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IONOSPHERIC DATA IN JAPAN

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CONTENTS

COMMUNICATIONS RESEARCH LABORATORY
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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 (IGRF2000)		Technical Method	
	Latitude	Longitude	Latitude	Longitude		
Wakkanai	45°23.6'N	141°41.1'E	36.4°N	208.6°	Vertical Sounding	(I)
Kokubunji	35°42.4'N	139°29.3'E	26.6°N	207.9°	Vertical Sounding	(I)
Yamagawa	31°12.1'N	130°37.1'E	21.4°N	199.8°	Vertical Sounding	(I)
Okinawa	26°40.5'N	128°09.2'E	16.8°N	198.4°	Vertical Sounding	(I)
Hiraiso	36°22.0'N	140°37.5'E	27.4°N	209.2°	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

DEC.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	38	36	37	36	32	38	31	54	79	86		84	83	92	80	79	70	57	42	38	40		38	38
2	40	50	44	44	45	45	47		85	81	96		83		83	79	61	54	53	46	41			34
3	32	34	40	36	40	40	40	58	79	84	93	94	77	80	91	78	61	45	44	36	29	29	32	28
4	A		55	38	32	37	30	53	62	92	93	99	82	81	80	77	67	46	40	38	34		39	34
5	32	37	40	41	40	41	36	53	79	98	84		77	92	82	74	76	70	40	34	34	34	37	36
6	31		28	29	A	A	A	53	66	82			90	84	91	76	60		A	A	A			35
7	36	36	36	34	37	37	A	50		110	81	84	81	83	82	66	58	48	44		41	59	40	37
8	37	40	42	45	50	46	40	52	78	81	77	84		84	77		38	52			A	34	36	40
9	34	32	34		32	32		39	32	56	61	74	77	82	78	73	53	40	39		26			34
10	22	34	30				29		61	76	78	71	71	68	73	67	40	34	30	25	32	32		
11						A		29	65	55	77	71	80	83	76	64	54	41	34		A		40	44
12	38	34	20		26	26	39	41	58	70	77		74	68	67	62	41	47	34	28		A	A	A
13	36	34	35	37	40	33	34	A	66	78	81		75		68	65		44	33			34		
14				40		35	34	48	70			82	76	63	62		40	30			A			34
15		49		24	29		30	38	62	A		75	76	75	71	66	51	33	53	30	41		42	32
16	44	44	41	41	46	45	51		81	77	82	75	179	74	66	61	44		29		31	32		38
17	35	31	35	34	32		33	45		76	74	81	70	76	72	63	47	42	41	36	34	34	38	31
18			34	59	40	36	39			81	78	78	64	73			48	37	52	36	A	A	42	38
19	36	37	38	34	34	40	48	61	66	75	81	80		73	70	64	63	39	38	34		A	41	42
20	38	42	A	40	45	42	41	54	60	77	76	81			66	70	52	44	41		34	31		36
21		49	34		34	38				66	77		82	82		76	71	A		A	A		45	45
22	45	42	41	42	40	45	45	54	78	C	79	87	82	84	77	67	60	A		A	A	A	40	44
23	40	34			34	36	37	32	78	81	93	82	84	83	73	66	58	51	A		34	A		36
24	32	35	34	35	34	34	34	47	80	84	90		78	82	68	64	55	47	32	34	34	37	37	37
25	31	40	38	37	36	36	34	44	72	82	92	82	85	82	76	70	55	52	45	40	37	32		
26			34	34	32	36	30	42	84			93	77	82	80	65	60	47	36			29	34	34
27		37	38		34	30	26	47	66	84	83	79	82	84	74	66	64	40			28		34	36
28	36	36	37	38	36	35	29	43	78	84			92	80	71	78	81	72	40	35			36	38
29	37	38	41	41	37	34	36	43	70	74	80	83	71	77	73	66	64	34		22		29	35	36
30	36		36		36		34	41	80	68	81		82	74	75	63	65	38		32				34
31	34	34	34	32	32		28	37	75	82	76	84	73	77	71	67	56	48	46	42		40	38	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	23	24	26	23	27	24	26	25	27	27	25	22	28	28	29	28	30	27	22	17	16	14	19	27
MED	36	36	36	37	36	36	34	47	72	81	81	82	79	82	74	66	58	45	40	35	34	33	38	36
U Q	38	41	40	41	40	40	40	53	79	84	87	84	82	83	80	75	64	51	44	38	38	34	40	38
L Q	32	34	34	34	32	34	30	41	65	75	77	78	75	74	70	64	51	39	34	31	31	31	36	34

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

DEC. 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	24	30	G	G	G	G	G	G	G	G	G	G	46		G	G	11	G	G	26	G	38	G	
2	11	29	G	G	G	G	G		G	G	46		G		G	G	G	27	32	32	33	32	30	28
3	26	25	G	G	G	G	G	G	34	34	G	G	48	G	G	G	11	G	G	G	G	G	28	28
4	35	33	G	G	G	G	G	G		35	G	G	G	G	G	G	G	G	G	G	G	27	G	
5		28		26	25	G	G	G	G	G	G	46	G	G	G	G	31	G	G	G	G	G	G	G
6	G	29	G	30	44	58	46	29	36	34		G	G	G	G	G	39	28	54	65	67	33	35	G
7	32	28	G	G	G	28	59	30	G		G	G	G	38	G	G	G	G	33	49	38	G	G	G
8	G	G	G	G	G	G	G	29		G	G	G	G	G	53	31	50	G	28		40	G	G	26
9	29	G	30	42	G	G	33	34	G	G	G	G	G	G	G	G	G	G	G	30	G			28
10	33	G	G	26		39	33	43	46	G	G	G	G	G	G	G	G	G	G	G	G	G		G
11			G		30	87	31	31	G	G	G	G	G	G	G	G	G	G	G	24	40	32	G	G
12	29	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	40	G	33		50	44	70
13	33	37	30	G	34	G	44	60	91	51	60	46	G		34	37	32	35	G			G	28	39
14	30	28	G	G		G	G	39	G	G	43	39	G				G	G	117		42	39	30	G
15		34	28		29	43	26	35	28	76		62	G	G	G	G	G	G	G	35	35	38	29	G
16	G	G	G	30	G	G	G	G	60	G	G	G	G	G	G	G	G	G	G		G	G	38	30
17	G	38	30	33	33	G	G	11	38	39	G	G	G	G	G	G	32	28	G	39	G	30	39	34
18	45	40	G	G	G	G	G	28	30	G	G		40	G		30	G	G	32			46	G	G
19	G	46	33		28	G	G	G	G	G	G	G		G	G	G	G	G	G	G	30	54	33	G
20	44	40	47	41	30	G	G		G	G	G	G		G	G	G	40	34	G	G	G	G	G	G
21		31	29		G	28	G			G	G	42	39	36	G	G		78	67	77	71	32	32	32
22	32	30	38	29	33	29	45	40	40	C	G	38	G	G	G	G	38	53	40	68	66	51	37	34
23	G	G			G	G	G	27	G	35	43	G	G	41	G	45	20	26	44	56	30	60	41	34
24	G	28	G	G	G	G	30	32	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	G	28	G	G	G	
26		35	28	G	G	G	G	25	46	G		G	G	G	113	G	G	G	G		G	28	G	27
27	30	G	G	29	G	G	G	G	G	33	G	G	G	G	G	44	44	68	33	27	G	32	G	G
28	G	G	G	G	G	G	27	33	66	33	G	G	G	G	G	G	38	49	28	26	40	37	G	G
29	G	G	23	34	29	30	G		G	36	G	G	42	G	G	34	100	56	28	26			G	G
30	G	G	G	32	32	34	28	34	G	G	G	G	G	G	G	G	G	40	39	33	31	35	46	32
31	30	G	G	G	G	34	G	G	G	G	G	G	G	G	G	G	G	G	G	29	32	33	G	28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	30	29	25	29	31	31	27	28	29	28	29	29	27	29	30	30	31	31	25	27	28	29	29
MED	25	28	G	G	G	G	G	28	G	G	G	G	G	G	G	G	G	G	G	28	30	32	27	G
U Q	32	33	28	30	29	29	30	34	37	34	G	G	G	G	G	G	32	35	33	37	40	38	34	31
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Wakkanai

DEC. 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	14	15	15	14	15	15	20	20	18	18	21	22	22	29	26	24	16	15	17	15	20	14	15	14
2	18	15	17	17	16	15	15		15	18	20		21		28	22	15	18	14	15	14	14	14	15
3	17	16	14	16	15	15	14	20	16	16	17	20	17	20	15	22	16	14	16	14	15	15	15	20
4	14	15	14	20	15	15	16	20	23	16	18	16	17	18	17	22	18	14	15	18	15		16	15
5	14	15	15	15	15	15	15	18	22	18	20	18	20	30	24	15	16	14	16	16	17	15	20	15
6	20	15	18	15	14	14	15	14	14	17		22	21	20	20	20	14	18	14	15	15	14	14	20
7	14	17	14	15	16	15	14	14	18	20	30	32	32	23	24	23	17	18	15	15	14	15	15	18
8	15	15	20	14	14		15	17	18	21	20	27	30	28	26	18	14	20	15		17	18	20	18
9	17	18	14	16	17	18	15	14	22	27	32	33	34	33	27	24	20	26	18	16	18			20
10	16	20	18	18		14	15	14	20	20	34	28	33	30	23	23	17	18	20	17	18	20		20
11			22		14	17	15	15	20	30	29	33	23	34	32	24	21	24	20	20	18	17	20	17
12	14	18	18		16	18	18	18	21	30	35	33	35	35	32	24	21	20	17	16		18	18	15
13	15	16	17	20	15	18	17	15	20	22	23	26	32		22	20	17	18	21			18	16	15
14	16	16	15	15	17	20	18	15	18	22	20	20	32	21	23		22	18	17	15	15	15	16	16
15	17	15	17	14	14	17	15	14	20	18	21	21	30	28	20	17	17	17	20	17	14	14	16	18
16	18	16	15	14	14	15	17	18	17	22	21	30	30	28	27	28	18	20	15		18	16	16	16
17	15	17	15	15	14	18	17	15	22	24	32	33	33	34	32	23	16	20	20	16	15	16	17	17
18	15	18	16	18	15	17	21	18	18	21	20	17	22	30		16	20	17	15	17	15	14	15	17
19	18	15	14	18	17	18	15	15	22	29	23	36	33		28	23	18	17	16	16	17	14	17	14
20	14	14	14	14	14	16	15	14	23	32	33	35		17	32	23	15	17	20	22	18	20	20	20
21		15	15	21	15	18	15	15	21	27	29	22	27	18	20	18	17	16	15	14	15	18	17	17
22	15	15	14	14	14	16	14	15	14	C	20	21	29	28	26	18	17	15	15	15	15	15	15	15
23	18	18			20	18	15	16	22	20	21	21	20	18	18	15	16	14	15	15	15	15	15	17
24	20	16	14	18	15	18	15	17	22	27	21	32	30	28	21	14	17	16	15	16	15	18	16	17
25	15	15	16	15	18	15	15	18	22	28	18	20	21	20	16	22	17	15	14	15	15	16	20	
26		14	16	17	15	15	20	16	18	32		33	30	29	29	24	20	15	15		21	18	17	18
27	15	15	15	15	15	17	20	15	22	20	29	33	24	30	27	20	15	15	14	18	18	15	15	15
28	16	18	16	14	14	17	16	14	15	20	18	21	22	20	27	23	15	14	14	15	15	15	14	16
29	14	16	15	14	16	16	15	15	24	24	38	35	29	35	28	20	14	14	20	15		16	17	16
30	15	15	18	14	14	14	15	14	21	26	32	32		34	29	24	20	15	14	14	15	15	16	18
31	16	15	15	17	15	15	18	17	21	26	33	35	48		30	23	18	14	15	16	14	15	16	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	28	30	30	28	30	30	31	30	31	30	29	30	29	27	30	30	31	31	31	27	28	29	29	30
MED	15	15	15	15	15	16	15	15	20	22	21	28	29	28	26	22	17	17	15	16	15	15	16	17
U Q	17	17	17	17	16	18	17	18	22	27	32	33	32	30	28	23	18	18	18	17	18	18	17	18
L Q	14	15	14	14	14	15	15	14	18	20	20	21	21	20	21	18	16	15	15	15	15	15	15	15

HOURLY VALUES OF foF2 AT Kokubunji

DEC. 2003

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

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	30		34		34	34	34	64	85	105	108	111	112	111	107	98	82	64	54	45	43	42	36	36
2	36	38	37	36	36	36	44	78	85	115	104	98	97	93	100	94	78	A	53	A	36	36	30	A
3	A		32	34	34	34	36	70	93	97	111	98	101	96	100	94	75	51	42	42	A	34		
4		32				34	41	67	81	81	132	107	88	94	81	86	77	54	47	36	30		34	34
5								66	83	102	100	98	102	93	86	86	78	80	51			34		
6	41	32	31	34			34	54	90	102	112	128	136	94	83	90	88	52	32	42	41	34		31
7		32	34	34	34	34	41	66	A	105	115	101	76	80	86	77	73	42	45	38	34	34		
8	A	37	A	30	34	34	39	54	73	103	108	101	124	88	78	77	85	45	39	36		A	A	
9	38						31	59	84	106	108	64	94	93	90	87	61	44		48	34	32		
10		32		30				54	80	96	127	101	78	92	94	91	63		32	43				
11						28		47		94	117	88	71	87	92	74	56							
12			A				34	54	73	64	105	94	88	68	66	76	66		A			A		
13	37	37		32	32	34	30	58	67	67	106	91	98	96	78	80	70	44	46			A	34	
14					28		34	44	77	85	96	74	75	64	67	66	55	39		39	31			
15		30			A		28	52	58	74	98	91	82	74	74	65			A	A	A	A		A
16	34	36							74	87	87	74	84	71	71	69	59	A	A			A	A	A
17							34	50	59	66	87	86	77	78	72	69	67	53	45	45	30			
18	A			34	34	36	43	52	69	73	84	96	72	68	74	76	A	41	43	45	A	A	25	32
19	A	34	A				38	58	69	80	82	80	82	69	78	71	58	A	48					
20						34	36	54	70	80	81	80	71	68	74	71	71	44	45		43		40	A
21	A	A	36	31		34	30	54	78	96	102	90	95	90	88	82	74	63				46		34
22	A				43		32	51	87	104	114	88	86	93	84	80	67	52	51	49		39	43	
23	A						34	67	80	101	104	88	87	97	88	72	61	61	46	44	34	32	31	
24	30	34	30	32		34	A	59	74	97	113	91	87	77	81	69	59	46	57	48	42	34	32	28
25		34	26			27		54	75	94	111	105	83	84	84	72	67	55	55	52	36		27	34
26	32	36	34	32	31	35	34	54	84	96	117	104	104	96	87	75	67	48		34		32		
27	36	43	43				27	59	69		130	127	121	126	104	91	66	69	39				A	
28		34	34	32	34	32	27	51	71	103	148	118	102	96	85	69	78	77	41			48	A	A
29	36	36	37	27				60	66	86	106	107	98	91	90	83	63	62	A		A	30	32	34
30		37	32			30		54	68	96	116	99	94	104	84	72	56	54	39	32	A	A	34	
31	34	32	36	34				A	66	76	93	86	91	95	78	77	64	57	45	36		32	A	37
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	18	14	14	11	16	22	29	29	30	31	31	31	31	31	31	29	24	22	18	12	15	12	9
MED	36	34	34	32	34	34	34	54	74	96	108	96	88	92	84	77	67	52	45	42	35	34	33	34
U Q	37	37	36	34	34	34	38	62	83	102	115	104	101	96	90	86	76	61	51	45	41	39	35	35
L Q	32	32	32	31	32	33	31	53	69	80	98	88	82	77	78	71	61	44	41	36	32	32	30	31

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Kokubunji

DEC. 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	G		G	G	G	G	G	G		40	G	49	G	42	G	G	G	G	G	G	G	G	G	G
2	G	G	G	G	G	G	G	G	G	41	45	45	45	G	G	G	38	53	G	43	25	50	25	39
3	53		G	G	G	G	G	G	G	G	G	G	G	G	G	36	G	24	30	G	58	26		32
4		G	G			G	G	G	G	G	G	49	70	G	43	34	G	G	G	36	G		G	G
5			28			G	G	G	G	G	G	G	G	G	G	41	40	G	G			33	28	29
6	26	G	G	G	G	G	G	G	G	54	G	G	G	G	G	G	G	28	G	25	G	G		G
7		G	G	G	G	29	G	G	80	G	G	G	G	G	G	G	G	34	40	28	G	G	G	31
8	46	30	37	G	G	G	G	G	G	G	G	73	99	79	66	50	40	40	33	29	29	43	40	33
9	G						G	G	49	48	G	54	G	G	G	G	G	G		G	G	G		
10		G		G				G	47	50	69	G	G	G	51	G	34		G	G	G	29		
11	27	29				G		36		90	52	G	50	66	G	G	G	31			31	29	28	
12		G	36	28	27	29	G	G	59	51	49	G	G	G	G	G	G		49	35	30	40	34	
13	G	G	24	G	G	G	G	G	35	G	64	G	G	G	G	G	45	40	37			35	G	
14					G		G	G	G	G	G	G	G	G	G	G	G	G		30	34	G		
15		G		31	52	30	G	G	35	G	92	49	G	47	G	G	G	39	67	103	41	60	37	67
16	33	G	33		G			G	G	G	70	50	G	G	G	G	46	71	80	36		94	49	45
17	25		29				G	G	G	39	G	60	G	G	G	G	G	G	28	G	G	G		
18	50		31	G	G	27	24	G	G	47	53	62	76	49	81	55	74	G	35	47	37	36	G	G
19	80	G	50		30		G	30	G	G	G	70	48	G	60	G	48	45	30		G			
20						G	G	G	G	G	G	G	G	G	G	G	G	G	G	39	G	G	34	49
21	41	50	G	G		G	G	G	46	G	G	G	G	G	49	75	47	35				G		G
22	41	47	36	32	G	27	28	G	G	G	G	G	G	G	G	G	G	G	G	G	45	G	G	41
23	49	30	34				G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
24	G	G	G	G	G	G	36	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
25		G	G			G		G	G	G	G	G	G	G	G	39	G	G	28	G	G		G	G
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G		G		
27	G	G	G				G	G	52	62	49	47	G	G	G	G	G	G	G		26		32	
28		G	G	G	G	G	G	G	33	G	G	G	G	G	G	G	G	G	G	G	G	93	40	
29	31	G	G	G				G	G	G	G	G	G	G	G	G	G	96	40	29	54	G	30	G
30	G	G	G		G	G	29	33	G	G	G	G	G	G	G	G	G	G	G	G	46	50	G	31
31	G	G	G	G			30	92	50	G	G	G	G	G	G	G	G	G	G	G		29	49	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	21	23	25	18	18	21	26	31	28	31	31	31	31	31	31	31	31	29	26	25	25	27	22	19
MED	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	26	29
U Q	43	G	32	G	G	14	G	G	40	41	49	49	G	G	G	G	38	37	35	35	35	40	34	39
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Kokubunji

DEC. 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		17	22	17	17	14	22	14	15	22	24	28	28	33	17	24	15	14	15	15	24	14	14
2	28	17	13	14	15	15	15	25	28	21	26	20	29	33	35	29	15	15	14	13	14	13	14	13
3	13		18	15	17	15	15	23	33	34	21	28		22	18	18	25	15	15	21	14	14		14
4		20	26			17	14	23	14	22		20	26		15	14	17	15	20	13	14		15	14
5			13			18	18	24	13	18		22	20	20	34	18	18	14	13			13	14	14
6	14	14	20	14	14	18	17	18	18	18	28	34	36	31	36	22	22	13	15	14	20	15		14
7		21	33	22	18	13	17	22	20		21	37	39	38	39	37	25	15	13	14	15	15	22	14
8	13	13	14	22	15	13	22	23	29		42	33	35	33	29	28	20	14	13	13	14	13	14	18
9	25						18	23	22	22	36	22	45	48	21	33	21	21		18	18	14		
10		21		22				18	17	22	26	34			28	33	18		21	18	14	14		
11	14	14				13		14	21	21	24		30	29	42	35	33	17			15	14	14	
12		18	18	15	14	13	18	23	22	29	29			37	30	31	29		20	26	15	14	14	
13	20	20	17	21	17	17	20	21	18	18	18	18	34		31	20	18	14	14			14	14	
14					18		13	17	26	30	17	20	18		29	34	29	17		15	13	23		
15		14		13	13	13	17	26	15		29	28		28		33		17	18	15	14	17	14	15
16	14	26	13		14			18	28		29	29				31	25	18	20	15		14	17	13
17	15		15				18	21	28	23	31	26	37	38	21	29	28	20	15	17	14	17		
18	14		15	22	20	13	15	21	28	26	28	28	37		22	22	21	21	13	14	14	18	17	21
19	14	15	13		15		15	14		36		28	28	30	28	37	15	14	13		20			
20						14	21	22	37		44	53	60	46	45	42	36	26	26	14	15	18	18	14
21	20	14	17	22		14	17	20	18	31	40			43	29	30	26	26				20		21
22	14	13	13	14	15	13	14	23	31	35	39	42	43	45			26			28	17	13	18	14
23	15	14	13				21	20	17	31	42		40	40	40	37	29	17	18	15	15	23	14	
24	13	14	15	18	14	18	14	18	15	20		36		39		29	26	26	20	17	15	14	14	21
25		17	14			17		20	18	20				21	24	18	24	26	15	14	18		20	20
26	21	20	14	13	17	20	15	18	17	31	34	42				33	15	17		20		15		
27	21	14	13				17	20	17	28	31	33	42	36	30	28	28	15	14		17		14	
28		18	13	14	15	14	14	20	17	20		37	38		33	28	23	15	15	15	21	13	13	15
29	14	14	20	18				18	35	41	42	43	44	45	44	38	30	14	14	17	14	13	14	13
30	17	20	15		14	13	18	13	28	42		43	44	42	42	36	28	15	14	22	15	13	18	15
31	22	17	20	22			14	13	28	36	40	42	43	40	37	34	23	14	15	15		15	14	21
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	23	25	18	18	21	26	31	30	26	24	26	22	23	26	30	30	28	25	25	25	27	22	20
MED	15	17	15	18	15	14	17	20	20	24	29	31	37	37	30	30	24	15	15	15	15	14	14	14
U Q	20	20	18	22	17	17	18	23	28	31	39	37	43	42	37	34	28	19	19	18	17	17	17	19
L Q	14	14	13	14	14	13	14	18	17	20	25	24	29	29	28	22	20	14	14	14	14	13	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Yamakawa

DEC. 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	30	34	34	38	47		36	63	81	85	113	91	114	110		108	91	78	70	51		53	37	34
2	30	34	36		34	32	32	52	87	90	89	81	107	86		108	106	84	64	52	52	53	41	29
3		30	29	28	29	32	31	51	83		98	105		91	112	114	88	78	53	51	54	49	34	
4	28	29	30	29	31	29	32	54	78	85	85	110	84	88	82	82	84	76	64	62	52	43	37	34
5	34	34	34	35	37	34	30	50	81	81	107	86	103			90	87		78	48	44	42	53	38
6	53	A	37					53	74	87	108		126	89	73	82	110		55		66	54		
7		32	34	30	34	31			64	78	113	113	84	84	78	89		82	A	A	A	A		
8	34	A	A			32	34	51	62	82	98	109	130	112		78	95	74	53	44	A		A	A
9	32	28		A		32	30	42	83	90	98	81	86	98	98	87	81	59	47	47	46	38		34
10		37	32	44			A	42	64	85		109	85	88	106	80	75	55	43	48	52	34	30	
11	31			A		28	A	31	59	89	124	88	77	79	97	82	71	67	44	36	42	A	A	A
12		26	28	28	A	A	26		72	86	71	101		81	68	77		66	32	A	A		37	32
13							30	44	61	71	84	86	88	85	87	108	112	86	66	35	37	34	31	
14			28	32	32		28	43	70	77	77	81	80	67	69	67	72	67	31	46	61	52	46	37
15				A	A	A	34	37	54	71	88	81	109	81	74	76		44	42	31	36	A		A
16	A	A	A	A		26		50	72	72	89	86	84	77	82	80	78	60	48	48	48	36	A	A
17	A	A	30				31	47	63	66	78	112	98	87	92	90	93	81	48	43	42			32
18		30				A	41	47	62	76	78	82	87	76	A	87	87	77	A		51	40	29	
19	A	A	32	32	29			52	68	71	78		81	80	78	89	77	63	A	A	54	A		
20							31		66	66	80	82	84	81	73	81	77	67	54	43	64	51	47	40
21							34	48	64	85		89	84	86	87	84	77	73	59	52	54	42		
22	32	34	34	31	32	35	32	42	80	86		88	86	88	88	108	86	67	66	77	54	53	42	37
23		29	30					44	82	83	106	88	87		86	84	80	64	67	58	52	36		
24		29		30	34	32		41	78	82	87	111		90			80	66	65	72	67	49		34
25	34	32	34			28	30	37	78	82	115		86	81	85	99	81	84	71	81	53	49	42	36
26	32	32		30	30	31	32	37	82	79	112	117	130	107	116	108	79	66	55	52	36			32
27		34	36	31		29	29	45	75	78		128	144	129	130			68	55	42	36	32	34	
28	34	32	38	32	34		28	41	64	77	130	148	110	122	146	113		77	66	33	32		34	34
29			29	A	A			43	70	74		140	148	148	146	128	86	63	55	43		36	34	
30		34						37	66	78	102	126	119	128	144	123	84	60	55	34	42	32		A
31			32	36				45	54	55	80	88	109	88	97	81	85	67	62	38	46	36	51	53
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	18	19	15	12	14	20	28	31	30	26	28	28	29	25	29	26	29	28	26	26	22	17	15
MED	32	32	32	31	33	32	31	44	70	80	94	90	88	88	87	87	84	67	55	48	52	42	37	34
U Q	34	34	34	35	34	32	33	50	80	85	108	111	112	102	109	108	88	77	65	52	54	51	44	37
L Q	30	29	30	30	30	29	30	41	64	74	80	86	84	81	78	81	78	63	48	42	42	36	34	32

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Yamakawa

DEC. 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	G	G	G	G	26		G	G	32	36	38	48	G	G	51	39	G	G	G	G	G	G	G	G
2	G	G	G		G	G	G	G	G	G	38	46	52	41		42	G	G	G	G	G	26	G	34
3	G	G	G	G	G	G	G	G	G		G	44	46	44	39	38	G	G	27	G	33	34	G	
4	G	G	G	G	25	G	G	G	G	G	G	G	G	G	G	40	G	26	38	28	28	G	G	G
5	G	G	G	G	G	G	26	25	G	G	G	43	49	40		41	G	30	31	24	G	26	G	G
6	32	57	33	34	30	26	29	40	40	38	58	60	48	G	39	39	43	34	36	39	G	28	33	28
7	27	G	G	30	28	G	28		G	69	G	71	G	40	G	G		66	77	43	71	41	30	
8	G	49	57	40	26	G	G	G	G	46	58	78	74	62			60	61	47	34	50	39	42	51
9	34	G		32	29	26	G	G	G	38	38	G	52	G	G	40	37	28	28	43	34	24		G
10		G	G	G		G	32	G	G	G		49	49	61	56	60	37	40	32	G	24	G	G	
11	G	G		38		G	26	40	41	36	38	60	G	G	G	G	34	37	26	G	27	38	39	38
12	31	G	G	G	33	39	26	37	34	42	55	40	G	43	G	G	G	28	30	49	42	41	G	G
13							G	G	G	G	G	G	56	43	38	G	G	G	28	G	G	G	G	
14			G	G	G		G	G	G	G	G	G	G	G	G	G	G	26	28	39	34	28	11	G
15			31	42	40	41	33	26	G	G	53	59	136	79	46	85	G	41	G	30	57	91	39	45
16	60	60	43	60	34	25	34	G	G	58	46	51	48	48	G	G	G	G	G	G	34	G	60	60
17	43	48	26	34	34	32	G	27	G	40	42	42	51	72	63	53	56	40	40	36	29	G		G
18	26	G	G	40	39	41	28	27	G	60	56	62	G	49	120	62	63	104	72	42	27	38	G	26
19	72	43	G	G	G		35	G	G	G	43	42	58	67	68	92	62	60	61	60	39	50	32	35
20	28						G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21						G	G	G	G	39		G	G	G	G	G	G	G	G	G	G	G		
22	G	G	G	25	G	30	G	G	G	G	G	G	40	G	G	47	G	G	G	G	G	G	G	G
23		G	G				G	G	G	G	G	G	41		G	G	G	34	40	G	G	G		
24		G		G	G	G		G		G	G	G	G	G	G		G	G	G	G	G	G		G
25	G	G	G			G	G	G	G	35	G	G	G	G	39	38	36		G	G	G	G	G	G
26	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	39	G	G	28	G	G
27		G	G	G		G	G	G	G	G		55	G	40	G			G	G	G	G	G	G	G
28	G	G	G	G	G		G	G	G	G	38	G	G	40	G	54		G	G	G	G		G	G
29			39	34	35		25	G	G	G		G	G	G	G	G	G	G	G	40	40	33	G	40
30	30	29	28	34	G	G	G	G	55	41	G	G	G	G	G	G	G	G	32	G	G	G	27	36
31	36	28	G	G				G	G	G	G	56	64	G	G	G	37	34	40	27	30	28	32	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	22	25	24	25	22	22	29	30	30	30	27	31	31	30	28	28	28	30	31	31	31	30	26	25
MED	14	G	G	G	26	G	G	G	G	G	G	42	G	20	G	38	G	26	28	G	24	25	G	G
U Q	32	28	27	34	33	26	27	G	G	39	43	55	51	44	39	44	37	37	39	39	34	34	32	35
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Yamakawa

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

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Okinawa

DEC. 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	41	47	42	54	54	41	43	64	100	97	108	101	123	125	122	110	114	110	87	80	73	76	70	43
2	35	37	35	31	C	30	C	51	88	116	106	86	106	117	111	134	157	144	121		87	87	85	54
3	30	40	41	34	35	32	28	54	86	105	106	96	102	117	128	140	135	123	88	84	84	76	54	49
4	42	48	49	43	37			60	87	102	96	83	101	108	106	98	90	98	87	76	71	53	52	52
5	40	41	38	37	36	32		45	85	110	100	110	110	120	131	146	146	145	110	87	77	80	82	60
6	54	41	32	36		C		52	75	94	116	127	138	106	84	86	114	131	109	88	88	100	83	60
7	47	34	37	36	32	C	29	52	81	81	107	118	122	117	103	104	121	124	A		54	65	43	
8	31	29	A		A	37	42	71	61	73	113	124	121	142	116	110	118	107	83	56		64	52	44
9	47	31	C	C	A		28	42	90	106	91	87	86	122	104	105	91	84	66	51	62	51	43	
10	38	42	32	58	31		26	41	70		130	126	107	106	135	118	105	90	71	61	77	78	55	A
11		32	A	C	C	C	C	36	72	117	132	107	86	107	128	141	121	122	104	54	60	43	36	
12	30	30	42	34	29	28		34	83	90	86	71	94	108	83	91	116	107	58	44	51	54	50	C
13	32	32	C	34	C	25		38	60	77	100	86	96	122	142	144	147	148	114	50	54	52	43	34
14	C	28	34	40	41	C		42	78	78	86	74	81	80	78	81	82	88	77	54	71	78	43	
15		A	A		A			42	54	75	113	105	107	114	100	A		88	77		54	59	A	50
16	A	A	A	A	A		30	58	72	77	100	107	104	105	126		115	107	82	74	76	66	44	A
17	A	A	A		31	C	A	41	71	72	89	90	102	111	134	142		130	100	54	66	A	A	A
18	A		C		34	A	40	52	76	80	86	84	107	112	110	137	148	141	108	77	80	72	46	
19	36	29	30				34	51	75	75	80	88	98	110	120	131	138	124	88	85	88	88		
20	36	30	30	30	29	29	28	44	76	78	84	78	86	100	98	100	97	85	78	61	76	77	54	66
21	34	C		34	31	41	42	54	76	101	113	104	97	100	110	105	106	95	87	71	71	54	C	C
22	C	C	C	C	29			41	84	111	116	118	111	112	137	146	136	130	108	124	110	100	61	48
23	38	37	30			28		43	88	111	112	123	126	131	148		144	99	90	86	87	72		31
24	31	36	32	32	43	C	C	38	88	105	116	135	148	146	148	141	127	103	90	88	108	87	54	37
25	37	36	38	32	C	28	30	43	75	108	118	122	127	125	134	146	127	114	120	87	80	77	54	53
26	44	36	34	30	30	29	29	38	82	108	125	141	150	146	147	141	111	100	75	66	67	63	54	43
27	31	34	30	29	C	C		45	87	102	99	132	170	171	150	150	152	106	72	78	74	53	38	37
28	37	34	36	30	30	26		40	73	82	116	146	151	152	152	154	146	110	81	61	62	52	54	52
29	46	34	31	C	C	C	C	50	88	101	131	156	157	152	174	148	148	101	72	66	64			36
30	32	30	29	C	C	C	C	34	66	88	108	127	157	158	148	146	131	92	67	62	54	52	34	32
31	C	29	32	32		C		40	64	62	84	90	122	150	148	148	141	121	87	67	76	80	76	72
	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	21	19	16	13	13	31	31	30	31	31	31	31	31	28	29	31	30	28	30	29	25	20
MED	37	34	34	34	32	29	30	43	76	96	107	107	107	117	128	138	127	107	87	69	74	72	54	48
U Q	42	38	38	37	36	34	41	52	87	106	116	126	127	142	147	146	145	124	104	84	80	79	58	53
L Q	32	30	30	31	30	28	28	40	72	78	91	87	98	108	106	105	112	98	77	58	62	53	43	37

