F-744

IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 2010

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≪Real Time Ionograms on the Web ・・・・・・・・・・・・・http://wdc.nict.go.jp/index_eng.html≫

NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

This Series contains data on ionosphere (I) and solar radio emission (S) obtained at the following stations under the National Institute of Information and Communications Technology , Japan.

Stations	Geographic(WGS84)		Geomagnetic (IGRF-10(2005))		Technical Method
	Latitude	Longitude	Latitude	Longitude	
✳Wakkanai/Sarobetsu	45˚10'N	141˚45'E	36.4˚N	208.9˚	Vertical Sounding (I)
Kokubunji	35˚43'N	139˚29'E	26.8˚N	208.2˚	Vertical Sounding (I)
Yamagawa	31˚12'N	130˚37'E	21.7˚N	200.5˚	Vertical Sounding (I)
Okinawa	26˚41'N	128˚09'E	17.0˚N	198.6˚	Vertical Sounding (I)
Hiraiso	36˚22'N	140˚37'E	27.6˚N	209.1˚	Solar Radio Emission (S)

✳We moved the observation facilities at Wakkanai to Sarobetsu on February 2009. The new observatory is located at approximately 26km south from the old observatory. The observation at Sarobetsu commenced on March 6, 2009.

A. IONOSPHERE

Ionospheric observations are carried out at the above four stations in Japan by means of vertical sounding using ionosondes. The ionosonde produces ionograms, which are recorded digitally on a computer storage medium. The digitally-recorded ionograms are collected from each station by the central computer and reduced to numerical values and Summary Plots by the automatic processing system. The ionograms obtained at Kokubunji are manually scaled by experienced specialists to supplement automatically-scaled parameters.

A1. Automatic Scaling

Digital ionograms are automatically scaled by the pattern recognition method. The following five characteristics of the ionospheric are listed below. 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 iono-spheric reflections
h'Es ***h'F***	Minimum virtual height on the ordinary wave for the ***Es*** and ***F*** layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

Blank No digital record because of problems occurring in the auto matic data processing system, but existence of film record.

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

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

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

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

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

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

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

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

K Presence of particle *E* layer.

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

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

N Conditions are such that the measurement cannot be interpreted.

O Measurement refers to the ordinary component.

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

Q Range spread present.

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

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

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

V Forked trace which may influence the measurement.

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

X Measurement refers to the extraordinary component.

Y Lacuna phenomena, severe layer tilt.

Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

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

D Greater than.

E Less than.

I Missing value has been replaced by an interpolated value.

J Ordinary component characteristic deduced from the extraordinary component.

M Mode interpretation uncertain.

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

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

U Uncertain or doubtful numerical value.

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 part *E* layer minimum virtual height.

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

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

q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.

r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.

a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km as-sociated with high absorption and large *fmin.*

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

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

Median count (**CND**) is the number of values from which the median has been computed. In addition to numerical values, the count may include certain descriptive letters.

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

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

B. SOLAR RADIO EMISSION

Solar radio observations at 200, 500 and 2800 MHz are carried out at Hiraiso. The observation equipment consists of three parabolic antennas, one with 10-meter diameter for 200 MHz Measurement, one with 6-meter diameter for 500 MHz measurements and one with 2-meter diameter for 2800 MHz measurements, each being equipped with a pair of crossed doublet antennas as a primary radiator, and three appropriate receivers. Each pair of the crossed doublet antennas is used as a polarimeter. Observations are continuously carried out almost from sunrise to sunset.

B1. 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
SGD Code	Letter Symbol	Morphological Classification
45	C	Complex
46	C	Complex F
47	GB	Great Burst
48	C	Major
49	GB	Major+

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

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

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

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

B2. Summary Plots of F10.7 at Hiraiso

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

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

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

HOURLY VALUES OF foF2 AT Wakkanai

DEC.2010

LAT.45°10.0′N LON.141°45.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	40	43	34	32	34	33	31	46	65	65	65	67	66	65	64	61	50	32	32		34	30	35	37
2	34	37	36	34	30	32	32	46	58	65	68	65	60	62	62	57	56	35	30	31	34	34	34	34
3	34	37	40	37	36	31	37	47	52	A	66	78	71	61	61	58	44	34	37	34		32		
4		42	44	44	41	41	31	45	51	61	65	68	68	62	68	60	45	A		34		34	34	32
5	34	32	32		37	29	26	47	55	64	68	64	61	58	66	61	32	26		32	34	34	34	30
6	36	32	38	34	37	38	26	34	55	58	65	65	67	57	66	63	46		28	34	32	29	32	32
7	32	35	29	34	34	34	32	44	54	51	67		65	64	60	54	44	28	28		31		32	32
8	34	34	32	28	34	34	32	52	60	62	67	66	65	64	61	67	55	32	31	29	34	34	32	34
9	31	34	34	34	47	46	35	44	58	66	67	64	77	70	61	61	38	32	29	32	34	31	34	34
10	34	35	34	34	34	30	30	44	68	70	62	62	60	70	61	56	43	29		26		28	31	
11	28	29	29	39	26	26		42	52	57	64	64	62	54	70	57	48	34		28		30	32	34
12	34	34	35	34	34	32	28	44	52	70	58	68	67	54	65	64	56		28	29		30	31	32
13	32	34	34	32	34	32	29	40	56	64	66	63	68	68	63	61	52	35	31	29	30	32	34	34
14	32	34	34	34	34	30	26	46	61	66	69	58	69	66	66	62	54	33	35	32	29	32	34	34
15	34	36	34	34	36	31	28		60	67	81		61	67	65	59	57	38	34	28		22	28	32
16	34	31			37	A		28	34	55	68	64	72	63	58	57	61	46	32	29	32	30	29	31
17	34	31	32	34	34	32	28		36	54	57	67	68	62	60	58	57	38	30	A		32	32	34
18	34	32	32		29	30	26	26	37	55	57	67	64	64	60	62	51	43					31	34
19	32	30	29	33	31		29			52	56	64	54	57		58	52	41	29	34	40	34	34	37
20	38	32	34	31	30	29		37	44	47	66	62	55	61	62	47	34	34	30	34	32	30	31	32
21	32	34	28	32	34	34	30	42	60	62	66	61	62	65	61	58	44	29	32	31	A		31	31
22	41	35	42	38	32	34		38	A	52	A	62	62	67	60	47	47		32	26			34	
23	A		34	36	34	34	32	32	56	67	58	64	62	64	40	47	24	22	28	28	59	32	32	32
24	32	32	31	32	31	28		28	47	56	67	65	58	52	60	54	40	29			31	31	29	31
25	31	29	29	31	32	35	26	32	46	68	62	67	61	60	60	52	43	28	32	29	30	34	32	38
26	28	28	26	28	26	26	A	34		58	64	62	67	64	61	58	48	30	29	31	31	29	32	34
27	34	34	32	32	30	32			44	52	62	60	61	58	64	55	41			31	31	30	29	31
28	32	32	32	34	34	59	A	28	44	48	60	61	57	53	66	55	42	32	29	31	28	32	30	31
29	30	31	34	34	37	29		31	47	64		70	66	62	64	54	46		28	32	54	32	32	45
30	47	44	46	47	52	44	34	34	52	65	85	65	76	62	59	63	46	36	46	29	32	32	34	37
31	32	32	32	31	31	31	34	34	54	57	65	67	62	67	62	54	52		32	34	34	34	32	34
	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	29	29	30	30	21	28	29	30	29	29	31	30	31	31	31	23	23	26	22	29	30	28
MED	32	34	34	34	34	32	30	39	54	62	66	64	62	62	62	57	45	32	31	31	32	32	32	34
U Q	34	35	34	34	36	34	32	44	58	66	67	67	67	65	65	61	50	34	32	32	34	33	34	34
L Q	31	32	32	31	31	29	27	34	51	57	64	62	61	58	60	54	41	29	29	29	31	30	31	32

HOURLY VALUES OF fEs AT Wakkanai

DEC.2010

LAT.45°10.0′N LON.141°45.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	32	G	G	G	G	32	G	26			G	G	G	G	34	36	31	30	29	26	G	G	G	G
2	G	G	G	G	G	G	G	G	G	36	G	G	G	G	G	39	11	G	G	G	G	G	39	32
3	G	G	G	G	G	G	G	G		69	50	G	48	G	60	50	24	G	G	G	34	G	39	39
4	40	29	G	G	G	G	23	30	30	36	G	39	35	35	G	G	39	53	38	30	G	G	G	G
5	34	G	G		G	G	24	G	G	G	G	N	G	46	G	G		G		G	G	G	G	G
6	27	G	G	G	G	G	G	G		G	G	G	G	G	N	G	G		G	G	G	G	G	G
7	G	G	G	G	G	G	G	11	G	G	G	G	G	G	G	G	11	G	G	26	G		G	G
8	G	G	G	G	G	G	G	G	35	G	G	G	G	34	G	G	11	G	28	32	29	27	27	G
9	G	G	G	G	G	G	G	11	33	36	39	G	G	34	G	G	26	G	26	24	G	G	30	32
10	G	G	G	G	G	G	G	G		37	39	50	G	G	N	G	11	G		G		G	25	33
11	26	25	G	G	G	G	G	23	29	34	G	G	G	48	G	28	G	G		G		G	26	30
12	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G		G	G		G	G	G
13	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33
14	34	32	26	G	G	G	G	23	32	35	38	38	35	60	G	G	G	G	G	G	G	G	G	G
15	G	33	G	G	G	G	G	11	29	34	39	35	G	G	35	36	33	G	G	G		G	27	G
16	G	G	40	32	25	41	28	24	28	50	35	36	35	G	G	G	G	G	G	G	G	G	G	G
17	G	G	G	G	G	G	G		32	G	G	G	G	G	38	G	11	G	26		G	G	G	G
18	34	30	27	G	G	G	G	G	38	G	G	G	G	G	G	G	28	29	26	26		G	G	G
19	25	G	G	24		G			G	G	G	G	G	G	G	G	11	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	28	29	G	G		G	47	G	33	G	G	G	G	G	68	33	36	27
22	30	G	G	G	G	G	34	58	71		71	G	G	G	G	G	26		G	G	30	34	30	32
23	34	28	G	G	G	G	27	34	52	33	G	48	G	34	G	29	G	G	G	G	G	G	G	G
24	G	G	G	G	G	G	G	G	33	G	G	G	G	G	G	G	11	G			G	G	G	G
25	G	G	G	G	G	G	34	28	34	36	G	G	G	G	G	G	G	G	G	28	27	33	24	G
26	23	G	G	G	G	29	38	32	53	G	G	G	G	G	G	G	11	G	G	G	G	G	G	G
27	G	G	G	G	G	G	G	G	37	37	G	G	G	G	G	G	G			G	G	G	G	G
28	G	G	G	G	G	G	27	28	33	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
29	G	G	G	G	G	G	G	G	32	37	40	52	40	37	G	31	32	27	G	G	G	G	G	G
30	G	G	G	G	26	11	G		42	35	35	38	38	G	G	G	G	G	G	30	27	G	G	27
31	G	G	G	G	G	G	24	30	32	34	G	38	G	G	G	G	11		G	G	G	26	23	27
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	30	31	30	28	26	29	30	30	31	30	29	31	30	26	26	29	26	30	31	31
MED	G	G	G	G	G	G	G	11	32	33	G	G	G	G	G	G	11	G	G	G	G	G	G	G
U Q	27	G	G	G	G	G	24	28	35	36	35	36	G	34	G	G	24	G	G	25	G	G	26	27
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. 2010

LAT. 45°10.0′N LON. 141°45.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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

HOURLY VALUES OF foF2 AT Kokubunji

DEC. 2010

LAT. 35°43.0′N LON. 139°29.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	28	32	27	30	31			51	55	61	66	75	63	68	76	63	60	A	A				26	
2	27	28	28	28				52	58	59	69	78	65	75	64	63	52	34	28	34	34	35	24	32
3	32	27	23	24	31	30		48	52	65	75	77	84	75	62	56	55	28		36	32		30	
4		35	36	21	32			51	48	64	69	71	67	67	65	59	54	A		32	34	A	A	
5	A		A	32	28			49	57	62	60	71	75	59	61	59	51		A	A	A		A	27
6	27		32	27	28			47	58	59	62	76	69	66	60	58	54			28	39			23
7		30	28	32		31	34	47	59	65	67	76	77	64	61	57	59	43	A	A		27	A	28
8	A			30				49	59	67	C	C	C	C	C	C	C	C	32		32		27	26
9	32	31	31	32	32	26		49	62	61	C	C	C	C	71	55	49			27		28	25	
10			32					51	59	61	69	73	78	69	66	55	53	A			27			
11	30	28	30	32	21			42	54	56	63	68	66	61	58	55	55	37	32		28		27	27
12	28	28	A	A			27	52	57	61	62	75	63	66	63	61	52	A	A	A	A	A	28	27
13	28	28	27	27	27	30		46	59	61	72	69	67	59	65	74		A	A					27
14	28	28	32	30	31	30		46	65	58	74	80	73	72	60	63	65	42			28			
15				32				45	57	61	75	87	75	66	58	66	68	48		29	32			
16	28	28	36	32				46	58	55	75	92	68	65	62	57	58			30			A	
17					28			45	54	62	65	74	84	63	58	55	58		A		30	28	28	28
18	30	30	27					44	55	65	65	75	70	61	61	57	49	37			30			
19		23	32		A			44	59	58	68	72	67	52	55	54	55	34			30			32
20	34		34	34	32		28	45	54	56	55	65	61	55	55	59	55	28		39		A		
21		30	31	35	A		28	44	49	58	78	75	58	57	66	52	59	28	A	A	A	A		28
22	A		34		28		27	47	60	59	68	65	63	55	68	59	49	34	34	A	27	27	30	
23		32	37	36	27		30	45	49	52	67	75	61		59	55	44	34		30	34	24		
24		28		34				42	54	52	56	66	72	65	61	55	46			34				
25			27		25			39	54	51	64	72	73	62	58	55	45	A	A	A	A	27		
26	A	34		34	28			41	52	51	72	78	92	61	67	58	49	35	A	36	38			
27	28	25	27	30	31			44	44	53	58	64	67	63	59	56	59	A	28	A	28			
28				34				37	46	51	59	51	62	64	55	65	51			28		23		
29		23	20	28	23			46	56	65	81	86	86		55	59	54					28	27	26
30	27	30	30	32		A		40	53	56	63	74	A	77	52	55	58	39						
31		30		30				44	55	60	67	63	76	62	52	66	39	38	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	14	21	22	24	17	5	6	31	31	31	29	29	28	27	30	30	29	15	5	12	16	9	10	12
MED	28	28	30	32	28	30	28	46	55	59	67	74	68	64	61	58	54	35	32	31	31	27	27	27
U Q	30	30	32	33	31	30	30	49	59	62	72	76	75	67	65	61	58	39	33	35	34	28	28	28
L Q	28	28	27	29	27	28	27	44	53	56	62	68	64	61	58	55	49	34	28	28	28	25	26	26

HOURLY VALUES OF fEs AT Kokubunji

DEC. 2010

LAT. 35°43.0′N LON. 139°29.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	28	G	25	26	G	G		G	G	G	50	G	37	G	32	37	35	32				G	
2	G	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	27	26	27	26	G	G	23	G
3	G	G	G	G	G	G		G	G	50	61	52	G	49	G	G	G	G		33	24	26	22	27
4		G	27	G	G		G	26	35	44	38	46	G	G	G	G	G	43	27	26	26	40	32	26
5	32	29	34	26	26		26	29	G	G	G	G	G	G	G	G	29	G	45	58	47	32	39	27
6	G		G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
7		23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	35	53		G	30	27
8	29	28	G	G	G	G	G	G	G	G	C	C	C	C	C	C	C	C	24		G	G	G	G
9	G	G	G	G	G	G	G	G	G	41	C	C	C	C	G	G		29		G		G	G	G
10	G	G	G	G	G	G	G	G	G	G	G	G	G	G	59	43	37	39	G		G	G	G	G
11	G	G	G	G	G			33	G	G	G	G	G	G	51	51	27	24	G	23	23	25	27	27
12	27	G	31	30		G	G	G	34	49	G	G	G	G	35	53	G	60	50	33	34	35	54	29
13	26	G	G	G	G	G	G	33	31	G	G	G	G	46	G	G	42	42	34				G	G
14	G	G	G	G	26	25	26	27		37	G	G	G	G	G	G	34	33	27	G	23	G	G	
15	24	G	G	G	G	G		G	G	G	G	G	G	G	G	35	G	G	G	G	G		26	G
16	G	G	G	22	G			G	G	36	51	50	G	G	G	G	G	27		G		G	46	26
17		G	G		26	G		G	G	G	G	G	G	G	G	G	G	G	28		G	G	G	G
18	G	G	G	G	25	G	G	G	G	G	G	G	G	G	G	G	G	G			G		G	
19	G	G	G	G	31			G	G	G	G	G	G	52	G	G	G	G	G	G	G	G		G
20	G		G	G	G	G	G	G	G	G	G	G	G	G	G	35	35	G		29		30	27	26
21	G	G	G	G	31	G	G	G	G	G	G	47	G	G	G	G	G	28	38	33	39	34	G	G
22	29	30	29		G	G	G	26	G	G	G	47	G	G	G	G	G	G	G	45	31	G	G	G
23	25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	G		G	G	G	G	G
24	G	G	G	G	G			27	G	G	G	G	G	G	G	G	G	G		G	G			G
25		G	G	G	G		G	G	G	G	G	G	G	G	G	73	30	81	81	69	43	30	34	29
26	37	29	29	26	G	32	G	G	G	G	G	G	G	G	G	G	46	G	56	G	G	G	G	28
27	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	34	29	27	27	G	24	26	24
28		G	G	G	24			G	G	G	G	G	G	G	G	G	G	26		G	G	26	27	27
29		G	G	G	G			24	32	G	G	G	G		G	G	29	27	G	G		G	G	G
30	G	G	24	G	G	26		25	G	G	47	53	82	50	71	46	G	11		29	28		G	G
31	31	26		G	G			G	G	G	43	51	48	52	G	44		27	29	29	28		23	
	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	30	29	30	20	19	30	30	31	29	29	29	28	30	30	28	30	22	25	24	24	29	27
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	27	26	G	G	G	G
U Q	26	12	G	G	24	G	G	25	G	G	G	46	G	G	G	35	32	29	35	33	28	28	27	27
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 Kokubunji

DEC. 2010

LAT. 35°43.0′N LON. 139°29.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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

HOURLY VALUES OF foF2 AT Yamagawa

DEC. 2010

LAT. 31°12.0′N LON. 130°37.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	28	28	29			31	28	38	54	61	62	68	67	72	77	64	60	53		A	28	34	30	
2	26	28	28	28	29		26	40	66	58	68	72	71	75	78	70	63	55				37	25	26
3	30	A		32	29	49		40		66	74	78	78	72	76	58	70	50		A	36	A	A	28
4					37		A	37	60	63	65	74	71	70	77	67	67	55	A	A	34	32	32	31
5	28		29	34	34		28		53	55	61	72	68	70	68	65	67	55	35		38	34	29	
6		25	29	28	30	32		37	54	57	69	71	71	72	74	59	58	50	A	20	34	37		26
7	28	28			29	26	26	38	54	63	65	75	68	80	72	70	56	64	A	32	A	32		A
8	26	31	33	43	37			36	42	60	67	76	72	78	78	71	66	52	A		36	A		26
9	28	28	30	32	31	32		36	65	66	65	72	77	89	91	83	61	51	40	34		28	26	28
10	28	29	34	28				34	58	71	68	77	78	95	78	94	62	52	50	37	34	41	34	28
11	28	30	32	30	32	31		34	51	56	60	67	67	68	65	59	60	58	34	34	28	30	32	26
12	32	32	34	29	31		26	38	62	70	72	78	70	67	81	65	58	50	47	30	31	A		28
13	26	30	34	29	34	34	29	37	54	55	74	69	59	66	67	68		58	38	29		30	31	25
14		30	32	30	32	28		37	60	60	62	65	82	86	80	67	75	64	46	40	32	29		
15	29	29	31	37	59			30	70	64	72	74	90	75	70	62	82	68		28	41		A	
16	28	31		28	28			32	38	66	67	82	76	68	67	66	57	52	37	30	34	34	34	
17						28		29	60	72	68	72	81	65	60	58	56	50	39	A	A	27	31	25
18	30	29	28	29	32			34	50	67	76	58	74	72		60	55		34			29		28
19	29	30	34	28				30	59	62	66	69	70	62	63	55	58	50	32			30	26	26
20	28			29	29	28		31	60	64	61	58		63	66	72	59	52	43	34	47	34	34	
21	31		25	37			26	36	60	62	66	72	71	69	66	70	60		34	34	31	28		26
22		28	30	31	32			32	60		65	69	65	60	71	65	60	47	31	A	34	29	39	28
23	28	28	29	31	28	26		30	50	60	60	72	73	74	61	60	56	44	32		34	32	30	26
24	26	29	32	37				29	53	57	54	65	75	68	66	57	61	45	28	31	31	28		
25	28	30	31	26	29			31	49	53	54	65	92	67	64	60	37	44	A	A	A			
26	28			32	29			34	44	58	59	75	76	70	65	60	56	46	31	34	38	36	29	A
27	28	28	28	28	32	26		30	54	44	44	54	67	71	63	56	57	60	34	30	26			
28		A	A	30	29	A		28	46	50	54	57	61	57	55	65	60	52	29	A		A	30	59
29	26	28	32	26	28			31	55	66	90	91	110	85	60	68	62	52	43	A	A			
30	29	29	30	34				30	55	57	60	71	62	92	65	A	65	A	A	A	37	34	26	28
31		28	31	A	A			34	52	56	76	80	80	86	68	78	72	67	26	38	38	40	34	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	24	23	23	26	23	12	7	30	30	30	31	31	30	31	30	30	30	28	21	16	21	23	18	18
MED	28	29	31	30	31	30	26	34	54	60	65	72	72	71	68	65	60	52	34	33	34	32	30	27
U Q	29	30	32	32	32	32	28	37	60	66	69	75	78	78	77	70	65	56	41	34	37	34	34	28
L Q	28	28	29	28	29	27	26	30	51	57	60	67	68	67	65	60	57	50	31	30	31	29	29	26

HOURLY VALUES OF fEs AT Yamagawa

DEC. 2010

LAT. 31°12.0′N LON. 130°37.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	36	G	G	G	30	G	G	46	40	50	39	36	39	32	39	35	24	G	G	G
2	G	G	G	G	G	G	G	G	32	54	40		47	51	G	43	36	45	33	33	38	38	25	G
3	G	26		23	G	G	G	G		40	53	59	45	41	39	G	46	40	39	43	36	34	42	G
4	26		42	39	G	27	30	23	36	48	49	52	46	47	44	62	55	57	57	35	32	G	G	G
5	G	28	G	G	G	G	G		30	36	41	46	G	48	42	40	50	32	G	39	G	22	26	24
6	G	G	G	G	G	G	G	G	30	37	44	40	42	40	41	46	49	46	44	27	27	G	28	G
7	G	G	G		G	G	G	G	58	G	40	40	40	G	G	G	38	44	53	32	38	28	27	24
8	29	G	G	G	G	G		G	32	34	42	G	53	42	45	52	50	61	51	35	28	33		G
9	G	G	27	G	G	G		G	31	37	48	45	56	40	41	G	38	32	36	G	G	G	G	G
10	G	G	G	G	G	G		11	G	G	37	G	G	G	G	G	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	22		G	G	53	40	G	G	G	G	G	32	G	G	G	G	G
12	G	G	27	27	27	G	G	G	29	34	43	49	G	G	G	37	34	G	G	G	27	49	30	G
13	G	G	G	G	G	G	26	G		41	G	46	G	40	G	G		G	G	28		G	G	G
14	34	G	G	G	G	G	G	G	G	35	48	45	52	41	49	39	33	34	28	G	G	G	27	24
15	G	G	G	G	G	G		G	30	36	G	43	48	48	40	40	34	40	28	G	40	34	33	29
16	G	G	G	G	G	G		26	39	40	55	60	54	G	G	G	34	G	G	31	G	G	29	
17				28	34	29		G	30	37	47	G	G	G	G	39	42	G	34	29	33	G	G	G
18	G	26	32	28	G	G		G	32	39	G	G	G	G		G	G		G		27	28	25	G
19	G	G	G	G				G	G	35	43	G	G	G	G	G	G	G	G		G	G	G	G
20	G	G		G	G	G		G		G	G	40		40	40	39	36	30	23	G	G	G	24	G
21	G		G	G		G	G	G	44	G	G	G	G	G	G	G	G	G	G	33	G	G	G	G
22		G	G	G	G	G		G	G	G	43	42	G	G	48	59	44	39	23	28	G	G	32	G
23	G	30	G	G	G	G		G	G	36	43	42	42	42	38	36	G	G	28	30	G	G	G	26
24	G	G	G	G	G	G		G	42	38	G	40	39	G	G	G	G	32	28	24	G	G	G	G
25	G	G	G	G	G			G	36	44	44	44	42	G	G	36	44	45	56	29	34	28	G	G
26	G	G	28	G	23			G	32	53	40	G	G	48	38	G	G	29	30	25	G	39	28	57
27	28	29	26	G	G	G	G	G	G		39	G	G	52	G	38	36	30	29	26	32	28	27	26
28	G	33	31	33	20	25		G	32	35	42	49	44	43	40	42	G	28	28	31	24	43	G	25
29	G	G	G	G	G	G		G	32	37	G	G	G		G	42	34	33	36	40	28	26		33
30	G	G	G	24				G	G	G	42	50	52	42	46	55	34	78	70	49	36	32	G	G
31		G	G	36	38		24	G	28	37	52	50	59	48	G	G	45	33	24	32	27	25	G	38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	30	28	26	14	30	27	30	31	30	30	30	30	31	30	30	31	29	30	31	29	30
MED	G	G	G	G	G	G	G	G	30	36	42	42	40	40	20	36	35	32	28	29	26	G	G	G
U Q	G	G	13	23	G	G	G	G	32	39	44	49	47	47	41	42	44	40	39	34	32	32	27	24
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	12	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

DEC. 2010

LAT. 31°12.0′N LON. 130°37.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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

HOURLY VALUES OF foF2 AT Okinawa

DEC.2010

LAT.26°41.0′N LON.128°09.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					29	32		37	49	67	65	60	74	74	77	76	62	65	58	A		32		
2			30	32	26			32	62	66	70	76	82	87	92	94	67	54	44	32	47	50	30	A
3		28			31			34	55	67	72	93	78	88	85	82	82	65	50		34			
4		30						34	56	74	67	84	72	75	86	81	76	80	A		41	28	36	
5			26	49					62	67	58	59	80	77	83	82	82	77	63	45	44	34		
6						31		34	54	65	77	71	70	86	82	75	72	71	63	43		44	38	
7								29	58	67	66	68	84	89	107	108	120	85	80		43	A		32
8				52	34			31	67		71	76	97	127	140	121	97	76	52		50	A	A	
9			28	32	42	30		29	66	78	70	70	75	108	134	120	111	83	66		43	29		
10		26		31	32	28		32		70	89	87	110	143	128	128	99	75	75	41				43
11						31		30	48	60	62	67	72	72	89	81	61	66	71	42	31	A		
12			29					34	54	66	80	62	78	92	107	131	115	90	67	54	43	36		
13					32	34		32	53	51	71	77	60	68	71	74	70	66	47	36	29	28	32	
14	A		32					30	60	64	65	67	77	86	120	118	117	106	86	63	54	63	50	44
15	53		50	42	32				67	87	74	76	94	97	88	85	80	87	56	34	A	48		
16								30	55	64	88	82	74	82	84	70	67	63	45	32		45	43	
17							A		59	93	88	71	80	82	75	64	64	68	54	A	A	34	43	
18					28			32	59	62	76	77	62	77	64	56	65	53	41	A		A	31	
19	28			29				30	59	66	87	69	70	66	59	63	67	61	40	30			36	
20								28	54	60	70	59	57	75	86	95	82	62	62	43	54	44		
21				43				31	55	66	80	77	83	87	91	90	78	59	43		38	44		
22									54	66	86	77	68	69	75	75	A	59	34	A	30		A	
23	A	A		32	32			30	54	64	61	67	106	106	106	85	74	55	A	A	A			
24	29								54	59	68	67	80	92	89	68	60	57	A		31		28	
25			34					28	50	64	60	69	94	90	74	77	65	60	42					
26				32					48	51	71	74	80	72	83	71	66	56		A				
27		A	28		32				52	70		60		76	81	65	63	64	52			A	A	
28			29	A		A	A		46	58	67	65	62	64	60	57	67	56			34	42	37	29
29			30	32					55	73	99	113	108	110	121	94	90	75	71	50	34		A	
30			32		A				52	60	70	69	71	A	93	84	64	82	61	43	44		42	31
31				A		A	A	30	58	65	86	88	113	121	142	124	100	88	74		53	A	44	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	3	11	11	11	6		21	30	30	30	31	30	30	31	31	30	31	26	14	19	15	13	5
MED	29	28	30	32	32	31		31	55	66	71	71	78	86	86	82	73	66	57	42	43	42	37	32
U Q	53	30	32	43	32	32		33	59	67	80	77	84	92	107	95	90	80	67	45	47	45	43	43
L Q	28	26	28	32	29	30		30	53	62	67	67	71	75	77	71	65	59	45	34	34	32	31	30

HOURLY VALUES OF fEs AT Okinawa

DEC. 2010

LAT. 26°41.0′N LON. 128°09.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					G	G	G	G	G	G	G	40	G	G	G	G	70	46	44	36		G	G	G
2	G	G	G	G	G			G	G	41	45	47	52	G	41	38	36	28	25	26	24	32	G	27
3		G		G	G			G	G	G	G	G	G	G	G	G	G	G	46	50	28	G		29
4		G	G	30		33		28	35	40	47	52	62	65	82	71	50	58	69	28	G	G	G	
5		G	G	G					30	G	38	G	G	G	G	G	G	G	G	25	27	29		
6						G		G	G	36	42	G	G	G	48	41	G	39	G	G		G	G	
7				G				G	G	G	44	G	G	G	53	G	36	37	27		34	36	G	G
8				G	G			G	G	G	44	48	43	51	44	124	59	31	G		G	41	38	
9			G	G	27	G		G	G	G	G	59	G	43	G	40	G	41	69	36	G	G	35	
10		G		G	G	G		G		G	G	G	G	G	G	37	35	34	30	28	44		G	G
11						G		G	G	G	G	46	50	44	G	G	G	G	G	G	30	32		
12			G					G	G	G	G	41	G	G	G	G	G	G	G	G	26	G		
13		G	G		G	G		G	33	G	G	G	G	G	G	G	G	G	11	G	G	G	G	
14	28		36					G	G	G	47	46	49	50	G	G	36	G	36	30	G	G	G	G
15	G		G	G	G				32	G	G	46	47	G	G	41	40	29	26	38	32	G		
16				G	G			G	G	39	42	60	79	40	G	G	G	G	G	G		G	G	
17							29	28	G	40	46	48	G	G	G	G	G	34	35	36	38	28	29	
18					G			G	29	G	G	G	46	43	G	G	36	31	27	34	29	36	27	25
19	G		G	G				G	G	G	G	42	G	G	G	51	G	G	G	G			G	
20			G					G	G	38	G	G	G	40	G	37	44	36	45	27	G	G		
21		G	G	G	G			G	G	G	G	G	G	G	G	42	38	35	G		G	G	G	
22			G					G	G	G	G	40	G	G	47	44	64	G	G	28	G	30	32	
23	80	34		G	G			G	31	36	G	58	44	G	G	G	36	34	39	36	49	36		
24	G			G					33	34	45	45	G	47	G	G	G	29	38	32	28	G	G	
25			G					G	G	G	G	53	G	G	50	38	G	35	26		G	G		
26				G	G			G	32	39	49	45	62	G	G	G	34	29	40	37				
27	28	34	G	25	G			G	34	G	G	G	N	G	G	G	G	G	28	28	36	38	34	
28		G	G	27		29	27	27	46	39	G	46	60	50	45	45	41	45	34	28	G	G	30	G
29			G	G				G	30	G	G	G	G	G	48	38	37	G	G	G	G		50	
30	G		G	34	29			25	G	G	40	52	52	82	60	66	G	G	11	G	G	G	G	G
31			29	51	37	34	28	G	29	G	51	59	G	51	47	49	36	37	50	36	36	59	29	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	10	18	20	16	9	4	28	30	31	31	31	30	31	31	31	31	31	31	27	26	27	22	9
MED	G	G	G	G	G	G	28	G	G	G	G	45	G	G	G	37	35	29	27	28	25	G	G	G
U Q	28	G	G	13	G	31	28	G	31	36	44	48	49	44	47	42	38	36	39	36	32	32	30	26
L Q	G	G	G	G	G	G	14	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

