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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), solar radio emission (S) and radio propagation (P) obtained at the following stations under the Communications Research Laboratory, Ministry of Posts and Telecommunications of Japan.

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5′N	141°41.2′E	35.3°N	206.5°	Vertical Sounding (I)
Kokubunji	35°42.4′N	139°29.3′E	25.5°N	205.8°	Vertical Sounding (I)
Yamagawa	31°12.1′N	130°37.1′E	20.4°N	198.3°	Vertical Sounding (I)
Okinawa	26°16.9′N	127°48.4′E	15.3°N	196.0°	Vertical Sounding (I)
Hiraiso	36°22.0′N	140°37.5′E	26.3°N	206.8°	Solar Radio Emission (S)
Inubo	35°42.2′N	140°51.5′E	25.6°N	207.0°	Radio Receiving (P)

A. IONOSPHERE

Ionospheic 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 as well as graphically on 35 mm photographic film. The digitally-recorded ionograms are collected from each station by the central computer and reduced to numerical values and Summary Plots by the automatic processing system. The ionograms obtained at Kokubunji are manually scaled as well by experienced specialists to supplement automatically-scaled parameters.

A1. Automatic Scaling

Digital ionograms are automatically scaled by the pattern recognition method. The following five factors of ionospheric characteristics are published for the present. The reliability of these factors has been ascertained by comparison of the automatically-scaled parameters with the manually-scaled values of large amounts of test ionograms.

The published data consist of tabulations of hourly values of three factors (*foF2, fEs, fmin*) and monthly medians of two factors (*h′Es, h′F*) , daily Summary Plots and monthly medians plot of *foF2*.

a. Characteristics of Ionosphere

foF2	Ordinary wave critical frequency for the *F2* layer
fEs	Highest frequency of the *Es* layer whether it may be ordinary or extraordinary
fmin	Lowest frequency which shows vertical ionospheric reflections
h′Es *h′F*	Minimum virtual height on the ordinary wave for the *Es* and *F* layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

A Impossible measurement because of the presence of a lower thin layer,for example *Es* (for *foF2*).

B Impossible measurement because of absorption in the vicinity of *fmin*.

C Impossible measurement because of any failure in observation.

G Impossible automatic scaling because of too small ionization density of the layer (for *fEs*).

N Impossible automatic scaling because of complex echoes.

Blank No digital record because of trouble in the automatic data processing system, but existence of film record.

c. Definitions of the CNT,MED,UQ and LQ

Median count (CNT) is the number of numerical values from which the median has been computed. In addition to numerical values, the count may include a descriptive letter G.

Median (MED) is defined as the middle value when the numerical values are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; the *lower quartile* (LQ) is the median value of the lower half.

If CNT is less than 10, there are blank spaces left.

d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of *foF2* , *fEs* and *fmin* were scaled within a difference of 1 MHz from about 90 , 90 and 99% , respectively of the test ionograms.

e. Summary Plot

Daily Summary Plots which are made from quarter-hourly digital ionograms are published to present general ionosphere conditions. The upper and middle parts of a Summary Plot show the diurnal variation of the frequency range of the echoes reflected from the *F* and *E* regions, respectively. The two solid arcing lines indicate the predicted values of *fxE* and *foE* calculated by the method described in the CCIR report 340. The lower part shows the diurnal variation of the virtual height where the echo traces become horizontal.

A2. Manual Scaling

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily *f*-plot.

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972 " and its revision of chapters I-4, published in July 1978.

a. Characteristics of Ionosphere

fxI	Top frequency of spread *F* trace
foF2 *foF1* *foE* *foEs*	Ordinary wave critical frequency for the *F2,F1, E* and *Es* including particle *E* layers, respectively
fbEs	Blanketing frequency of the *Es* layer, e.g. the lowest ordinary wave frequency visible through *Es*
fmin	Lowest frequency which shows vertical ionospheric reflections
M(3000)F2 *M(3000)F1*	Maximum usable frequency factor for a path of 3000 km for transmisson 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 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.

Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

When more than one type of *Es* trace are present on the ionogram, the type for the trace used to determine *foEs* must be written first. The number of multiple trace is indicated after the type letter.

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.

l A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.

c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)

h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normnal *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 measurements, 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 percent.

One of the following symbols may be attached after numerical values, if necessary.

D	greater than, or later than,
E	less than or earlier than,
U	approximate, or uncertain.

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

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

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

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

C. RADIO PROPAGATION

C1. Phase Variation in OMEGA Radio Waves at Inubo

The phase values of eight OMEGA radio signals as received at Inubo are depicted for an interval of one month, along with the phase deviation defined as a deviation from a value averaged over the six quietest day within the month. Particulars of the received signals are given in the table below.

In each of the four panels of the figure, the phase (ϕ) is shown in the lower part and the phase deviation ($\Delta\phi$) is shown in the upper part. The phase data are sampled every 30 min, so the curves of the phase and phase deviation are composed of 48 data points per day. The phase delay is measured as a positive value.

The polar cap phase anomaly (PCPA) caused by the solar protons are well detected on the Norway signal. The start, end and maximum times of the PCPA are listed in the table next to the figure, where the times are expressed as day / hour & minute in U.T.. The maximum phase deviation in the list is defined as a phase advance (negative values in the figure) in degrees.

C2. Sudden Phase Anomaly (SPA) at Inubo

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

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

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

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

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

Transmitting Stations

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

HOURLY VALUES OF foF2 AT Wakkanai

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	43	38		38		38		A	94		140	143	137	128	106	90	93	78	A		47	A		
2	89		38	38	37	40	48	70	90	82	143	147	89	127		92	82		40	48	49			A
3	A	A	59	49	56	31	48	A	87	94	140	140	114	132	92	89	72	79	A		A	A	A	A
4	89		59	59		38		53		121	138	138	139	106	124	119	86	83	84	49	60		A	
5	A	A	A	56	38	37	48	54	76	122	138	123			83	92	91	74	58	60	47	A	A	A
6	A	A	44	43	44	30	48	A	81	111	133	122	112	106		115	70	59	A	A	A	A	A	A
7	A	A	A	A	38	37	41	A	84	140	142	135	125	114	122	82	88	93	92	53	34	A	A	A
8	69	44	60	38	38			A	94	94	126	142	82	100		92	82		54	52	A			A
9	69	59	59	A		A	89	A	94	109	138	142	125	88	115	92	88	83	82	64	46	A	A	
10	A	37	38	40	40	A	69	52	92	92	137	119	97	88	119	92	81	52	50	59	A	A	97	
11	47	40	38	35	38	A	A	42	94	119	108	92	92	88	101	78		61	57	A	A		A	
12	A	41	59	48	38	38		69	94			93	93	98	86	82	84	81	A	A	56			A
13	58	44	38	41	41	40		63	94	82	114	102	95	93	92	84	83	61	32	44	A	A	A	A
14	59	44		36	38	40	49	A	92	94	82	94	85	90	92	81	68	53	A		49	A	A	A
15		50	59	31	37	37		A	90	84	98	93	82	83	84			58	53	52	A	A	A	A
16	43	41		44	42	38		53	95	76	99	94	92	92	83	81	A	80	52	A	A	A	A	A
17	49	59	59	31	31		79	A	84	90	92	92	96	91	82	91		52	53		A	A	A	A
18	89	32		34	34		89	42	95	92	104	92	107	86	93	94	83	58	A	A	A	96		
19	49	37	37	35	32	A	A	54	84	93		88	93		95	93	115	90	50	36	A	A	A	
20		59	36		38	A	89	A	80	81	103	100		91	92	78	80	68	58	46		69		
21	69		N	59		69	38	51	94	95		107	95	92	100	82	78	73	67	54		A	A	A
22	58		38	40	36	47	69	53	94	94	114	108	94	92	84	81	71	68	54	38				
23	89	32		37	37			A	93	90	108	104	103	90	95	81	83	82	66	69	49	A	A	A
24	59	42		37	37	32	A	82	96	94			104	95	94	92	91	54	74			A	A	A
25	69	69	69	37		34			95	94	119	115	95	106	107	81	94	54	A	50		A	A	34
26		69		40	37	49	59	54	94	100	A	126	98	115	94	92	81					A		A
27							47	A	94	79	80	69	80	79	81	76		82		A	A	A	A	
28	40	41	40	40		37		38	83	104	133	124	92	94	98		93	89	53	60				
29	89		36	29	36			A	95	94	94	105	92	95	92	93	84	73	66		41	A		A
30		36	46		59	40		A	93	83	114	92	106	112	106	92	84	82	41		59	A	A	
31	A	32	37		31				77	96	102		92	91	94	81	82	39	53	46		A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	21	20	25	24	19	15	15	30	29	26	29	29	29	28	29	26	28	22	17	11	2	1	1
MED	59	41	42	38	38	38	49	53	94	94	114	107	95	93	94	90	83	73	54	52	49	82	97	34
U Q	89	54	59	43	39	40	79	63	94	102	138	130	106	106	103	92	88	82	66	59	56	96	48	17
L Q	49	37	38	35	36	37	48	51	84	87	102	93	92	90	89	81	81	58	52	46	46	69	48	17

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fEs AT Wakkanai

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	26	G	G	G	G	G	G			G	G	G	G	G	G	G	G	G		G	G		G	G
2	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G		54	28	28	G	G	
3	64	28	26	G	G	G	G	41	47	G	G	G	G	G	G	41	43	45	42		48	56		
4		G	G	G	G	G	G	G	G	81	76	44	G	G	G	G	G	28	G	48	38	G		G
5	44	30	34	G	G	G	G	G	G	G	G	65	G		G	G	G	G	G	G	G			
6		61		G	G	G	42	39	55	77	48	G	G	G		G	28	39	54	50	28			58
7	30	39	32	30	30	G	52	49		G	G	G	G	G	40	30	30	25	44	48	G			
8	G		28	26	G	G	48		44	G	49	G	G	G	G	68	86		53	46	45	G		
9	G	G	G	26	27	45	42	32	G	G	G	G	G	G	G	G	42	42	G	55	36			G
10	32	G	G	30	G	33	43	40	G	G	G	G	G	53	50	46	76	47	39	44	28			G
11	G	G	30	G	29	42	35	50		G	G	G	G	G	G		44	42	61	46	42	G	72	G
12	31	G	G	G	G	28	32	26	G	G		G	39	G	74	43	73	89	44	42	G	G	G	
13	G	24	G	G	G	G	G	41	48	G	G		G	G	40	42	78	32	34	31	41			
14	G	G	G	G	G	G	44	29	G	G	G	G	G	G	38	35	31	G	38	G	G			
15	G	G	G	G	G	G	G	48	48	G	G	G	G	G	41		30	G	G	48	23			
16	G	G	G	G	G	G	G	G	48	G	48	G	G	G	G	G		32	60	50	25			
17		G	G	G	G	G	G	29		G	G	G	G	G	G	G		50	42		68			
18	G	G	G	G	G	25	42	45	G	G	G	50	G	G	G	G	G	G	27	32	34			G
19	24	G	G	G	G	28	29	53	34	G		G	G		G	38	G	G	G	83	66			G
20		G	G	G	G	34	52	34	G	G	G	G	G	G	G	G	G	G	28	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	40	32	30	42	G	27	G			
22	G	G	G	G	G	G	39	G	G	G	G	G	G	G		G		G	G	G	G		G	G
23	G	G	G	G	G	G	45	37	G	G	G	G	G	G	G	34	G	31	31	G	G			
24	G	G	G	G	G	G	34	32	30	G			39	G	G	33	G	50	51	39				
25	48	G	G	G	G	G	24	G	48	G	G	G	G	G	40	36		34	46	46	G			G
26	G	G	G	G	G	32	31	G	48	36		G	G	G	G	G	G			G	G		G	
27			G				G	45	48	G	G	G	G	G	G	G		G		64	36			G
28	G	G	G	G	G	60	33	40	30	G	G	G	G	G	G	G	30	29	25	G	G	G	G	G
29	G	G	G	G	G	G	G	37	42	G	G	G	G	G	G	G	G	G	G	G	G		G	
30	G	G	G	G	G	G	30	27	G	G	G		G	G	42	41	32	46	G	49	48			G
31	31	G	G	G	G	G	G		G	G	G		G	G	G	G	G	G	G	G	G			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	26	29	30	30	30	30	31	28	27	31	27	27	31	29	28	29	26	28	28	29	30	8	9	15
MED	G	G	G	G	G	G	30	33	G	G	G	G	G	G	G	G	29	30	32	39	24	G	G	G
U Q	30	G	G	G	G	28	42	41	48	G	G	G	G	G	40	37	42	42	45	48	38	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	20	16	18	17	17	17	16	18	17	20	22	21	22	23	20	23	16	15	15	15	16			
2	18	20	17	18	21	18	15	20	27	20	20	20	20	18		26	17		15	15	17			
3	18	18	16	20	17	16	15	20	24	20	20	21	21	21	28	15	15	16	15		15			
4	20	20	16	20	20	20	15	18	15	16	17	17	18	20	18	23	17	17	16	15	16			
5	18	17	16	17	20	20	16	18	26	21	20	20	20		26	24	17	17	15	15	17			
6	15	16	16	17	17	15	15	14	17	18	20	21	21	20		16	17	15	15	15	18			
7	18	16	17	15	15	17	15	15	16	17	18	18	20	20	18	15	16	16	15	16	21			
8	20	15	18	18	20	20	18	15	15	15	16	18	20	23	22	17	16		15	15	15			
9	18	20	18	18	18	16	15	15	24	28	20	20	21	24	28	23	15	15	15	16	16			
10	15	17	17	17	18	17	15	15	22	34	33	47	47	24	21	21	16	16	15	15	20			
11	17	15	17	15	15	16	15	14	20	29	34	33	22	23	23	20	15	15	15	15	16			
12	16	18	21	20	18	17	15	16	23	32		48	27	35	20	17	15	14	15	15	20			
13	20	18	21	17	16	18	15	15	26	18	21	21	21	20	18	15	16	15	14	15	18			
14	21	17	18	16	16	16	14	16	16	16	16	18	16	18	18	16	15	16	14	14	21			
15	18	16	18	18	18	18	15	14	20	18	17	18	18	18	16		14	15	15	15	18			
16	20	15	16	16	15	16		17	28	18	18	20	21	18	20	22	15	15	15	15	18			
17	21	21	21	16	18	20	18	18	20	20	20	22	34	20	29	24		15	16	20	15			
18	20	18	17	18	17	18	17	16	17	18	20	20	20	17	17	26	18	15	16	15	15			
19	20	18	20	15	17	20	15	14	16	18		21	22		30	20	18	15	15	16	16			
20		18	17	20	17	17	15	15	16	20	20	22	22	21	17	24	20	15	14	15	21			
21	21	17	20	21	18	17	15	17	16	17	18	21	18	18	17	15	17	15	15	15	20			
22	17		18	18	16	15	16	16	15	18	20	20	22	20	18	27	18	16	15	15	15			
23	18	20	20	18	20	16	15	17	26	17	17	20	20	20	18	16	18	15	16	14	17			
24	17	18	20	17	18	18	14	15	15	18			20	18	18	16	18	15	15	14				
25	17	16	18	16	20	20	17	16	26	18	20	20	17	18	17	15	15	15	15	16	15			
26	20	18	18	17	16	16	16	16	21	18	16	20	17	20	18	17	16			16	26			
27							20	17	21	20	34	51	35	34	33	30		15		14	15			
28	20	17	20	17	20	17	15	15	16	17	20	18	20	21	15	24	18	15	15	16	16			
29	20	18	18	20	18	20	16	15	15	18	21	23	23	22	20	24	17	14	15	15	16			
30	18	20	17	18	20	16	14	16	23	27	21	21	18	20	17	15	15	15	15	14	17			
31	17	20	17	18	18	18	14		21	15	15		17	16	18	15	17	15	16	15	18			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	30	30	30	30	30	30	31	31	28	29	31	29	29	30	29	28	29	30	30			
MED	18	18	18	18	18	17	15	16	20	18	20	20	20	20	18	20	16	15	15	15	17			
U Q	20	19	20	18	20	18	16	17	24	20	20	21	22	22	22	24	17	15	15	15	18			
L Q	17	16	17	17	17	16	15	15	16	17	17	20	18	18	17	16	15	15	15	15	16			

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF foF2 AT Kokubunji

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	38	46	A	42	41	58	64	94	105	121	150	149	149	140	140	132	117	91	77	81	68	47		
2	56	59	34		37	41	48	94	116	127	132		151	137	132	127	132	99		60	69	46	A	A
3	46	A	A		59	34	46	92	106	107	137	153	138	132	137	133	103	93	80	82	60	58	A	A
4	A	A	56		38	38	58	92	117	152	150	149	135	140		138	116	120	82	68	68	68		A
5	A	A	58	A	A	35	38		94		134	124	121	120	113	113	116	97	69	56	70	69	46	58
6	A	44			59	34	41		108	106	115	120	124	115	117	114	114	63	57		56	23	58	46
7	35	34	31	30		35	58	69	96	149		151	120	120	114	120	103	86		A	A	A	58	A
8	A	A		N	27	37	68	70		116	174	151	127	123	122	118		A	A	A	A	57	A	59
9	41	36	40			N			106	135	151	116	94	104	113	112	97	91	97	82	A	57	57	57
10		30	35	32	34	59	59	69	81	122	152	114	107	104	116	103	82	93	58	57			37	
11	59	35	38	35	30	34	40	68	115	114	126	117	110		111	104	86	60	A	A	A	58	31	
12	40	31		34		59	35	74		116	153	153	125	117	122	116	100	80	82	56	56	40	46	34
13	38	38	59	A	25	29		68	94	115	132	116	106	93	90	90			69	56		43		36
14	36	35			31	28		63	93	114	115	102	97	85	117	84	A	71	A	47	56	38	35	56
15	34		38		34		58		93	103	104	115	115	94	93	92	83	62	67	46			36	
16	32	35		34	32	35	89	67	94	103	107	93	110	112	103	92	88		56	A	A	48	40	36
17	31		58	32		49	69	68	93	103	106	116	102	103	116	98	83	48	56	A	A	A	59	A
18	36	A		30	32	A	40		105	126		126	132	134	132	114	93	92	56	43	A	A	A	
19		59	30		28	35		68	94	116	117	122	116	108	108	114	102	81	72	56		A	42	
20					28		37	69	114	116	120	115	116	113	108	103	82	80	82		57	58	50	58
21	30	29	32		35	26	35	70	94	94	120	115	102	101	100	100	116	76	73	50	56	58	58	46
22	A	47		N	31	30		92	92	114	121	115	114	107	100	102	94	79	76	72	56		44	
23	59	35	37			25		74	91	113	128	152	116	107	95	103	96	98	82	70	60	A	32	56
24	51	67	59		29	35		94	105	122	153	154	126	122	113	103	86	90	A	47	56	38	A	
25	31		69	30		31	37		98	122	124	131	127	119	120	114	81	86	92	A	A	A	A	A
26	A	A	37	38		N	29			120	133	136	122	105	108	111	101		81	50	A	A	A	58
27				34			38	69	94	116	122	115	123	130	115	116	116	82	74		A		A	A
28	A		59	32	32	35	29	69	104	116	128	132	117	121	122	113	91	81	94		63	56	38	38
29	35	35		38	29	29		68	94	97		135	131	123	116	114	102	74	81	69	56	46		37
30	36	37	36		36	37		68		122	132	135	126		132	122	101	83	60	56	57	58	46	
31			69	34		29		69	111	113	107	116	116	115	97	102	91	67	A	60	58	37	40	41
	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	18	19	14	21	25	21	24	27	30	28	30	31	29	30	31	28	27	24	21	17	20	19	15
MED	36	36	38	34	32	35	41	69	96	116	128	123	120	115	114	113	98	82	75	56	57	52	44	46
U Q	46	46	59	35	36	37	58	83	106	122	143	149	127	123	122	116	108	92	82	69	65	58	57	58
L Q	34	35	35	32	29	29	37	68	94	113	118	115	110	104	108	102	87	74	63	50	56	41	37	37

HOURLY VALUES OF fEs AT Kokubunji

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	26	G	32	G	G	G	G	G	G	G	G	54	G	G	G	G	G	52	28	40	28	23		G
2	G	24	33	G	G	G	G		39	G	G	54	52	G	G	G	G	28	26	30	30	25	48	67
3	53	47	34	28	G	G	G	G	G	44	G	G	G	51	G	37	G	G	45	30	G	30	62	34
4	60	33	25	G	G	G	G	28	G	G	G	G	G	G	41	40	37	35	34	G	G	G	42	60
5	34	28	G	34	28	G	26	G		G	G	G	G	G	G	G	34	G	G	30	37	40	29	G
6	32	28	G		G	G	G	G	G	G	G	G	G	G	G	34	G	34	45		49	G	G	G
7	G	G	G	G	G	G	G	29	36	40	43	48	118	G	G	36	28	37	56	121	68	38	G	34
8	58	34	25	G	26	G	G	28	36	43	50	43	54	72	58	71	71	102	152	100	55	38	60	34
9	32	G	G	G		G	34		62	G	G	G	G	G	G	35	G	G	G	28	50	36	28	26
10	G	G	G	G	G	G	27	G	G	G	G	G	G	G	G	G	36	44	33	30	G	G	G	
11	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	31	40	57	60	61	28	G	G
12	G	23	G	G		G	G	G	G	G	G	G	G	G	G	G	G	33	28	G	G	G	G	G
13	G	G	27	28	28	G	G	G	G	G	G	49	G	55	61	61	133		69	34	G	G	G	G
14	G	G	G	G	G	G	G	G	G	G	G	G	43	56	65	69	71	85	40	G	G	G	G	G
15	G	G	G		G	G	G	G	G	G	G	G	G	G	G	44	41	41	24	23	G	G	G	G
16	G	G		G	G	G	G	G	G	G	G	G	G	43	G	G	34	37	36	40	32	G	G	G
17	G	G	G	G		G	G	40	37	38	40	G	G	G	G	42	29	46	45	60	33	34	34	35
18	28	30		G	G	30	32	58	G	G	G	G	G	G	G	G	G	G	29	33	64	40	32	40
19	G	G	G		G	G	25	38	G	G	G	G	G	G	G	G	G	G	G	26	G	35	G	G
20				G	G	G	G	G	G	39	53	60	56	G	40	G	29	28	G	G	G	G	G	G
21	G	G	G		G	G	G	G	G	G	G	43	50	53	G	G	G	G	G	G	G	G	G	G
22	30	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
23	G	G	G	G		G	G	G		G	G	G	G	G	G	G	G	28	26	34	G	27	G	G
24	G	G	G		G	G	G	27		G	G	G	G	G	G	G	32	61	62	28	28	26	43	
25	G	G	G	G	G	G	25	31	37	G	G	G	G	90	39	59	48	44	72	61	53	52		28
26	27	27	G	G		G	G	36	G	G	G	G	G	G	G	G	G		G	26	54	40	32	G
27	G		G	G		G	G	G	G	G	48	49		G	G	G	48	40	46	52		34	30	34	30
28	29		G	G	G	G	30	32	57	39	G	G	G	G	G	G	G	G	29	30	G	28	27	G
29	G	G	G	G	G	G	25	G	G	40	G	G	G	G	G	G	G	G	G	G	G	G	G	G
30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	45	G	G	G	G	G	G	G	G	G
31	G	G	G	G		G	G	G	G	G	G	G	G	48	57	44	52	39	30	28	G	G	G	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	30	28	28	26	24	31	31	29	27	31	31	31	31	31	31	31	31	29	31	29	31	31	29	29
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	28	34	29	30	G	25	G	G
U Q	29	25	G	G	G	G	25	28	36	G	G	43	G	43	39	42	37	44	45	37	49	35	33	32
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. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	14	14	15	15	14	23	32	18	22	23	18	17	17	15	21	14	17	15	15	15		15
2	14	15	14	14	15	18	15	16	15	16	18	22	23	22	17	17	22	15	14	14	14	14	14	14
3	15	14	14	18	15	14	15	15	17	20	23		29	22	20	18	16	15	14	14	14	15	15	14
4	14	14	15	14	16	15	16	15	16	16	17	20	16	17	16	15	15	15	14	15	14	14	14	14
5	16	14	15	14	17	17	14	15	14	18	17	17	18	18	16	16	15	14	15	16	14	14	14	15
6	15	15	14		15	14	14	16	15	16	17	18	18	20	15	14	22	15	15		14	16	17	15
7	14	14	14	14	15	15	15	14	15	17	18	20	17	17	14	16	14	14	14	15	15	14	15	14
8	15	14	15	15	14	16	15	16	15	15	16	17	17	16	16	15	16	15	15	14	14	14	14	15
9	15	14	15	16		16	15		14	15	16	18	17	15	14	15	17	15	15	15	14	14	14	14
10	14	16	15	14	14	16	16	15	15	20		44	39	42	34	17	15	14	15	14	18	14	14	
11	16	15	14	14	15	15	15	18	32	45	52	46	63		52	28	15	15	15	14	14	15	15	18
12	22	14	18	15		15	17	20	17		27	31		40	21	17	23	15	15	15	15	15	14	14
13	14	15	14	14	14	17	15	21	15	20		48	33	26	16	15	15		14	14	14	14	14	18
14	15	15	15	15	15	14	15	14	16	18	15	21		18	17	15	15	15	15	14	15	15	14	15
15	14	14	15		14	14	15	15	18	16	15	21	14	18	17	15	14	14	14	15	15	20	18	15
16	15	14		14	15	15	15	14	14	17	18	21	21	17	15	14	14	14	14	14	14	15	14	15
17	15	71	15	15		17	15	14	16	16	23		42	40	18	15	15	14	14	14	14	15	14	15
18	17	15		21	16	14	14	15	14	16	18	21	20	22	20	18	14	15	14	15	14	14	14	15
19	15	17	17		17	16	16	14	15	17	23		40	17	18	17	18	15	15	17	15	14	15	17
20				16	15	20	14	18	15	16	16	17	15	15	14	15	14	14	14	14	14	14	15	15
21	15	18	15		16	16	15	15	16	18	22	23	23	23	22	18	24	14	15	15	14	15	14	15
22	14	17	15	15	16	15	15	17	16	16	18	18	20	24	26	18	23	14	14	15	14	15	15	16
23	17	15	15	14		16	18	14	17	17	16	16		17	18	20	21	15	15	14	14	15	16	15
24	15	14	16			15	15	20	16	17	16	20	18	17	17	16	15	15	16	15	14	15	15	
25	14	16	14	15	15	16	14	14	16	16	14	16	15	16	16	15	14	15	15	15	14	14	15	14
26	14	15	14	18		15	15	15	15	18	20		23	20	21	17	15		14	15	15	14	14	16
27	18		18	15		18	15	20	15	17	16	22	27	20	18	16	17	14	14		15	15	14	15
28	14		16	15	16	14	14	15	14	14	15		26	20	17	16	24	15	14	15	14	15	14	
29	15	15	14	14	15	17	15	15	15	15	18		16	18	16	18	24	15	14	14	15	15	17	15
30	15	16	15	15	15	15	14	20	15	15	15	16	17	18	18	16	24	15	16	17	15	14	16	15
31	17	17	16	14		18	17	20	15	15	14	17	15	14	15	15	15	15	14	16	15	16	15	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	28	28	26	23	31	31	30	31	30	29	25	28	30	31	31	31	29	31	29	31	31	30	28
MED	15	15	15	15	15	15	15	15	15	16	17	20	19	18	17	16	15	15	14	15	14	15	14	15
U Q	15	16	15	15	16	17	15	18	16	18	21	22	26	22	20	17	22	15	15	15	15	15	15	15
L Q	14	14	14	14	15	15	14	15	15	16	16	17	17	17	16	15	15	14	14	14	14	14	14	14

COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES

IONOSPHERIC DATA of Yamagawa is not available due to the ionosonde trouble.