HOURLY VALUES OF fEs AT Okinawa

DEC. 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	G	G	G	G	G	G	G	G	58	G	39	G	51	66	44	48	38	47	42	G	G	G	G	G
2	G	G	G	G	C	G	C	G	G	G	G	54	G	52	73	G	37		29	30	G	33	G	G
3	G	G	G	G	G	G	G	G	G	G	42	56	58	42	G	G	35	G	28		G	G	G	23
4	G	G	G	G	G			G		G	G	G	G	G	49	44	50	G	G	G	G	G	G	G
5	25	24	G	G	G	G	G	G	36	36	39	42	46	50	50	70	69	72	30	58	G	G	28	25
6	34	27	28	27	27	C	28	33	G	G	G	52	101	59	71	58	52		59	57	44	58	29	G
7	G	G	G	G	G	C	G	24	G	50	39	57	G	46	G	68	65	72	103	57	G	G	G	27
8	G	G	39	40	54	26	G	25	G	37	43	62	G	G	G	G	G	G	26	27	28	26	G	28
9	30	G	C	C	40	26	28	28	G	38	43	56	44	G	74	G	G	G	27	38	27	27	28	33
10	G	G	G	G	G	G	G	G	35		G	42	G	41	46	46	G	G	30	G	G	G	37	46
11	43	27	33	C	C	C	C	40	58	44	G	G	G	G	G	52	60	41	53	50	36	27	G	32
12	G	G	G	G	G	G	G	G	G	46	47	49	73	G	G	90	63	36	32	28	25	G	27	C
13	G	G	C	G	C	G	G	24	G	G	39	G	G	G	G	G	39	38	36	27	26	28	G	G
14	C	G	G	G	G	C	27	26	G	G	G	G	43	43	42	46	36	40	28	39	37	27	G	34
15	28	33	37	28	39	25	28	34	G	G	45	58	83	68	84	160		62	33	42	35	29	79	79
16	114	59	49	51	40	30	27	G	G	41	89	68	82	86	78		38	28	32	40	39	39	42	34
17	82	48	59	34	25	C	37	24		44	71	58	55	52	62	67		60	67	50	40	85	72	44
18	36	34	C	G	G		G	G	G	36	57	45	45	113	67	71	78	56	49	57	33	58	34	26
19	G	G	28	27	38	51	G	31	41	35	G	40	66	58	64	85	64	62	40	39	46	51	55	36
20	G	G	G	G	G	G	G	G	G	G	G	G	G	52	G	48	50	44	26	28	G	G	G	G
21	G	C	G	G	G	G	G	G	G	G	59	82	64	73	G	G	G	G	G	G	G	G	C	C
22	C	C	C	C	G	G	G	G	G	G	G	G	46	G	40	G	G	46	36	G	G	G	G	G
23	G	G	G	G	G	G	G	G	G	G	G	G	47	G	G	G	G	G	29	G	G	G	35	G
24	G	G	G	G	G	C	C	G	G	G	G	46	G	G	G	G	G	G	36	G	G	G	G	G
25	G	G	G	G	C	G	G	G	G	38	49	43	41	49	49	44	G	G	26			26	G	G
26	29	G	G	G	G	G	G	G	G	G	43	G	G	G	G	G	G	36	34	51	27	G	G	G
27	G	G	G	G	C	C	G	G	G	G	G	50	42	48	48	47	36	34	26	28	34	G	G	G
28	G	G	G	G	G	G	G	G	G	G	46	52	55	60	48	46	46	50	48	33	27	G	34	G
29	G	G	G	C	C	C	C	34	G	G	G	45	46	43	G	G	G		39	31	44	58	43	33
30	29	G	G	C	C	C	C	G	30	41	46	G	G	G	G	G	G	G	25	G	26	G	G	G
31	C	G	G	26	27	C	23	G	49	36	G	78	G	G	45	50	55	47	40	41	31	28	28	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	28	29	27	26	24	20	25	31	29	30	31	31	31	31	31	30	29	28	31	29	30	31	30	29
MED	G	G	G	G	G	G	G	G	G	G	39	45	44	43	44	46	37	37	32	31	26	G	G	23
U Q	29	12	28	26	27	25	25	25	15	38	46	56	55	58	62	58	53	48	40	46	35	29	34	33
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	G	G	G	G

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

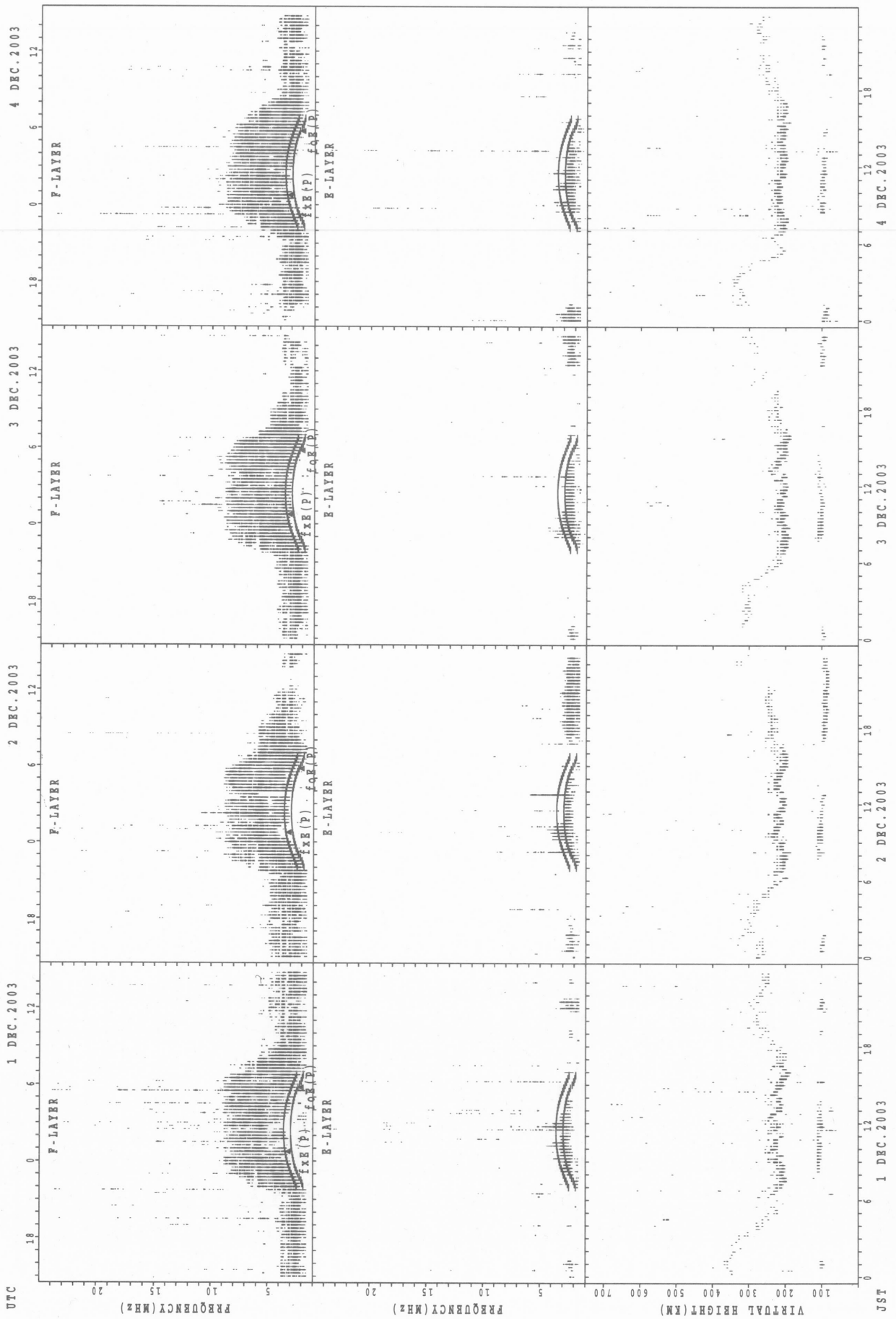
HOURLY VALUES OF fmin AT Okinawa

DEC. 2003

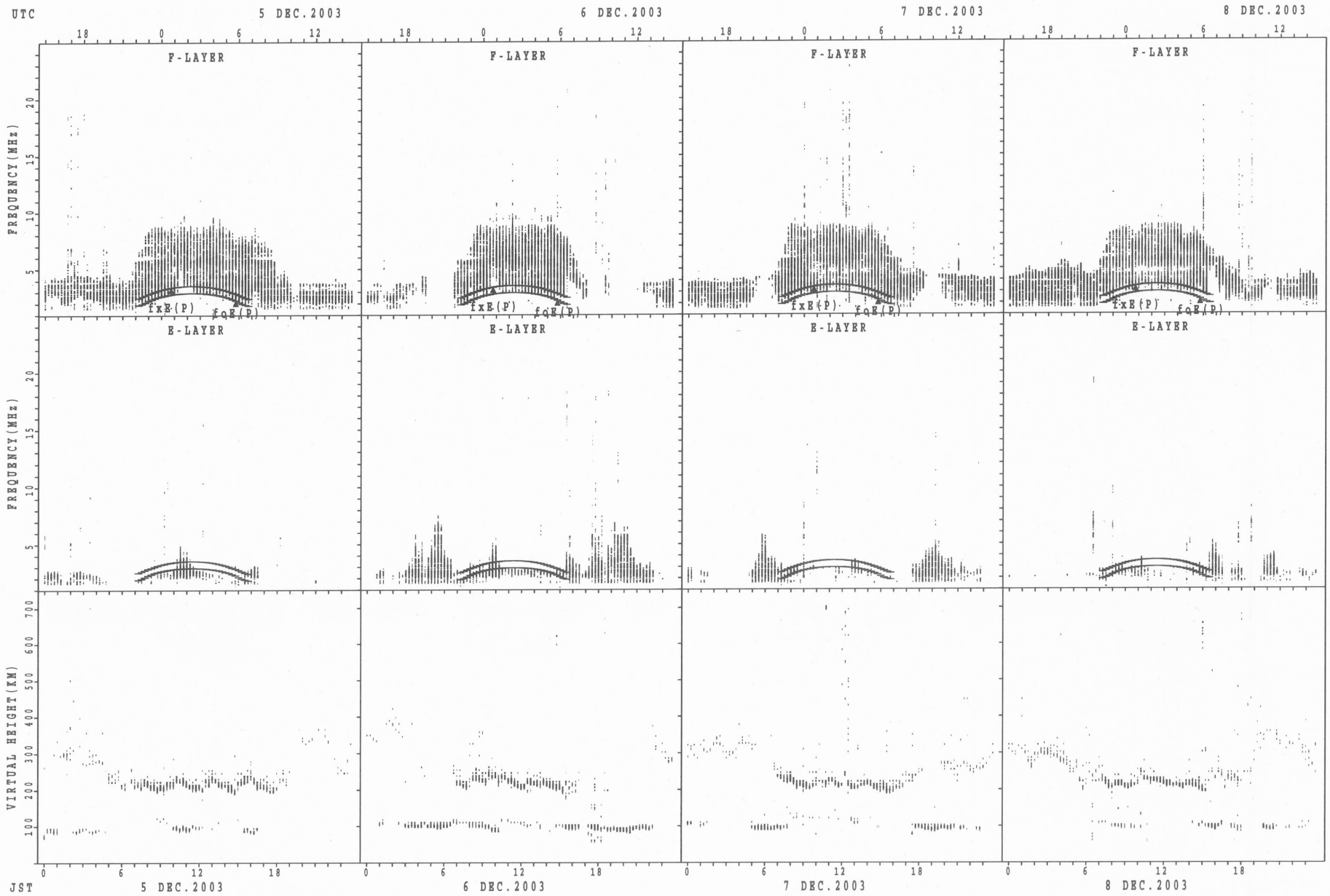
LAT. 26°40.5'N LON. 128°09.2'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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	15	14	15	16	14	16	16	18	14	15	20	23	22	18	22	18	16	14	14	15	14	15	14	14
2	15	14	14	14	C	15	C	21	14	16	18	21	23	20	22	23	14	14	14	14	17	14	15	14
3	15	14	15	14	15	15	14	17	18	15	21	23	23	22	23	20	16	14	14	14	15	15	14	15
4	15	14	15	14	15			17	14	14	15	18	27	15	16	15	15	14	15	14	14	14	15	15
5	14	14	15	15	14	15	15	16	14	15	18	20	20	20	17	15	14	14	14	14	14	15	14	14
6	14	14	14	14	14	C	14	14	14	14	18	20	20	22	20	20	15	15	14	14	14	14	15	14
7	14	15	15	14	14	C	14	14	15	21	24	29	30	22	21	20	16	14	14	14	15	15	15	15
8	15	15	15	14	14	14	15	14	14	15	20	21	21	21	22	22	21	21	14	14	14	15	15	14
9	14	14	C	C	14	14	14	14	14	15	18	21	21	20	21	15	17	16	14	14	14	14	14	14
10	18	17	15		16	18	14	15	14		16	16	18	18	16	15	14	14	14	15	14	16	14	14
11	14	14	14	C	C	C	C	14	14	16	18	21	21	23	22	18	15	14	14	14	14	14	16	14
12	14	14	14	14	14	15	15	15	14	14	15	20	21	15	14	14	14	14	14	14	14	15	14	C
13	16	14	C	21	C	14	14	14	14	16	14	15	17	14	14	14	14	14	14	14	14	14	15	14
14	C	23	14	14	14	C	14	14	14	14	14	14	14	14	16	14	14	14	14	14	14	14	15	15
15	14	14	14	14	14	14	14	14	14	14	14	15	16	20	17	16		14	14	14	14	14	14	14
16	14	14	14	14	14	14	14	15	15	16	14	18	18	22	20		14	14	14	14	14	14	14	15
17	14	14	14	14	14	C	14	14	14	16	14	15	22	22	18	18		14	14	14	14	14	14	14
18	14	14	C	18	15	15	16	14	15	14	17	22	24	21	22	21	17	16	14	14	14	14	14	15
19	15	14	15	14	14	14	15	14	14	15	17	21	22	20	16	17	15	14	14	14	14	14	14	15
20	20	16	15	14	14	15	15	15	15	17	18	21	27	23	22	22	20	18	15	14	15	15	15	14
21	16	C	21	14	14	14	14	15	20	20	22	30	36	30	50	43	35	24	18	22	18	15	C	C
22	C	C	C	C	15	15	14	14	15	22	33	36	29	18	21	14	14	14	17	15	17	15	16	15
23	14	14	14	15	14	14	15	15	14	17	24	28	29	28	29	21	15	14	14	15	15	15	15	15
24	14	15	15	15	15	C	C	15	14	16	21	21	22	22	20	21	15	14	14	15	22	21	14	15
25	14	14	15	14	C	14	15	14	15	15	18	22	29	22	21	18	16	21	14	14	15	15	14	15
26	14	14	14	14	14	15	15	15	21	18	21	22	23	21	23	21	18	14	14	14	15	15	15	16
27	15	14	14	14	C	C	18	15	15	15	16	21	22	21	22	20	16	14	14	14	14	14	14	14
28	15	15	15	14	14	14	17	15	15	21	20	28	28	28	23	20	15	14	14	14	14	15	14	15
29	16	17	18	C	C	C	C	14	14	20	20	28	32	29	22	34	20	14	14	14	14	15	14	14
30	14	16	15	C	C	C	C	15	14	17	21	26		40	30	22	18	15	14	14	15	14	14	15
31	C	16	14	14	14	C	15	14	15	22	27	29		29	26	17	15	14	14	14	14	14	14	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	27	25	24	20	25	31	31	30	31	31	29	31	31	30	29	31	31	31	31	31	30	29
MED	14	14	15	14	14	14	15	15	14	16	18	21	22	21	21	19	15	14	14	14	14	15	14	14
U Q	15	15	15	14	14	15	15	15	15	17	21	26	27	23	22	21	17	15	14	14	15	15	15	15
L Q	14	14	14	14	14	14	14	14	14	15	16	20	20	20	17	15	14	14	14	14	14	14	14	14

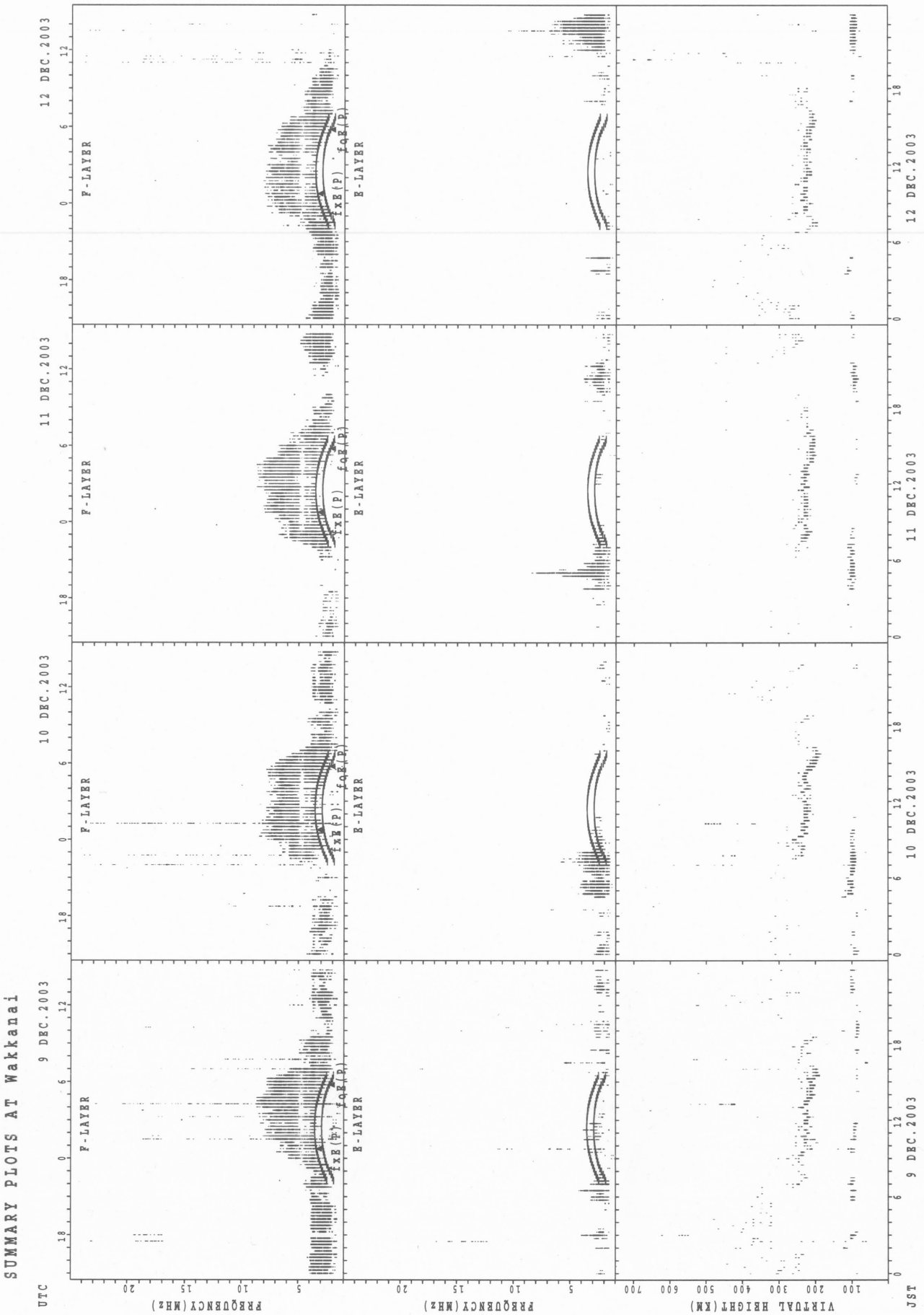
COMMUNICATIONS RESEARCH LABORATORY, JAPAN


SUMMARY PLOTS AT Wakkanai
1 DEC.2003
2 DEC.2003
3 DEC.2003
4 DEC.2003
UTC
JST
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

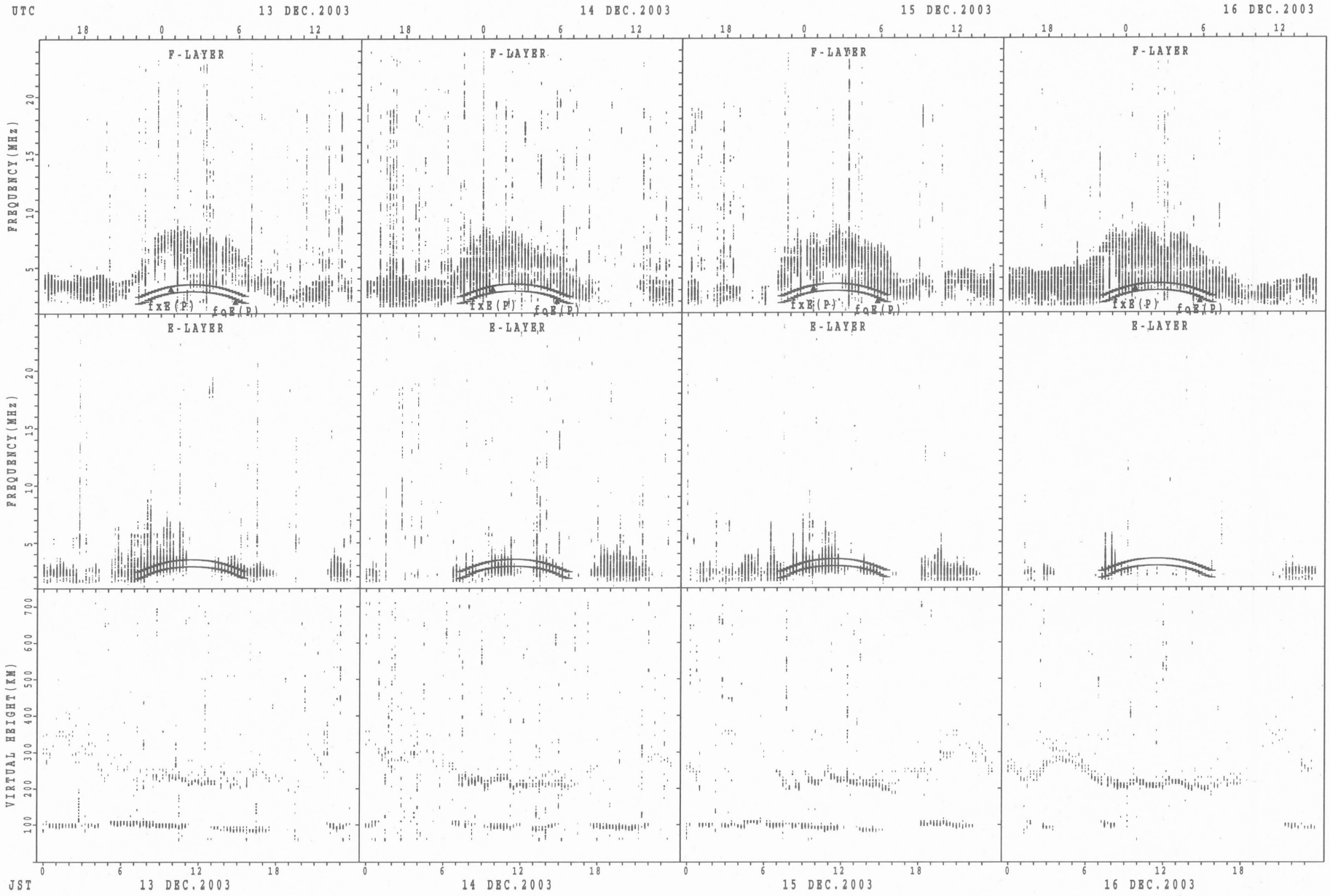
SUMMARY PLOTS AT Wakkanai



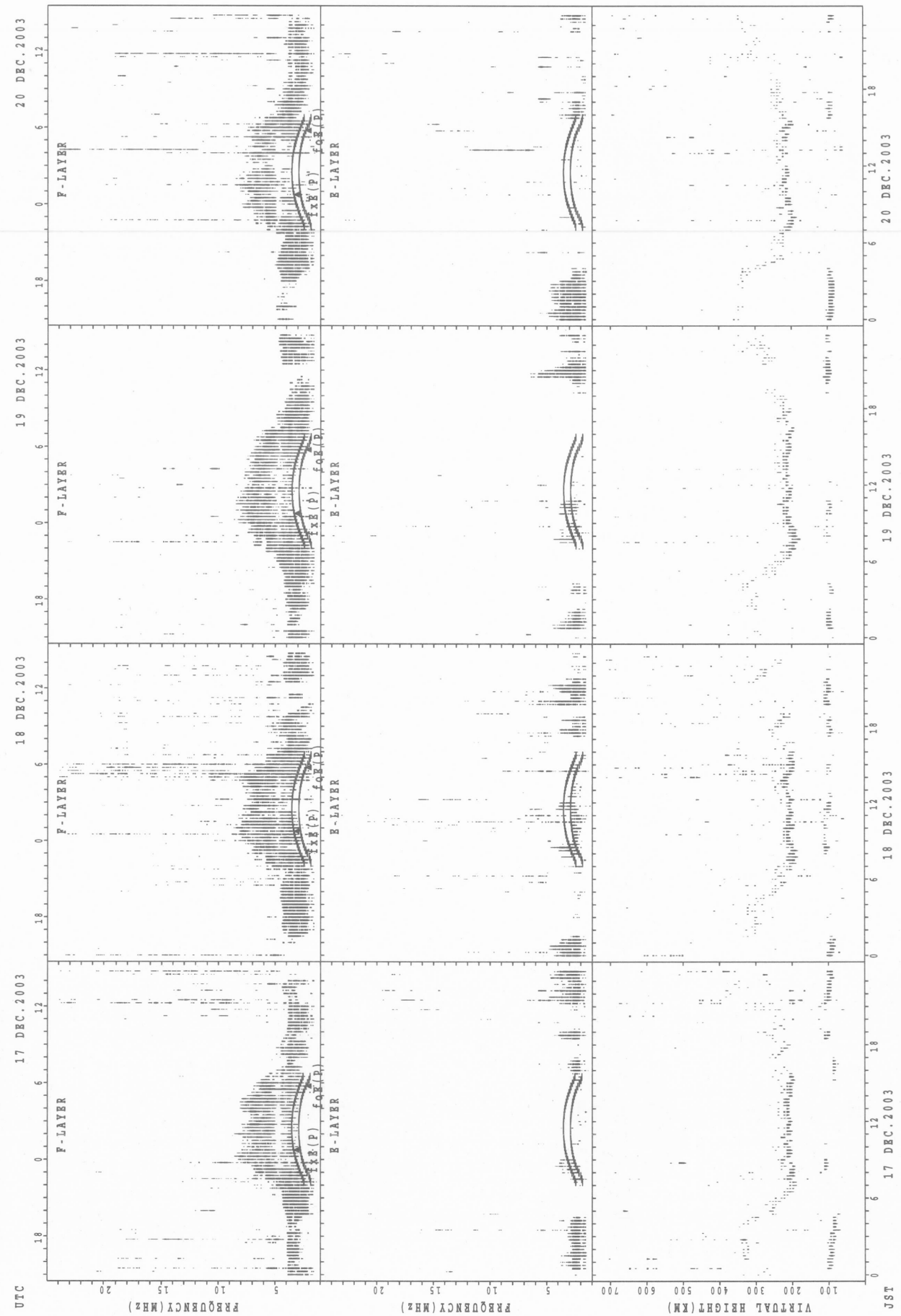
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


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

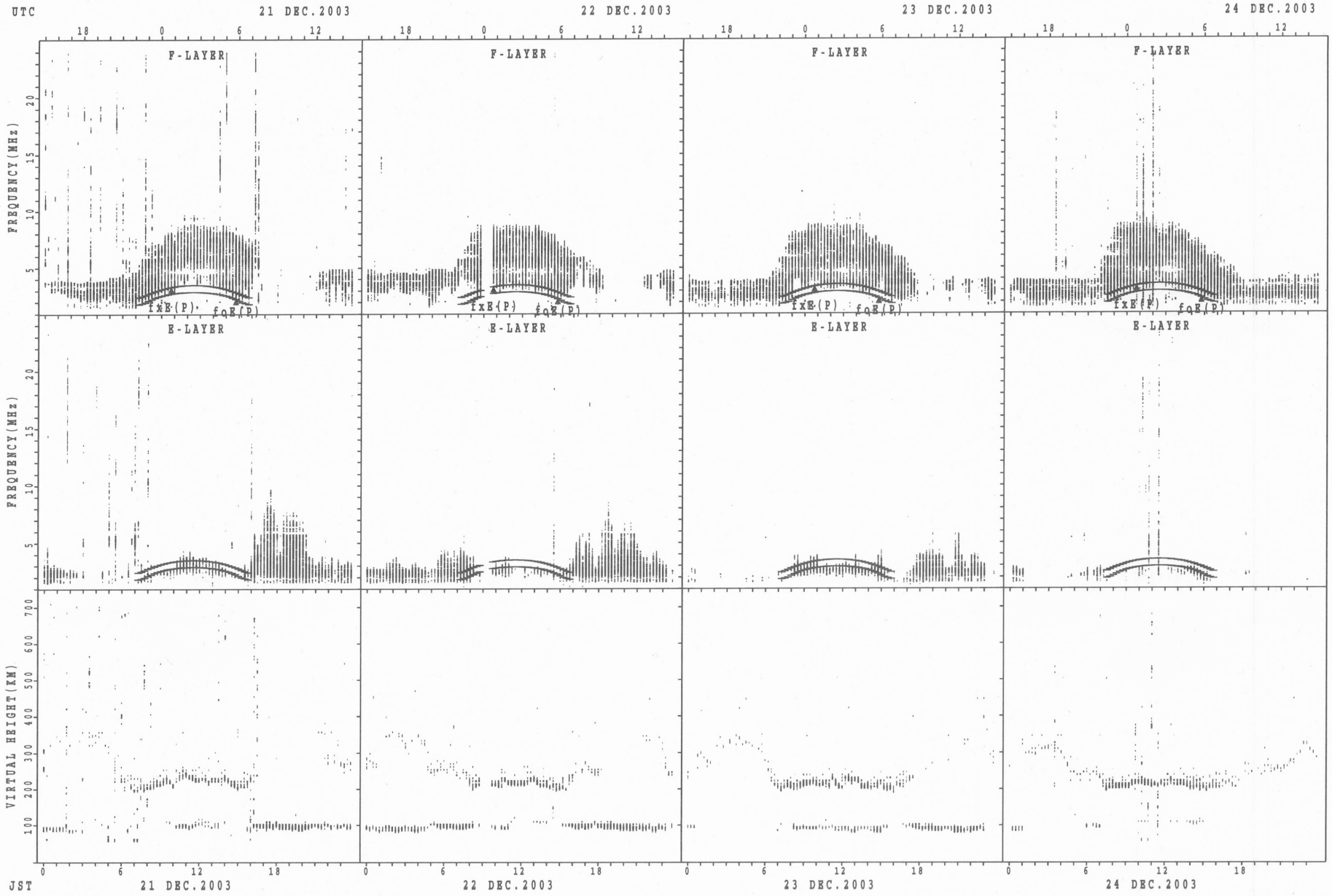
SUMMARY PLOTS AT Wakkanai



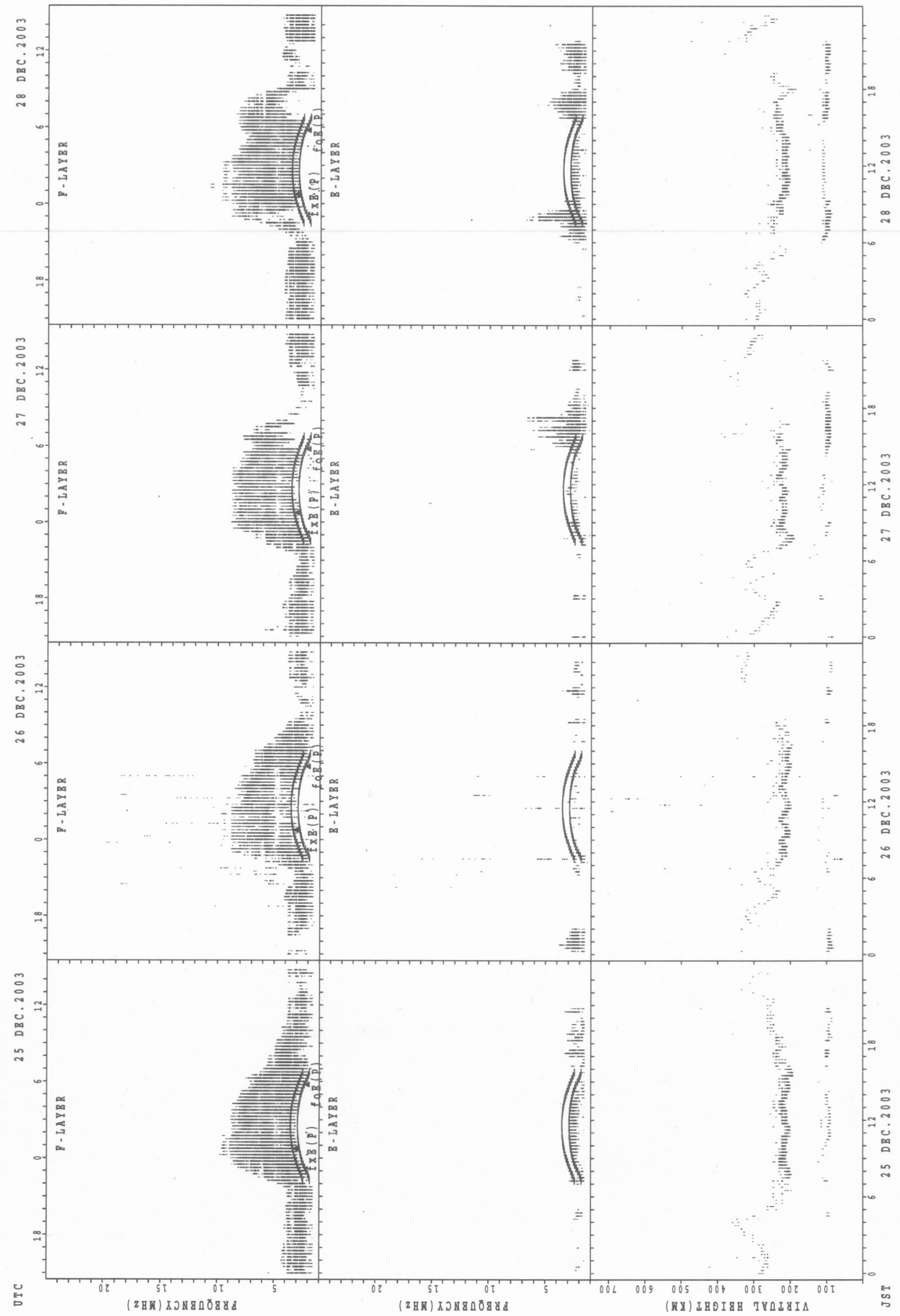
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE


SUMMARY PLOTS AT Wakkanai
UTC
JST
17 DEC.2003
18 DEC.2003
19 DEC.2003
20 DEC.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

