	94	B	122	116	106	106	100	98	102	118	120	B	110	102	114	108	100	94	94	100	104
13	96	94	96	90	88	122	104	104	106	102	100	96	100	102	100	102	102	116	104	96	100	100	100	96
14	96	94	96	94	102	130	112	106	104	104	100	100	100	102	102	102	102	104	102	98	94	90	94	94
15	C	C	92	102	102	C	108	104	104	96	96	102	112	88	106	C	108	106	110	92	92	108	96	104
16	94	108	94	94	92	112	102	100	100	94	94	100	96	96	98	114	116	110	100	B	B	B	B	96
17	104	106	106	112	108	106	110	104	106	118	112	116	94	98	98	98	98	118	108	108	102	102	102	110
18	96	98	94	94	100	120	116	106	102	102	100	110	102	100	98	98	100	94	96	96	94	90	90	90
19	100	108	102	102	104	G	138	120	104	100	98	98	98	94	94	114	104	100	100	98	94	90	110	98
20	98	100	98	100	C	C	106	106	108	102	104	106	102	B	B	120	112	104	112	104	94	92	C	100
21	102	98	98	96	B	116	112	106	100	98	102	98	104	B	120	116	106	106	110	102	104	100	104	102
22	98	96	94	100	100	106	116	114	102	102	100	100	128	122	148	122	118	110	98	102	104	94	94	102
23	98	102	98	96	98	98	102	102	102	102	142	132	130	122	130	116	114	104	102	100	98	96	110	104
24	102	98	B	B	B	104	108	102	102	104	104	100	100	118	118	108	114	114	110	102	104	104	108	100
25	100	96	100	96	96	100	102	102	100	96	98	98	96	114	138	124	104	106	100	98	104	B	100	98
26	96	98	96	100	104	106	102	102	98	100	100	96	96	96	94	98	96	94	94	90	90	90	108	100
27	98	102	98	96	100	112	116	108	104	104	102	108	G	106	116	106	114	100	110	106	106	104	104	102
28	112	118	106	104	114	116	126	102	100	100	104	128	G	118	120	126	120	116	104	104	108	C	94	94
29	90	92	B	B	C	110	102	102	108	110	170	106	116	112	104	104	104	104	100	100	94	92	94	98
30	C	92	C	96	106	110	106	106	104	102	102	G	B	B	100	98	116	92	114	108	100	100	100	98
31	92	96	96	94	94	114	106	104	104	102	100	98	116	110	120	108	104	106	104	104	B	100	98	98
	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	28	26	26	31	31	31	31	31	30	27	28	28	30	31	31	31	28	29	28	27	31
MED	96	96	94	96	100	111	112	104	102	102	100	100	100	105	105	108	106	106	102	100	98	99	100	98
U Q	99	98	98	98	104	120	116	106	106	104	102	106	112	118	120	116	116	112	108	104	104	102	104	102
L Q	95	94	92	94	94	106	106	102	100	100	98	98	96	96	98	100	102	102	100	98	94	93	96	96

IONOSPHERIC DATA STATION Kokubunji

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

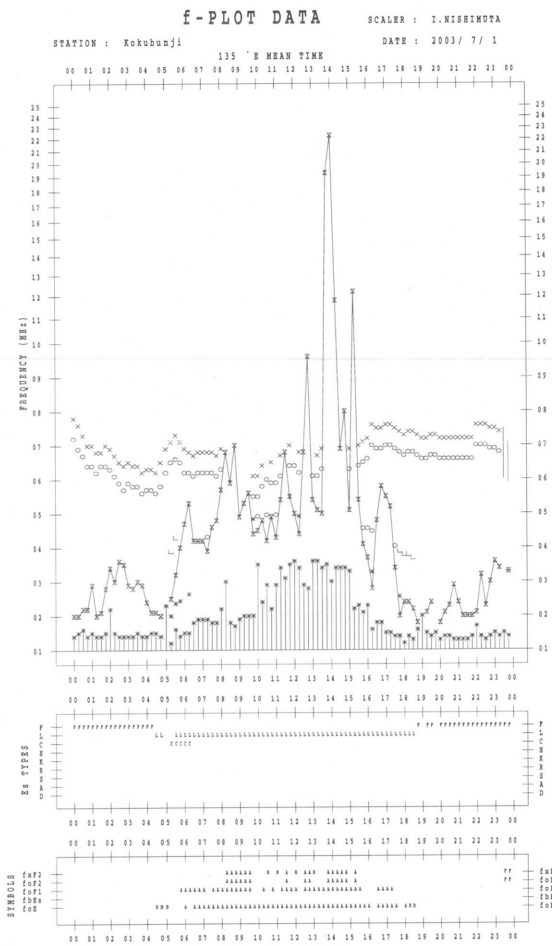
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

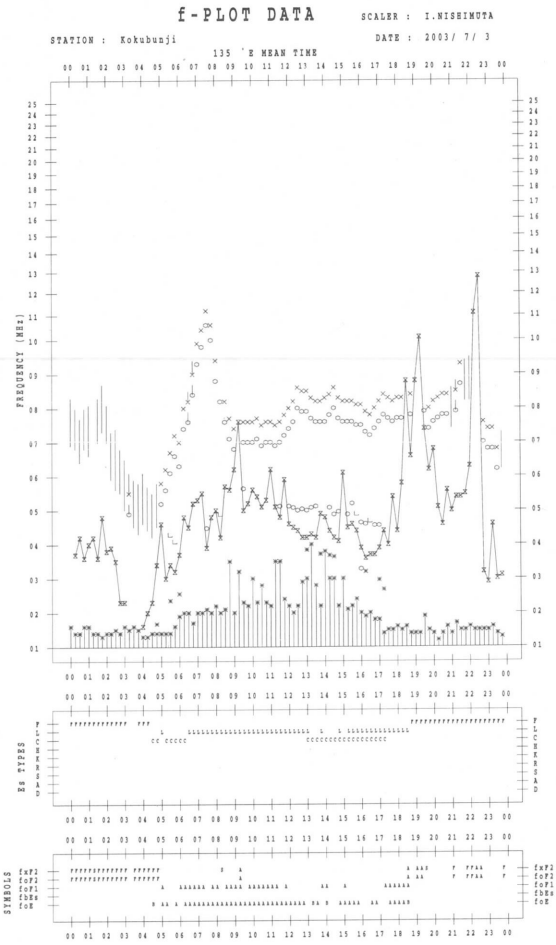
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F4	F5	F2	F2	F2		CL31	L2	L2	L2	L2	L1	L2	L3	L3	L2	L2	L3	L2		F2	F6	F4	F5
2	F4	F2	F3		F1	C1	L3	L3	L3	L3	L2	L3	L2	L2	L2	L2	L2	CL21	L5	F4	FF44	F3	F3	FF31
3	F2	F3	F3	F1	F1	L3	C1	L3	L3	L3	L2	L3	L1	CL11	C1	C2	CL11	CL31	L4	F4	F5	F7	F5	F3
4	F2	F2	F5	F3	F2	C1	C3	L3	L3	L3	L2	L2	L2	L3	L3	L2	L2	CL12	L4	F2	F4	F3	F3	F4
5	F3	F3	F4	F2	F3	C2	C1	L2	L1	L1	L1	L1		C1	C1	C1	CL21	L3	L4	F4	F4	F4	F3	F2
6	F4	F3	F3	F3	F2	C2	C2	L3	L2	L1	L2	L2	L3	L2		C2	L2	L4	L3		F2	FF22	F5	F5
7	F5	F4	F4	F3	FF12	L4	CL21	L3	L3	L4	L4	L3	L3	CL21	L2	L3	L3	L3	L4	F2	F4	F3	F4	F3
8	F2	F4	F2	F2	F3	L3	C2	L2	L2	L1	L3	L4	L1	L1	L2	L2	CL11	C1	L1	F1	F3	F2		F2
9	F4	F3	F3	F2	FF23	L2	L3	L2	L3	L2	L2	L2	L2	L2	CL11	CL21	CL11	L3	L4	F3	F3	F3	F2	F2
10	F1	F3	F2	F2	F1		C2	L2	C2	L2	L3	L3	L2	L3	L4	L3	L3	L3	L2	F3	F3	F4	F3	F4
11	F3	F2	F4	F3	F3	L1	L3	L2	L2	L1	L2	C1	C1	CC11	C1	CL21	CL11	L2	C2	F3	F3	F2		F3
12	F1	F1	F2	F2		C2	C2	L2	L2	L2	L2	L1	CL11	CL21		CL21	L2	CL11	L3	F2	F4	F4	F3	F3
13	F4	F2	F1	F2	F2	C2	L3	L3	L1	L3	L2	L3	L2	L1	L1	L2	L2	C1	L3	F3	F2	F3	F5	F4
14	F4	F5	F3	F4	F2	CL11	C3	L3	L3	L2	L3	L2	L3	L2	L2	L3	L2	L2	L3	F5	F3	F6	F3	F2
15			F2	F3	F2		L2	L2	L2	L3	L2	L1	L1	LC11	L2		L1	L2	CL21	F4	F6	F2	F5	F3
16	F3	F4	F1	F1	F2	CL12	L3	L2	L2	L2	L3	L2	L1	L3	L1	CL11	CL11	CL31	L3					F2
17	FF32	F4	F4	F2	F2	L3	CL21	L2	L2	CL11	C2	CL11	L3	L2	L1	L2	L1	CL11	CL31	F3	F3	F4	F3	F3
18	F3	F4	F4	F3	F3	C2	C2	L3	L2	L2	L2	L1	L2	L3	L2	L2	L2	L2	L2	F3	F2	F4	F3	F3
19	F3	F2	F2	F3	F2		H1	C2	L2	L2	L3	L2	L2	L3	L2	CL22	L2	L2	L2	F2	F2	F4	F2	F3
20	F2	F4	F2	F2			L1	L1	L1	L1	L2	L1	L2			CL11	CL11	L1	CL23	F3	F2	F1		F5
21	F3	F4	F3	F7		C1	C3	L2	L2	L3	L2	L3	L2		C2	C1	L2	L3	C3	F4	F3	F4	F4	F5
22	F3	F3	F3	F4	F3	L2	CL21	CL11	L1	L1	L2	L1	C1	C1	H1	C2	CL21	C5	L4	F2	F3	F2	F3	F3
23	F3	F2	F4	F3	F5	L2	L3	L2	L1	L2	HL11	C1	C1	C1	C1	C1	C1	L2	L2	F3	F5	F5	FF21	F2
24	F1	F1				L3	C2	L4	L3	L1	L2	L3	L3	CL31	C2	L2	C2	CL21	C3	F3	F5	F3	F4	F5
25	F4	F4	F3	F2	F4	L3	L3	L3	L3	L3	L2	L2	L3	L2	HL11	CL11	L2	L3	L2	F2	F2		F3	F3
26	F2	F3	F4	F3	F2	L2	L1	L2	L2	L3	L2	L2	L2	L4	L3	L3	L3	L2	L2	F4	F3	F2	FF22	F2
27	F3	F2	F2	F3	F2	C3	C3	L3	L1	L2	L2	L1		LC11	CL11	L2	CL31	L4	C4	F3	F4	F4	F4	F5
28	F4	F2	F2	F2	F2	C2	C2	L1	L2	L2	L1	C1		CL21	C1	CL11	CL11	CL11	L2	F3	F3		F3	F3
29	F2	F1				L1	L2	L1	L2	L1	HL11	L1	C2	C1	L2	L2	L3	L3	L3	F3	F2	F1	F2	F1
30		F3		F2	F3	C3	L2	L3	L2	L1	L2				L1	L1	CL11	L4	CL32	F3	F4	F3	F4	F2
31	F4	F3	F2	F3	F3	C2	L3	L3	L2	L4	L3	L2	CL11	CL21	CL21	CL21	L2	L1	L2	F2		F3	F6	F3
	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																								