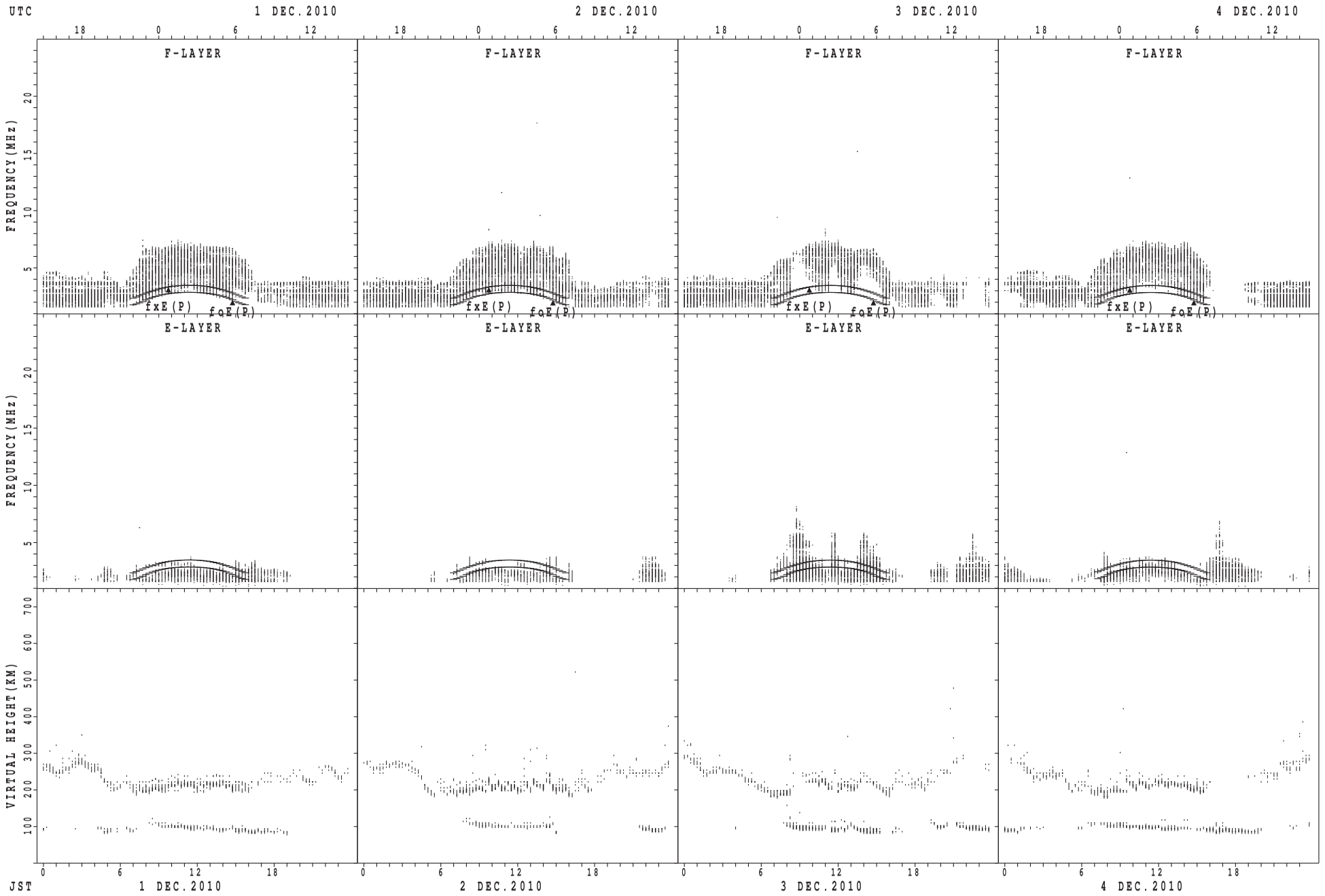
HOURLY VALUES OF fmin AT Okinawa

DEC.2010

LAT.26°41.0′N LON.128°09.0′E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

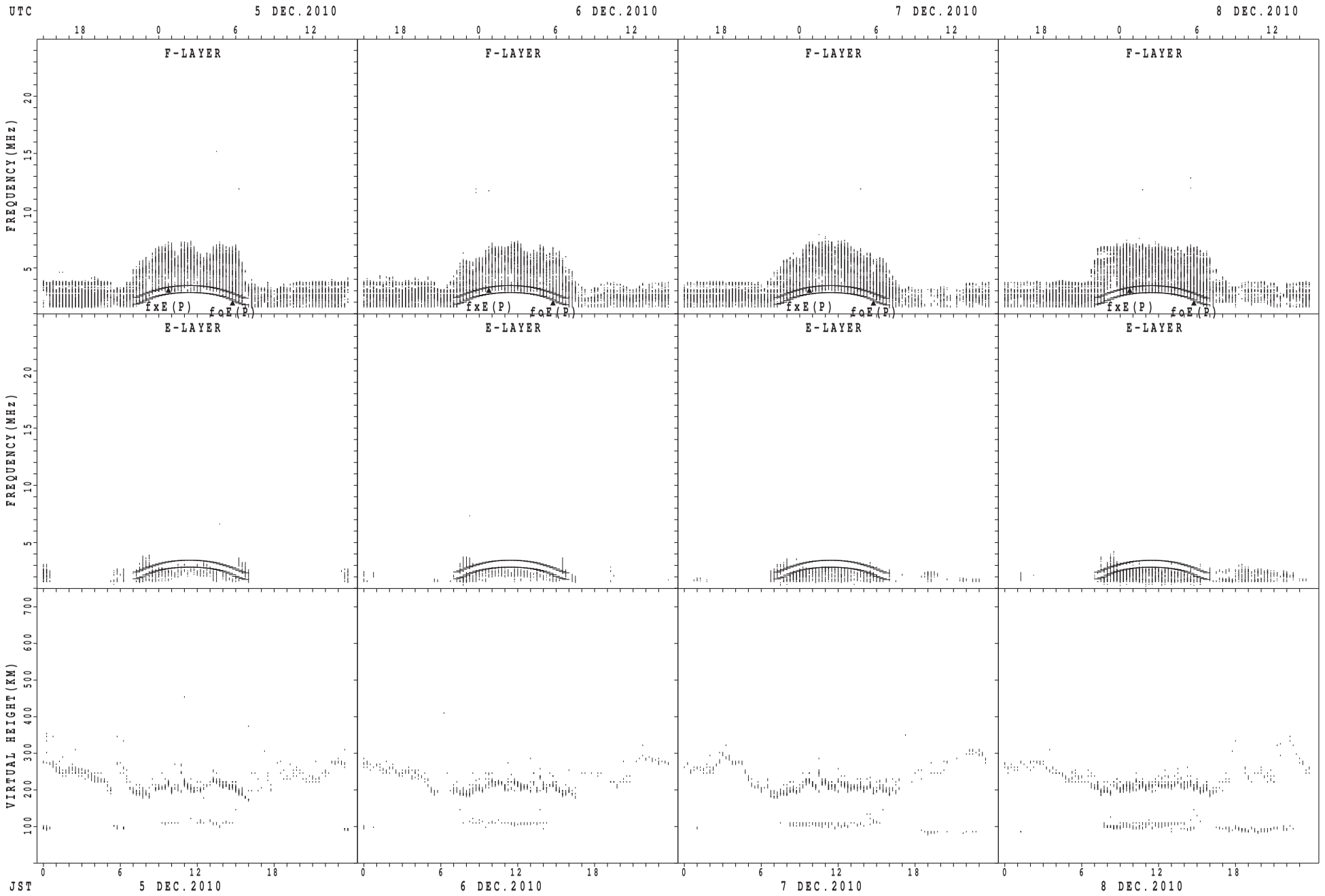
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					15	14	15	18	27	30	22	23	43	30	26	14	15	14	17	15		15	18	17
2	18	18	15	15	15			15	14	15	28	28	27	41	21	21	16	15	15	17	15	15	15	14
3		20		17	16			16	14	17	17	43	27	42	40	32	29	23	14	17	14	23		15
4		23	23	15		15		14	14	23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

SUMMARY PLOTS AT Wakkanai



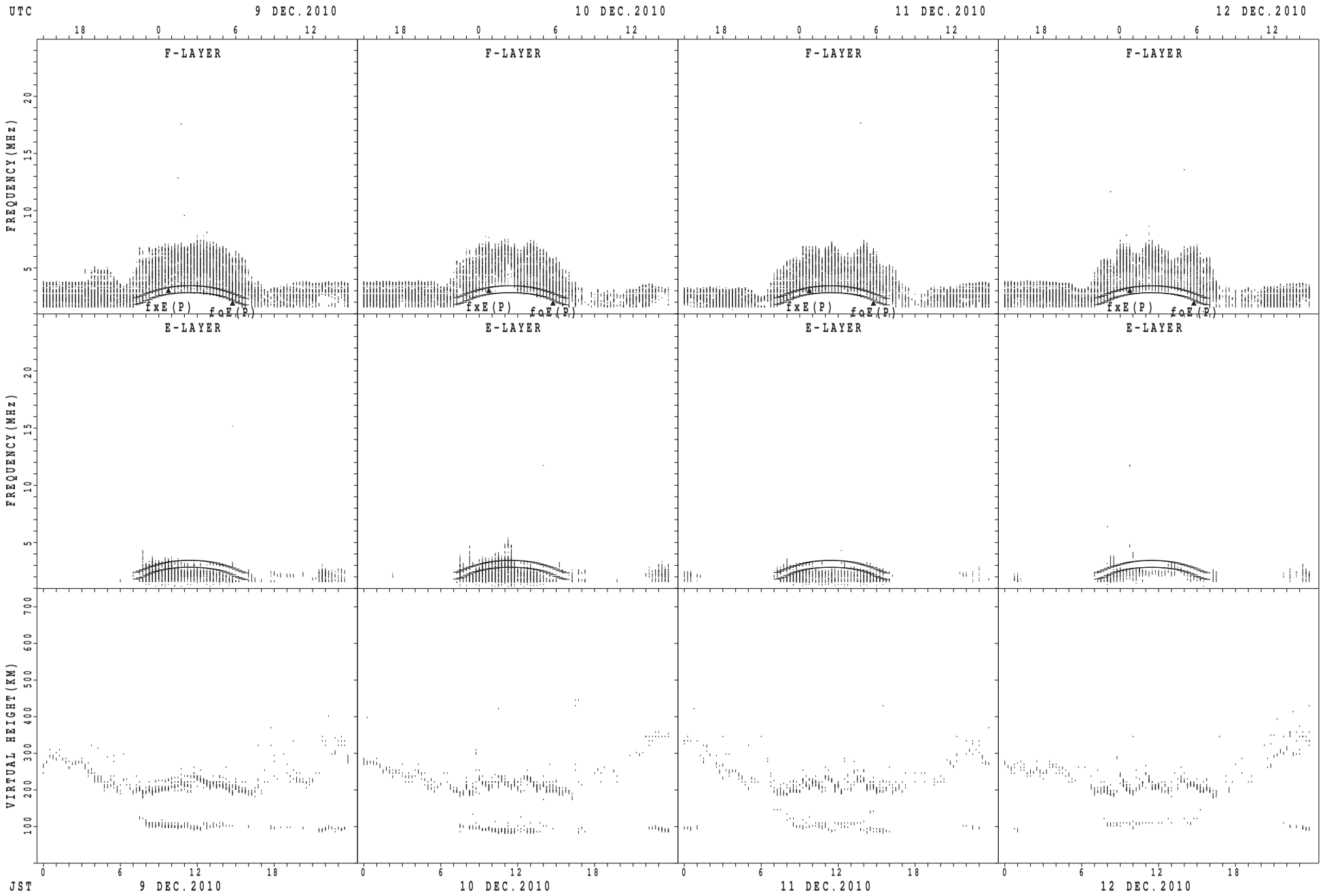
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



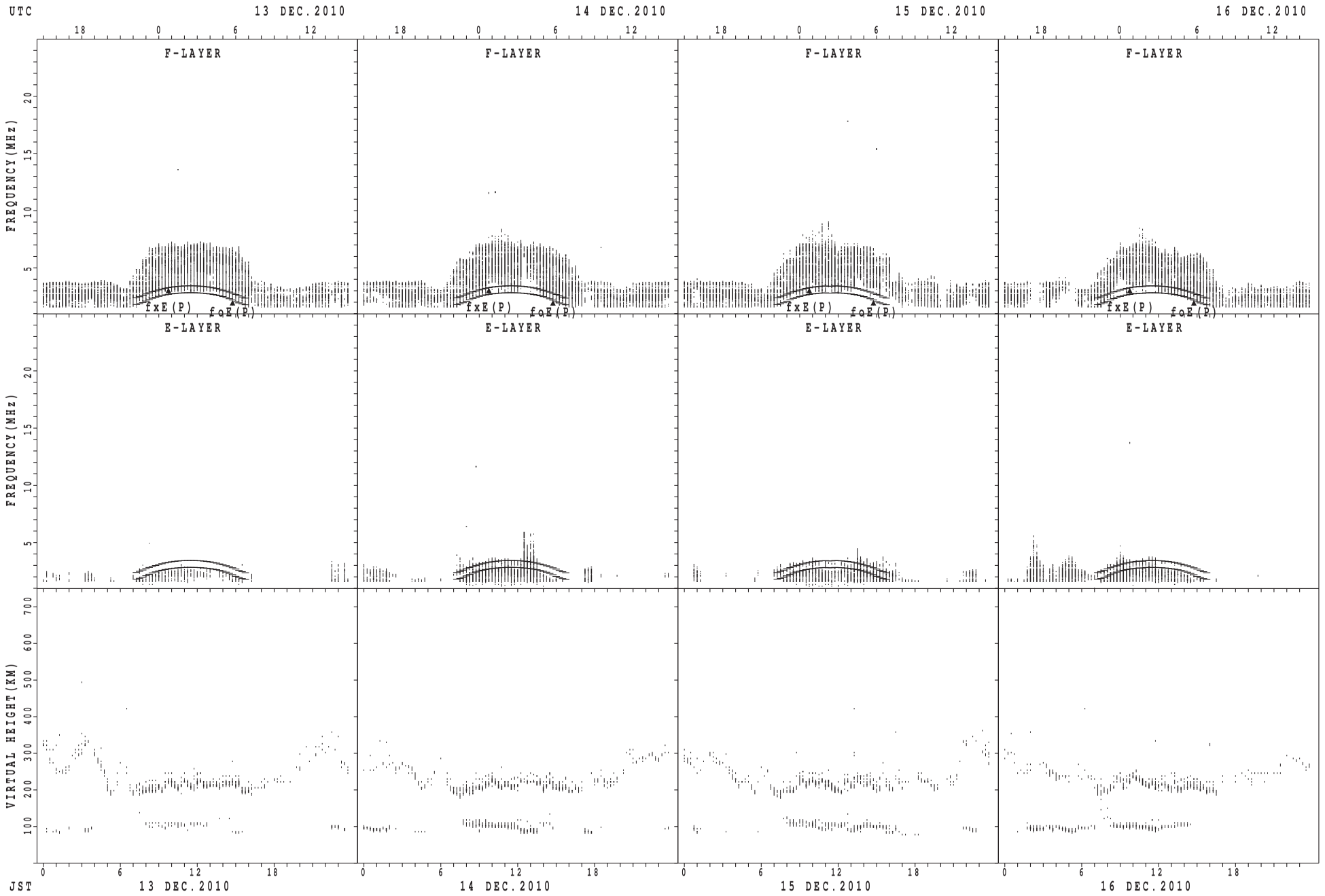
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



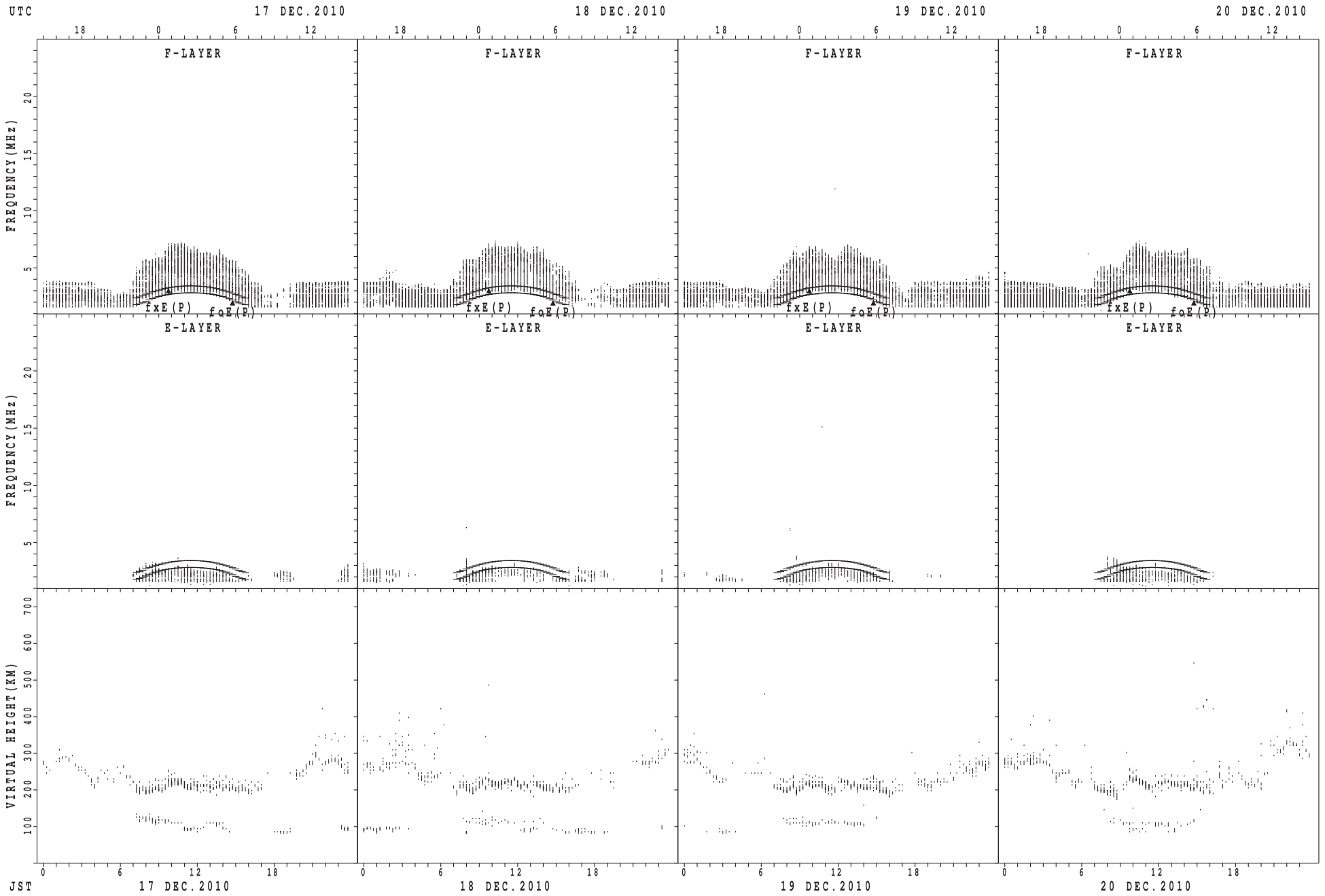
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



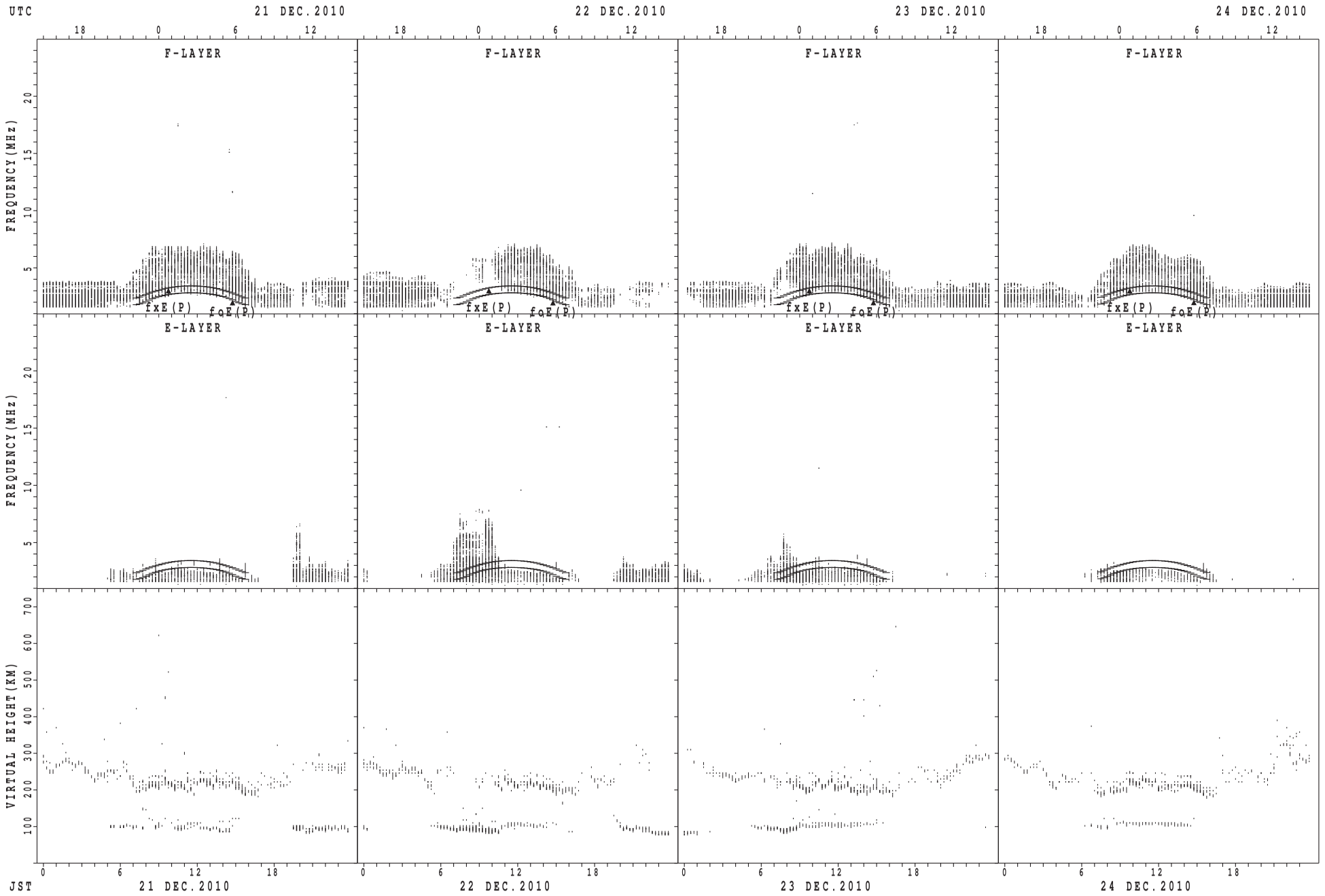
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



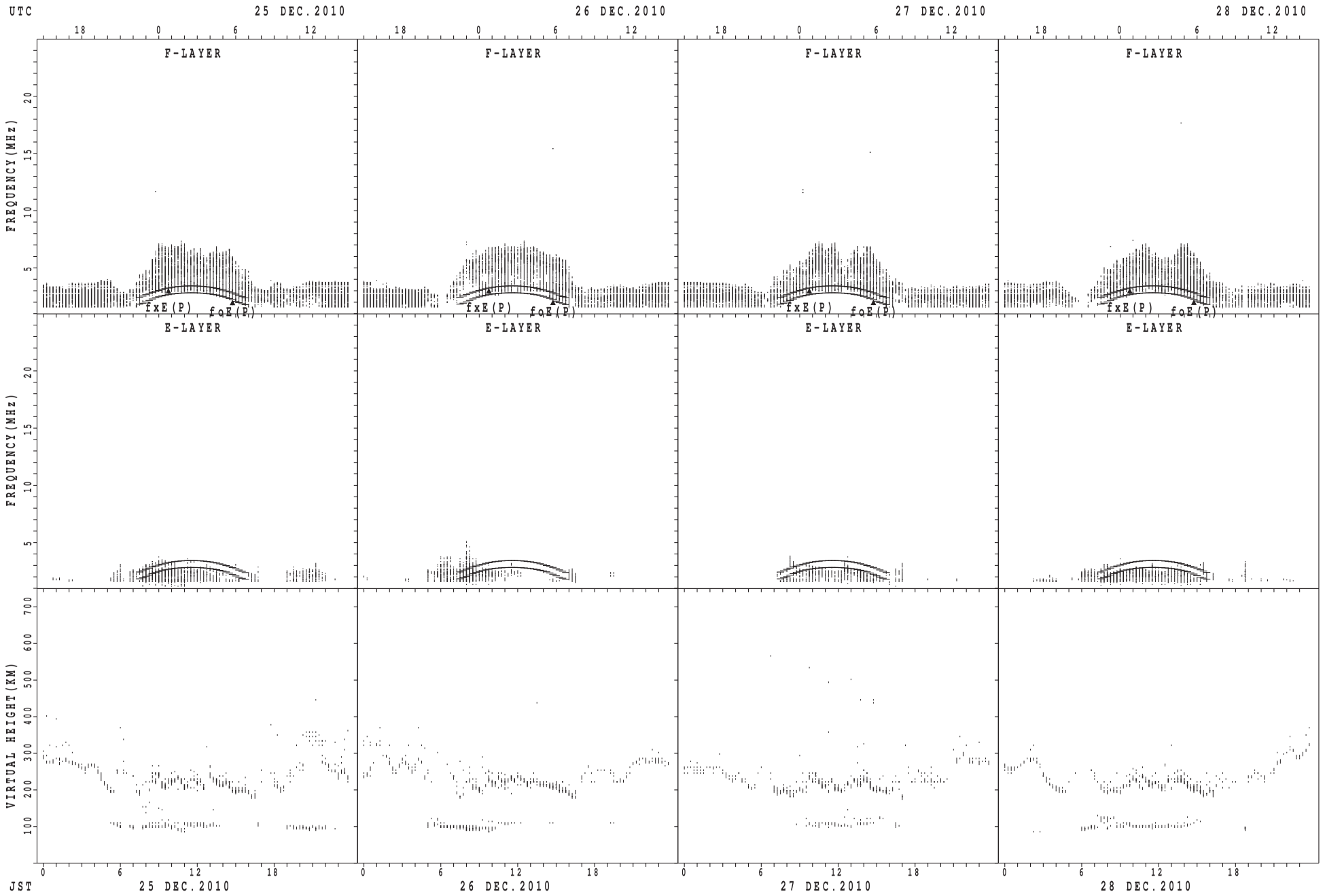
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



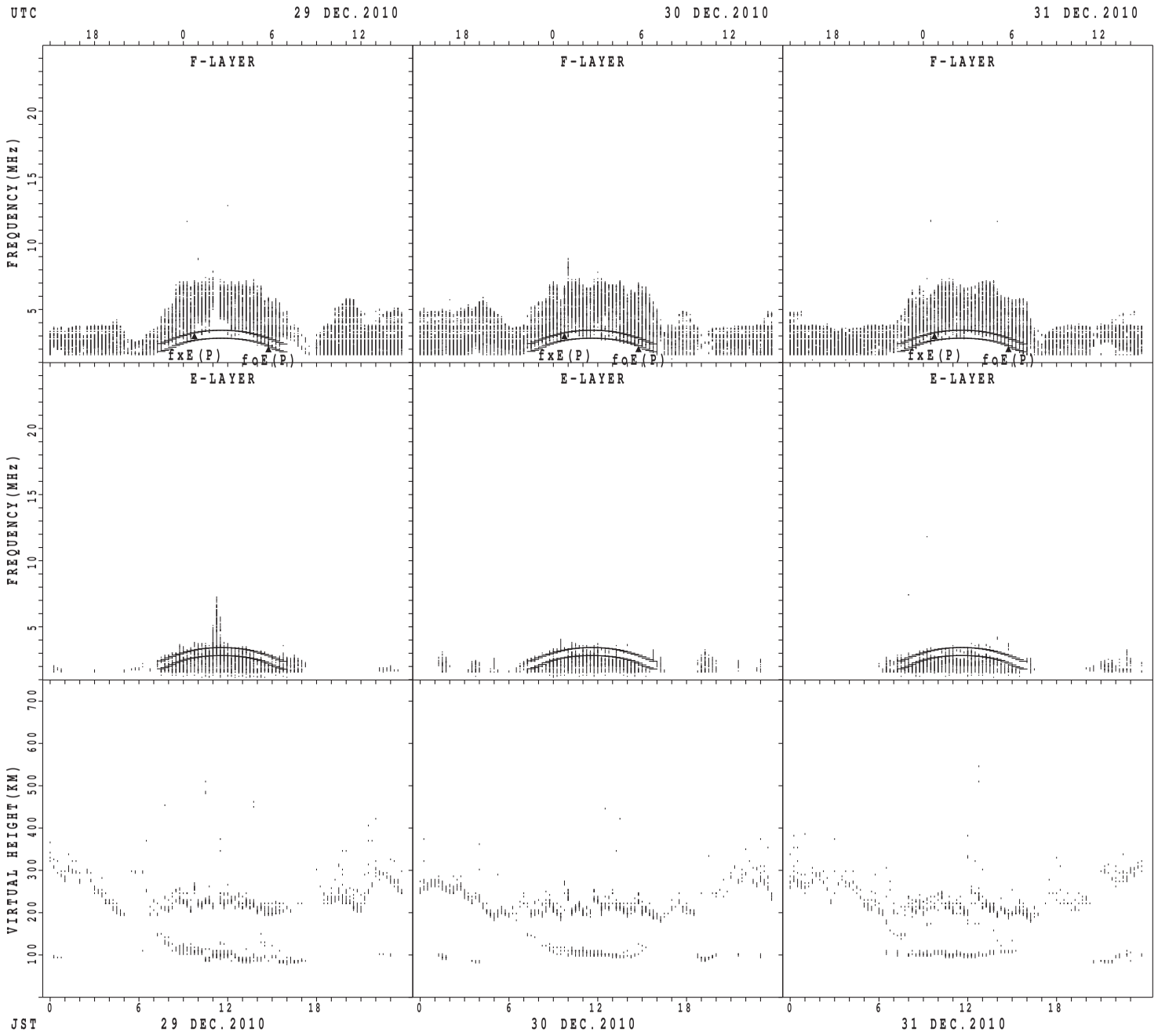
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