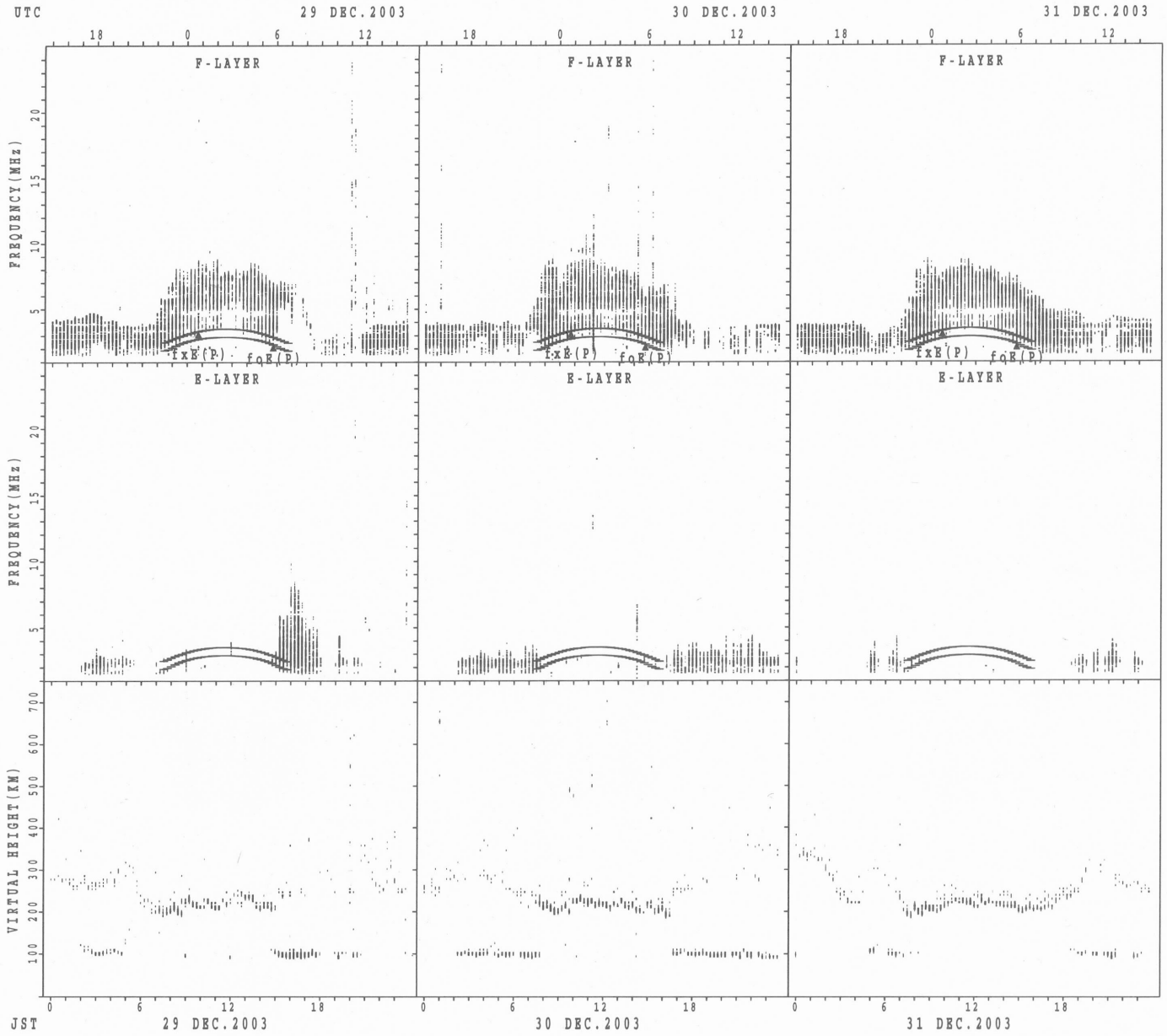
SUMMARY PLOTS AT Wakkanai



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

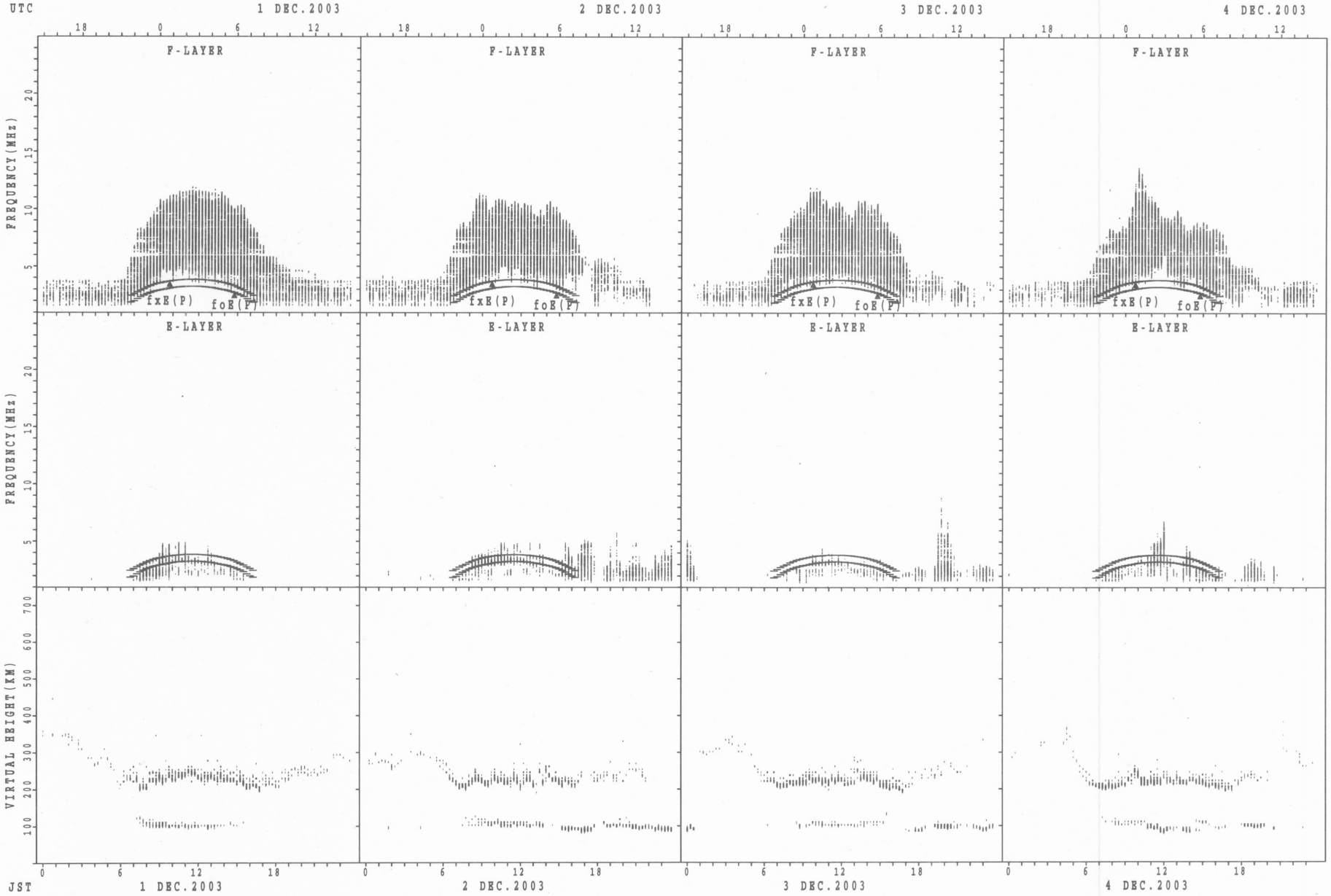

SUMMARY PLOTS AT Wakkanai
UTC
JST
25 DEC.2003
26 DEC.2003
27 DEC.2003
28 DEC.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



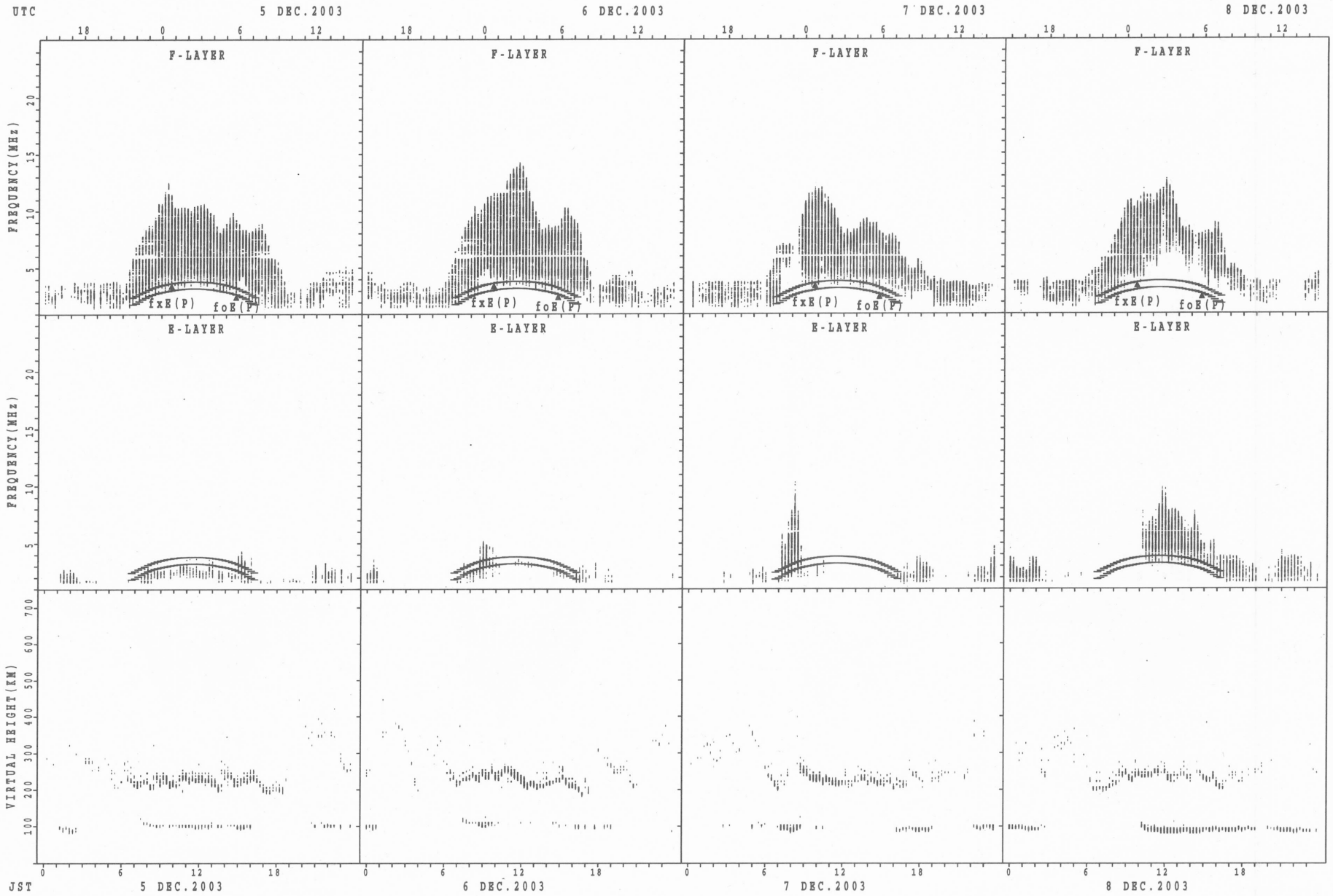
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



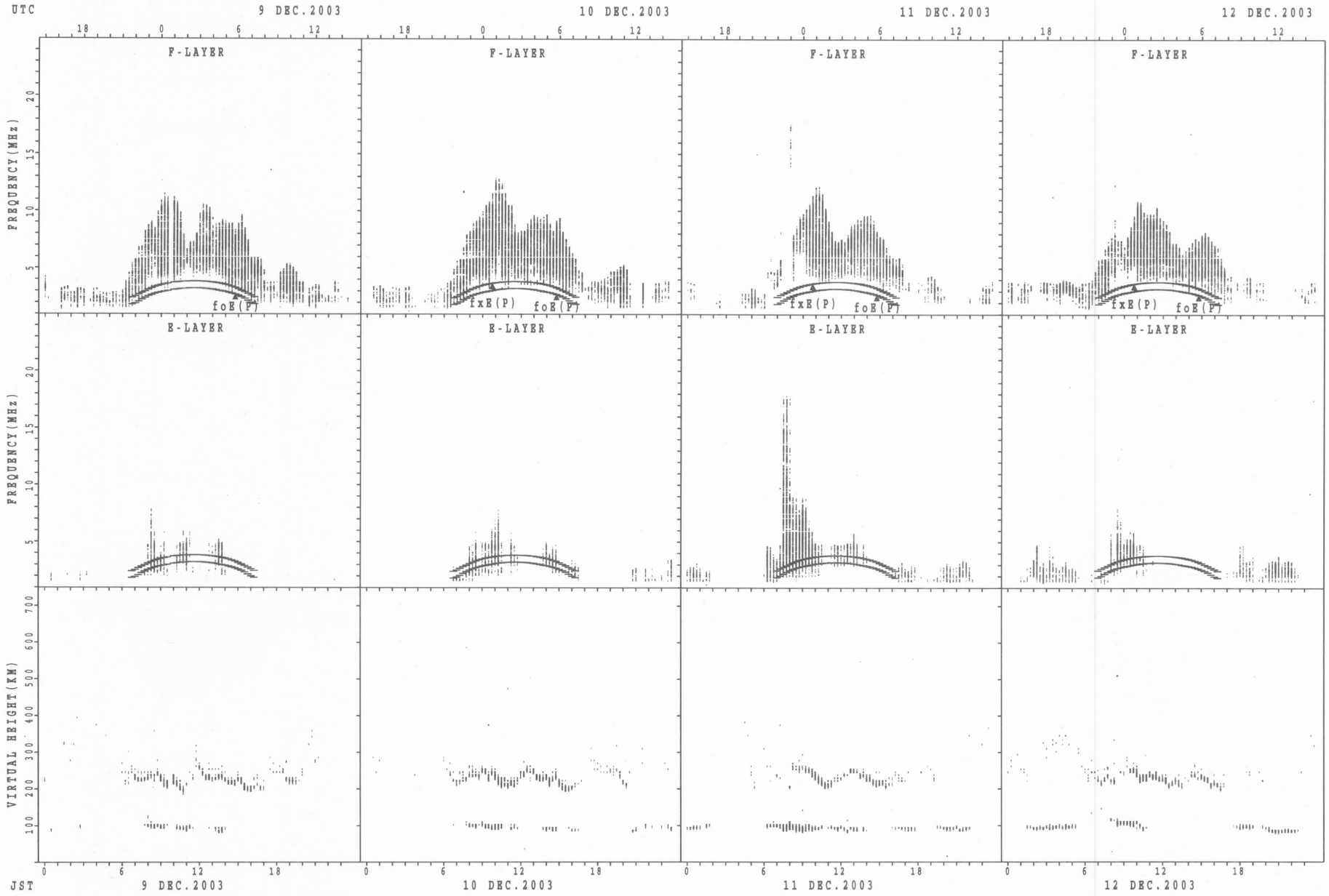
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



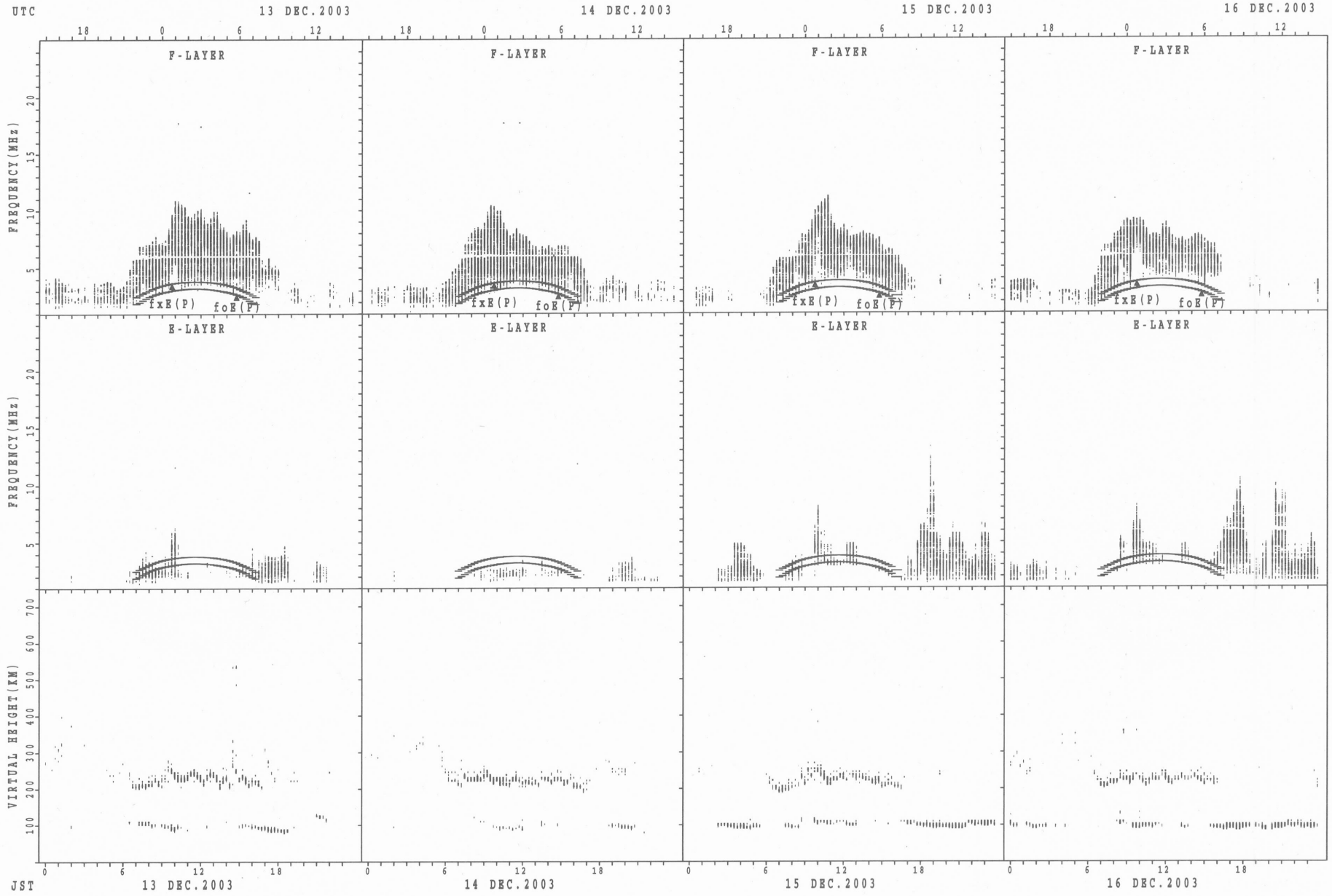
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



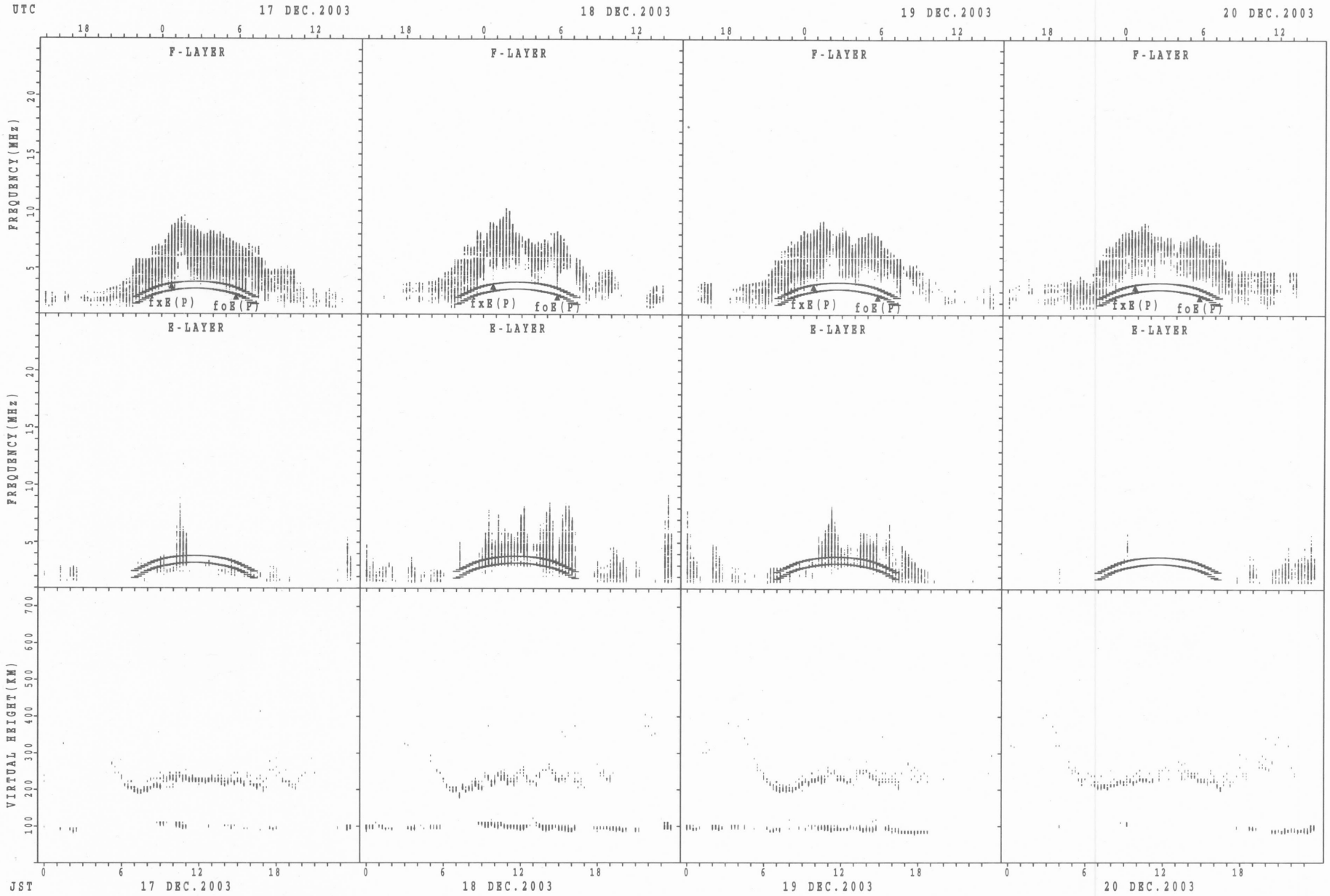
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



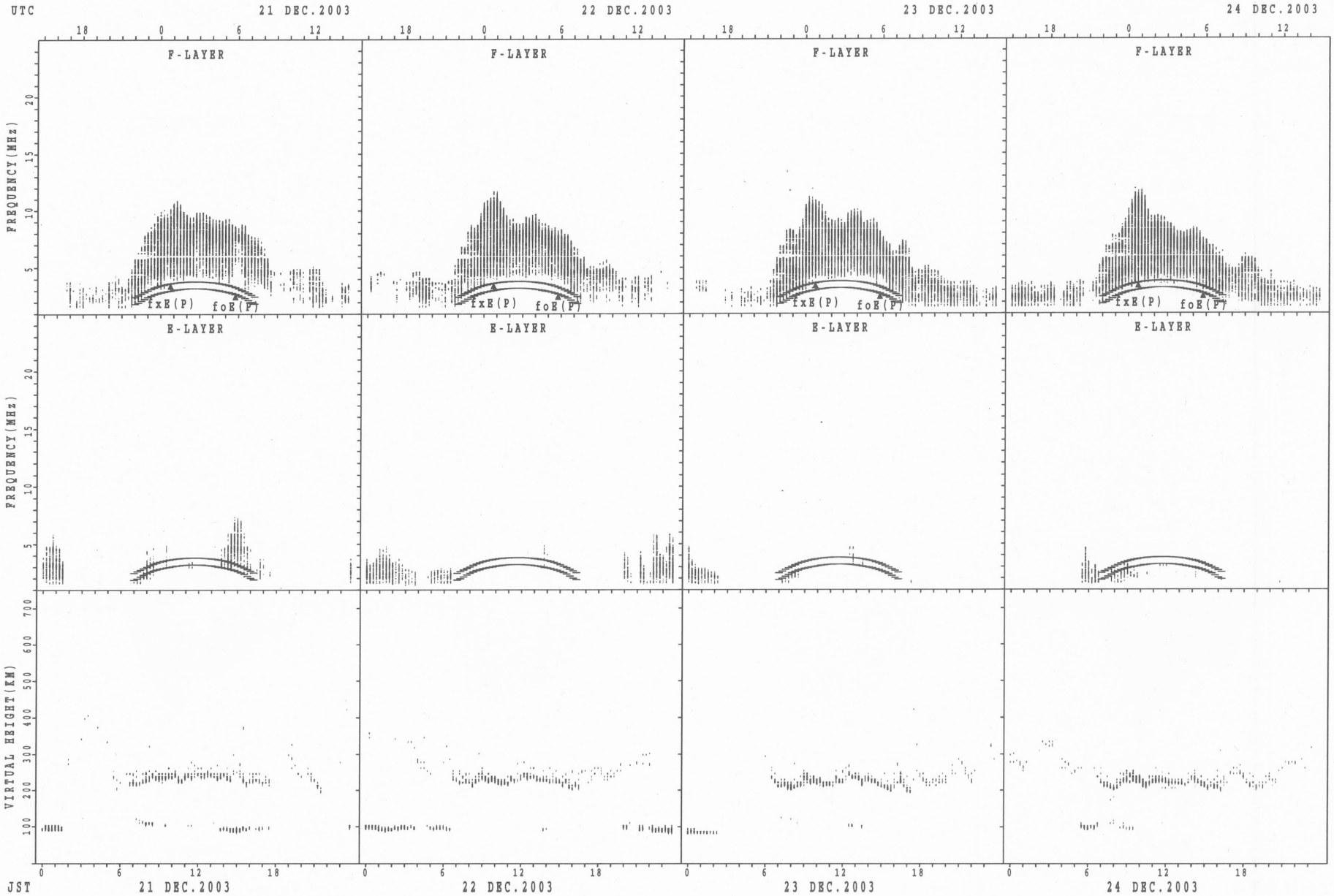
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



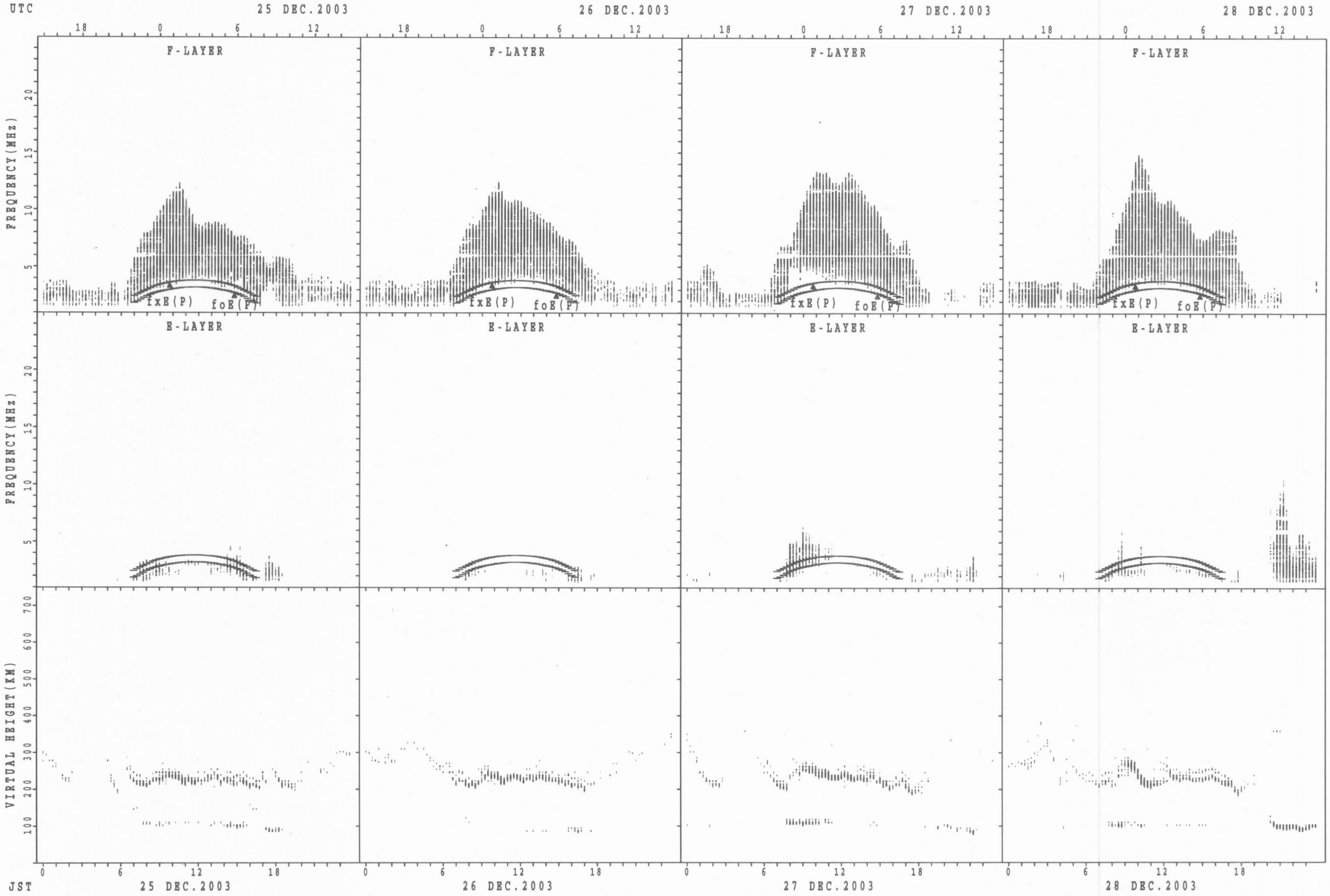
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



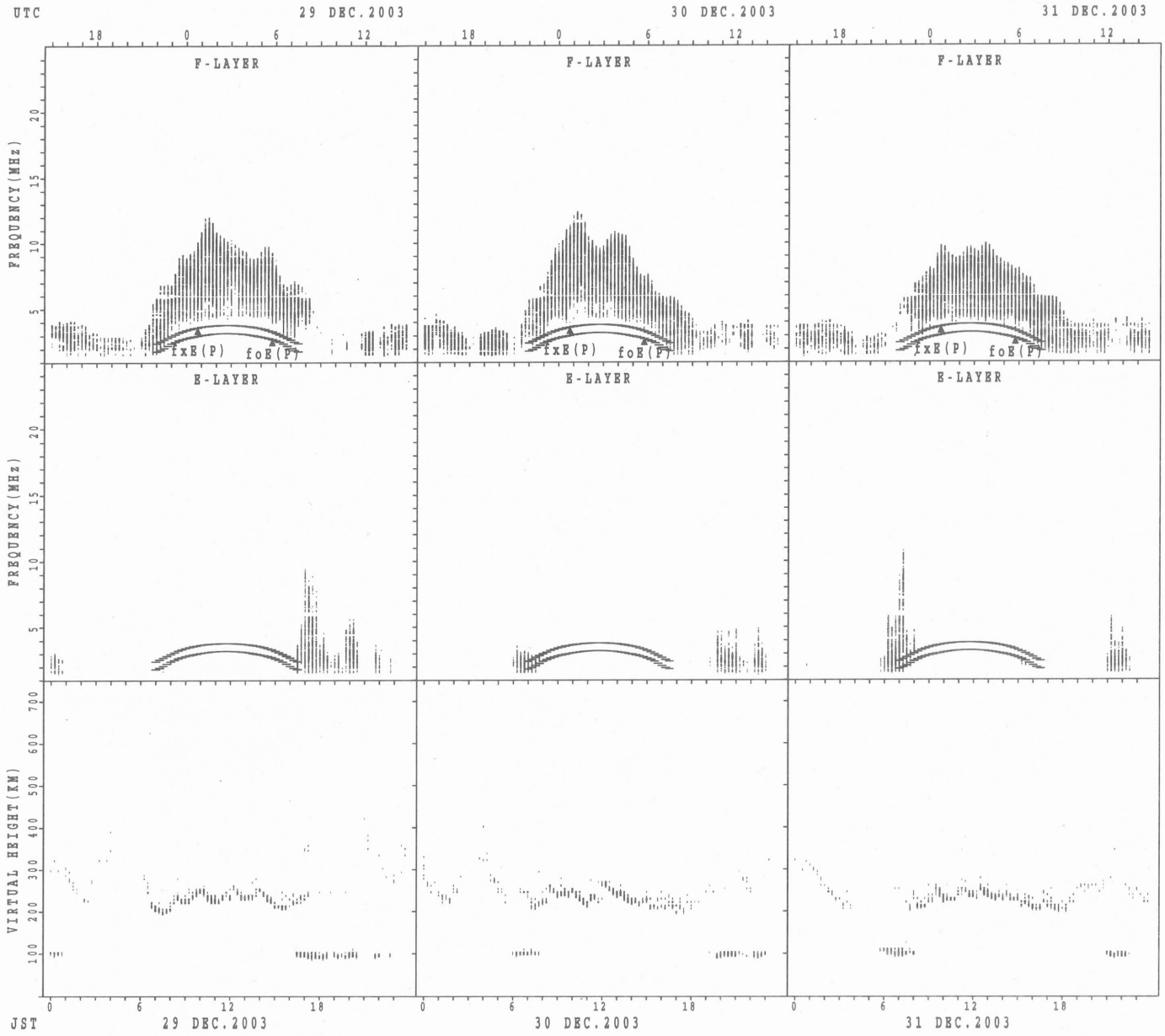
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



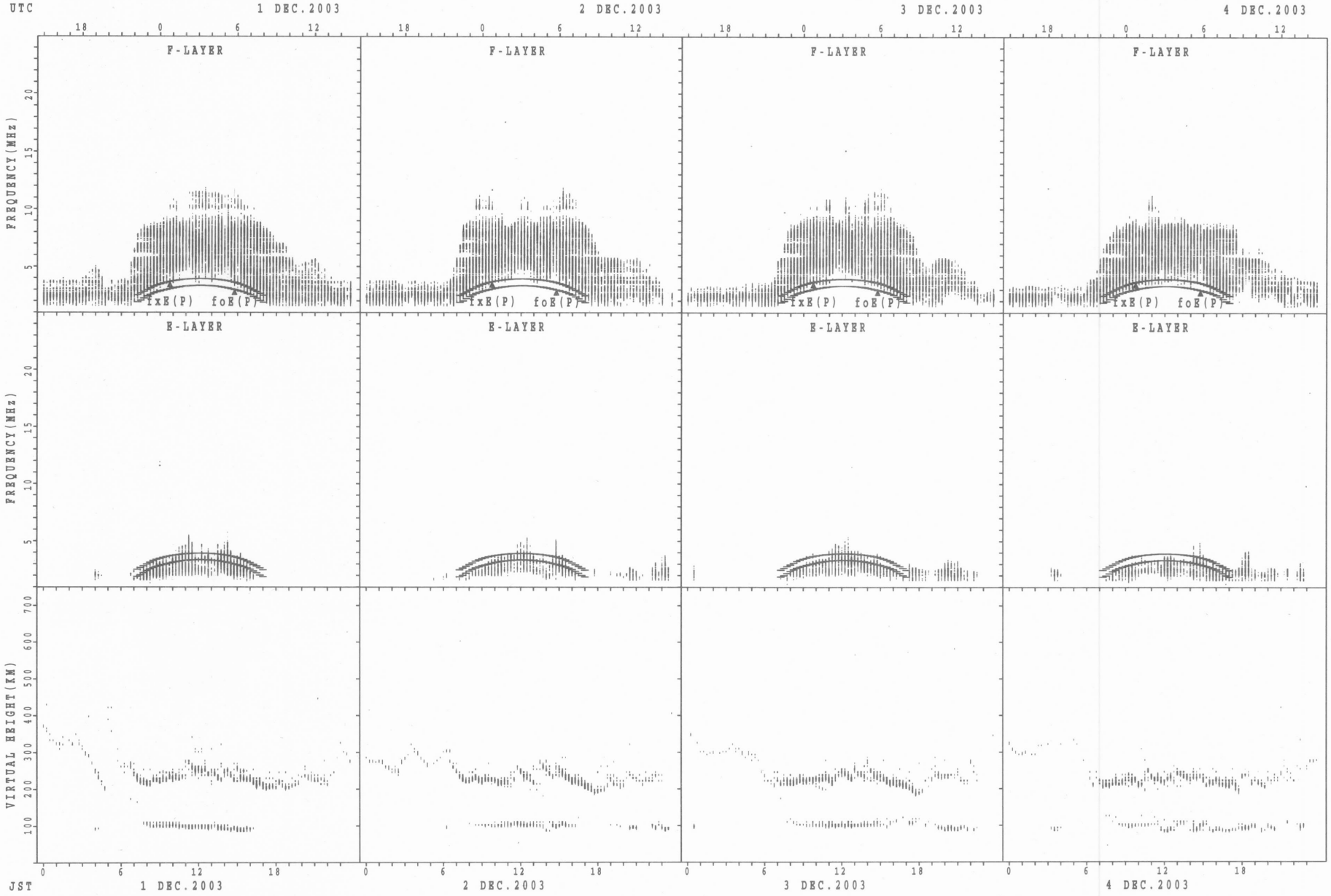
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