HOURLY VALUES OF foF2 AT Okinawa

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		43	49	58	57	44		81	123	134	132	117	146	160	171	161	162	159		A	114	117	91	93
2	70	69	61	62	69	47	38	82	116	156		147	159	170	182	185	180	184			120		94	69
3	42			43	50	49	57	75	121	125	137	147	164	172	192	200		199		167	161	149	114	50
4	67	68	48		51	37	61	90	139	159	158	166	166	169	182		171	178	174	A	122	115	94	59
5	48	49	59	40		34		59	104	159	126	122	132	130	130	154	146	158	174	A	156	158	97	70
6	70	43	44	43	37		59	65	96	106	113	117	132	127	132	150	147	141		169	154		93	64
7	58	62	69	58		37		68	116		151	153		170	161	166	167	171	174		133	124	117	82
8	A	94	49	A	A	38	69	A	87	112	125		134	118	122	130	137	130	139		126	134	80	92
9	75	60	A	41			89	91	90	124	132	128	122	114	124	132	151	174	172	189	175	150	122	93
10	N	64	35	38		38		68	114	93	99	121	139	122	132	132	142	154	159		116		93	95
11	70	70	70	46				60	110	116	119	132	156	171	171	170	160	152	150	128	94	92	69	69
12	70	43	56				N	89	118	117	159	166	157	153	154	163	166	154		175	150	92	92	61
13	69	67	38				59		96	133	133	126	128	132	150	117	122	117			116	82	70	67
14	58	43	47						94	155	138	132	131	154	164	118	105	112	A	A	81	93	70	
15	59	37	44	42	36			89	84	139	123	133	126	142	158	144	156	126	92	A	88	84	58	46
16		48	56		A	A	69	68	93	124	126	112	124	156	172	158	158	123	112	A	92	95	82	69
17	57	69	63				58		95	95	131	121	153	150	162	148	138	125	133	110	93	92	77	70
18	69	44				60	38	A	110	133	144	170	179	166	N	150	160	166	156	144	117	93	82	80
19	92	50	B	B	B	B		119	97	117	105	120	130	144	157	171	156	146		81	96	117	76	92
20	72	69	50	38			109	N	126	120	132	131	155	156	166	174	174	163	165	148	164	153	122	93
21		38	34	B	32	34	38	59	121	131	132	116	132	142	153	151	146	146	155	131	122	117	94	67
22	69	69	58	48	38	35	109	149	124	130	125	130	145	152	149	145	159	172	171	177	94	120	93	62
23	44	41	50	70	38		89	47	104	123	131	148	123	145	127	125	120	124	127	111	106	87	111	92
24	70	70	57	43	38	N	B	59	123	146	148	153	172	166	151	150	142	121	112	A	82	94	63	50
25	59	50	43	38	89		37	69	100	124	144		132	146	146	172	147	124	124	189	92	92	81	56
26	43	69	54	55	69	26	28	54	114	131	146	125	124	158	154	162	145	158	138	179	88	115	67	44
27	56	55	58	38	31		56	60	102	117	120	120	133	158	168	161	144	156	140	90	92	112		60
28	69	56	59	51	43		42	70	119	120	122	130	151	160	158	145	154	121	111	110	117	96	81	66
29	57	60	68	41	N	B	N	109	89	121	140	136	165	168	174	172	170	171		140	119	117	94	
30	73	70	70	41	41	40	44		88	122	141	111	134	161	172	168	181	174	189	146	124		120	70
31	B		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	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	25	29	26	20	15	13	19	23	30	29	29	28	29	30	29	29	29	30	21	18	30	26	29	28
MED	69	60	55	43	41	38	58	69	107	124	132	130	134	155	158	154	154	154	150	145	116	114	92	69
U Q	70	69	59	53	57	45	69	89	119	133	142	147	156	166	171	169	164	171	171	175	126	120	95	87
L Q	57	43	47	40	37	34	38	60	95	117	124	120	130	142	147	144	143	125	125	111	93	92	76	60

HOURLY VALUES OF fEs AT Okinawa

DEC. 2000

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		G	G	G	G	G	G	G	G	G	G	G	G	G	G	45	49	G	39		37	31	G	G
2	G	36	G	G	G	G	G	G		G		G	G	G	G	G	G	38	28	46	27	G	G	G
3	G	G	G	G	G	G	24	G	38	40	43	59	G	46	59	G				43	39	34	36	26
4	22	45	G	G	G	G	G	46	35	38		48	52	53			38	40	49	52	40		40	G
5	26	G	26	25	25	G	G	G	G	G			G	G	G	G	G	G	G		G	40	G	G
6	G	G	26	34	G	G	G	25	G	38	43	52	G	G	G	44	59	41	47	39	23		G	G
7	G	G	27	27		G	G	G		41	45	63	50	51	54	48	45	36	34		G	G	G	G
8		41	34	27	32	G	G		G	G	G	47	48	55		49	39	37	34	G	G	20	G	G
9	37	62	36		G	G	G	23	G	G	47	47	44	47	53	64	45	38	36	G	G		G	34
10	28	31	25	G	G	G	G	G	G	43	50	46	G	G	G	G	37	G	45	49	45		G	G
11	G	G	G	G	G			25	G	38	G	G	G	G	G	G	39	G	50	36	43	26	24	G
12	G	G	G	G			G	24	53	38	G	G	49	G	43	53	50	42	38	34	G	G	G	G
13	G	G	G				G	32	G	G	G	G	56	46	53	44	77	65		46	G	G	G	G
14	G	G	G	G	G			23	G	39	49	G	56	43	G	41	38	76	61	64		G	G	G
15	G	G	G	G	G	G		G	34	G	45	G	G	50			41	32	35	48	43	50	G	16
16	G	G	G		22	24	G	68	38	G	G	56	60	58	49	49	53	58	34	57	30	38	39	G
17	G	G	G	G			G	23	G	38	G	G	G	46	48	48	42	33	53		25	G	G	G
18	28	G	G			G	G	43	71	81	42	G	62	G	G	40	37	34	40	56	25	G	G	G
19	G	G				B		48	34	58	80	G	G	(	G	G	G	G		48	G	G	G	G
20	G	G	G	G	G	G	G	G	G	G	G	43	G	44	G	G	37	37	29	36	G	G	G	G
21	G	G	G	B	G	G	G	G	34	38	G	G	G	G	G	G	G	33	34	36	G	35	G	G
22	G	G	G	G	G	G	G	G	32	41	G	49	G	G	G	G	G	G	G	134	G	G	120	G
23	G	G	G	G	G	G	G	G	43	40	G	G	G	G	G	G	G	G	38	76	G	G	G	G
24	G	G	G	G	G	G	B	G	G	G	G	G	G	G	44	G	38	39	48	50	G	G	G	25
25	G	G	G	G	G	G	G	24	G	39	G		G	G	G	G	G	G	60	83	G	36	28	G
26	G	G	G	28	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	G	G	G	26	G
27	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	24	G	G	G		G
28	G	G	G	G	G	G	G	G	G	38	G	G	G	60	G	G	G	31	G	G	G	G	G	G
29	G	G	G	G	G	B	G	G	G	G	G	G	44	G	G	G	G	G		35	G	G	G	
30	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	42	G	G	26	44	G		G	G
31	B		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	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	28	30	29	24	24	23	25	29	28	30	27	28	30	30	27	28	29	29	26	26	29	25	29	29
MED	G	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	37	33	36	45	G	G	G	G
U Q	G	G	G	G	G	G	G	24	34	39	43	47	48	46	44	44	43	39	47	52	28	32	12	G
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	29	35	G	G	G	G

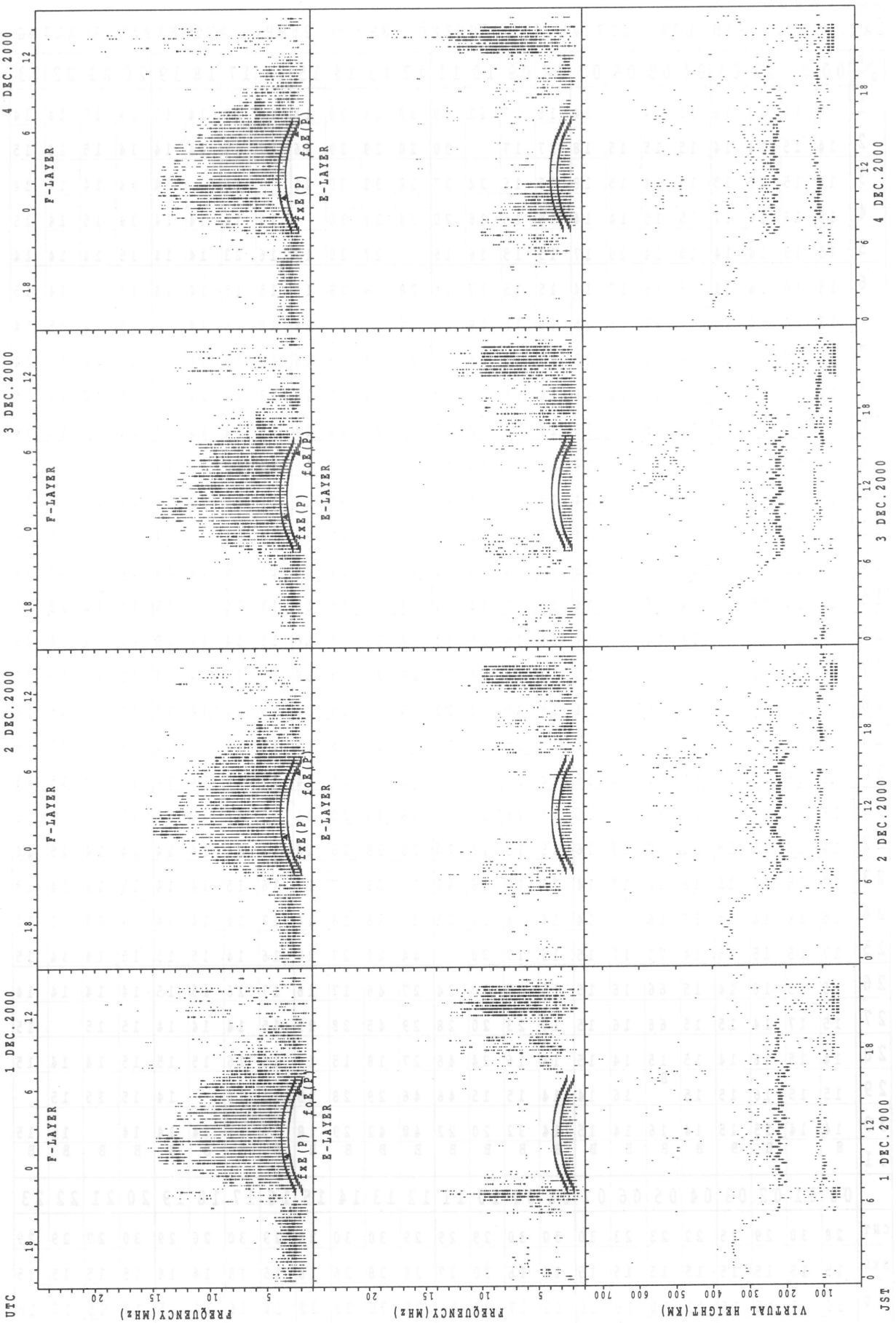
COMMUNICATIONS RESEARCH LABORATORY, JAPAN

HOURLY VALUES OF fmin AT Okinawa

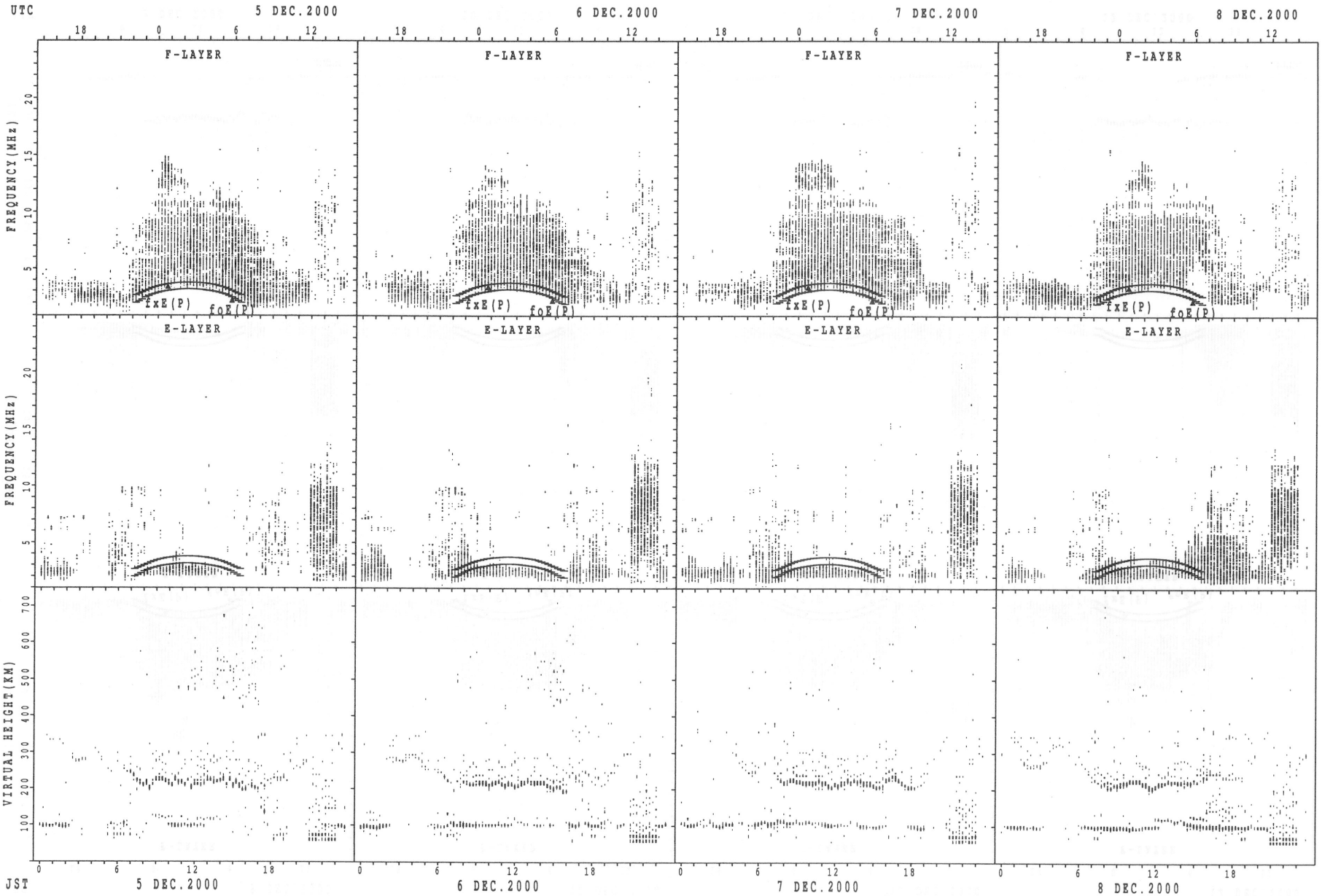
DEC. 2000

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

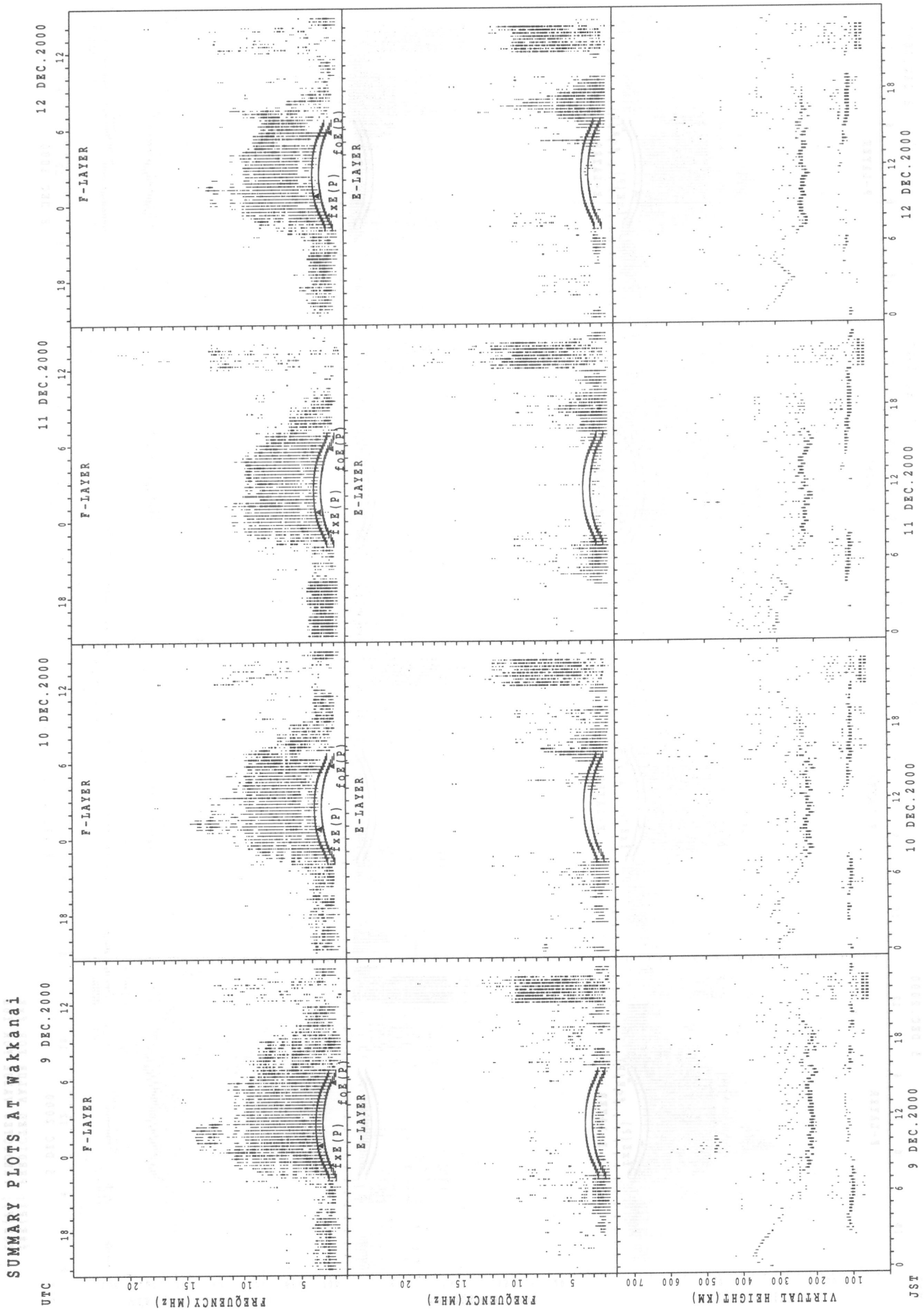
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		14	16	15	15	14		14	18	17	21	39	30	28	28	18	16	27	14	15	14	15	14	14
2	14	15	14	14	15	15	15	18	27	17		30	28	29	29	26	17	15	14	14	14	15	14	15
3	14	15	27	15	15	14	15	18	15	16	24	27	28	32	30	26		16		14	14	14	14	14
4	15	15	16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


SUMMARY PLOTS AT Wakkanai
UTC
JST
1 DEC.2000
2 DEC.2000
3 DEC.2000
4 DEC.2000
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

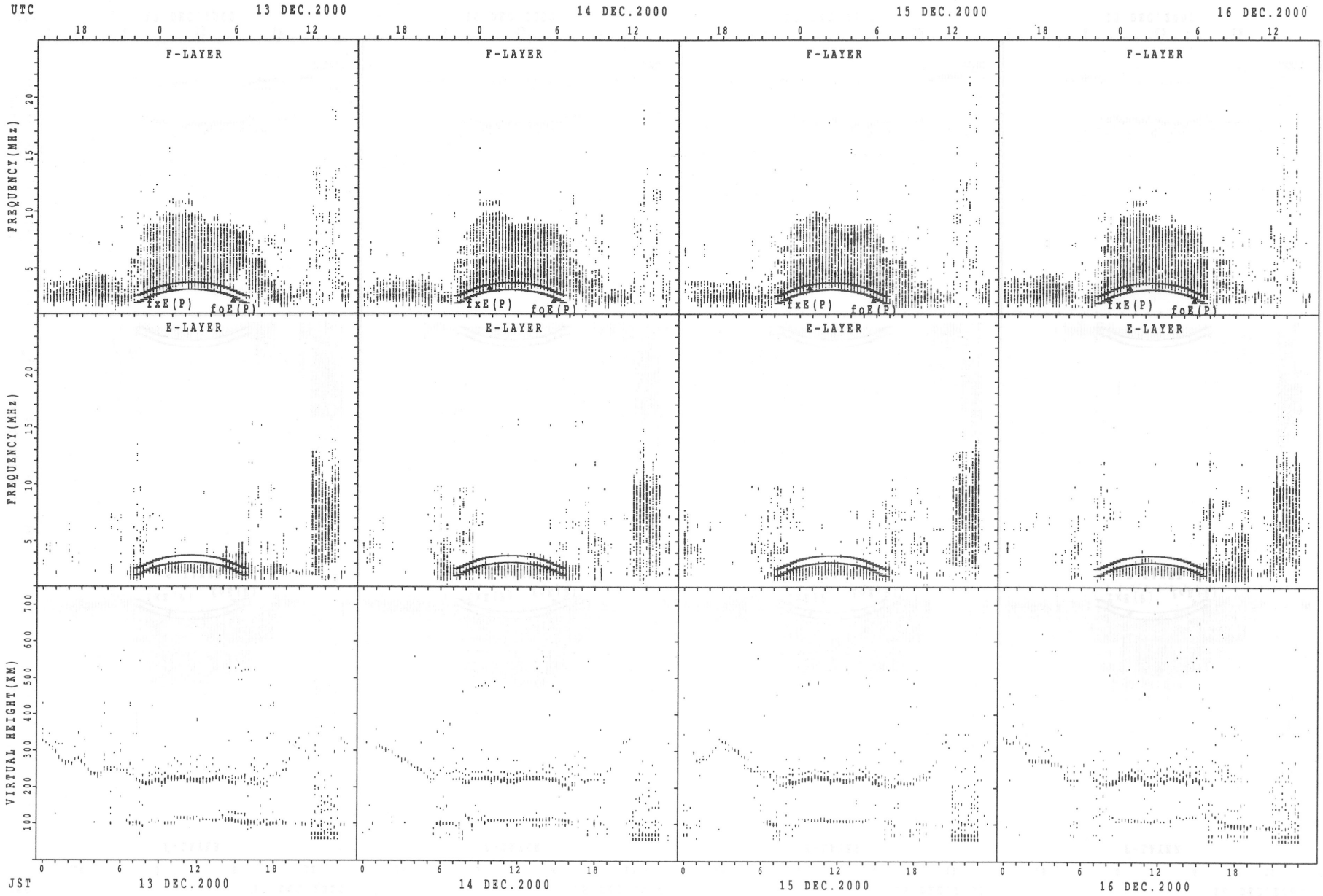
SUMMARY PLOTS AT Wakkanai



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

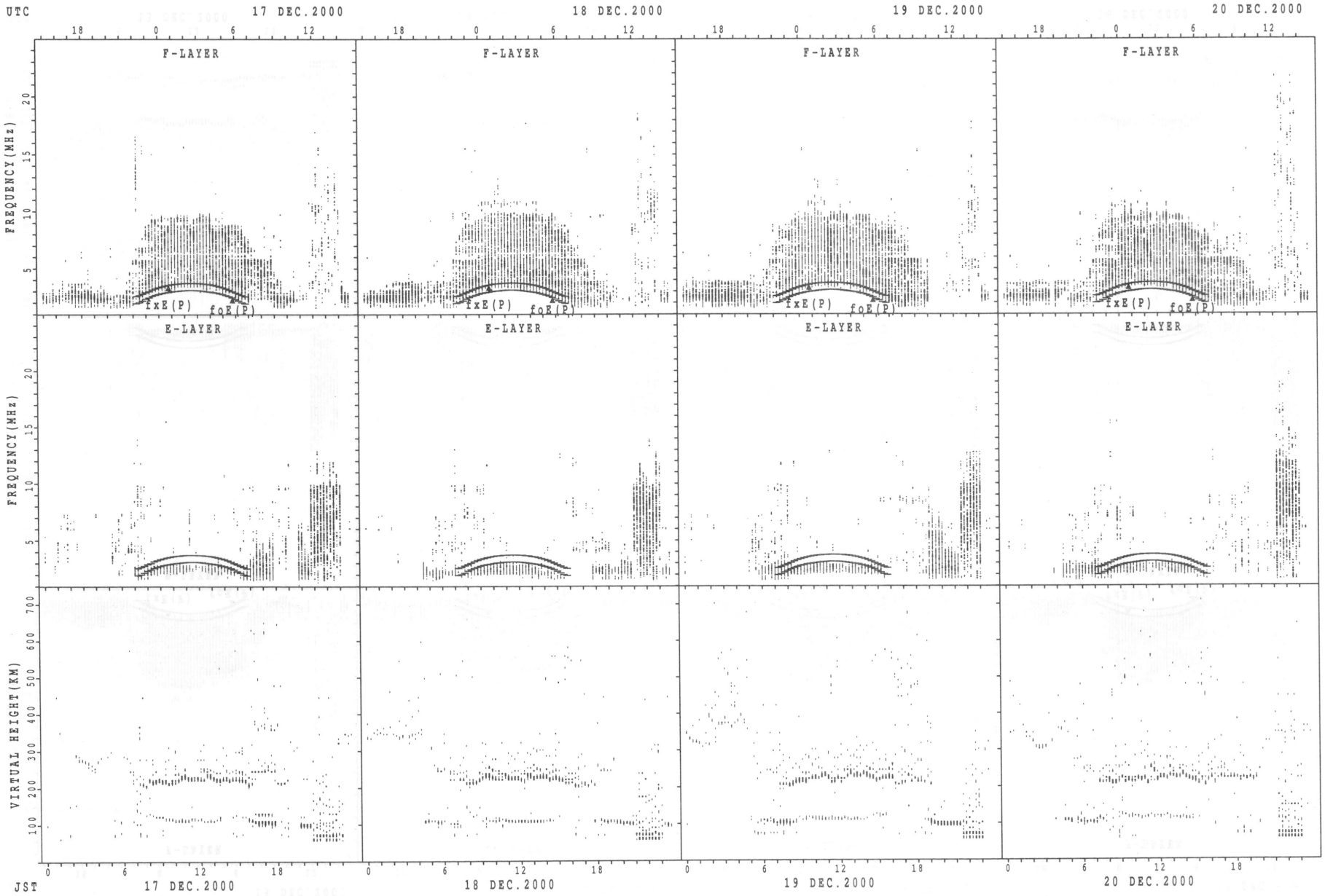

SUMMARY PLOTS AT Wakkanai
UTC
JST
9 DEC.2000
10 DEC.2000
11 DEC.2000
12 DEC.2000
F-LAYER
E-LAYER
fxE(P)
foE(P)
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



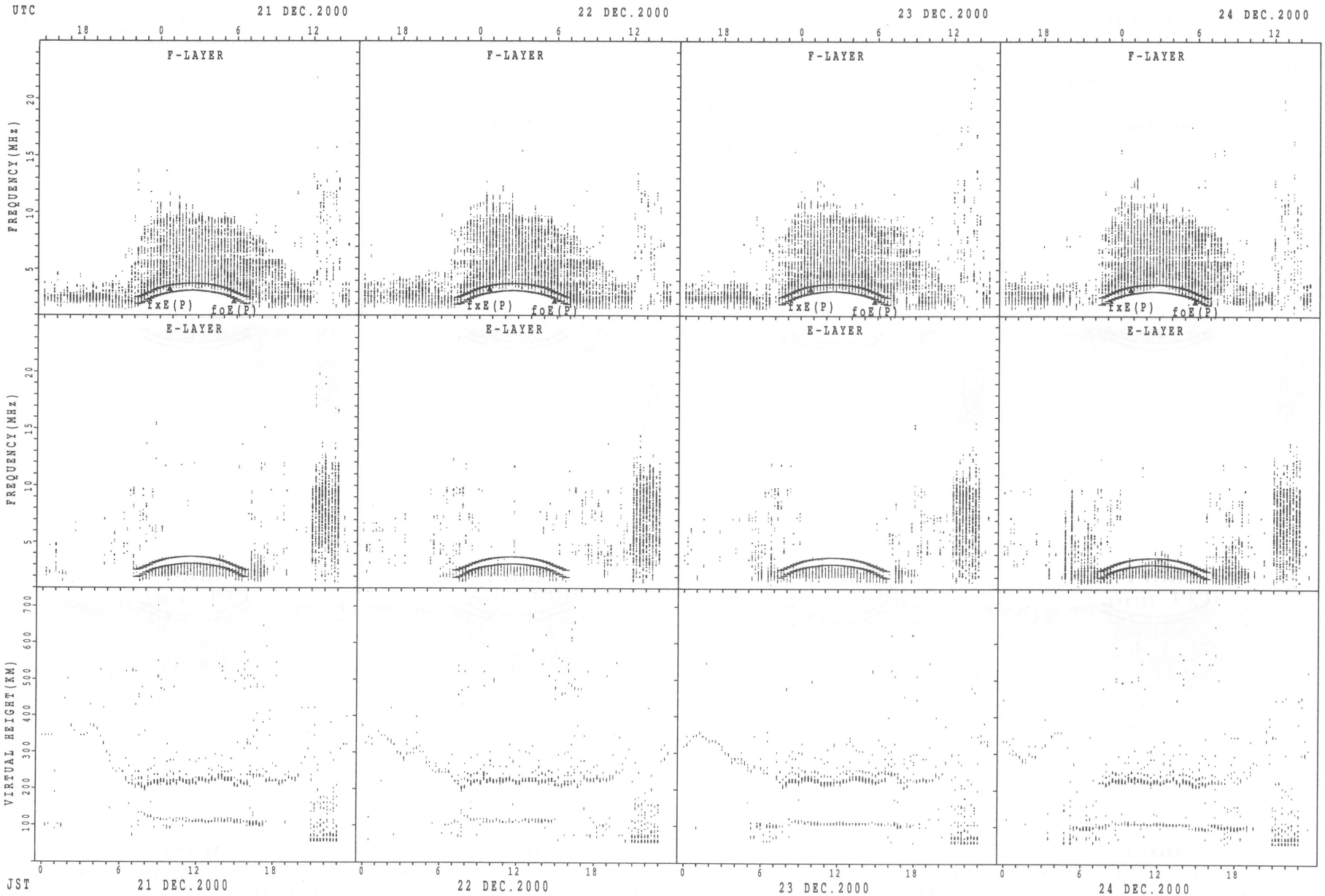
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai