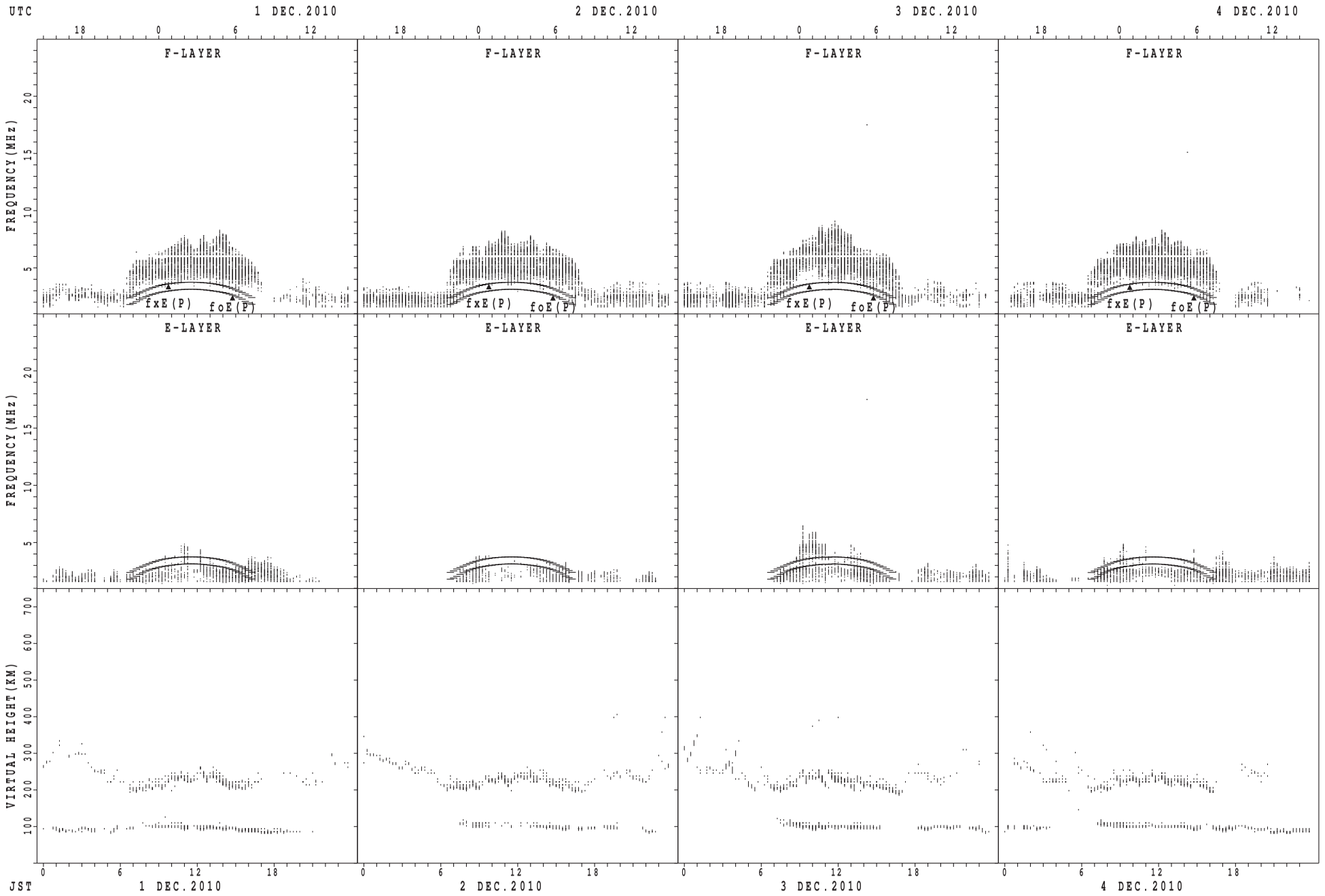
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



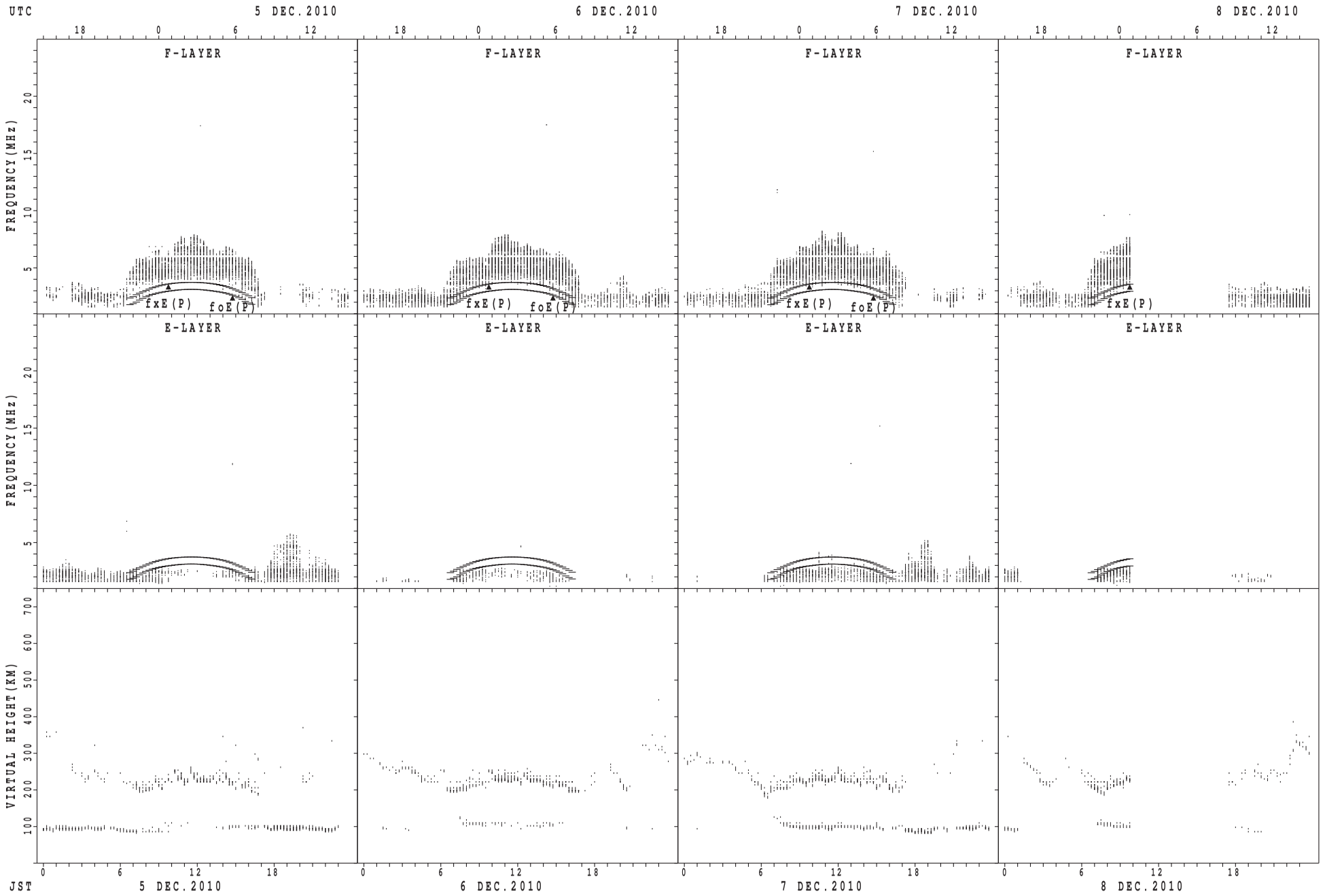
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



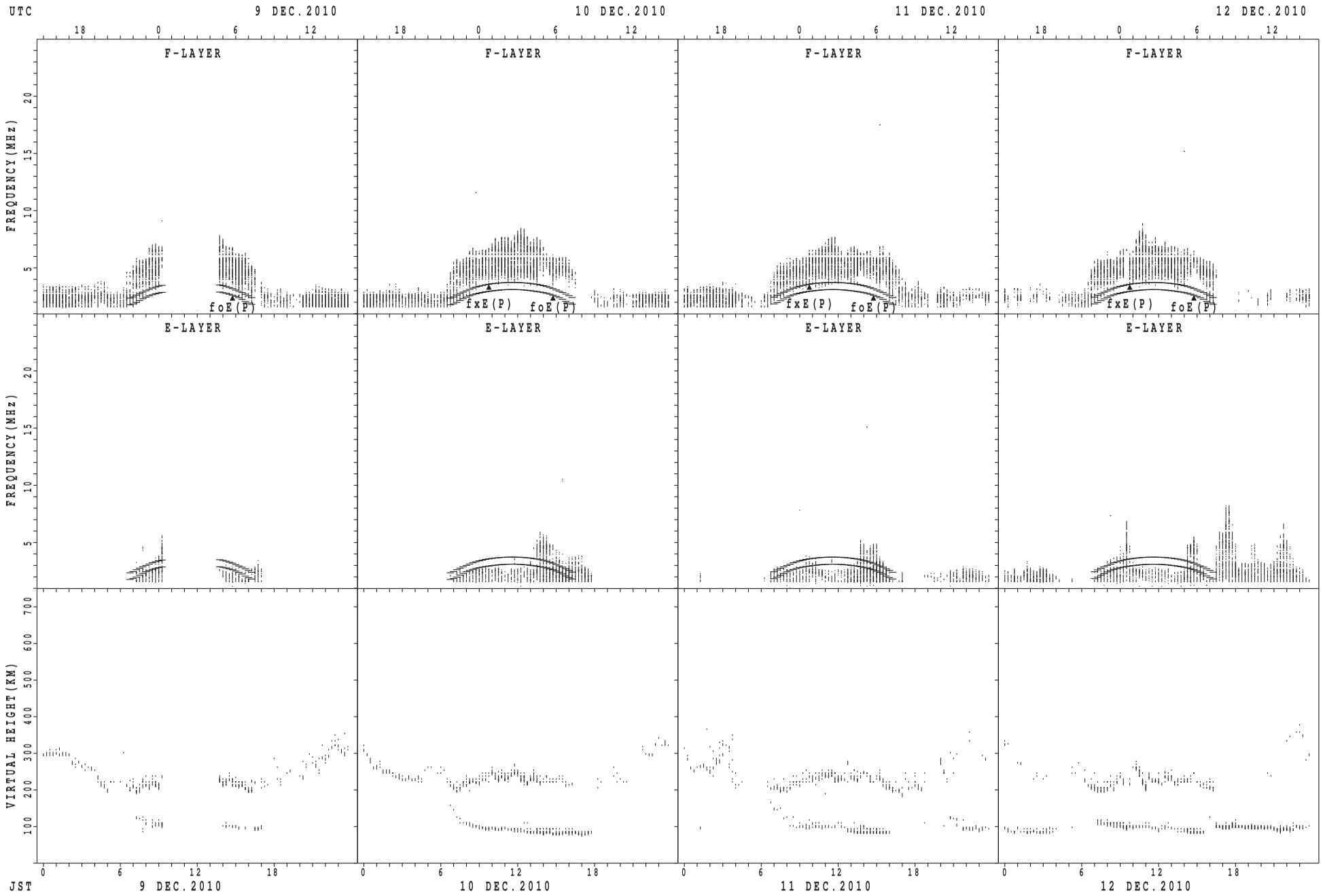
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



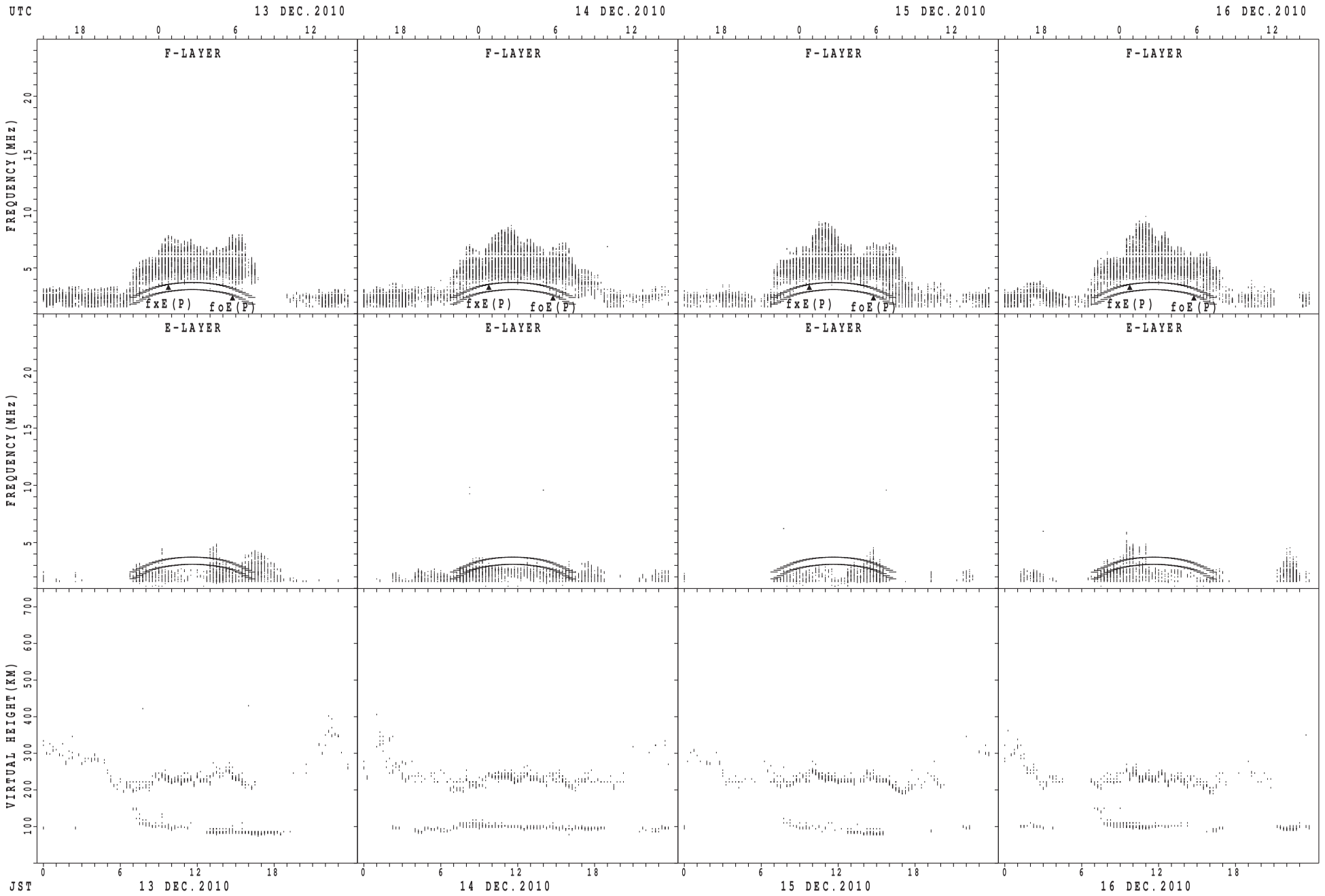
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



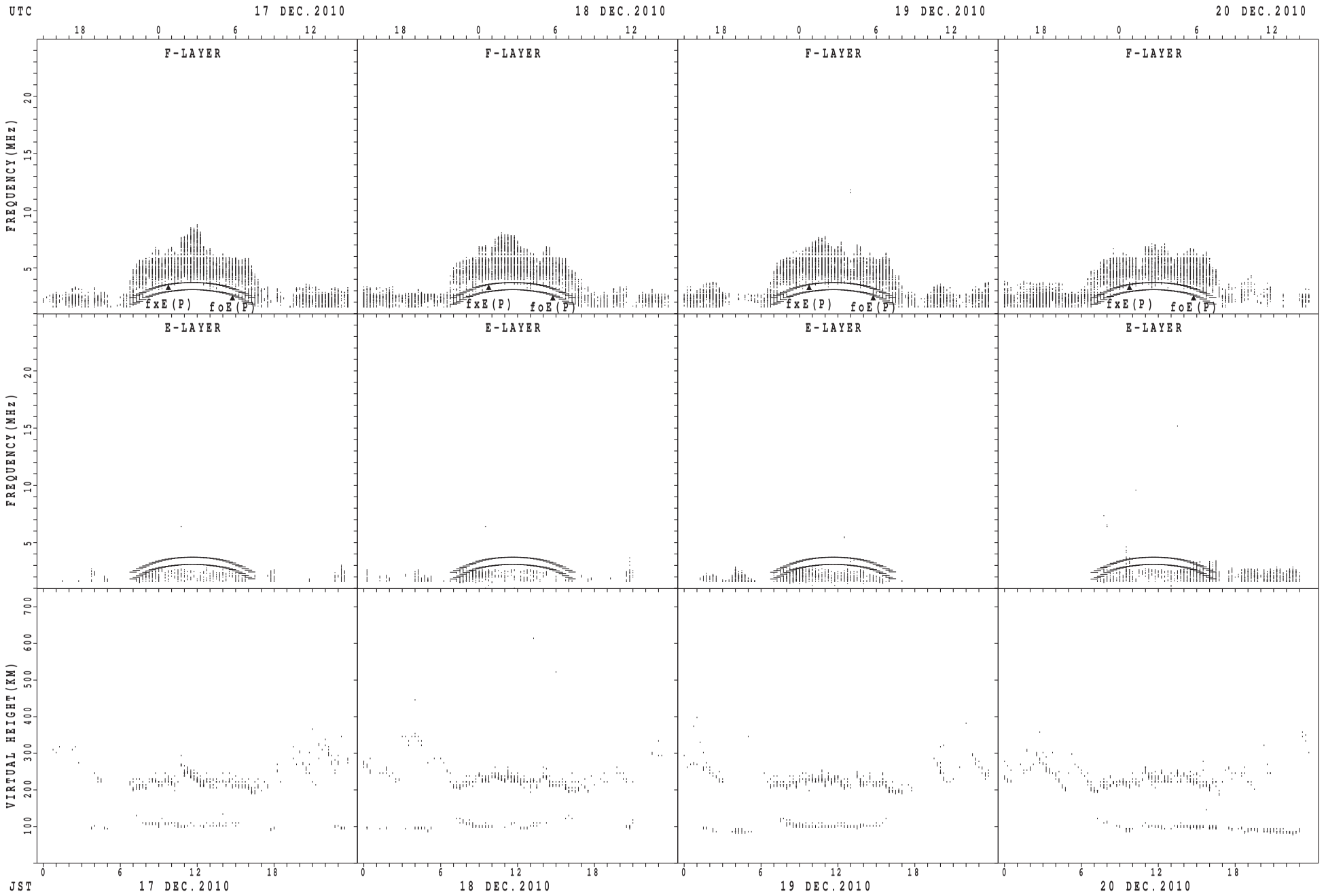
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



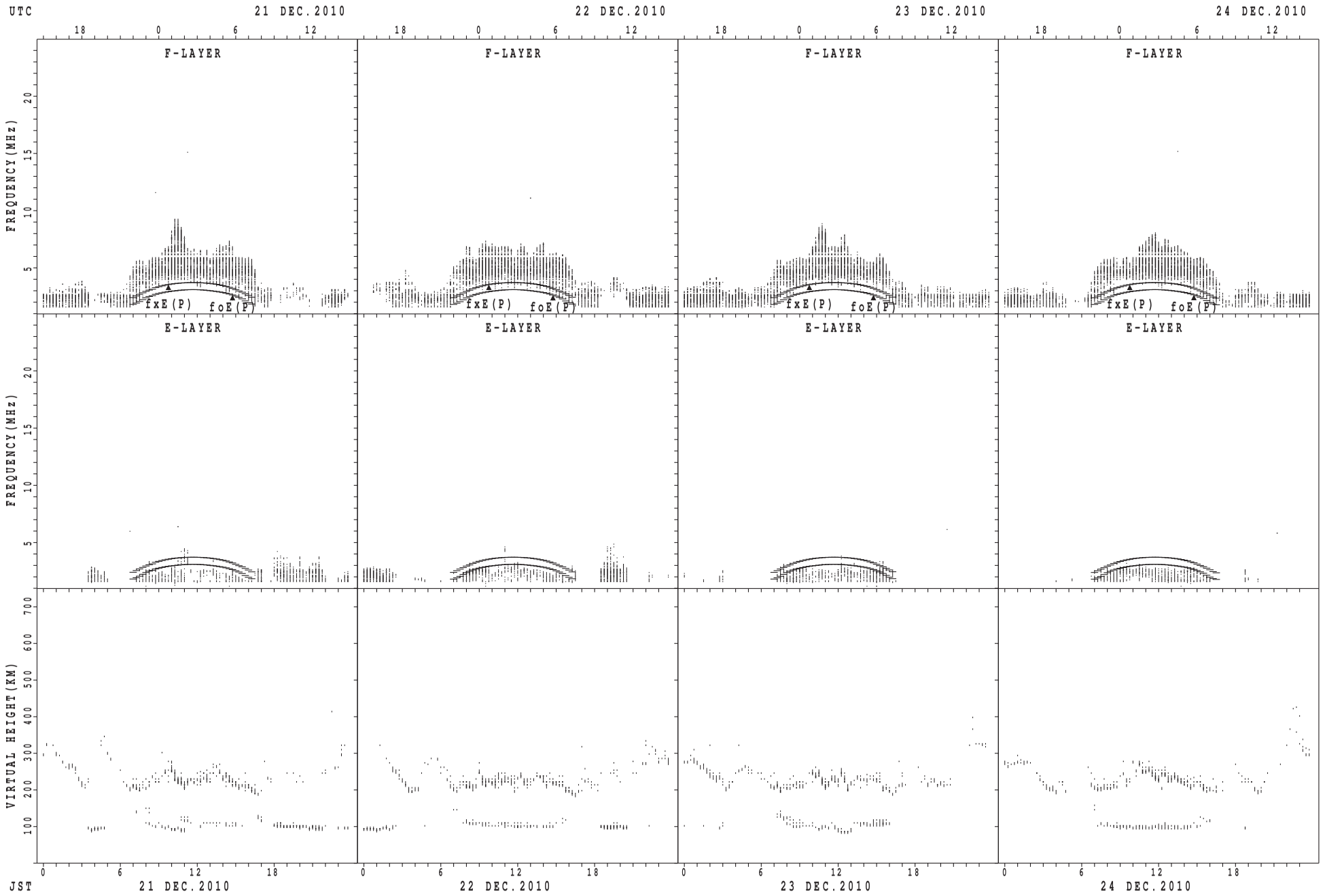
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



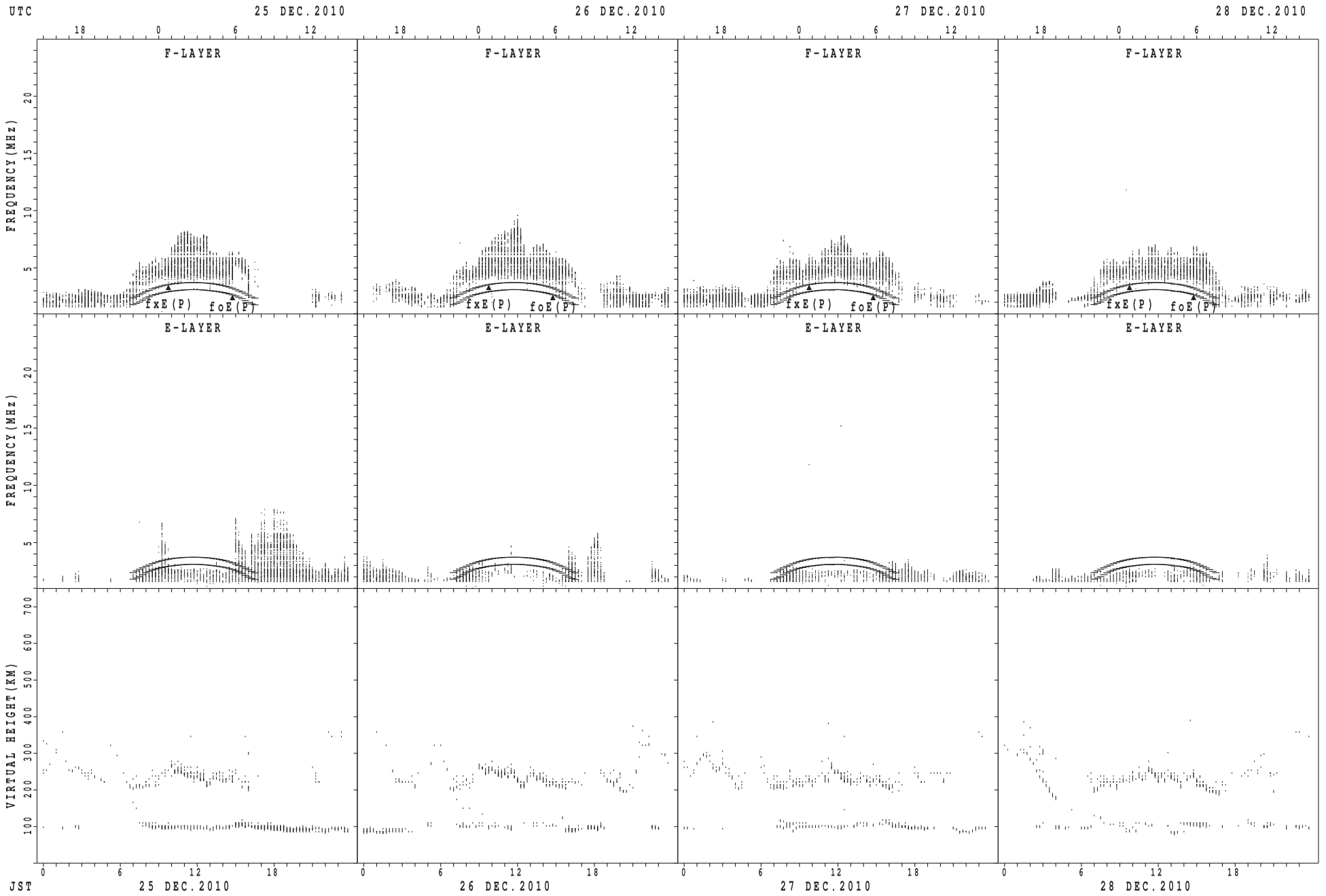
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



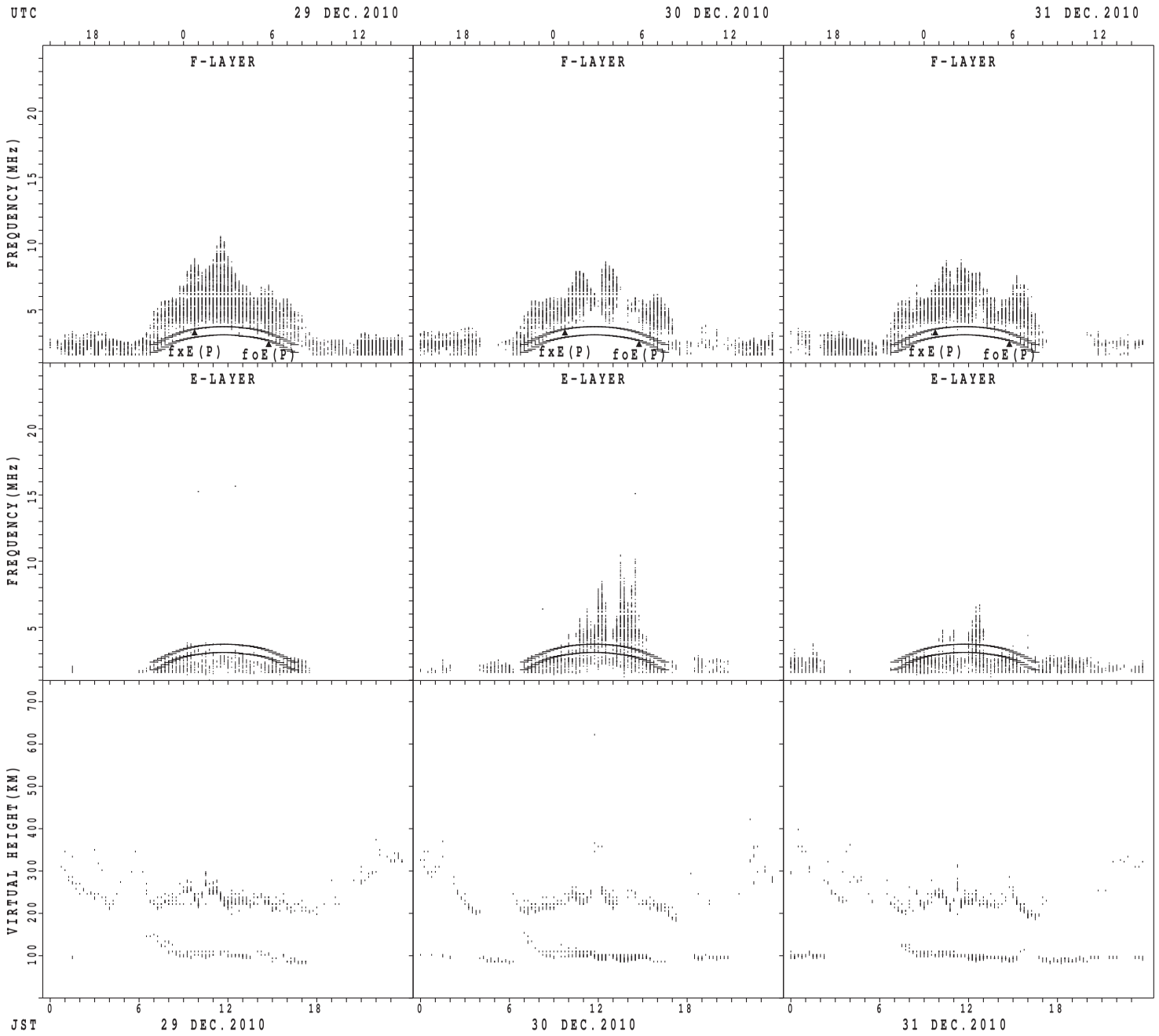
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