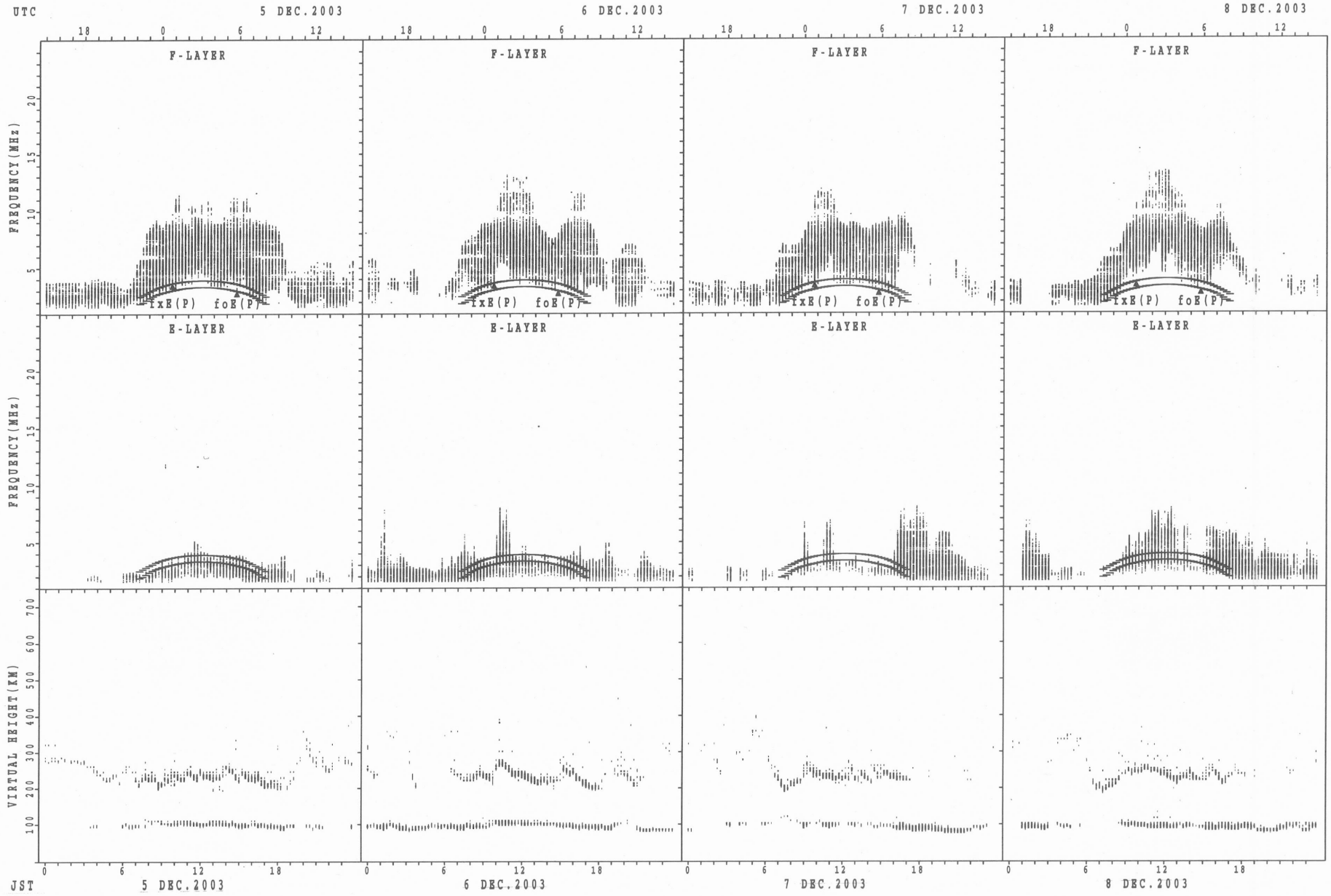
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa

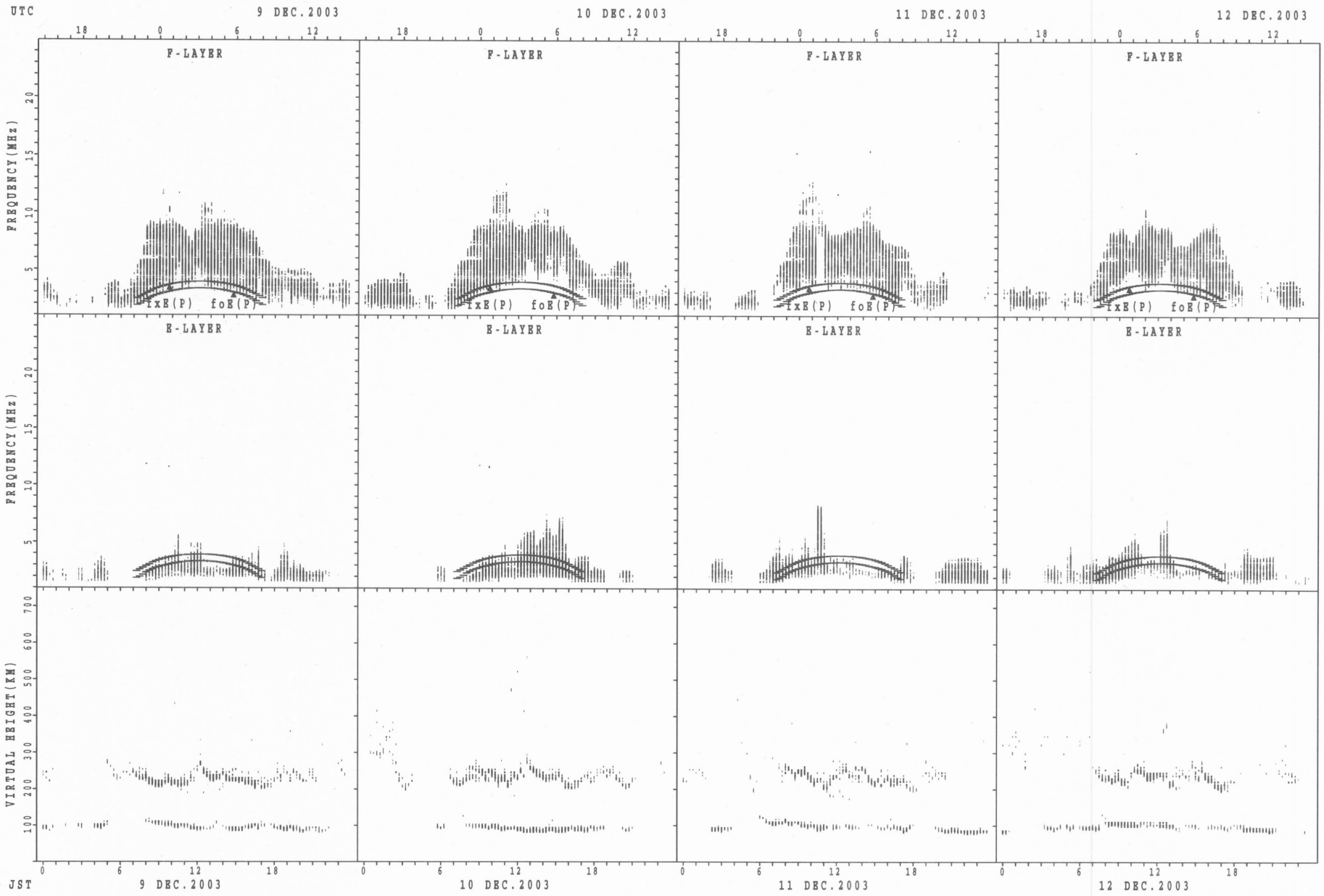


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

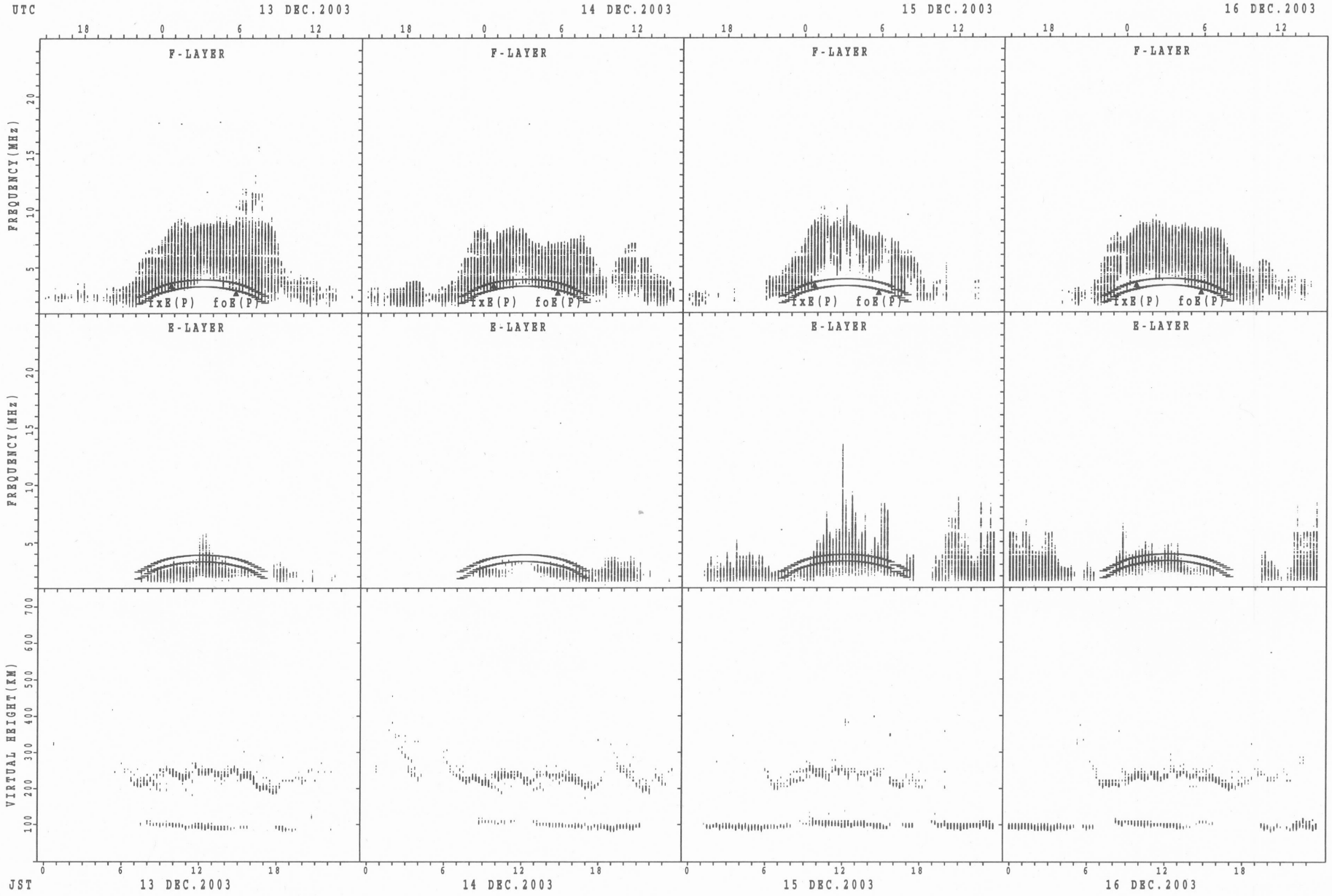
SUMMARY PLOTS AT Yamagawa



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

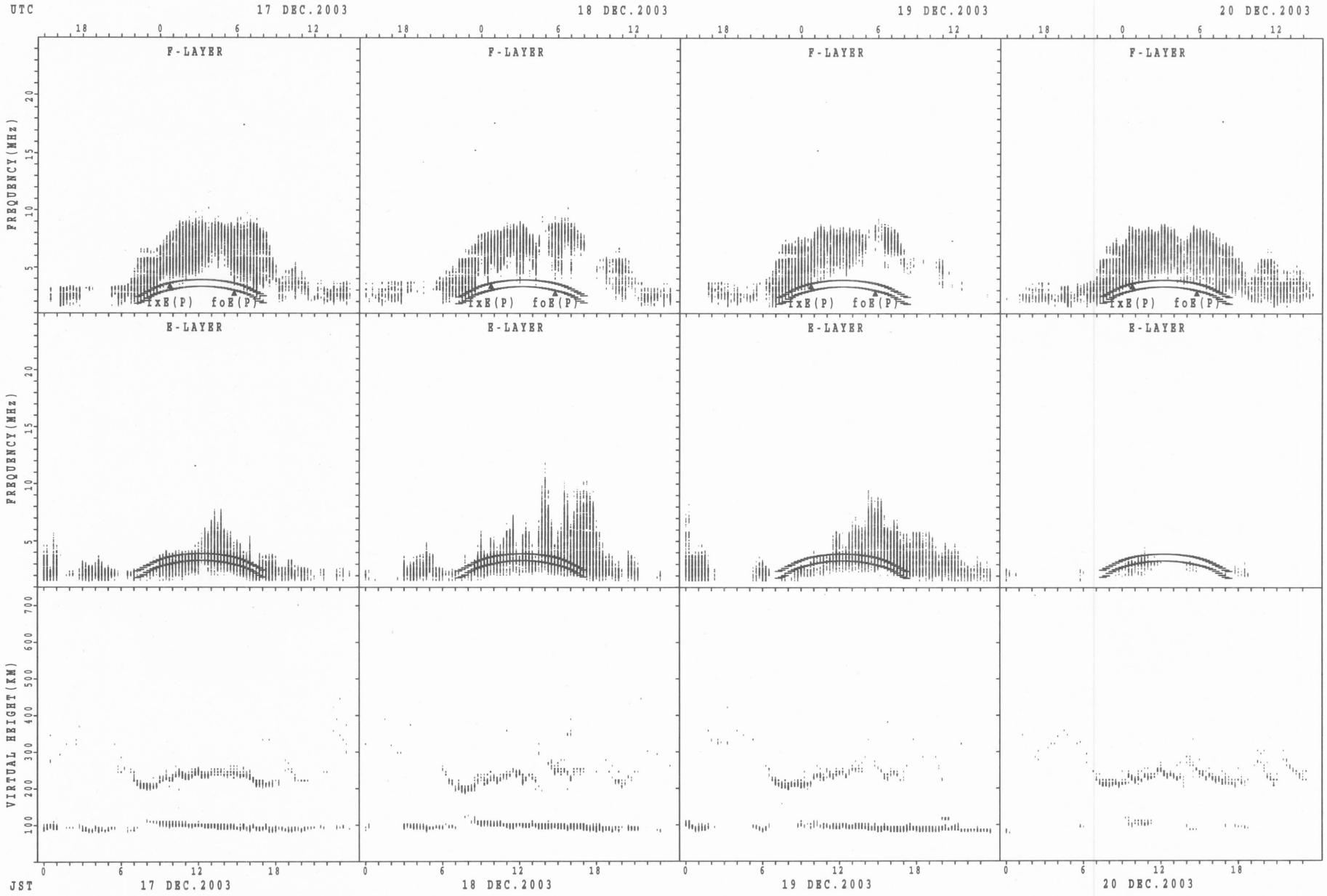

SUMMARY PLOTS AT Yamagawa
UTC
9 DEC.2003
10 DEC.2003
11 DEC.2003
12 DEC.2003
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



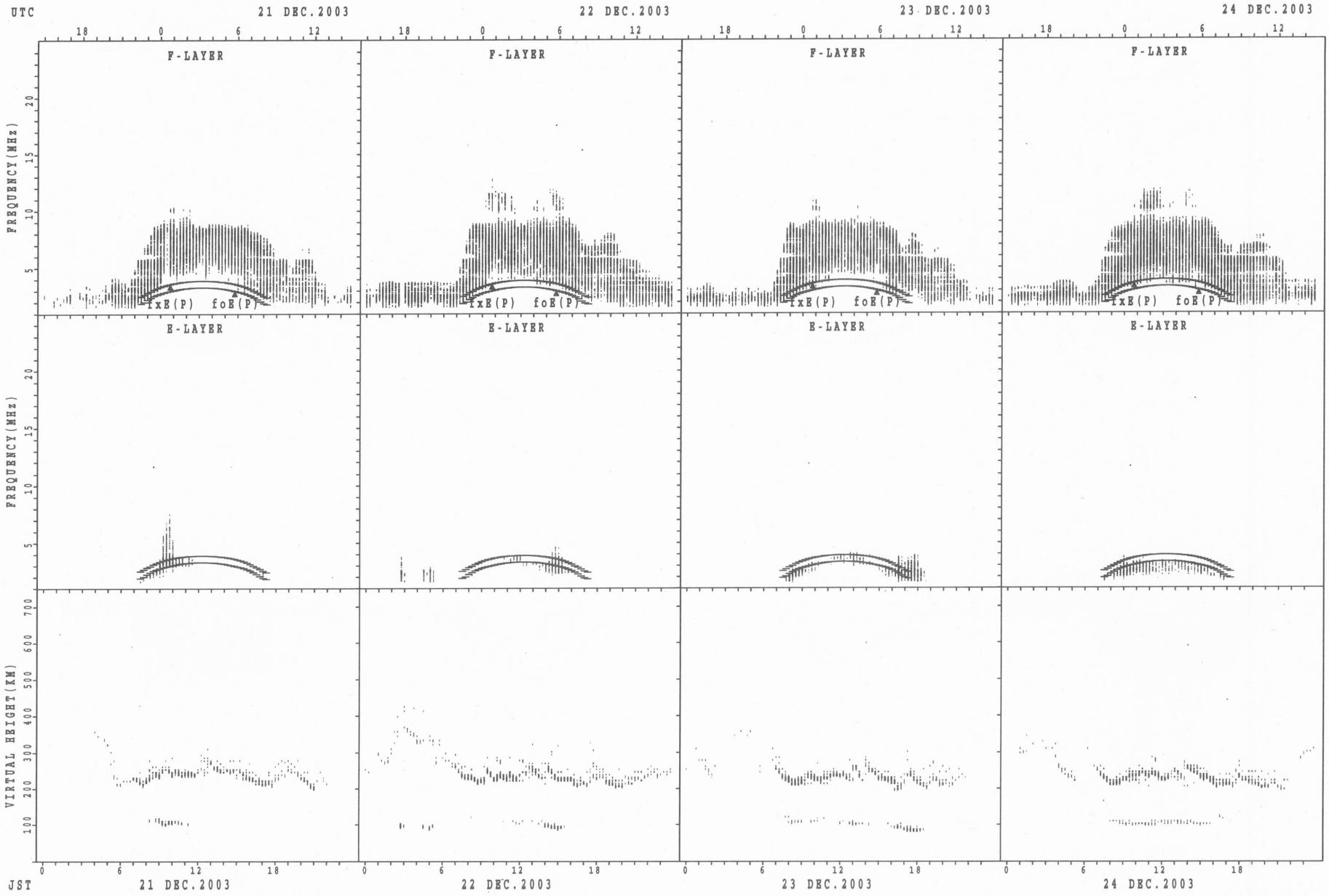
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



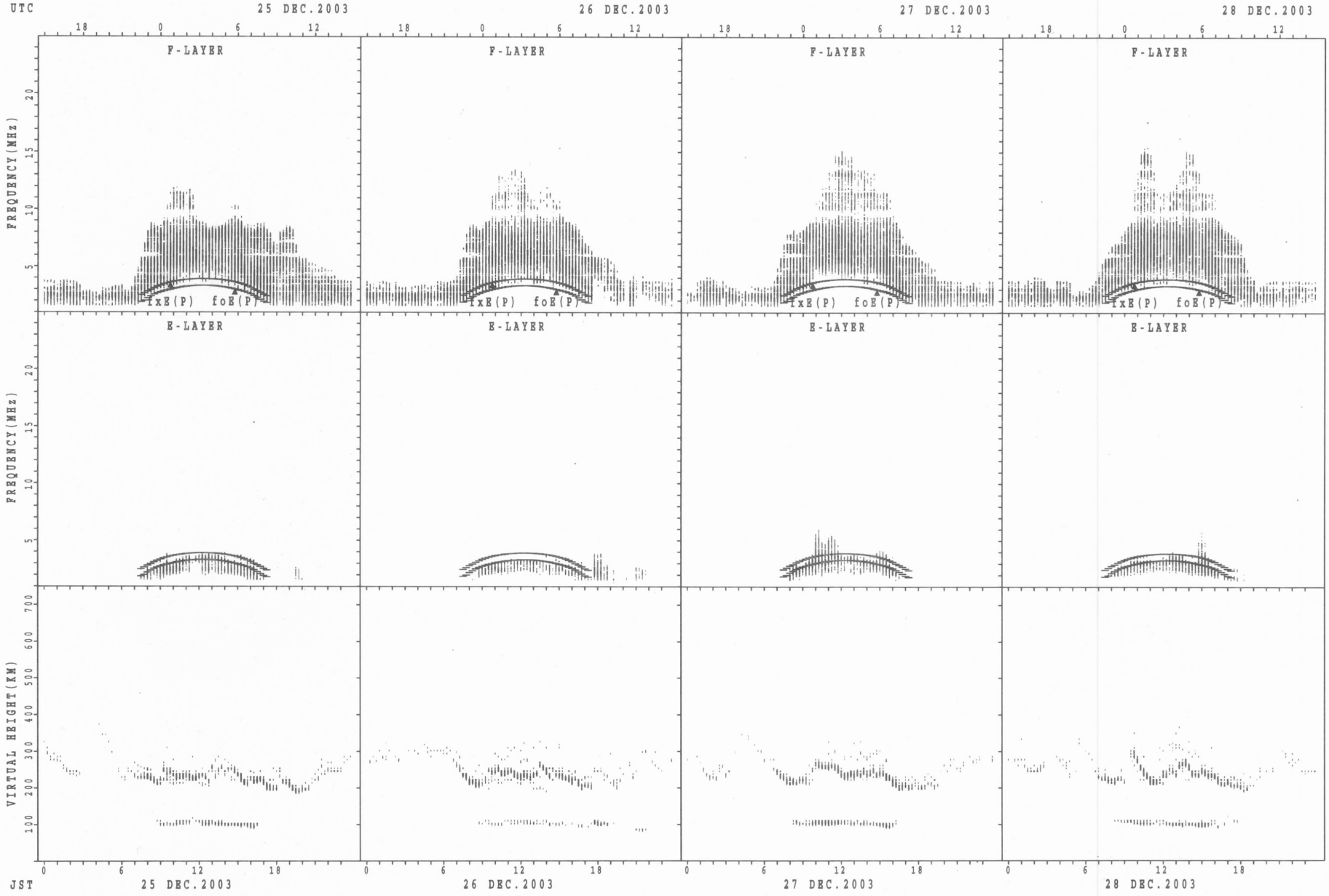
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



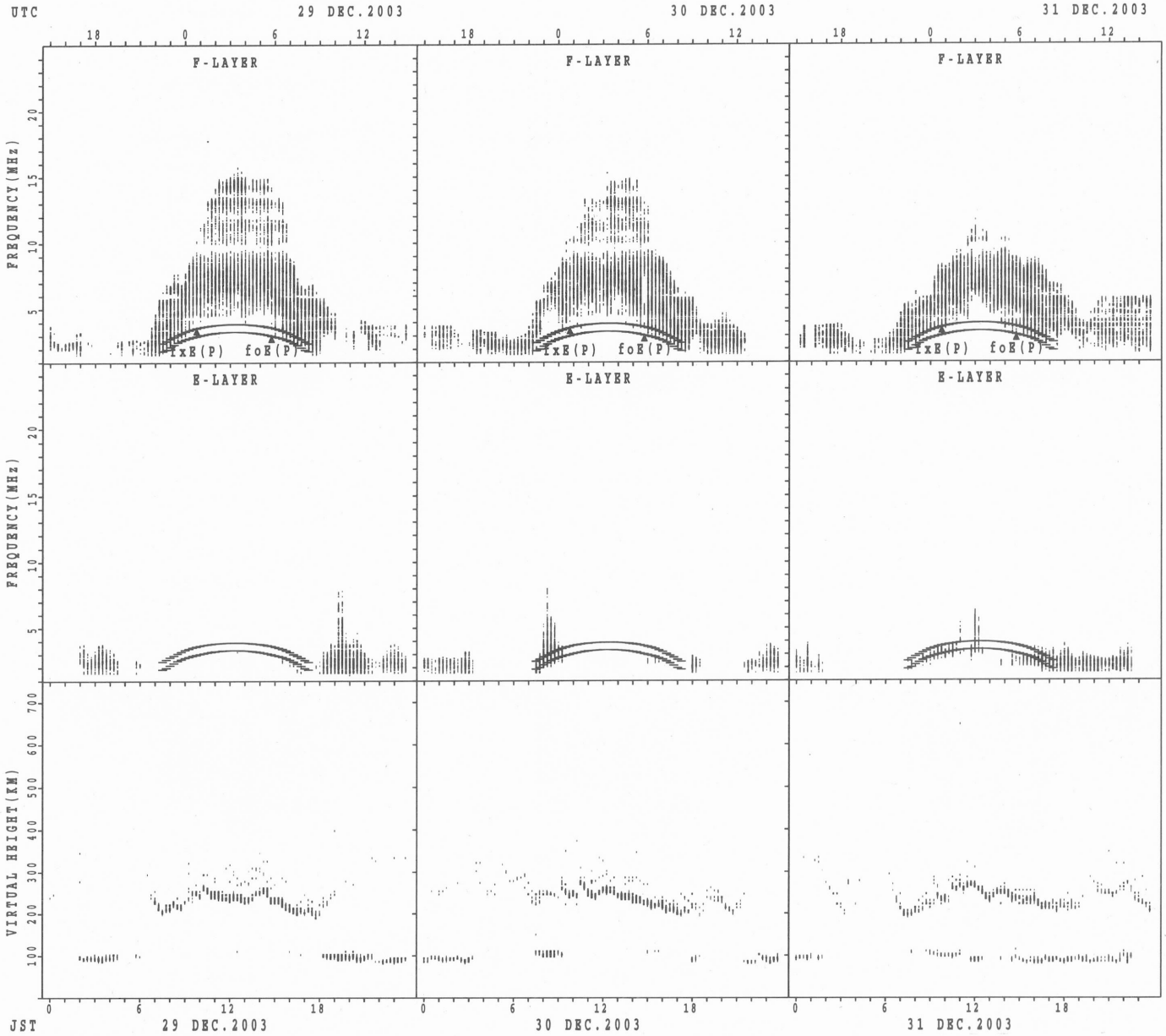
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



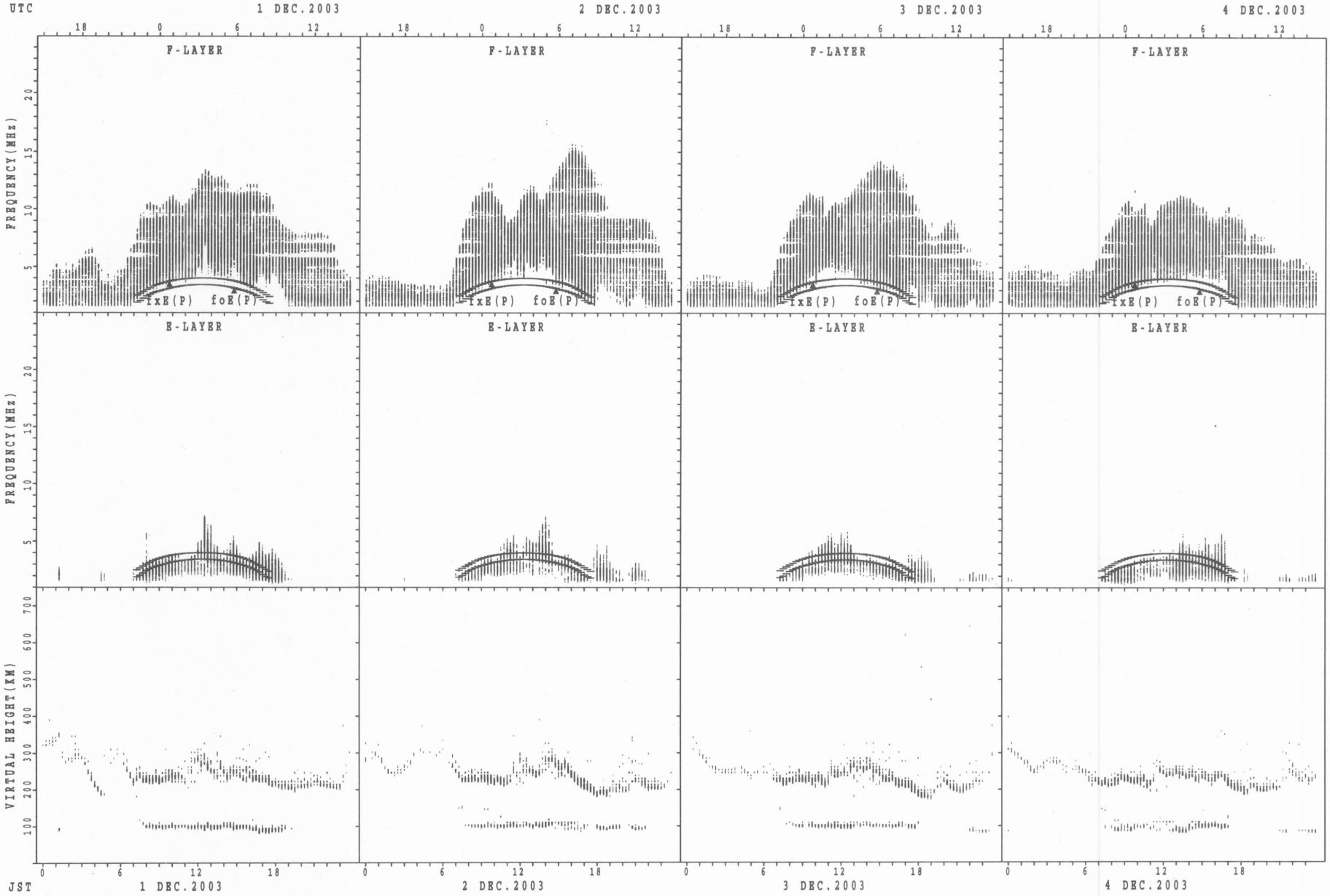
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



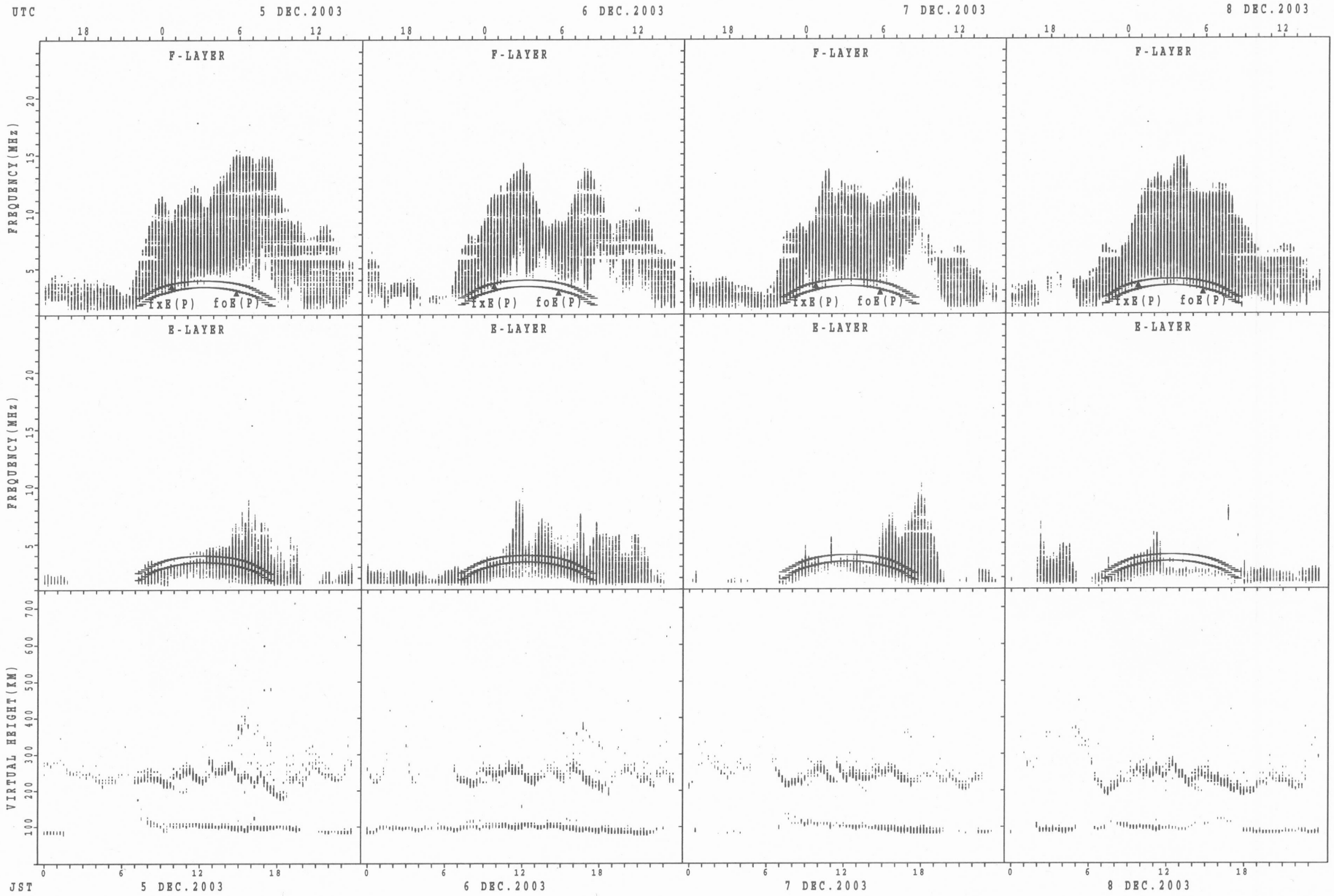
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