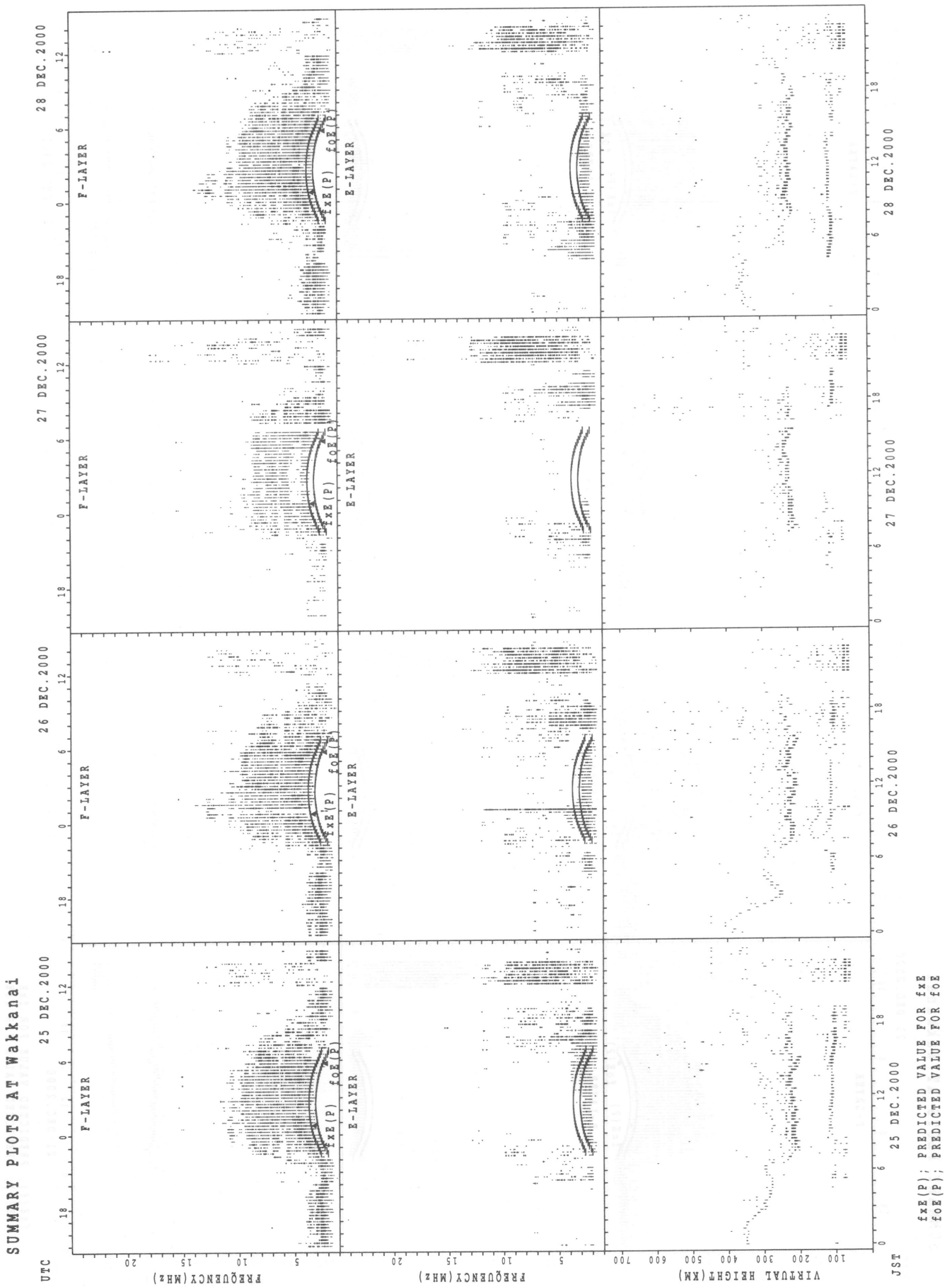


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

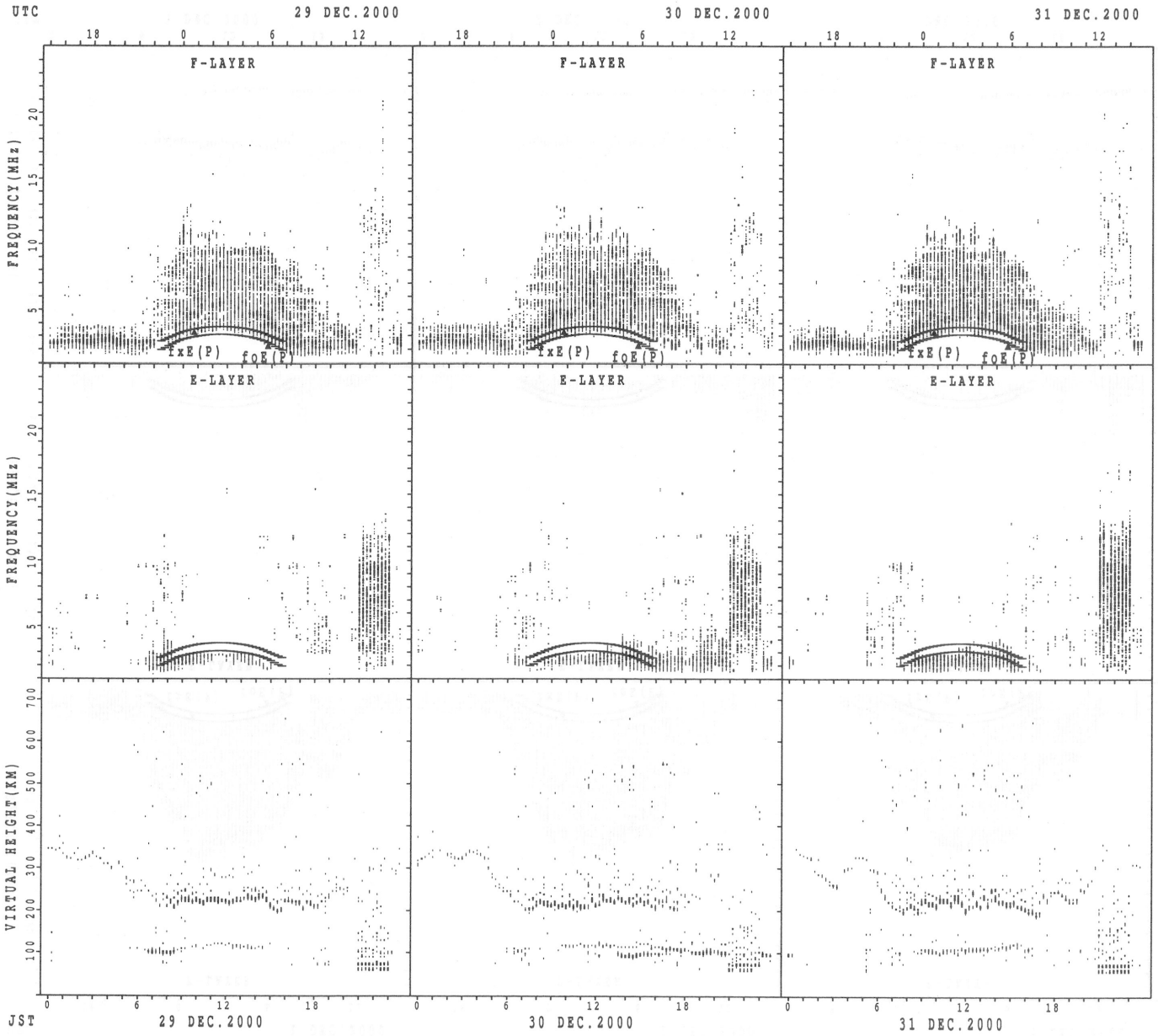
SUMMARY PLOTS AT Wakkanai



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

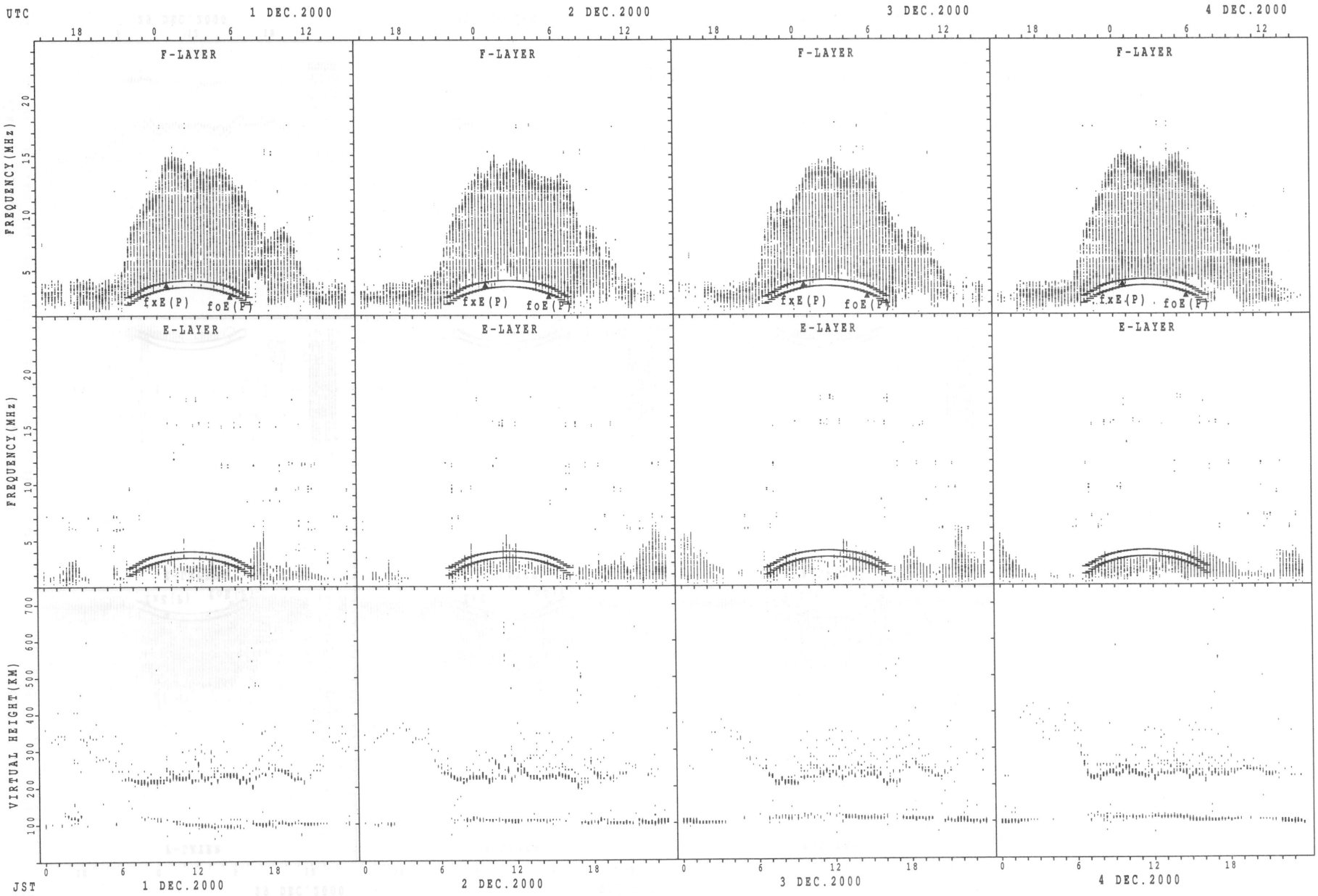

SUMMARY PLOTS AT Wakkanai
UTC
JST
25 DEC.2000
26 DEC.2000
27 DEC.2000
28 DEC.2000
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P)
foE(P)
fxE(P) ; PREDICTED VALUE FOR fxE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



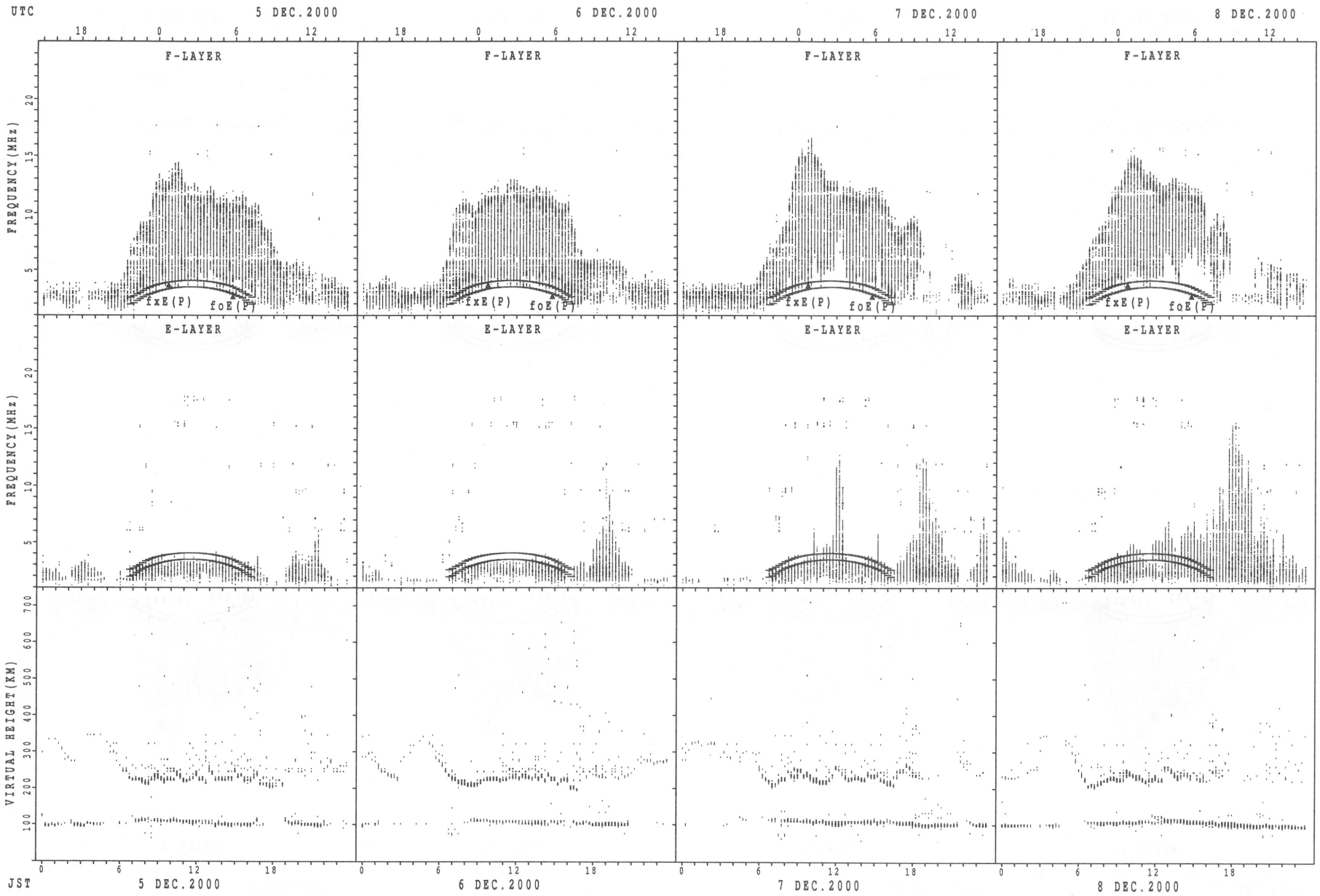
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



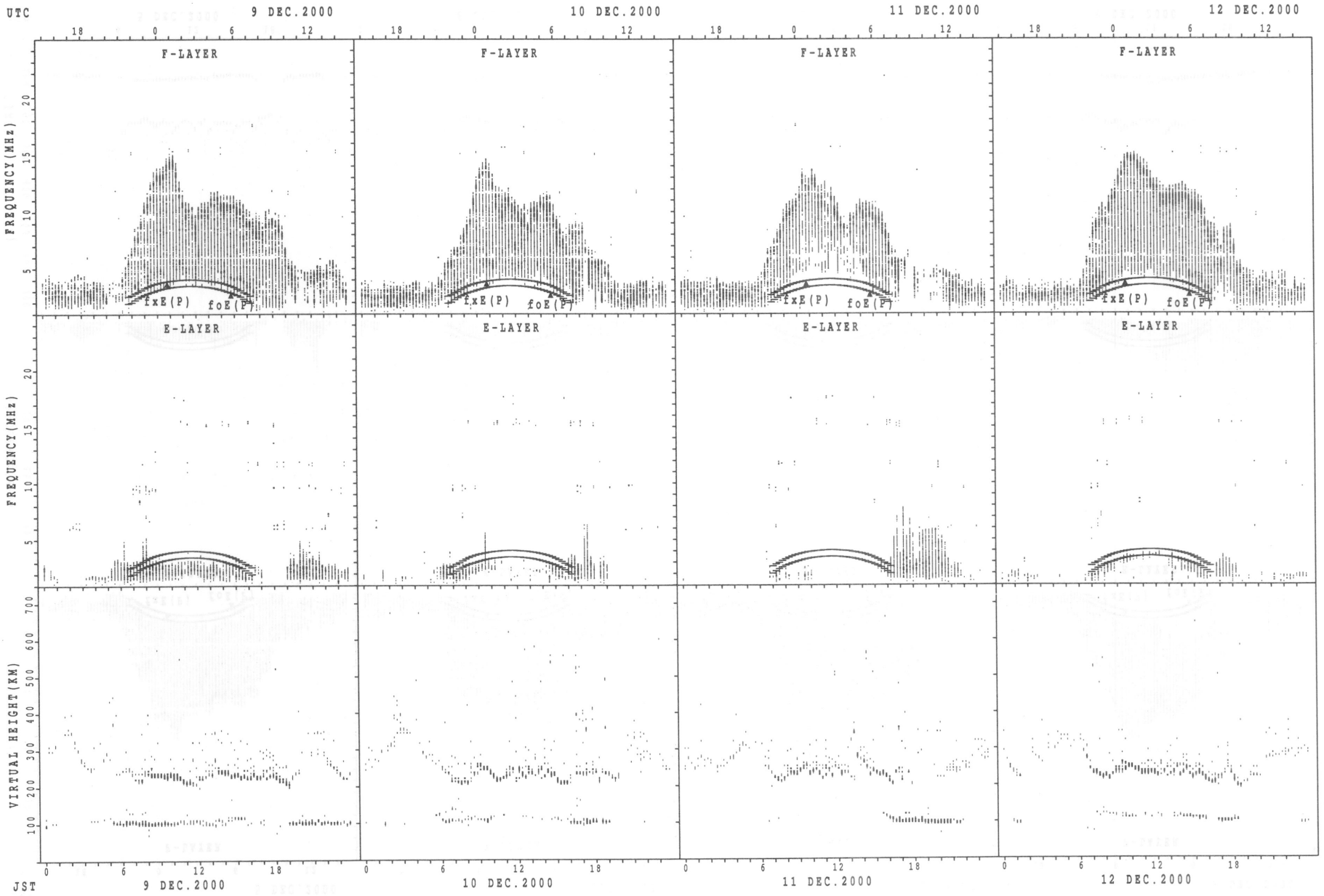
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



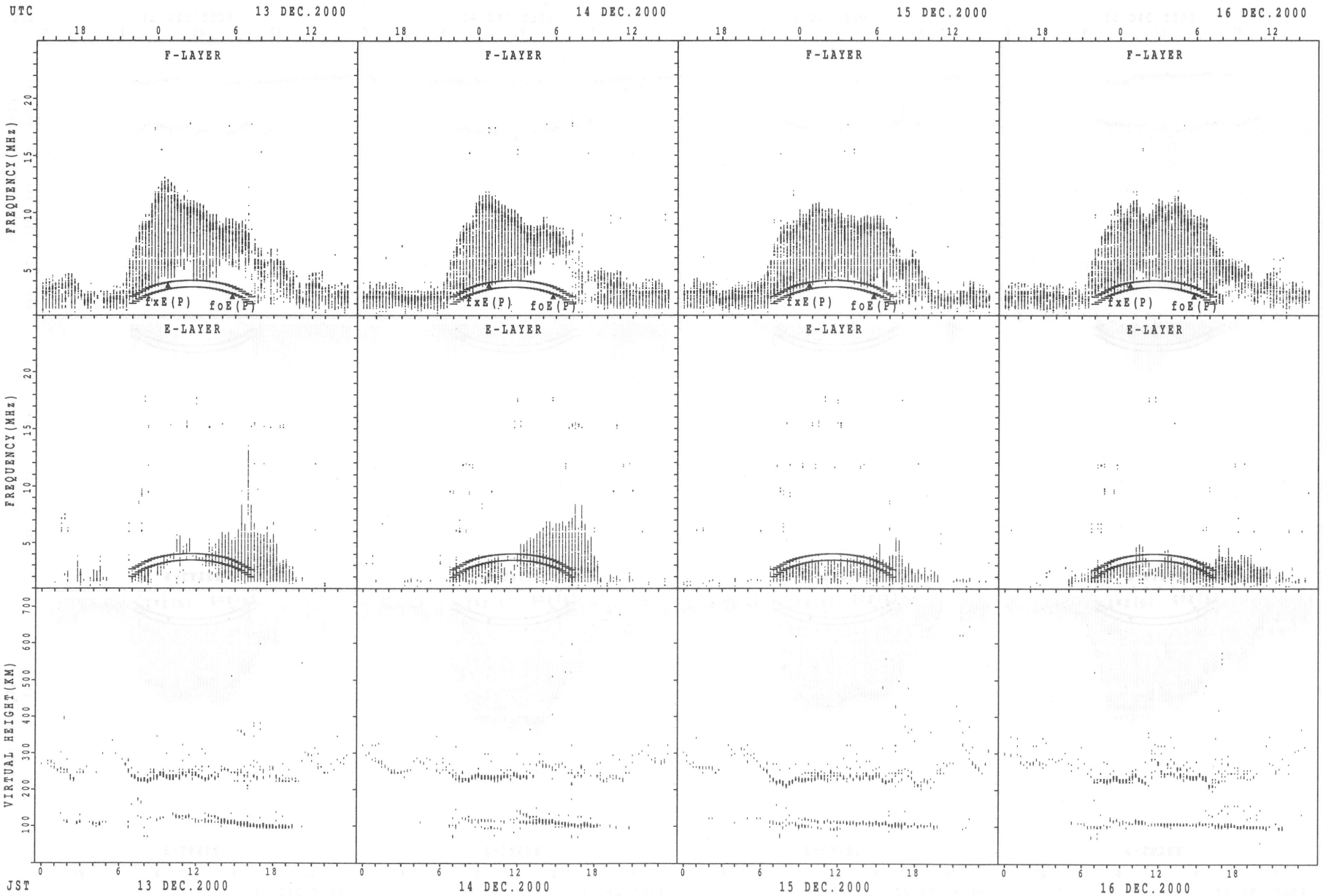
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



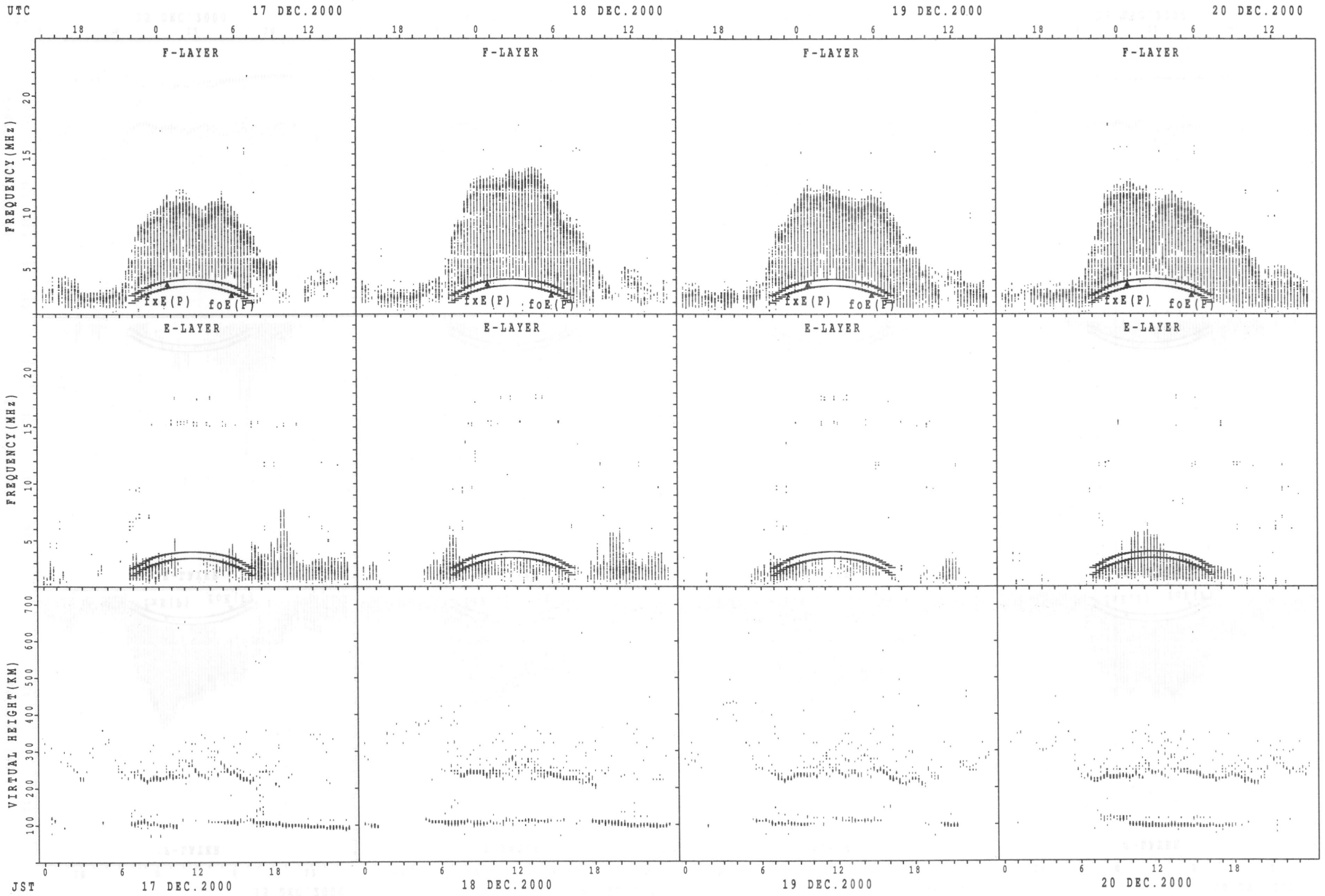
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



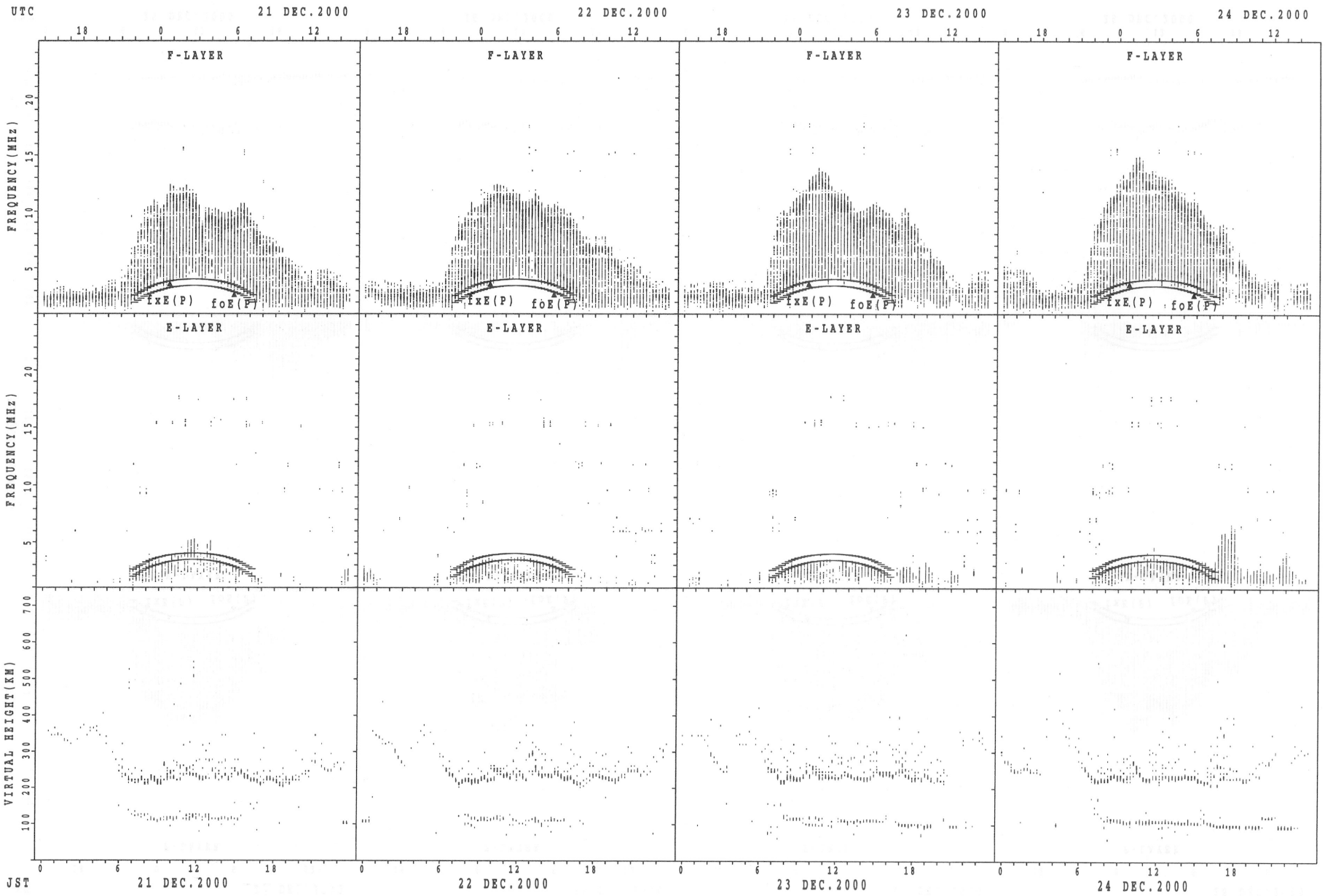
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



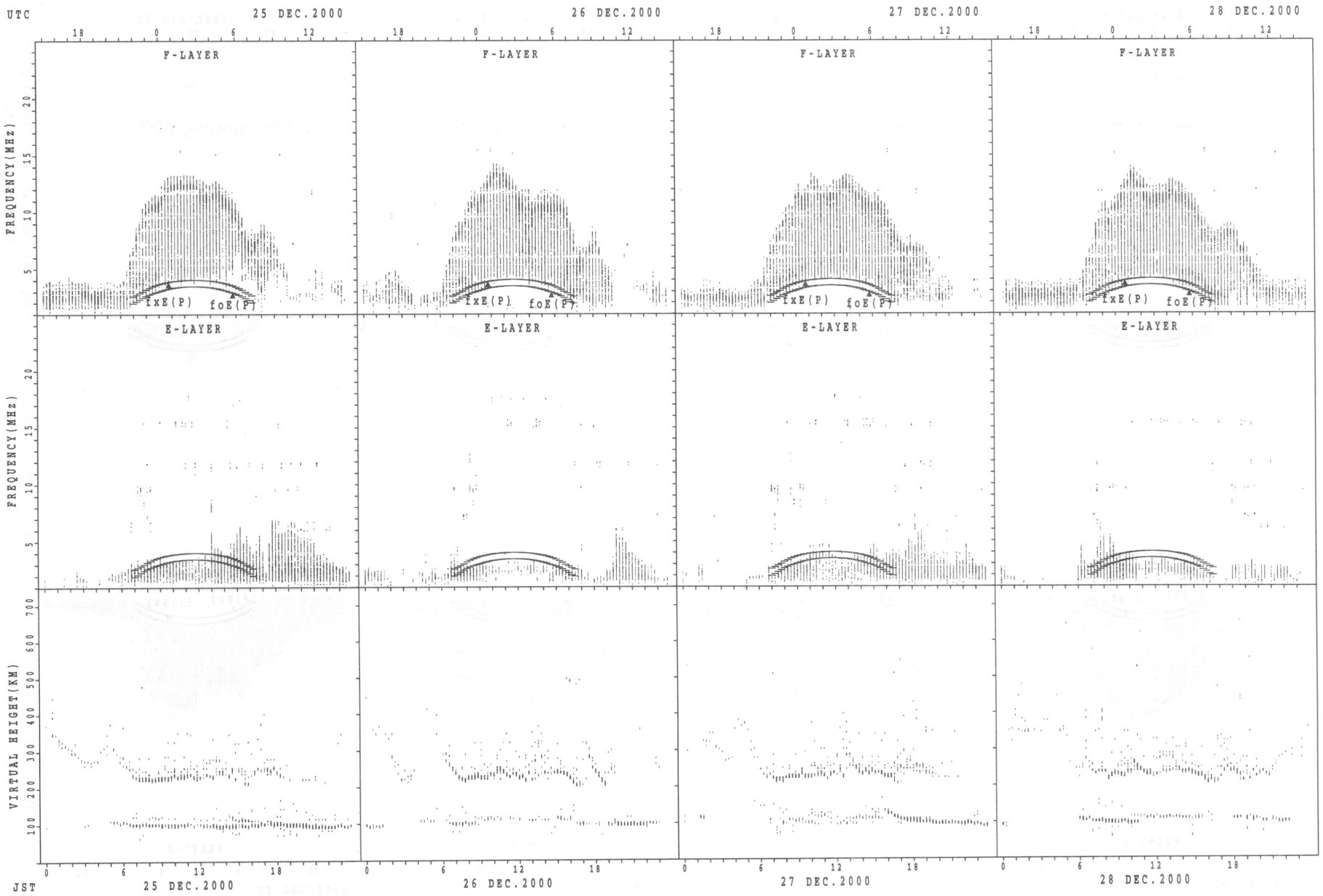
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