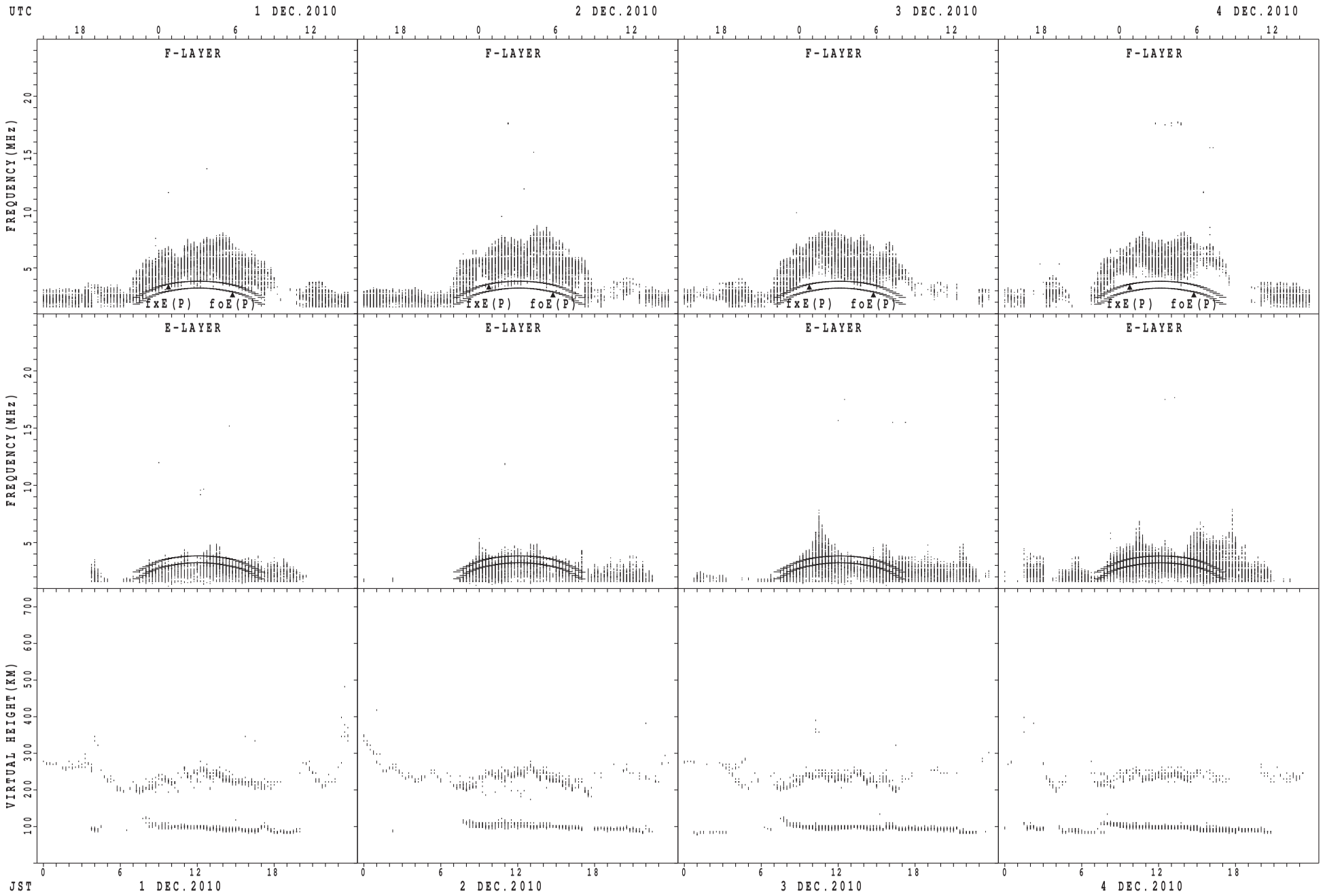
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



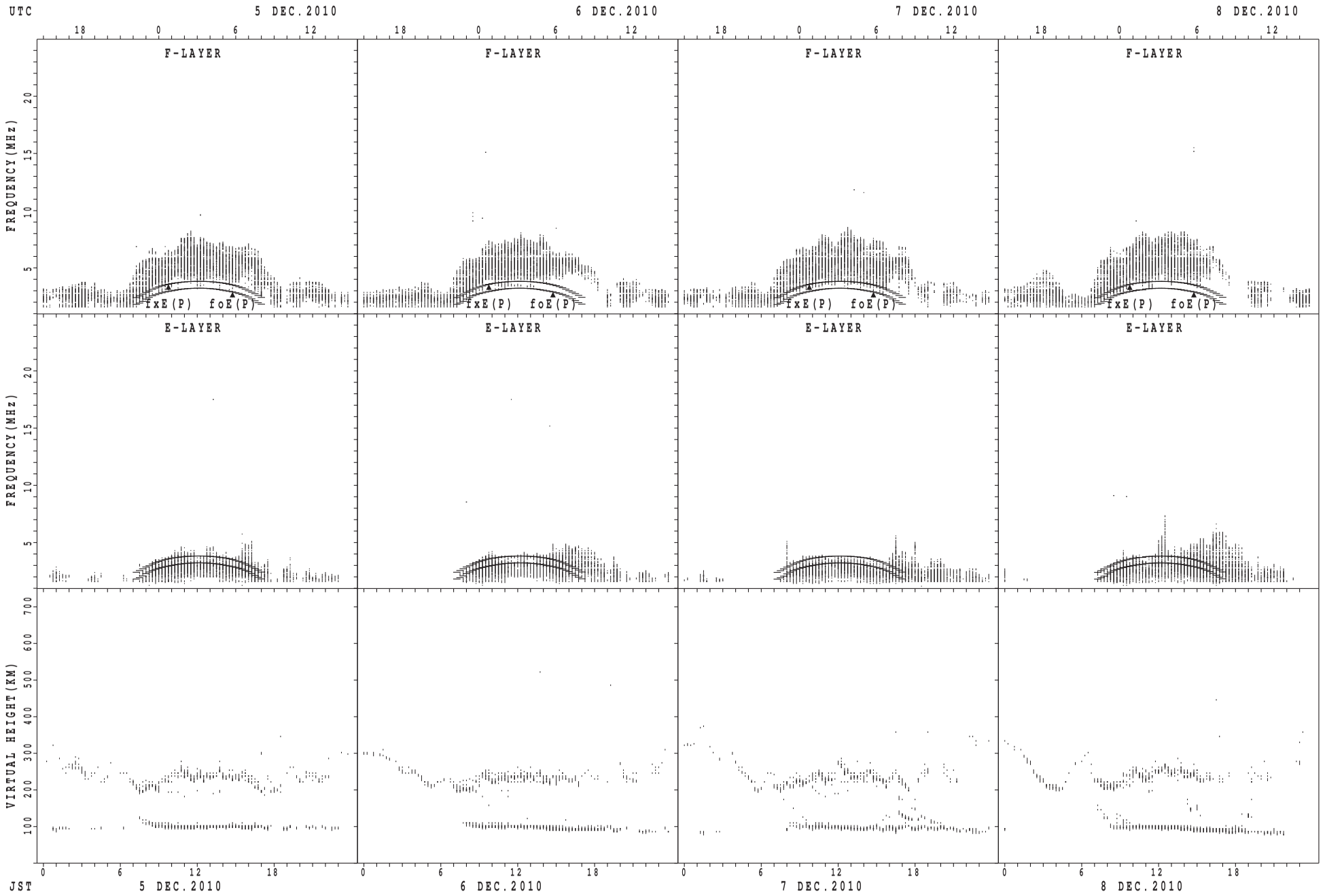
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



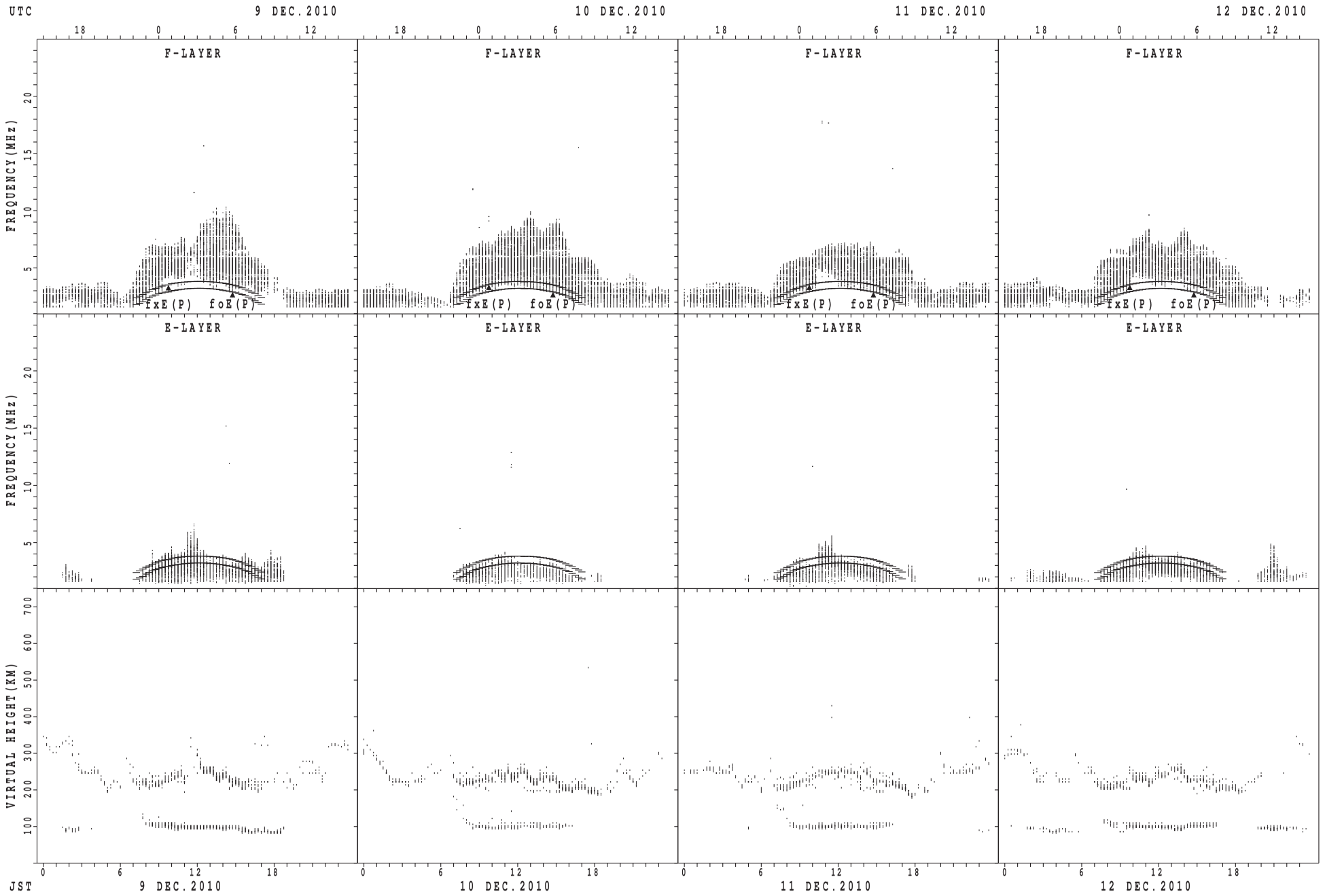
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



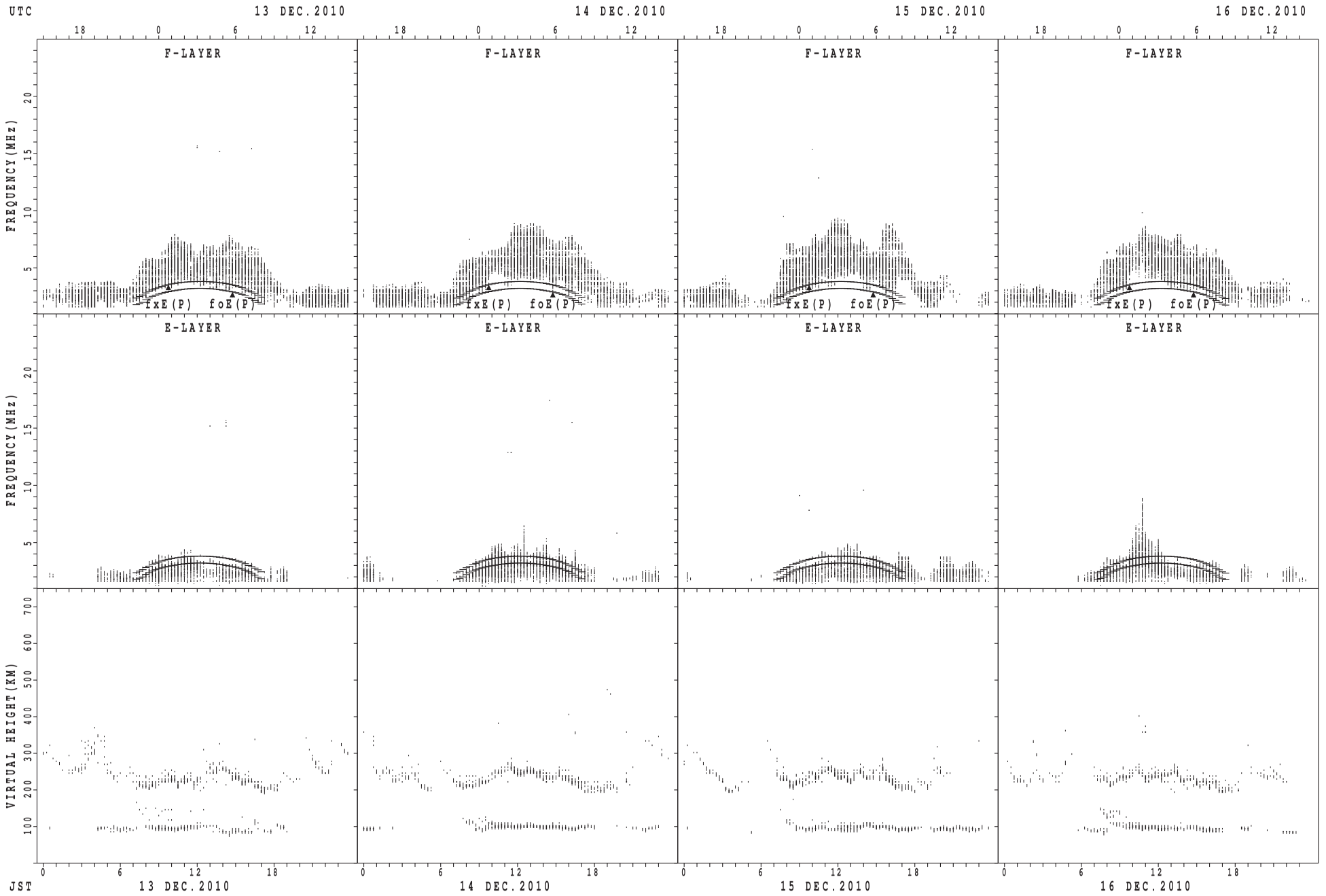
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



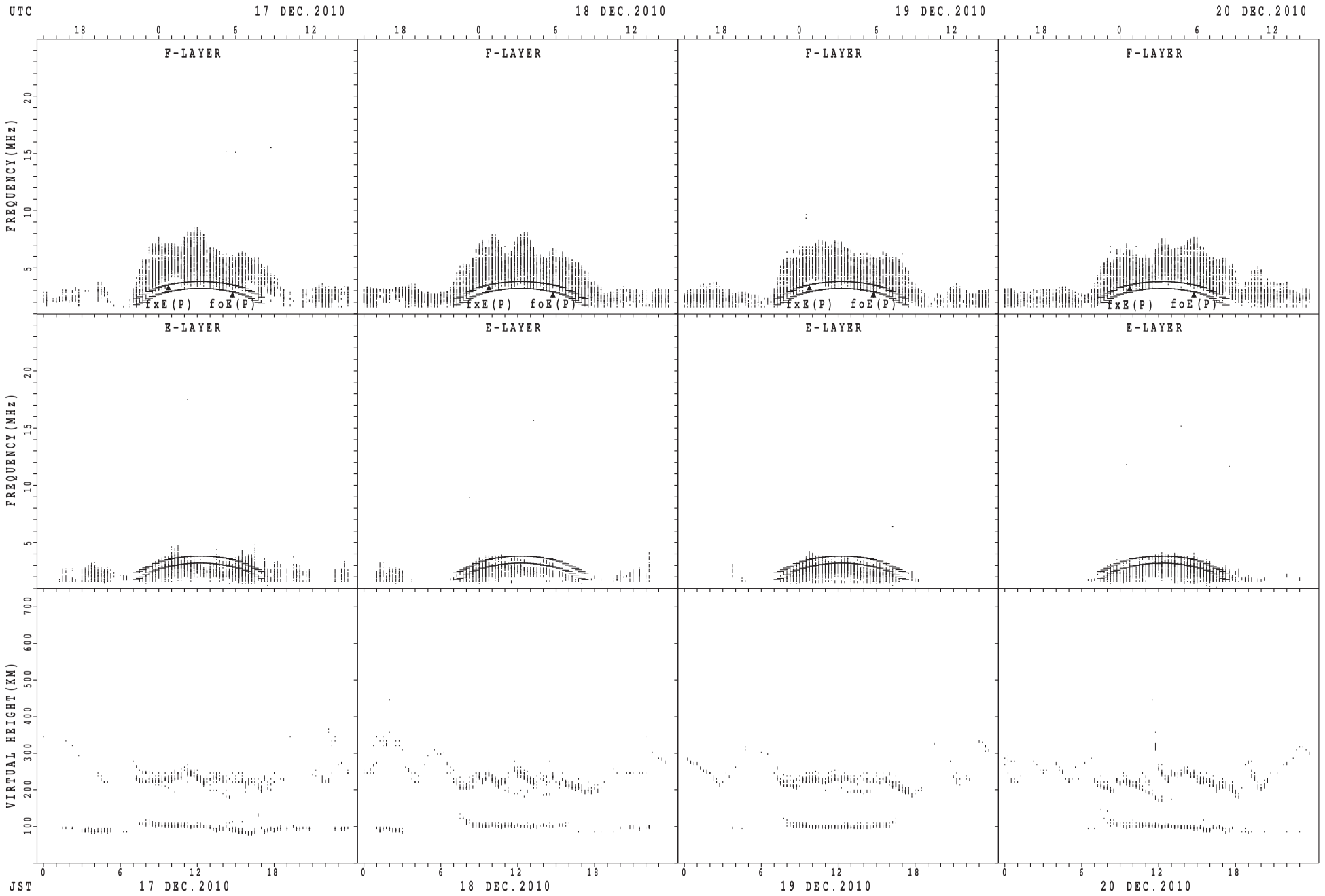
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



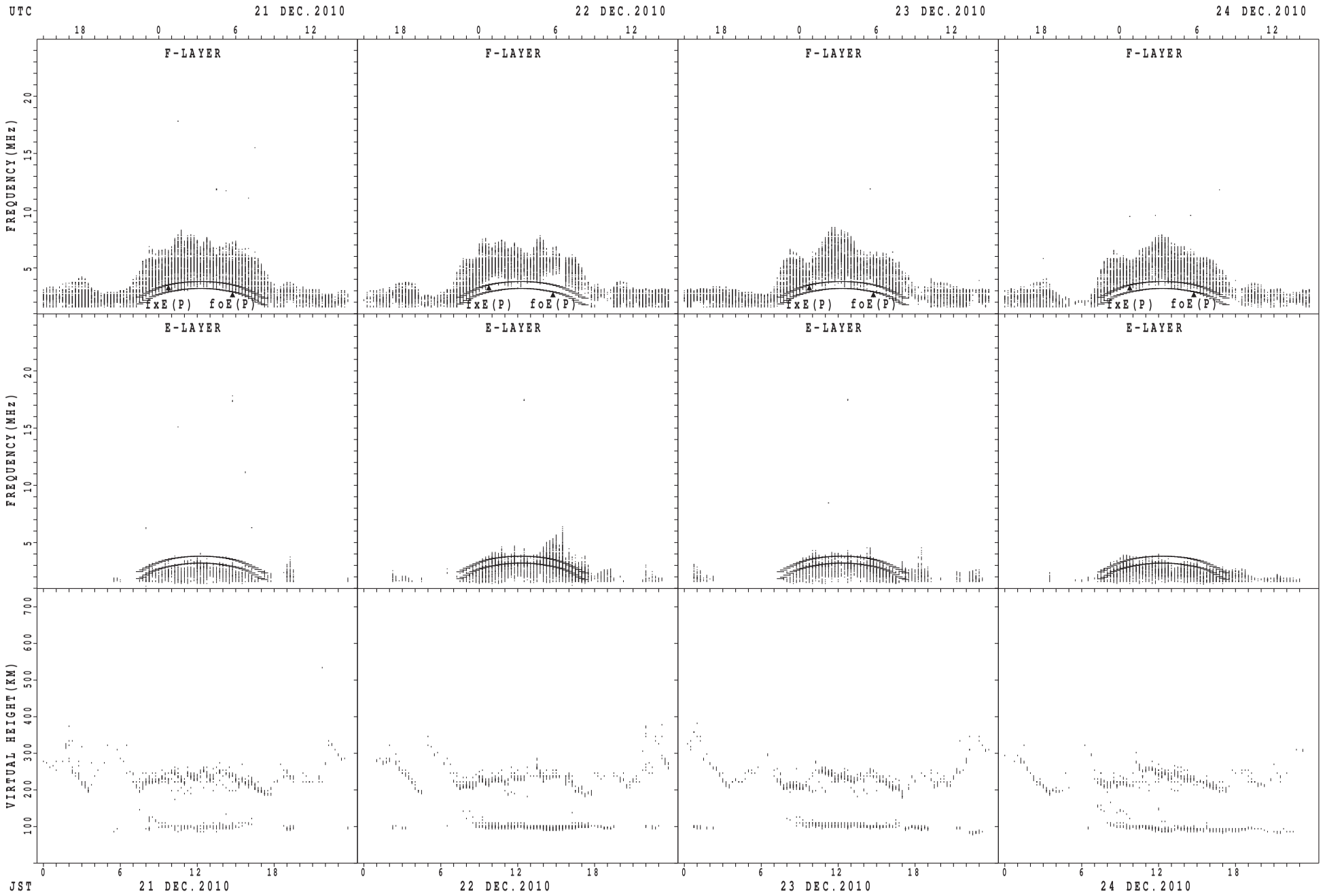
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



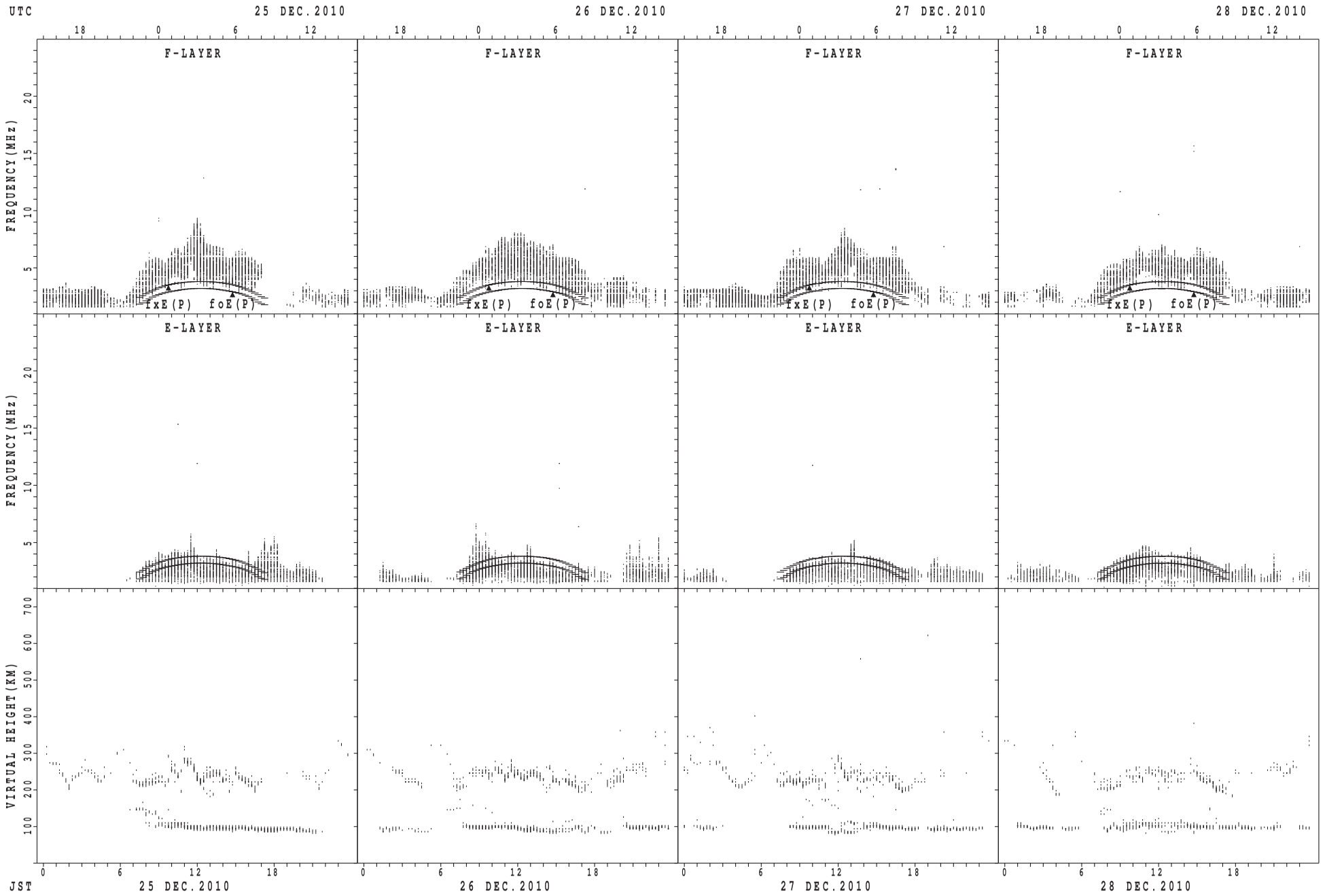
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



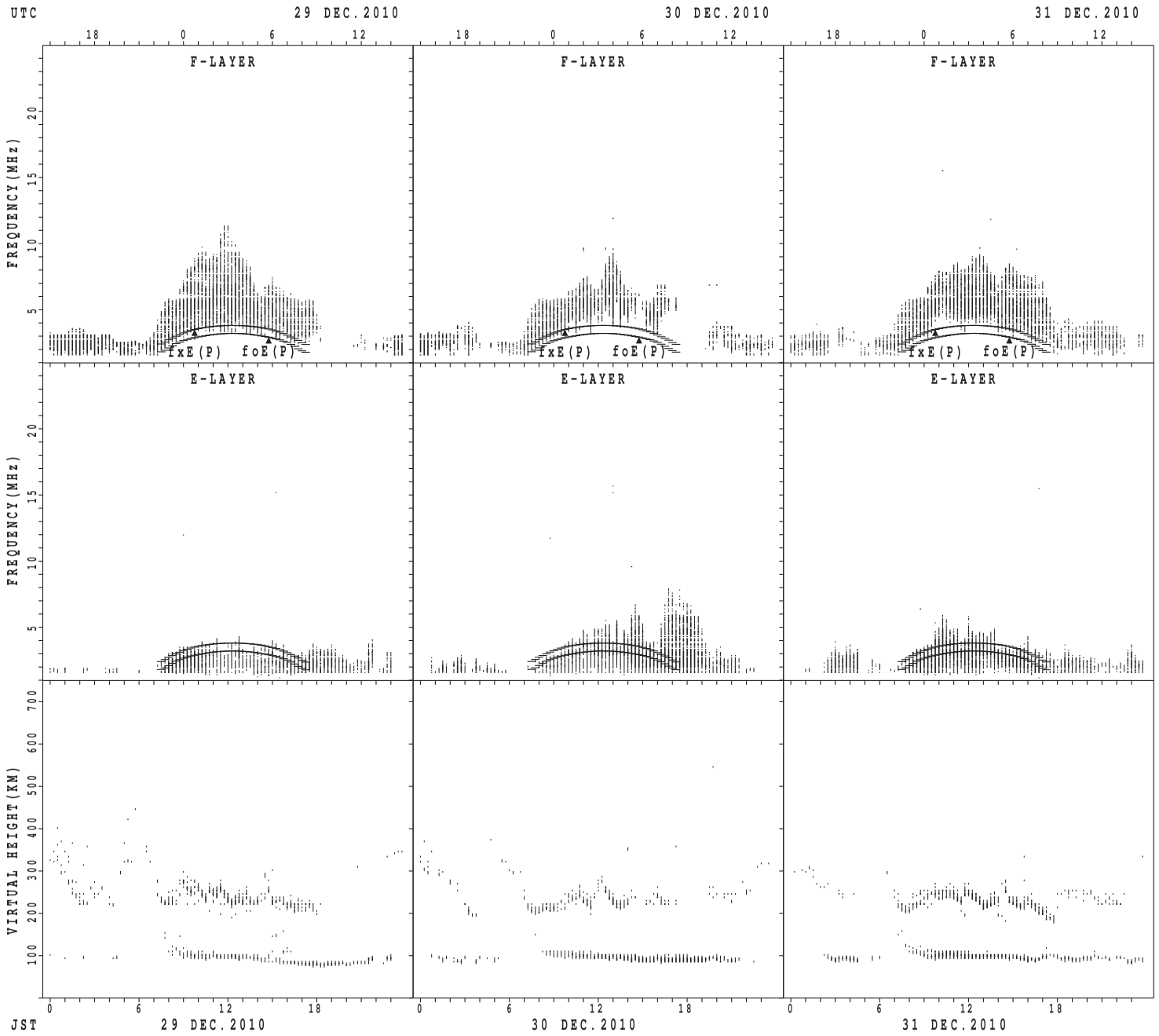
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