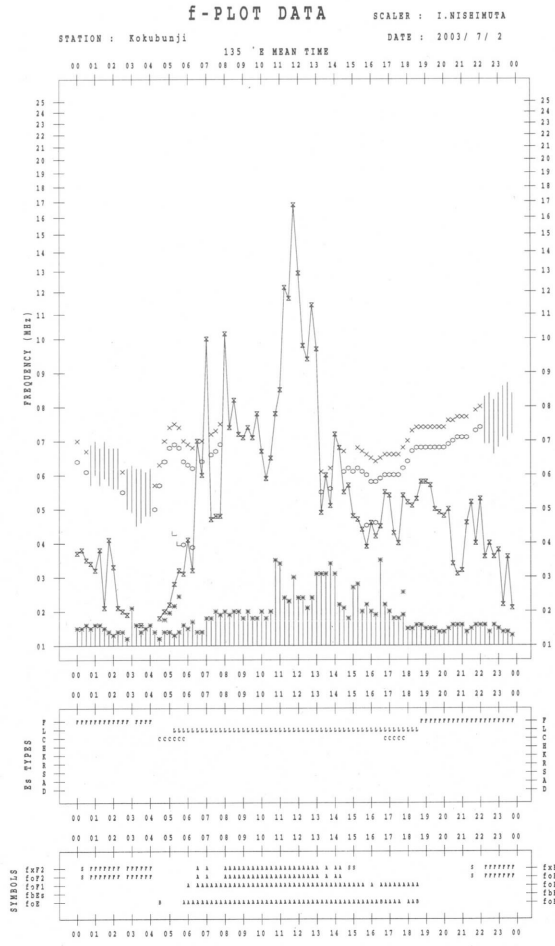
JUL. 2003 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

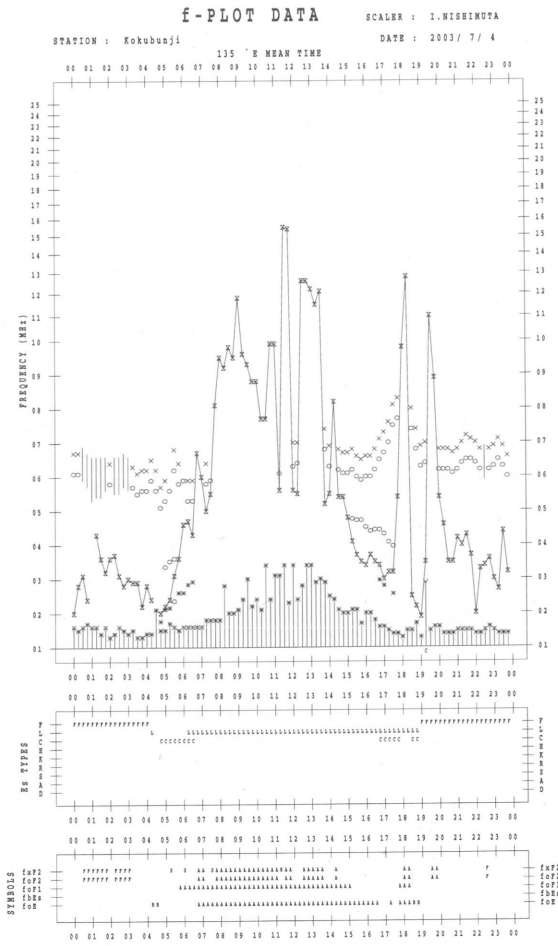
f-PLOTS OF IONOSPHERIC DATA

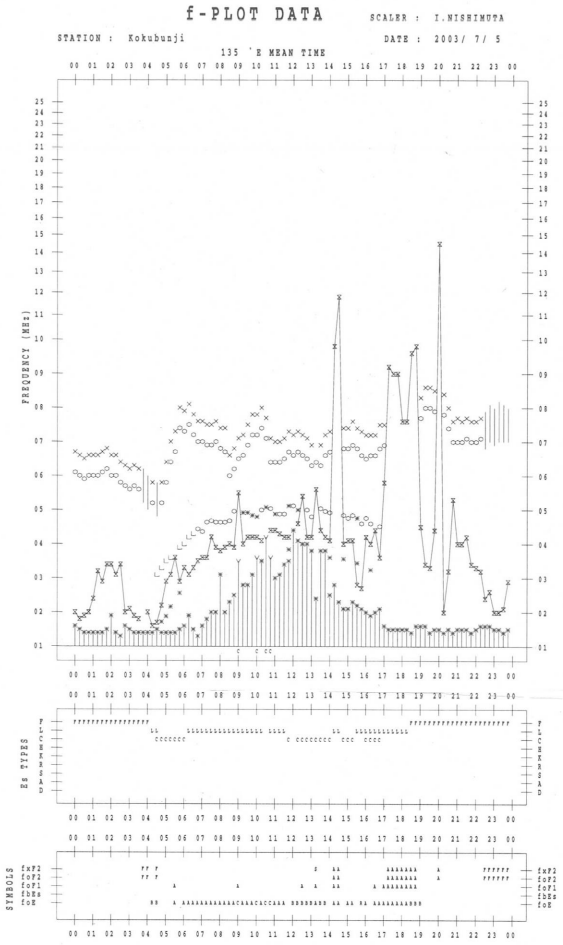
KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