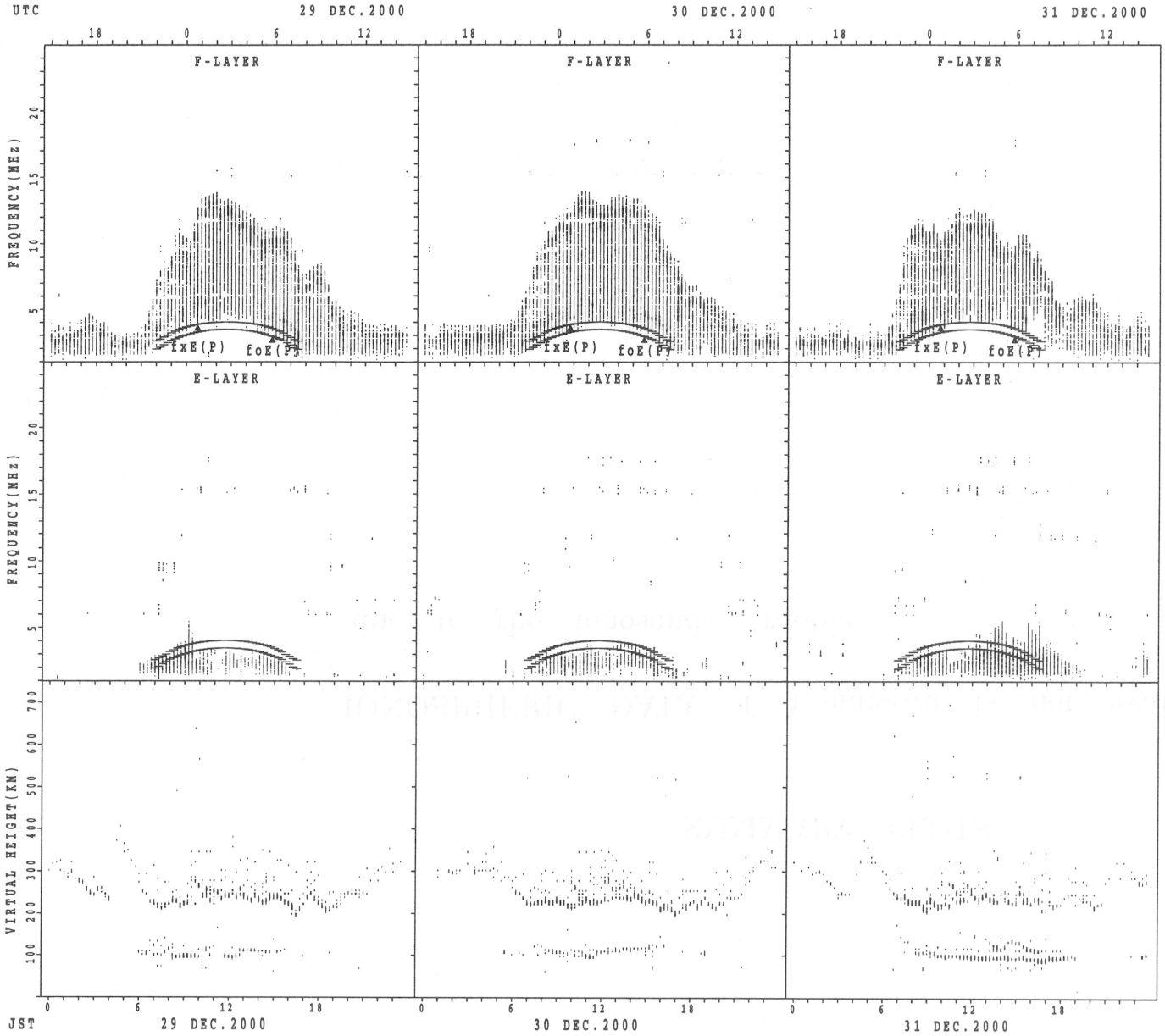
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



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

SUMMARY PLOTS AT Kokubunji

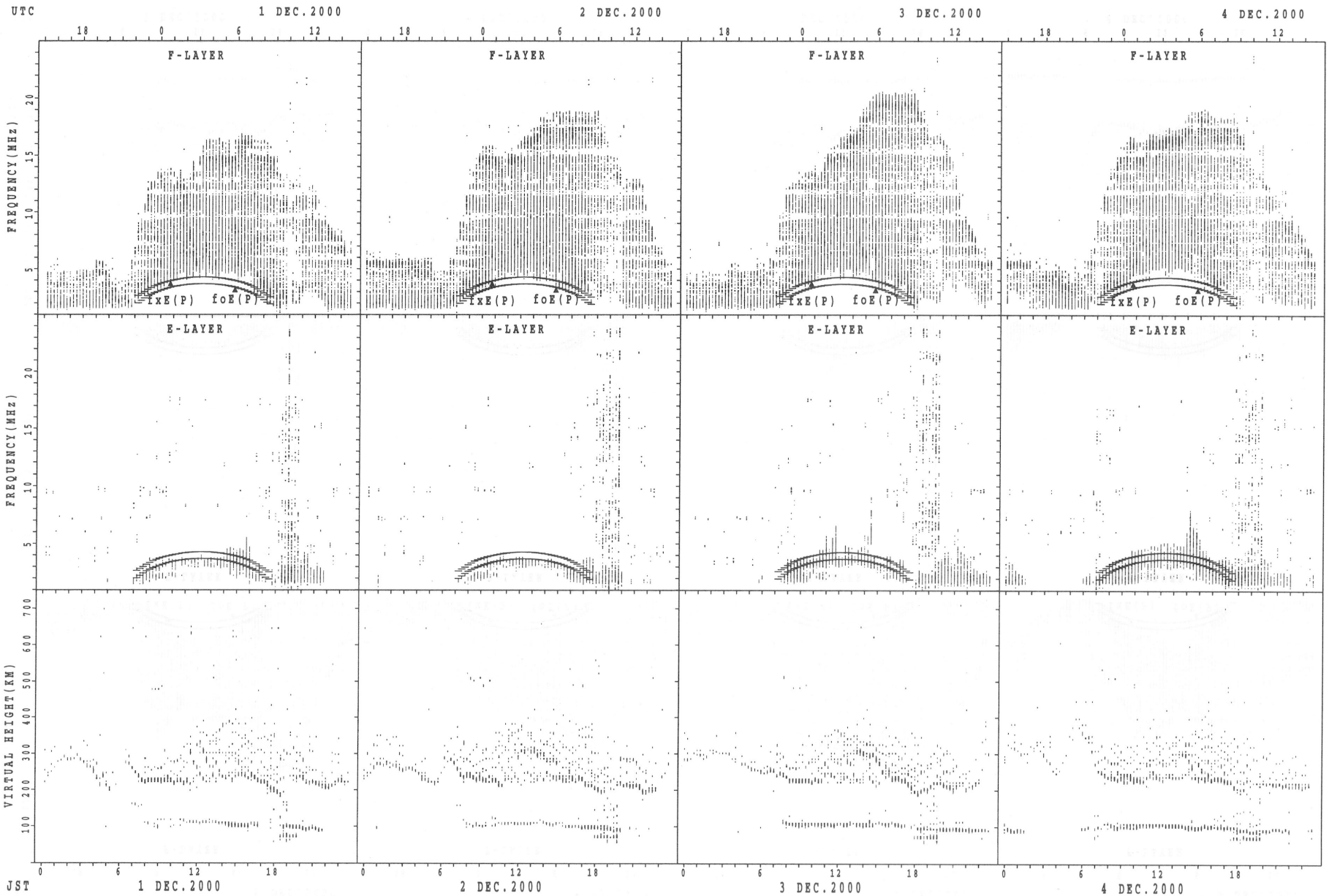


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS

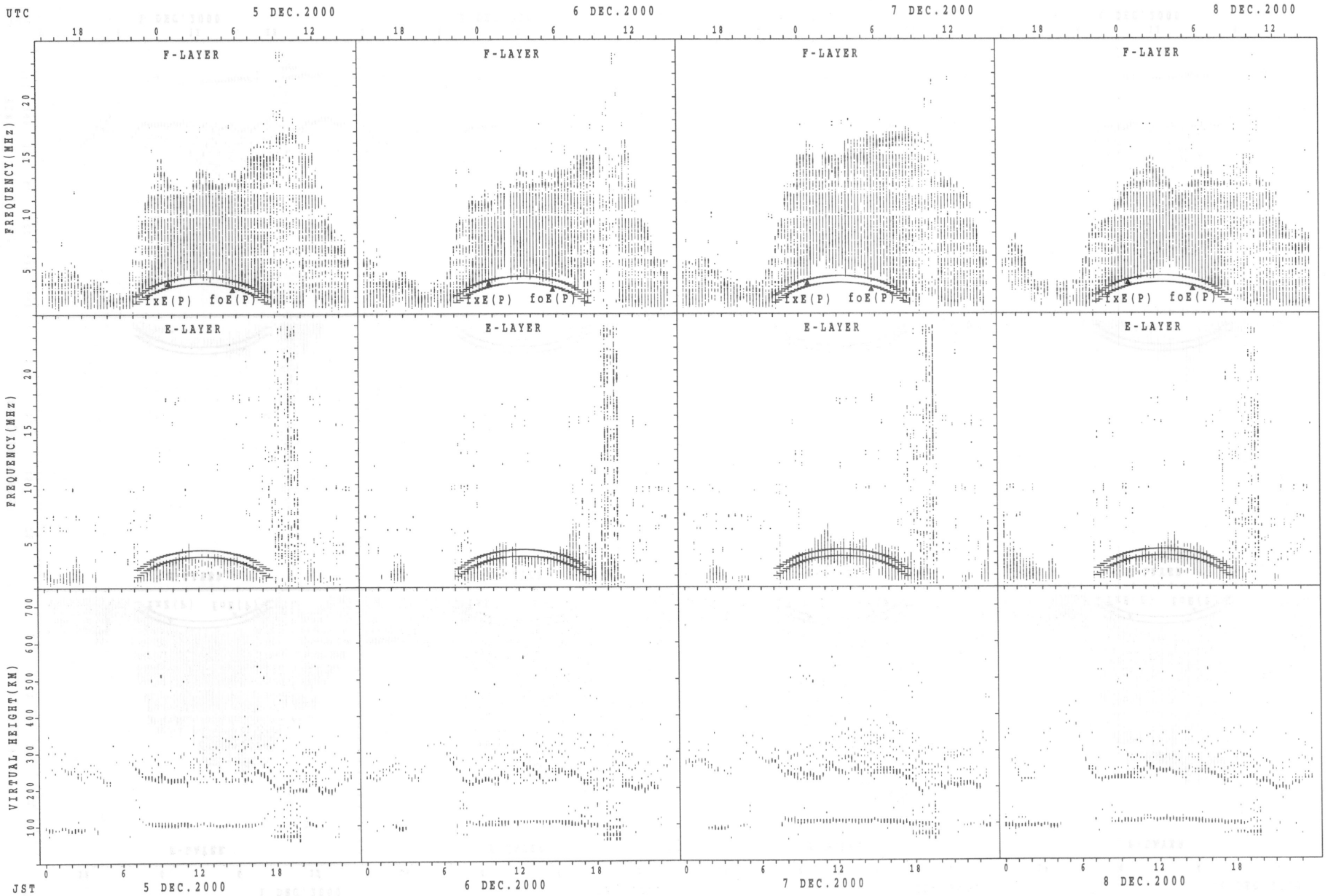
IONOSPHERIC DATA of Yamagawa is not available due to the ionosonde trouble.

SUMMARY PLOTS AT Okinawa



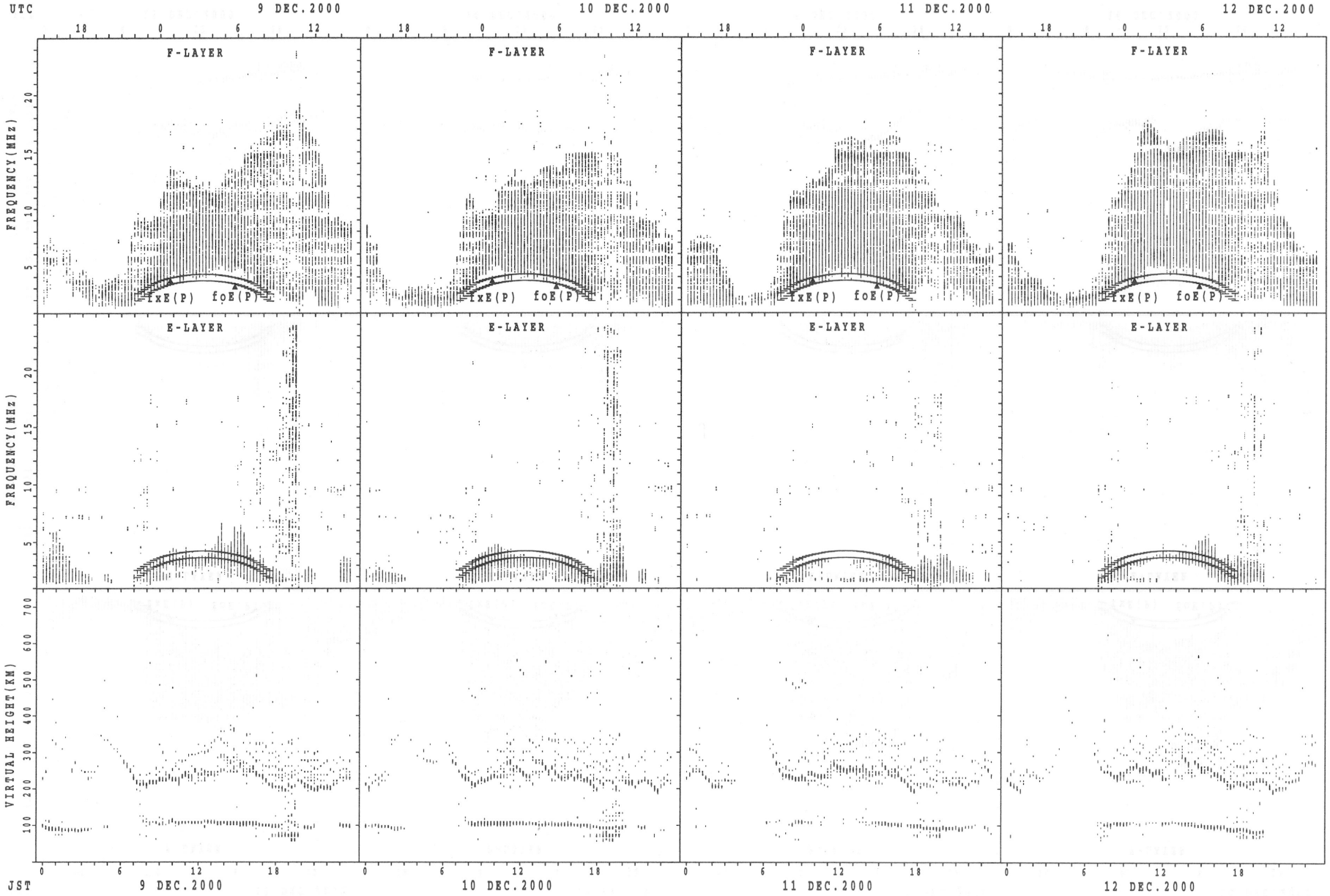
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



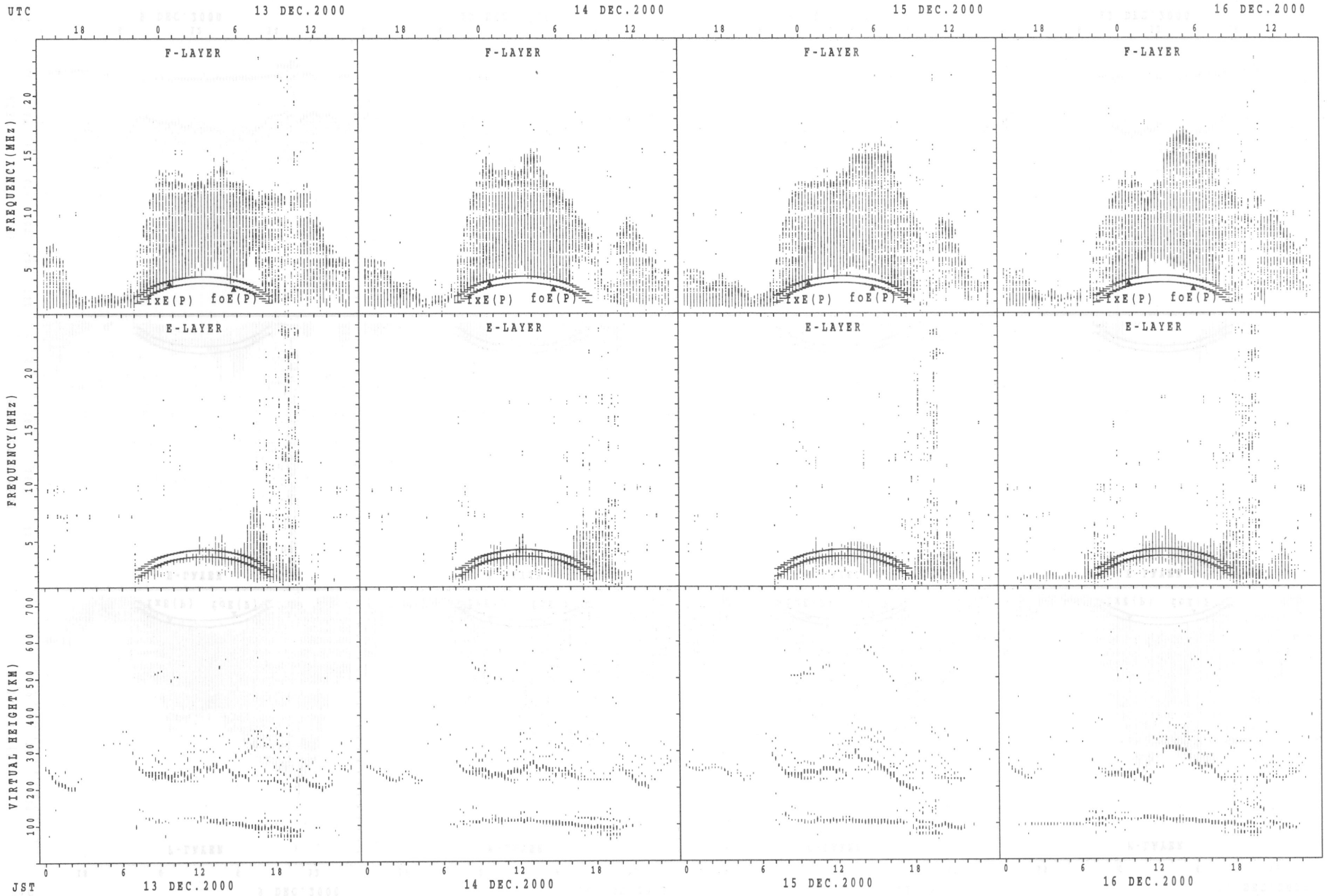
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



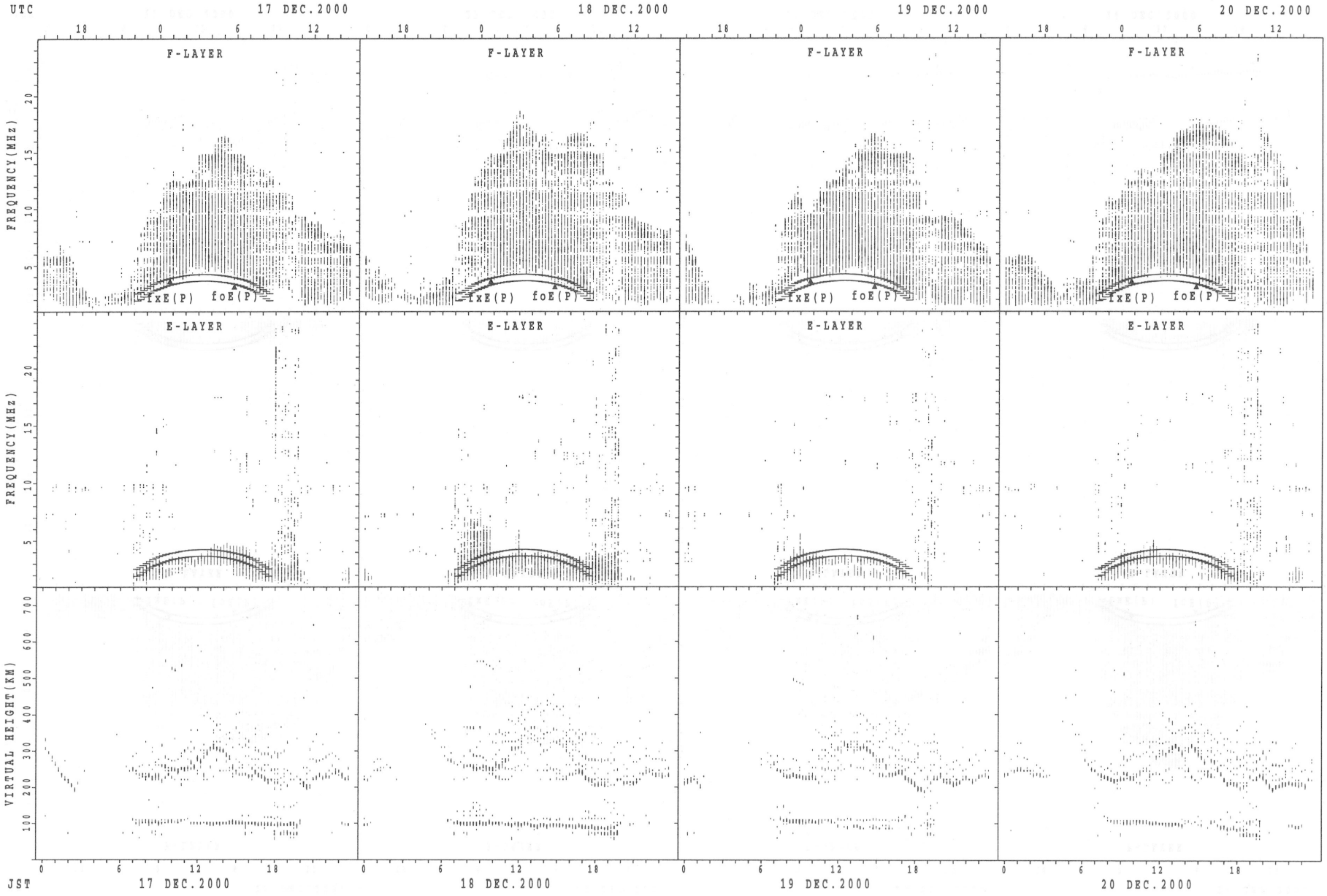
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



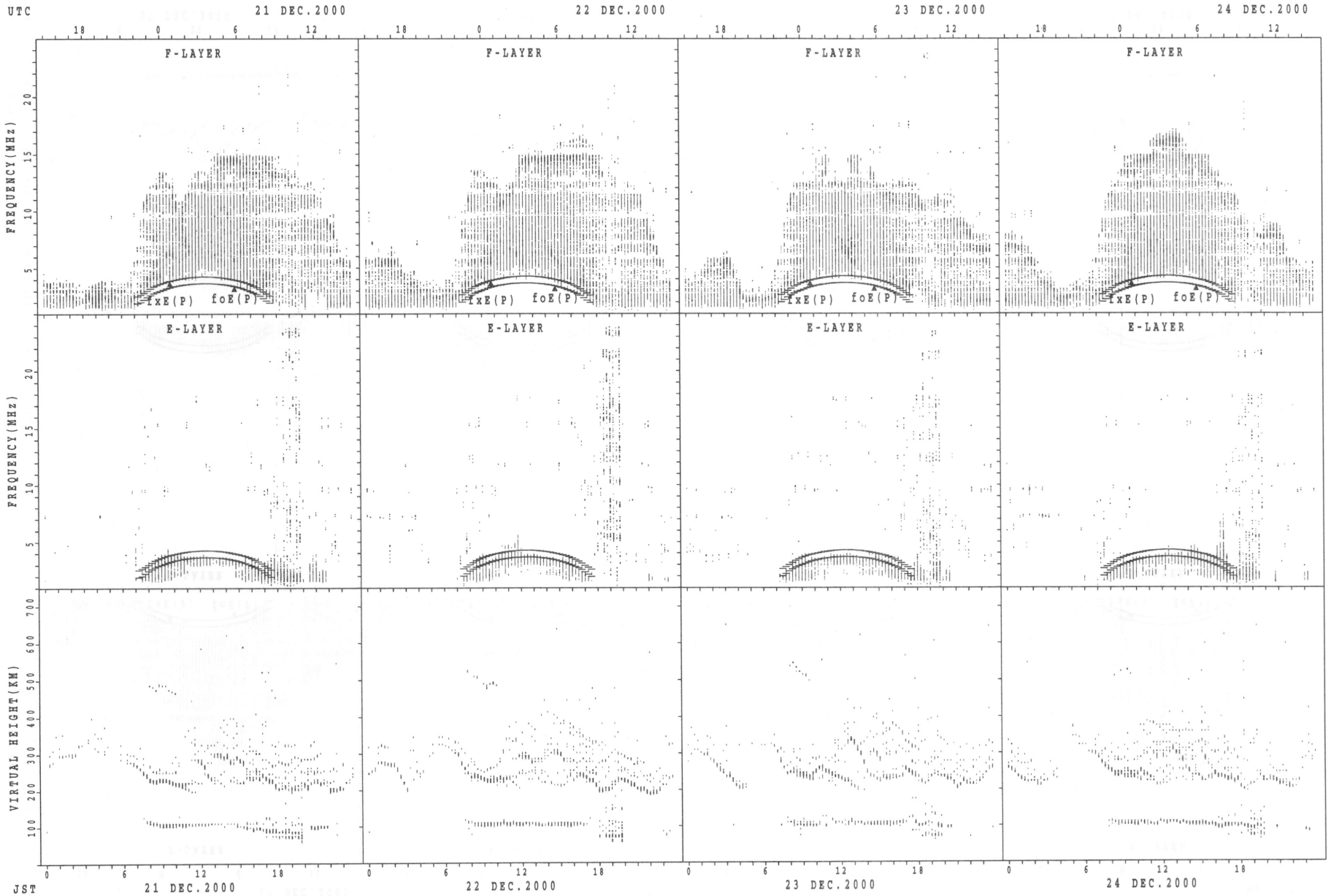
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



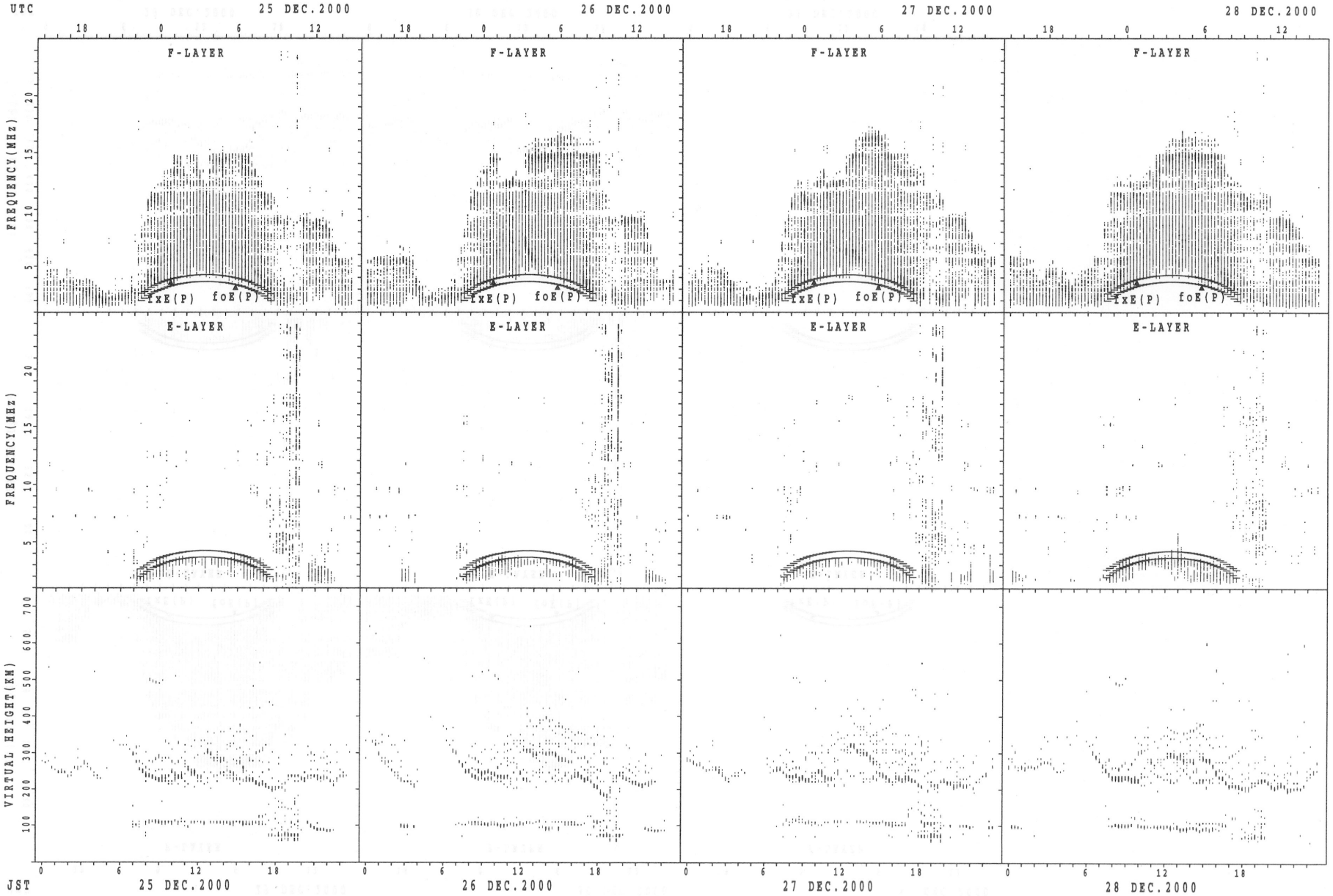
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