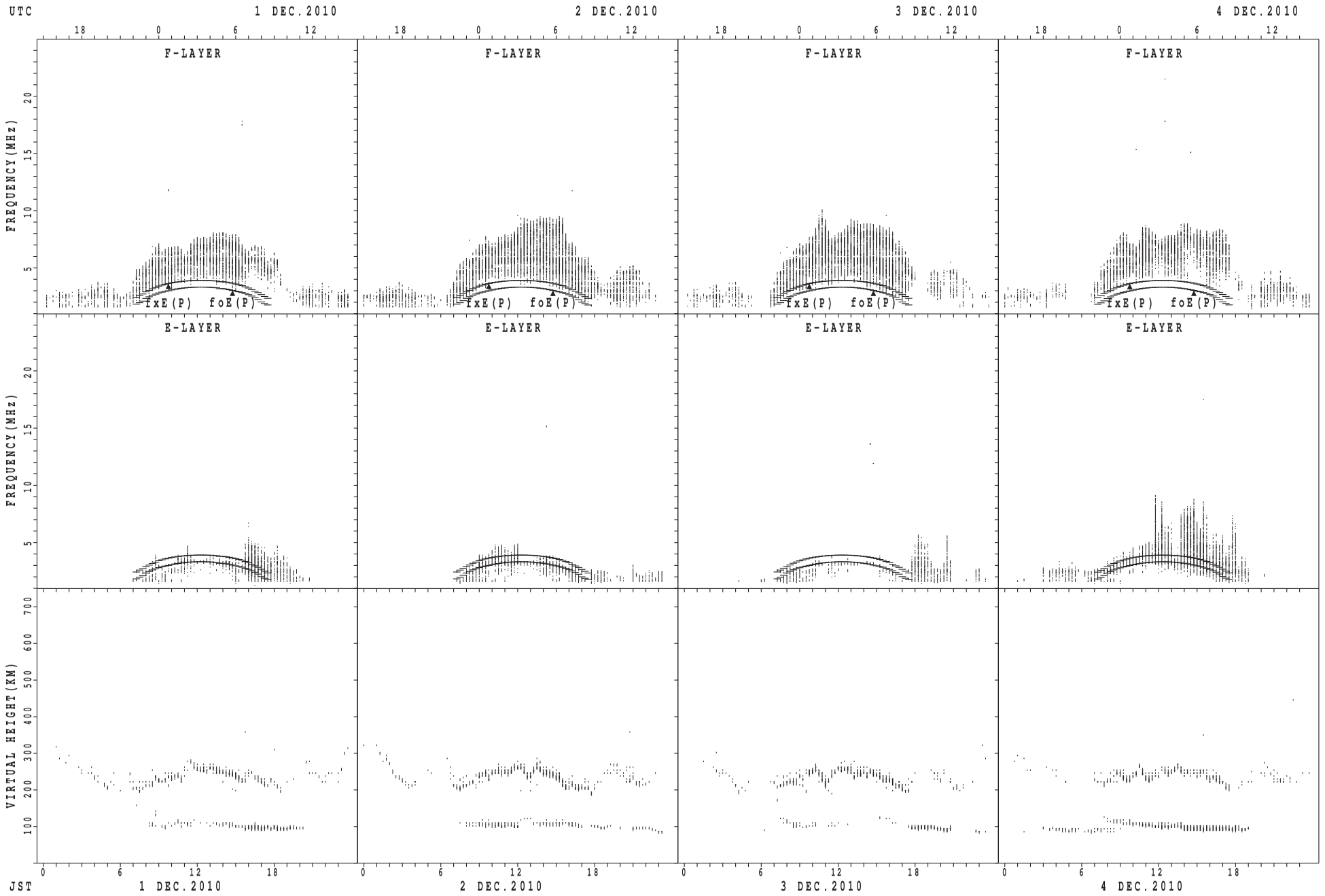
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



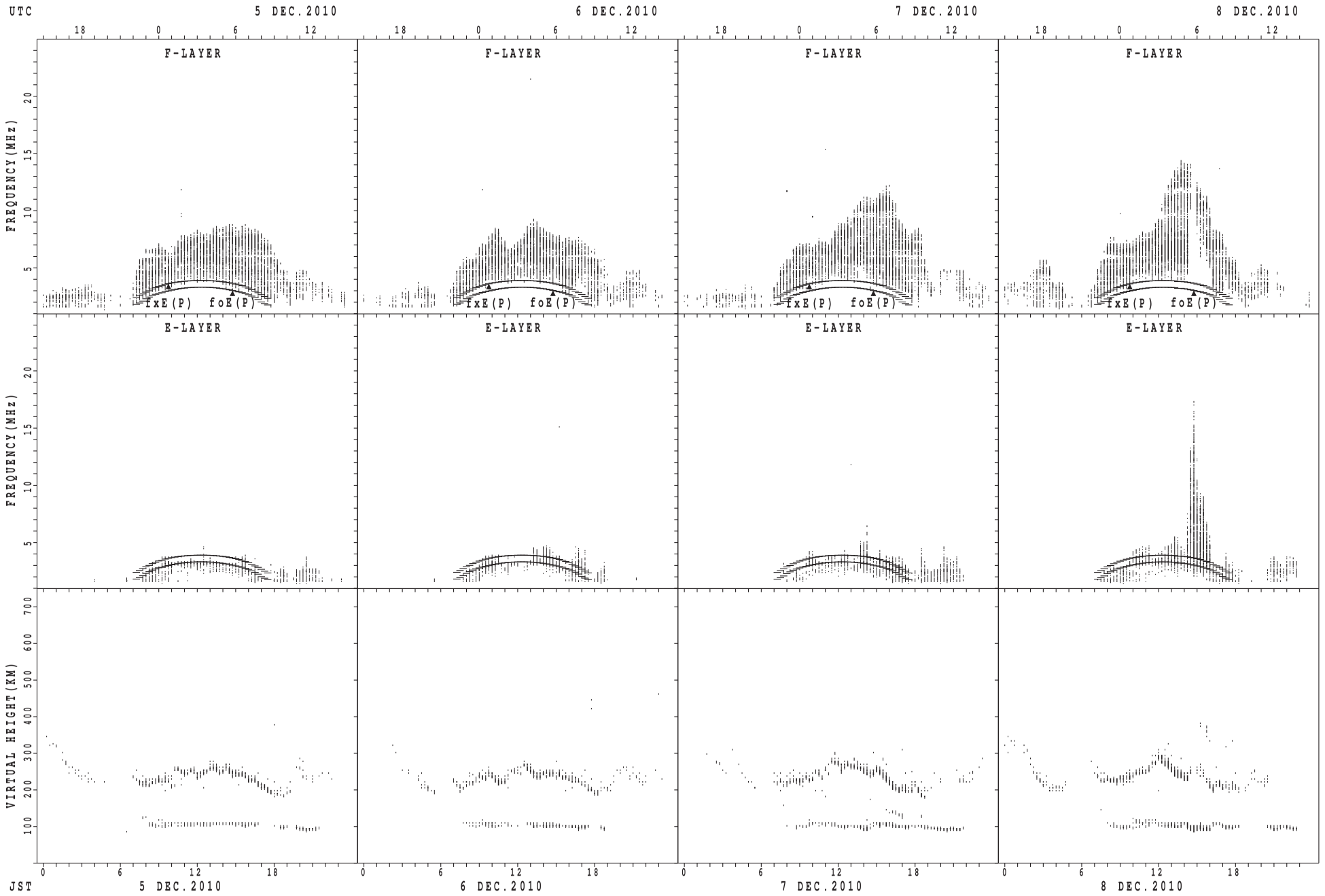
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



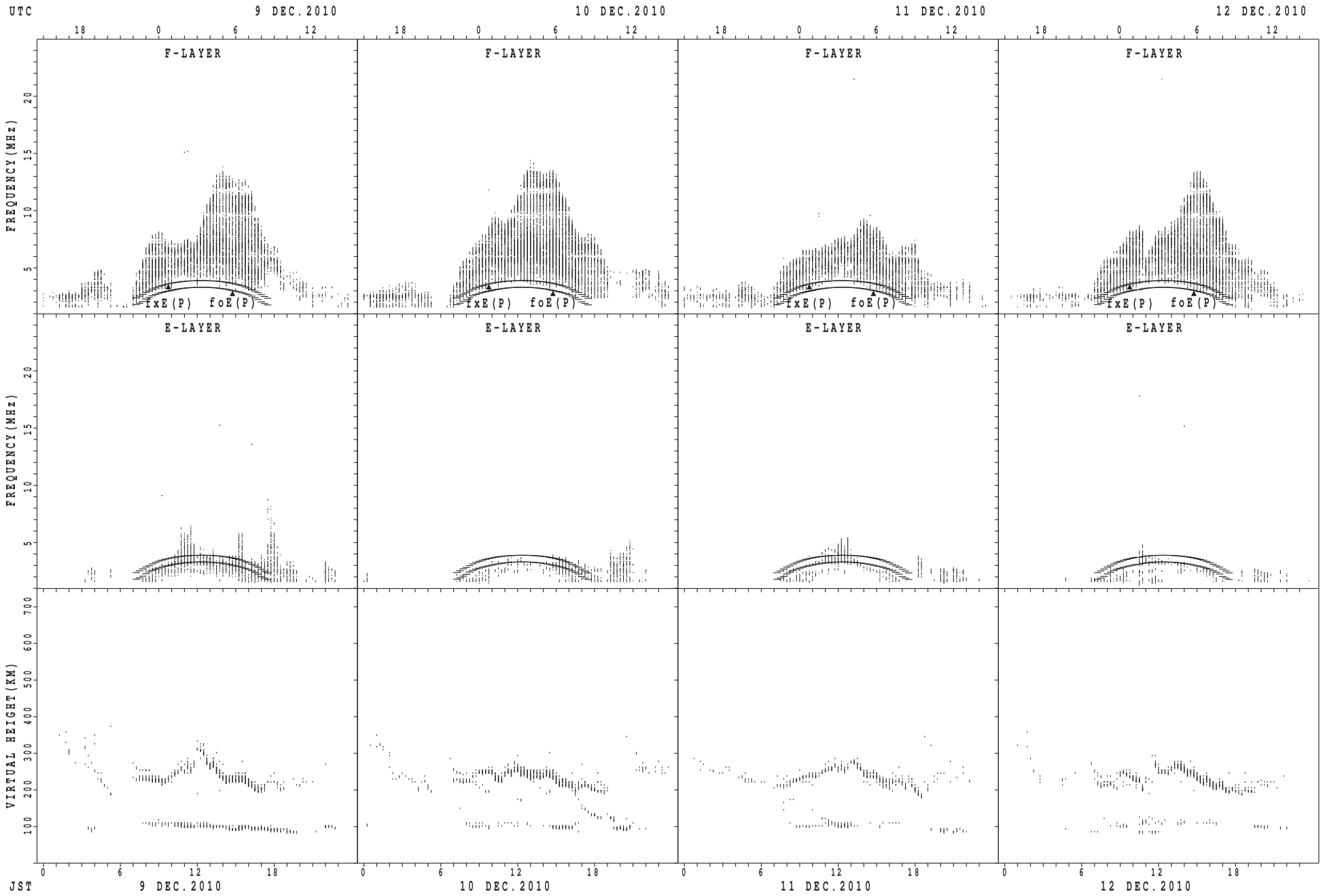
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



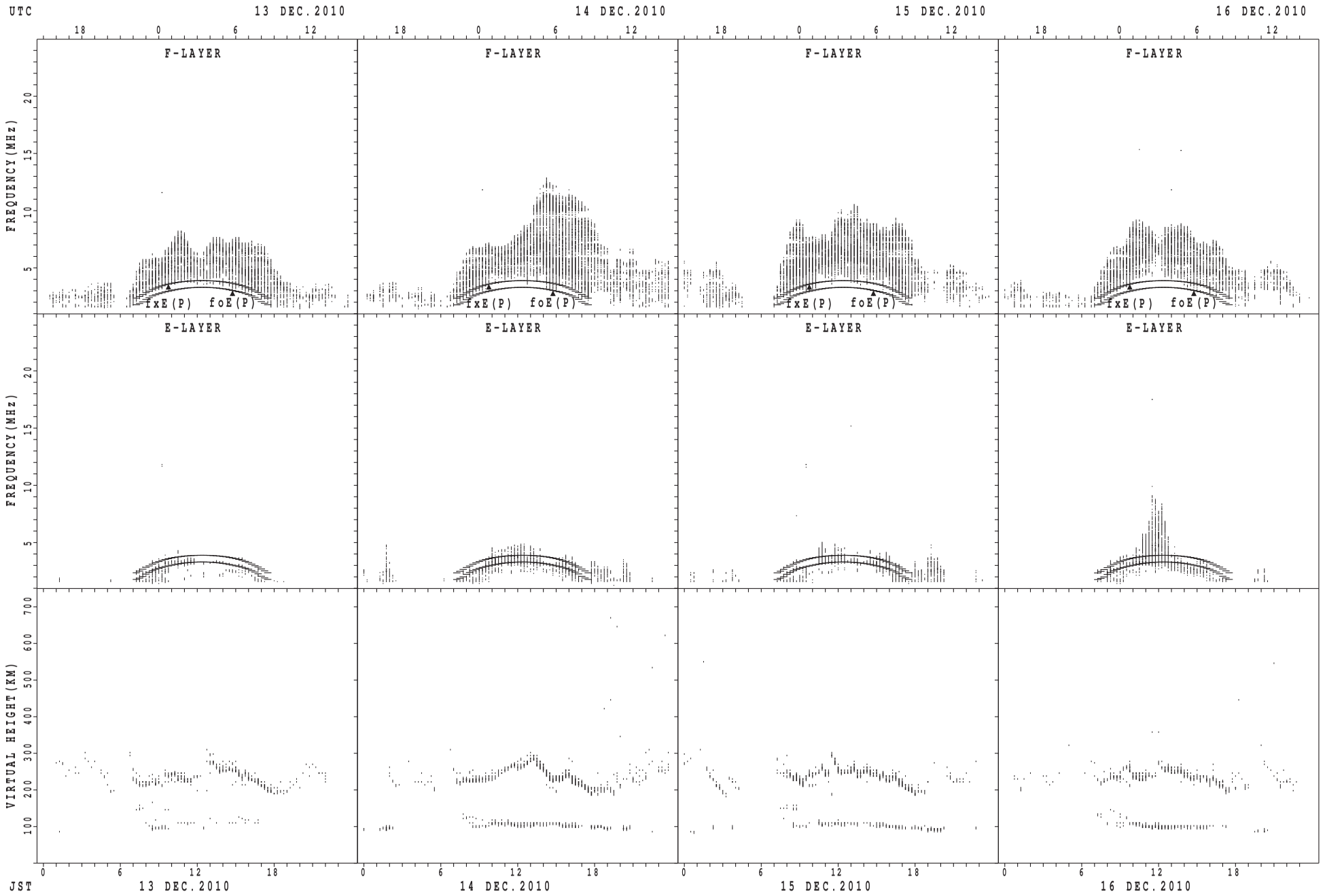
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



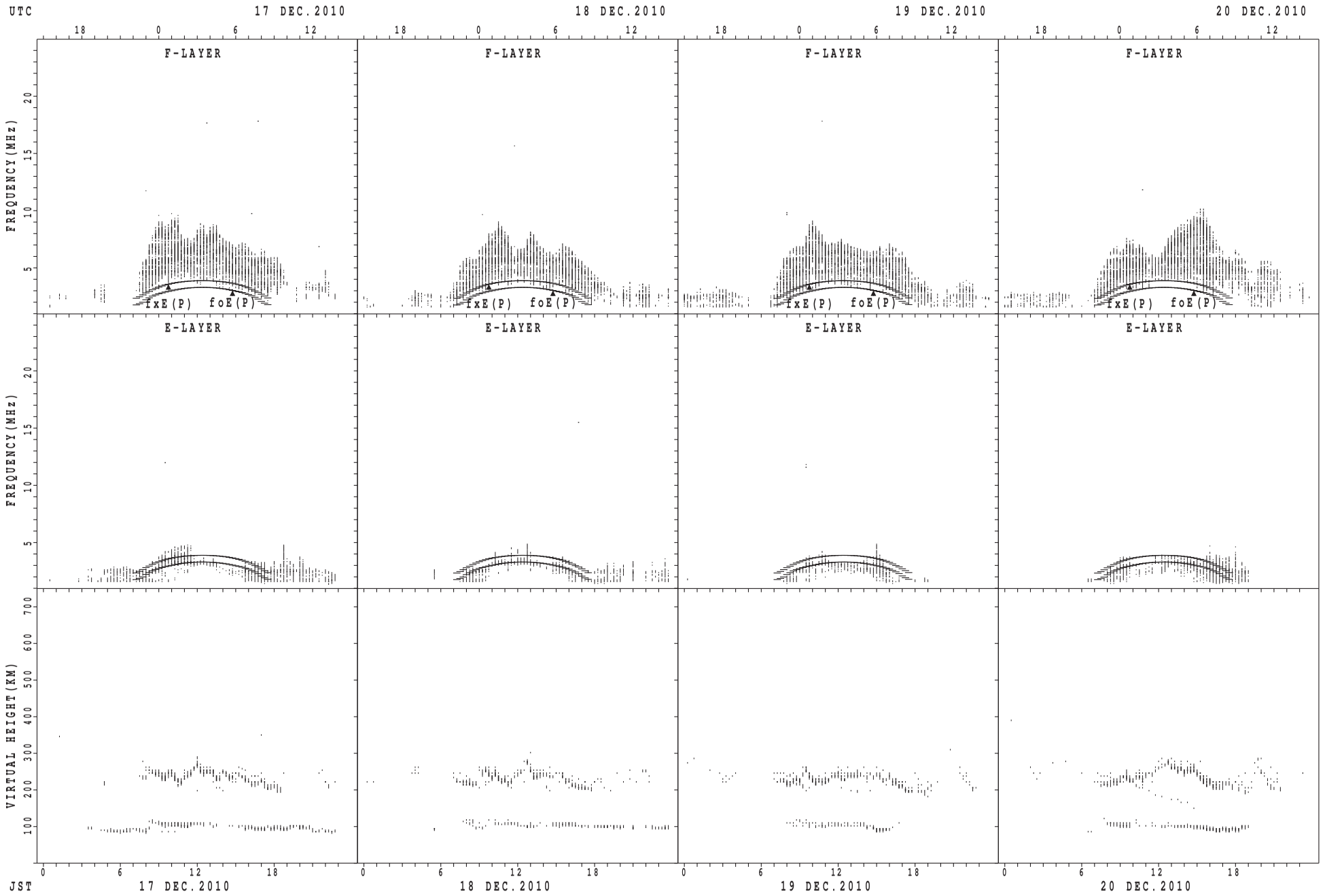
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



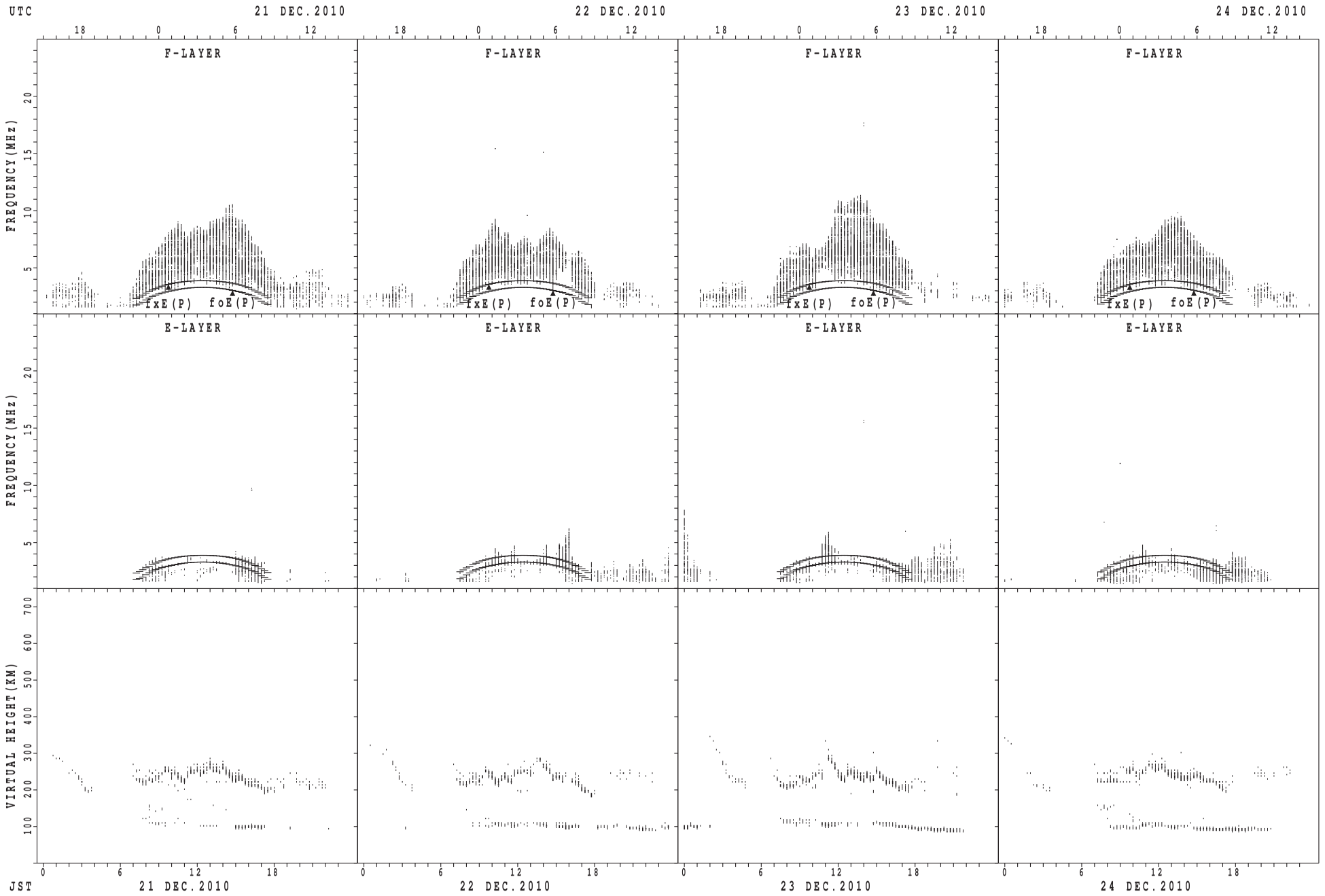
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



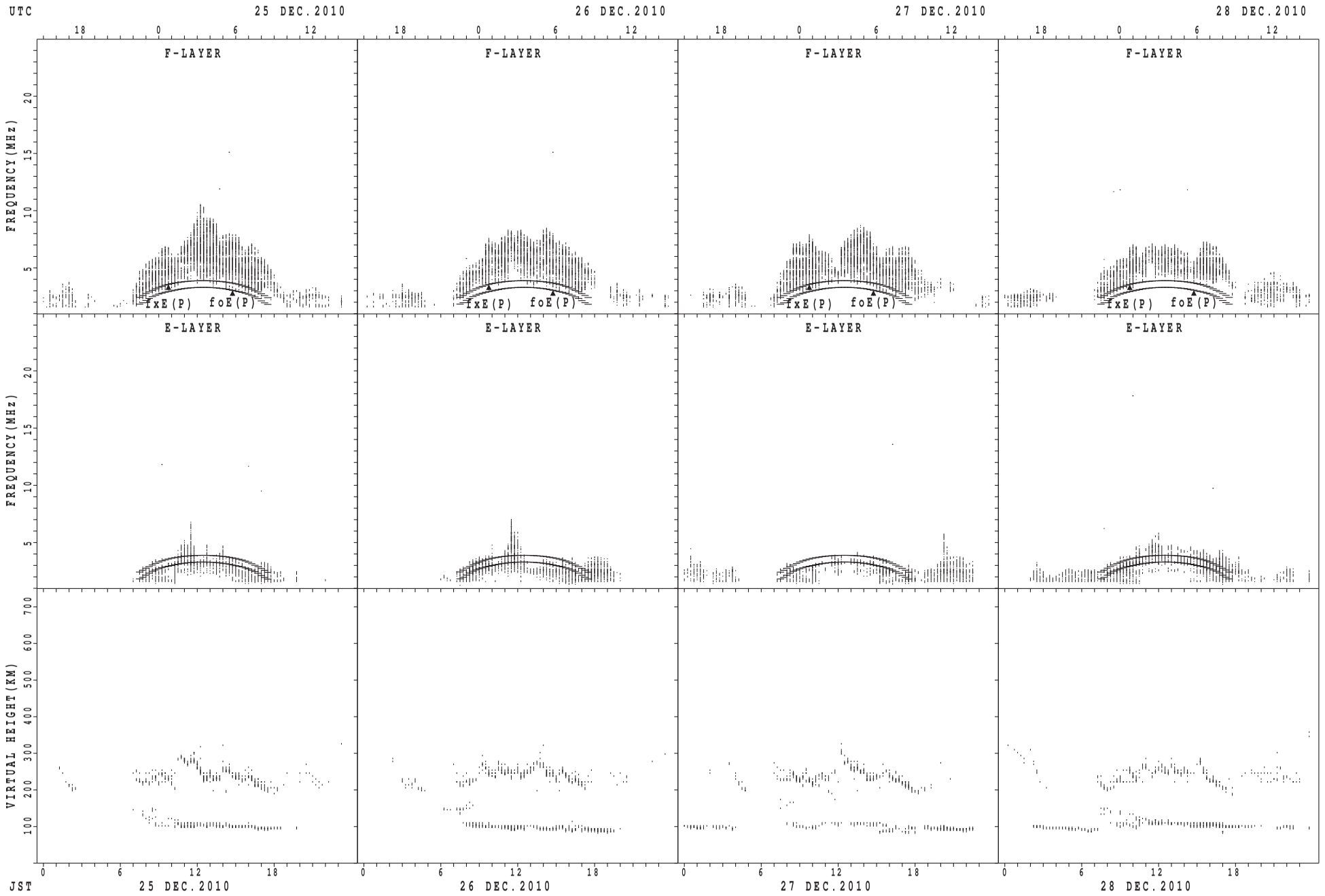
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



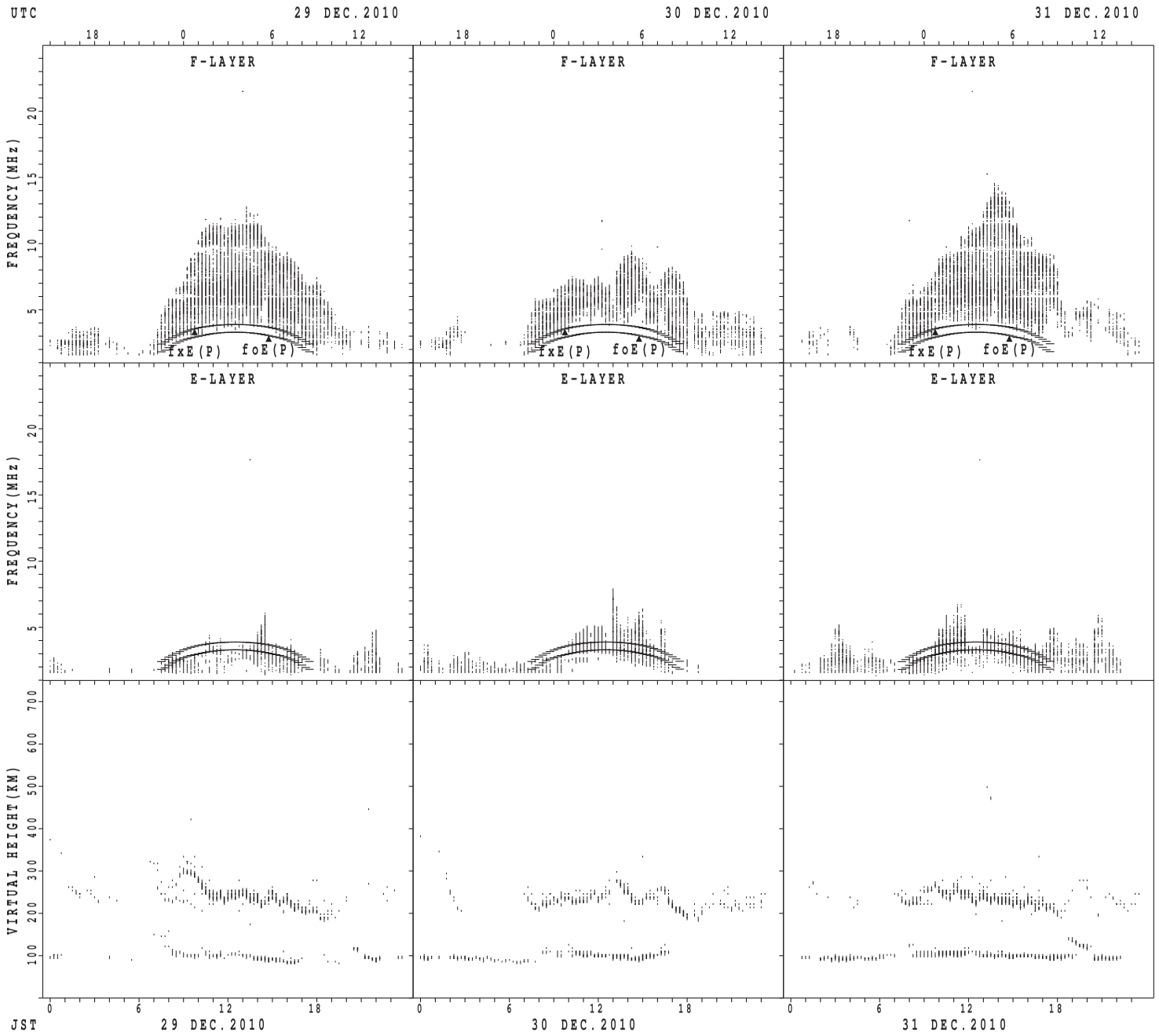
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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

MONTHLY MEDIANS OF h′F AND h′Es

DEC.2010 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

h′F STATION Wakkanai LAT. 45°10.0′N LON. 141°45.0′E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									5	16	28	31	27	19	18	8								
MED									220	223	230	222	228	230	230	225								
U Q									228	241	239	236	234	238	238	232								
L Q									214	213	222	214	218	222	220	222								

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	6	3	2	2	3	10	11	19	15	9	9	7	8	5	7	8	4	6	8	6	5	11	10
MED	97	89	97	93	94	89	100	99	107	107	103	99	105	107	93	95	89	90	91	89	102	95	95	95
U Q	97	95	97	97	99	105	103	113	125	119	109	108	107	149	129	119	94	93	95	96	103	99	99	99
L Q	93	87	95	89	89	89	97	97	99	105	95	96	103	97	90	91	89	88	89	87	99	90	95	93

h′F STATION Kokubunji LAT. 35°43.0′N LON. 139°29.0′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									3	13	18	28	24	20	14	6	3							
MED									232	232	248	232	235	238	239	240	230							
U Q									232	247	258	241	246	246	248	246	232							
L Q									226	232	230	222	223	231	234	228	228							

h′Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	9	7	6	5	8	3	2	9	4	7	5	8	2	6	4	10	12	17	15	14	11	10	14	12
MED	95	95	94	91	94	93	92	147	110	107	103	105	97	99	90	93	94	97	97	97	97	96	96	98
U Q	99	99	97	96	98	111	93	153	122	111	111	107	97	99	93	101	99	104	101	99	103	101	97	101
L Q	95	91	91	90	91	89	91	102	108	107	99	99	97	99	86	87	88	87	89	95	95	95	89	94

h′F STATION Yamagawa LAT. 31°12.0′N LON. 130°37.0′E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									6	16	24	28		15	24	16	10	4						
MED									235	239	244	230		240	239	232	238	222						
U Q									242	250	248	246		254	250	241	244	231						
L Q									228	228	234	225		224	231	227	230	214						

h′Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	6	7	8	6	3	3	3	20	22	22	21	18	18	15	18	21	21	23	22	17	15	14	10
MED	96	99	97	91	92	91	91	91	113	114	104	103	101	101	97	97	95	95	95	95	95	95	95	95
U Q	98	103	99	95	93	95	99	159	125	131	107	105	103	105	103	103	100	99	99	97	96	97	97	97
L Q	95	91	93	89	89	89	89	87	109	105	103	102	99	99	95	95	91	92	91	93	91	89	89	89