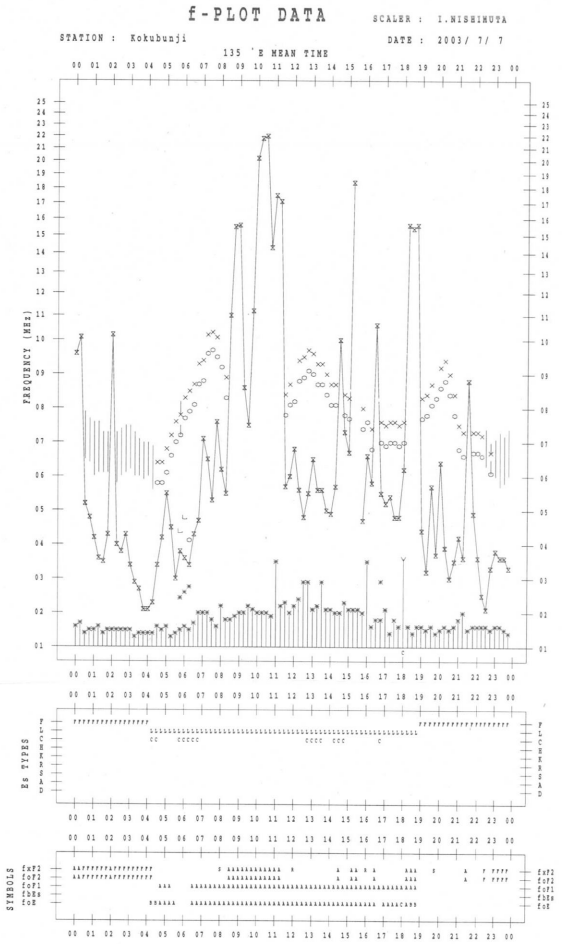

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 1
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

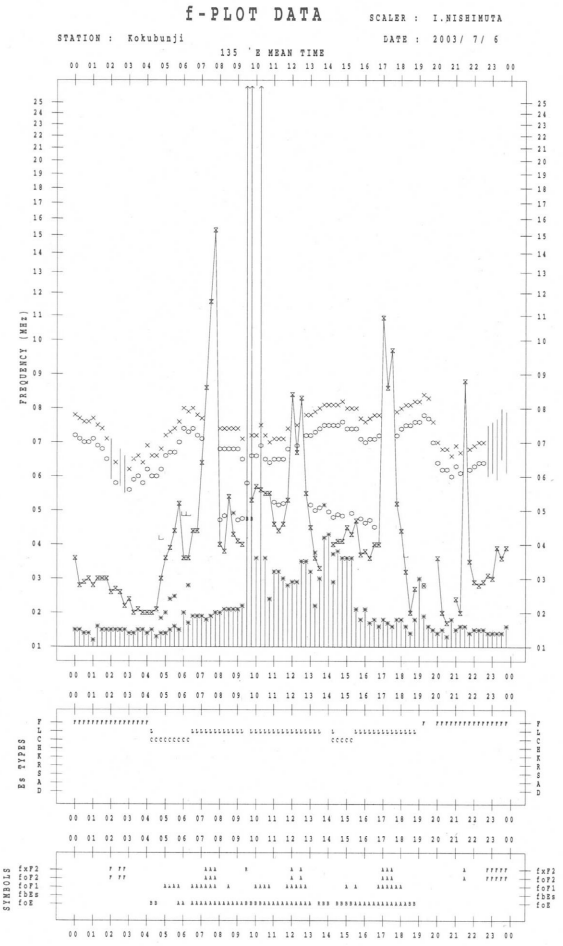

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 3
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

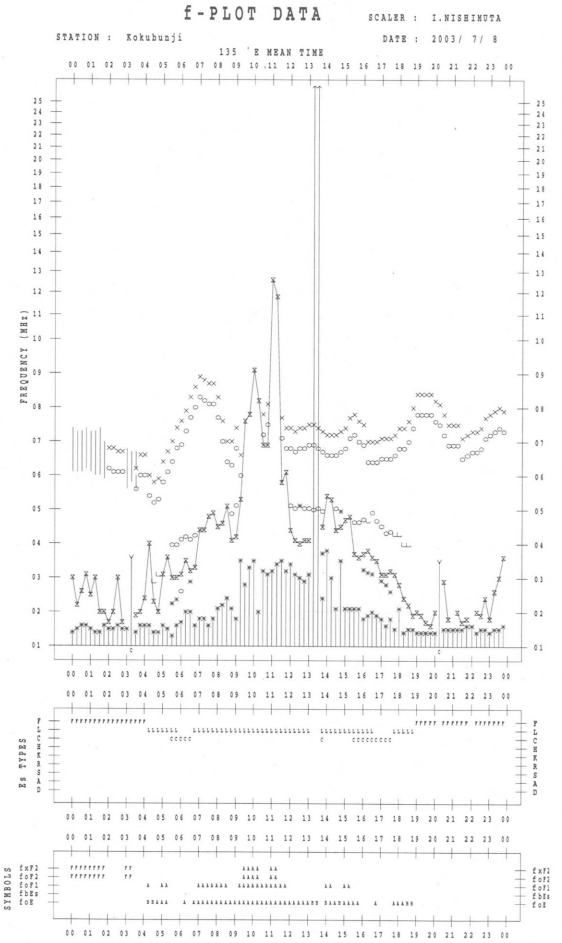

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 2
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

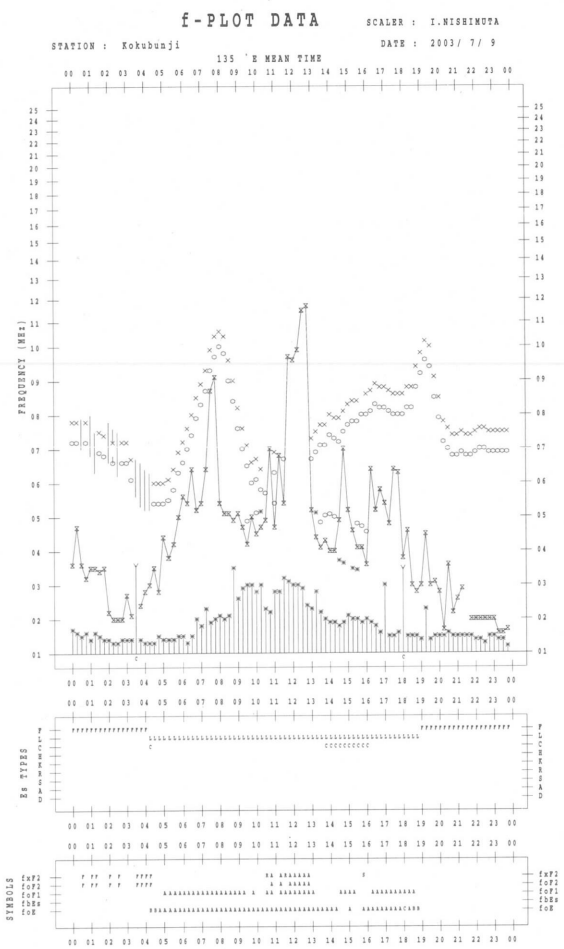

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 4
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