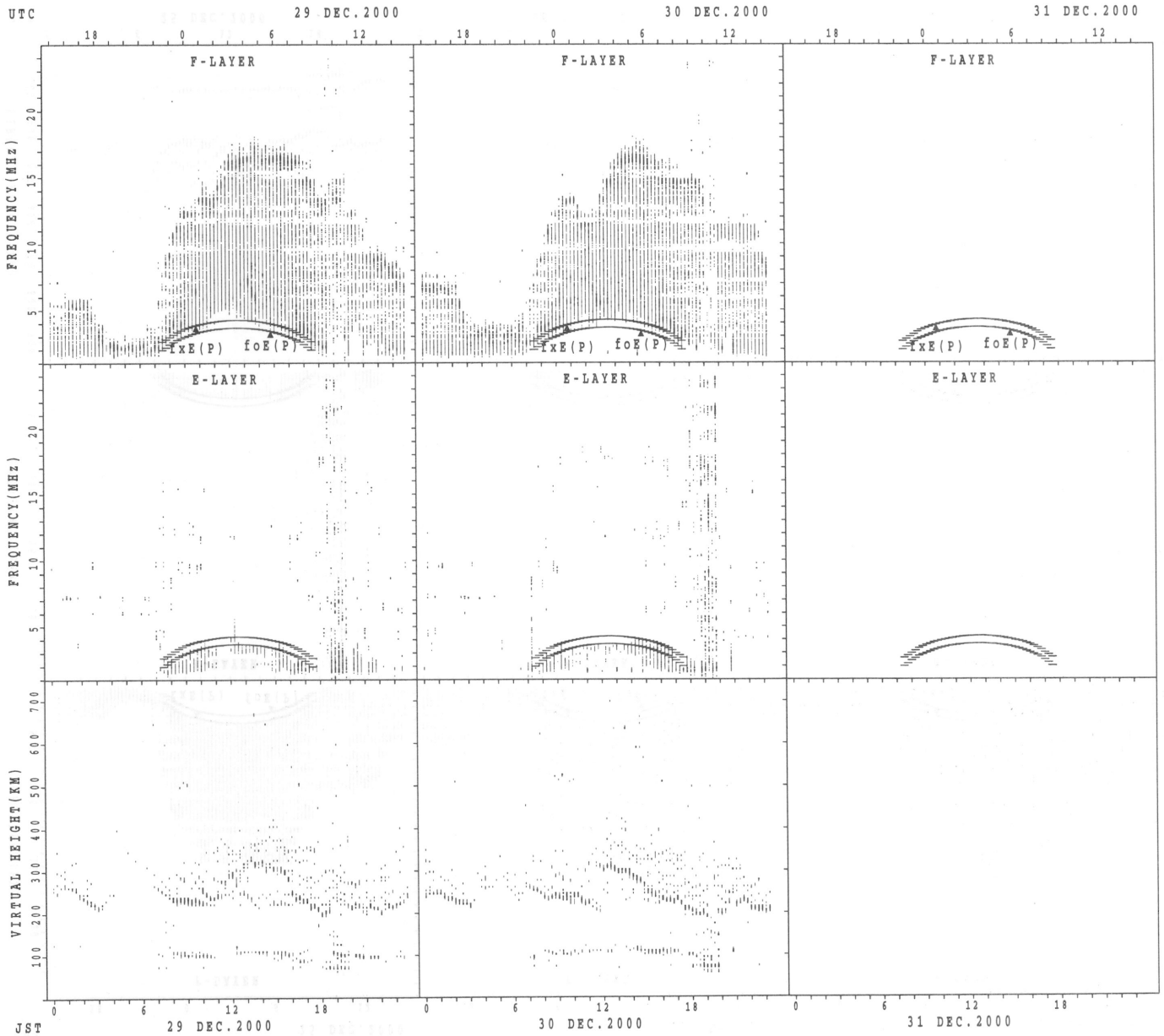
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

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.2000 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	4	30	31	27	29	31	29	29	30	26	16	6	3		1	1	
MED							222	279	232	226	224	222	232	232	232	231	249	263	363	318		322	330	
U Q							111	289	242	240	232	224	240	246	246	240	258	295	478	472		161	165	
L Q							111	262	226	222	218	217	218	229	229	222	234	249	348	210		161	165	

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	6	6	4	3	9	18	22	17	3	5	5	2	1	10	14	17	17	19	20	16	23	21	17
MED	103	100	101	104	113	107	104	103	109	155	107	123	116	83	114	110	107	103	101	98	103	125	119	89
U Q	108	103	105	109	119	112	107	107	176	165	125	171	119	41	117	117	117	105	107	106	106	155	146	149
L Q	101	95	97	99	107	107	99	97	104	103	100	105	113	41	107	105	100	100	95	91	102	101	98	80

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								27	31	31	31	31	31	30	31	31	28	20	16	8		1		
MED								248	230	234	242	242	248	254	258	246	240	263	260	270		296		
U Q								272	238	244	252	254	264	268	264	258	255	280	278	278		148		
L Q								242	224	230	232	230	240	244	250	238	228	252	256	259		148		

h'Es

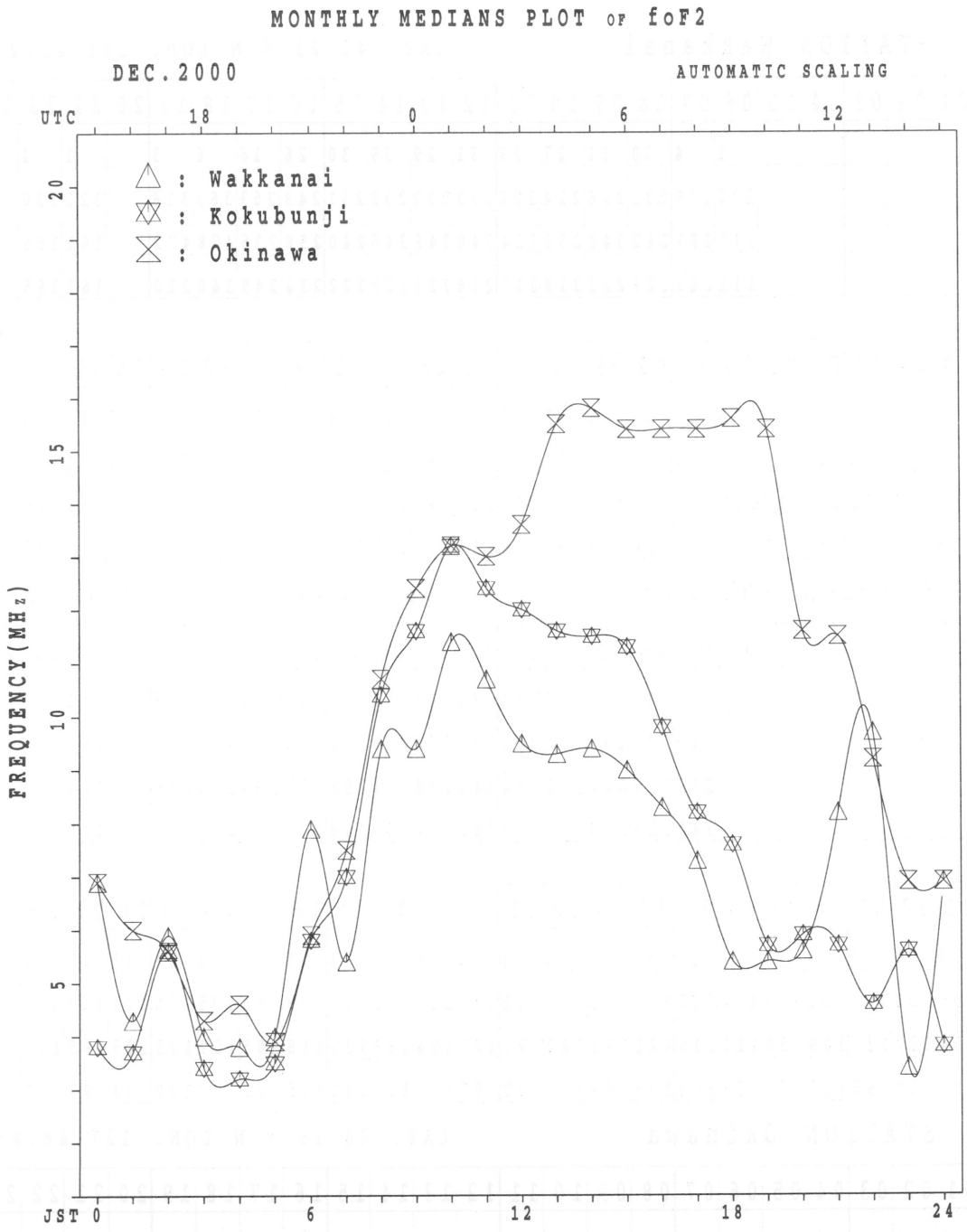
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	9	6	3	3	1	8	11	11	7	5	8	6	8	8	13	16	19	22	21	15	17	13	10
MED	103	99	103	105	101	113	110	107	107	105	111	112	117	117	114	111	109	103	105	105	101	103	103	97
U Q	107	104	107	113	109	56	113	115	121	113	120	121	127	124	118	122	118	105	109	105	105	105	105	103
L Q	97	99	103	99	101	56	107	103	103	89	101	107	107	111	105	111	105	99	103	100	99	97	97	97

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	3	1					5	30	30	29	29	30	30	30	29	29	30	25	22	30	27	22	12
MED	288	274	266					310	242	238	238	248	272	298	291	274	252	235	234	236	247	240	243	288
U Q	332	288	133					329	254	246	245	264	304	310	302	286	268	240	274	258	256	254	256	309
L Q	244	252	133					273	232	230	230	233	246	270	264	255	241	224	225	222	234	230	226	256

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	6	5	6	6	3	1	1	13	12	16	10	11	10	12	11	13	17	19	23	24	12	11	6	4
MED	96	95	94	95	93	97	101	105	111	110	114	111	111	110	109	105	103	101	97	89	97	95	91	91
U Q	99	98	105	97	99	48	50	123	113	112	119	113	119	113	113	111	105	103	103	94	101	97	95	97
L Q	95	92	91	91	91	48	50	98	100	107	109	109	107	103	105	103	100	95	91	87	95	95	87	87


MONTHLY MEDIANS PLOT OF foF2
DEC. 2000
AUTOMATIC SCALING
UTC
18
0
6
12
△ : Wakkanai
✡ : Kokubunji
⧖ : Okinawa
FREQUENCY (MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Kokubunji

DEC.2000 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 44	X 45	X 44	X 46	X 45	X 46	X 49											X 95	X 82	X 89	X 70	X 45	O X 40	X 43
2	X 43	X 38	X 42	X 42	X 44	X 45	X 53											X 101	X 91	X 76	X 56	X 46	X 40	A
3	X 43	A	X 37	X 38	X 39	X 44	X 48											X 93	X 85	X 82	X 68	X 45	R 36	X 44
4	A	X 41	X 40	X 43	X 42	X 43	X 49											X 108	X 86	X 73	R 72	X 60	X 38	O X 38
5	X 38	X 39	X 43	X 36	X 38	X 38	X 44											X 101	X 76	X 58	X 58	X 52	X 49	X 46
6	X 42	X 46	X 46	X 38	X 38	X 40	X 46											X 69	X 67	O X 65	X 61	X 45	X 47	X 45
7	X 40	X 39	X 38	X 41	X 40	X 40	X 50											X 92	O X 100	A	A	X 44	X 49	X 44
8	A	X 40	X 40	X 35	X 38	X 41	X 51											X 103	A	A	X 59	X 56	A	X 48
9	X 45	X 43	X 45	X 45	X 43	X 39	X 44											X 98	X 104	O X 78	X 51	X 53	X 55	X 57
10	X 39	X 36	X 37	X 36	40	X 40	X 46											X 93	O X 70	X 59	X 40	X 42	X 42	O X 44
11	X 42	X 41	X 43	X 41	X 40	X 40	X 44											X 65	A	X 51	X 54	X 48	X 44	X 38
12	X 42	X 43	X 35	X 38	X 38	X 40	X 42											X 84	X 93	X 55	X 47	X 50	X 50	X 45
13	X 43	X 45	X 48	X 34	X 34	X 34	O X 38											X 73	X 73	X 55	X 42	X 47	X 47	X 41
14	X 39	X 39	X 42	X 37	X 36	X 36	X 37											A	X 51	X 52	X 48	X 42	X 45	X 45
15	O X 44	X 45	X 42	X 36	X 39	X 39	X 44											X 67	X 68	X 43	X 36	X 34	O X 40	36
16	X 37	X 41	X 41	X 38	X 38	X 38	X 34											X 68	X 60	X 55	X 44	X 52	X 44	O X 40
17	R 40	O X 45	X 46	X 35	X 32	X 34	X 35											X 70	X 61	A	X 39	X 47	X 49	X 46
18	X 46	X 38	X 36	X 36	X 38	X 40	X 45											X 88	X 61	X 46	A	X 50	X 44	O X 42
19	O X 38	X 40	X 34	X 35	X 37	X 36	X 37											X 88	X 77	X 58	X 48	X 54	X 46	X 40
20	X 36	X 38	X 39	X 39	X 38	X 39	X 43											X 84	X 81	X 73	X 57	X 53	X 55	X 47
21	X 34	X 36	X 38	X 36	X 36	X 38	X 43											X 81	X 79	X 62	X 54	X 49	X 49	X 47
22	X 36	X 40	X 39	X 39	X 38	X 38	X 44											X 82	X 80	O X 77	X 61	X 55	X 49	X 40
23	X 37	X 39	X 41	X 38	X 37	O X 37	X 37											X 102	X 92	X 76	X 60	X 45	O X 45	X 47
24	X 56	X 56	X 48	X 36	X 38	X 39	X 42											X 89	R 50	X 52	X 41	X 42	X 44	X 40
25	X 39	X 40	X 42	X 39	X 36	X 38	X 39											X 91	X 80	X 56	X 51	X 50	X 51	X 42
26	X 42	X 42	X 47	X 44	X 28	X 30	X 36											X 71	X 85	X 54	X 50	X 46	X 45	X 43
27	X 37	O X 36	X 38	X 38	X 36	X 34	X 40											X 86	X 80	X 73	X 49	X 39	O X 39	O X 40
28	O X 38	X 37	X 38	X 38	X 38	X 40	X 37											X 85	X 93	O X 75	X 52	X 41	X 41	X 41
29	X 40	O X 42	X 45	X 43	X 33	X 34	X 38											X 80	X 85	X 59	X 50	X 45	X 41	X 43
30	X 41	X 42	X 41	X 41	X 42	X 42	X 47											X 85	X 70	O X 62	X 53	X 46	X 41	X 38
31	X 38	X 38	X 39	X 40	X 32	X 33	X 34											X 76	X 55	X 62	X 65	X 48	X 46	X 46
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	31	31	31	31	31											30	29	28	29	31	30	30
MED	X 40	X 40	X 41	X 38	X 38	X 39	X 43											X 86	X 80	X 60	X 52	X 47	X 45	X 43
U Q	X 43	X 43	X 44	X 41	X 40	X 40	X 46											X 93	X 86	X 74	X 60	X 52	X 49	X 46
L Q	X 38	X 38	X 38	X 36	X 36	X 36	X 37											X 76	X 68	X 55	X 48	X 45	X 41	X 40

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	38	39	R 38	40	39	40	43	83	103	R 120	148	144	141	135	138	126	116	89	R 76	83	64	39	R 34	37
2	37	R 32	36	36	38	39	47	88	108	131	132	R	146	137	130	127	126	R 95	85	R 70	50	40	R 35	A
3	37	A	R 32	R 32	33	38	R 42	R 94	104	108	135	142	143	132	130	131	104	87	79	R 76	R 62	39	R	38
4	A	36	R 34	37	36	36	43	85	115	R 138	R 155	R 141	137	139	145	137	R 118	R 102	80	R 67	R	R 54	R 32	R 32
5	32	33	37	30	R 32	32	38	74	92	129	134	122	120	120	110	112	102	95	R 70	52	52	46	R 43	40
6	36	40	40	32	32	34	40	R 88	108	106	116	116	123	114	115	R 108	106	V 63	R 61	59	R 55	R 38	40	39
7	34	33	32	35	34	34	44	R 64	94	150	R	132	125	119	113	119	102	86	R 94	A	A	R 38	R 43	R 38
8	A	R 34	34	29	31	35	45	74	91	121	R 147	132	127	123	122	118	R 90	R 96	A	A	53	50	A	42
9	39	37	39	39	37	33	38	68	105	134	147	111	93	108	112	112	98	92	98	R 72	R 44	R 47	49	R 51
10	33	31	31	30	F 30	34	40	63	82	126	138	112	108	R 98	110	R 102	76	87	64	52	34	R 36	36	R 38
11	36	35	37	35	34	34	38	R 69	97	111	125	122	107	R	106	101	86	59	A	45	48	R 42	R 38	32
12	36	37	29	32	32	34	36	72	101	121	R 154	144	124	117	118	R 112	R 98	R 78	86	49	40	44	R 44	39
13	37	39	42	28	28	28	32	66	95	119	122	111	106	94	89	89	80	67	R 67	49	R 36	41	R 41	35
14	33	32	36	31	30	30	31	R 61	89	113	111	102	94	84	91	82	72	A	45	45	42	36	39	39
15	38	38	36	30	33	33	38	69	86	R 99	102	99	98	93	92	92	80	61	62	37	30	28	34	R
16	31	35	U R 36	32	32	32	28	R 63	84	102	106	92	108	105	102	92	80	62	54	48	38	U R 46	38	34
17	R	R 39	R 40	29	26	28	29	R 62	88	R 98	R 105	110	101	102	108	97	82	R 64	55	A	33	R 41	R 43	R 41
18	40	32	30	30	32	34	39	73	105	124	126	125	131	134	130	110	92	82	55	40	A	44	R 38	36
19	32	34	28	29	31	30	31	65	89	108	117	120	115	108	107	110	99	82	71	52	42	R 48	40	34
20	R 30	32	R 33	33	32	33	37	68	110	R 119	120	U R 121	R 107	112	R 107	100	86	78	R 75	67	51	47	R 48	41
21	28	R 30	32	30	30	32	R 37	69	100	100	117	R 119	101	100	96	99	94	75	R 73	56	U R 48	43	43	41
22	R 30	34	33	32	32	33	38	76	96	101	R 120	117	110	107	101	101	94	76	R 74	R 71	55	49	43	34
23	31	33	R 35	32	R 31	31	31	R 72	97	111	127	132	114	106	98	102	94	96	86	70	54	39	R 39	R 41
24	50	50	42	30	32	33	36	79	104	124	139	R 132	126	120	108	102	84	83	R	46	R 35	36	37	34
25	33	34	36	33	30	32	33	70	103	113	128	129	126	120	R 118	104	78	85	R 74	50	R 45	R 44	R 45	36
26	36	36	41	38	22	24	30	73	R 97	113	133	136	120	108	109	110	100	65	78	48	U R 44	R 40	39	37
27	31	30	32	32	30	28	34	69	94	R 117	120	120	122	129	120	110	103	80	74	67	R 43	33	R 33	R 34
28	32	31	32	32	33	34	31	R 64	103	109	129	126	117	120	120	110	89	79	87	69	46	35	R 35	35
29	34	36	39	37	27	28	32	67	89	R 97	130	134	130	122	108	108	100	74	79	53	44	39	35	37
30	35	36	35	36	36	36	41	69	96	117	128	134	125	132	130	120	R 101	79	64	56	R 47	R 40	R 35	32
31	32	32	33	34	26	27	28	67	109	107	106	R 118	R 122	114	96	102	89	71	49	56	59	R 42	40	40
	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	31	31	31	31	31	31	31	31	30	30	31	30	31	31	31	30	28	28	28	31	29	29
MED	34	34	35	32	32	33	37	69	97	113	128	122	120	116	110	108	94	80	74	54	46	41	R 39	37
U Q	37	37	38	35	33	34	40	74	104	124	135	132	126	123	120	112	102	87	80	R 68	52	46	R 43	40
L Q	32	32	32	30	30	30	31	R 66	91	107	117	116	107	106	102	101	84	71	63	48	41	38	R 35	34

DEC. 2000 foF2 (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

DEC. 2000 foF1 (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	R	R 316	A	U R 344	R	R	R	R	R							
2								B	A	A	R	A	A	R	U R 316	U R 264	B							
3								B	U R 256	A	336	R	R	A	A	A	A							
4								B	A	A	A	R	R	A	A	A	A							
5								B	276	A	A	R	U R 352	R	U R 316	U R 284	A							
6								B	264	320	R	U R 352	R	U R 340	A	284	188							
7								B	A	A	A	A	A	A	A	A	R							
8								B	180	A	A	A	U R 344	328	312	256	B							
9								B	A	U R 332	R	R	U R 336	R	U R 300	264	A							
10								B	256	R	R	R	R	R	R	252	A							
11								B	264	B	B	B	B	B	B	B	A							
12								B	268	R	A	A	R	R	A	A	R							
13								B	236	U R 304	R	R	R	A	U R 300	252	A							
14								U R 184	252	R	R	R	R	336	312	264	B							
15								B	260	U A 312	340	R	R	R	U A 312	264	A							
16								B	256	308	U R 344	A	U R 348	A	A	R	204							
17								A	A	U R 328	A	U R 356	B	R	A	A	A							
18								B	264	U R 316	348	U R 360	R	344	320	268	U R 208							
19								B	A	A	U R 348	R	R	R	U R 328	U R 264	212							
20								B	R	A	A	A	A	A	A	U R 288	A							
21								B	272	320	356	364	364	348	R	276	B							
22								B	280	328	A	U R 372	U R 368	A	R	A	R							
23								184	264	328	U R 360	R	R	R	R	R	200							
24								U R 184	272	324	344	U R 356	A	U R 344	324	276	U R 204							
25								A	R	A	U R 336	U R 352	U R 360	340	A	A	A							
26								A	244	292	R	R	R	U R 340	U R 304	U R 280	U R 224							
27								U R 180	268	308	336	R	364	R	U R 328	268	204							
28								A	A	A	A	R	R	U R 344	U R 320	272	200							
29								U R 188	A	A	R	R	R	R	U R 328	U R 260	200							
30								B	256	292	U R 328	A	R	U R 344	324	288	192							
31								B	240	U R 304	U R 332	R	U R 348	340	U R 316	276	188							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								5	20	16	12	8	9	11	16	20	12							
MED								U R 184	262	316	342	U R 356	U R 352	340	U R 316	268	202							
U Q								U R 186	268	326	348	U R 362	364	U R 344	U R 324	278	U R 206							
L Q								182	254	306	336	U R 352	U R 346	340	U R 312	264	196							

DEC. 2000 foE (0.01MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A 19	22	J A 26	20	E B 16	E B 16	E B 16	E B 22	G	G	39	J A 50	G 30	G 31	G 26	G 22	G	J A 47	J A 21	J A 27	J A 24	22	20	E B 16
2	20	J A 18	J A 28	19	E B 15	E B 15	E B 15	23	J A 32	32	G 29	J A 49	J A 46	G 31	G 28	G 23	E B 22	J A 22	J A 21	J A 24	J A 26	J A 19	J A 42	J A 62
3	J A 48	J A 42	J A 27	J A 20	E B 15	E B 12	J A 17	J A 23	31	J A 38	G	G	38	J A 44	36	32	23	J A 19	J A 38	J A 23	20	J A 26	J A 53	J A 27
4	J A 50	J A 28	J A 19	E B 16	E B 22	E B 15	20	22	29	33	33	36	G	J A 37	J A 37	J A 36	37	34	J A 26	21	21	20	J A 35	J A 42
5	J A 22	J A 22	E B 14	J A 28	J A 24	E B 16	J A 23	J A 22	G	31	34	J A 35	G 32	G 28	36	G J A 26	J A 28	24	E B 15	J A 24	J A 31	J A 40	J A 25	E B 16
6	J A 30	J A 21	18	E B 14	19	20	E B 14	21	G 24	G 27	G 28	G 28	G 28	G 32	35	G 23	G	J A 28	J A 39	J A 66	J A 48	E B 15	19	19
7	20	18	E B 15	E B 14	19	21	20	J A 24	30	34	37	J A 44	J A 114	36	32	J A 30	G 21	J A 34	J A 52	J A 116	J A 76	J A 34	E B 16	J A 27
8	J A 50	J A 27	J A 18	20	J A 20	E B 16	E B 15	J A 22	J A J A 31	J A 38	J A 44	J A 38	J A 49	J A 65	J A 52	J A 65	J A 64	J A 96	J A 146	J A 96	J A 50	J A 33	J A 53	J A 29
9	J A 26	20	E B 15	19	21	21	J A 27	J A 26	J A 49	36	G 28	G 26	G 25	G 22	G 20	30	J A 22	J A 22	E B 15	J A 22	J A 46	J A 28	J A 22	J A 20
10	20	E B 16	E B 16	19	19	20	J A 22	J A 21	G	G 27	G	G	G	G 24	G	28	J A 30	J A 23	J A 28	23	E B 20	E B 15	E B 16	E B 19
11	E B 17	E B 14	E B 15	E B 15	E B 14	E B 16	E B 15	22	30	E B 45	E B 48	E B 46	E B 52	E B 43	E B 48	E B 29	J A 26	J A 33	J A 52	J A 55	J A 49	J A 21	E B 14	16
12	E B 16	22	19	18	24	E B 16	E B 18	E B 20	G 24	G 28	37	39	G	G	34	28	G J A 18	J A 26	J A 24	20	22	J A 18	18	20
13	E B 14	E B 16	J A 20	J A 22	J A 22	20	18	J A 23	28	G	39	52	40	J A 48	60	J A 54	J A 126	J A 54	J A 66	J A 28	E B 14	E B 16	E B 16	E B 16
14	E B 16	19	E B 16	18	18	18	E B 16	J A 23	J G 22	G 20	G 23	40	J A 43	J A 50	J A 60	J A 62	J A 65	J A 80	J A 33	E B 15	19	19	E B 16	B 15
15	E B 14	E B 15	18	20	19	20	20	J A 22	G J 22	G 30	37	G	G 20	J A 38	37	J A 37	J A 36	J A 36	J A 19	J A 16	E B 14	18	18	18
16	E B 14	E B 16	E B 16	E B 14	E B 14	19	J A 18	J A 23	G 20	G	G	37	G J 30	A 40	35	30	26	J A 33	J A 34	J A 37	J A 25	E B 15	20	E B 14
17	E B 12	E B 25	E B 14	E B 14	E B 14	E B 16	E B 16	J A 34	J A 33	G 30	39	G	E B 42	G	35	J A 36	23	J A 33	J A 39	J A 56	J A 28	J A 28	J A 30	J A 30
18	J A 24	J A 25	E B 15	E B 14	E B 15	B J 24	A J 26	A J 52	A J 23	G 28	G 27	G 23	G 21	G	G	G	G	J A 26	J A 32	J A 26	J A 54	J A 28	J A 26	J A 38
19	E B 16	E B 16	E B 14	E B 16	E B 18	A J 22	J A 19	J A 32	31	34	G 25	G	G 26	G	G	G	24	E B 14	E B 16	B J 20	A 22	J A 30	E B 16	B 14
20	E B 22	E B 16	E B 16	E B 14	E B 15	E B 16	E B 15	27	G 23	34	J A 48	J A 54	J A 50	39	39	G 25	29	J A 21	22	18	19	18	E B 16	E B 16
21	E B 16	E B 13	E B 15	E B 15	E B 14	E B 14	E B 16	22	36	39	42	43	46	G	E B 24	E B 16	E B 14	E B 16	E B 15	E B 16	E B 13	E B 15		
22	J A 26	E B 15	E B 15	E B 14	E B 16	E B 15	E B 14	J A 20	G	G 38	G	37	G	G 31	31	G J 19	A 21	E B 16	E B 15	E B 16	E B 15	E B 16	E B 15	
23	E B 15	E B 16	E B 15	18	18	18	J A 20	24	G	G 20	G 23	G 24	G	G 31	G	G	24	J A 22	A J 20	A J 28	21	J A 22	E B 15	B 16
24	E B 14	E B 16	E B 13	E B 15	19	E B 15	E B 15	23	G	G	G	39	38	G 33	G 31	30	26	J A 55	J A 59	J A 22	J A 22	J A 19	J A 38	J A 22
25	E B 16	E B 16	19	J A 17	E B 15	20	J A 19	J A 26	J A 32	33	G 28	G 24	G 23	J A 84	J A 39	J A 53	J A 42	J A 39	J A 64	J A 55	J A 48	J A 46	J A 31	J A 24
26	J A 22	J A 22	20	E B 20	J A 21	J A 17	20	J A 29	J A 28	G 21	G	G	G	G	G	32	28	J A 21	J A 19	J A 23	J A 50	J A 34	J A 29	19
27	J A 19	E B 15	E B 16	E B 16	18	E B 16	21	J A 22	G	G 24	41	42	G 21	G 28	37	J A 41	J A 34	J A 41	J A 48	J A 49	J A 30	J A 25	J A 31	J A 28
28	J A 24	18	E B 14	E B 15	E B 16	E B 15	B J 25	A J 26	A J 50	A J 36	39	G	G	G 32	G 30	G	24	E B 15	J A 22	J A 24	19	J A 23	J A 24	E B 14
29	E B 16	E B 14	E B 15	E B 14	E B 16	E B 15	B J 18	A J 26	33	J A 36	G 24	G	J G 30	G	G	29	G	E B 16	E B 15	E B 16	E B 15	E B 16	E B 15	E B 14
30	E B 16	E B 16	E B 15	E B 14	E B 16	E B 15	20	21	G	G 24	G J 20	A 40	G	39	38	32	23	E B 16	B J 16	A E 22	B E 14	B E 12	E B 15	B 16
31	E B 16	E B 15	E B 14	E B 16	E B 16	E B 15	E B 16	21	30	G 24	G 26	G 27	J G 30	42	J A 51	36	J A 46	J A 36	J A 25	J A 22	E B 16	E B 16	18	24
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 19	E B 16	E B 16	E B 16	E B 18	E B 16	18	J A 23	G	G	G	E G 35	G	G	34	30	24	J A 26	J A 25	J A 23	22	J A 20	19	19
U Q	J A 24	J A 22	J A 19	19	19	20	J A 20	J A 26	J A 31	34	39	42	J A 42	J A 42	38	J A 36	J A 34	J A 36	J A 39	J A 37	J A 46	J A 28	J A 30	J A 27
L Q	E B 16	E B 16	E B 15	E B 14	E B 15	E B 15	E B 16	22	G	G 27	G 28	G	G 30	G 32	G	G	G 22	E B 21	E B 19	B 20	E B 19	E B 16	E B 16	B E 16