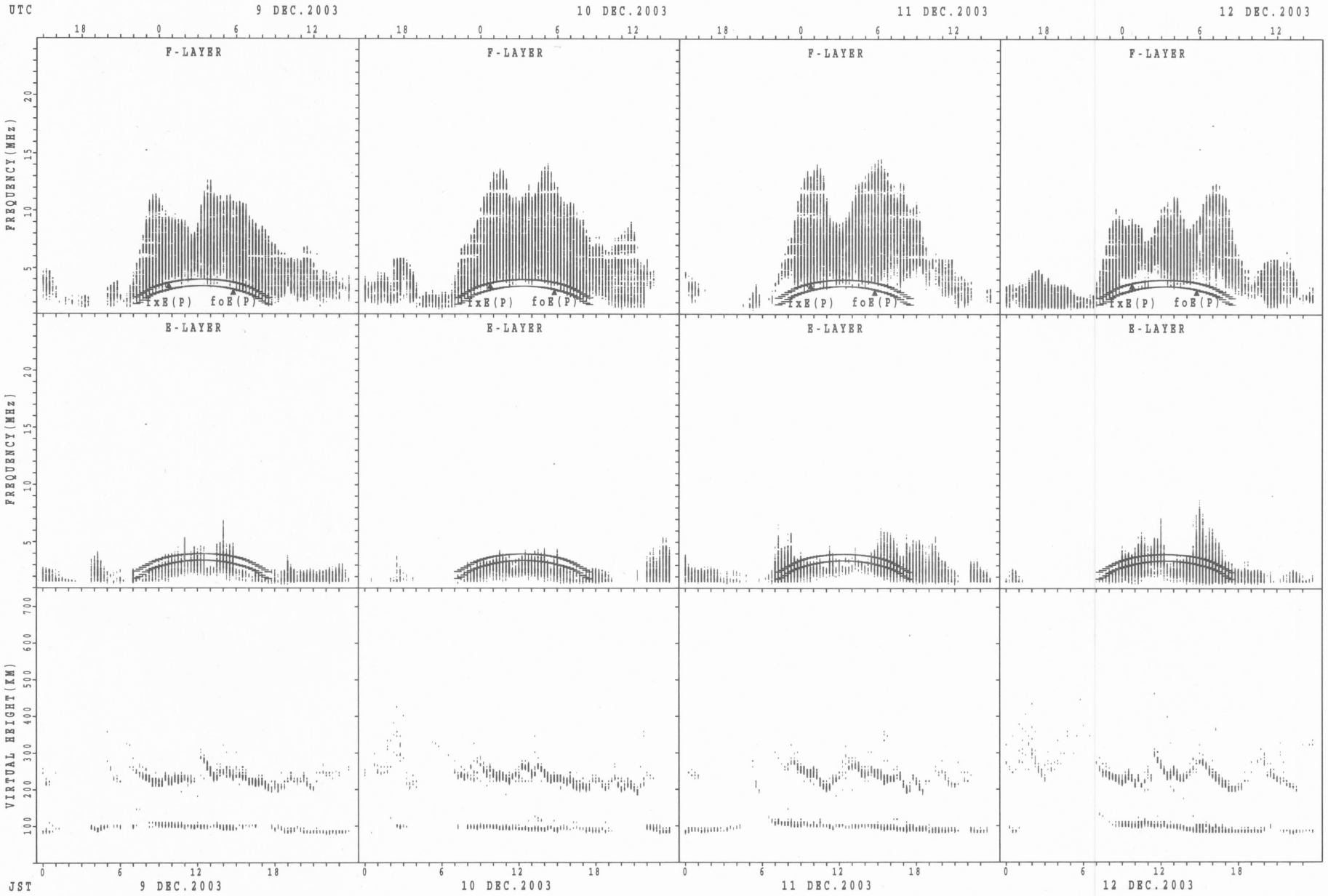
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



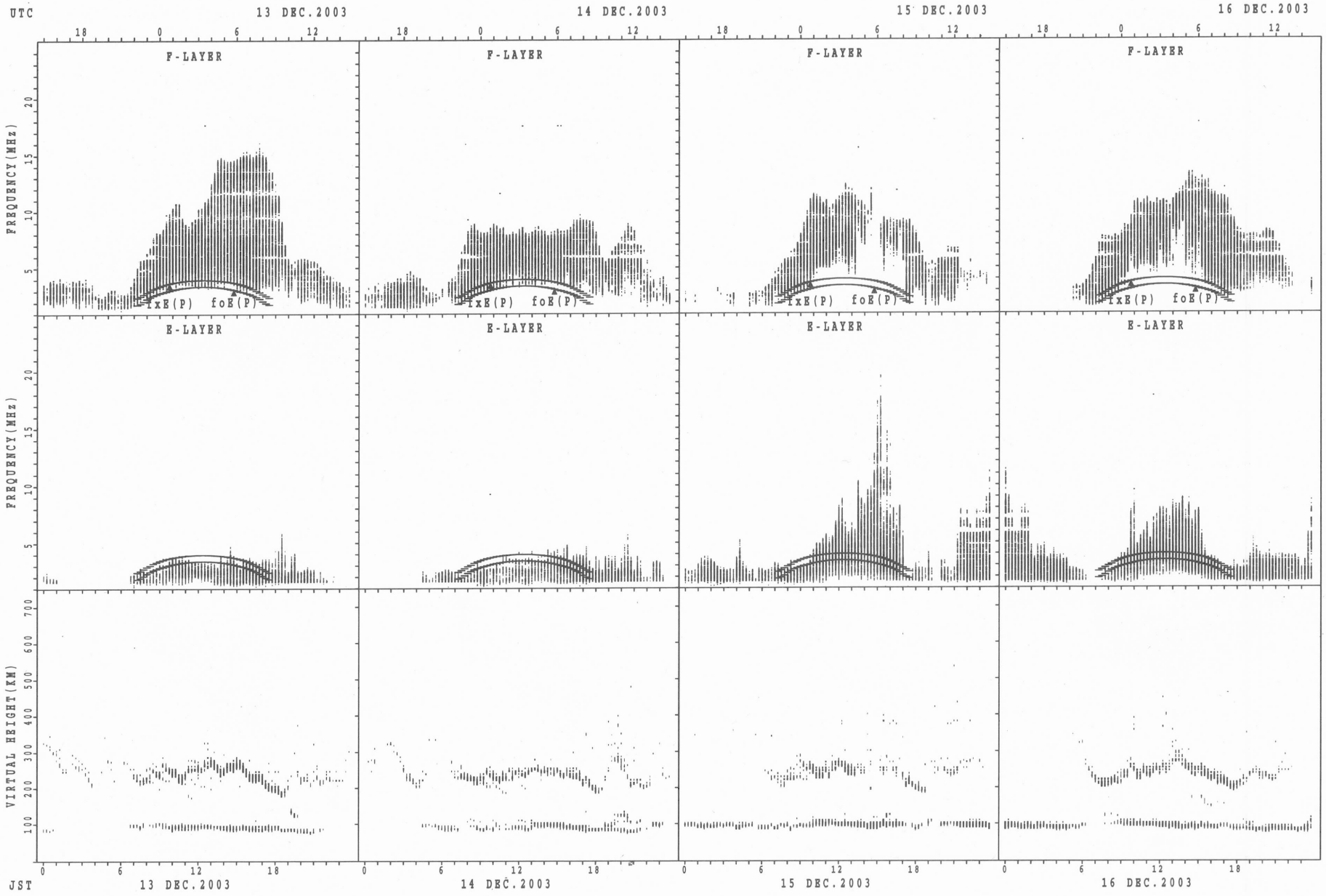
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



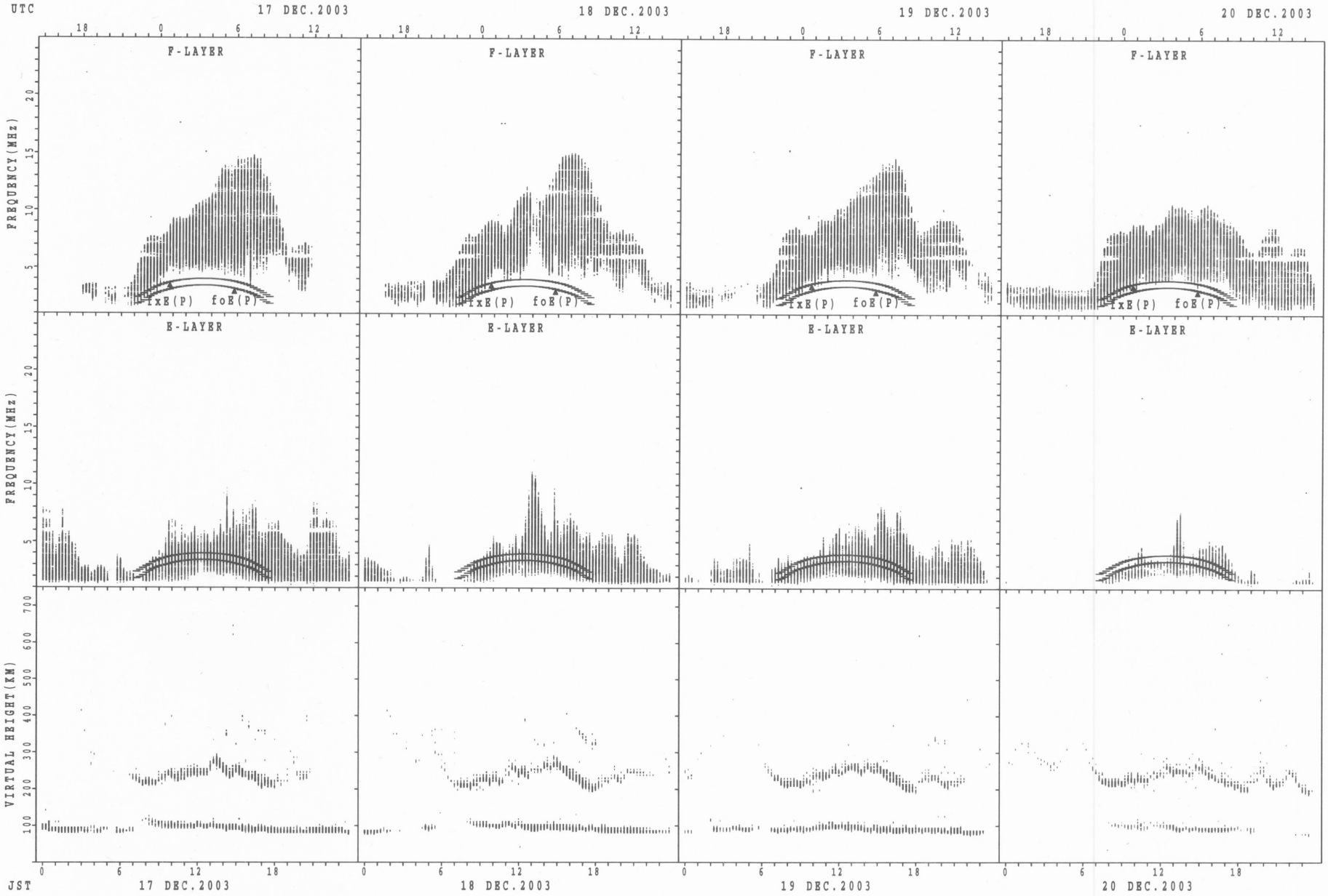
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



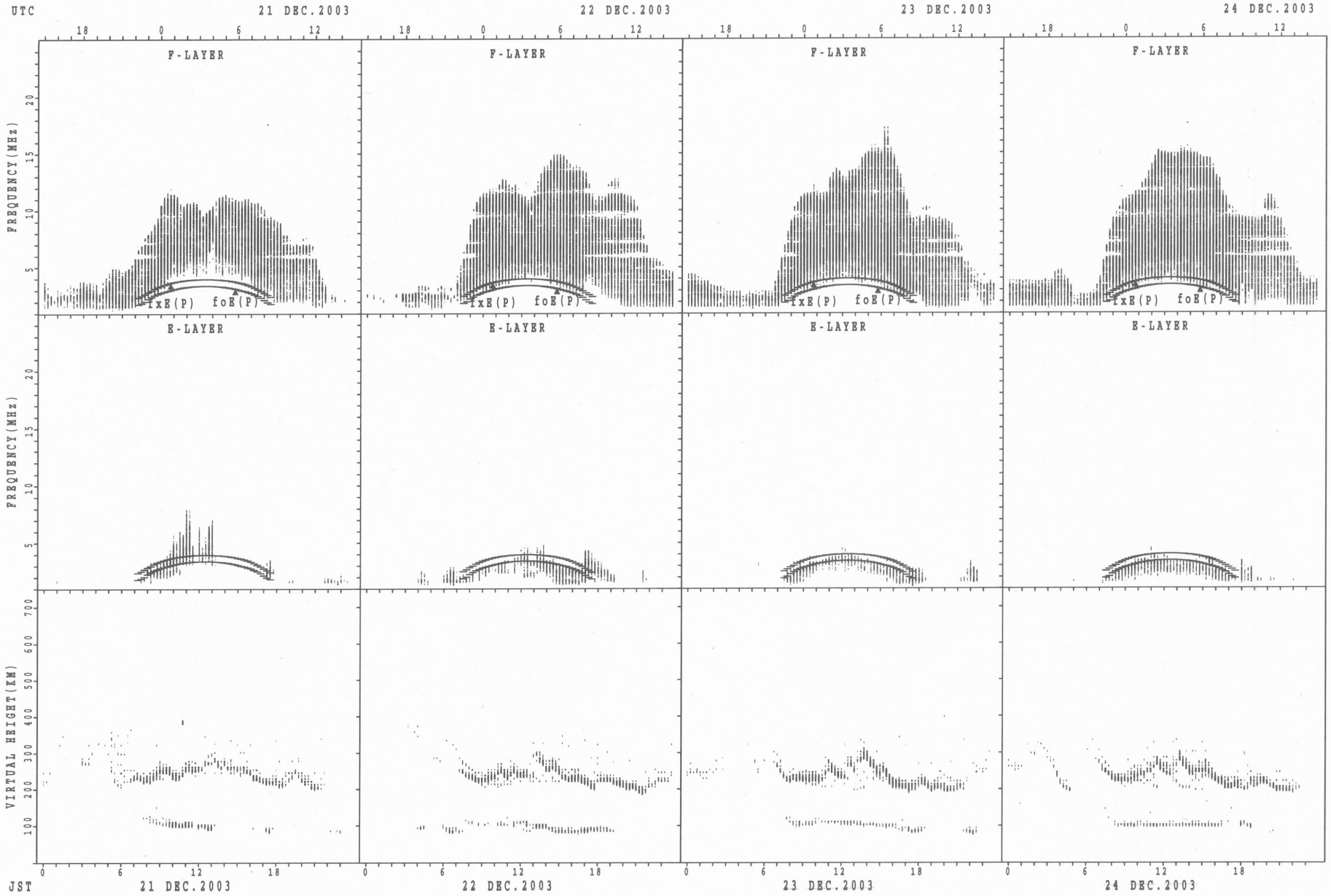
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



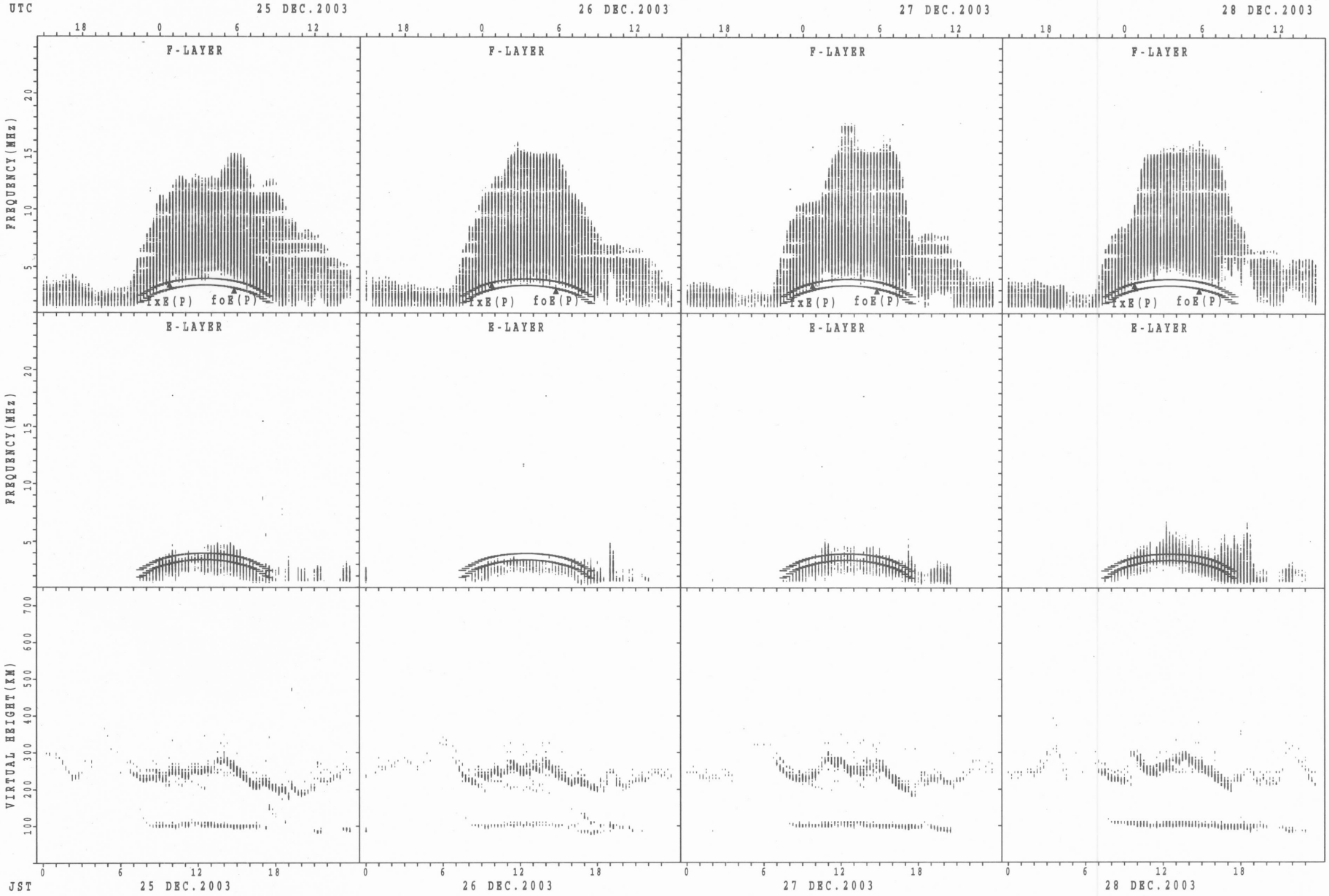
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



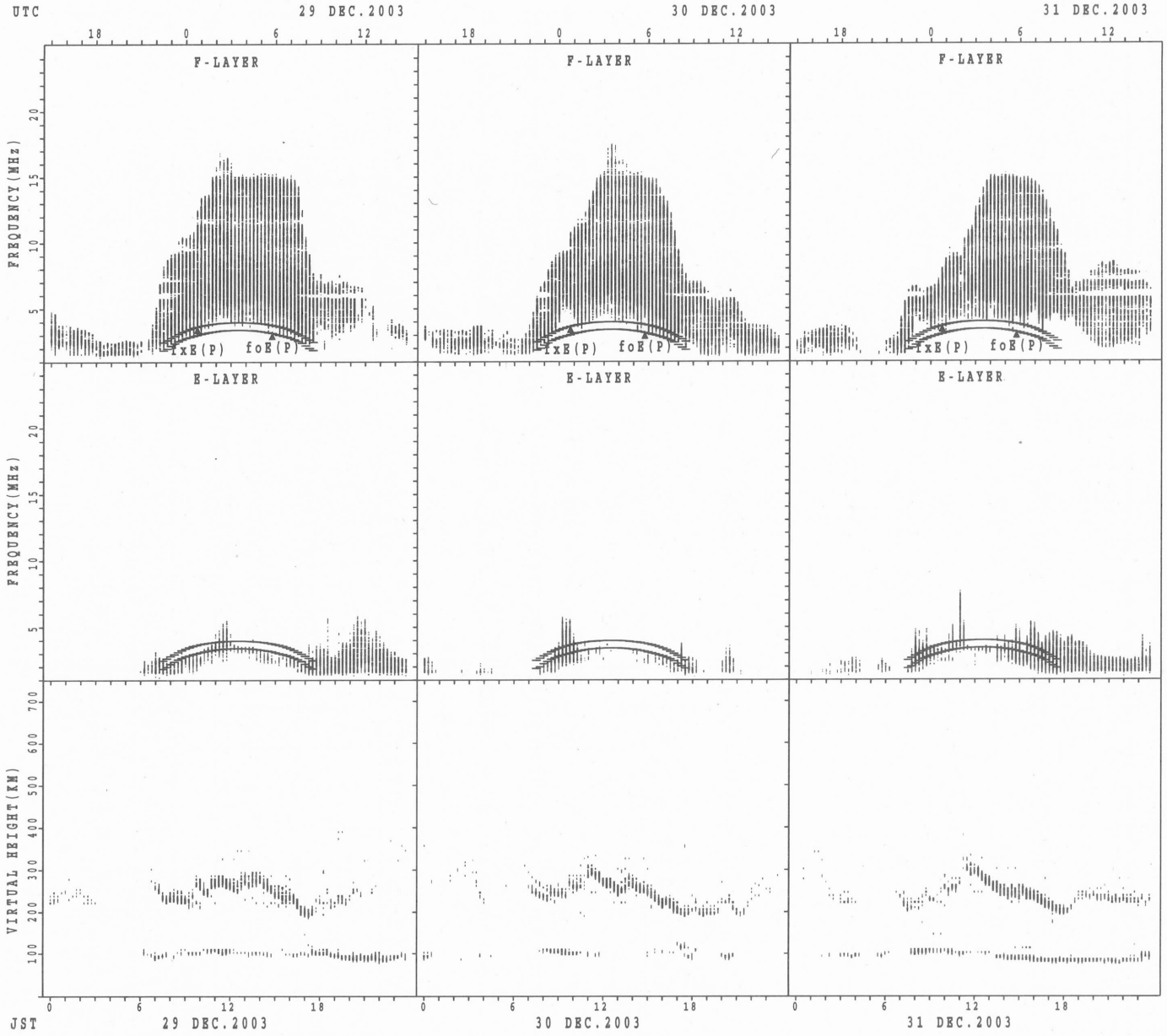
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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

MONTHLY MEDIANS OF h'F AND h'Es

DEC.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		1	1	1	1			1	26	27	28	30	29	29	30	24	6	3					1	
MED		208	302	234	216			482	230	222	225	222	226	230	228	227	248	248					294	
U Q		104	151	117	108			241	232	230	236	224	232	238	238	240	260	248					147	
L Q		104	151	117	108			241	220	214	219	214	217	223	222	222	246	190					147	

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	18	10	11	11	10	11	16	11	10	4	6	5	3	3	6	11	14	13	18	14	18	15	14
MED	95	94	96	95	97	106	103	102	105	98	98	96	103	97	107	99	95	99	99	99	95	97	97	95
U Q	97	103	105	103	105	109	115	107	109	103	102	97	126	111	181	107	99	103	105	103	99	101	103	99
L Q	91	89	91	91	91	101	97	97	97	95	95	95	95	87	89	89	89	95	94	95	95	95	95	93

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								9	25	31	31	31	30	30	31	30	20	4						
MED								240	230	238	230	226	232	238	238	234	236	238						
U Q								244	240	246	234	238	246	240	252	240	241	258						
L Q								224	223	222	222	216	224	234	230	226	226	228						

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	5	10	3	3	5	5	4	10	10	9	11	6	5	6	7	9	12	12	12	12	14	12	10
MED	100	95	95	99	99	99	103	103	105	107	105	99	96	103	94	97	97	94	93	99	98	99	97	96
U Q	101	97	97	99	101	100	107	106	107	109	112	107	97	114	97	107	97	97	96	99	101	103	102	101
L Q	96	91	95	97	97	97	99	100	103	103	95	97	93	88	87	91	93	92	90	97	95	91	91	91

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									23	26	27	31	31	30	23	29	28	14	3	2	1			
MED									230	233	234	230	240	236	248	244	234	226	244	354	240			
U Q									244	252	238	242	248	246	258	248	240	232	248	464	120			
L Q									224	224	224	224	234	230	234	230	230	222	220	244	120			

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	7	7	12	12	8	11	7	5	13	13	17	15	15	10	15	10	16	19	14	16	16	9	10
MED	93	97	97	95	95	96	97	95	107	107	103	103	99	99	96	99	95	95	93	92	94	91	89	90
U Q	95	97	97	97	97	104	103	97	115	112	106	106	105	103	105	103	97	97	97	95	96	95	97	103
L Q	89	95	95	91	93	92	95	91	101	104	103	98	97	95	95	91	91	91	91	89	89	89	87	87

MONTHLY MEDIANS OF h'F AND h'Es

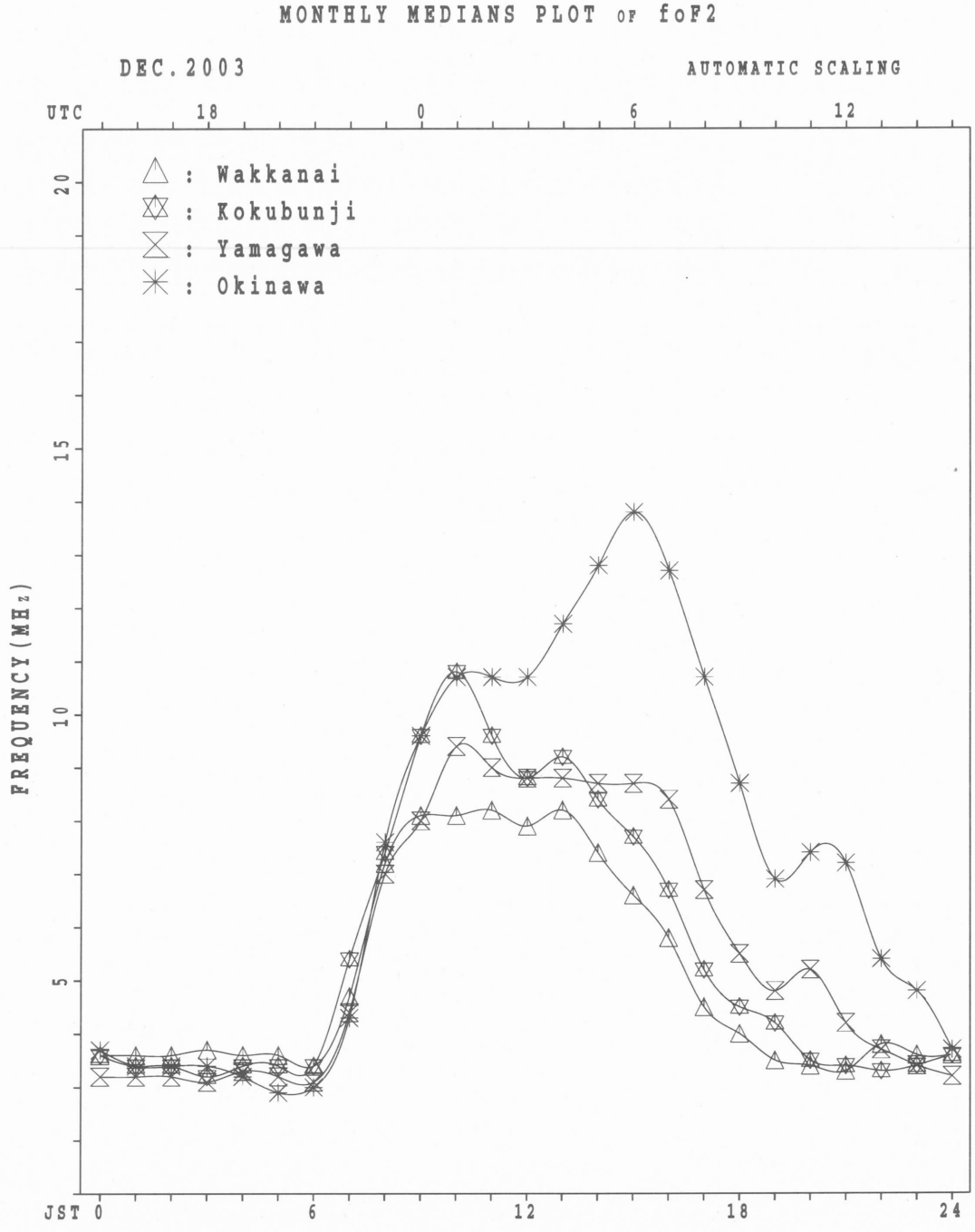
DEC.2003 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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								1	26	28	31	31		2	31	29	29	31	23	10	10	10	3	
MED								228	233	227	238	246		250	250	246	224	216	214	238	243	238	230	
U Q								114	242	240	246	254		260	262	255	235	222	234	256	264	248	272	
L Q								114	224	222	226	228		240	242	238	222	206	206	224	228	222	230	

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	7	7	7	8	6	7	11	7	13	17	21	19	19	18	18	18	18	29	21	18	15	14	15
MED	88	95	95	95	93	97	95	93	103	107	103	103	103	101	99	98	95	94	93	89	89	89	87	89
U Q	97	97	105	95	95	99	97	99	111	107	112	106	107	103	103	99	103	97	99	97	95	91	91	95
L Q	87	87	89	91	89	93	91	91	95	103	103	99	101	95	95	95	93	91	89	87	89	87	87	87


MONTHLY MEDIANS PLOT OF foF2
DEC. 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

DEC. 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 41	X 41	X 41	X 42	X 42	X 41	X 40											X 72	X 60	X 50	X 48	X 48	X 43	X 44
2	X 44	X 45	X 47	X 43	X 44	X 44	X 48											X 62	X 60	X 55	X 42	X 41	X 35	A
3	A	X 40	X 40	X 39	X 40	X 40	X 44											X 57	X 46	X 48	X 41	X 39	X 34	X 38
4	X 39	X 39	X 40	X 41	X 39	X 40	X 46											X 66	X 54	X 49	X 37	X 35	X 40	X 40
5	X 40	X 39	X 40	X 40	X 42	X 42	X 37											X 86	X 60	X 34	S 21	X 42	X 49	X 54
6	X 50	X 39	X 38	X 40	X 30	X 38	X 40											X 57	X 38	X 46	X 46	X 38	X 34	X 36
7	X 40	X 38	X 42	X 40	X 41	X 40	X 46											X 54	X 57	X 45	X 39	X 39	40	X 38
8	X 40	X 42	X 42	X 37	X 42	X 41	X 44											X 55	X 46	X 42	X 40	X 39	X 40	X 41
9	X 44	X 32	X 34	C	C	32	X 36											X 50	X 47	X 55	X 38	X 37	X 37	X 40
10	X 33	X 36	X 35	X 36	X 33	X 34	X 36											X 43	X 45	X 49	56	X 33	X 34	X 41
11	X 39	X 33	X 30	X 29	X 31	X 35	X 30											X 51	X 45	X 46	X 34	O X 32	X 34	45
12	X 40	X 40	X 38	44	43	44	X 40											X 48	X 45	X 43	X 33	A	X 44	X 36
13	X 44	X 43	47	X 38	X 38	X 39	X 37											X 56	X 52	X 41	X 30	A	X 40	X 31
14	X 36	X 36	X 38	X 38	X 36	X 36	X 39											X 45	X 38	X 46	X 42	X 40	X 39	X 40
15	X 37	X 36	X 33	X 32	A	X 30	X 36											X 47	A	A	A	X 33	X 37	X 38
16	46	X 42	X 34	X 28	X 32	X 31	X 31											A	A	X 42	X 35	A	X 41	X 42
17	X 31	X 33	X 33	X 34	X 32	X 33	X 39											X 60	X 52	X 56	X 37	X 34	X 35	X 36
18	X 38	X 39	X 40	X 40	X 39	X 41	X 48											X 49	X 49	X 51	X 34	A	X 35	X 38
19	A	X 39	X 39	X 37	X 38	X 39	X 43											X 56	X 55	X 44	X 40	X 36	X 36	X 40
20	X 39	X 42	X 43	X 40	X 42	X 45	X 42											X 56	X 51	X 52	X 52	X 46	X 51	A
21	A	A	X 41	X 38	X 38	X 40	X 37											X 71	X 48	X 51	X 54	X 55	X 33	X 41
22	44	X 46	X 41	X 43	X 47	X 41	X 38											X 59	X 56	X 56	X 43	X 45	X 47	X 43
23	A	X 42	X 34	X 34	X 35	X 36	X 38											X 70	X 52	X 50	X 41	X 40	X 39	X 34
24	X 38	X 41	X 38	X 38	X 40	X 40	X 40											X 54	X 65	X 55	X 47	X 39	X 40	X 36
25	X 40	X 40	X 36	X 33	X 33	X 36	X 30											X 62	X 62	X 60	X 42	X 46	X 42	X 40
26	X 41	X 42	X 40	X 37	X 38	X 42	X 42											X 56	X 46	X 41	X 36	X 39	X 40	X 39
27	X 42	X 50	X 49	X 29	X 31	X 31	X 33											X 75	X 46	X 29	X 34	X 36	A	X 40
28	X 41	X 40	X 38	X 38	X 40	X 38	X 34											X 84	X 49	X 32	X 34	X 37	X 42	X 41
29	X 40	X 42	X 42	X 34	X 32	X 30	X 34											X 68	X 42	X 31	A	X 35	X 38	X 40
30	46	X 43	X 38	X 33	35	X 38	X 32											X 60	X 44	X 38	X 41	X 40	X 40	X 40
31	X 41	X 40	X 42	X 40	X 30	X 31	X 33											X 64	X 51	X 43	X 43	X 44	X 45	X 43
	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	30	31	30	29	31	31											30	29	30	29	27	30	29
MED	X 40	X 40	X 40	X 38	X 38	X 39	X 38											X 57	X 49	X 46	X 40	X 39	X 40	X 40
U Q	X 44	X 42	X 42	X 40	X 42	X 41	X 42											X 66	X 56	X 51	X 43	X 42	X 42	X 41
L Q	X 39	X 39	X 36	X 34	X 32	X 34	X 34											X 54	X 46	X 42	X 34	X 36	X 35	X 38