MONTHLY MEDIANS OF h′F AND h′Es

DEC.2010 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

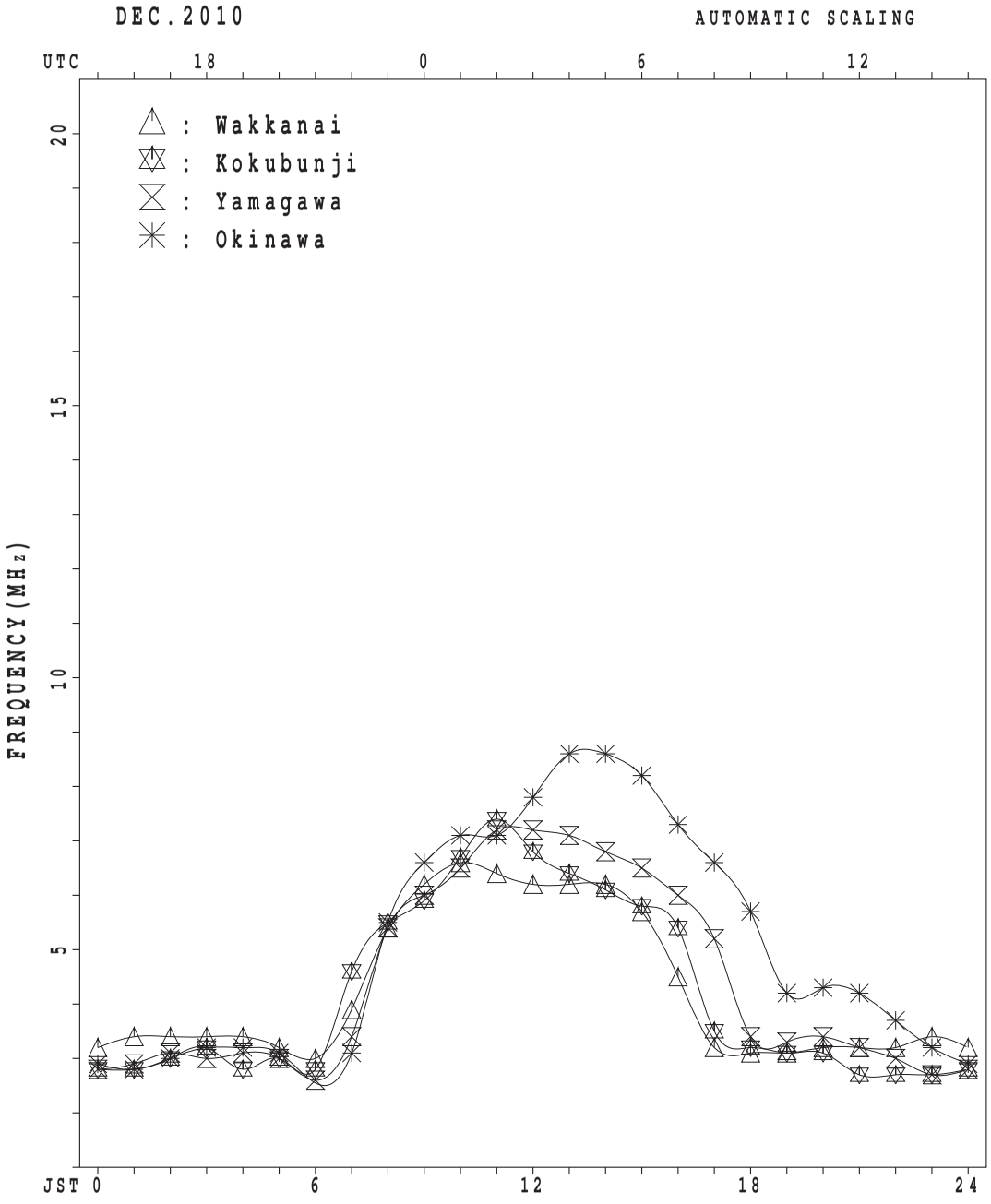
h′F STATION Okinawa LAT. 26°41.0′N LON. 128°09.0′E

	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	22	30	18			31	27	28	22	9					
MED									249	241	241	241			246	238	238	224	224					
U Q									265	256	246	248			260	246	246	234	229					
L Q									237	238	236	230			238	230	225	218	213					

h′Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	2	2	5	3	3	3	4	12	10	13	20	12	12	11	16	17	19	19	19	14	11	9	3
MED	99	100	96	97	97	95	95	93	152	113	107	107	105	105	103	99	101	99	99	97	97	97	97	89
U Q	107	103	97	103	97	95	97	95	159	131	113	110	111	106	111	104	106	105	103	105	99	97	103	101
L Q	95	97	95	96	95	89	89	90	115	105	106	103	103	101	97	98	96	95	97	95	95	91	94	89

MONTHLY MEDIANS PLOT OF foF2



IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 fxI (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 36	X 38	X 38	X 38	X 37	X 36	X 33											X 42	X 37	X 41	X 42	X 40	X 36	X 34
2	X 36	X 36	X 35	X 36	X 36	X 34	X 35											X 46	X 34	X 39	X 39	X 41	X 40	X 39
3	X 40	X 40	X 40	X 39	X 40	X 38	X 34											X 38	X 37	X 43	X 40	X 33	X 35	X 39
4	X 40	X 40	X 40	41	X 39	X 34	X 31											X 35	X 31	X 37	X 40	A	O X 36	X 37
5	X 36	X 37	X 38	X 37	X 33	X 30	X 33											X 36	A	A	X 41	X 35	X 35	X 35
6	X 36	X 37	X 38	X 36	X 36	X 35	X 30											X 42	X 32	X 38	X 45	X 31	X 32	X 34
7	X 36	X 36	X 37	X 39	X 37	X 38	X 41											X 49	A	A	X 36	X 33	X 34	X 34
8	X 36	X 37	X 39	X 39	X 34	X 31	X 33	X 61			C	C	C	C	C	C	C	C	X 38	X 35	X 40	X 35	X 34	X 35
9	X 38	X 37	X 37	X 38	X 39	X 36	X 31				C	C	C	C				X 41	X 31	X 32	X 35	X 33	38	37
10	36	X 36	X 38	X 37	X 35	X 31	X 30											A	X 34	X 31	X 35	X 30	X 32	X 33
11	X 35	X 35	X 37	42	40	X 27	X 25											X 43	X 40	X 29	X 32	X 32	X 34	X 34
12	X 34	X 34	X 38	X 40	X 32	X 32	X 32											A	X 33	X 35	A	X 33	X 34	X 34
13	X 35	X 35	X 37	X 36	X 34	X 35	X 32											A	A	O X 36	O X 35	X 32	X 34	X 34
14	X 34	37	42	42	X 37	X 35	X 32											X 53	X 47	X 38	X 33	X 32	X 34	X 36
15	X 36	X 38	X 39	X 38	X 35	X 32	X 28											X 54	X 40	X 39	X 40	X 30	X 30	X 35
16	36	36	X 38	X 38	X 31	X 27	X 26											X 44	X 34	X 42	X 38	X 34	A	X 31
17	X 33	X 33	X 34	X 34	X 34	X 30	X 28											X 40	X 35	X 32	X 36	X 36	X 34	X 35
18	X 36	X 34	X 36	X 32	X 31	X 33	X 30											X 43	X 32	X 34	X 36	X 32	X 32	X 34
19	X 36	X 38	X 38	X 35	X 31	X 32	X 30											X 40	X 29	X 31	X 39	X 32	X 30	X 38
20	X 41	X 37	X 40	43	X 38	X 31	X 34	X 50										X 37	X 41	X 45	X 30	X 34	X 30	X 32
21	X 35	X 36	X 37	X 40	X 31	X 30	X 34											X 38	A	X 36	X 36	X 31	X 34	X 34
22	X 32	X 39	X 41	X 41	X 40	X 32	X 33											X 40	X 40	X 39	X 38	X 32	X 37	41
23	37	44	44	X 42	X 34	X 36	X 35											X 42	X 34	X 39	X 38	X 34	X 32	X 34
24	X 35	X 36	X 35	X 39	X 32	X 26	X 24											X 33	X 34	X 40	X 31	X 28	X 31	X 31
25	X 33	X 30	X 33	X 33	X 31	X 28	X 28											A	A	A	A	X 34	X 31	39
26	A	X 39	X 39	X 38	X 34	X 30	X 24											X 41	A	X 42	X 45	35	34	36
27	X 34	X 33	X 36	X 35	41	30	30	X 50										X 42	X 36	X 33	X 40	X 28	X 28	X 30
28	X 28	X 31	32	X 38	X 31	X 23	X 25											X 39	X 32	X 36	O X 40	X 37	32	X 30
29	X 32	37	X 34	X 34	X 34	X 28	X 28											X 50	X 34	X 32	X 31	X 34	X 33	X 33
30	X 34	41	X 35	X 38	X 33	X 27	X 29											X 45	X 32	X 42	X 36	X 35	X 34	44
31	X 37	X 36	X 33	X 35	X 32	X 32	X 27											X 43	A	X 32	X 37	X 35	X 32	X 33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	3										26	24	28	29	30	30	31
MED	X 36	X 37	X 38	X 38	X 34	X 32	X 30	X 50										X 42	X 34	X 36	X 38	X 33	X 34	X 34
U Q	X 36	X 38	X 39	40	X 37	X 35	X 33	X 61										X 44	X 38	X 40	X 40	X 35	X 34	37
L Q	X 34	X 35	X 35	X 36	X 32	X 30	X 28	X 50										X 39	X 32	X 32	X 35	X 32	X 32	X 33

DEC. 2010 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	30	32	32	32	31	30	27	50	54	61	64	74	64	67	75	62	54	36	31	35	36	34	30	28
2	30	30	29	30	29	28	29	52	59	60	70	78	66	74	62	63	56	39	28	33	33	35	34	33
3	34	34	34	33	34	32	28	54	59	63	74	77	84	74	61	58	56	32	31	37	34	27	29	33
4	34	34	34	F	33	28	25	50	59	68	69	70	69	66	65	61	56	29	25	31	34	A	30	31
5	30	30	32	31	27	24	27	49	56	62	61	72	74	61	V 65	V 59	57	30	A	A	35	29	29	29
6	30	30	32	30	30	29	24	47	52	56	67	75	70	65	63	59	52	36	26	32	39	25	26	28
7	30	30	31	33	31	31	35	47	54	65	66	75	77	64	60	55	59	43	A	A	30	27	28	28
8	30	31	33	32	28	25	27	55	59	68	C	C	C	C	C	C	C	C	32	29	34	29	28	28
9	32	31	31	32	33	30	25	50	60	65	C	C	C	C	72	59	51	35	25	26	29	27	F	F
10	F	30	32	31	29	25	24	50	57	60	68	72	79	71	63	53	52	A	28	25	29	24	26	27
11	29	29	31	F	F	21	18	44	50	54	62	68	65	64	59	56	59	37	34	23	26	26	28	28
12	28	28	32	34	26	26	26	52	56	60	62	73	70	66	64	62	53	A	26	29	A	27	28	28
13	29	29	31	30	28	29	26	45	54	60	73	70	68	58	63	72	65	A	A	30	29	26	27	27
14	28	F	F	F	30	29	26	44	65	58	73	80	72	71	62	64	65	47	41	32	27	26	28	30
15	30	32	32	32	28	26	21	44	62	60	74	86	74	66	61	66	69	48	34	33	34	24	24	29
16	F	F	32	32	25	20	20	47	56	54	74	86	70	64	62	58	56	38	28	36	32	28	A	25
17	27	27	28	28	28	24	22	44	52	62	64	74	84	63	57	54	54	34	28	26	30	30	28	28
18	30	28	30	26	24	26	24	46	54	65	65	75	70	60	61	58	47	37	26	28	30	26	26	28
19	30	32	32	29	25	26	24	43	58	58	68	73	67	52	58	53	53	34	22	25	33	26	24	32
20	35	31	34	F	32	24	28	44	53	57	55	65	63	54	60	60	54	31	34	38	24	27	24	26
21	29	29	31	34	25	24	28	48	50	56	79	73	58	59	65	57	55	31	A	30	30	25	28	28
22	26	33	35	35	34	26	26	47	65	62	68	64	62	55	68	58	48	34	34	33	32	26	31	F
23	F	F	F	35	28	30	28	44	50	57	66	80	V 62	57	54	55	44	36	28	32	32	28	26	27
24	29	30	29	33	26	20	17	43	54	52	55	69	70	63	60	53	45	27	28	34	25	24	23	25
25	27	24	26	26	25	22	22	40	49	50	65	79	73	61	58	58	48	A	A	A	A	28	25	F
26	A	33	33	32	28	24	18	39	51	56	71	79	88	60	66	57	50	35	A	36	39	F	F	F
27	28	27	30	29	F	F	F	43	48	52	55	62	68	64	60	58	58	36	31	27	34	22	22	24
28	25	25	F	32	25	16	19	38	50	50	61	56	61	64	57	65	51	32	26	30	34	30	F	24
29	26	F	28	28	28	22	22	44	57	69	81	86	85	66	56	59	57	44	28	26	25	28	27	27
30	28	F	29	32	27	21	23	42	51	54	62	72	72	76	55	54	58	39	26	36	30	28	27	F
31	31	29	27	29	26	26	21	45	52	59	69	65	76	61	52	67	56	37	A	26	30	29	26	27
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	26	28	27	29	30	30	31	31	31	29	29	29	29	30	30	30	26	24	28	29	29	27	26
MED	30	30	32	32	28	26	24	45	54	60	67	73	70	64	61	58	54	36	28	30	32	27	27	28
U Q	30	32	32	33	30	29	27	50	59	62	72	78	75	66	64	62	57	38	32	34	34	28	28	29
L Q	28	29	30	29	26	24	22	44	51	56	62	70	66	60	58	56	51	32	26	26	29	26	26	27

IONOSPHERIC DATA STATION Kokubunji

DEC.2010 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	A	L											
2											L	L	L	L										
3												A	U 424 L											
4											L	L	L	L	L									
5												L	L	L										
6											L	L	L		L	L								
7											L	L	L	L										
8										L	C	C	C	C	C	C	C							
9											C	C	C	C	L									
10										L	L	L	L	L										
11											L	L	L	L	A									
12										A	U 432 L	A	L	L	L									
13											L		U 420 L	A	A	A								
14									L		L	L	L	L	L									
15											L	A	L	L										
16											A	L	L	L	A									
17											L	U 424 L		L	L									
18										L		L	L	L	L									
19											L		L											
20											L	L	L		U 400 L									
21											U 420 L	A		L										
22										L		L	L											
23											L	A	L	L	L									
24											U 444 L	U 412 L	L	L	A									
25											L	L	L	L										
26										A	L	L	U 400 L	L	L									
27											L	L	A	L										
28											L		L	U 396 L										
29										L	A			L	L									
30											A	A	A	A										
31											L	A	A	A	L	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											3	2	3	1	1									
MED											U 432 L	U 418 L	U 420 L	U 396 L	U 400 L									
U Q											U 444 L		U 424 L											
L Q											U 420 L		U 400 L											

DEC.2010 foF1 (0.01MHz)

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DEC.2010 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								180	244	A	A	A	A	A	UR 280	UR 244	A							
2								B	A	A	A	A	A	A	A	A	UA 188							
3								UR 184	A	A	A	A	A	A	A	R	UR 180							
4								B	A	A	A	A	A	A	A	A	172							
5								A	R	R	R	R	R	R	R	A	B							
6								176	UR 252	280	A	R	R	R	R	R	UR 172							
7								B	244	A	R	R	A	A	A	R	B							
8									A	A	C	C	C	C	C	C	C							
9								B	UR 252	A	C	C	C	C	R	A	UR 196							
10								B	A	R	R	R	R	R	A	A	A							
11								192	248	292	A	A	R	A	A	A	A							
12								B	A	A	R	R	R	R	R	A	B							
13								180	244	A	R	R	R	A	A	A	A							
14								B	R	A	A	R	R	R	R	A	A							
15								B	236	R	R	A	R	A	A	A	UR 184							
16								B	244	A	A	A	R	R	A	UR 236	B							
17								B	A	R	R	R	R	R	UR 280	UR 244	168							
18								B	A	284	R	R	R	R	R	R	B							
19								B	A	A	R	R	R	R	R	R	180							
20									R	R	R	R	R	R	R	A	A							
21								B	212	A	A	A	R	R	R	232	180							
22								B	UR 264	R	A	A	A	R	R	A	UR 188							
23								B	A	A	UR 312	A	A	A	A	A	A							
24								B	224	A	R	A	R	R	268	A	B							
25								B	A	260	304	R	R	R	R	A	A							
26								B	220	A	UA 300	A	R	R	R	UR 248	B							
27									UR 224	R	R	R	312	R	R	UR 252	B							
28								B	UA 216	264	A	A	R	R	R	A	B							
29								B	A	A	A	A	A	A	R	224	R							
30								B	216	A	A	A	A	A	A	A	B							
31								B	240	A	A	A	A	A	R	A	UR 184							
	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	16	5	3		1		3	7	11							
MED								180	242	280	U 304		312		UR 280	UR 244	UR 180							
UQ								188	UR 246	288	UR 312				UR 280	UR 248	UR 188							
LQ								178	222	262	UA 300				268	232	172							

DEC.2010 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	19	J A 23	22	J A 22	J A 23	20	J A 18	G	G	34	36	J A 49	34	J A 35	G 26	J A 31	J A 33	J A 34	J A 30	J A 27	J A 20	20	E B 16	E B 15
2	E B 15	E B 15	E B 16	E B 14	E B 15	E B 15	E B 16	22	29	34	J A 37	36	38	39	34	32	J A 28	J A 22	J A 24	J A 23	22	E B 15	J A 19	E B 14
3	E B 15	E B 16	18	E B 16	E B 14	E B 15	E B 15	G	30	J A 45	J A 57	J A 46	34	J A 44	32	G 22	G	E B 14	J A 23	J A 28	J A 22	J A 22	J A 18	J A 23
4	22	22	J A 24	J A 21	21	E B 15	20	J A 21	J A 31	J A 41	J A 36	J A 45	J A 36	38	J A 34	28	20	J A 39	J A 24	J A 23	J A 22	J A 39	J A 29	J A 24
5	J A 29	J A 27	J A 33	J A 23	J A 20	20	J A 24	29	G 22	G 20	G 19	G	G	G	G 24	27	J A 24	J A 20	J A 45	J A 58	J A 47	J A 29	J A 39	J A 22
6	21	19	E B 14	20	19	E B 15	E B 15	24	G 22	34	34	G 28	G 26	G 25	G 24	G 21	G	E B 14	E B 14	E B 15	E B 15	E B 15	E B 15	21
7	E B 15	J A 22	E B 14	E B 15	E B 15	E B 15	E B 14	E B 15	28	J A 32	G 26	G 29	37	34	J A 32	G	23	J A 23	J A 30	J A 50	J A 20	19	J A 35	J A 29
8	J A 28	J A 24	E B 14	E B 16	E B 15	E B 15	E B 15	E B 15	29	32	C	C	C	C	C	C	C	C	J A 18	J A 20	20	J A 17	E B 14	E B 15
9	E B 16	E B 15	E B 15	E B 15	E B 16	E B 15	E B 15	E B 17	G 22	35	C	C	C	C	G 26	J A 30	G	J A 27	E B 14	E B 14	E B 14	E B 15	E B 15	E B 13
10	E B 15	E B 15	E B 15	E B 14	19	E B 15	E B 14	19	26	G 25	G 25	G 22	G 28	G 26	J A 54	J A 41	J A 37	J A 38	23	E B 14	E B 15	E B 14	E B 15	20
11	E B 15	E B 15	E B 16	J A 18	19	E B 13	E B 16	26	29	35	J A 38	G 26	G 28	33	J A 46	J A 46	J A 25	J A 22	E B 14	J A 17	J A 20	J A 23	J A 24	J A 26
12	J A 21	J A 20	J A 26	J A 27	22	E B 15	E B 15	20	J A 32	J A 48	G 28	G 27	G 26	G 24	G 26	J A 50	20	J A 66	J A 51	J A 28	J A 30	J A 31	J A 53	J A 26
13	J A 21	21	20	20	E B 15	E B 15	E B 15	25	31	36	G 24	G 26	G 23	J A 40	J A 38	33	42	J A 39	J A 30	21	20	E B 14	21	20
14	20	20	E B 15	21	J A 23	J A 23	J A 22	J A 25	G	J A 34	39	G 28	G 29	G 28	G 25	29	J A 31	J A 30	J A 29	J A 18	J A 19	E B 15	J A 24	23
15	J A 22	J A 20	E B 14	E B 14	E B 15	E B 15	E B 15	20	27	G 22	G 23	34	G 20	36	35	J A 36	G	E B 14	E B 14	E B 15	J A 20	20	J A 25	J A 21
16	E B 15	J A 16	J A 20	J A 21	22	J A E B 17	E B 14	20	31	35	J A 52	J A 44	G 28	G 24	32	G 21	J A 23	J A 24	19	E B 14	E B 15	E B 22	J A 44	J A 28
17	19	E B 15	20	20	J A 26	J A 22	E B 15	E B 15	27	G 26	G 25	G 23	G 25	G 24	G 25	G	21	E B 15	J A 23	J A 20	J A 17	J A 22	E B 15	J A 23
18	J A 19	E B 14	J A 18	E B 14	J A 20	21	20	E B 15	26	G 24	G 26	G 22	G	G 26	G 23	G	20	J A 18	22	E B 15	20	J A 24	E B 15	E B 15
19	E B 15	E B 15	J A 21	20	J A 28	J A 21	E B 15	18	27	34	G 27	G 25	G 23	G 23	G	G 24	21	E B 14	E B 15	E B 14	E B 15	E B 15	E B 14	E B 15
20	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	21	E B 15	G	G 22	G	G	G 28	G 23	G 23	J A 34	35	E B 16	22	J A 29	J A 21	J A 28	J A 24	J A 21
21	E B 14	E B 15	E B 15	E B 15	J A 26	19	E B 15	E B 16	26	32	36	41	G 19	G 22	G 23	28	22	J A 22	J A 36	J A 44	J A 34	J A 32	21	21
22	J A 24	J A 28	J A 22	20	20	20	19	18	G	G	35	J A 44	J A 37	G 25	G 24	26	G	E B 15	20	J A 44	J A 32	J A 18	J A 22	E B 15
23	J A 22	E B 15	E B 16	J A 24	E B 14	E B 15	E B 15	E B 15	28	30	G	40	35	35	33	29	21	E B 15	E B 15	E B 15	E B 14	E B 15	E B 14	E B 15
24	E B 15	20	E B 15	E B 15	E B 15	E B 16	E B 15	21	27	J A 37	G 26	36	G 23	G 24	32	30	22	J A 22	J A 20	20	E B 15	21	E B 15	E B 15
25	22	E B 15	E B 15	E B 15	E B 14	E B 14	E B 15	18	23	34	35	G 25	G 24	G 27	G 25	G J A 67	J A 29	J A 79	J A 96	J A 68	J A 45	J A 32	J A 30	J A 31
26	J A 38	J A 24	J A 24	J A 21	21	J A 29	E B 15	18	28	37	36	J A 38	G	G 28	G	G 20	J A 46	J A 22	J A 54	20	E B 15	21	E B 14	J A 24
27	23	21	20	21	E B 14	21	E B 15	21	G 21	G 22	G 26	G 26	38	G 25	G 24	G 22	J A 29	J A 24	J A 23	J A 24	E B 14	J A 26	J A 24	J A 22
28	J A 19	E B 15	18	22	J A 22	20	J A 17	18	27	31	36	37	G	G 24	G 24	J A 30	21	J A 22	J A 24	J A 24	E B 16	J A 28	J A 21	J A 24
29	J A 26	E B 16	E B 15	E B 15	E B 15	E B 15	E B 14	20	27	32	35	34	36	J A 36	G 24	28	J A 24	J A 22	20	E B 15	E B 15	E B 15	E B 15	E B 15
30	22	20	J A 20	E B 15	J A 22	J A 22	J A 19	19	27	32	J A 42	J A 46	J A 75	J A 44	J A 68	J A 41	J A 25	E B 14	E B 15	J A 32	J A 25	J A 18	E B 14	E B 15
31	J A 32	J A 20	J A 30	E B 15	20	E B 15	E B 15	E B 15	29	34	J A 37	J A 49	J A 46	J A 48	G 25	J A 41	G	J A 26	J A 32	J A 27	J A 24	J A 20	23	22
	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	29	29	29	29	30	30	30	30	31	31	31	31	31	31
MED	20	19	18	18	19	E B 15	E B 15	18	27	34	35	34	G	G 28	G 26	29	22	J A 22	J A 23	J A 21	J A 20	J A 20	J A 21	21
U Q	J A 22	J A 21	J A 21	J A 21	J A 22	J A 20	18	21	29	35	J A 36	J A 42	36	J A 36	J A 33	J A 34	J A 29	J A 27	J A 30	J A 28	J A 22	J A 26	J A 24	J A 24
L Q	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 16	G	G	G 26	G 26	G 26	G 24	G 24	G	G 20	E B 15	E B 18	E B 15	E B 15	E B 15	E B 15	E B 15

DEC. 2010 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 15	17	E B 15	17	E B 15	E B 16	E B 15	G	G	30	33	36	33	30	G 22	G 17	22	24	20	20	17	E B 15	E B 16	E B 15
2	E B 15	E B 15	E B 16	E B 14	E B 15	E B 15	E B 16	19	26	32	30	33	32	33	30	29	G 17	17	17	16	16	E B 15	E B 16	E B 14
3	E B 15	E B 16	E B 15	E B 16	E B 14	E B 15	E B 15	G	27	32	42	42	32	36	30	G 21	G	E B 14	18	18	16	17	E B 14	E B 15
4	18	E B 16	E B 16	E B 16	E B 15	E B 15	E B 15	18	25	32	33	33	30	32	28	20	19	22	E B 15	E B 16	16	A A 39	19	19
5	E B 15	16	20	16	E B 15	E B 15	17	25	G 20	G 19	G 19	G	G	G	G 23	26	19	17	A A 45	A A 58	24	E B 15	22	E B 15
6	E B 15	E B 15	E B 14	E B 15	E B 14	E B 15	E B 15	20	G 22	30	32	G 26	G 26	G 23	G 24	G 21	G	E B 14	E B 14	E B 15	E B 15	E B 15	E B 15	E B 15
7	E B 15	E B 15	E B 14	E B 15	E B 15	E B 15	E B 14	E B 15	26	30	G 24	G 27	34	30	27	G	20	E B 15	A A 30	A A 50	18	E B 15	17	E B 15
8	17	E B 16	E B 14	E B 16	E B 15	E B 15	E B 15	E B 15	26	29	C	C	C	C	C	C	C	C	E B 16	E B 15	16	E B 15	E B 14	E B 15
9	E B 16	E B 15	E B 15	E B 15	E B 16	E B 15	E B 15	E B 17	G 19	30	C	C	C	C	G 25	25	G	E B 15	E B 14	E B 14	E B 14	E B 15	E B 15	E B 13
10	E B 15	E B 15	E B 15	E B 14	E B 15	E B 15	E B 14	18	25	G 23	G 23	G 21	G 24	G 25	42	33	31	A A 38	E B 15	E B 14	E B 15	E B 14	E B 15	E B 15
11	E B 15	E B 15	E B 16	E B 15	E B 16	E B 13	E B 16	21	27	30	32	G 25	G 26	G 31	40	34	20	16	E B 14	E B 15	E B 15	E B 16	E B 15	16
12	E B 15	E B 15	20	18	18	E B 15	E B 15	17	26	32	G 22	G 24	G 22	G 20	G 22	44	18	A A 66	24	20	A A 30	20	E B 15	17
13	E B 16	E B 15	E B 16	E B 15	E B 15	E B 15	E B 15	22	26	33	G 23	G 24	G 22	34	35	30	40	A A 39	A A 30	E B 15	E B 15	E B 14	E B 15	E B 15
14	E B 15	E B 15	E B 15	E B 15	15	16	16	E B 15	G	28	33	G 28	G 28	G 26	G 21	25	29	22	20	E B 15	E B 15	E B 15	E B 15	E B 15
15	16	E B 15	E B 14	E B 14	E B 15	E B 15	E B 15	18	26	G 22	G 21	31	G 19	31	31	29	G	E B 14	E B 14	E B 15	16	16	E B 14	E B 15
16	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 14	20	28	32	39	34	G 27	G 22	28	G 19	20	17	E B 15	E B 14	E B 15	E B 15	A A 44	E B 15
17	E B 15	E B 15	E B 16	E B 15	E B 15	E B 15	E B 15	E B 15	25	G 24	G 24	G 22	G 23	G 23	G 25	G	20	E B 15	22	E B 15	E B 15	E B 16	E B 15	E B 15
18	E B 14	E B 14	E B 14	E B 14	E B 15	E B 15	E B 15	E B 15	23	G 21	G 23	G 21	G	G 24	G 23	G	20	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15
19	E B 15	E B 15	E B 16	E B 15	19	17	E B 15	16	23	29	G 25	G 24	G 22	G 22	G	G 21	21	E B 14	E B 15	E B 14	E B 15	E B 15	E B 14	E B 15
20	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	15	E B 15	G	G 21	G	G	G 22	G 20	G 22	28	31	E B 16	18	18	16	17	16	E B 15
21	E B 14	E B 15	E B 15	E B 15	20	16	E B 15	E B 16	24	32	33	38	G 18	G 20	G 21	25	21	20	A A 36	18	17	18	E B 15	15
22	19	20	17	E B 15	E B 15	E B 15	E B 16	18	G	G	31	32	31	G 24	G 23	23	G	E B 15	E B 15	18	17	E B 15	E B 15	E B 15
23	E B 15	E B 15	E B 16	E B 15	E B 14	E B 15	E B 15	E B 15	24	28	G	36	32	28	29	27	20	E B 15	E B 15	E B 15	E B 14	E B 15	E B 14	E B 15
24	E B 15	E B 15	E B 15	E B 15	E B 15	E B 16	E B 15	20	26	32	G 24	30	G 22	G 22	30	26	19	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15
25	E B 15	E B 15	E B 15	E B 15	E B 14	E B 14	E B 15	17	22	30	34	G 24	G 23	G 24	G 23	26	23	A A 79	A A 96	A A 68	A A 45	16	16	18
26	A A 38	16	20	E B 15	E B 15	E B 15	E B 15	16	25	35	33	33	G	G 26	G	G 18	29	18	A A 54	E B 15	E B 15	E B 15	E B 14	15
27	E B 15	E B 15	E B 15	E B 15	E B 14	E B 15	E B 15	E B 15	G 19	G 21	G 24	G 26	36	G 25	G 23	G 21	24	19	19	19	E B 14	16	16	E B 16
28	E B 15	E B 15	E B 14	E B 15	E B 15	E B 15	E B 15	16	24	30	31	32	G	G 22	G 20	26	20	18	16	E B 15	E B 16	E B 16	E B 15	E B 15
29	E B 16	E B 16	E B 15	E B 15	E B 15	E B 15	E B 14	17	25	30	34	33	34	30	G 22	26	16	18	E B 14	E B 15	E B 15	E B 15	E B 15	E B 15
30	E B 15	E B 16	E B 16	E B 15	E B 15	17	E B 15	17	24	29	36	36	60	34	40	32	19	E B 14	E B 15	24	20	16	E B 14	E B 15
31	E B 15	E B 15	E B 15	E B 15	15	E B 15	E B 15	E B 15	25	29	33	36	38	38	G 23	31	G	20	A A 32	20	17	E B 14	14	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	29	29	29	29	30	30	30	30	31	31	31	31	31	31
MED	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	17	25	30	31	30	G	G 26	G 25	26	20	17	16	E B 15	E B 16	E B 15	E B 15	E B 15
U Q	16	16	16	E B 15	15	15	E B 15	18	26	32	33	34	32	31	30	29	22	20	A A 24	19	17	16	16	15
L Q	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	E B 15	G	G	G 24	G 24	G 22	G 22	G 23	G 21	G	E B 15	E B 15	E B 15	E B 15	E B 15	E B 14	E B 15