DEC. 2000 foEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 16	E B 16	24	E B 14	E B 16	E B 16	E B 16	E B 22	G	G	33	G 29	G 29	G 29	G 26	G 22	G	41	18	18	16	E B 16	E B 15	E B 16
2	E B 14	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	22	30	U Y 32	G 29	36	44	G 28	G 27	G 23	E B 22	18	E B 16	E B 16	20	16	29	A A 62
3	18	A A 42	19	18	E B 15	E B 12	E B 16	22	27	34	G	G	U Y 38	41	36	32	22	E B 16	23	18	E B 16	18	20	18
4	A A 50	24	17	E B 16	E B 16	E B 15	E B 16	21	27	32	U Y 33	32	G	35	31	29	35	31	24	E B 16	E B 16	E B 16	17	23
5	E B 15	18	E B 14	18	18	E B 16	E B 16	20	G	29	32	30	G 31	G 28	G 24	G 22	24	E B 15	E B 15	E B 15	22	25	E B 16	16
6	23	E B 16	E B 16	E B 14	16	16	E B 14	21	G 24	G 26	G 28	G 28	G 26	G 29	32	G 19	G	22	19	20	20	E B 15	E B 15	16
7	E B 15	E B 15	E B 15	E B 14	E B 16	E B 16	E B 16	19	27	32	36	39	75	33	32	28	G 20	29	21	A A 116	A A 76	20	E B 16	22
8	A A 50	24	E B 14	E B 16	E B 15	E B 16	E B 15	20	30	32	36	34	42	63	49	62	63	75	A A 146	A A 96	36	22	A A 53	18
9	17	E B 16	E B 15	E B 16	E B 16	E B 16	22	21	27	G 26	G 24	G 26	G 24	G 21	G 20	27	21	E B 14	E B 15	E B 15	27	22	E B 15	E B 16
10	E B 15	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	19	G	G 26	G	G	G	G 24	G	27	23	E B 15	16	21	E B 20	E B 15	E B 16	E B 19
11	E B 17	E B 14	E B 15	E B 15	E B 14	E B 16	E B 15	22	28	E B 45	E B 48	E B 46	E B 52	E B 43	E B 48	E B 29	22	28	A A 52	37	36	E B 16	E B 14	E B 16
12	E B 16	16	E B 16	16	E B 16	E B 16	E B 18	E B 20	G 24	G 28	36	39	G	G	U Y 34	28	G 18	17	16	E B 15	E B 16	E B 16	E B 15	E B 14
13	E B 14	E B 16	17	18	19	E B 16	15	E B 16	27	G	39	48	39	44	55	45	48	30	31	19	E B 14	E B 16	E B 16	E B 16
14	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 16	20	G 21	G 18	G 22	U Y 40	41	44	57	60	62	A A 80	23	E B 15	E B 14	E B 15	E B 16	E B 15
15	E B 14	E B 15	16	E B 16	16	16	E B 16	20	G 22	G 22	36	G	G 20	37	35	35	32	31	15	E B 15	E B 14	E B 14	E B 16	E B 16
16	E B 14	E B 16	E B 16	E B 14	E B 14	E B 15	E B 15	21	G 19	G	G	U Y 37	G 30	38	34	29	23	25	29	20	16	E B 15	E B 15	E B 14
17	E B 12	E B 25	E B 14	E B 14	E B 14	E B 16	E B 16	29	29	G U Y 28	39	G	E B 42	G	35	34	U Y 23	30	35	A A 56	26	24	20	23
18	18	18	E B 15	E B 14	E B 15	20	17	22	G 22	G 25	G 24	G 23	G 21	G	G	G	G	E B 16	24	E B 15	A A 54	20	18	30
19	E B 16	E B 16	E B 14	E B 16	E B 18	E B 16	E B 15	21	29	34	G 24	G	G 26	G	G	G	23	E B 14	E B 16	E B 15	E B 14	25	E B 16	E B 14
20	E B 22	E B 16	E B 16	E B 14	E B 15	E B 16	E B 15	22	G 22	34	44	44	46	38	36	G 24	24	18	17	E B 15	E B 15	16	E B 16	E B 16
21	E B 16	E B 13	E B 15	E B 15	E B 14	E B 14	E B 16	20	G	36	38	42	43	45	G	G	E B 24	E B 16	E B 14	E B 16	E B 15	E B 16	E B 13	E B 15
22	E B 15	E B 15	E B 15	E B 14	E B 16	E B 15	E B 14	E B 19	G	G	G 36	G	G	G 37	G	U Y 31	G 19	E B 14	E B 16	E B 15	E B 16	E B 15	E B 16	E B 15
23	E B 15	E B 16	E B 15	E B 14	14	15	E B 14	20	G	G 19	G 23	G 21	G	G 30	G	G	24	E B 16	E B 16	24	E B 16	E B 19	E B 15	E B 16
24	E B 14	E B 16	E B 13	E B 15	E B 15	E B 15	E B 15	20	G	G	G 39	38	38	G 33	G 30	30	24	49	40	20	17	E B 14	31	16
25	E B 16	E B 16	E B 14	E B 13	E B 15	16	E B 12	20	18	32	G 25	G 22	G 23	G 29	32	51	36	30	44	35	30	26	26	E B 15
26	18	20	E B 15	E B 20	E B 14	15	E B 16	20	G 20	G 19	G	G	G	G	G	31	23	16	E B 16	E B 14	41	27	23	16
27	17	E B 15	E B 16	E B 16	16	E B 16	E B 16	19	G	G 23	40	40	G 20	G 21	36	38	33	21	23	19	24	19	29	24
28	22	16	E B 14	E B 15	E B 16	E B 15	19	20	28	31	35	G	G	G 32	G 30	G	23	E B 15	19	20	15	E B 16	17	E B 14
29	E B 16	E B 14	E B 15	E B 14	E B 16	E B 15	E B 16	21	33	31	G 21	G	G 24	G	G	28	G	E B 16	E B 15	E B 16	E B 15	E B 16	E B 15	E B 14
30	E B 16	E B 16	E B 15	E B 14	E B 16	E B 15	E B 15	19	G	G 24	G 20	39	G	37	36	31	22	E B 16	E B 16	22	E B 14	E B 12	E B 15	E B 16
31	E B 16	E B 15	E B 14	E B 16	E B 16	E B 15	E B 16	19	28	G 24	G 22	G 23	G 26	39	47	35	42	28	20	19	E B 16	E B 16	E B 13	E B 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	E B 16	20	G	G	G	G	G	G	32	29	23	18	19	18	16	E B 16	E B 16	E B 16
U Q	18	16	16	16	16	16	E B 16	21	28	32	36	39	41	38	36	34	32	30	24	21	26	20	20	18
L Q	E B 15	E B 15	E B 14	E B 14	E B 15	E B 15	E B 15	20	G 24	G 25	G 24	G	G 26	G 29	G	G	G 21	E B 16	E B 16	E B 15	E B 15	E B 15	E B 15	E B 15

DEC. 2000 fbEs (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	14	14	16	16	16	22	20	20	20	22	18	19	15	16	18	15	17	14	15	16	15	16
2	14	15	15	15	15	15	15	17	18	17	20	20	21	20	17	18	22	16	16	16	14	14	14	14
3	16	15	13	16	15	12	16	14	16	20	20	27	24	22	21	18	15	16	16	14	16	15	16	16
4	14	16	14	16	16	15	16	16	16	16	21	20	19	18	14	16	16	12	16	16	16	16	15	16
5	15	16	14	13	16	16	16	16	16	18	19	18	17	20	15	19	15	15	15	15	16	16	16	16
6	16	16	16	14	14	14	14	14	16	16	19	17	19	19	16	14	16	16	16	15	14	15	15	14
7	15	15	15	14	16	16	16	15	15	18	16	19	14	15	22	15	12	15	14	15	13	16	16	16
8	16	16	14	16	15	16	15	14	15	16	14	17	16	17	18	13	15	16	16	14	16	16	15	15
9	14	16	15	16	16	16	16	16	14	16	16	18	20	15	16	15	15	14	15	15	15	16	15	16
10	15	16	16	15	15	16	16	13	16	21	23	23	24	18	22	17	13	15	14	14	20	15	16	19
11	17	14	15	15	14	16	15	16	22	45	48	46	52	43	48	29	13	16	16	15	16	16	14	16
12	16	15	15	13	16	16	18	20	19	24	24	28	29	27	21	16	14	14	15	15	16	16	15	14
13	14	16	15	14	16	16	12	16	17	21	24	24	20	24	14	15	15	16	16	15	14	16	16	16
14	16	16	16	16	15	15	16	12	16	14	16	21	22	18	16	16	16	16	16	15	14	12	16	15
15	14	15	14	16	12	14	16	16	17	14	16	20	14	19	19	16	15	14	12	14	14	14	16	16
16	14	16	16	14	14	15	15	16	16	14	19	20	21	17	15	14	15	16	14	16	12	15	15	14
17	12	25	14	14	14	16	16	16	16	23	22	20	42	20	18	16	15	16	15	15	13	16	16	16
18	14	14	15	14	15	15	14	15	14	16	18	18	17	20	18	19	16	16	16	15	16	13	15	15
19	16	16	14	16	18	16	15	15	12	17	20	26	21	21	19	16	16	14	16	15	14	13	16	14
20	22	16	16	14	15	16	15	16	13	16	15	19	14	15	14	14	14	14	14	15	15	13	16	16
21	16	13	15	15	14	14	16	16	18	14	18	22	22	24	22	19	24	16	14	16	15	16	13	15
22	15	15	15	14	16	15	14	19	18	19	16	20	20	23	23	19	16	14	16	15	16	15	16	15
23	15	16	15	12	13	12	14	18	19	15	16	14	25	22	19	20	16	16	16	14	16	16	15	16
24	14	16	13	15	15	15	15	15	14	18	19	20	18	16	20	15	14	14	18	15	16	14	16	12
25	16	16	14	13	15	12	12	14	16	15	16	16	16	15	13	14	14	16	15	14	14	14	16	15
26	14	16	15	20	14	12	16	15	14	14	21	22	24	21	20	17	14	16	16	14	15	14	13	14
27	15	15	16	16	15	16	16	15	15	17	16	21	15	16	17	16	14	16	15	14	14	15	15	14
28	14	13	14	15	16	15	16	16	13	14	15	22	23	21	19	16	16	15	13	15	13	16	14	14
29	16	14	15	14	16	15	16	16	16	14	15	20	16	20	16	18	16	16	15	16	15	16	15	14
30	16	16	15	14	16	15	15	19	17	16	14	16	19	18	16	15	14	16	16	16	14	12	15	16
31	16	15	14	16	16	15	16	16	14	17	15	15	14	15	16	16	14	16	16	16	16	16	13	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	16	15	15	15	15	16	16	16	16	18	20	20	19	18	16	15	16	16	15	15	15	15	15
U Q	16	16	15	16	16	16	16	16	17	19	20	22	23	21	20	18	16	16	16	15	16	16	16	16
L Q	14	15	14	14	14	15	15	15	14	15	16	18	16	17	16	15	14	14	15	14	14	14	15	14

DEC. 2000 fmin (0.1MHz) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	283	272	R 276	280	289	295	327	342	345	R 321	324	313	319	301	306	311	330	325	R 305	337	349	313	R 271	285
2	291	R 297	260	258	271	282	313	R 340	329	326	306	R	304	307	305	302	319	R 322	330	R 329	329	296	R 301	A
3	276	A	R 276	R 276	278	297	R 318	R 358	368	313	319	315	309	303	305	310	308	307	302	R 324	R 343	324	R	302
4	A	264	R 260	267	266	255	282	341	327	R 312	R 324	R 316	296	296	301	308	R 300	R 307	322	R 310	R	R 342	R 308	R 288
5	282	287	301	287	R 283	288	312	340	340	339	324	326	326	320	303	317	309	328	R 316	315	305	317	R 311	316
6	305	306	336	294	283	280	301	R 349	360	340	334	315	327	315	321	R 333	356	V 322	R 321	338	R 348	R 297	304	309
7	314	291	286	292	295	289	331	R 362	316	327	R 348	328	321	315	309	324	329	306	R 336	A	A	R 278	R 294	R 289
8	A	R 356	322	268	273	275	319	368	335	339	R 339	334	331	314	313	320	R 315	R 331	A	A	297	308	A	316
9	287	267	268	311	293	272	308	342	333	340	335	336	321	303	319	328	314	312	333	R 352	R 308	R 279	307	R 337
10	317	296	290	259	F 280	299	340	342	298	334	346	330	332	R 318	319	R 348	307	325	328	340	319	R 294	289	R 315
11	311	298	316	302	301	287	309	R 345	335	331	336	329	337	R	329	332	353	308	A	311	306	R 323	R 322	307
12	311	343	317	319	279	290	291	340	348	322	R 329	328	316	309	308	R 315	R 331	R 330	349	310	305	290	R 276	287
13	304	323	343	353	307	293	283	326	350	336	341	337	330	330	312	329	336	322	R 327	333	R 299	291	R 321	299
14	297	312	321	316	297	314	306	R 336	344	351	342	337	341	330	335	340	339	A	311	319	331	294	285	289
15	286	314	316	279	283	309	314	349	349	R 347	340	328	324	326	319	329	344	314	348	370	320	295	291	R
16	295	297	R 316	306	300	298	319	R 360	350	349	336	314	316	302	314	321	347	339	314	322	278	U R 295	315	288
17	R	R 300	R 315	343	292	294	335	R 342	352	R 336	R 330	309	314	297	312	318	327	317	R 319	A	262	R 273	291	R 292
18	291	289	268	275	258	267	314	326	326	326	316	296	295	295	299	306	311	313	344	302	A	290	R 301	294
19	316	310	297	242	269	292	354	330	343	317	315	302	295	292	294	304	318	322	334	321	280	R 303	331	308
20	R 290	284	R 299	293	267	273	337	337	350	R 337	323	R 312	R 299	301	R 300	320	322	318	R 323	335	306	295	R 316	320
21	301	R 274	272	258	280	282	R 325	342	349	330	335	R 323	338	311	303	304	336	312	R 336	331	R 286	282	312	304
22	R 288	281	286	296	284	272	295	336	349	330	R 320	313	317	294	296	311	318	310	R 307	R 317	299	298	310	287
23	279	284	R 289	325	R 271	276	287	R 321	339	319	308	306	298	300	285	295	296	296	305	317	319	267	R 271	R 267
24	282	303	318	282	248	273	299	332	326	315	302	R 297	295	299	302	316	319	321	R	326	R 330	285	298	281
25	255	274	297	327	296	294	310	333	345	323	317	312	300	294	R 304	321	308	308	R 338	320	R 282	R 297	R 293	269
26	253	260	296	342	282	264	308	343	R 336	326	308	311	307	292	295	304	329	302	323	305	R 304	R 290	301	321
27	301	286	286	299	256	283	328	350	329	R 321	309	301	294	299	297	301	310	313	320	346	R 294	307	R 269	R 287
28	287	262	273	258	259	289	356	R 321	347	324	306	309	293	291	301	312	316	302	333	338	321	311	R 305	299
29	293	287	300	322	356	273	317	328	331	R 329	325	319	304	296	292	301	320	298	330	337	305	305	286	282
30	296	296	292	277	289	277	312	335	338	328	308	313	294	300	301	310	R 312	308	317	318	R 319	R 324	R 293	282
31	280	283	307	335	301	278	308	326	357	319	324	R 325	R 309	330	310	316	323	323	307	313	328	R 290	284	297
	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	31	31	31	31	31	31	31	31	31	30	31	30	31	31	31	30	28	28	28	31	29	29
MED	291	290	297	293	283	283	313	340	343	328	324	315	314	302	305	316	319	314	323	323	306	295	R 301	294
U Q	302	303	316	319	295	294	327	R 345	349	337	336	328	326	315	313	324	331	322	334	337	324	308	310	308
L Q	282	281	276	275	271	273	306	332	331	321	315	311	298	296	300	306	311	308	315	316	298	290	288	287

DEC. 2000 M(3000)F2 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

DEC. 2000 M(3000)F1 (0.01) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									246		264		274	298	290									
2											286	286			290	284								
3											284													
4										272	264			288		274								
5											274			276		280								
6												280	256											
7										268				280	276									
8																								
9													242											
10										272		254	260	246	276									
11									266			266			280									
12											264	250			290									
13													256											
14																256	E A 282							
15											262			262	284									
16											258		280	288	288									
17											252	294		294	288									
18											270	286		286		274								
19												294			298									
20												280		292	296									
21											252	274		282	276									
22											274			312			280							
23											280	264	298	284	312	294								
24											296		296	300	288									
25													280	284										
26											280			316										
27										284	284		300	312	312									
28													314	302	284									
29											274	274												
30											288		298		290									
31											278	276	288			296								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									2	4	19	13	13	18	17	7	2							
MED									256	272	274	276	280	288	288	280	281							
U Q										278	284	286	298	300	293	294								
L Q										270	264	265	258	282	282	274								

DEC. 2000 h'F2 (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	290	318	356	318	274	258	226	220	212	220	220	228	220	216	234	232	224	242	246	232	216	228	296	308
2	284	312	340	352	312	300	242	226	222	230	220	224	248	228	222	226	228	196	236	220	224	260	E A 336	A
3	E A 318	A	E A 326	308	328	276	246	230	210	204	220	234	232	228	236	232	204	212	264	232	224	228	284	E A 284
4	A	376	E A 386	E A 338	312	360	312	222	224	228	230	228	218	230	238	224	218	220	226	244	236	222	236	E A 318
5	286	308	278	E A 300	314	304	264	224	216	232	228	222	240	228	226	230	216	214	206	226	254	246	238	248
6	284	270	234	266	302	320	276	228	216	212	226	218	230	232	230	228	224	208	242	226	222	230	262	268
7	268	308	302	290	280	286	252	210	228	234	232	218	260	228	230	236	214	236	236	A	A	E A 316	256	304
8	A	238	244	284	344	318	254	212	222	226	238	226	232	258	230	240	222	280	A	A	E A 306	258	A	256
9	292	306	328	260	260	266	280	218	236	236	224	212	200	236	238	238	226	228	226	204	E A 270	E A 306	268	228
10	244	262	314	340	318	270	244	218	212	244	230	218	220	220	230	216	212	222	230	228	254	260	278	278
11	246	240	268	256	270	280	262	224	226	244	242	230	244	224	E B 258	236	216	230	A	E A 314	E A 288	242	250	274
12	272	226	280	256	286	308	312	236	226	232	226	224	230	232	234	230	212	208	216	206	222	270	278	274
13	268	256	244	234	E A 284	E A 286	286	240	224	232	232	244	220	232	E A 238	230	232	240	254	218	220	276	242	260
14	272	274	252	242	258	262	248	238	230	242	234	236	238	248	262	A	A	A	254	224	230	270	286	278
15	286	258	252	274	280	278	262	230	214	228	228	230	222	E A 230	232	242	220	232	214	212	240	254	298	254
16	276	282	262	262	270	268	228	226	224	228	222	222	208	248	230	238	214	220	234	228	248	250	248	280
17	280	E B 312	254	218	256	296	232	226	222	230	228	218	234	216	240	240	220	228	266	A	E A 400	E A 342	278	E A 294
18	282	282	320	324	348	E A 360	244	242	240	244	238	236	238	226	232	236	226	214	214	228	A	282	282	E A 360
19	256	262	282	E B 404	E B 368	296	228	230	228	236	240	238	242	234	232	248	228	214	222	246	234	284	256	254
20	E B 322	318	292	274	312	330	230	220	232	230	228	240	244	218	240	238	226	226	232	216	226	270	244	240
21	266	356	314	324	332	318	246	222	216	216	226	230	232	228	228	244	232	212	222	214	226	260	254	252
22	290	326	310	252	284	336	278	238	224	220	228	236	224	224	238	242	228	214	238	228	224	242	234	264
23	316	324	302	250	274	314	304	252	220	228	236	220	230	238	232	242	244	246	222	238	228	276	316	336
24	286	244	254	244	374	348	278	232	226	234	234	232	236	234	234	238	222	262	250	220	238	262	E A 334	E A 278
25	354	322	292	264	256	296	264	230	224	226	232	230	228	232	232	244	222	252	242	E A 262	E A 314	E A 300	E A 304	288
26	E A 362	E A 368	284	224	E B 280	E A 360	286	246	228	228	H 218	236	228	224	242	244	226	198	244	230	E A 306	E A 302	E A 302	252
27	280	302	308	278	308	326	244	224	222	228	226	232	224	246	236	238	226	214	248	226	E A 252	E A 260	E A 452	E A 346
28	E A 316	E A 348	324	336	352	306	234	234	238	230	236	236	230	240	236	230	210	220	232	222	224	238	270	280
29	298	292	272	244	218	344	272	224	222	224	228	220	242	236	234	230	222	222	222	214	244	244	266	286
30	282	288	288	296	288	284	260	228	228	228	218	234	232	238	236	230	210	202	224	232	218	224	276	304
31	310	294	276	238	260	326	284	240	230	210	208	228	246	246	234	222	228	218	222	248	230	242	276	290
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	29	28	29	31	30	30
MED	282	292	285	269	285	300	260	228	224	228	228	230	232	232	234	236	222	220	232	226	229	253	268	272
U Q	304	318	314	318	318	326	278	236	228	234	234	236	240	238	238	240	226	232	245	232	E A 254	E A 276	E A 296	294
L Q	272	262	262	250	270	280	244	222	220	226	224	222	224	226	230	230	216	214	222	219	224	242	254	256

DEC. 2000 h'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B 124	118		A 120	124	124	118	118	122								
2								B 118	116	124	A	A 122	126	124	B									
3								B E A 138	120	122	122	122	120	118	120	120								
4								B 114	120	116	A	118	A	A	A	A								
5								B 118	116	A	128	118	118	122	E A 132	118								
6								B 130	122	122	120	118	122	A	132	116								
7								B 114	120	120	A	A	A	A	A	A								
8								B 112	A	A	A	118	118	118	116	B								
9								B	A E A 130	122	120	116	116	118	120	A								
10								B 120	126	122	120	118	120	120	118	A								
11								B 136	B	B	B	B	B	B	B	A								
12								B 134	E A 134	A	A	122	120	118	A	A								
13								B 132	122	124	120	118	A	122	116	A								
14								E A 162	A	114	118	116	118	118	118	114	B							
15								B 122	124	118	118	118	116	118	114	A								
16								B 120	118	118	118	124	A	120	122	A								
17								A	A 124	A	122	B	118	A	A	A								
18								B 126	120	122	118	116	118	118	118	126								
19								B	A	A 124	122	120	118	116	116	136								
20								B 122	116	A	A	A	A	A	120	A								
21								B 126	116	122	118	120	120	122	118	B								
22								B 130	118	118	120	116	116	122	116	128								
23								E B 164	124	122	120	118	120	122	114	118	E A 134							
24								E B 144	122	120	116	116	A	E A 130	128	126	E A 138							
25								A	122	122	118	118	118	124	A	A	A							
26								A	120	120	116	120	118	118	118	120	128							
27								124	120	120	118	120	122	122	118	116	126							
28								A	A	A	A	120	118	128	128	116	124							
29								118	120	A	120	118	118	116	118	118	118							
30								B	120	118	118	118	118	120	120	120	122							
31								B	124	118	120	116	122	118	120	120	122							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								5	26	26	23	24	25	25	24	25	15							
MED								E 144	122	120	120	120	118	119	118	118	123							
U Q								E 163	126	122	122	120	121	122	122	120	128							
L Q								121	120	118	118	118	118	118	118	116	120							

DEC. 2000 h'E (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 h'Es (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	98	104	122	102	B	B	B	B	G	G	164	102	100	96	98	96	G	104	108	102	106	104	108	B
2	104	100	104	106	B	B	B	114	112	116	112	110	108	108	108	112	B	104	110	114	106	98	106	108
3	108	106	106	104	B	B	118	116	118	116	G	G	118	116	114	114	114	120	110	108	114	106	106	104
4	102	102	102	B	108	B	112	118	118	118	118	116	G	110	112	104	106	106	106	112	110	106	102	98
5	128	100	B	100	102	B	102	110	G	110	110	106	110	106	102	106	100	104	B	112	106	102	104	B
6	102	104	106	B	100	106	B	98	116	114	112	108	110	106	106	110	G	108	104	104	104	B	104	110
7	102	102	B	B	120	118	124	122	118	120	114	108	104	110	110	112	114	110	106	102	106	104	B	104
8	104	104	104	104	102	B	B	112	106	106	110	110	126	116	116	112	108	106	106	102	102	102	102	100
9	98	104	B	120	114	114	106	106	104	106	104	106	106	106	102	128	102	110	B	108	104	104	106	104
10	106	B	B	100	102	122	114	140	G	112	G	G	G	106	G	118	106	108	108	106	B	B	B	B
11	B	B	B	B	B	B	B	168	140	B	B	B	B	B	B	B	112	104	106	100	100	106	B	B
12	B	100	102	108	100	B	B	B	124	114	112	118	G	G	116	110	106	104	108	108	104	104	102	100
13	B	B	112	110	110	112	114	130	168	G	136	130	116	128	116	112	104	104	100	100	B	B	B	B
14	B	126	B	122	114	114	B	144	110	102	98	148	140	126	118	114	108	106	104	B	98	106	B	B
15	B	B	126	126	118	118	122	114	106	102	142	G	96	120	124	116	108	108	110	106	B	102	102	126
16	B	B	B	B	B	108	114	106	104	G	G	120	112	106	120	162	134	106	106	104	102	B	100	B
17	B	B	B	B	B	B	B	108	110	102	102	G	B	G	112	108	118	110	106	102	102	100	98	98
18	106	100	B	B	B	114	112	106	112	104	106	110	104	G	G	G	G	112	112	110	104	102	104	98
19	B	B	B	B	B	122	112	106	108	102	106	G	110	G	G	G	152	B	B	100	104	98	B	B
20	B	B	B	B	B	B	B	122	110	118	100	98	98	98	98	98	98	94	98	102	100	98	B	B
21	B	B	B	B	B	B	B	130	G	132	138	132	128	122	G	G	B	B	B	B	B	B	B	B
22	112	B	B	B	B	B	B	114	G	G	126	G	G	122	G	116	112	114	B	B	B	B	B	B
23	B	B	B	114	114	116	106	174	G	110	104	100	G	110	G	G	132	106	104	96	100	100	B	B
24	B	B	B	B	110	B	B	130	G	G	G	146	114	110	114	180	140	104	102	100	102	124	100	104
25	B	B	102	102	B	112	110	104	104	124	98	106	102	98	100	114	116	106	104	102	98	96	96	98
26	98	96	96	B	118	112	112	100	104	104	G	G	G	G	G	154	148	100	102	100	100	100	102	102
27	106	B	B	B	124	B	146	118	G	108	132	124	102	102	150	128	130	114	108	104	98	98	98	98
28	94	96	B	B	B	B	110	104	100	100	96	G	G	112	112	G	142	B	112	110	110	106	102	B
29	B	B	B	B	B	B	112	134	138	100	102	G	98	G	G	130	G	B	B	B	B	B	B	B
30	B	B	B	B	B	B	106	132	G	108	102	126	G	152	134	134	146	B	B	106	B	B	B	B
31	B	B	B	B	B	B	B	114	144	110	104	104	100	138	118	132	118	92	98	100	B	B	96	106
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	14	11	13	15	13	18	29	22	25	25	21	21	24	22	25	25	26	24	27	23	22	19	16
MED	104	102	104	106	110	114	112	114	111	110	110	110	108	110	113	114	114	106	106	104	104	102	102	103
U Q	106	104	112	117	118	118	114	130	118	116	122	125	115	121	118	129	133	110	108	108	106	106	104	105
L Q	98	100	102	102	102	112	110	106	106	103	102	106	101	106	106	110	106	104	104	100	100	100	100	98

DEC. 2000 h'Es (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2000 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F1	F1	F3	F1							HL11	LH11	L1	L1	L1	L2		F4	F2	F2	F1	F2	F1	
2	F1	F2	F3	F1				C1	C2	C1	L1	L1	L1	L1	L1	L1		F1	F2	FF11	F4	F2	F4	F4
3	F3	F4	F3	F2			F1	C2	C1	C2			C1	C1	C2	C2	C2	F1	F2	F2	F1	F2	F2	F3
4	F5	F3	F2		F1		F1	C2	C2	CL21	C1	L2		L1	L2	L3	L3	F4	F4	F1	F1	F1	F2	F4
5	FF12	F2		F2	F2		F1	L1		C1	L1	L1	L1	L2	L2	L2	L2	F2		F1	F3	F5	F2	
6	F2	F1	F1		F1	F1		L1	L1	L1	L1	L1	L1	L2	L2	L2		F2	F3	F3	F3		F1	F1
7	F1	F1			F2	F2	F1	C1	C2	C1	CL11	L1	L3	L1	L1	L2	L2	F4	F4	F3	F3	F2		F3
8	F5	F5	F2	F2	F3			C2	C4	L3	L2	L1	CL11	C2	C2	C3	L2	F5	F3	F4	F4	F3	F3	F3
9	F3	F1		F1	F1	F1	F3	L2	L2	L2	L1	L1	L1	L1	L1	C1	L1	F1		F1	F2	F2	F2	F1
10	F1			F1	F1	F1	F1	CL11		L1				L1		CL11	L2	F2	F2	F3				
11								H1	H1								L1	F4	F2	F3	F3	F2		
12		F1	F1	F1	F1				CL11	L1	L1	L1			C1	L1	L1	F1	F1	F1	F1	F1	F1	F1
13			F2	F2	F3	F1	F1	CH11	H1		H1	C1	C1	CL11	CL21	C2	L4	F5	F3	F2				
14		F1		F1	F1	F2		HL11	L1	L1	L1	H1	H1	C2	C2	C4	L5	F6	F3		F1	F1		
15			F1	F1	F1	F2	F1	C1	L1	L2	HL11		L1	C1	C1	C3	L6	F6	F2	F1		F2	F1	F1
16						F1	F1	LC11	L1			CL11	L1	L1	CL11	HL11	HL11	F2	F3	F4	F1		F1	
17								LC41	L2	L1	L1				L1	L2	L1	F4	F5	F4	F3	F4	F2	F2
18	F1	F1				F3	F3	L3	L1	L1	L1	L1	L1					F1	F3	F1	F3	F2	F2	F4
19						F1	F2	L2	L1	L2	L1		L1				H1			F1	F1	F2		
20								C1	L1	C1	L2	L2	L2	L1	L2	LC21	L2	F2	F1	F1	F1	F1		
21								C3		C1	C1	C1	C1	C1										
22	F2							C1			C1			C1		C2	L1	F2						
23				F2	F1	F2	F1	HL11		L1	L1	L1		L1			HL11	F2	F2	F2	F1	F2		
24					F1			C1				H1	L1	L1	L1	HL11	HC22	F4	F3	F2	F2	F1	F4	F1
25			F1	F1		F2	F2	L2	LC21	CL12	L2	L1	L2	LH21	LC21	CL32	CL22	F3	F2	F3	F3	F2	F2	F2
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27	F2				F1		F1	C1		L1	HL11	C1	L1	L1	H1	C2	C2	F2	F6	F4	F3	F2	F2	F1
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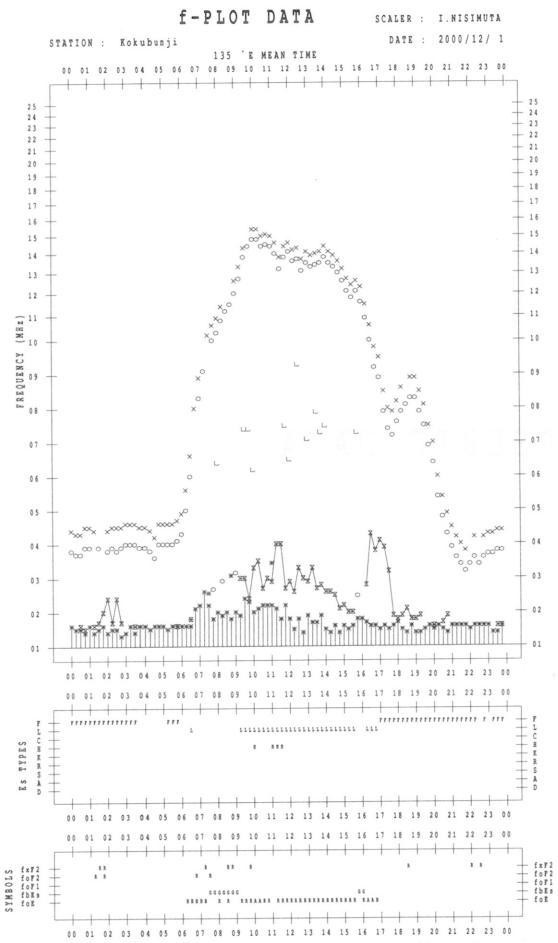
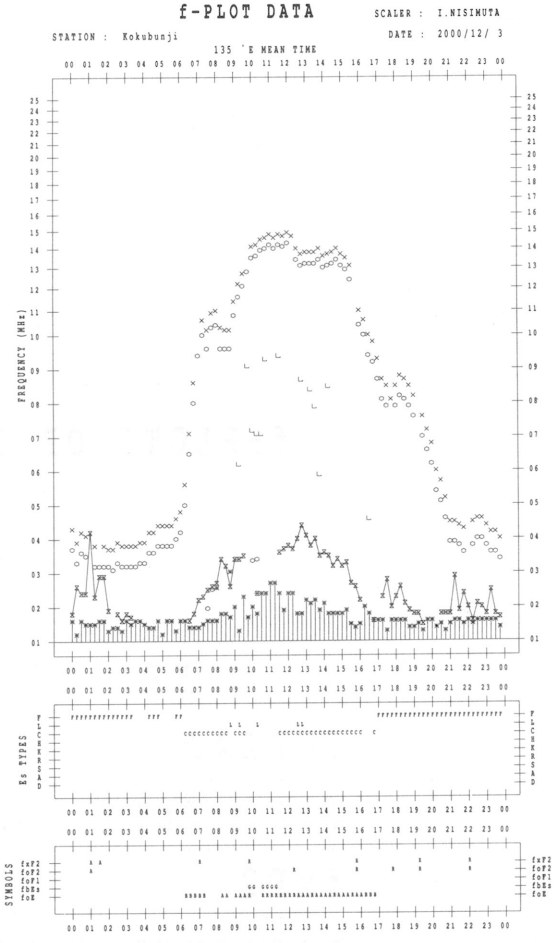
29							F1	CL11	CL11	L2	L1		L1			C1								
30							F1	C1		L1	L1	CL11		H1	H1	H1	H1			F2				
31								C1	H1	L1	L1	L1	L2	HL12	CL22	CL22	CL22	F2	F2	F1			F1	F1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