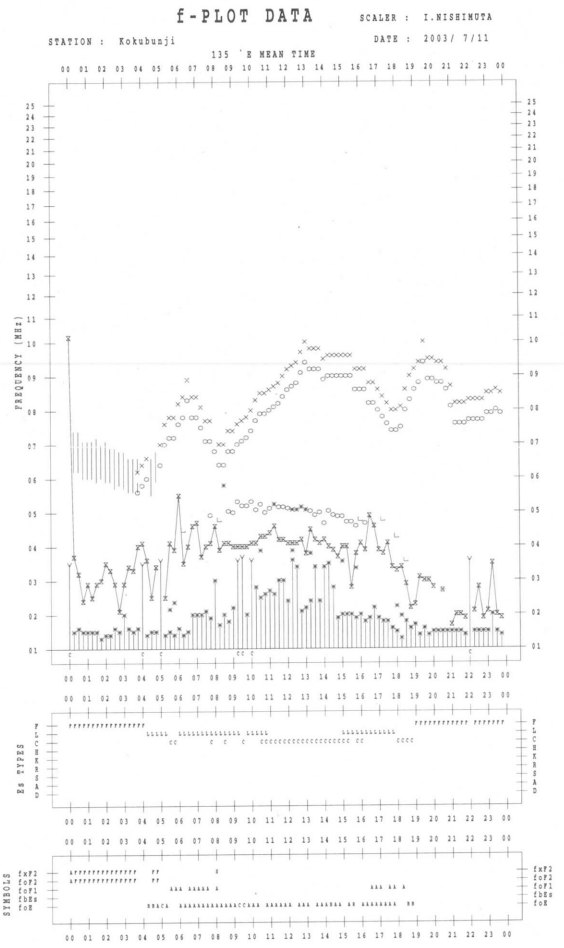

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

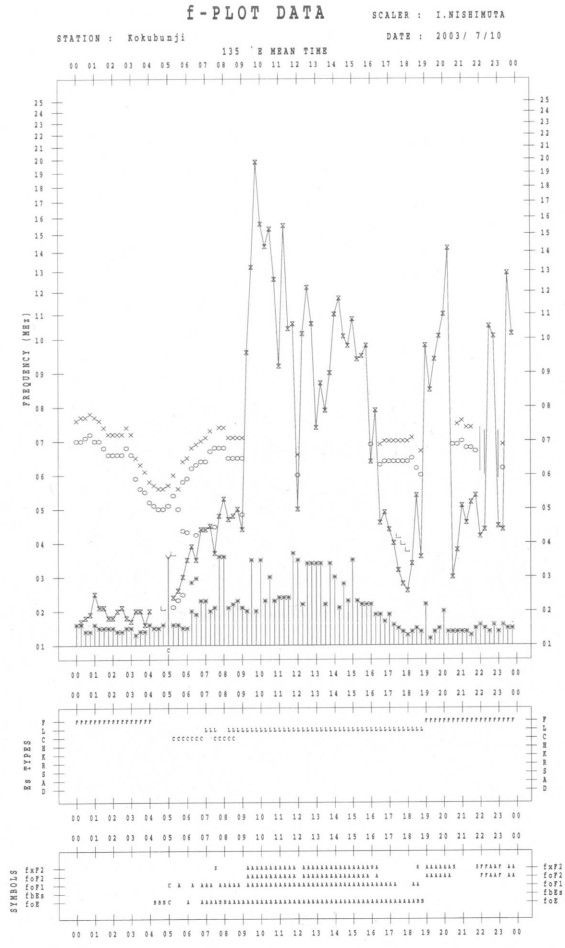

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

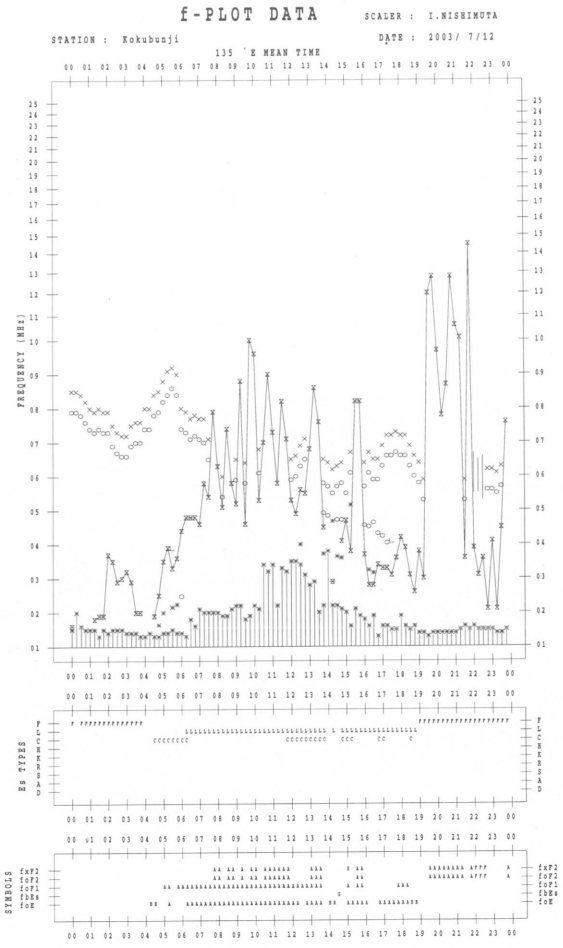

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

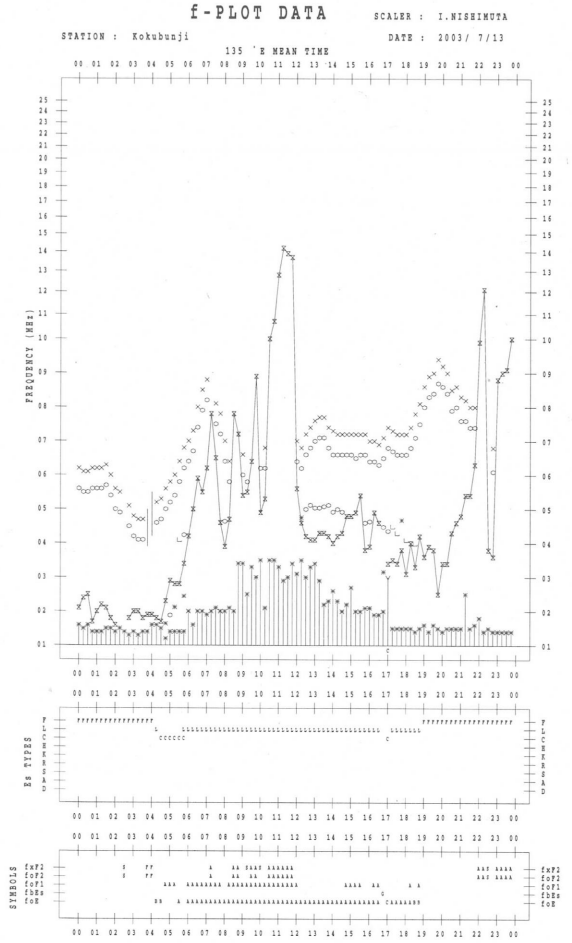

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

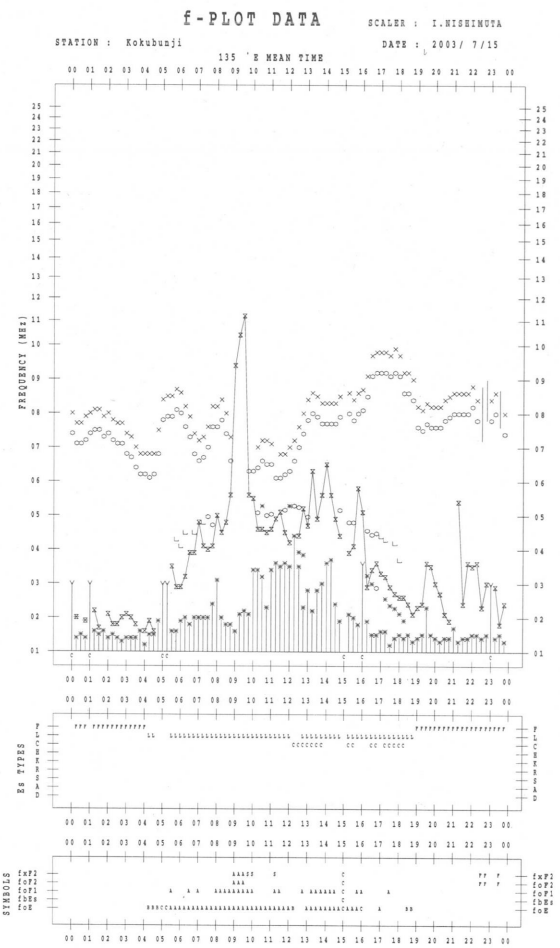

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

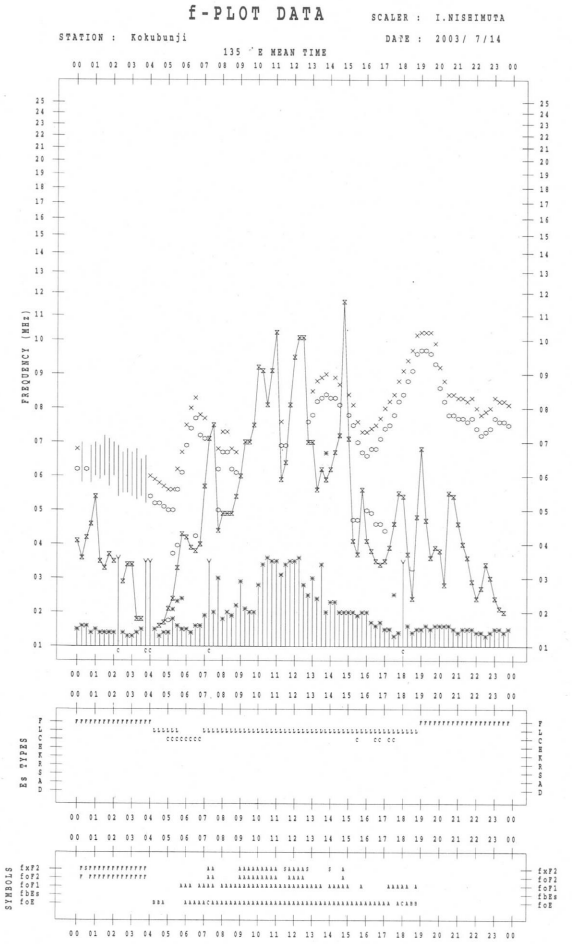

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