DEC. 2010 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC.2010 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2010 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	318	298	302	303	346	358	361	382	378	373	372	375	328	350	381	369	369	369	335	330	350	342	330	318
2	319	308	319	322	322	336	367	374	393	389	373	380	365	360	357	373	379	388	345	338	337	327	362	283
3	288	329	327	318	334	368	327	387	382	368	366	374	363	392	382	387	395	360	327	356	361	335	324	334
4	343	314	332	F	363	374	346	358	399	393	376	378	346	376	368	374	397	392	333	338	339	A	310	323
5	296	327	321	355	337	343	340	374	397	381	353	385	379	369	V 325	V 346	372	352	A	A	350	350	328	314
6	312	321	329	324	332	338	342	384	391	373	360	370	367	379	374	362	381	379	351	314	363	332	290	303
7	321	321	332	304	335	331	371	368	379	380	374	384	354	360	354	392	388	362	A	A	331	305	294	305
8	298	311	322	356	365	334	344	396	381	370	C	C	C	C	C	C	C	C	350	316	339	341	330	285
9	303	296	305	318	329	384	380	376	370	377	C	C	C	C	378	368	388	360	329	347	351	327	F	F
10	F	322	327	355	358	337	340	388	375	379	366	375	358	359	369	374	392	A	365	333	349	335	306	295
11	294	326	325	F	F	356	382	371	393	369	378	365	369	354	356	346	383	371	367	387	330	341	299	323
12	297	322	336	379	319	335	348	386	398	353	342	391	375	376	363	384	362	A	365	370	A	344	304	294
13	299	306	314	308	307	330	383	396	382	357	375	370	356	379	344	355	373	A	A	316	320	304	307	289
14	321	F	F	F	348	329	331	379	357	375	355	360	366	369	371	337	363	351	363	367	347	309	316	314
15	326	307	311	321	367	345	347	365	385	351	346	366	373	381	330	383	371	380	364	324	368	410	302	310
16	F	F	338	381	360	336	363	362	367	354	335	363	345	358	389	364	393	357	316	317	324	349	A	305
17	313	305	305	318	344	355	324	378	380	378	380	363	384	389	377	373	388	382	330	349	323	349	311	322
18	307	332	320	355	356	309	332	368	375	372	342	354	383	381	362	368	396	351	361	349	352	343	308	299
19	306	309	333	353	327	300	328	373	390	374	372	391	375	390	376	373	397	378	373	330	327	363	316	321
20	341	320	320	F	324	330	353	404	377	375	373	351	346	373	350	366	382	350	351	372	351	365	284	274
21	295	305	331	368	313	323	353	388	380	354	358	399	363	344	367	372	392	374	A	350	361	292	337	316
22	301	317	302	329	373	318	332	378	387	369	384	377	351	362	386	370	405	335	354	346	383	328	313	F
23	F	F	F	345	329	333	343	369	407	402	352	388	V 377	386	372	373	408	374	323	371	357	367	295	285
24	314	311	319	378	412	440	339	391	391	337	355	351	362	373	382	377	381	391	341	367	379	318	324	276
25	324	308	331	349	343	390	346	384	375	360	348	349	363	372	374	365	392	A	A	A	A	345	307	F
26	A	315	322	378	375	333	344	379	393	353	350	357	379	362	371	392	374	372	A	352	360	F	F	F
27	329	329	308	331	F	F	F	393	367	397	391	366	343	388	349	348	393	374	338	354	332	357	300	299
28	317	318	F	357	418	342	360	384	376	377	377	350	386	380	334	380	395	383	321	335	293	388	F	324
29	311	F	321	343	366	307	317	362	376	341	363	329	375	370	336	385	384	366	389	350	365	334	293	297
30	310	F	314	361	387	299	331	370	387	396	365	382	332	383	375	369	378	390	322	349	338	356	310	F
31	311	299	322	339	310	310	308	361	380	381	366	364	374	387	369	344	397	367	A	342	328	339	313	301
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	26	28	27	29	30	30	31	31	31	29	29	29	29	30	30	30	26	24	28	29	29	27	26
MED	311	314	322	345	344	336	344	378	381	373	366	370	365	373	369	371	388	372	348	348	349	341	310	304
U Q	321	322	330	357	366	355	360	387	391	380	374	381	375	382	376	377	395	380	364	355	360	353	324	318
L Q	299	307	314	321	328	329	332	369	376	357	352	358	352	361	354	364	378	360	330	332	330	328	300	294

DEC. 2010 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2010 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	A	L											
2											L	L	L	L										
3												A	U L 387											
4											L	L	L	L	L									
5												L	L	L										
6											L	L	L		L	L								
7											L	L	L	L										
8										L	C	C	C	C	C	C	C							
9											C	C	C	C	L									
10										L	L	L	L	L										
11											L	L	L	L	A									
12										A	U L 380	A	L	L	L									
13											L		U L 411	A	A	A								
14									L		L	L	L	L	L									
15											L	A	L	L										
16											A	L	L	L	A									
17											L	U L 386		L	L									
18										L		L	L	L	L									
19											L		L											
20											L	L	L		U L 374									
21											U L 361	A		L										
22										L		L	L											
23											L	A	L	L	L									
24											U L 386	U L 393	L	L	A									
25											L	L	L	L										
26										A	L	L	U L 387	L	L									
27											L	L	A	L										
28											L		L	U L 403										
29										L	A			L	L									
30											A	A	A	A										
31											L	A	A	A	L	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											3	2	3	1	1									
MED											U L 380	U L 390	U L 387	U L 403	U L 374									
U Q											U L 386		U L 411											
L Q											U L 361		U L 387											

DEC.2010 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2010 h'F2 (KM) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											244	236	248											
2											236	226	242	246										
3												224	224											
4											238	234	244	232	230									
5												224	226	230										
6											250	230	234		222	230								
7											240	230	250	238										
8										234	C	C	C	C	C	C	C							
9											C	C	C	C	222									
10										230	254	232	248	230										
11											240	244	224	250	E A 234									
12										226	252	212	224	238	240									
13											232		238	220	242	236								
14									232		250	238	230	236	232									
15											256	234	234	240										
16											254	238	246	234	224									
17											228	248		228	238									
18										246		236	230	220	236									
19											236		238											
20											240	258	246		242									
21											256	212		238										
22										250		228	252											
23											254	212	220	222	244									
24											274	254	228	230	224									
25											270	246	242	222										
26										260	260	250	228	246	228									
27											228	236	250	222										
28											240		226	236										
29										254	228			234	236									
30											240	226	E A 268	220										
31											250	228	228	216	230	248								
	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	7	25	25	26	23	16	3								
MED									232	246	244	234	235	232	232	236								
U Q										254	254	241	246	238	239	248								
L Q										230	237	226	228	222	226	230								

DEC.2010 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 h′F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 258	E A 298	E B 278	E A 278	E B 236	208	202	H 182	H 180	214	198	A	198	210	214	212	204	208	E A 242	E A 236	222	206	E B 216	E B 244
2	E B 262	E B 276	E B 276	E B 256	E B 246	E B 240	E B 208	206	206	206	200	190	188	216	208	210	202	186	214	230	222	220	214	E B 268
3	E B 300	E B 240	E B 240	E B 234	226	214	214	208	210	220	228	A	190	208	204	208	200	190	E A 234	224	208	216	E B 272	E B 254
4	E A 242	E B 262	E B 252	212	208	200	224	198	202	216	206	202	198	206	198	204	200	204	E B 240	E B 230	220	A	E A 284	E A 268
5	E B 290	E A 268	E A 278	226	E B 244	E B 232	E A 236	202	198	214	218	196	202	188	218	202	208	202	A	A	E A 250	200	E A 282	E B 272
6	E B 280	E B 270	E B 244	E B 252	E B 242	214	218	196	200	212	206	200	200	224	206	186	202	E B 194	210	E B 256	216	198	E B 286	E B 292
7	E B 272	E B 264	E B 262	E B 258	E B 256	E B 246	206	H 180	200	226	208	200	194	192	210	212	202	206	A	A	E A 236	E B 252	E A 308	E B 310
8	E A 300	E B 288	E B 260	210	208	E B 242	226	204	206	190	C	C	C	C	C	C	C	C	206	228	232	226	228	E B 312
9	E B 284	E B 290	E B 282	E B 256	E B 240	196	204	206	204	210	C	C	C	C	202	214	194	198	214	E B 212	204	E B 266	E B 272	E B 292
10	E B 294	E B 258	E B 242	222	222	E B 242	E B 238	206	208	204	212	206	222	198	218	214	208	A	212	E B 244	E B 222	228	E B 280	E B 308
11	E B 294	E B 250	E B 248	E B 282	212	222	E B 246	204	200	216	216	188	192	206	A	222	204	192	E B 208	200	E B 264	E B 242	E B 286	E A 276
12	E B 286	E B 262	E B 248	E A 210	E A 276	E B 240	E B 236	204	202	A	178	A	200	204	204	212	204	A	E A 268	220	A	E A 254	E B 298	E A 322
13	E B 286	E B 292	E B 272	E B 262	E B 278	E B 242	212	200	208	222	204	212	184	A	A	A	212	A	A	E B 244	E B 248	E B 250	E B 314	E B 326
14	E B 252	E B 296	240	E B 234	220	220	218	200	200	212	206	202	202	204	192	208	210	214	210	212	212	E B 284	E B 296	E B 284
15	E A 258	E B 276	E B 256	E B 236	210	214	E B 258	218	212	220	216	A	206	210	218	224	214	194	E B 200	E B 220	210	188	E B 304	E B 292
16	E B 274	E B 300	E B 242	200	218	E B 244	228	214	216	214	A	202	204	194	A	212	196	196	E B 230	E B 242	216	212	A	E B 284
17	E B 272	E B 272	E B 280	E B 262	E B 240	220	E B 260	204	206	212	202	202	220	202	196	208	206	202	E A 282	212	E B 252	214	E B 296	E B 260
18	E B 260	E B 236	E B 232	208	E B 254	E B 258	E B 258	216	208	212	220	208	200	196	206	210	200	206	208	214	228	214	E B 272	E B 278
19	E B 270	E B 258	E B 248	208	E A 290	E A 278	E B 260	210	210	208	196	208	212	184	212	210	196	192	200	E B 276	E B 242	208	E B 276	E B 252
20	226	E B 236	E B 238	E B 260	228	224	228	202	206	206	192	202	200	198	178	222	206	194	218	214	E A 240	218	E A 310	E B 338
21	E B 274	E B 284	E B 254	214	E A 324	E A 274	E B 236	208	206	220	214	A	212	192	224	218	206	200	A	226	206	E A 338	E B 232	E A 256
22	E A 302	E A 294	E A 264	E B 224	196	E B 254	E B 248	204	210	214	212	202	192	198	218	216	196	192	208	226	202	E B 232	E B 244	E B 270
23	E B 252	E B 262	E B 238	212	E B 224	E B 240	226	204	204	200	188	A	196	186	198	218	196	206	220	210	210	208	E B 294	E B 320
24	E B 266	E B 266	E B 266	218	198	190	E B 306	202	204	220	208	188	202	204	A	212	200	198	E B 242	216	196	E B 232	E B 262	E B 304
25	E B 246	E B 288	E B 248	E B 246	226	192	E B 248	206	212	206	222	198	206	192	218	222	202	A	A	A	A	E A 220	E A 274	E A 344
26	A	E A 258	E A 272	204	204	E B 258	E B 288	204	212	A	226	212	206	198	198	198	200	198	A	214	194	E B 204	E B 312	E A 312
27	E B 242	E B 238	E B 268	E B 250	208	E B 248	E B 246	206	204	206	198	206	A	198	206	210	208	194	E B 238	208	226	E B 242	E A 332	E B 306
28	E B 300	E B 278	E B 282	220	180	E B 340	E B 248	196	214	208	206	210	204	206	218	214	202	196	E A 262	216	E B 236	202	E B 248	E B 316
29	E B 314	E B 294	E B 240	E B 236	212	E B 236	E B 286	226	218	208	A	E A 242	220	194	174	210	218	204	202	E B 234	E B 218	E B 250	E B 282	E B 310
30	E B 296	E B 286	E B 280	E B 216	196	E A 312	E B 258	204	204	216	A	A	A	A	214	214	208	190	E B 256	E A 244	E A 262	216	E B 248	E B 274
31	E B 290	E B 286	E B 268	E B 230	E A 260	E B 268	E B 270	216	210	218	210	A	A	A	186	A	198	216	A	E A 278	E A 254	226	E A 276	E B 288
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	31	31	29	26	21	26	26	26	28	30	26	24	28	29	30	30	31
MED	E B 274	E B 272	E B 256	E B 230	U 211	E B 240	E B 236	204	206	212	207	202	201	198	206	212	202	198	208	218	214	212	E B 281	E B 292
U Q	E B 294	E B 288	E B 272	E B 256	E 246	E B 254	E B 258	208	210	217	216	208	206	206	218	215	208	204	E A 241	E B 239	E 241	E B 242	E B 296	E B 312
L Q	E B 258	E B 258	E B 242	212	208	214	218	202	202	207	200	199	196	194	198	209	200	194	208	214	210	208	E B 262	E B 270

DEC. 2010 h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2010 h'E (KM) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								114	120	116	118	A	A	A	118	120	A							
2								B	118	A	A	A	A	A	A	A	122							
3								122	118	A	A	A	A	A	A	120	120							
4								B	A	A	A	A	A	A	A	A	122							
5								A	114	118	116	114	116	118	120	A	B							
6								118	126	122	A	122	122	122	122	124	120							
7								B	124	A	124	124	A	A	A	116	B							
8									120	120	C	C	C	C	C	C	C							
9								B	126	128	C	C	C	C	124	A	120							
10								B	A	116	118	118	116	112	A	A	A							
11								130	114	116	120	120	124	A	A	A	A							
12								B	A	A	126	122	118	118	122	A	B							
13								126	116	122	120	118	118	A	A	A	A							
14								B	118	A	A	118	122	120	120	A	A							
15								B	118	118	118	114	112	A	A	A	112							
16								B	118	120	A	A	118	118	118	118	B							
17								B	124	122	126	116	118	120	120	118	118							
18								B	A	124	120	118	120	120	120	120	B							
19								B	A	A	122	122	122	122	118	122	118							
20									122	118	112	114	118	118	116	A	A							
21								B	112	112	116	116	122	118	120	112	118							
22								B	118	118	A	A	A	116	120	116	116							
23								B	116	114	114	120	A	A	A	A	A							
24								B	126	A	122	A	118	118	116	118	B							
25								B	A	116	116	120	120	116	120	A	A							
26								B	120	124	122	A	120	120	118	116	B							
27									120	118	116	120	118	114	118	116	B							
28								B	122	118	110	118	128	114	110	A	B							
29								B	118	120	118	A	A	A	124	112	116							
30								B	116	122	120	A	A	A	A	A	B							
31								B	124	118	A	A	A	A	118	A	118							
	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	25	23	21	18	19	17	20	14	12							
MED								122	118	118	118	118	118	118	120	118	118							
U Q								128	123	122	122	120	122	120	120	120	120							
L Q								116	117	116	116	116	118	116	118	116	117							

DEC.2010 h'E (KM)

IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 h'Es (KM) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	94	96	96	92	90	98	98	G	G	130	118	102	106	102	98	98	98	88	88	90	86	84	B	B
2	B	B	B	B	B	B	B	132	126	102	106	110	104	104	100	100	98	100	100	102	102	B	96	B
3	B	B	94	B	B	B	B	G	120	106	106	98	100	100	106	100	G	B	102	100	100	100	102	102
4	90	104	100	98	98	B	138	110	106	104	104	102	108	104	102	98	144	100	98	100	98	88	92	90
5	92	94	96	96	96	98	98	94	94	92	92	G	G	G	100	100	104	104	98	96	94	94	90	96
6	96	96	B	94	94	B	B	136	106	142	110	104	104	106	108	110	G	B	B	B	B	B	B	98
7	B	98	B	B	B	B	B	B	164	106	104	104	104	104	104	G	98	100	92	88	98	96	100	100
8	100	94	B	B	B	B	B	B	116	116	C	C	C	C	C	C	C	C	98	96	92	94	B	B
9	B	B	B	B	B	B	B	B	110	120	C	C	C	C	106	106	G	98	B	B	B	B	B	B
10	B	B	B	B	100	B	B	144	110	104	100	96	92	92	88	88	88	84	90	B	B	B	B	94
11	B	B	B	94	94	B	B	152	146	140	122	104	110	96	98	90	90	114	B	114	102	120	98	94
12	94	94	94	92	90	B	B	108	108	104	104	102	94	98	98	90	122	104	104	104	104	96	96	104
13	100	98	98	98	B	B	B	146	144	126	98	104	102	92	90	92	86	82	86	88	88	B	100	106
14	102	104	B	102	98	96	96	98	G	106	106	106	106	102	100	100	98	98	98	98	98	B	96	96
15	96	94	B	B	B	B	B	146	164	104	100	112	94	88	86	84	G	B	B	B	92	92	96	108
16	B	108	108	102	96	102	B	150	134	130	106	102	102	102	134	94	92	92	104	B	B	104	96	102
17	98	B	96	96	98	96	B	B	130	104	106	104	104	104	106	G	158	B	94	96	94	96	B	104
18	102	B	98	B	96	94	94	B	106	104	102	98	G	104	106	G	130	92	92	B	90	112	B	B
19	B	B	96	88	88	90	B	126	104	104	104	102	102	104	G	106	142	B	B	B	B	B	B	B
20	B	B	B	B	B	B	102	B	G	104	G	G	102	96	106	106	100	B	96	90	96	92	92	92
21	B	B	B	B	96	94	B	B	146	114	128	112	92	100	106	138	158	124	104	104	100	100	100	94
22	96	94	98	98	98	102	102	142	G	G	108	106	102	102	102	128	G	B	106	102	102	108	108	B
23	106	B	B	106	B	B	B	B	124	114	G	124	96	90	108	110	110	B	B	B	B	B	B	B
24	B	96	B	B	B	B	B	146	154	102	100	100	100	102	136	118	114	96	92	96	B	96	B	B
25	100	B	B	B	B	B	B	144	106	162	134	102	96	94	102	106	106	102	102	92	92	94	92	94
26	92	90	90	92	94	110	B	154	148	130	132	102	G	104	G	106	90	96	98	98	B	104	B	100
27	98	100	96	96	B	100	B	98	108	108	104	104	138	106	106	106	106	104	102	96	B	96	94	94
28	98	B	112	108	102	102	100	124	134	142	116	120	G	92	90	108	104	104	104	110	B	102	102	98
29	100	B	B	B	B	B	B	134	128	118	110	104	106	98	104	142	96	92	98	B	B	B	B	B
30	100	100	100	B	100	94	88	144	146	126	116	108	100	102	96	98	90	B	B	98	96	96	B	B
31	98	102	104	B	104	B	B	B	128	122	106	106	98	96	98	92	G	98	90	90	90	96	96	96
	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	20	17	16	16	18	13	9	20	27	30	27	27	25	28	28	27	24	21	24	22	20	22	18	20
MED	98	96	97	96	96	98	98	139	126	111	106	104	102	102	102	100	102	98	98	97	96	96	96	97
U Q	100	101	100	100	98	102	102	146	146	126	116	106	105	104	106	108	118	104	102	102	100	102	100	102
L Q	95	94	96	93	94	94	95	117	108	104	104	102	97	96	98	94	94	92	92	92	92	94	94	94

IONOSPHERIC DATA STATION Kokubunji

DEC. 2010 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0′N LON.139°29.0′E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F2	F4	F5	F2	F2	F2	F2			CL11	C2	L2	L2	L2	L2	L2	L2	F4	F3	F2	F2	F2		
2								H1	C2	L2	L2	L2	L2	L2	L2	L3	L3	F3	F3	F2	F1		F3	
3			F1						C2	L2	L2	L2	L2	L2	L2	L2			F2	F2	F1	F2	F2	F2
4	F2	F1	F2	F2	F2		F1	L3	L2	L2	L2	L2	L1	L2	L2	L3	HL12	F3	F3	F2	F2	F3	F3	F3
5	F2	F2	F3	F3	F3	F3	F2	L3	L2	L2	L2				L1	L2	L3	F2	F3	F4	F4	F2	F4	F2
6	F2	F1		F2	F1			H2	L2	HL22	L2	L2	L2	L2	L1	L2								F1
7		F2							H2	L2	L2	L1	L2	L2	L2		L2	F2	F5	F5	F3	F2	F3	F1
8	F2	F2							C2	CL22									F2	F2	F2	F2		
9									L2	CL22					L2	L3		F2						
10					F1			H2	L2	L2	L2	L1	L2	L2	L2	L2	L2	F3	F2					F1
11				F1	F1			H2	H2	H2	CL22	L2	L1	L2	L2	L2	L2	F2		F1	F1	F2	F2	F2
12	F2	F2	F4	F2	F3			L3	L2	L2	L2	L2	L2	L2	L2	L3	C1	F4	F3	F7	F5	F5	F4	F4
13	F2	F1	F1	F2				H2	H2	CL22	L2	L2	L2	L2	L2	L2	L3	F3	F3	F1	F1		F1	F1
14	F1	F1		F1	F3	F3	F3	L1		L2	L2	L2	L2	L2	L2	L2	L2	F3	F3	F2	F1		F2	F2
15	F1	F1						H2	H2	L2	L2	CL12	L2	L3	L3	L2					F1	F1	F1	F1
16		F1	F2	F1	F1	F1		H2	H2	C2	L2	L2	L2	L2	CL11	L2	L2	F2	F2			F1	F5	F2
17	F2		F1	F2	F1	F1			C2	L2	L2	L2	L2	L2	L2		H1		F3	F2	F2	F1		F2
18	F1		F1		F2	F2	F2		L2	L1	L1	L2		L2	L2		H1	F1	F1		F1	F3		
19			F2	F2	F4	F2		C2	L2	L2	L2	L2	L1	L2		L1	H2							
20							F1			L1			L1	L2	L2	L2	L2		F2	F3	F2	F3	F3	F2
21					F4	F2			H2	C2	CL22	CL12	L2	L2	L2	H2	H2	F3	F5	F2	F2	F3	F2	F2
22	F2	F4	F2	F1	F1	F1	F1	H2			L2	L2	L2	L2	L1	C2			F2	F3	F2	F1	F1	
23	F1			F3					C2	C2		C2	L2	L2	L2	L3	L2							
24		F1						H4	HL23	L2	L2	L2	L2	L2	HL12	CL22	C2	F1	F1	F1		F1		
25	F2							H1	L2	HL12	HL12	L2	L2	L2	L1	L2	L2	F3	F4	F4	F5	F3	F3	F3
26	F4	F3	F4	F2	F1	F2		H1	HL22	CL12	CL22	L2		L2		L1	L2	F3	F5	F1		F1		F2
27	F3	F1	F2	F2		F2		L1	L2	L2	L2	L2	HL12	L2	L2	L2	L2	F4	F6	F5		F2	F3	F1
28	F1		F1	F2	F4	F2	F2	CL22	CL22	H2	CL22	C1		L2	L2	L2	L2	F3	F1	F1		F2	F2	F2
29	F1							H1	C2	CL22	CL22	L2	L2	L2	L2	HL22	L2	F2	F3					
30	F2	F2	F2		F2	F3	F3	H2	H2	CL22	CL22	L2	L3	L2	L3	L2	L2			F2	F2	F2		
31	F2	F2	F2		F1				C2	C2	L2	L2	L2	L2	L2	L2		F2	F4	F4	F3	F2	F2	F2
	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																								

f-PLOTS OF IONOSPHERIC DATA

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

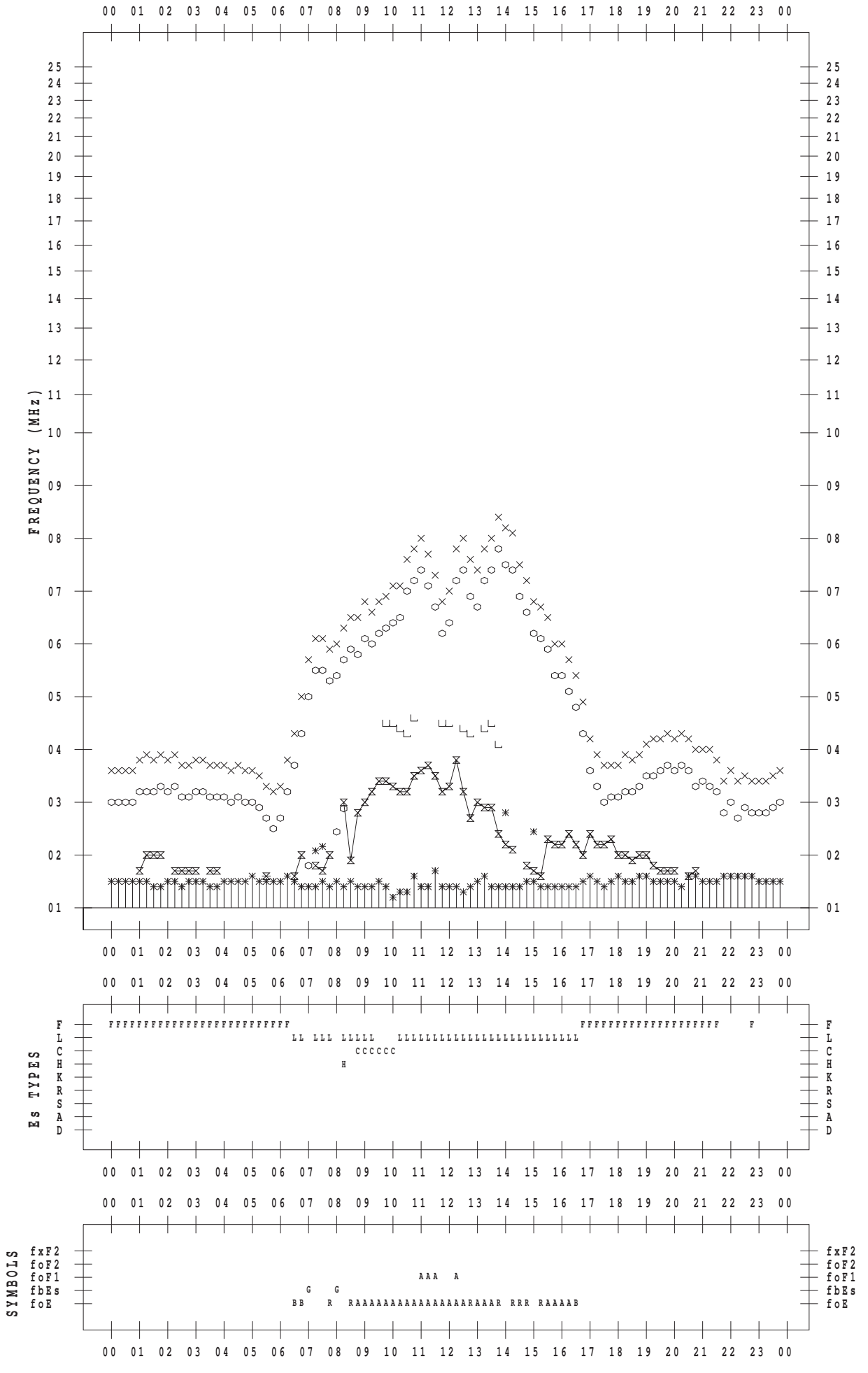
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 1

135 °E MEAN TIME



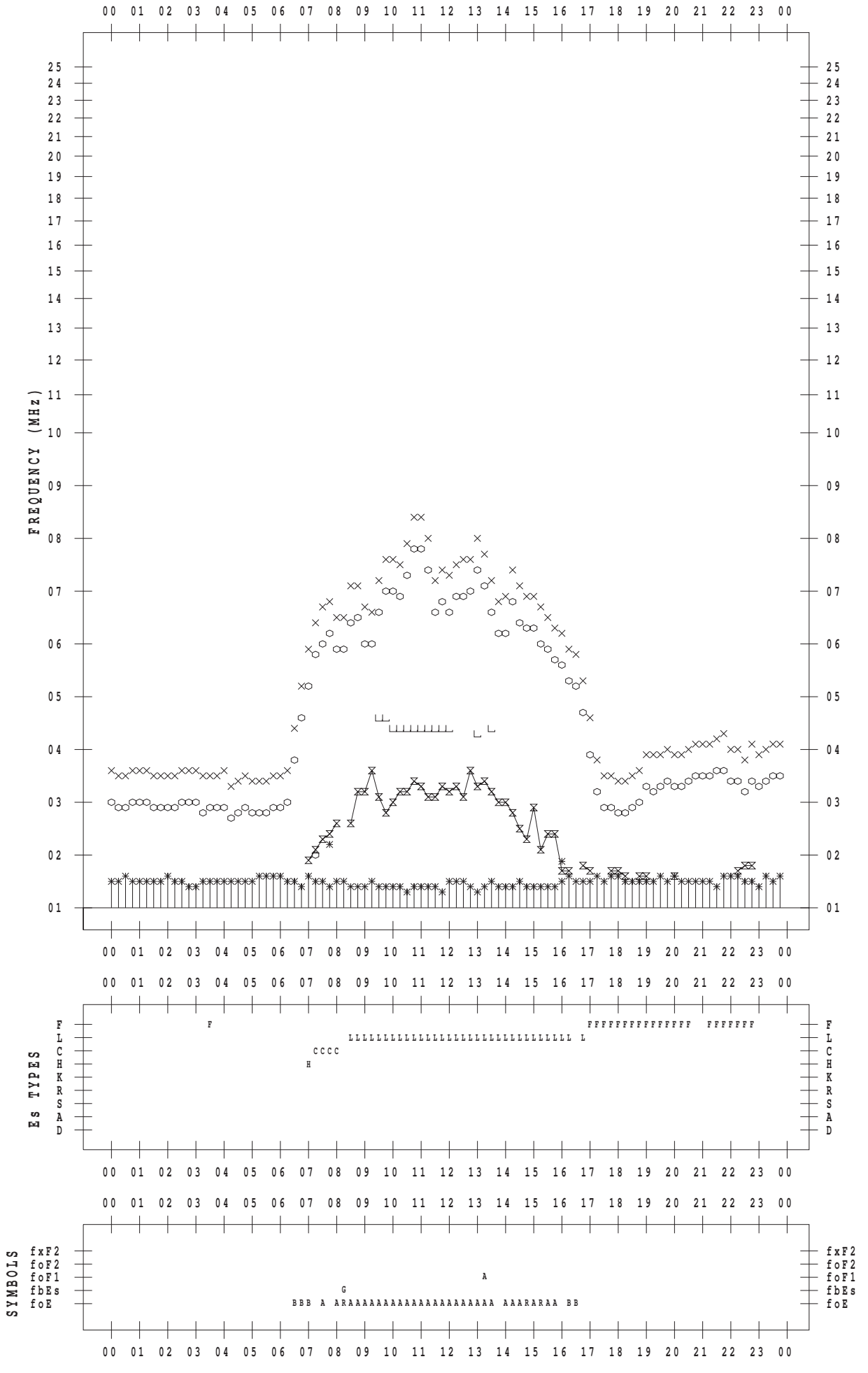
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 2