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

IONOSPHERIC DATA STATION Kokubunji

DEC. 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

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	35	35	35	36	36	35	34	65	84	105	109	112	113	111	108	98	83	66	54	44	42	42	37	38
2	38	39	41	37	38	38	42	79	85	108	104	97	98	92	102	93	80	56	54	49	36	35	29	A
3	A	34	34	33	34	34	38	70	90	98	112	98	100	97	101	93	76	51	40	42	35	33	28	32
4	33	33	34	35	33	34	40	67	78	81	133	107	89	94	80	86	79	60	48	43	31	S 28	34	34
5	34	33	34	34	36	36	31	66	83	104	100	100	102	93	87	88	79	80	54	28	S	36	43	49
6	44	33	32	34	24	32	34	64	93	105	113	127	137	97	83	90	90	51	32	40	40	32	28	30
7	34	32	36	34	35	34	40	66	69	104	115	103	76	81	88	77	74	48	50	39	33	33	F	32
8	34	36	36	31	36	35	38	54	74	105	108	107	124	88	78	78	84	50	40	36	34	33	34	35
9	38	26	28	C	C	F 22	30	60	84	106	111	63	94	89	88	S 87	60	44	41	49	32	31	31	34
10	27	30	29	30	27	28	30	55	80	96	127	106	79	92	92	89	63	37	38	43	F	27	28	35
11	33	27	24	23	25	29	24	50	62	93	116	87	70	87	92	74	55	45	39	40	28	26	28	F
12	34	34	32	F	F	F	34	55	71	66	105	93	88	68	67	76	68	41	39	37	27	A	38	31
13	39	37	F	32	32	33	31	56	66	68	106	92	98	95	78	78	69	50	46	35	24	A	34	25
14	30	30	32	32	30	30	33	50	76	86	96	73	75	65	66	66	62	39	32	40	36	34	33	34
15	31	30	27	26	A	24	30	58	58	74	98	91	83	73	74	66		41	A	A	A	S 27	31	32
16	34	36	28	22	26	25	25	63	74	88	86	74	84	71	71	68	60	A	A	36	28	A	35	36
17	25	26	27	28	26	27	33	56	60	66	87	86	78	78	72	68	67	54	46	50	31	28	29	30
18	32	33	34	34	33	35	41	58	69	71	85	97	74	68	73	75	A	43	43	45	28	A	29	32
19	A	33	33	31	32	33	37	58	70	78	82	79	82	69	78	71	59	50	49	38	33	30	30	34
20	33	36	36	34	36	39	36	57	69	79	80	80	73	70	74	72	70	50	45	46	46	40	45	A
21	A	A	35	32	32	34	31	55	76	95	102	94	95	89	89	82	75	65	42	45	48	49	26	35
22	F	40	35	37	41	34	32	58	82	104	113	88	86	92	83	80	64	52	50	50	37	39	41	37
23	A	36	28	28	29	30	32	64	80	102	104	89	88	98	88	73	62	64	46	44	35	34	32	28
24	32	35	32	32	34	34	34	58	74	97	115	91	87	77	80	69	61	48	59	49	41	32	34	30
25	34	34	30	27	27	30	24	55	74	94	112	104	82	84	84	72	67	56	56	54	35	40	36	34
26	35	37	34	31	32	36	36	55	84	96	116	104	103	95	88	74	68	50	40	35	30	33	33	32
27	36	44	43	23	25	25	27	60	70	104	130	126	122	123	104	91	65	69	40	23	28	30	A	34
28	35	34	32	32	33	32	28	50	70	103	149	118	102	97	86	70	79	78	43	26	28	31	S 36	35
29	34	36	36	28	26	24	28	58	66	85	108	109	H 97	H 90	90	84	66	62	36	25	A	29	32	33
30	F	37	32	27	F	32	26	53	69	97	118	103	96	103	83	72	58	54	38	32	35	34	34	34
31	35	34	36	34	24	25	27	50	65	77	93	85	91	94	81	77	63	58	45	37	37	38	39	37
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	30	30	29	27	30	31	31	31	31	31	31	31	31	31	31	29	30	29	30	27	27	29	28
MED	34	34	34	32	32	32	32	58	74	96	108	97	89	90	83	77	67	51	43	40	34	33	33	34
U Q	35	36	35	34	35	34	36	64	82	104	115	106	100	95	89	87	78	60	50	45	37	36	36	35
L Q	32	33	30	28	26	28	28	55	69	79	98	87	82	77	78	72	62	48	40	36	28	30	29	32

IONOSPHERIC DATA STATION Kokubunji

DEC. 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											L	L		L										
2											L				L									
3												L	L	L										
4												L	A											
5												L			L									
6										L	L	L												
7										L		L	L	L										
8										L	L													
9										L	L		L											
10										L	L		L	L										
11									A	A	A	A	A	A	A									
12											A	L												
13											A	L 428	L	L										
14										L	L				L									
15												L	L											
16												L	L	A										
17											L	L	L	L										
18												A	A				A							
19										L	L	A	L	L	A									
20											L	L												
21										L				A										
22													L											
23										L		L												
24													L											
25											L													
26											L		L											
27										L	L	L	L	L										
28										L	L													
29											L		L	L	L									
30										L	L	L	L											
31												L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												1												
MED												L 428												
U Q																								
L Q																								

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

IONOSPHERIC DATA STATION Kokubunji

DEC. 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								180	U R 264	A	A	A	A	A	R	U R 268	192							
2								172	A	A	A	A	A	A	A	U R 260	A							
3								U R 196	R	A	A	A	A	R	A	248	B							
4								180	252	A	U A 316	A	A	U A 312	A	U A 256	U A 200							
5								176	U R 248	R	U R 316	A	A	U A 312	A	A	U A 184							
6								U R 184	A	A	A	A	A	A	A	A	A							
7								B	A	R	A	U R 324	R	R	R	B	A							
8								B	U R 276	R	B	A	A	A	A	A	A							
9								B	A	A	A	A	C	C	A	B	B							
10								B	A	A	A	U R 316	A	R	A	A	A							
11								A	A	A	A	A	A	A	A	B	A							
12								180	U A 228	A	A	A	R	R	R	U R 232	U R 232							
13								B	A	U R 272	A	A	R	U R 312	U R 276	A	A							
14								B	U R 220	U R 280	U R 296	R	A	A	A	A	A							
15								C	A	A	A	A	A	A	R	A								
16								B	R	R	A	A	U R 328	A	A	R	A							
17								B	240	A	A	A	U R 332	A	A	U R 260	A							
18								B	236	A	A	A	A	A	A	A	A							
19								B	248	U A 316	U R 332	A	A	A	A	A	A							
20								B	U R 284	A	B	B	B	B	B	B	B							
21								B	A	A	U R 336	A	A	A	A	A	A							
22								B	U R 252	U R 316	U R 336	R	B	B	A	A	U R 228							
23								B	U R 256	R	U R 332	U R 352	A	A	U R 320	B	B							
24								B	240	296	U R 328	U R 336	U R 352	U R 320	R	R	U R 212							
25								B	236	288	328	U R 356	U R 344	U R 324	U A 300	A	U R 224							
26								B	240	U R 280	320	R	R	U R 332	A	R	U A 192							
27								B	U A 252	A	A	A	A	U R 324	U R 304	U R 248	B							
28								B	A	A	A	R	U R 344	R	U R 308	U R 272	R							
29								B	R	R	B	B	B	B	B	B	B							
30								B	U R 248	R	B	B	B	B	B	B	U R 220							
31								B	A	R	B	B	B	U R 336	U R 308	U R 260	U R 196							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								7	17	7	10	5	5	8	6	9	10							
MED								180	U 248	U R 288	U R 328	U R 336	U R 344	U R 322	U R 306	U R 260	U R 206							
U Q								U R 184	U R 254	U 316	U R 332	U R 354	U R 348	U R 328	U R 308	U R 264	U R 224							
L Q								176	238	U R 280	U R 316	U R 320	U R 330	U A 312	U 300	U R 248	U A 192							

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

IONOSPHERIC DATA STATION Kokubunji

DEC. 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	E B 15	E C 28	18	E B 15	E B 16	E B 15	E B 15	G	G	35	J A 42	J A 44	J A 41	J A 37	G 24	G 20	G	E B 16	E B 15	19	E B 15	E B 15	E B 14	E B 16
2	E C 28	E B 16	E B 15	E B 14	E B 15	E B J A 17	18	21	28	J A 39	J A 41	J A 45	J A 46	J A 41	35	G 23	J A 33	J A 48	J A 32	J A 42	J A 19	J A 46	J A 23	J A 36
3	J A 54	18	E B 16	E B 15	E B 14	E B 15	E B 14	G	G 23	32	J A 37	J A 41	J A 35	G 28	33	30	21	J A 20	J A 27	24	J A 51	J A 22	J A 32	J A 30
4	J A 23	E B 15	E B 15	E C 28	E B 17	E B 15	E B 16	23	G	31	35	J A 45	J A 68	36	J A J 43	A J 29	A J 28	A J 21	A J 22	A J 32	A J 23	E B 14	E B 15	B 19
5	E B 15	19	J A 26	19	18	J A 30	19	20	G	G 27	G J 27	A 38	38	J A 31	33	J A 37	J A J 36	A 20	20	20	23	J A J 32	A 24	J A 24
6	J A J 21	A 21	20	18	E B 15	E B 14	19	G	27	J A J 48	A 42	35	37	34	33	J A 32	23	J A 24	A J 21	A J 23	A J 18	E B 15	E B 15	J A 22
7	J A 26	J A E 17	B 16	J A J 17	A J 19	A J 24	A J 23	21	J A 74	G 26	35	G 26	G	G	G E 28	B	23	J A 28	A J 34	A J 26	A J 20	A J 23	A J 22	A J 28
8	J A J 34	A J 24	A J 35	A J 23	A J 20	A E B 15	J A E 18	B 20	G 27	G	E B J 32	A 74	J A J 97	A J 82	A J 62	A J 49	A J 44	A J 43	A J 28	A J 24	A J 30	A J 43	A J 38	A J 33
9	J A 23	J A J 23	A 23	C	C	E B 16	E B 15	B 16	J A 46	J A 44	J A 38	A J 48	E C 36	E C 50	J A 36	E B 32	E B 21	E B 16	B 20	J A 25	E B 16	18	19	22
10	J A 22	J A E 16	B 14	E B 14	E B 15	E B 14	E B 16	22	J A J 41	A J 44	A J 66	G 27	J A 46	G 29	J A J 52	A J 44	A J 44	24	E B J 15	A 18	E B 14	J A J 31	A J 26	A J 24
11	J A J 27	A J 31	A J 22	A J 19	A E 15	B E 14	B J 19	A J 42	A J 172	A J 84	A J 48	A J 42	A J 47	A J 60	A J 45	A E 33	B J 33	A J 30	A J 28	A E 28	C J 26	A J 24	A J 26	A J 20
12	E B 19	J A J 22	A J 32	A J 25	A J 23	A J 24	A E B 15	G	J A J 53	A J 46	A J 48	A 36	G	G	G	G	G	J A J 28	A J 43	A J 34	A J 29	A J 46	A J 33	A J 19
13	E B 15	E B J 15	A E 27	B 14	18	E B 15	E B 15	21	J A 35	G 21	J A J 61	A 43	G 27	G 25	G	28	J A J 43	A J 45	A J 39	A 20	E B 15	J A J 29	A E 26	B 15
14	E C 28	E B J 15	A E 23	C 28	E B 16	20	E B 15	B E 17	G	G	G 24	G 26	36	33	J A 38	J A 27	J A 21	19	J A J 20	A J 25	A J 31	A J 24	22	21
15	E B 15	E B 15	E B J 15	A J 25	A J 54	A J 26	A J 19	A E C 28	J A 29	33	J A J 96	A 48	J A J 42	A J 46	G	28		J A J 33	A J 61	A J 106	A J 44	A J 54	A J 33	A J 62
16	J A 29	E B J 16	A 28	J A 18	A J 20	A J 19	A E 15	B E 18	G	G J 27	A J 66	A 47	G J 27	A J 44	A J 37	A G 26	J A J 44	A J 80	A J 89	A J 33	A J 24	A J 102	A J 45	A J 48
17	J A J 20	A J 23	A J 25	A J 17	E B 15	E B 15	B E 14	B E 16	G	J A 43	34	J A 60	G 31	38	J A 36	G 22	J A J 29	A J 24	A J 24	A J 23	A J 19	A J 17	E B 15	J A 24
18	J A J 53	A J 28	A J 33	A J 23	A J 24	A J 24	A J 21	A 18	27	J A 44	J A 56	A J 70	J A J 71	A J 47	A J 88	A 50	J A J 68	A J 23	A J 30	A J 43	A J 35	A J 44	E B 16	J A 61
19	J A J 75	A J 24	A J 46	A 22	J A 26	E B 16	J A 18	A J 27	G 21	34	G J 27	A J 74	J A 47	39	J A 58	A J 53	A J 56	A J 40	A J 28	A J 20	A E B 20	17	18	E B 17
20	E B 15	J A E 26	B 16	E B 15	E B 29	J A 14	E B 15	E B 20	G	J A 46	E B 37	E B 41	E B 44	E B 45	E B 43	E B 35	E B 29	E B 20	B 22	J A 34	A J 20	A J 27	A J 28	A J 46
21	J A J 40	A J 48	A 20	E B 15	E B 15	E B 15	E B 15	E B 15	J A 42	32	E B 22	J A 44	A J 42	A J 55	A J 43	A J 74	A J 46	A J 37	A 27	E B 16	E B 16	E B 16	20	E B 14
22	J A J 40	A J 42	A J 33	A J 26	A J 19	A J 22	A J 24	G	G	G	G	G	E B 42	E B 42	B J 45	A J 32	G	23	18	E B 15	J A 52	A J 24	A J 26	A J 42
23	J A J 46	A J 26	A J 28	18	E B 15	E B 15	E B 14	B E 20	G	G	G	G	37	38	G E 30	B	E B 28	B J 19	A E 14	B E 14	B E 16	B 19	E B 16	E B 15
24	E B 15	E B 14	E B 14	E B 14	E B 16	E B 15	B J 32	A E 15	G	34	G 26	G	G 27	G 28	G	G	G	E C 28	E B 16	22	E B 16	19	18	E B 15
25	E B 15	E B 15	E B 14	E B 16	E B 16	E B 14	E B 16	21	29	33	G	G 34	G 32	G 29	34	J A 35	G E 20	B 15	J A E 26	B 15	J A 17	E B 15	B 16	E B 14
26	E B 16	E B 16	E B 14	E B 14	E B 15	E B 14	E B 13	B E 15	G	G	G	G	G 26	G 29	34	G	25	J A 22	J A 19	19	E B 13	E B 13	B E 15	B E 15
27	J A 22	E B 14	E B 14	E B 14	E B 15	E B 15	E B 15	E B 17	J A 45	J A J 58	A J 47	A 44	38	G	G 29	G 23	E B 23	E B 15	B E 15	J A 22	A J 26	A J 27	A J 34	A 18
28	19	18	E B 14	E B 16	B J 21	A 20	E B 15	E B 15	J A 34	34	J A 38	G 27	G 32	G 30	G 27	G 24	G	E B 14	E B 16	B E 16	B E 14	B J 102	A J 45	A J 84
29	J A J 28	A J 19	A E 16	B E 14	B E 14	B E 16	B E 15	B E 15	G 26	G	E B 34	B E 40	B E 40	B E 36	B E 38	B E 34	B E 28	B J 102	A J 45	A J 28	A J 54	A J 15	E B 27	A E 15
30	J A 20	E B 15	E B 15	E B 13	E B 15	E B 14	B J 31	A J 28	G	G	G	E B 39	E B 39	B E 40	B E 35	B E 29	G	E B 14	J A 19	J A 17	A J 42	A J 46	A J 24	A J 27
31	E B 16	J A 18	E B 16	E B 15	E B 15	E B 15	B J 25	A J 87	A J 46	G 28	E B 36	E B 36	E B 36	G	G	G	J A J 21	A 18	E B 15	B 16	J A J 17	A J 26	A J 52	E B 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	30	30	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	J A 22	18	18	E 16	E B 16	E B 15	E B 16	E G 18	G	33	36	J A 41	37	U 34	34	28	24	23	J A J 22	A J 22	A J 20	A J 24	A J 24	A J 22
U Q	J A J 29	A J 24	A J 27	A J 22	A J 20	A J 20	A J 19	A 21	J A 41	J A J 44	A J 47	A J 45	J A J 44	A J 44	A J 43	A J 35	J A J 36	A J 33	A 30	J A 28	A J 30	A J 43	A J 32	A J 33
L Q	E B 16	E B 15	E B 15	E B 14	E B 15	E B 15	E B 15	B E 17	G	G	G	G	G	G	G	G	G	E B 21	E B 19	B E 18	B E 18	B E 16	B E 17	B E 16	B E 15

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

IONOSPHERIC DATA STATION Kokubunji

DEC.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	E B 15	E C 28	E B 15	E B 15	E B 16	E B 15	E B 15	G	G	33	34	35	35	35	G 24	G 19	G	E B 16	E B 15	E B 14	E B 15	E B 15	E B 14	E B 16
2	E C 28	E B 16	E B 15	E B 14	E B 15	E B 14	E B 15	20	27	32	34	35	35	32	32	G 22	30	41	E B 14	34	17	18	E B 14	A A 36
3	A A 54	E B 15	E B 16	E B 15	E B 14	E B 15	E B 14	G	G 23	30	34	34	32	G 24	31	28	20	16	20	20	24	E B 16	E B 15	20
4	18	E B 15	E B 15	E C 28	E B 17	E B 15	E B 16	22	G	30	34	34	52	32	32	27	G 18	E B 15	E B 16	26	16	E B 14	E B 15	E B 15
5	E B 15	16	17	E B 14	16	E B 15	15	19	G	U Y 27	G 27	32	34	G 27	30	32	21	E B 15	E B 15	E B 16	18	23	17	17
6	E B 16	E B 16	E B 16	E B 16	E B 15	E B 14	E B 16	G	26	33	34	34	33	32	30	28	21	E B 14	17	17	E B 16	E B 15	E B 15	E B 15
7	E B 12	E B 15	E B 16	E B 16	E B 14	16	16	20	46	G 26	31	G 24	G	G	G	E B 28	22	21	20	E B 16	E B 15	E B 15	E B 15	20
8	29	16	23	16	15	E B 15	16	E B 20	U Y 27	G	E B 32	43	56	54	42	36	29	29	22	20	22	29	31	24
9	21	19	16	C	C	E B 16	E B 15	E B 16	30	30	30	31	E C 36	E C 50	31	E B 32	E B 21	E B 16	16	16	E B 16	E B 15	17	20
10	19	E B 15	E B 14	E B 14	E B 15	E B 14	E B 16	19	29	31	35	G 23	31	G 28	37	29	24	21	E B 15	E B 14	E B 14	19	19	20
11	21	21	16	16	E B 15	E B 14	E B 16	26	47	57	43	38	37	42	38	E B 33	29	28	24	E C 28	20	20	19	E B 15
12	E B 19	18	30	19	18	17	E B 15	G	44	42	39	35	G	G	G	G	G	21	30	23	19	A A 46	24	16
13	E B 15	E B 15	18	E B 14	16	E B 15	E B 15	19	24	G 18	47	32	G 26	G 23	G	26	29	24	30	19	E B 15	A A 29	E B 15	E B 15
14	E C 28	E B 15	17	E C 28	E B 16	E B 16	E B 15	E B 17	G	G	G 24	G 24	32	31	29	25	19	E B 16	16	21	20	E B 16	20	E B 15
15	E B 15	E B 15	E B 15	16	A A 54	19	E B 15	E B C 28	26	30	32	35	34	35	G	26		23	A A 61	A A 106	A A 44	E B 15	19	20
16	20	E B 16	20	15	16	16	E B 15	E B 18	G	G 27	41	37	U Y 27	37	33	G 26	30	A A 80	A A 89	22	19	A A 102	27	25
17	E B 14	17	20	E B 16	E B 15	E B 15	E B 14	E B 16	G	30	31	36	G 28	33	31	G 19	23	21	19	17	E B 14	E B 16	E B 15	E B 14
18	26	20	21	16	17	19	17	18	U Y 27	36	34	45	58	36	39	34	A A 68	18	27	28	24	A A 44	E B 16	16
19	A A 75	18	17	19	20	E B 16	E B 15	22	G 19	32	G 27	42	38	36	46	31	31	38	21	20	19	E B 17	E B 14	E B 17
20	E B 15	24	E B 16	E B 15	17	E B 14	E B 15	18	G	36	E B 37	E B 41	E B 44	E B E 45	E B 43	E B 35	E B 29	E B 20	20	29	17	21	25	A A 46
21	A A 40	A A 48	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	29	30	E B 22	39	39	39	38	40	31	31	26	E B 16	E B 16	E B 16	17	E B 14
22	25	31	24	21	16	18	E B 15	G	G	G	G	G	E B 42	E B 42	38	30	G	22	18	E B 15	22	E B 15	17	28
23	A A 46	20	20	16	E B 15	E B 15	E B 14	E B 20	G	G	G	G	34	35	G	E B 30	E B 28	E B 15	E B 14	E B 14	E B 16	16	E B 16	E B 15
24	E B 15	E B 14	E B 14	E B 14	E B 16	E B 15	24	E B 15	G	32	U Y 26	G	U Y 27	G 28	G	G	G	E C 28	E B 16	E B 15	E B 16	E B 15	16	E B 15
25	E B 15	E B 15	E B 14	E B 16	E B 16	E B 14	E B 16	20	28	31	G	G 32	G 29	G 28	32	30	18	E B 15	20	E B 15	E B 15	E B 15	E B 16	E B 14
26	E B 16	E B 16	E B 14	E B 14	E B 15	E B 14	E B 13	E B 15	G	G	G	G	U Y 26	G 28	31	G	23	17	17	16	E B 13	E B 13	E B 15	E B 15
27	17	E B 14	E B 14	E B 14	E B 15	E B 15	E B 15	E B 17	39	40	37	38	35	G	G 28	G 22	E B 23	E B 15	E B 15	16	18	18	A A 34	E B 15
28	E B 15	E B 14	E B 14	E B 16	E B 14	E B 15	E B 15	E B 15	24	30	31	G 27	G 29	G 29	G 27	G 24	G	E B 14	E B 16	E B 16	E B 14	E B 16	29	20
29	E B 14	E B 14	E B 14	E B 16	E B 14	E B 16	E B 15	E B 15	G 22	G	E B 34	E B 40	E B 40	E B 36	E B 38	E B 34	E B 28	E B 27	19	16	A A 54	E B 15	18	E B 15
30	16	E B 15	E B 15	E B 13	E B 15	E B 14	16	20	G	G	G	E B 39	E B 39	E B E 40	E B 35	E B 29	G	E B 14	E B 16	E B 16	22	20	E B 16	22
31	E B 16	15	E B 16	E B 15	E B 15	E B 15	21	38	34	G 24	E B 36	E B 36	E B 36	G	G	G	G 16	E B 13	E B 15	E B 16	E B 15	16	20	E B 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	30	30	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	E 17	E B 16	E B 16	E B 16	E B 15	E B 15	E B 15	E G 18	24	30	32	34	32	E G 32	30	E G 28	21	19	18	16	17	E B 16	17	E B 16
U Q	26	19	18	16	16	16	16	20	29	32	35	38	39	37	38	32	29	27	22	22	20	20	20	20
L Q	E B 15	E B 15	E B 15	E B 14	E B 15	E B 14	E B 15	E B 17	G	G	G	G	G	G 29	G	G	G	E B 15	E B 16	E B 16	E B 15	E B 15	E B 15	E B 15

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

IONOSPHERIC DATA STATION Kokubunji

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

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

IONOSPHERIC DATA STATION Kokubunji

DEC. 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	261	276	276	286	292	303	328	325	335	347	337	324	330	327	328	326	330	318	336	325	316	315	311	302
2	307	304	315	294	288	291	311	358	341	363	349	357	317	352	322	350	345	333	330	341	356	334	311	A
3	A	291	289	285	296	306	330	374	355	348	362	344	342	316	343	363	346	353	333	349	332	319	306	279
4	294	288	282	285	283	300	348	377	371	343	365	360	340	354	350	350	350	356	346	359	351	S 328	288	316
5	295	303	301	320	313	313	311	356	367	345	357	344	344	352	328	336	329	360	343	296	S	276	265	298
6	327	283	258	283	385	309	313	358	329	331	343	334	355	354	344	319	356	369	284	317	324	324	289	279
7	307	304	309	274	295	275	318	382	359	338	353	362	355	336	341	357	346	348	365	353	323	335	F	292
8	288	306	300	298	284	292	334	360	340	351	338	329	339	354	353	338	364	330	355	345	314	312	293	292
9	363	298	322	C	C	F 294	323	357	356	361	374	390	328	347	347	S 347	376	320	343	351	355	315	288	305
10	292	319	290	303	301	297	305	346	345	337	354	362	350	351	370	377	382	333	327	337	F	300	307	315
11	325	339	307	293	260	346	342	366	335	347	360	375	352	339	359	368	369	343	315	347	330	283	277	F
12	328	315	297	F	F	F	328	360	368	350	363	344	368	374	332	353	359	337	346	357	374	A	339	277
13	310	312	F	299	305	359	333	366	378	350	362	352	363	349	365	346	347	311	C 357	350	327	A	344	295
14	307	303	300	299	285	296	329	354	366	347	356	362	369	363	361	368	370	347	321	342	333	315	317	330
15	327	323	315	295	A	277	352	387	362	334	351	365	367	352	362	362		346	A	A	A	S 288	275	287
16	314	336	384	292	299	291	313	367	363	366	380	355	373	359	343	360	377	A	A	335	309	A	343	326
17	361	306	296	283	287	318	356	389	364	359	364	364	365	360	350	353	360	348	330	363	345	329	317	317
18	294	274	274	292	297	309	355	396	383	370	360	379	375	341	340	356	A	341	330	364	339	A	264	312
19	A	306	284	271	275	305	343	376	369	371	352	355	358	337	340	358	359	336	357	343	344	305	310	312
20	288	304	307	287	294	314	336	369	366	374	364	366	355	332	333	346	358	335	322	330	304	287	331	A
21	A	A	313	271	275	289	375	344	358	348	337	341	326	331	333	335	330	341	308	298	319	339	296	326
22	F	326	287	282	301	330	310	336	362	346	357	342	338	343	340	343	342	332	321	351	304	293	308	321
23	A	327	306	290	285	280	306	358	368	346	361	345	328	344	344	348	329	332	329	344	340	312	347	289
24	299	312	290	285	313	323	334	344	362	349	362	357	354	342	340	355	353	309	344	354	342	313	320	305
25	296	329	342	283	268	329	421	347	355	349	335	362	354	336	352	348	356	342	337	349	332	302	325	291
26	292	314	304	285	287	302	320	338	350	337	346	340	342	328	334	345	353	358	323	336	329	306	292	282
27	282	325	366	306	283	286	320	365	342	327	337	341	324	325	322	350	343	354	363	328	292	286	A	286
28	310	323	304	277	343	327	341	348	323	311	351	329	321	329	342	338	339	342	379	354	281	290	S 293	287
29	300	291	341	300	292	292	306	373	353	340	329	338	H 330	H 333	335	352	332	353	371	320	A	272	299	302
30	F	346	331	293	F	325	319	355	345	330	333	337	317	337	358	361	352	344	362	332	342	293	329	300
31	286	295	318	335	357	302	331	370	372	340	353	339	334	345	342	360	364	356	362	320	317	314	306	324
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	30	30	29	27	30	31	31	31	31	31	31	31	31	31	31	29	30	29	30	27	27	29	28
MED	300	306	304	290	292	302	329	360	359	347	354	352	344	343	342	350	353	342	337	344	330	312	307	301
U Q	320	323	315	298	301	318	342	373	367	351	362	362	358	352	352	360	362	353	357	351	342	319	322	316
L Q	292	298	290	283	284	292	313	348	345	338	343	340	330	333	334	345	342	333	325	330	316	290	290	288

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

IONOSPHERIC DATA STATION Kokubunji

DEC. 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											L	L		L										
2											L				L									
3												L	L	L										
4												L	A											
5												L			L									
6										L	L	L												
7										L		L	L	L										
8										L	L													
9										L	L		L											
10										L	L		L	L										
11									A	A	A	A	A	A	A									
12											A	L												
13											A	L 383	L	L										
14										L	L				L									
15												L	L											
16												L	L	A										
17											L	L	L	L										
18												A	A				A							
19										L	L	A	L	L	A									
20											L	L												
21										L				A										
22													L											
23										L		L												
24													L											
25											L													
26											L		L											
27										L	L	L	L	L										
28										L	L													
29											L		L	L	L									
30										L	L	L	L											
31												L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												1												
MED												L 383												
U Q																								
L Q																								

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

IONOSPHERIC DATA STATION Kokubunji

DEC.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											240	252		244										
2											242				262									
3												228	238	266										
4												228	230											
5												240			252									
6										248	244	258												
7										260		228	228	234										
8										248	248													
9										232	228		266											
10										254	242		250	246										
11									E A 266	252	238	212	226	250	228									
12											248	240												
13											240	234	234	242										
14										238	232				232									
15												226	230											
16												232	230	228										
17											236	234	226	232										
18												226	232					A						
19										228	230	234	236	240	250									
20											234	224												
21										248				248										
22													250											
23										246		224												
24													230											
25											246													
26											240		230											
27										256	256	246	246	232										
28										270	240													
29											252		246	234	252									
30										248	250	222	264											
31												248	242	238										
	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	13	19	19	19	13	6									
MED									E A 266	248	240	232	234	240	251									
U Q										255	248	240	246	247	252									
L Q										242	236	226	230	233	232									

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

IONOSPHERIC DATA STATION Kokubunji

DEC.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 B 340	E C 354	E B 318	E B 296	258	262	212	H 196	208	218	214	218	226	208	212	220	208	200	208	222	234	230	232	266
2	E C 282	254	250	256	E B 272	256	248	216	210	224	204	206	202	206	220	218	208	E A 254	220	E A 258	212	238	E B 248	A
3	A	E B 282	E B 282	E B 310	E B 288	E B 272	214	212	216	216	220	198	198	218	226	214	204	196	E A 240	234	E A 266	234	236	E A 326
4	E A 286	E B 290	E B 298	E C 336	E B 314	E B 284	220	208	206	210	228	204	A	210	214	216	208	194	212	218	224	E B 248	E B 282	246
5	E B 258	E A 264	E A 288	A E B 258	E A 256	248	208	214	220	216	212	H 192	214	214	200	214	228	198	198	218	E A 356	E A 348	E A 322	E A 280
6	234	E B 318	E B 344	E B 320	192	252	E B 258	218	228	216	216	220	224	214	202	222	212	196	E A 302	256	238	202	E B 284	E B 318
7	E B 268	250	260	E B 308	E B 290	E A 328	260	202	208	208	226	210	196	198	220	220	208	202	222	224	222	226	E B 288	E A 330
8	E A 370	E A 276	E A 294	236	E A 298	E B 266	240	202	214	222	216	234	244	218	220	232	214	E A 242	218	244	E A 292	E A 318	E A 394	E A 320
9	214	E A 320	E A 256	C	C	E B 304	244	H 198	226	214	204	198	E C 240	226	216	218	198	198	228	220	220	E B 270	E A 292	E A 284
10	E A 322	236	E B 292	242	226	E B 290	250	212	232	220	224	204	202	216	224	214	202	212	238	240	220	E A 324	E A 274	E A 278
11	E A 256	E A 266	E A 278	E A 308	E B 390	232	E B 246	216	A	A	A	A	A	A	A	212	212	214	E A 256	C 250	E A 258	E A 368	E A 322	E B 312
12	E B 244	E A 256	E A 410	E A 272	E A 286	E A 280	236	226	220	222	A	220	222	210	202	230	208	212	E A 252	224	214	A	E A 246	E A 248
13	E B 260	E B 252	E A 338	E B 284	E A 262	220	238	210	210	206	A	196	212	212	210	220	206	E A 244	222	222	E B 242	A	226	E B 262
14	E C 298	E B 266	E A 312	E C 326	E B 296	E B 296	244	216	H 204	214	210	204	204	200	198	224	210	198	234	E A 246	238	E B 252	E A 274	246
15	240	244	234	E A 304	A	E A 372	224	200	200	212	224	208	206	214	210	212		216	A	A	A	E B 298	E A 368	E A 330
16	E A 264	E B 244	220	E A 314	E A 310	E A 312	E B 266	210	216	220	218	204	198	A	212	214	204	A	A	E A 244	E A 276	A	E A 280	E A 284
17	200	E A 292	E A 324	E B 344	E B 328	E B 270	222	200	204	208	204	204	208	202	204	220	218	202	230	214	212	E B 240	E B 256	246
18	E A 358	E A 332	E A 326	E A 304	E A 282	E A 282	222	198	202	208	214	A	A	200	E A 238	216	A	206	E A 258	224	E A 300	A	E B 328	E A 282
19	A	E A 302	E A 304	E A 358	E A 348	E B 282	230	202	200	196	192	A	198	196	A	212	214	E A 252	220	226	228	E B 268	E B 270	E B 264
20	E B 272	E A 316	262	E B 292	E A 296	244	210	208	208	218	206	B	220	220	232	226	220	204	244	E A 248	E A 258	E A 310	E A 256	A
21	A	A	E B 254	E B 304	E B 346	E B 304	204	220	228	224	218	222	240	A	234	230	218	218	E A 254	E B 264	228	226	E A 246	252
22	E A 356	E A 290	E A 326	E A 334	E A 266	234	242	228	224	226	220	216	206	236	224	222	206	218	236	220	E A 284	E B 268	E A 264	E A 270
23	A	E A 260	E A 262	E A 300	E B 308	E B 314	E B 268	212	208	214	216	200	220	228	218	210	202	200	E B 238	212	220	E A 248	222	E B 304
24	E B 272	258	E B 278	E B 294	E B 264	E B 234	E A 260	222	H 184	224	226	214	206	212	212	216	210	E C 248	236	208	222	E B 246	E A 256	E B 262
25	E B 280	E B 256	218	E B 304	E B 350	E B 256	194	226	216	220	216	218	208	214	220	208	206	210	234	208	208	E B 246	230	E B 278
26	E B 276	E B 260	E B 270	E B 286	E B 284	E B 268	238	212	H 200	H 196	208	208	H 190	206	H 206	220	210	198	218	218	224	E B 266	E B 276	E B 304
27	E A 314	242	210	E B 248	E B 322	E B 310	E B 242	214	216	228	228	220	204	204	214	220	204	208	196	226	E A 308	E A 320	A	E B 274
28	238	246	242	E B 292	E B 210	E B 252	220	208	H 204	192	224	206	204	204	224	224	228	210	192	202	E B 288	E B 298	E A 358	E A 308
29	E B 286	E B 284	228	226	E B 302	E B 328	E B 278	208	202	226	222	218	216	B	B	210	210	212	212	E A 252	A	E B 322	E A 324	E B 272
30	E A 260	226	236	E B 248	E B 302	E B 246	E A 274	220	216	214	216	202	202	E B 240	218	224	210	200	206	228	E A 248	E A 290	236	E A 336
31	E B 296	E A 290	E B 250	214	202	E B 280	E A 258	E A 228	208	204	224	212	210	210	224	226	210	214	200	216	238	E A 262	E A 272	222
	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	30	31	30	29	31	31	31	30	30	28	27	28	27	28	31	29	30	29	30	29	27	30	29
MED	E 272	E 265	E 278	E 298	E B 290	E B 272	230	212	209	216	216	208	206	211	216	220	210	205	220	221	U 225	E 266	E A 273	E 278
U Q	E A 298	E A 290	E A 312	E A 310	E B 312	E B 304	E 258	218	216	222	224	218	220	218	224	224	213	E 216	E A 239	E 244	E A 271	E A 310	E A 292	E A 310
L Q	256	252	250	258	263	252	220	202	204	208	211	204	202	204	210	214	206	200	212	218	221	240	246	262