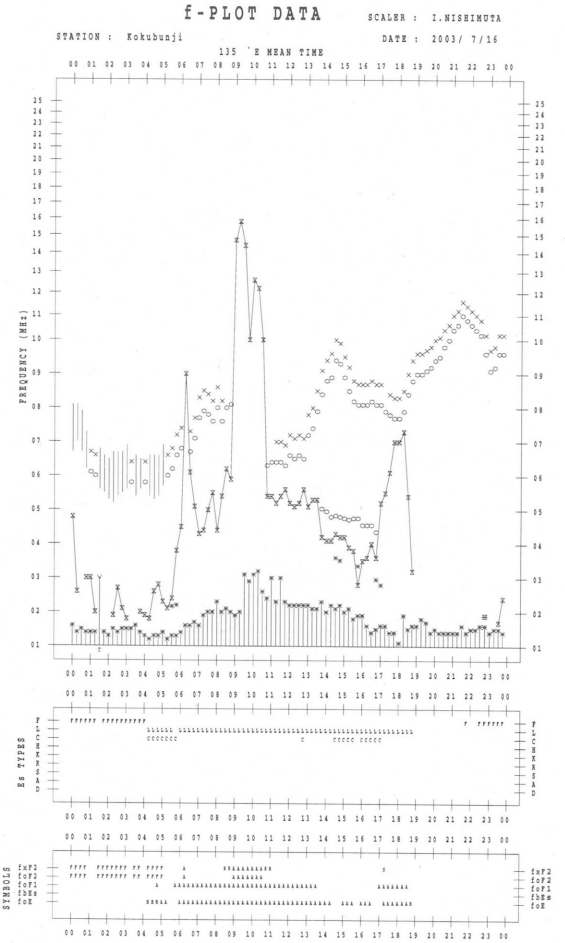

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

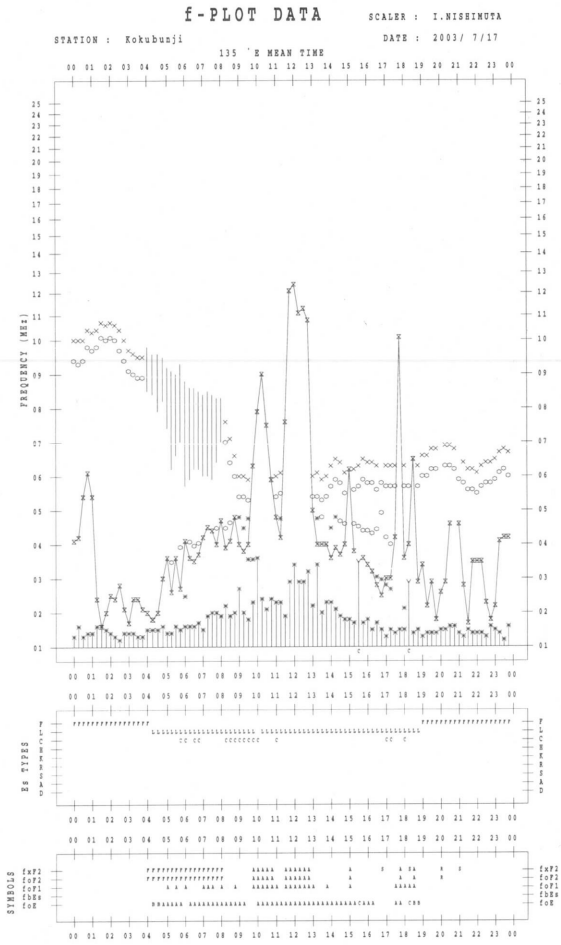

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

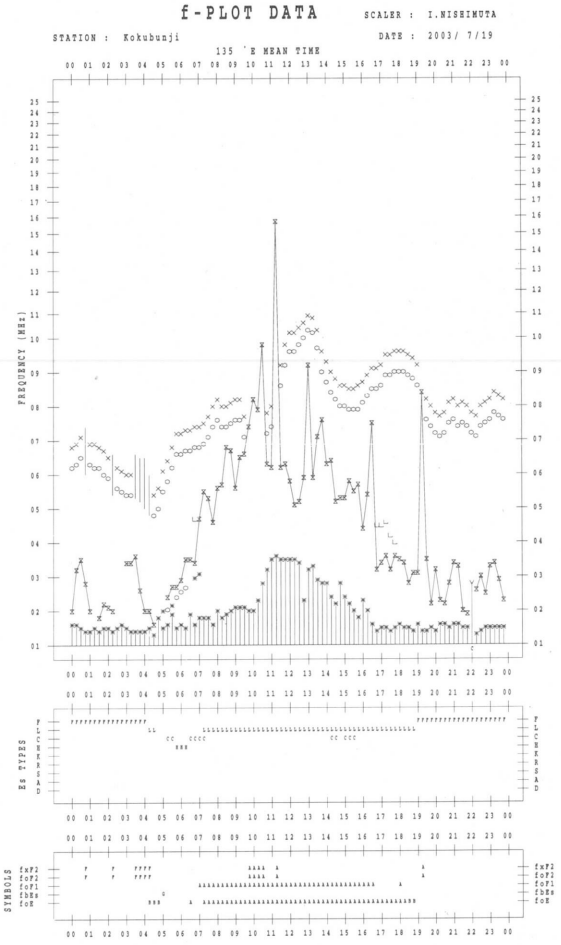

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

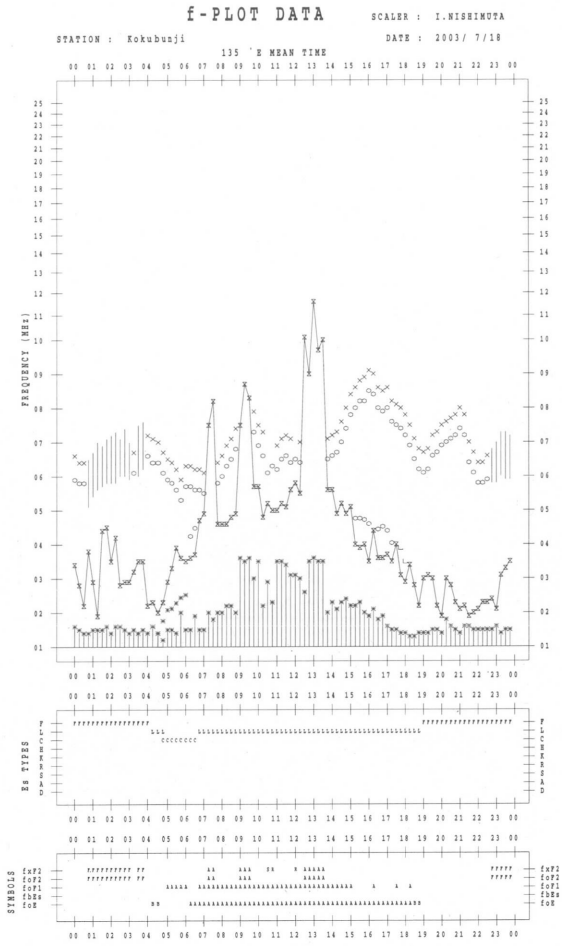

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

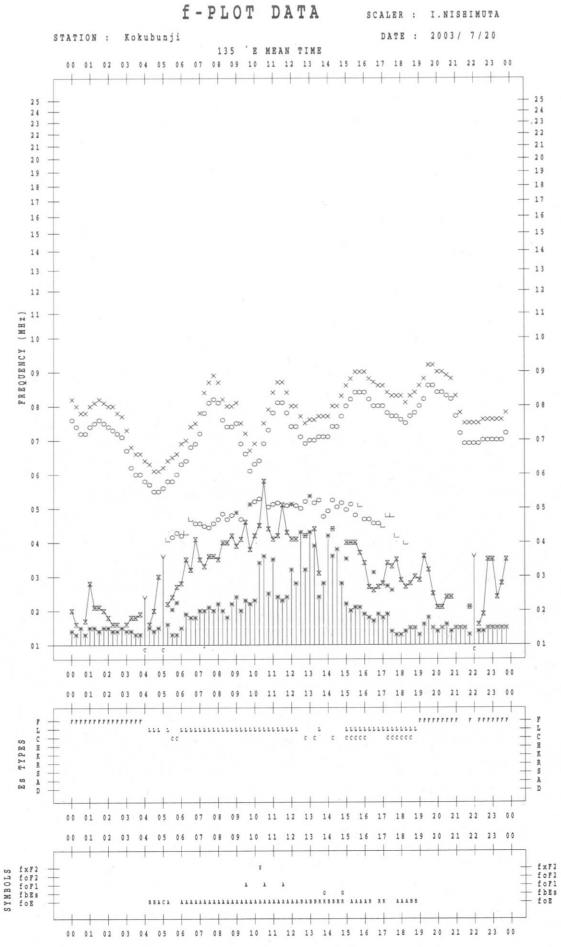

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

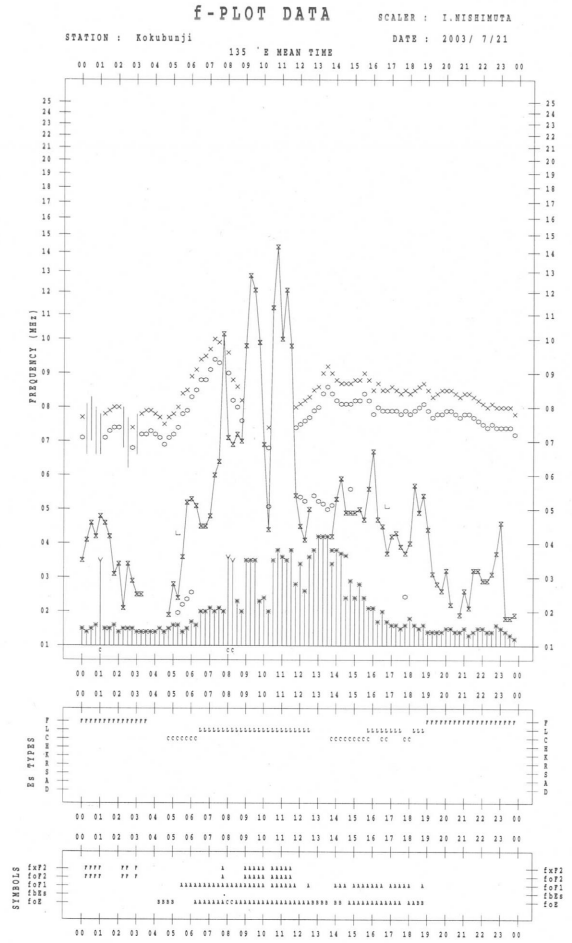

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

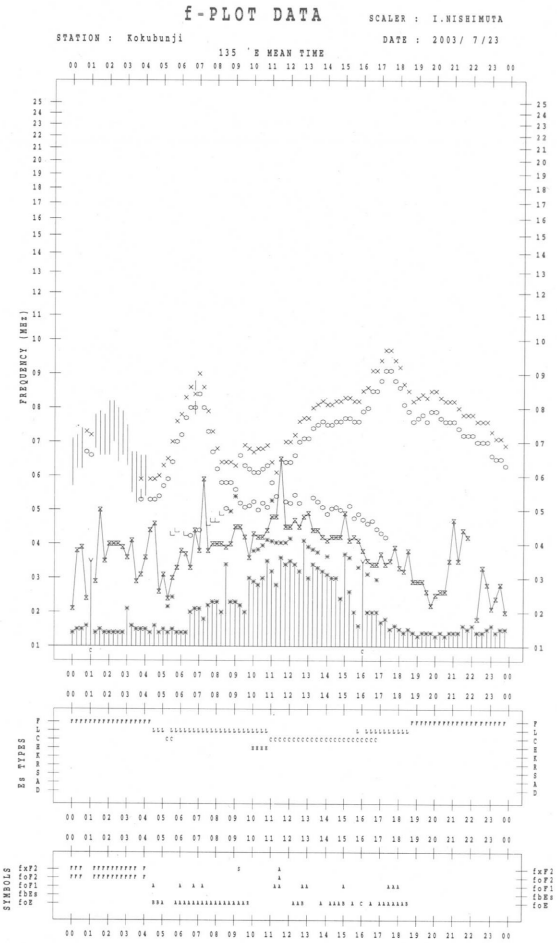