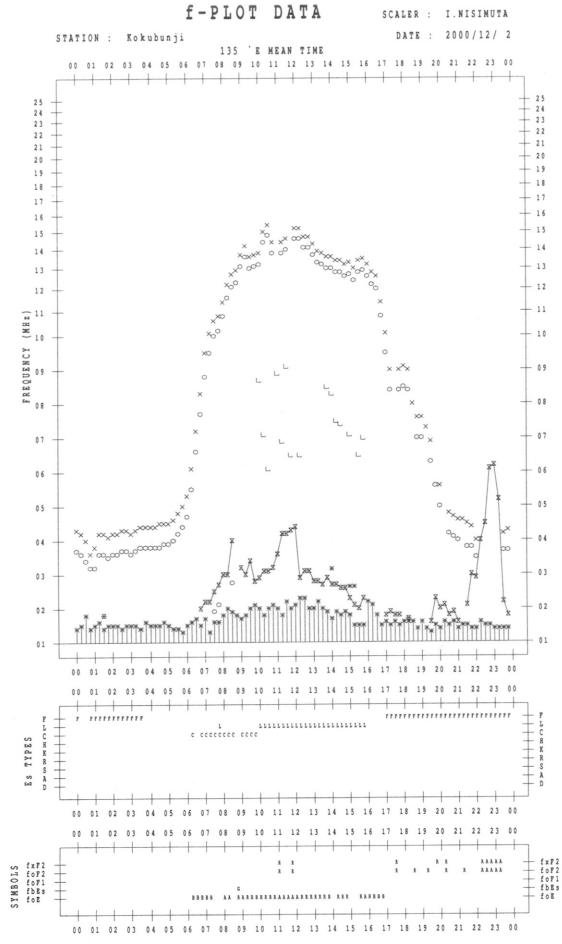
DEC. 2000 TYPES OF Es COMMUNICATIONS RESEARCH LABORATORY, JAPAN

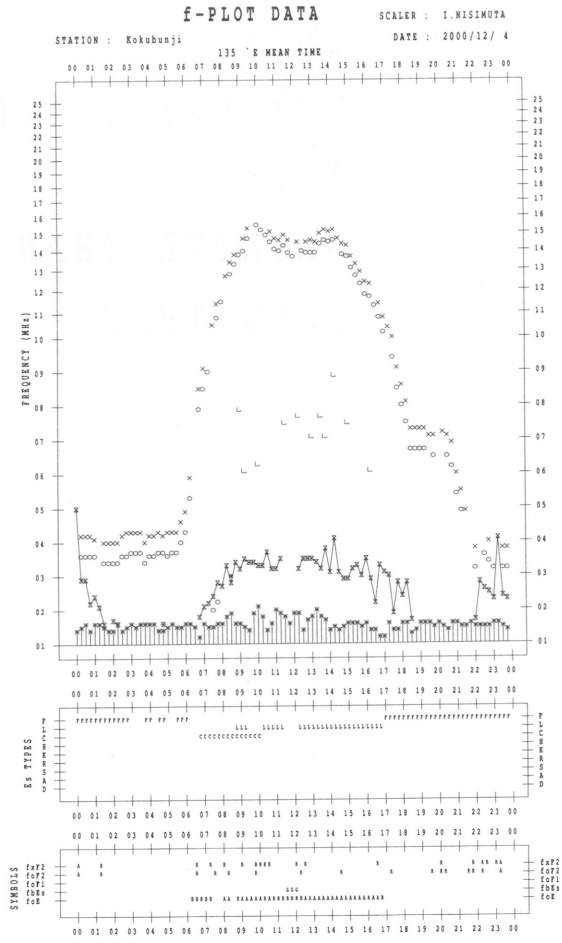
f-PLOTS OF IONOSPHERIC DATA

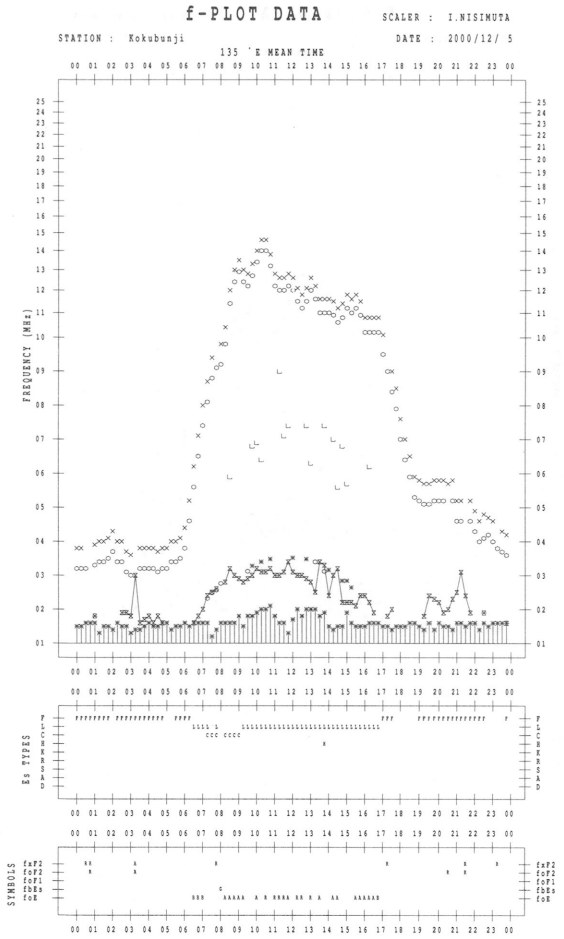
KEY OF f-PLOT	
	SPREAD
	foF2, foF1, foE
	fxF2
	DOUBTFUL foF2, foF1, foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

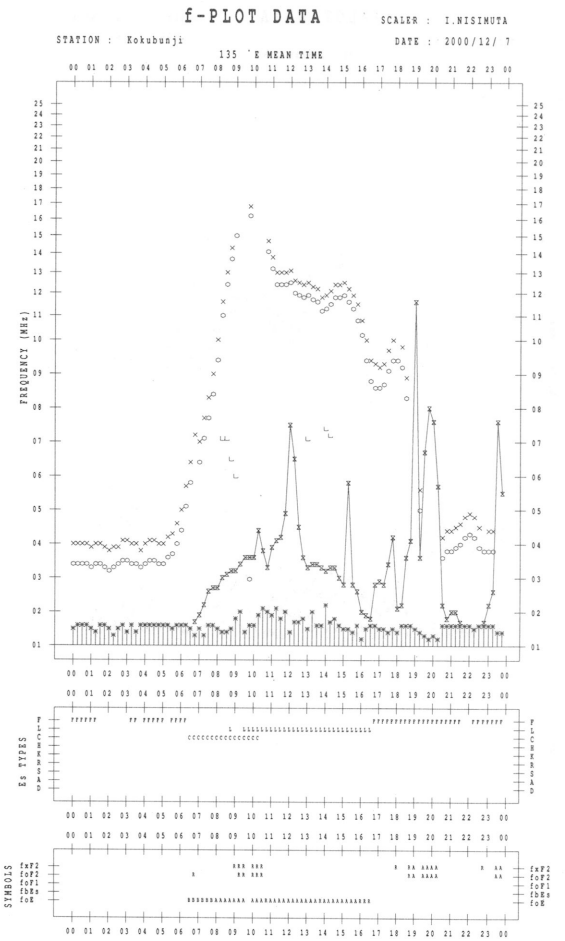

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 1
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

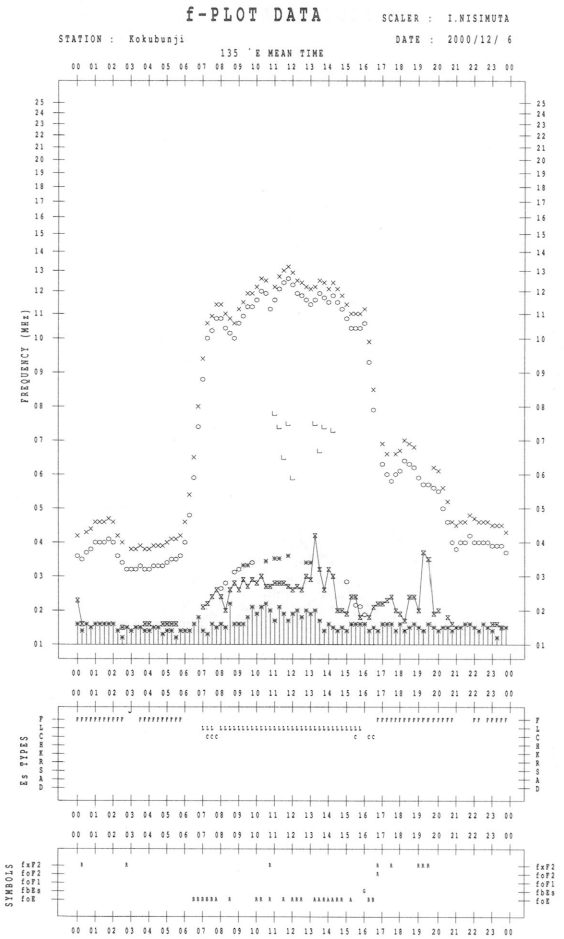

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 3
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

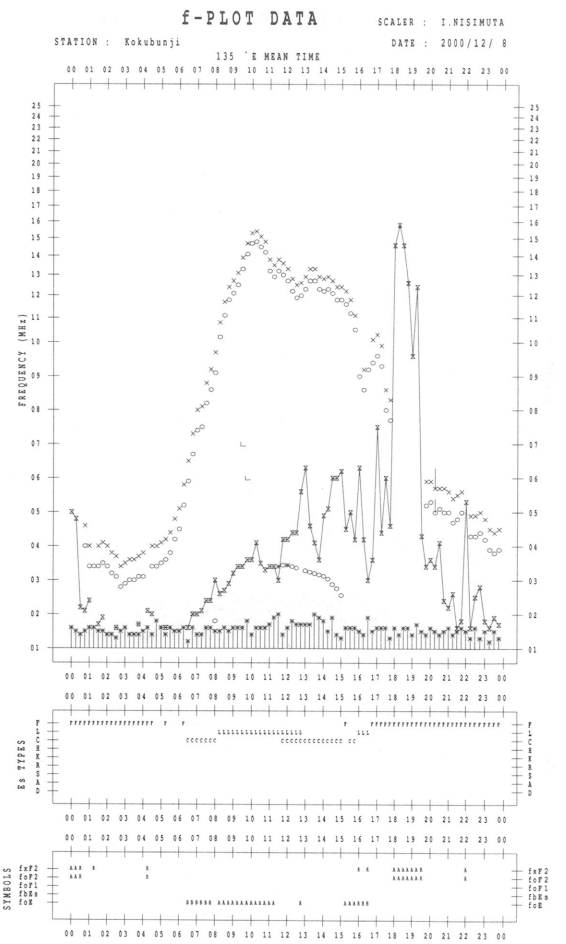

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 2
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