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DEC. 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								120	116	114	A	A	A	A	114	114	120							
2								124	112	116	A	A	A	A	A	116	A							
3								124	122	116	A	A	A	118	A	124	B							
4								E B 134	110	A	116	A	A	114	A	118	122							
5								E B 130	112	116	114	A	A	120	120	A	122							
6								122	116	A	A	114	A	A	114	A	A							
7								B	A	110	A	116	120	122	118	B	A							
8								B	A	114	B	A	A	A	A	A	A							
9								B	A	A	A	A	C	C	A	B	B							
10								B	A	A	A	114	A	110	A	A	A							
11								A	A	A	A	A	A	A	A	B	A							
12								108	120	A	A	116	116	116	116	114	108							
13								B	A	110	A	A	116	116	114	A	A							
14								B	118	118	112	108	A	A	A	A	A							
15								C	A	118	A	A	A	A	118	118								
16								B	122	122	A	A	116	A	A	114	A							
17								B	124	A	A	A	120	A	A	116	A							
18								B	116	A	A	A	A	A	A	A	A							
19								B	116	116	112	A	A	A	A	A	A							
20								B	122	116	B	B	B	B	B	B	B							
21								B	A	A	124	A	A	A	A	A	A							
22								B	118	124	116	114	B	B	A	A	E B 138							
23								B	114	114	116	116	116	A	118	B	B							
24								B	112	112	116	116	116	116	112	112	120							
25								B	112	114	116	122	122	118	122	A	126							
26								B	114	116	116	118	118	114	A	110	118							
27								B	118	A	116	118	116	118	116	118	B							
28								B	A	A	A	118	120	114	116	116	110							
29								B	122	128	B	B	B	B	B	B	B							
30								B	122	122	B	B	B	B	B	B	E B 132							
31								B	A	120	B	B	B	118	118	114	114							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								7	21	20	11	12	11	13	13	13	11							
MED								122	116	116	116	116	116	116	116	116	119							
U Q								E B 130	122	119	116	118	120	118	118	118	E B 126							
L Q								120	113	114	114	114	116	114	114	114	114							

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DEC. 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	B	C	98	B	B	B	B	G	G	114	104	102	102	102	98	100	G	B	B	96	B	B	B	B
2	C	B	B	B	B	94	102	164	118	116	108	104	106	106	106	102	96	92	110	104	106	100	98	94
3	94	94	B	B	B	B	B	G	108	116	104	104	104	102	104	138	130	94	90	104	100	102	100	92
4	96	B	B	C	B	B	B	146	G	106	144	100	90	126	90	116	94	92	102	98	100	B	B	94
5	B	94	92	96	92	94	98	164	G	100	102	102	100	100	116	100	100	104	104	98	94	108	104	100
6	100	102	104	104	B	B	134	G	114	106	108	110	108	108	112	106	100	100	104	98	98	B	B	92
7	92	100	B	104	104	102	106	102	94	98	100	96	G	G	G	B	96	92	92	96	98	96	102	100
8	100	98	92	96	94	B	98	B	104	G	B	94	90	90	92	90	94	92	96	94	96	94	92	92
9	92	92	96	C	C	B	B	B	104	102	104	96	C	C	90	B	B	B	104	94	B	94	92	92
10	94	90	B	B	B	B	B	102	104	106	98	98	94	94	92	92	94	94	B	96	B	90	100	98
11	94	94	104	102	B	B	108	102	98	92	94	98	96	92	94	B	94	90	90	C	92	94	94	96
12	B	98	94	96	98	98	B	G	120	108	106	112	G	G	G	G	G	100	96	96	94	86	86	88
13	B	B	96	B	98	B	B	118	106	92	92	94	102	100	G	98	98	96	90	96	B	130	120	B
14	C	B	92	C	B	92	B	B	G	G	98	94	92	100	104	96	94	100	94	100	98	98	86	86
15	B	B	B	100	96	94	100	C	98	116	104	106	110	106	G	112		108	102	98	100	98	110	106
16	102	B	94	100	98	94	B	B	G	102	98	98	100	98	96	94	94	94	94	100	94	96	100	100
17	98	98	94	92	B	B	B	B	G	108	104	100	104	104	102	100	96	94	94	96	96	98	B	100
18	98	102	94	96	100	98	98	100	140	108	104	100	98	104	98	96	94	94	96	98	92	92	B	102
19	100	96	98	96	100	B	98	96	94	116	100	100	96	96	96	100	94	90	84	86	92	B	86	B
20	B	90	B	B	102	B	B	140	G	114	B	B	B	B	B	B	B	B	102	94	98	90	92	92
21	94	96	98	B	B	B	B	B	106	110	B	108	100	108	98	92	98	96	100	B	B	B	94	B
22	102	96	94	98	96	94	96	G	G	G	G	G	B	B	96	96	G	94	94	B	102	106	98	92
23	90	88	86	86	B	B	B	B	G	G	G	G	106	104	G	B	B	106	B	B	B	90	B	B
24	B	B	B	B	B	B	100	B	G	160	104	G	104	104	G	G	G	C	B	90	B	88	88	B
25	B	B	B	B	B	B	B	148	154	146	G	106	110	106	138	102	104	B	90	B	92	B	B	B
26	B	B	B	B	B	B	B	B	G	G	G	G	92	92	88	G	140	90	90	88	B	B	B	B
27	102	B	B	B	B	B	B	B	112	108	116	116	118	G	108	106	B	B	B	96	96	90	88	92
28	96	94	B	B	100	94	B	B	104	104	104	104	100	98	100	104	G	B	B	B	B	100	98	92
29	102	104	B	B	B	B	B	B	104	G	B	B	B	B	B	B	B	102	96	98	98	B	96	B
30	96	B	B	B	B	B	106	104	G	G	G	B	B	B	B	B	G	B	98	94	96	102	102	98
31	B	98	B	B	B	B	106	102	106	106	B	B	B	G	G	G	96	94	B	B	94	106	100	B
	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	19	19	16	13	12	10	13	13	19	24	21	23	23	22	21	20	19	23	24	24	22	23	23	21
MED	96	96	94	96	98	94	100	104	106	108	104	100	100	102	98	100	96	94	96	96	96	96	98	94
U Q	100	98	98	101	100	98	106	147	114	115	105	106	106	106	105	105	100	100	102	98	98	102	100	100
L Q	94	94	93	96	96	94	98	102	104	103	99	98	96	98	93	96	94	92	91	94	94	90	92	92

IONOSPHERIC DATA STATION Kokubunji

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

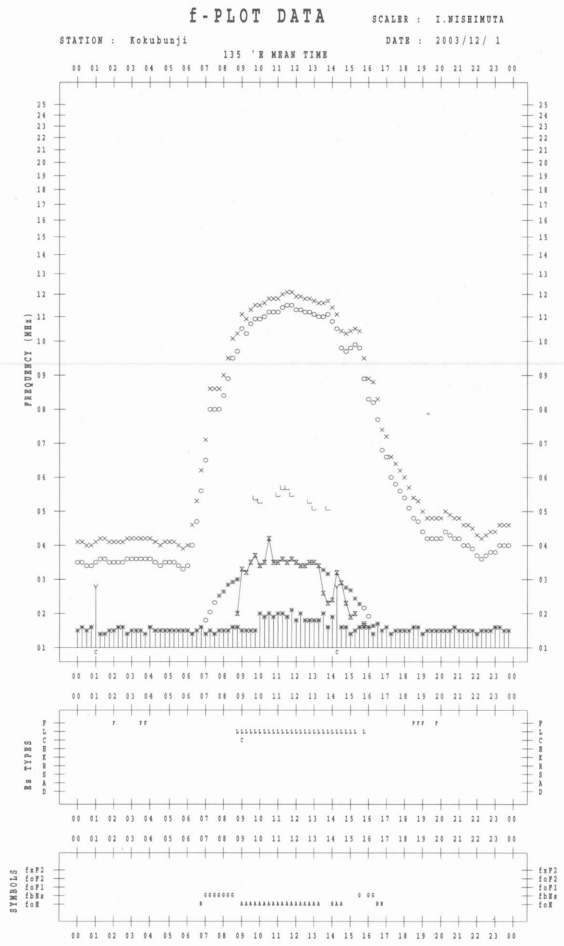
LAT.35°42.4'N LON.139°29.3'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

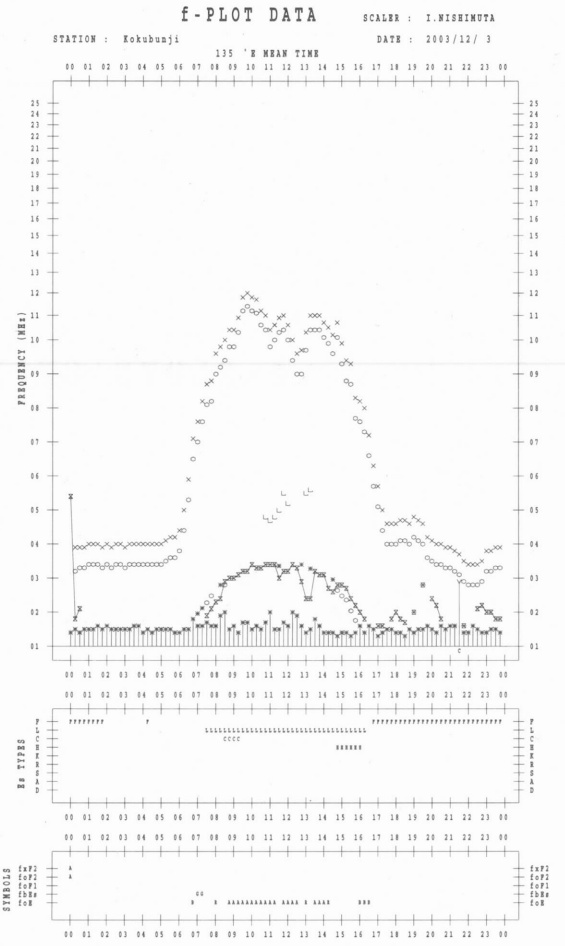
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			F1							CL11	L1	L1	L1	L1	L1	L1				F1				
2						F1	F1	H1	CL22	CL11	L1	L2	L1	L1	L1	L1	L2	F4	F1	F4	F1	F3	F3	F3
3	F3	F1							L1	CL11	L2	L2	L1	L1	L1	HL11	HL21	F1	F3	F1	F3	F2	F2	F3
4	F1							H1		L1	HL11	L1	L3	CL12	L2	CL22	L1	F1	F1	F3	F1			F1
5		F1	F2	F1	F1	F1	F1	H1		L1	L1	L1	L1	L1	CL11	L2	LC21	F3	F1	F1	F1	F5	F2	F2
6	F2	F2	F2	F1			F1		C1	L2	L1	C1	L1	L1	C1	L1	L1	F1	F1	F2	F1			F2
7	F1	F1		F2	F2	F2	F2	L2	L3	L1	L1	L1					L1	F2	F2	F2	F1	F1	F2	F2
8	F2	F2	F2	F1	F2		F1		L1			L2	L2	L2	L2	L2	L2	F4	F3	F2	F2	F3	F3	F2
9	F1	F1	F1						L1	L2	L2	L1			L1				F1	F1		F1	F1	F1
10	F1	F1						L2	L1	L1	L1	L1	L1	L1	L2	L1	L1	F1		F1		F2	F1	F1
11	F1	F2	F1	F1			F1	L2	L3	L2	L1	L1	L1	L2	L1		L1	F1	F1		F2	F2	F2	F1
12		F2	F5	F2	F3	F3			C2	L2	L1	CL11						F1	F2	F1	F2	F2	F2	F1
13			F1		F1			CL11	L1	L1	L3	L1	L1	L1		L1	L2	F2	F3	F1		F3	F2	
14			F2			F1					L1	L1	L2	L1	L1	L1	L1	F1	F1	F2	F3	F1	F1	F1
15				F2	F3	F2	F1		L1	CL11	L2	L1	L1	L1		C1		F1	F4	F3	F3	F3	F2	F3
16	F2		F3	F2	F2	F2				L1	L2	L2	L1	L1	L1	L1	L2	F2	F3	F2	F2	F3	F2	F2
17	F1	F1	F2	F1						L1	L1	L2	L1	L1	L1	L1	L1	F2	F2	F1	F1	F1		F1
18	F2	F1	F1	F2	F1	F2	F1	L1	H1	L1	L2	L2	L3	L1	L2	L2	L3	F1	F2	F2	F3	F2		F2
19	F3	F2	F2	F1	F2		F1	L3	L2	CL21	L1	L2	L2	L1	L2	L1	L2	F3	F3	F2	F1		F1	
20		F1			F1			H1		C1									F1	F2	F1	F2	F3	F3
21	F2	F2	F1						L1	L1		L1	L1	L1	L1	L2	L1	F2	F1				F1	
22	F2	F2	F3	F3	F1	F3	F2								L1	L1		F1	F1		F2	F1	F2	F2
23	F2	F2	F2	F1									L1	L1				F1				F1		
24							F3			HL11	L1		L1	L1						F1		F1	F1	
25								H1	H1	H1		L1	L1	L1	HL11	L3	L1		F2		F1			
26													L1	L1	L1		HL11	F2	F2	F1				
27	F2								C2	L1	C1	C1	C1		L1	L1				F2	F1	F2	F2	F1
28	F1	F1			F1	F1			L1	L1	L1	L1	L1	L1	L1	L1						F2	F2	F2
29	F2	F2							L1									F2	F3	F1	F2		F3	
30	F1						F2	L3											F2	F1	F3	F2	F1	F2
31		F2					F4	L3	L2	L1							L1	F1			F1	F2	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																								

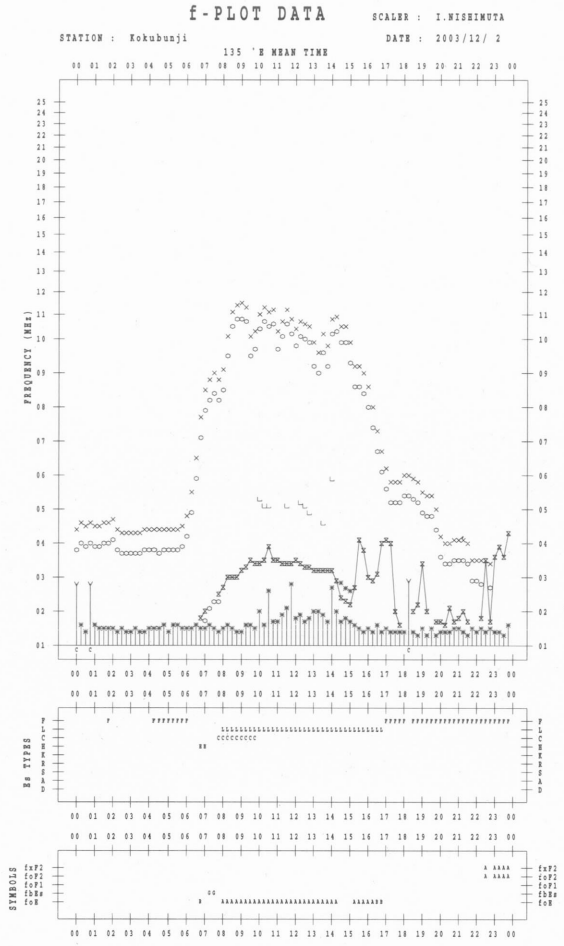
DEC.2003 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

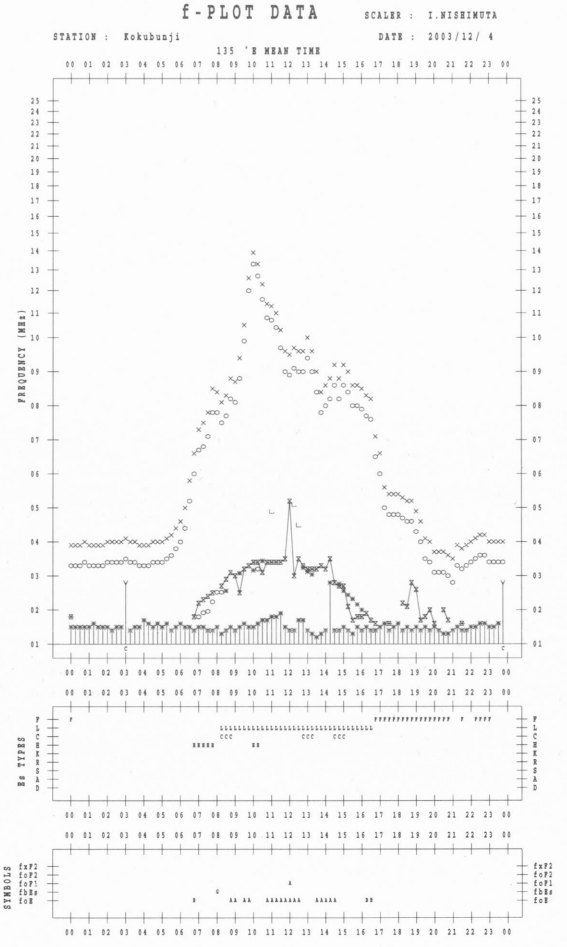
f-PLOTS OF IONOSPHERIC DATA

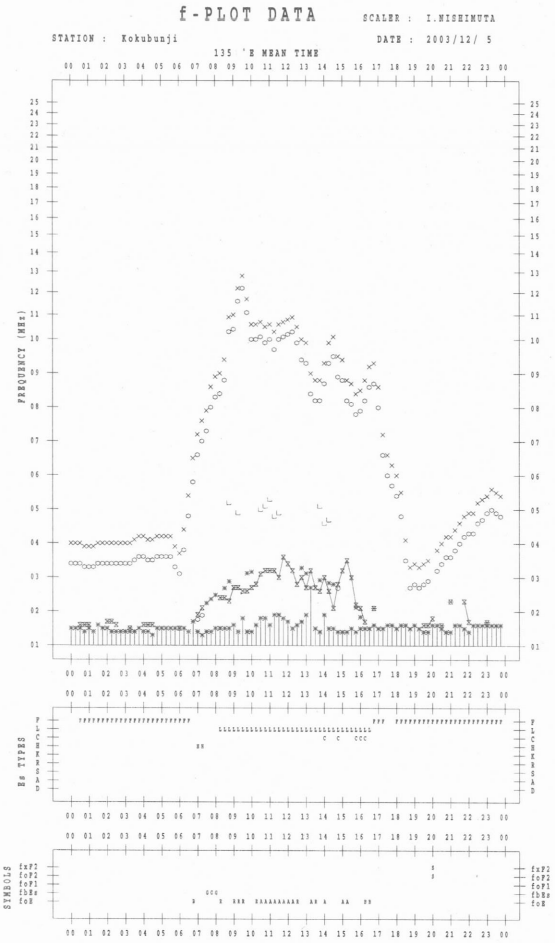
KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

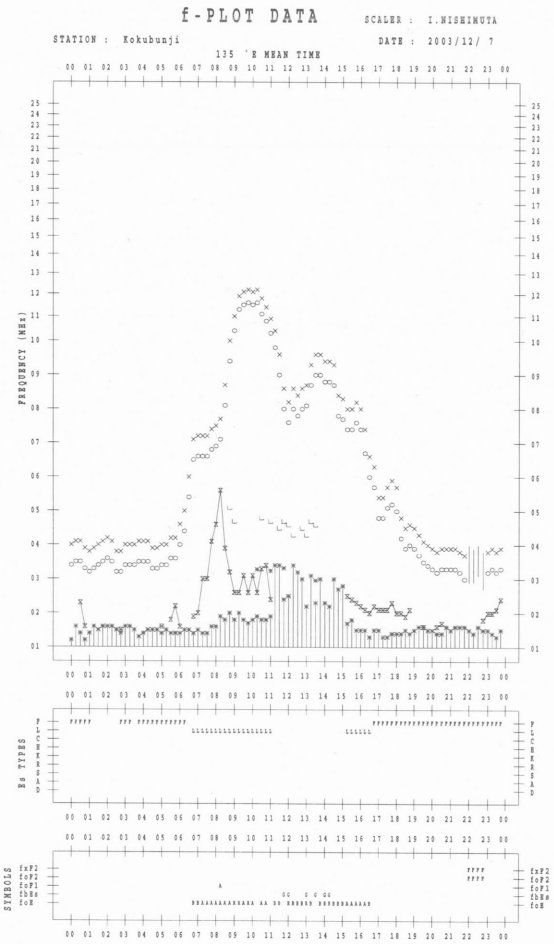

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 1
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

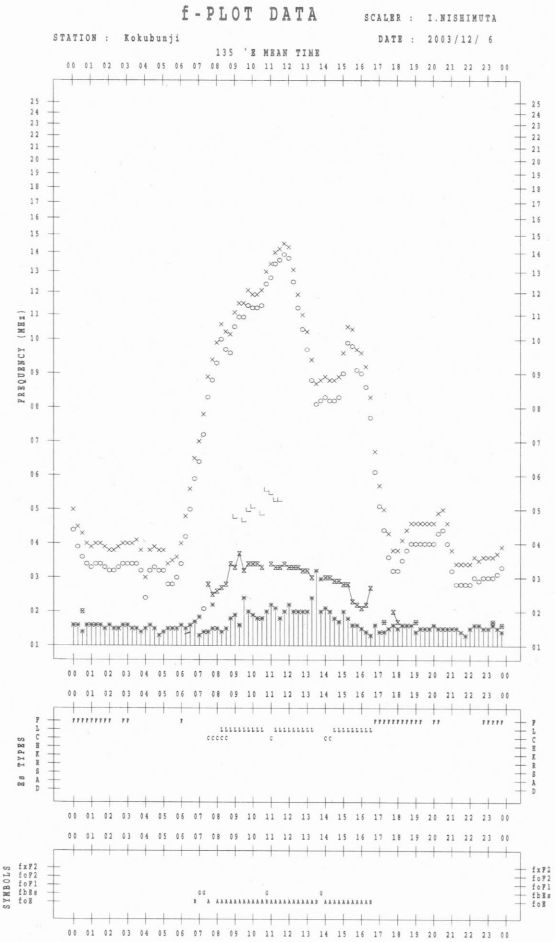

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 3
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

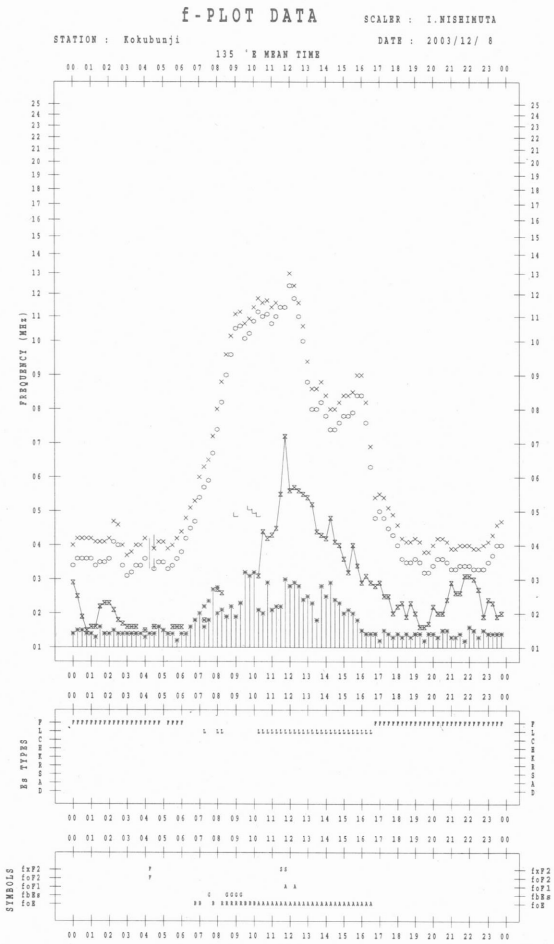

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 2
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

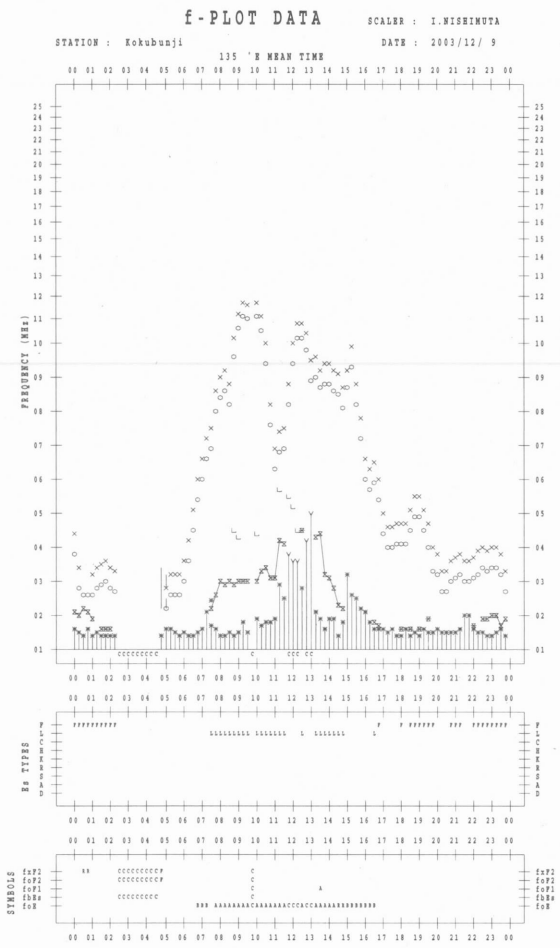

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 4
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

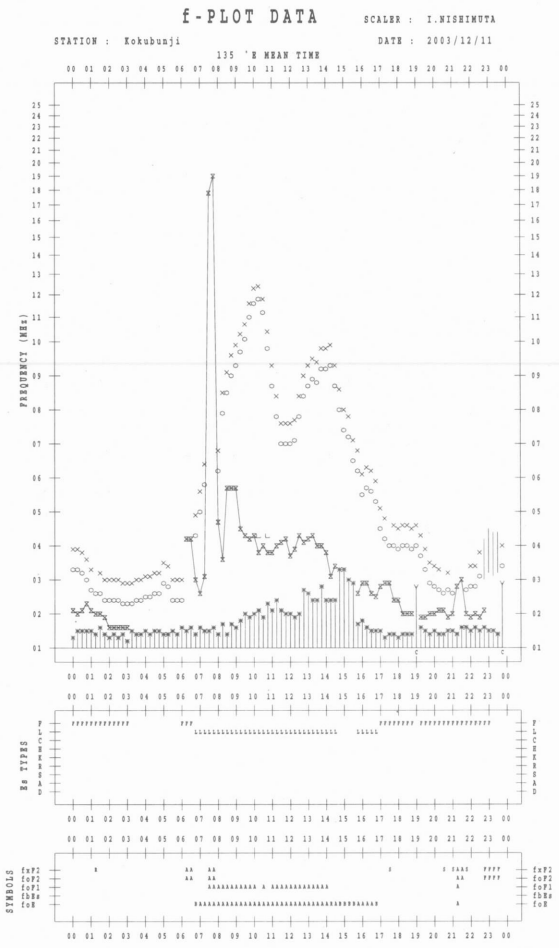

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 5
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

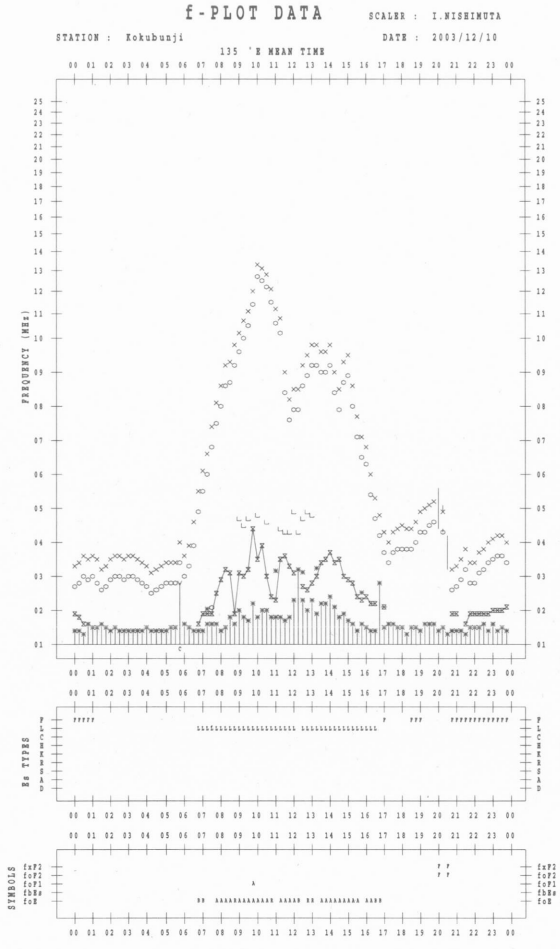

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 7
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

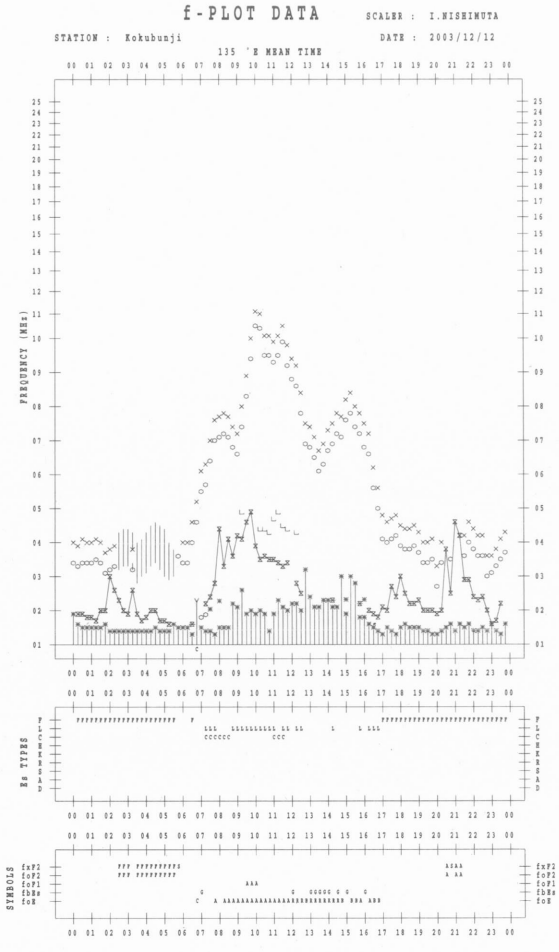

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 6
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

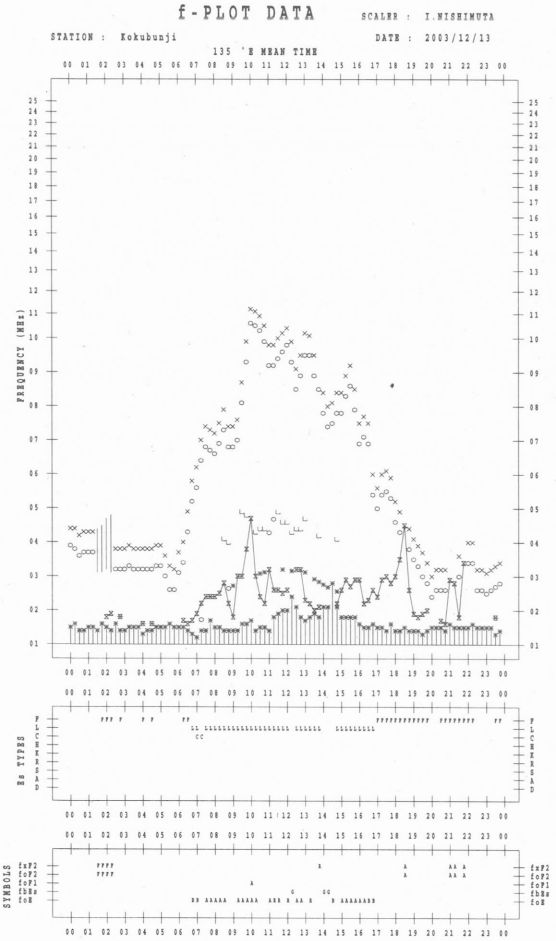

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 8
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

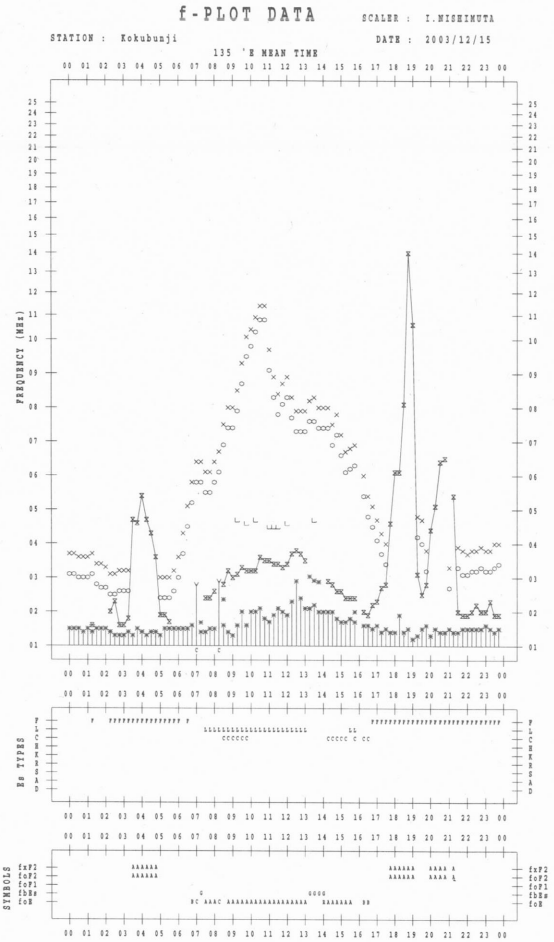

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/ 9
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