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/17
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

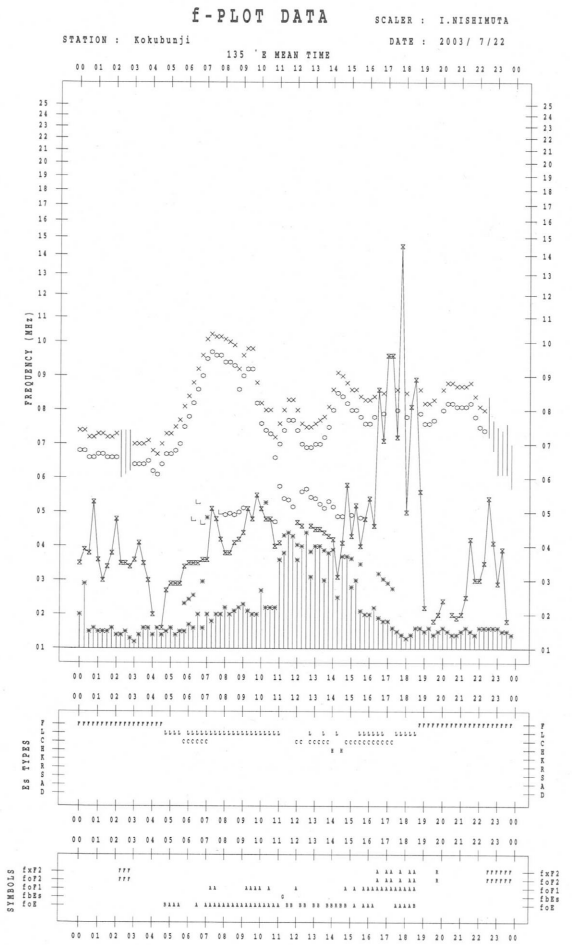

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/19
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

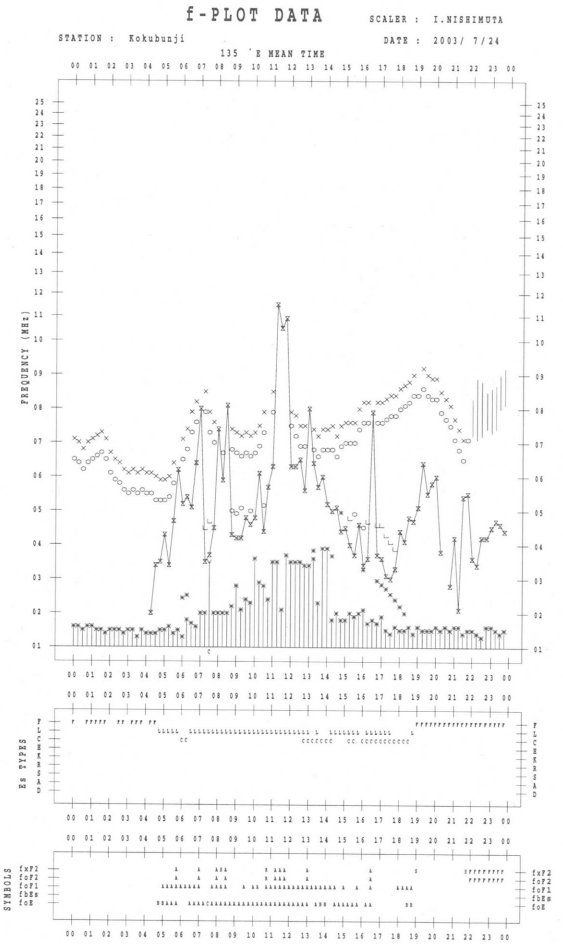

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/18
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

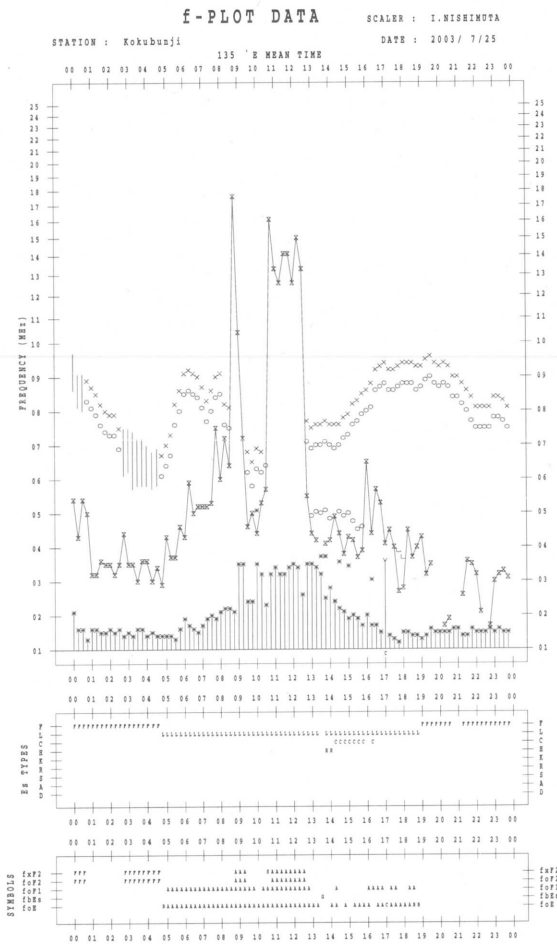

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/20
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