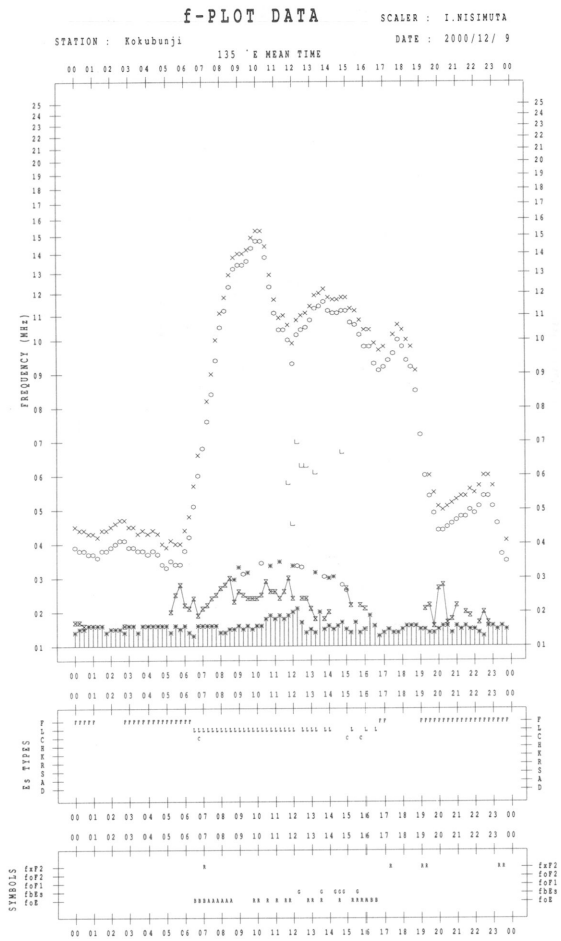

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 4
135 'E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 5
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 7
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 6
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 8
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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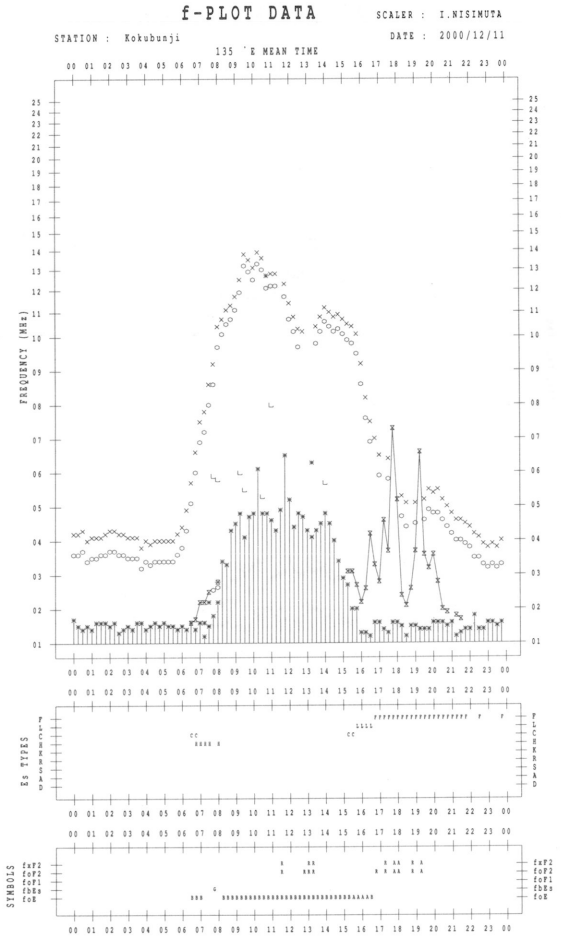
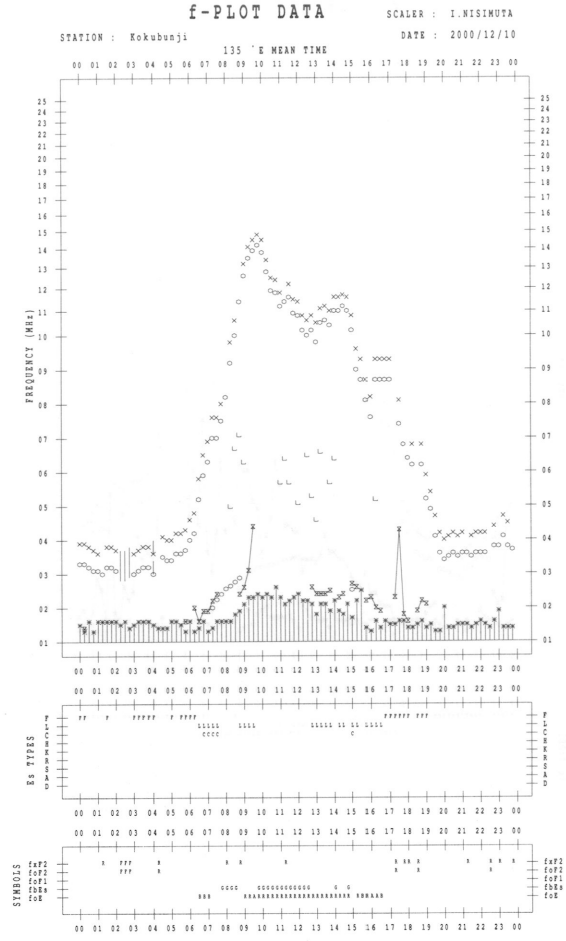
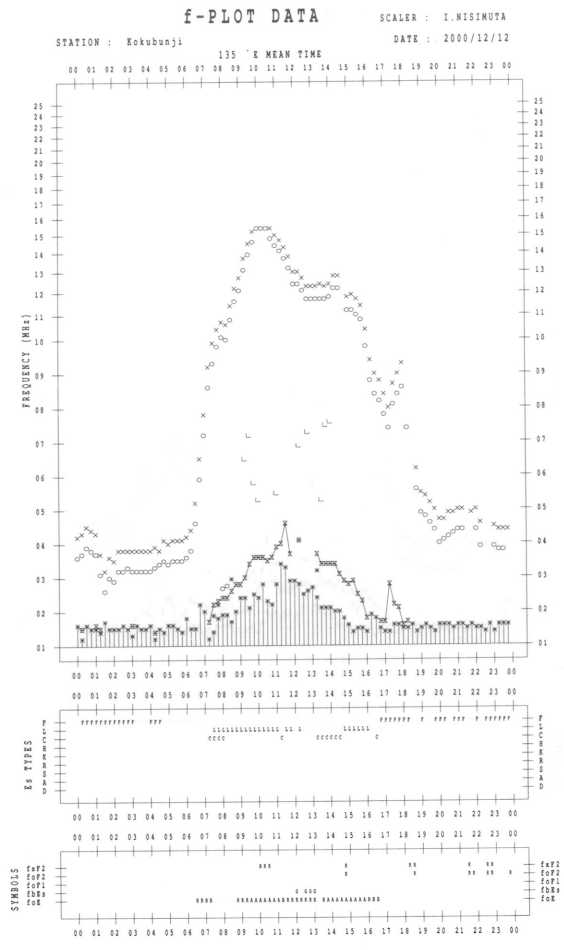
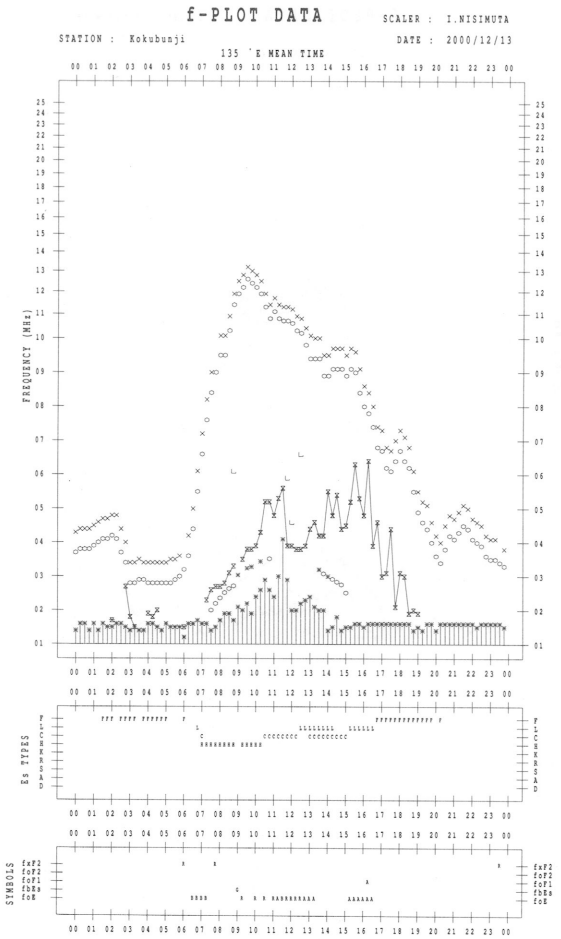
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/ 9
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/11
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/10
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/12
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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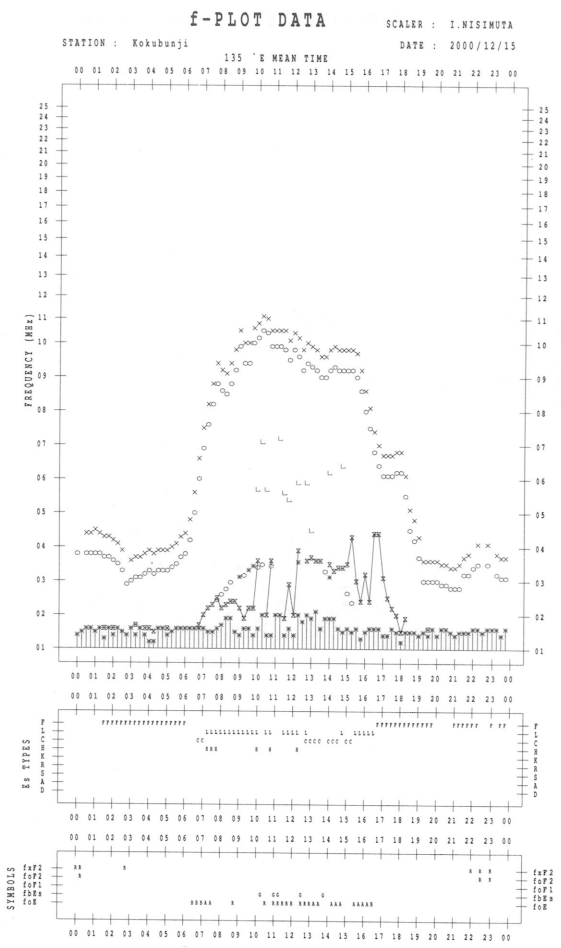
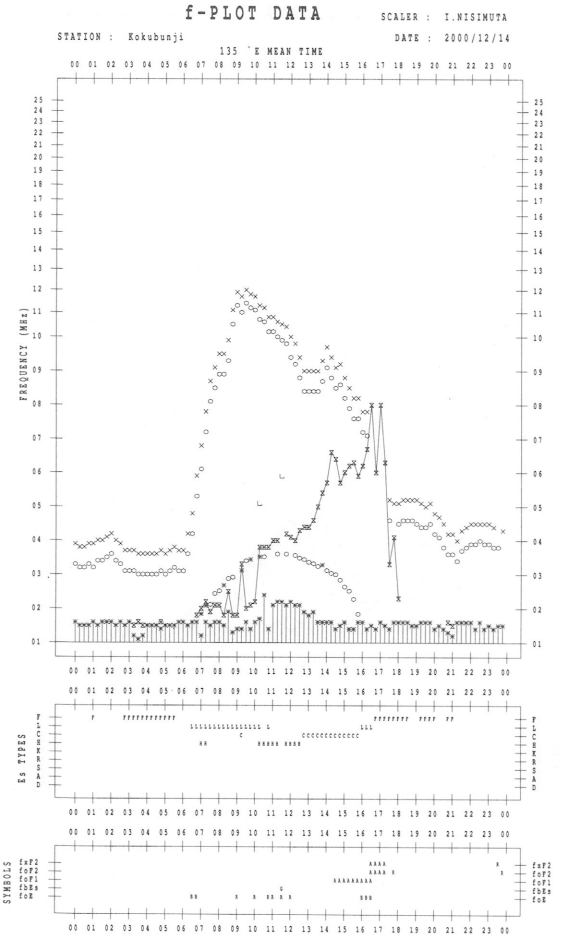
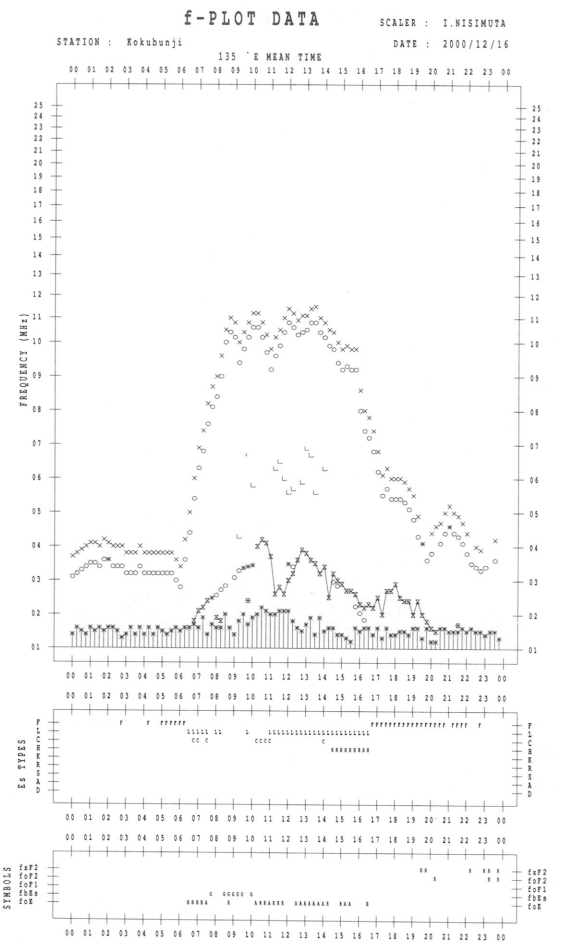
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/13
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/15
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/14
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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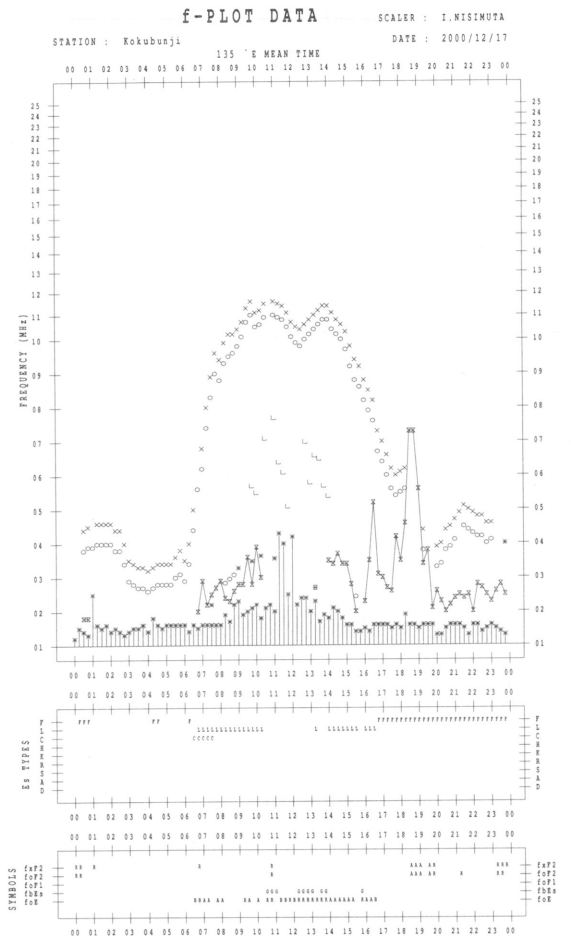
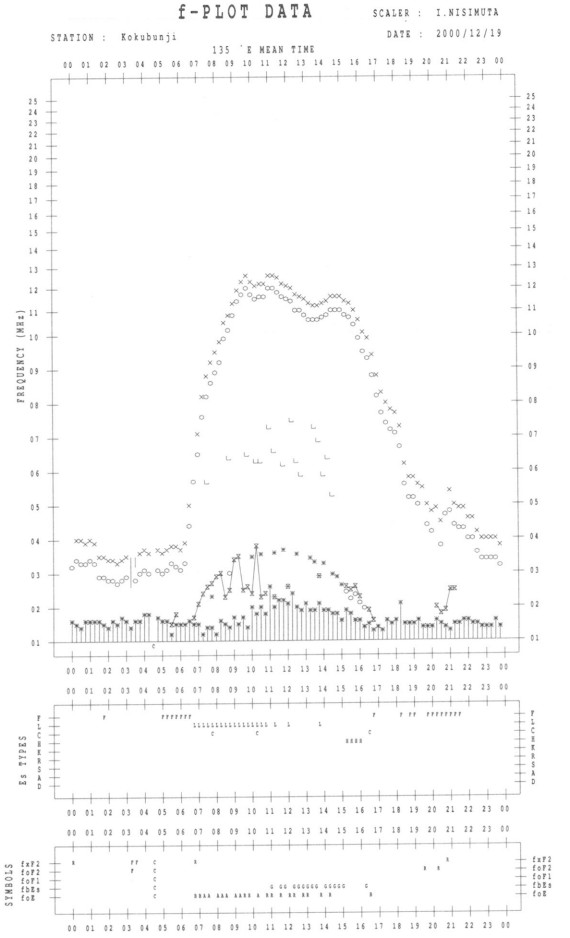
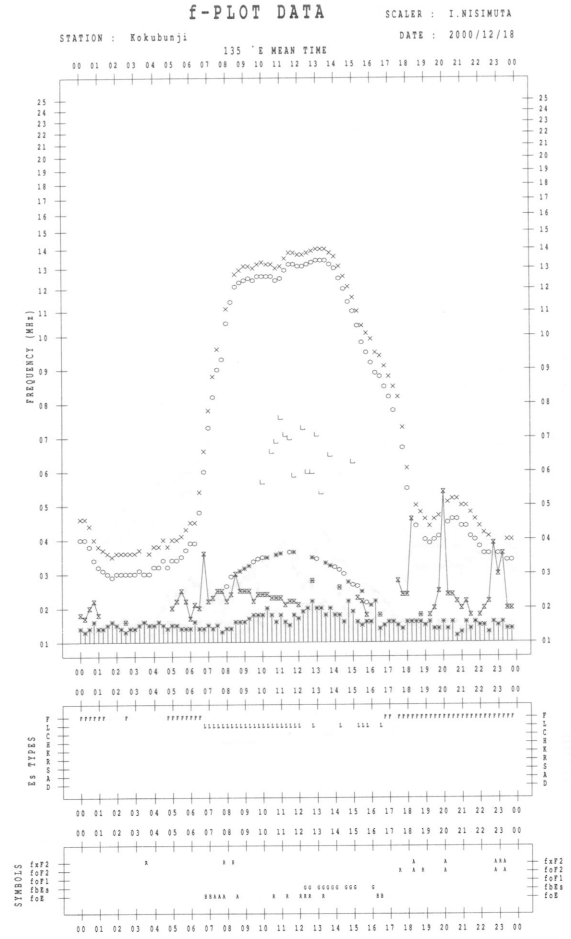
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/16
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/17
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/19
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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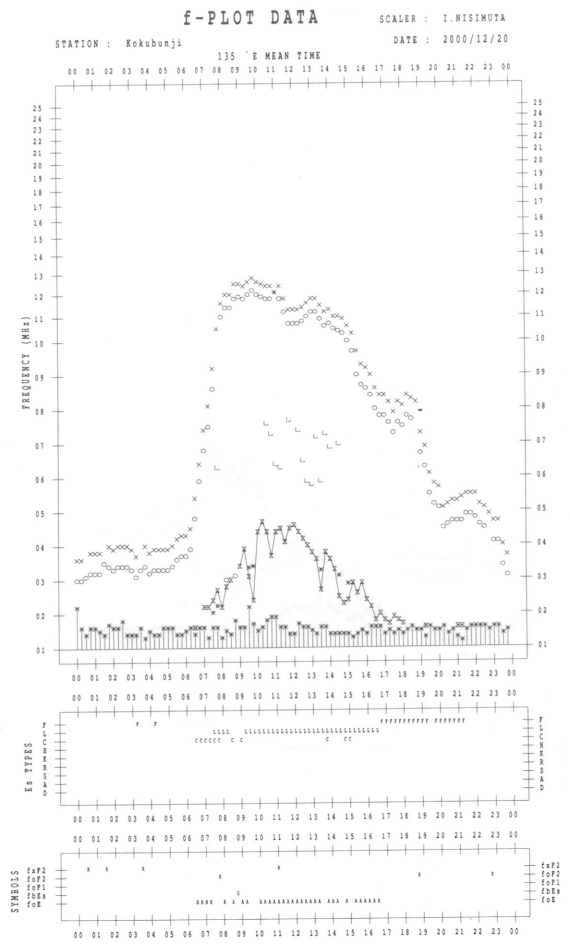
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/18
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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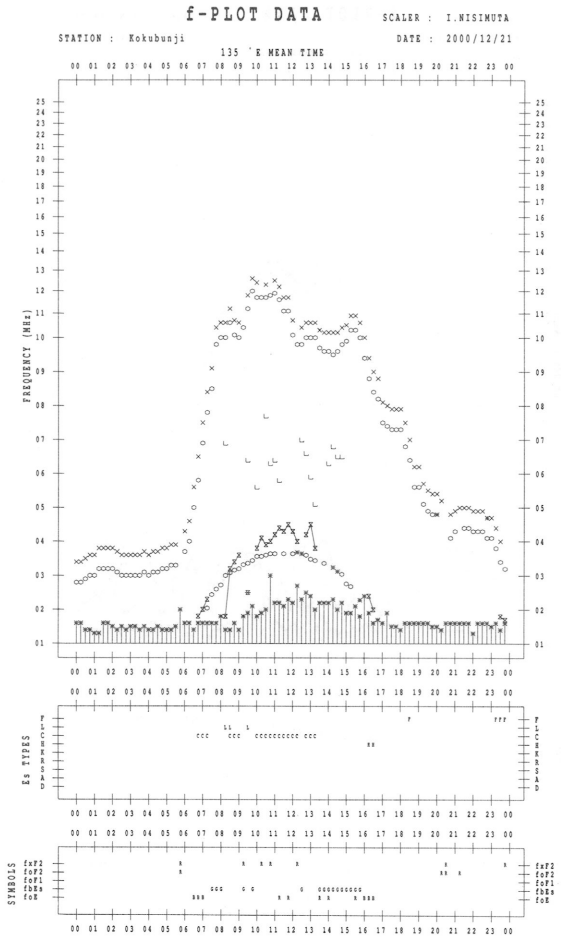
STATION : Kokubunji
DATE : 2000/12/20
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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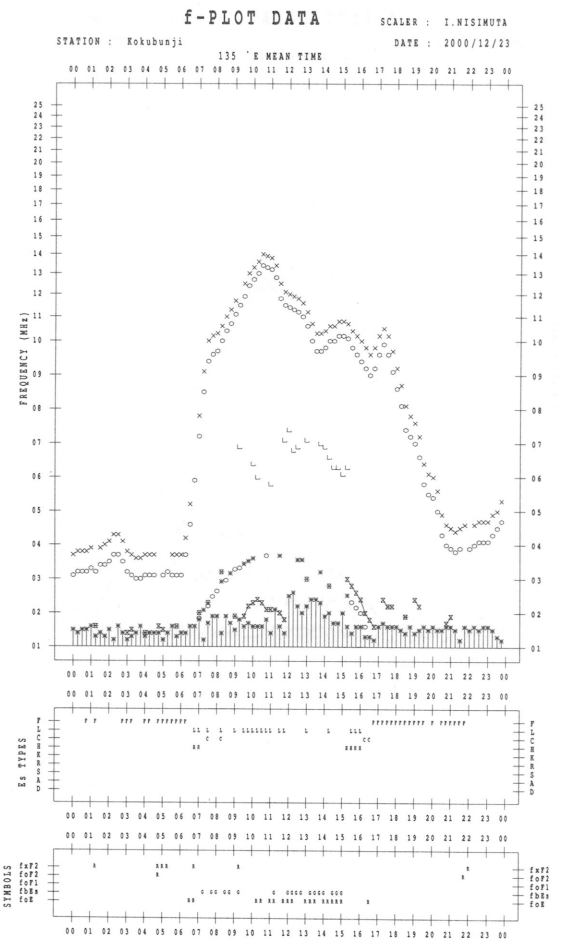
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/21
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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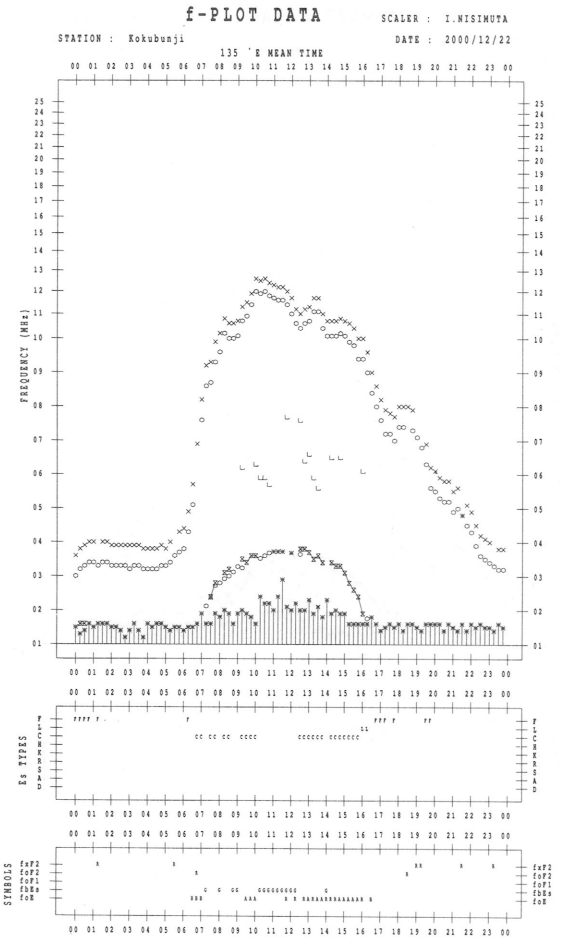
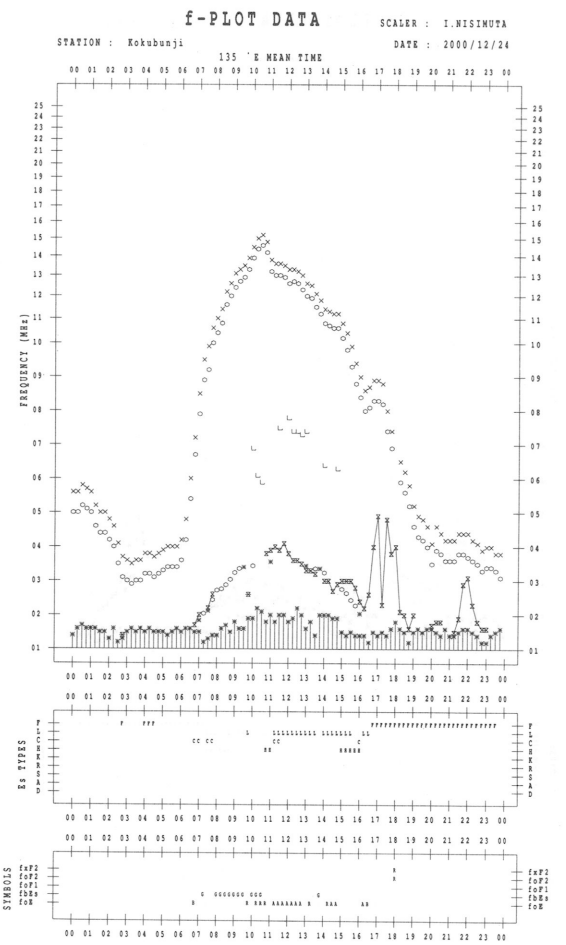
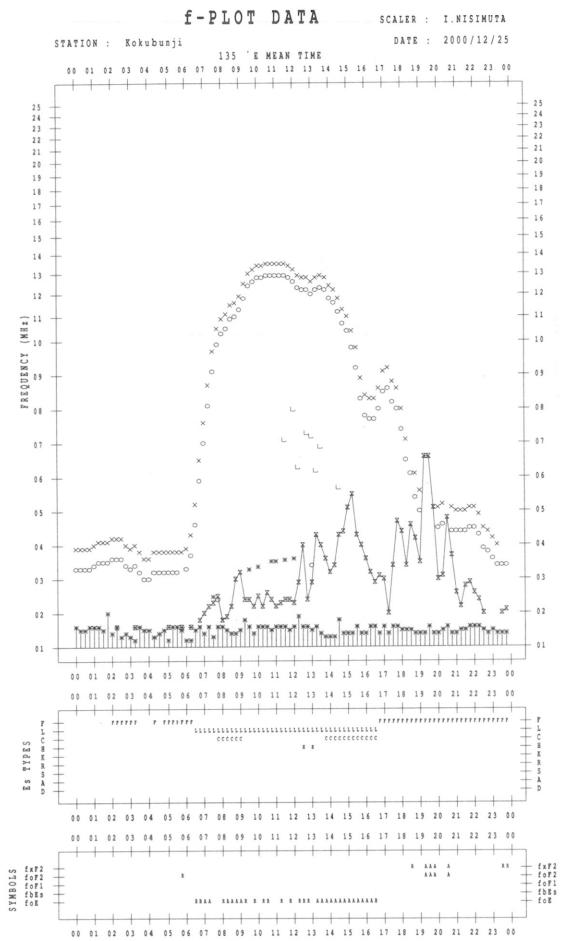
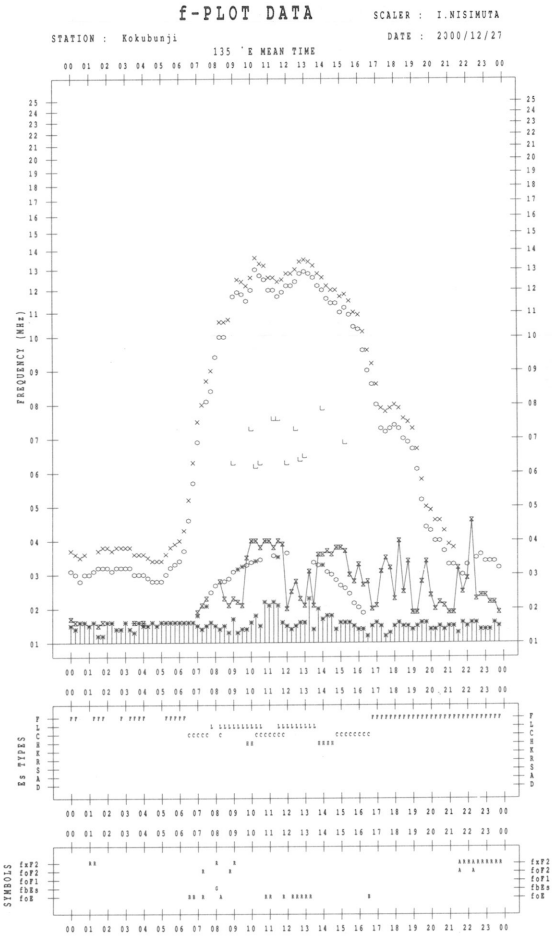
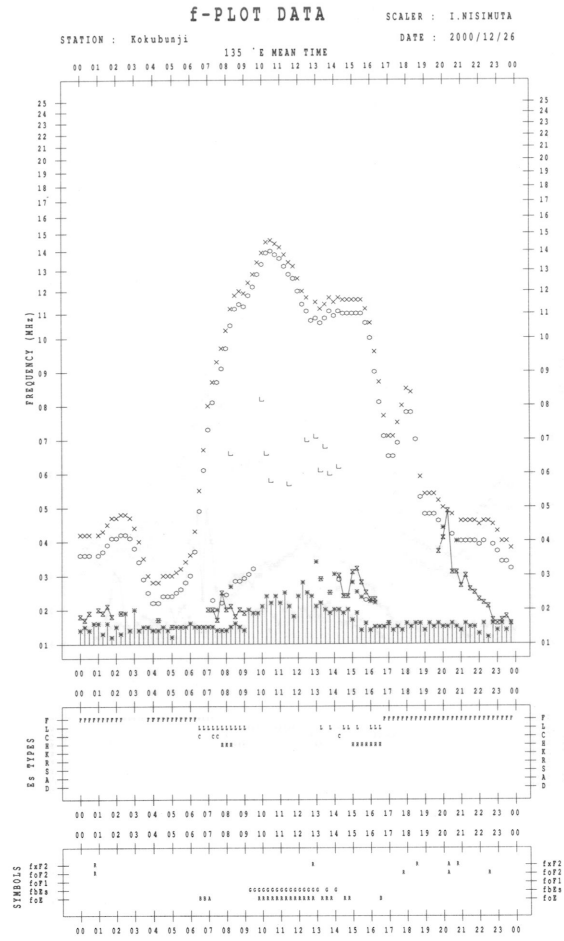
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/23
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

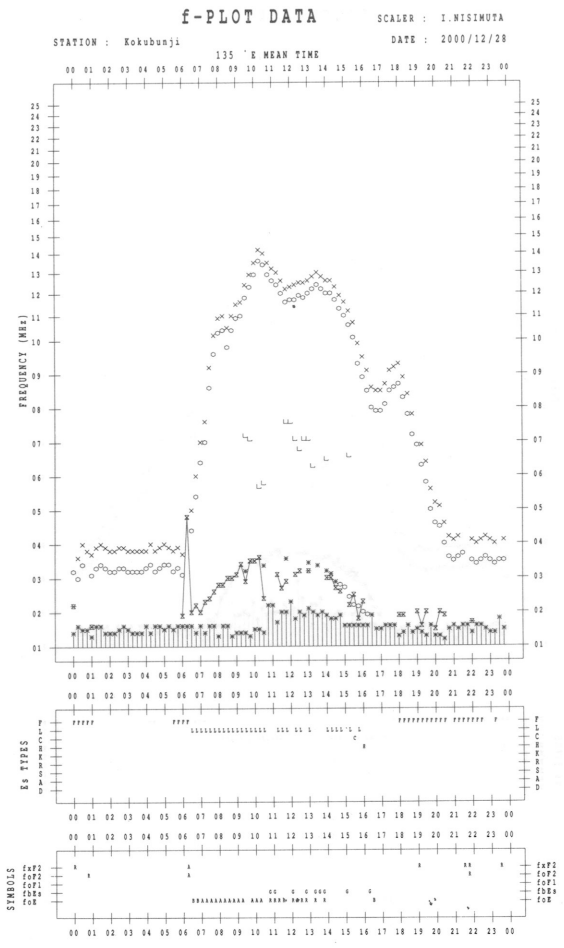

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/22
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

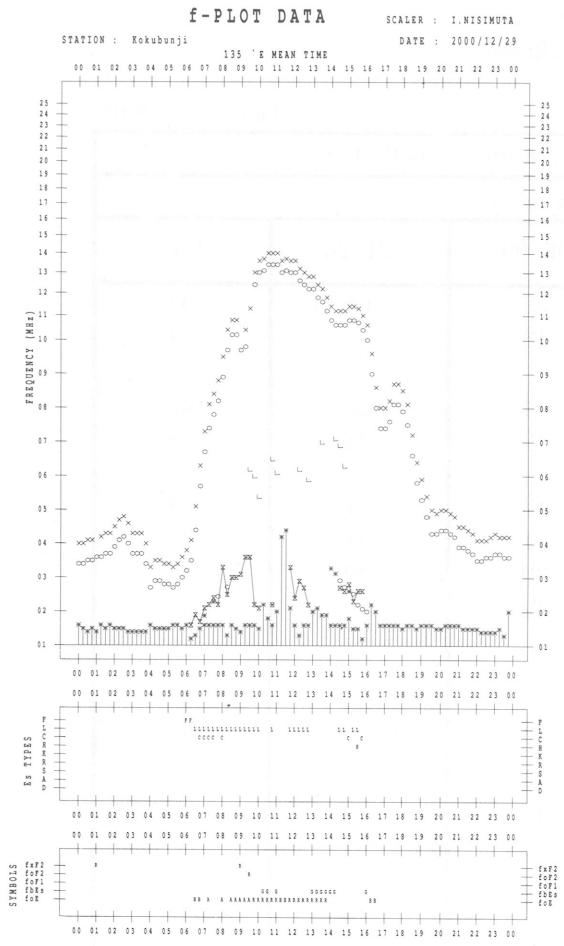

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/24
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE

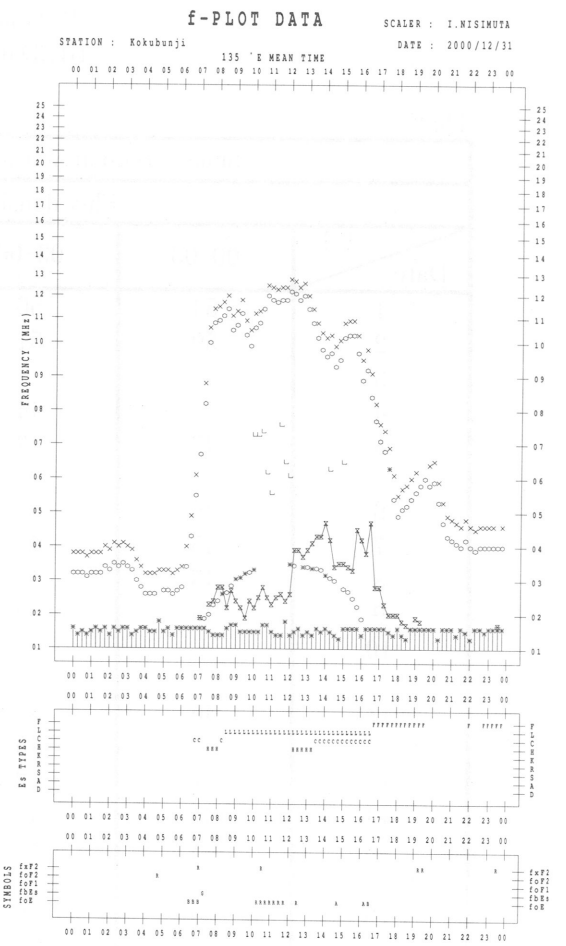

f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/25
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/27
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/26
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/28
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/29
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE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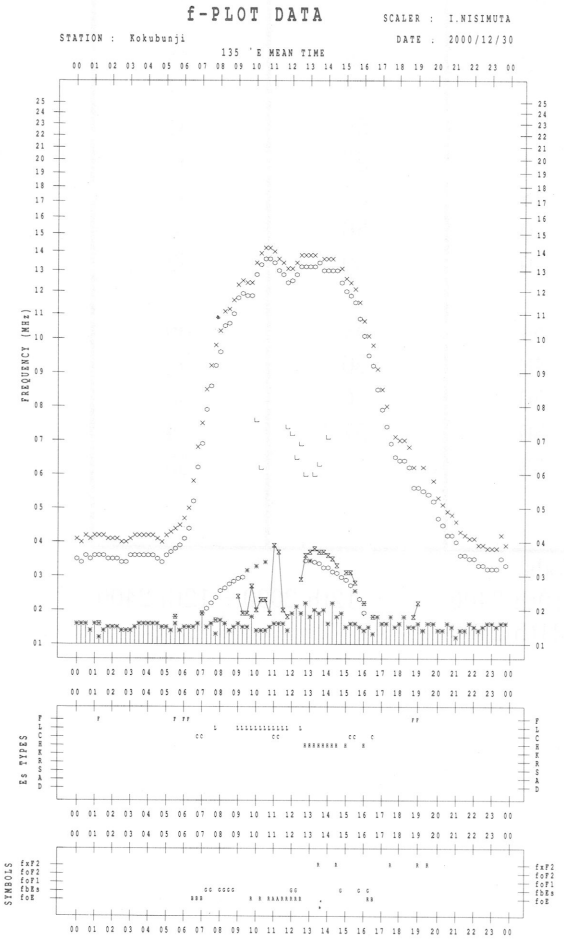
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/31
135 °E MEAN TIME
FREQUENCY (MHz)
Es TYPES
SYMBOLS
fxF2
foF2
foF1
fbEs
foE


f-PLOT DATA
SCALER : I.NISIMUTA
STATION : Kokubunji
DATE : 2000/12/30
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 2000

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	54	50	52	61	54
2	59	51	48	–	54
3	–	–	–	–	–
4	–	44	44	50	46
5	47	43	43	48	46
6	45	42	42	47	44
7	45	41	41	48	44
8	45	40	39	49	43
9	45	39	39	–	41
10	–	–	–	–	–
11	46	44	43	48	45
12	47	45	46	–	46
13	47	42	41	48	45
14	47	45	45	52	47
15	48	44	44	54	48
16	49	45	43	55	48
17	52	50	50	54	51
18	53	51	51	–	52
19	–	–	–	–	–
20	56	52	53	58	55
21	54	51	52	55	53
22	53	51	51	56	53
23	53	49	48	55	52
24	52	49	50	56	52
25	52	49	49	60	52
26	56	54	54	59	56
27	56	50	48	56	53
28	55	51	50	56	53
29	55	52	50	57	54
30	57	53	55	–	55
31	–	–	–	–	–

Note: No data is available during the following periods.
2nd 2000 - 4th 0400 9th 2000 - 10th 2400 12th 2000 - 12th 2400
18th 2000 - 19th 2400 30th 2000 - 31th 2400

B. Solar Radio Emission

B2. Outstanding Occurrences at Hiraiso

Hiraiso December 2000

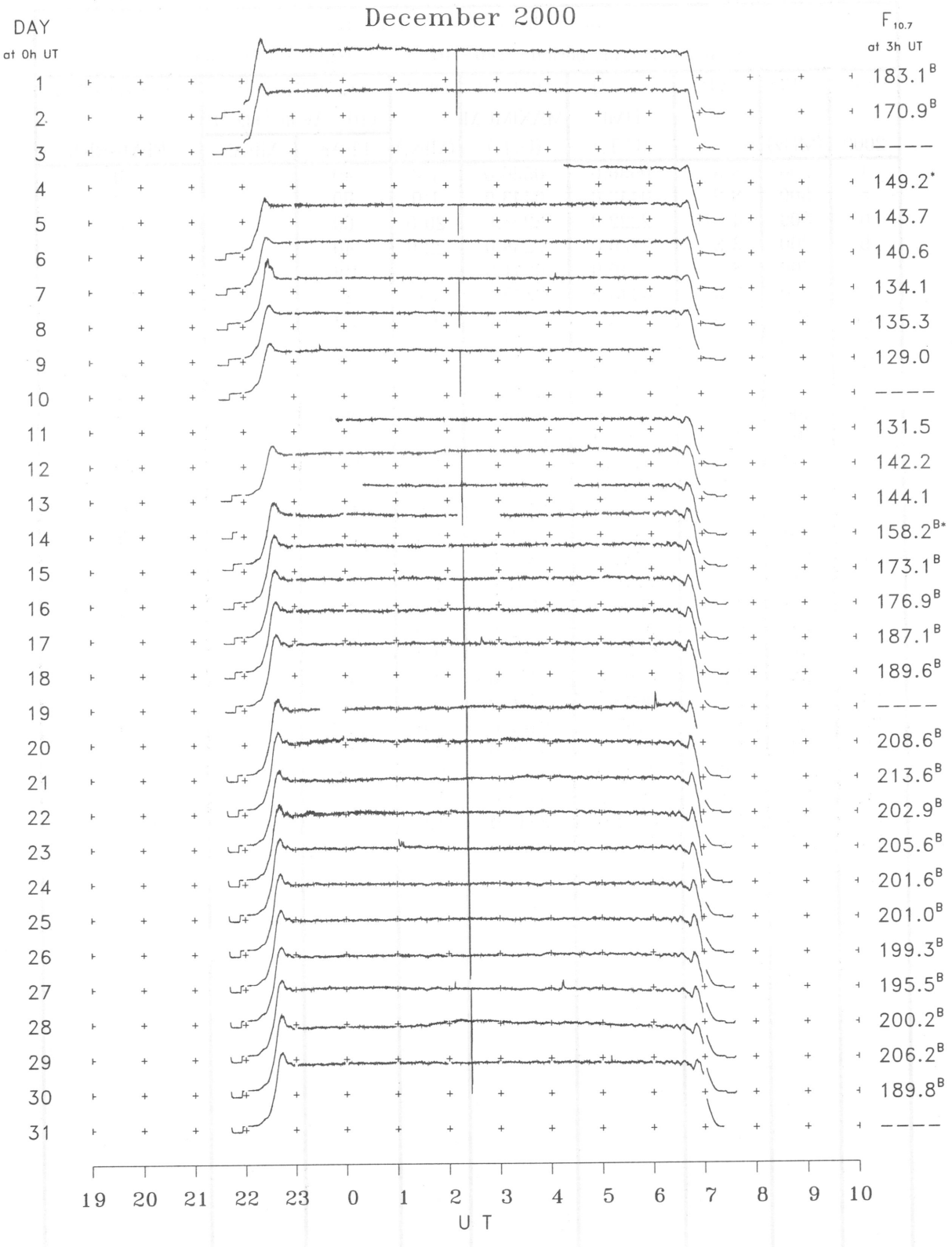
Single-frequency observations

Normal observing period: 2140 - 0725 U.T. (sunrise to sunset)

DEC. 2000	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
1	200	8 S	0536.0	0536.0	1.0	40	-	0
5	500	8 S	0443.0	0443.0	1.0	90	-	0
6	500	4 S/F	2222.0	2227.0	20.0	60	-	0
6	200	3 S	2226.0	2238.0	22.0	40	-	0
7	200	8 S	0240.0	0241.0	1.0	190	-	0
13	200	8 S	0345.0	0345.0	1.0	40	-	WL
14	200	8 S	2214.0	2214.0	1.0	240	-	0
14	200	8 S	2332.0	2333.0	1.0	70	-	0
15	200	8 S	0211.0	0212.0	1.0	30	-	0
17	200	8 S	2357.0	2357.0	1.0	40	-	0
18	200	8 S	0239.0	0240.0	1.0	260	-	0
18	200	47 GB	0452.0	0452.0	1.0	570	-	0
18	500	8 S	0453.0	0453.0	1.0	130	-	WR
18	200	8 S	0456.0	0456.0	1.0	30	-	0
18	500	8 S	0528.0	0528.0	1.0	230	-	0
18	200	8 S	0528.0	0528.0	1.0	50	-	0
20	200	8 S	0321.0	0321.0	1.0	170	-	0
21	200	8 S	0147.0	0147.0	1.0	30	-	0
22	200	8 S	0606.0	0606.0	1.0	30	-	0
24	500	8 S	0101.0	0102.0	1.0	110	-	0
24	200	8 S	0101.0	0102.0	2.0	40	-	0
24	200	8 S	0107.0	0108.0	2.0	40	-	0
24	200	8 S	0608.0	0610.0	2.0	40	-	WR
25	500	8 S	0157.0	0158.0	1.0	200	-	0
29	500	7 C	0223.0	0228.0	9.0	40	-	
29	200	8 S	2339.0	2340.0	2.0	60	-	0
30	200	8 S	0510.0	0510.0	1.0	440	-	0
30	200	8 S	0545.0	0545.0	1.0	110	-	0
30	200	8 S	0639.0	0639.0	1.0	60	-	0

B. Solar Radio Emission

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



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

IONOSPHERIC DATA IN JAPAN FOR DECEMBER 2000
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☎（042）（327）７４７８(直通)

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