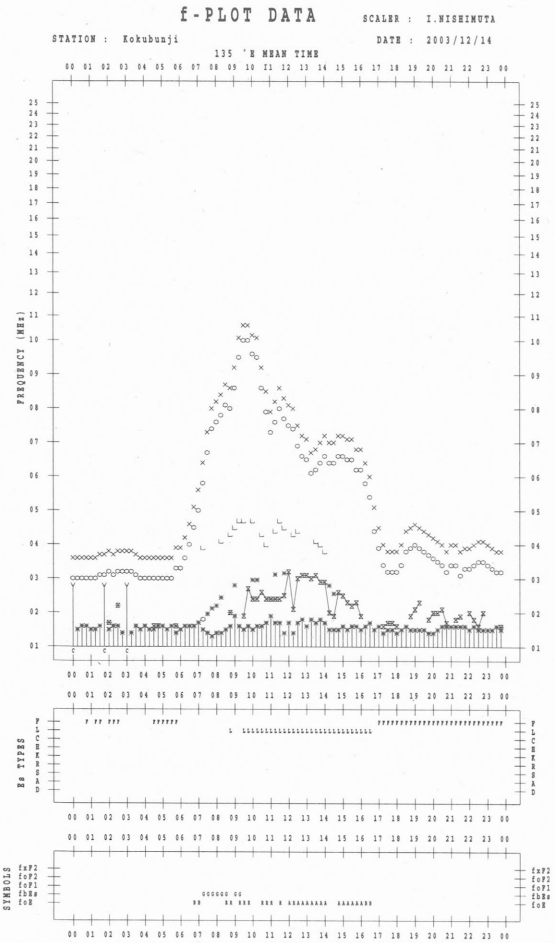

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/11
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

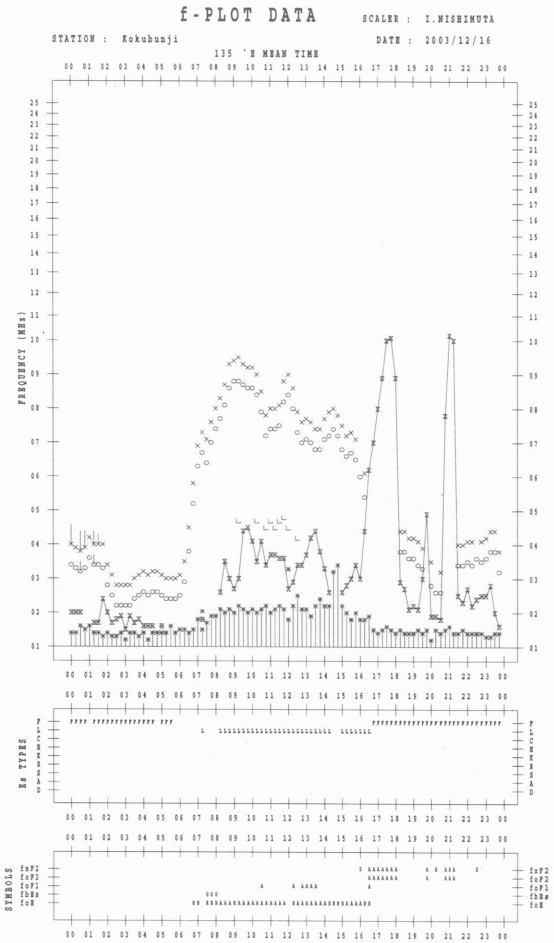

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/10
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


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


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/13
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/15
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/14
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS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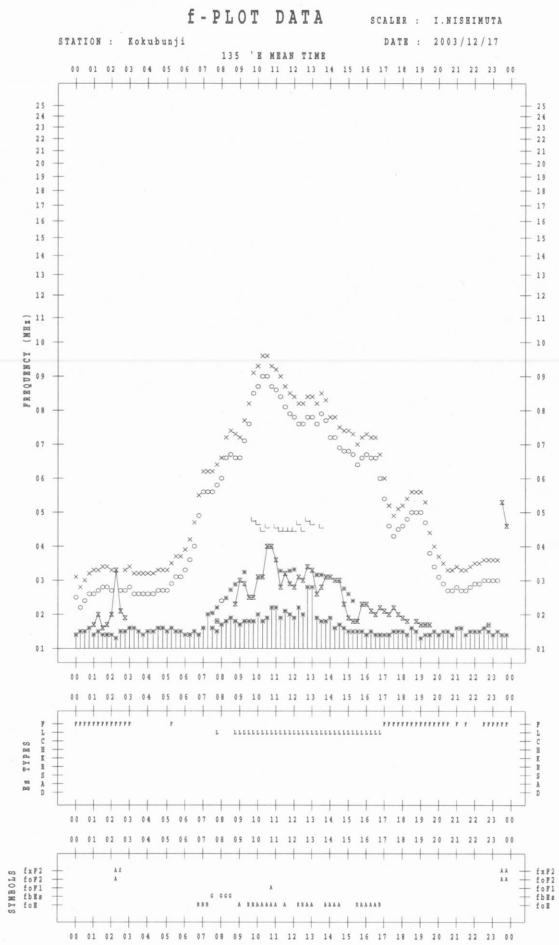
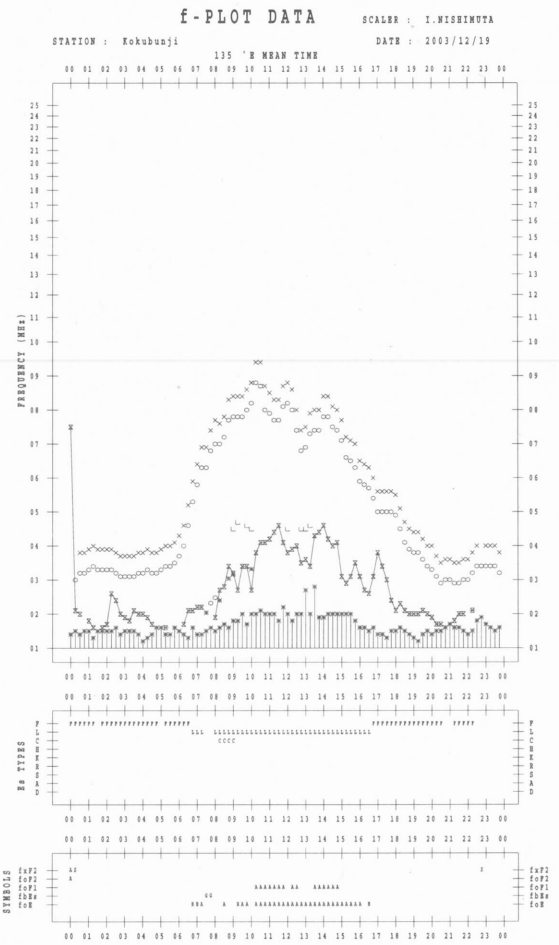
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/16
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/17
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE
fbEs
foF1
foF2
fxF2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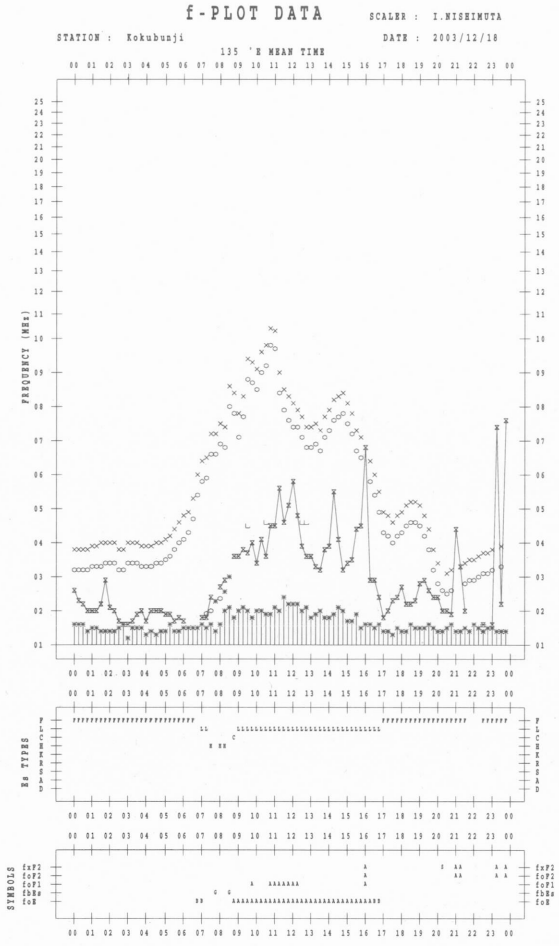
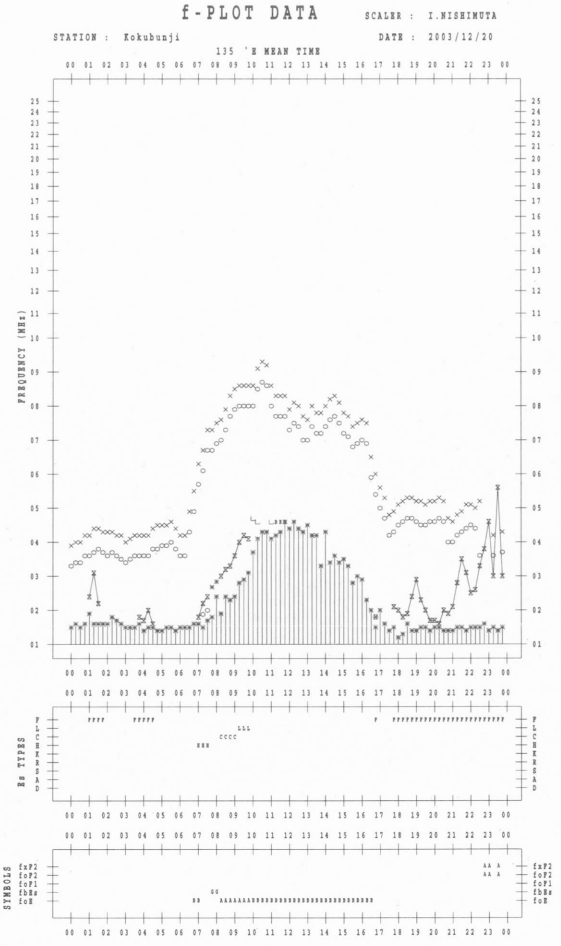
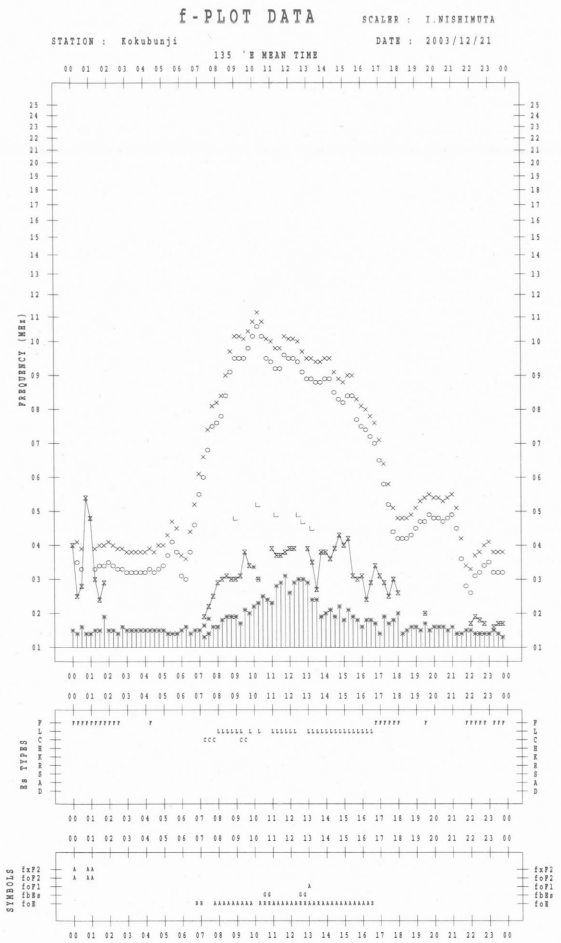
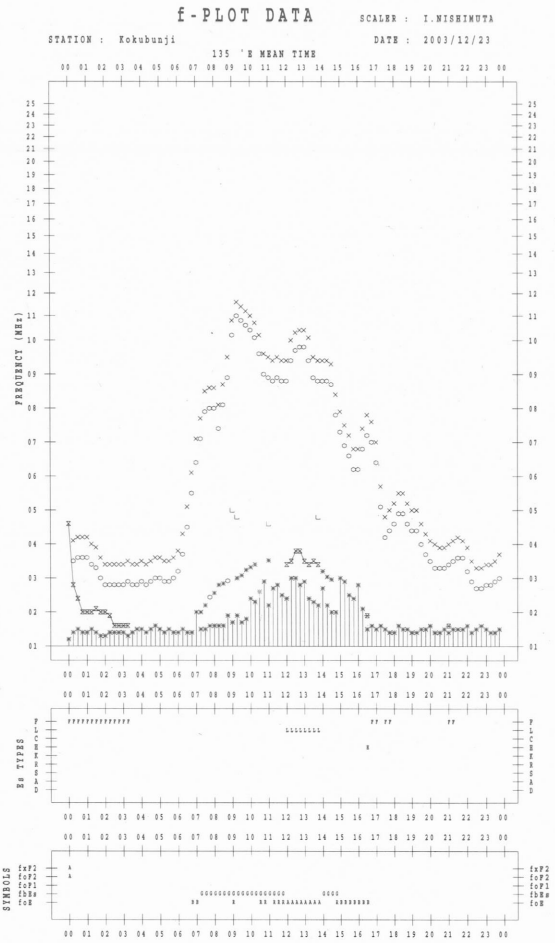
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/19
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE
fbEs
foF1
foF2
fxF2


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/18
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE
fbEs
foF1
foF2
fxF2


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/20
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE
fbEs
foF1
foF2
fxF2


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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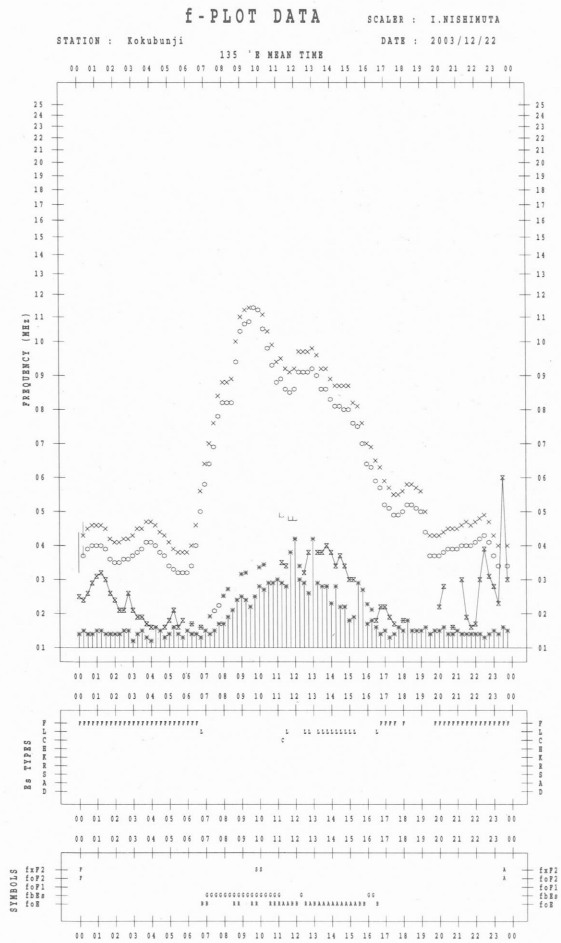
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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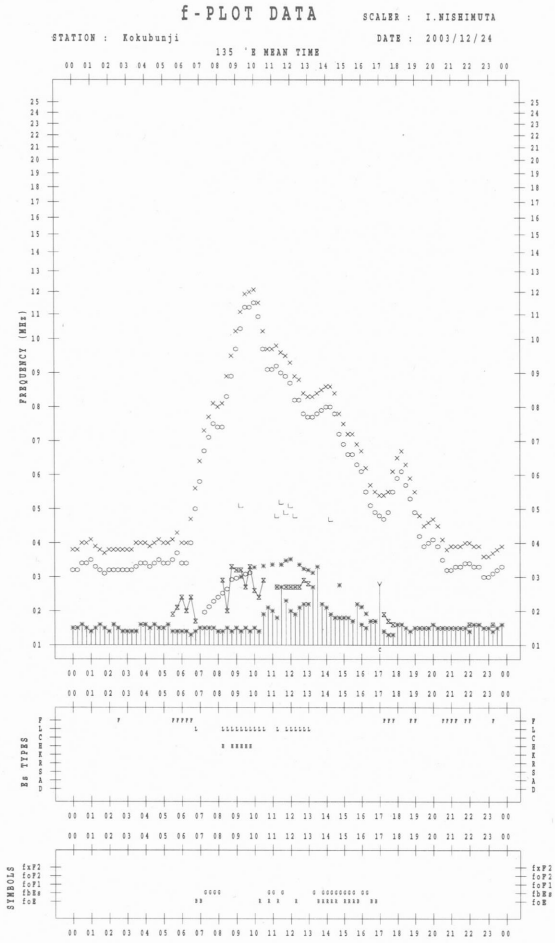
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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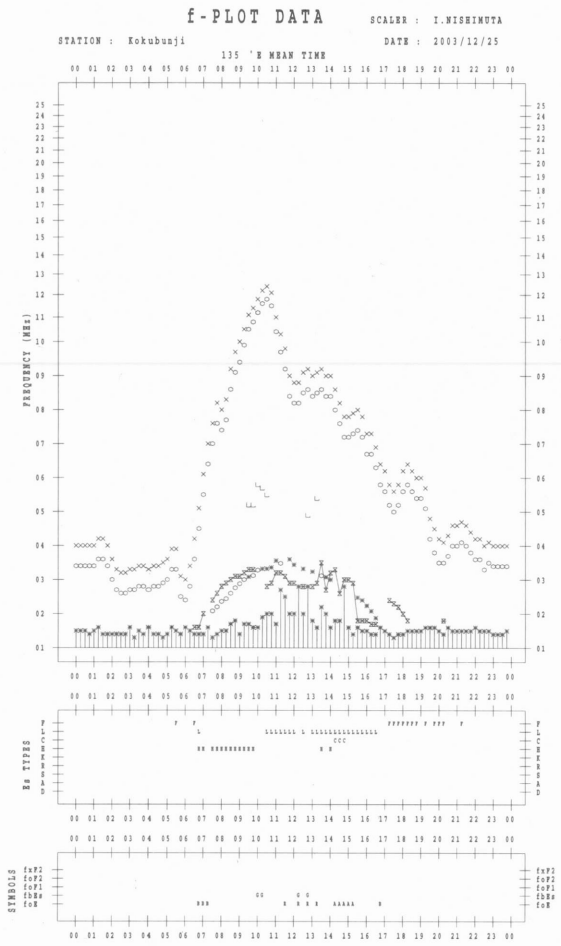
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
foE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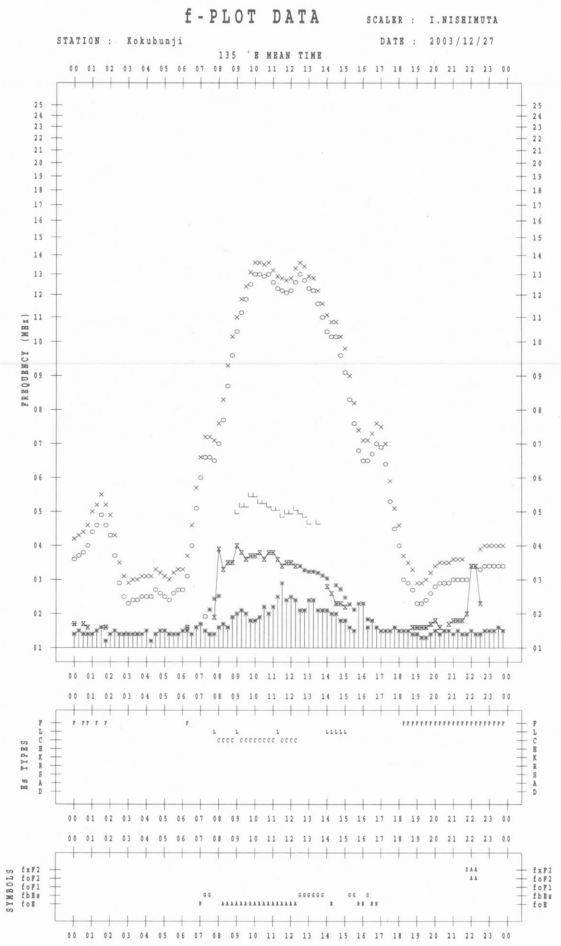
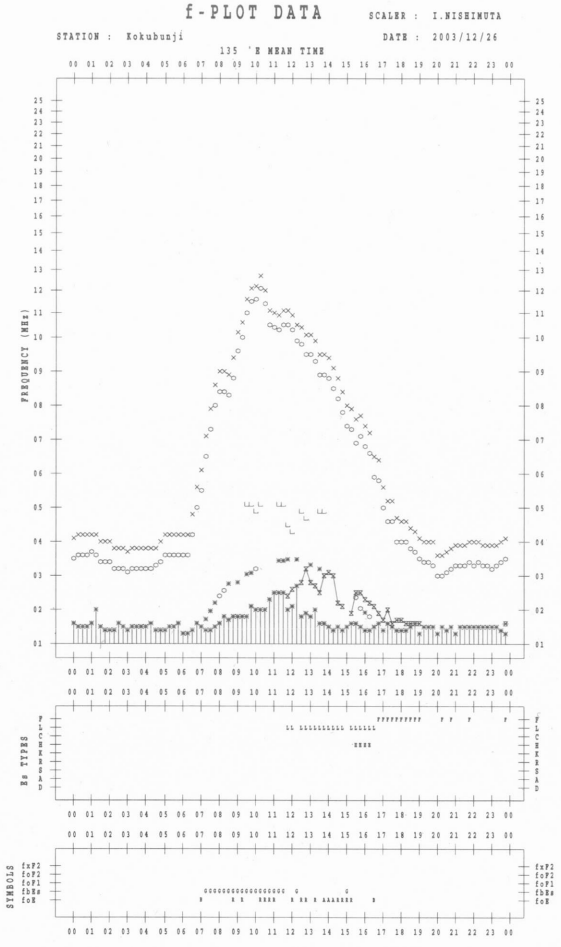
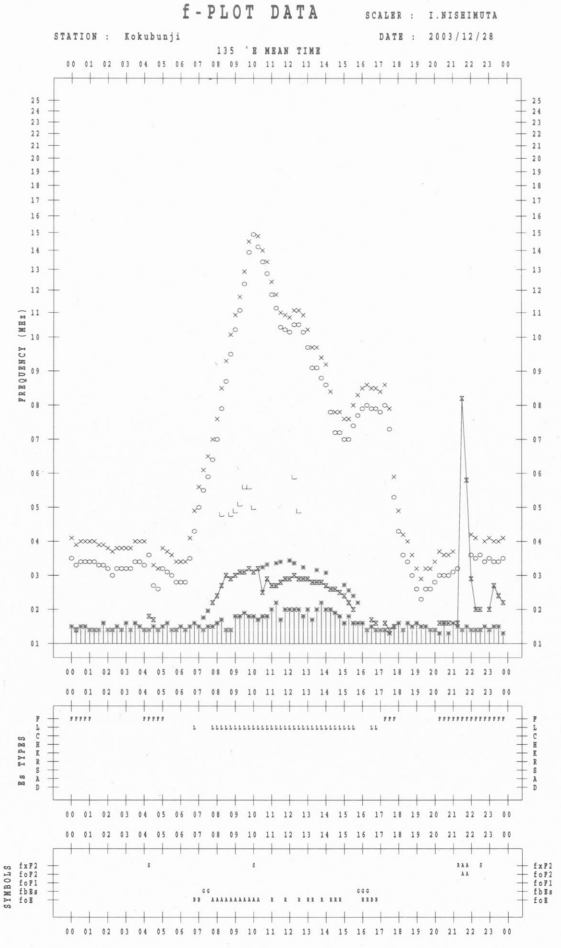
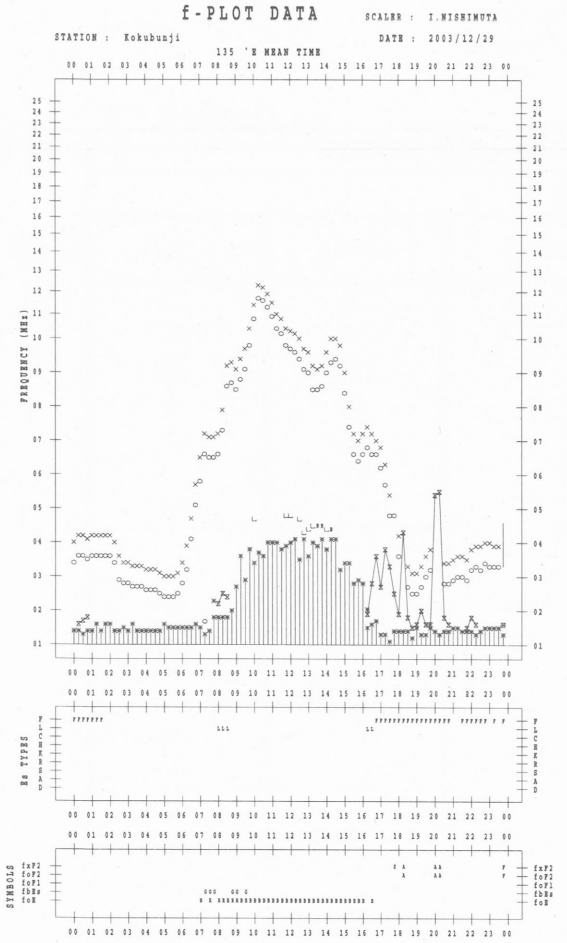
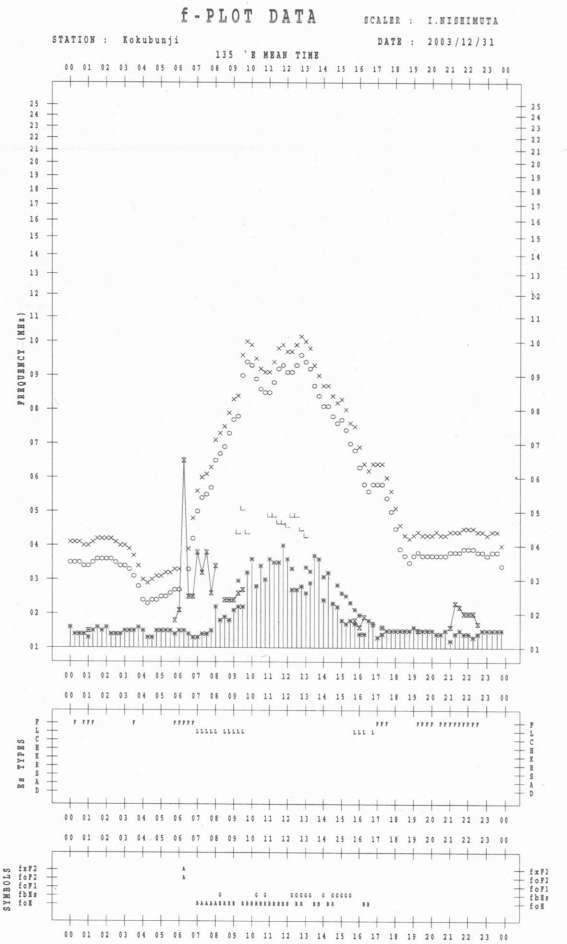
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/25
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS

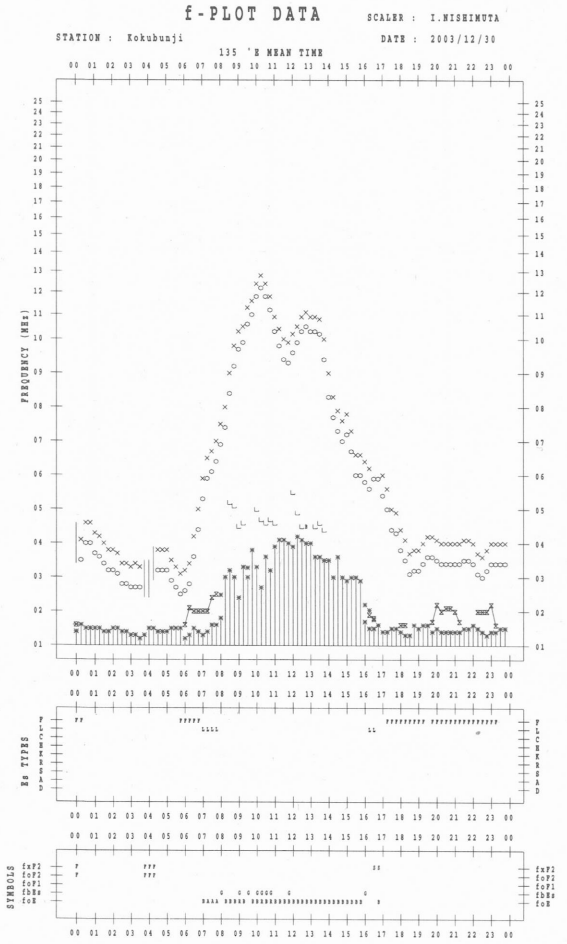

f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/27
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/26
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/28
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/29
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/31
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISHIMUTA
STATION : Kokubunji
DATE : 2003/12/30
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 December 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	33	34	35	33
2	33	31	30	37	33
3	33	31	31	34	33
4	31	30	30	34	31
5	32	31	31	31	31
6	32	30	30	-	30
7	-	-	-	-	-
8	28	26	26	31	28
9	28	27	27	32	28
10	29	28	27	29	28
11	28	27	26	27	27
12	27	26	26	-	27
13	-	-	27	32	30
14	29	27	27	33	29
15	30	28	28	33	29
16	32	30	30	33	31
17	33	32	31	37	33
18	34	32	33	36	33
19	35	32	31	41	34
20	40	39	39	41	39
21	39	37	37	46	39
22	41	37	37	46	39
23	42	37	36	48	40
24	41	37	39	45	40
25	40	37	37	43	39
26	39	38	39	42	39
27	39	38	38	41	39
28	38	34	33	38	36
29	36	32	30	37	34
30	35	33	33	37	34
31	36	32	32	43	35

Note: No data is available during the following periods.
6th 2315 - 8th 0045 12th 2200 - 13th 0555

A superscript * stands for being superposed on a burst.

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso December 2003

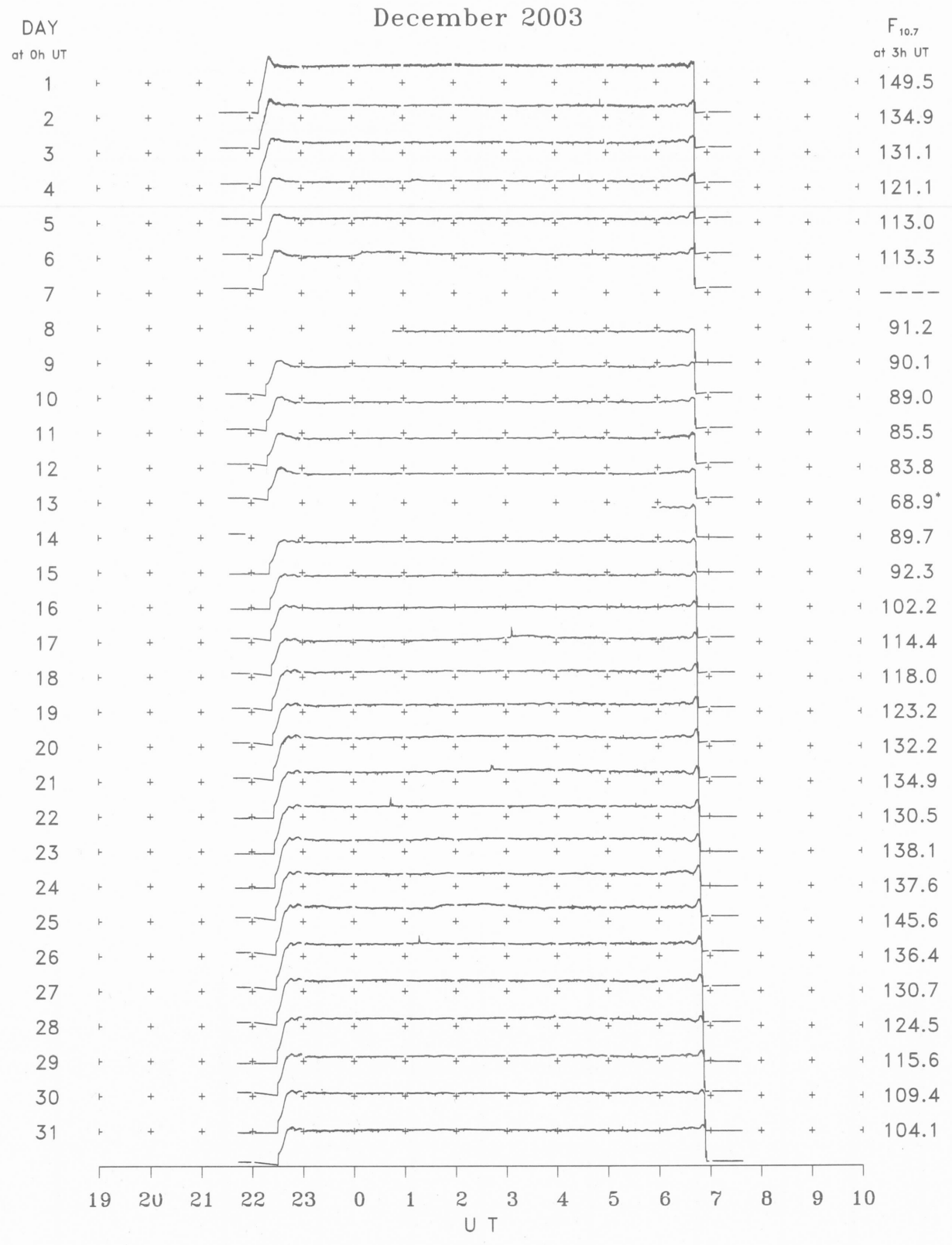
Single-frequency observations

Normal observing period: 2135 – 0730 U.T. (sunrise to sunset)

DEC. 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
3	500	8 S	0407.0	0407.0	1.0	10	–	WR
4	2800	8 S	0431.0	0431.0	1.0	20	–	WR
6	500	7 C	0007.0	0016.0	31.0	250	–	MR
6	500	47 GB	0145.0	0221.0	132.0	695	–	SR
15	500	8 S	0410.0	0410.0	1.0	10	–	0
17	2800	8 S	0307.0	0307.0	2.0	30	–	0
21	2800	7 C	0241.0	0243.0	5.0	20	–	0
22	2800	1 S	0042.0	0044.0	5.0	25	–	0
26	2800	8 S	0117.0	0117.0	2.0	20	–	0
31	500	8 S	0220.0	0220.0	1.0	15	–	0
31	500	42 SER	0322.0	0322.0	7.0	15	–	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°.

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☎ (042) (327) ７４７８(直通)

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