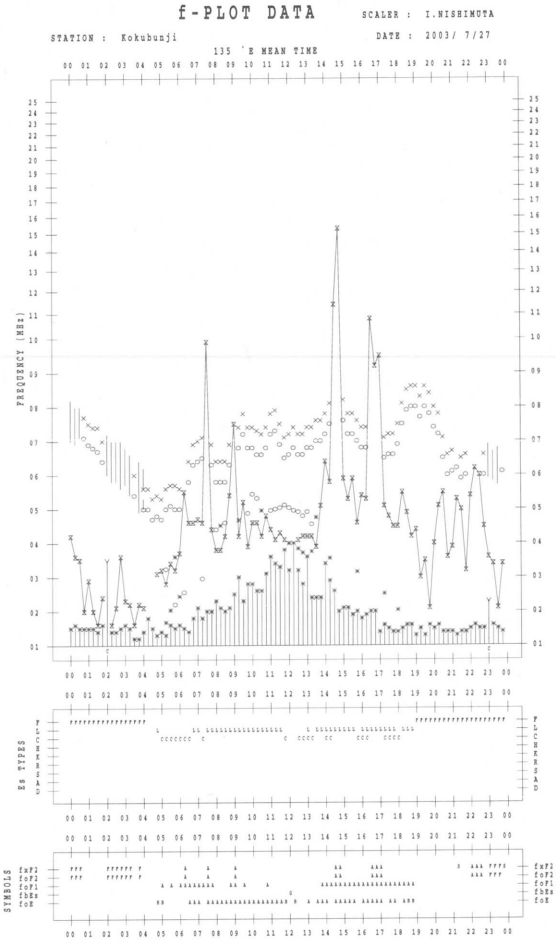

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

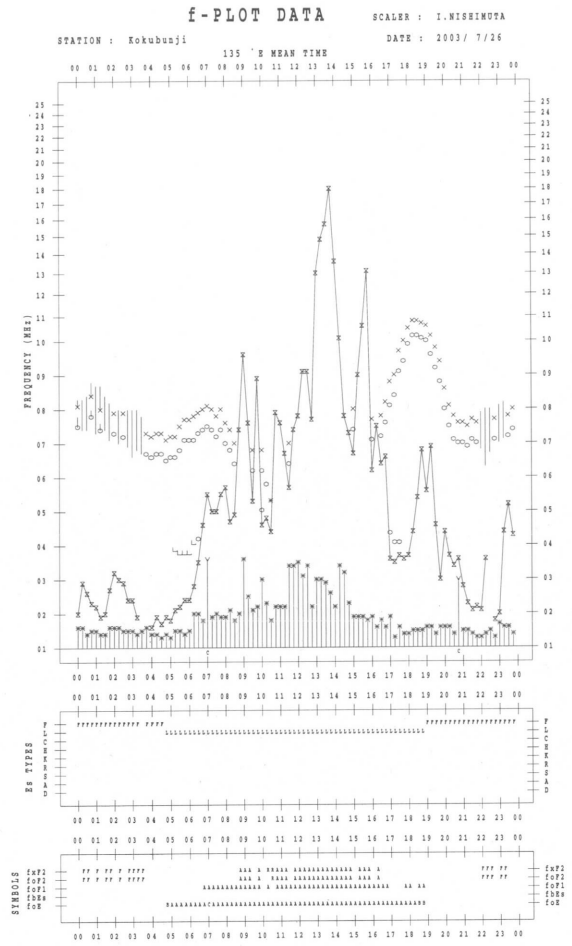

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

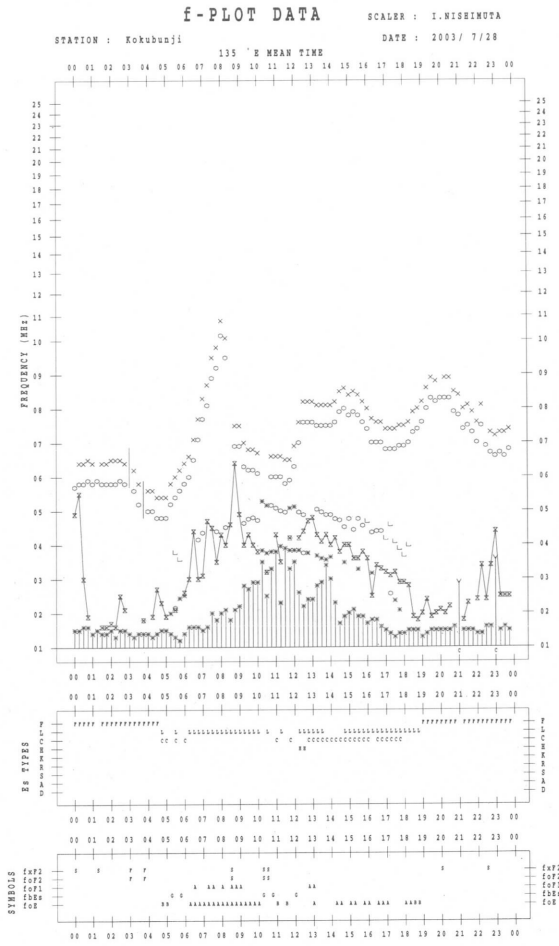

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

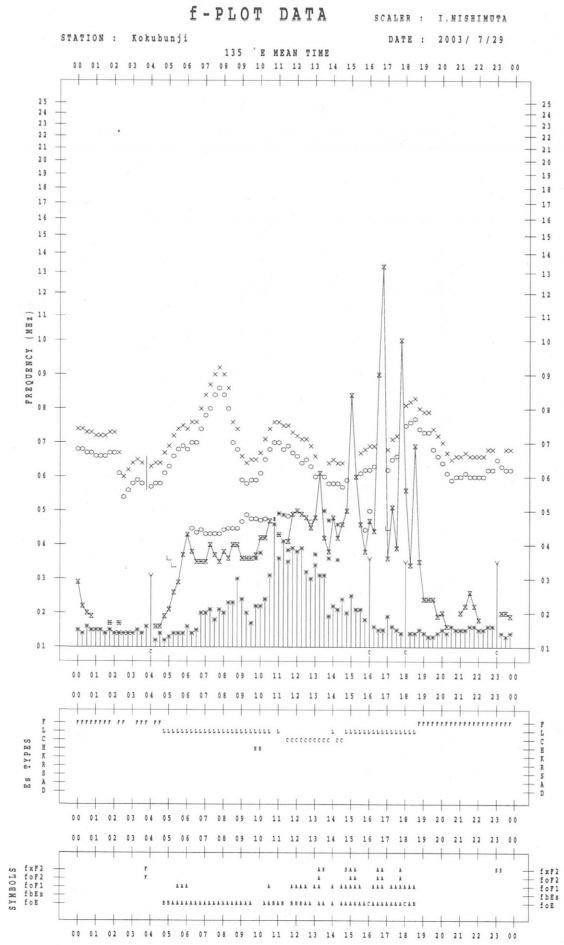

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

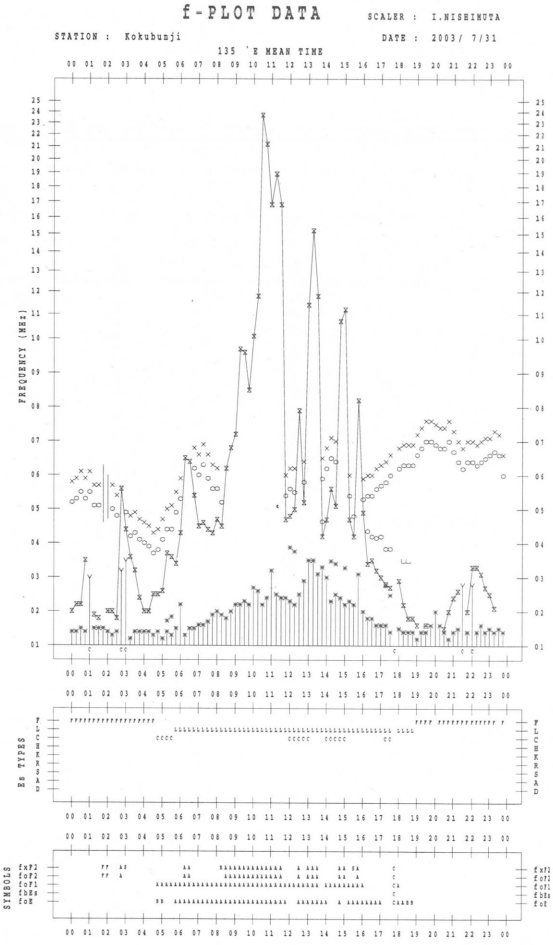

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

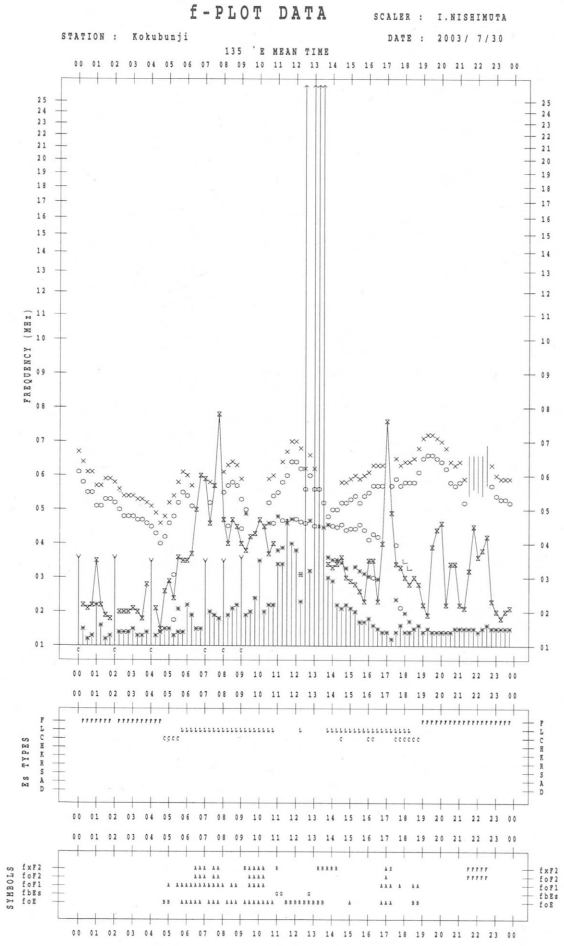

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/ 7/30
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 July 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	31	30	31	30	30
2	29	28	29	31	29
3	31	29	30	31	30
4	31	29	30	32	30
5	30	30	30	35	31
6	33	31	30	29	31
7	29	28	26	35	29
8	36	38	37	32	35
9	31	30	30	29	30
10	28	27	26	30	28
11	27	25	27	27	27
12	25	26	28	27	26
13	29	28	26	–	28
14	–	–	–	–	–
15	–	–	–	–	–
16	–	–	–	–	–
17	26	25	26	28	26
18	29	27	26	27	27
19	28	–	–	–	28
20	–	–	27	27	27
21	30	30	29	31	30
22	32	31	30	31	31
23	30	29	29	28	29
24	29	28	28	28	28
25	27	27	28	25	27
26	25	25	25	26	25
27	25	25	25	27	25
28	25	24	23	24	24
29	23	24	24	24	23
30	24	24	23	26	24
31	25	24	25	27	25

Note: No data is available during the following periods.
13rd 2000 - 17th 0120 19th 0150 - 20th 0600

A superscript * stands for being superposed on a burst.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso July 2003

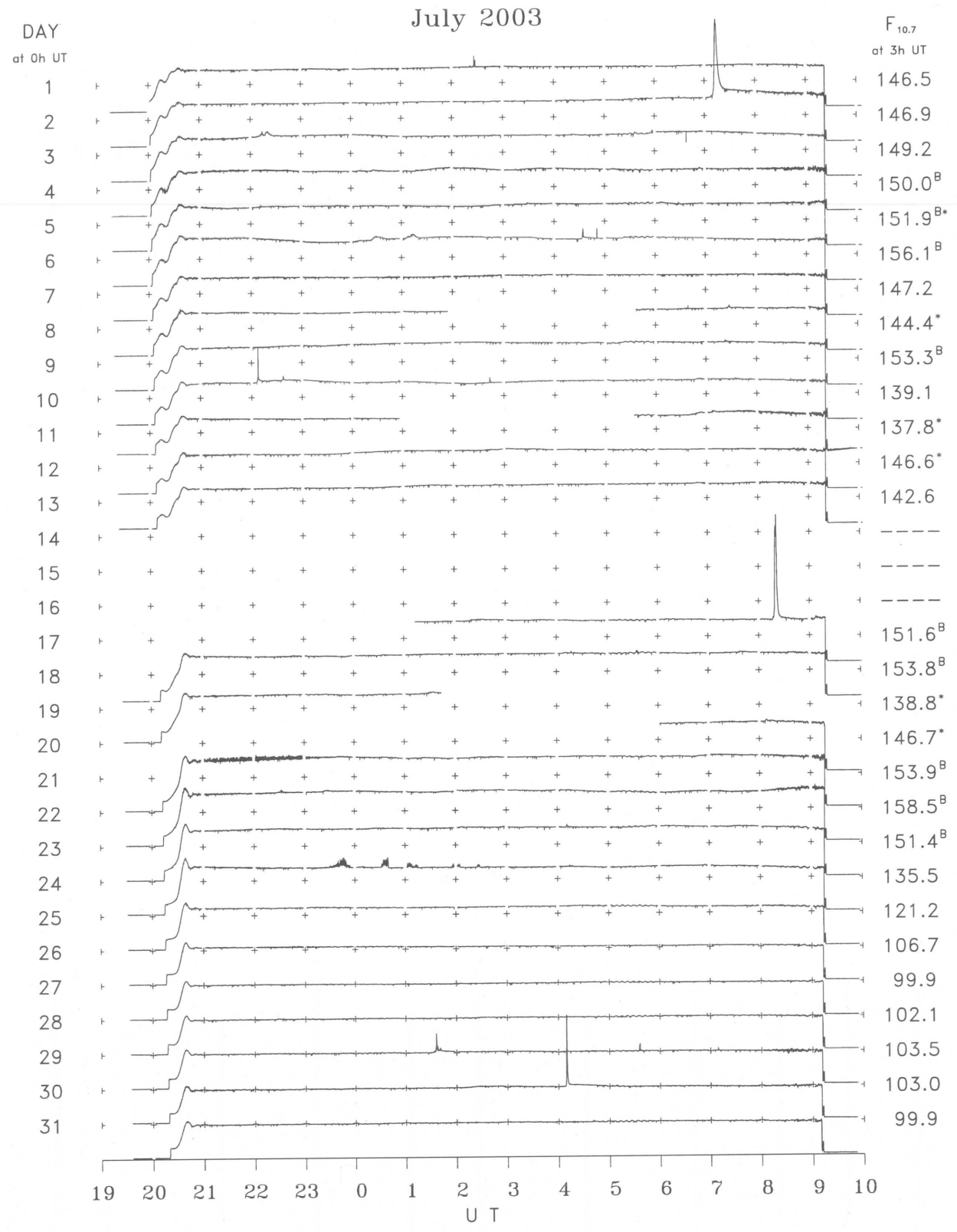
Single-frequency observations

Normal observing period: 1925 - 1000 U.T. (sunrise to sunset)

JUL. 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	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1}) MEAN	POLARIZATION REMARKS
2	2800	3 S	0707.0	0714.0	15.0	220	-	0
2	500	1 S	0710.0	0713.0	7.0	10	-	0
2	500	7 C	2214.0	2219.0	8.0	10	-	0
3	500	8 S	0111.0	0111.0	1.0	10	-	0
3	500	8 S	2223.0	2223.0	1.0	10	-	0
4	500	8 S	2137.0	2137.0	1.0	75	-	SR
6	500	7 C	0025.0	0114.0	52.0	40	-	
6	2800	1 S	0433.0	0434.0	1.0	30	-	
9	2800	8 S	2207.0	2208.0	3.0	100	-	0
11	500	4 S/F	0707.0	0710.0	7.0	70	-	ML
17	500	8 S	0609.0	0610.0	1.0	20	-	WL
17	500	8 S	0748.0	0748.0	1.0	30	-	0
17	500	7 C	0801.0	0819.0	27.0	100	-	WL
17	2800	8 S	0817.0	0821.0	9.0	290	-	0
17	500	8 S	2044.0	2044.0	1.0	205	-	0
17	500	7 C	2244.0	2247.0	5.0	10	-	0
18	500	8 S	0535.0	0535.0	1.0	20	-	0
19	500	7 C	0129.0	0133.0	6.0	10	-	0
21	500	8 S	0622.0	0622.0	1.0	15	-	0
21	500	8 S	0820.0	0820.0	1.0	10	-	0
21	500	7 C	2232.0	2233.0	2.0	15	-	0
22	500	7 C	0159.0	0201.0	5.0	30	-	WR
23	500	8 S	0135.0	0137.0	2.0	115	-	0
23	500	8 S	0412.0	0413.0	1.0	30	-	0
23	500	42 SER	0731.0	0747.0	28.0	20	-	0
29	500	7 C	0134.0	0136.0	8.0	50	-	0
29	2800	7 C	0135.0	0136.0	7.0	50	-	WR
29	2800	7 C	0535.0	0537.0	2.0	20	-	0
30	2800	8 S	0408.0	0410.0	4.0	200	-	0
31	500	8 S	0440.0	0441.0	1.0	10	-	0

B. Solar Radio Emission

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



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

IONOSPHERIC DATA IN JAPAN FOR JULY 2003
F-655 Vol.55 No.7 (Not for Sale)

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☎ (042) (327) ７４７８(直通)

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