135 °E MEAN TIME



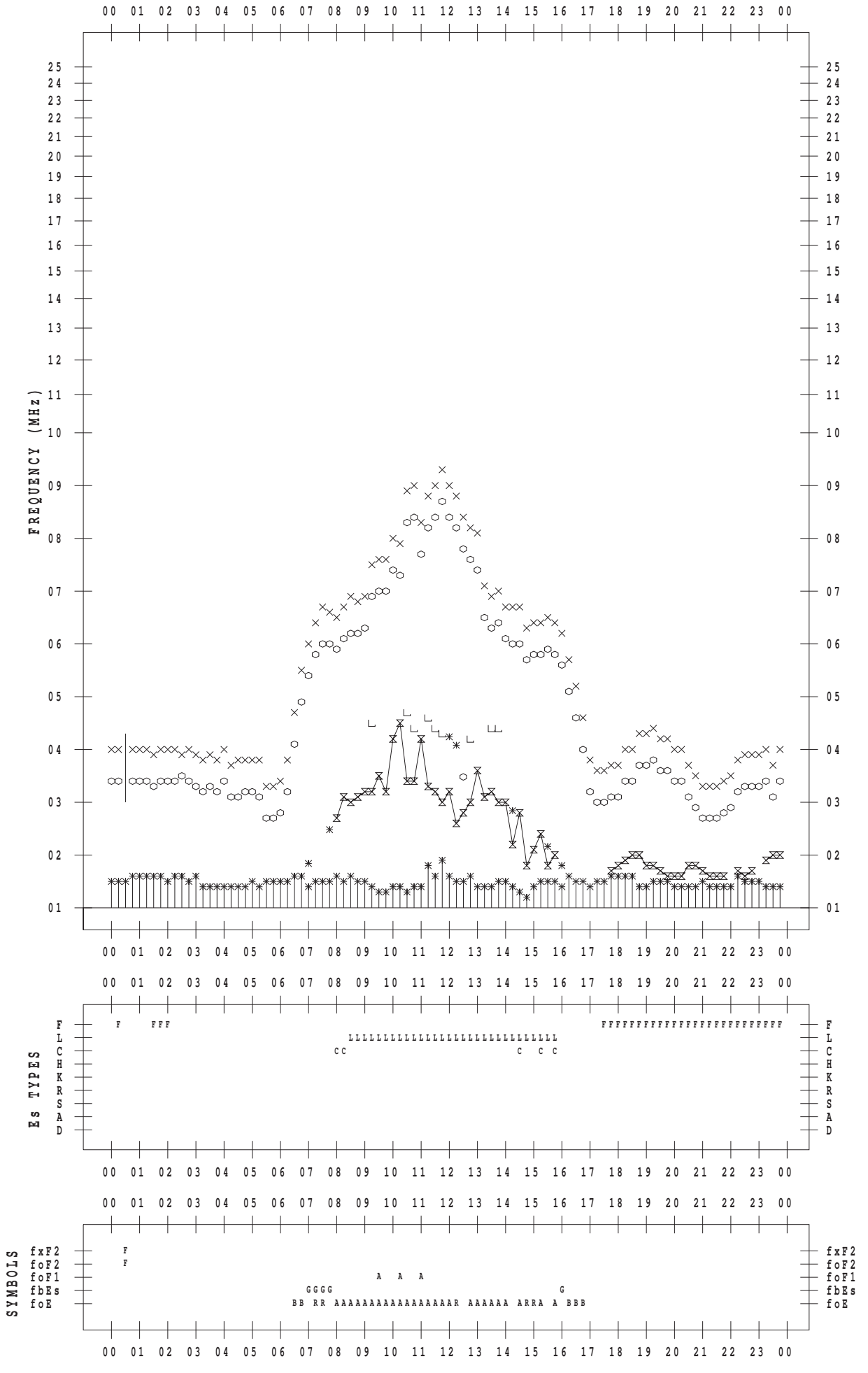
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 3

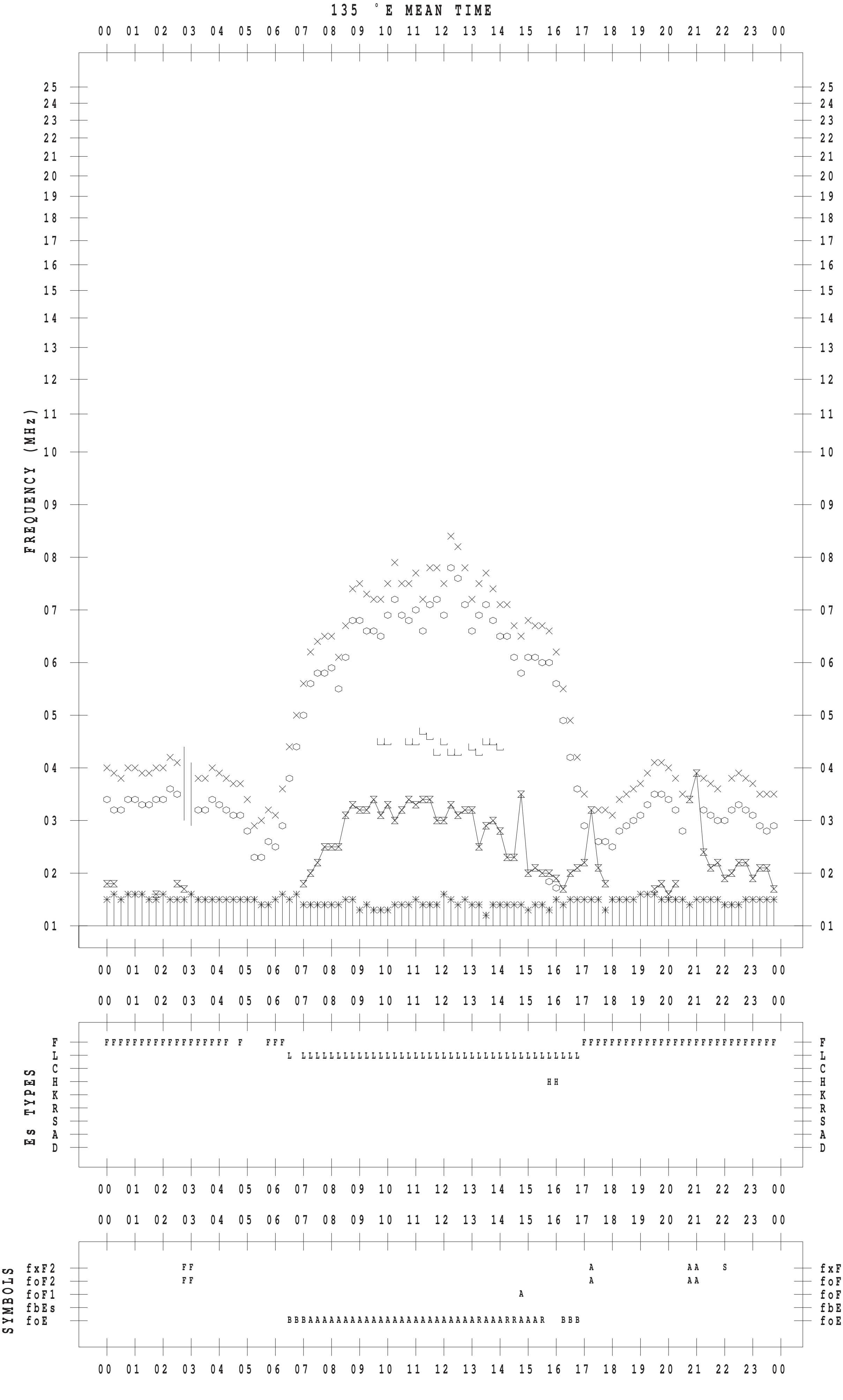
135 °E MEAN TIME



f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji DATE : 2010/12/ 4



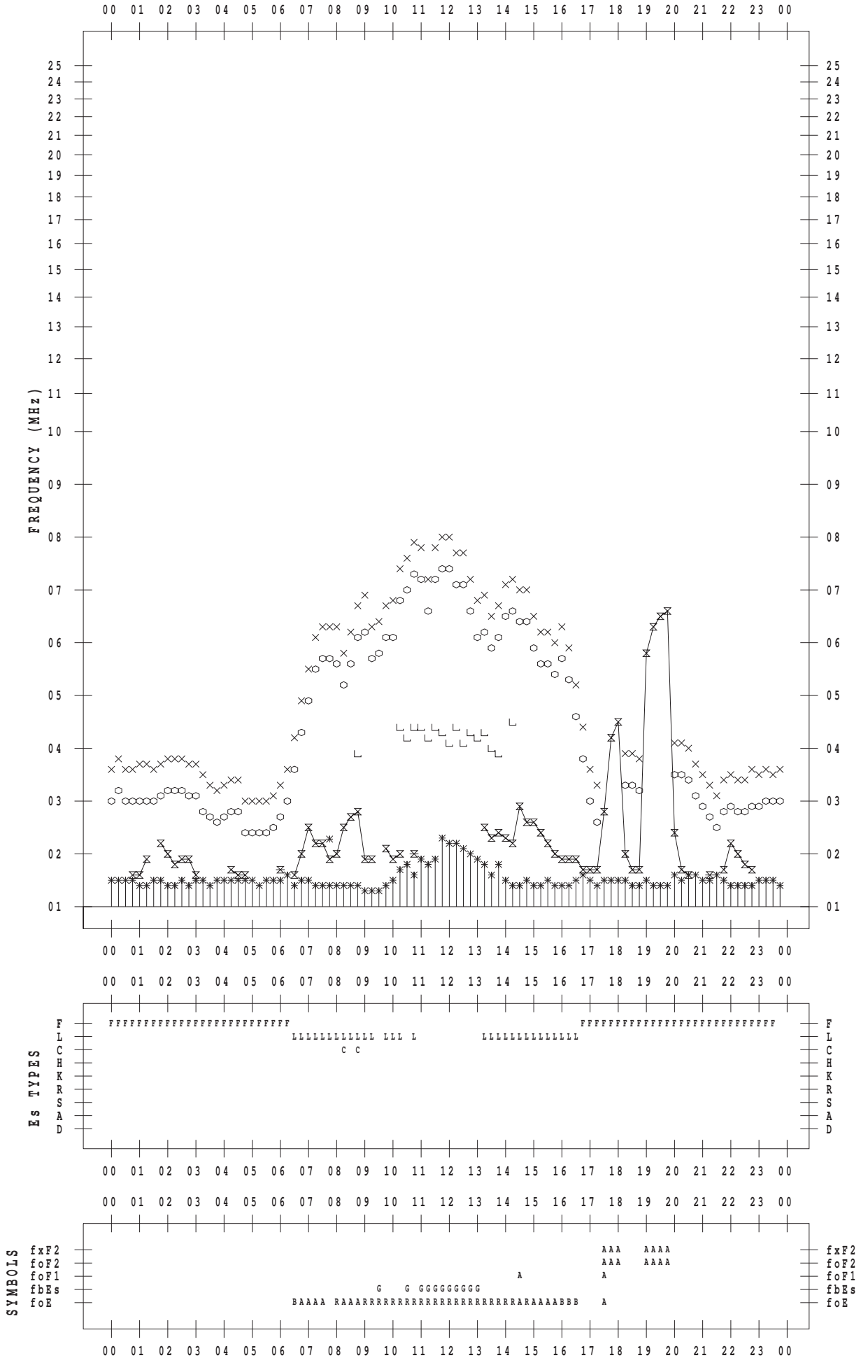
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 5

135 °E MEAN TIME



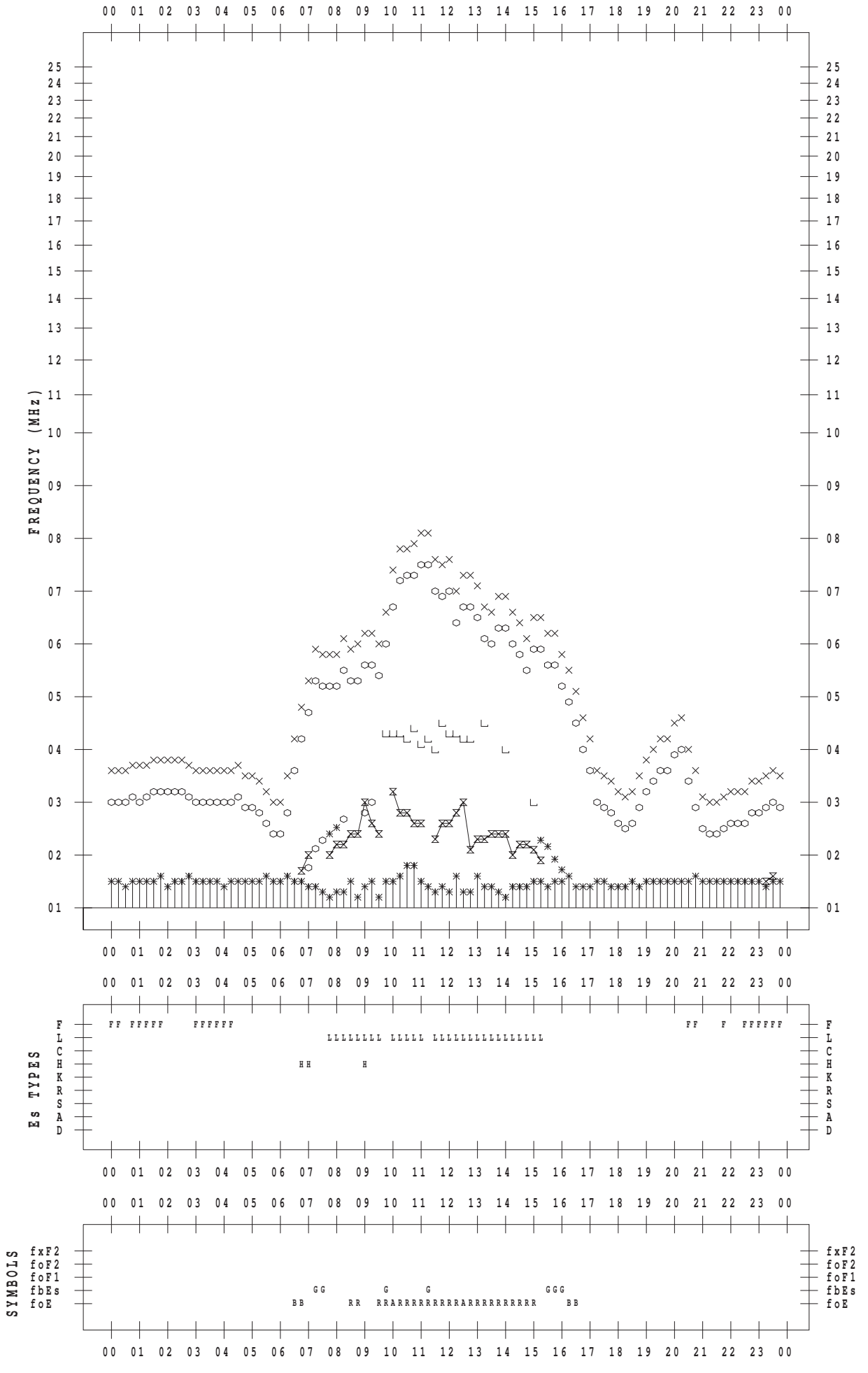
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 6

135 °E MEAN TIME



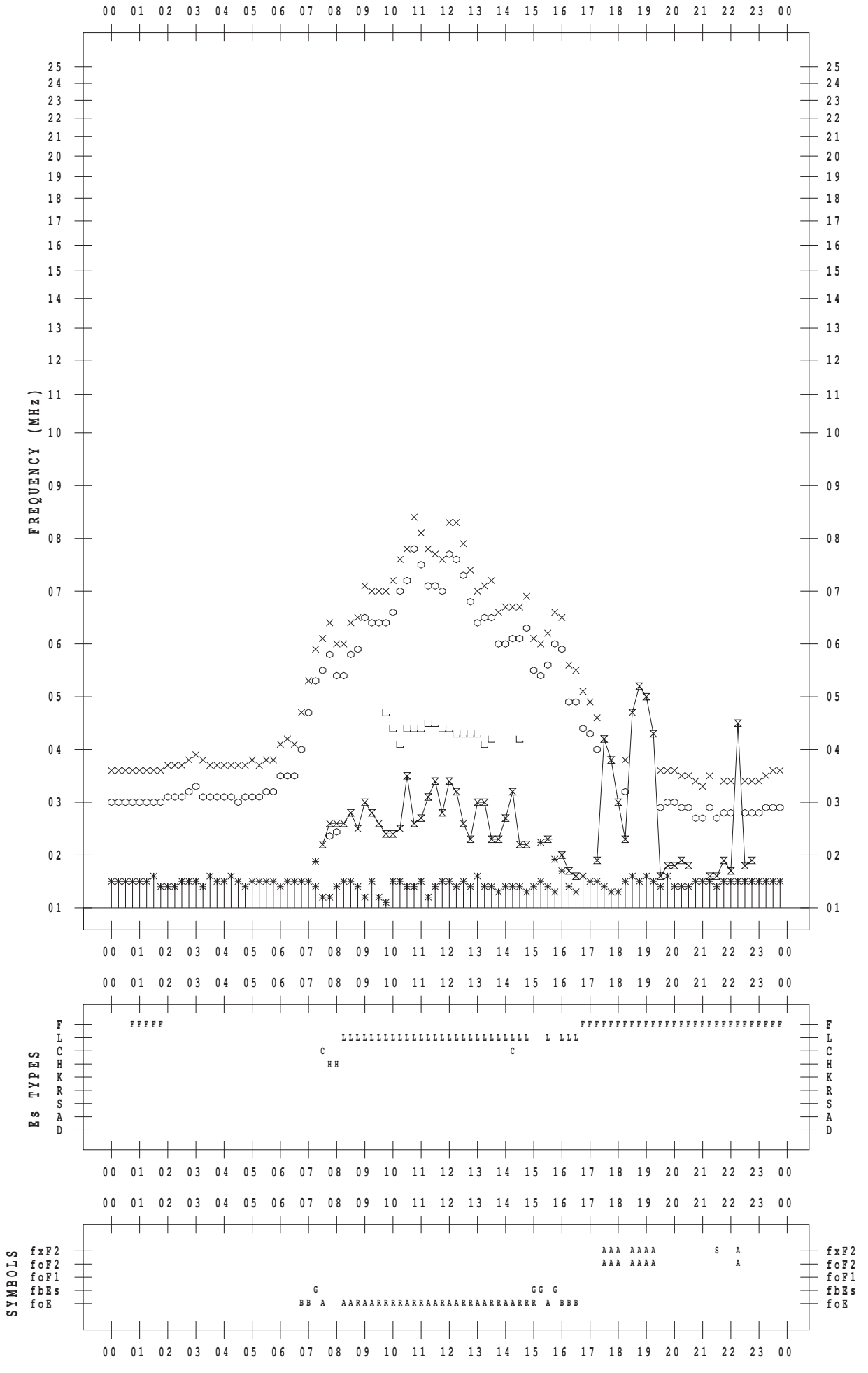
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 7

135 °E MEAN TIME



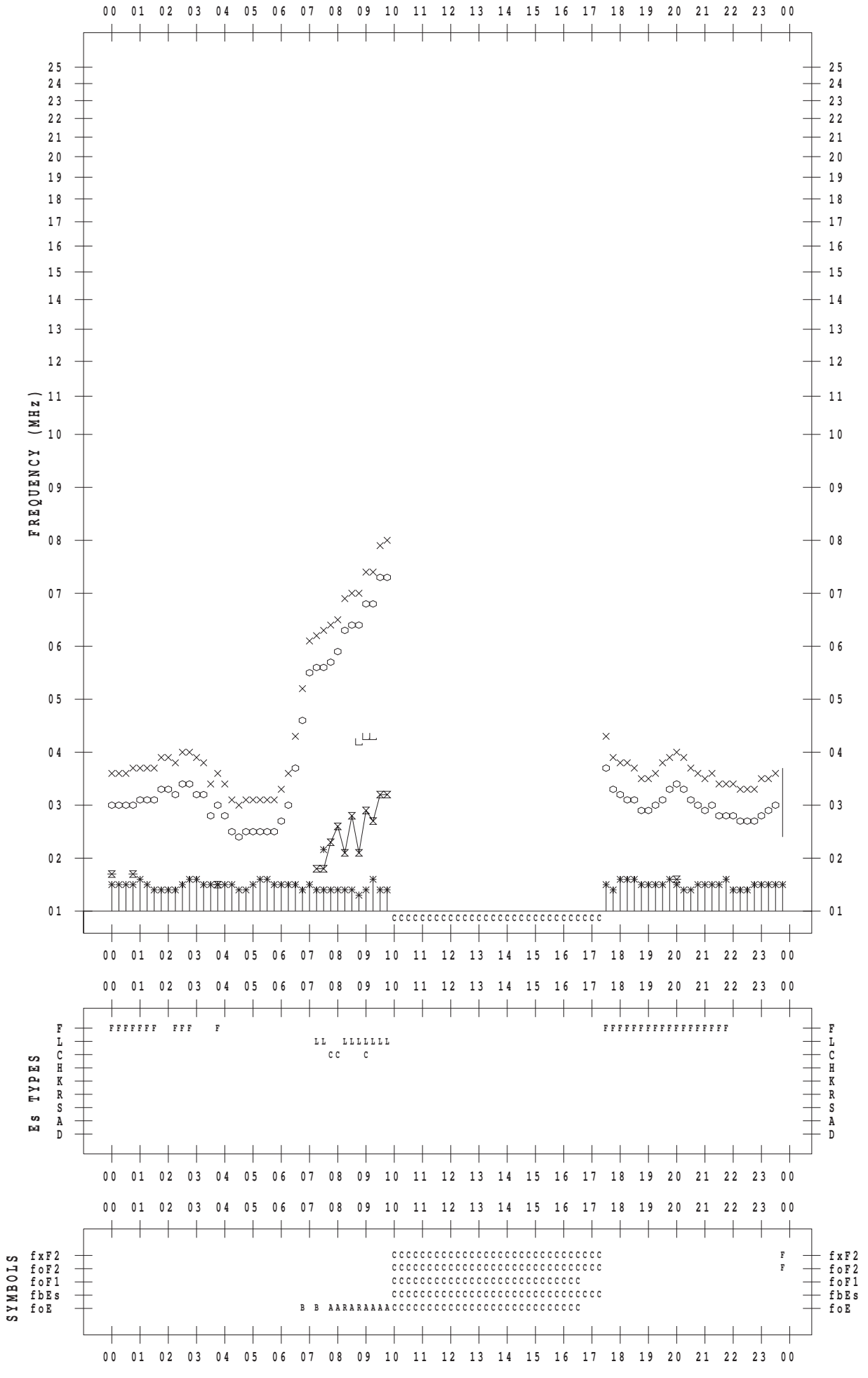
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 8

135 °E MEAN TIME



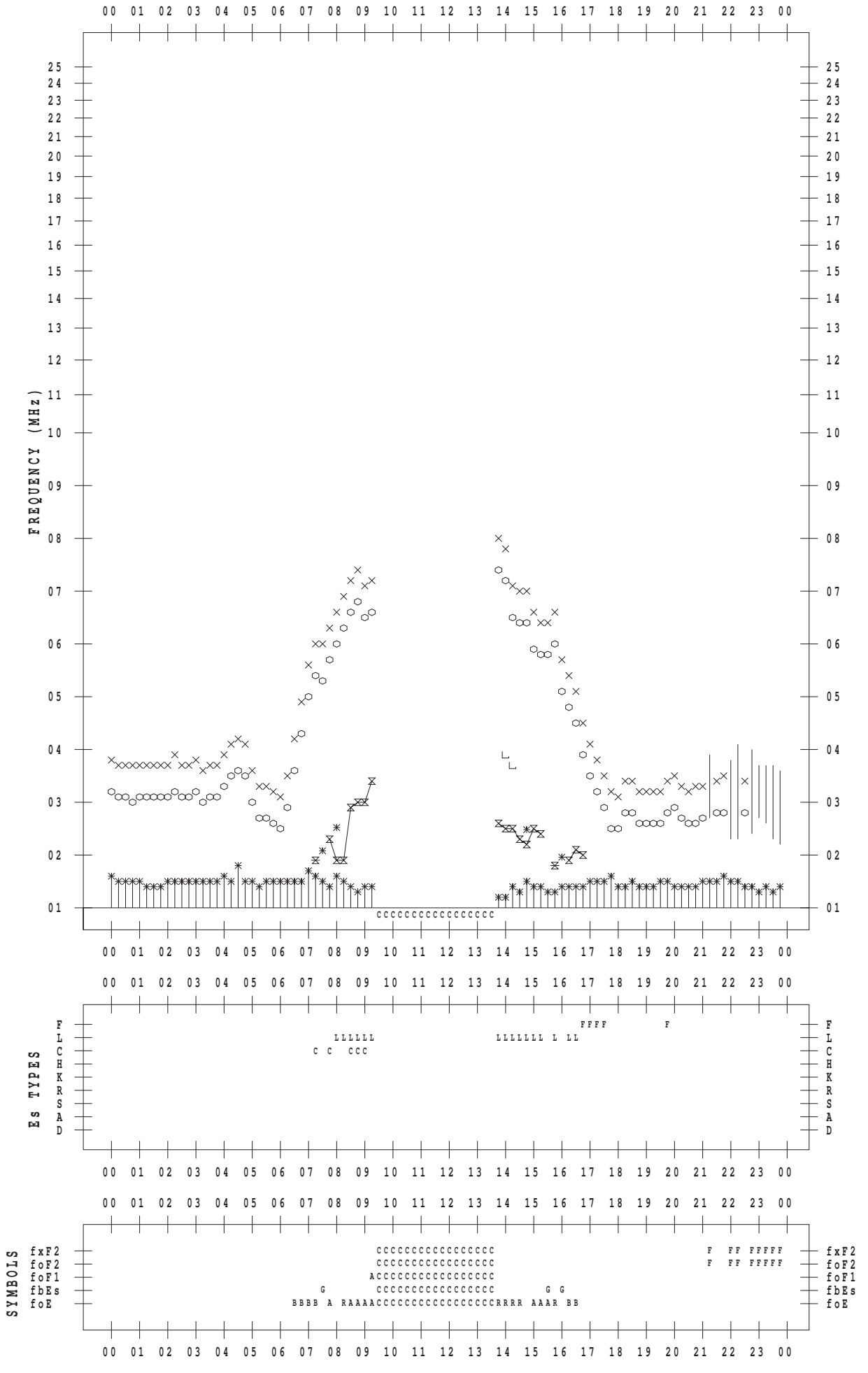
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/ 9

135 °E MEAN TIME



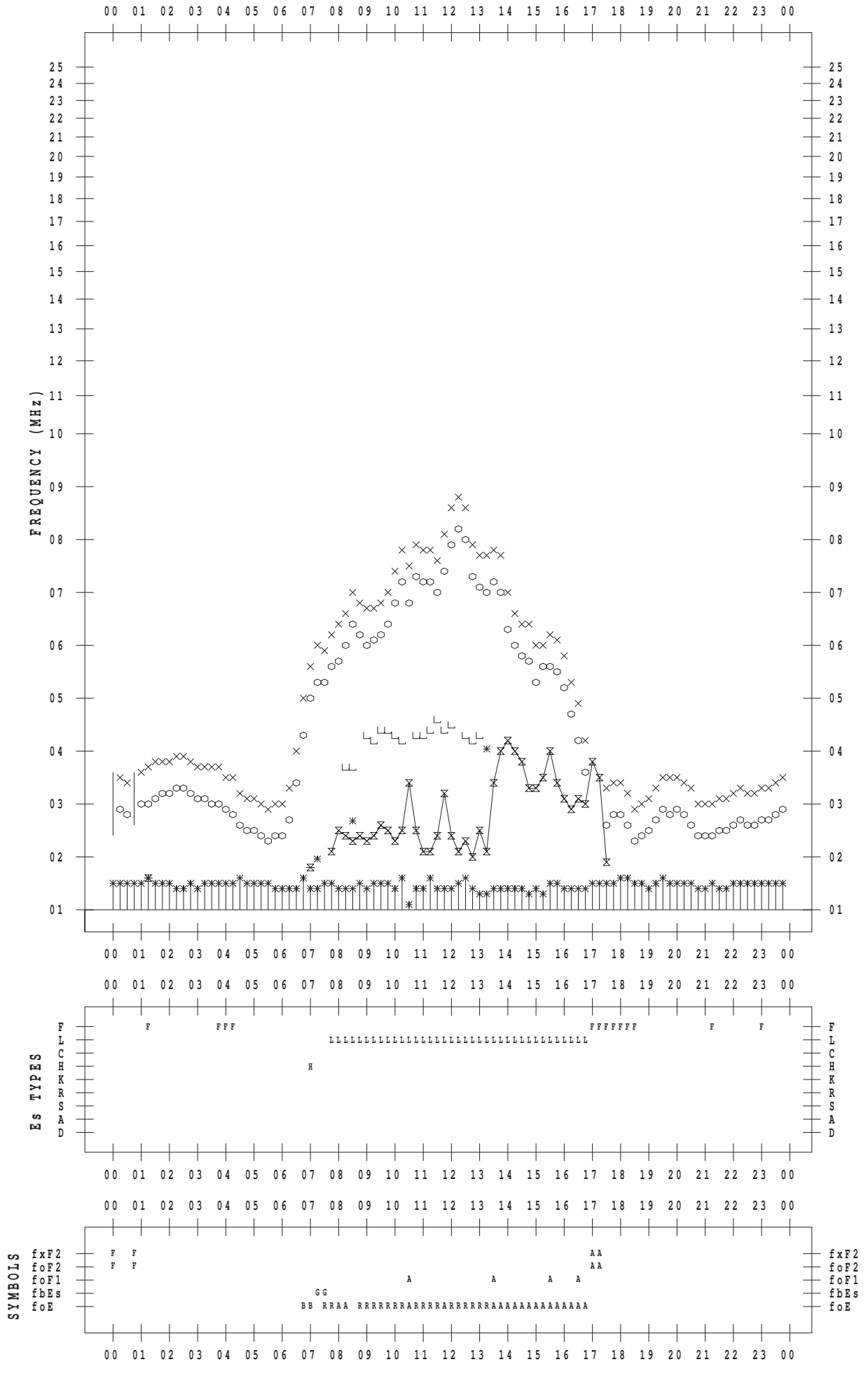
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/10

135 °E MEAN TIME



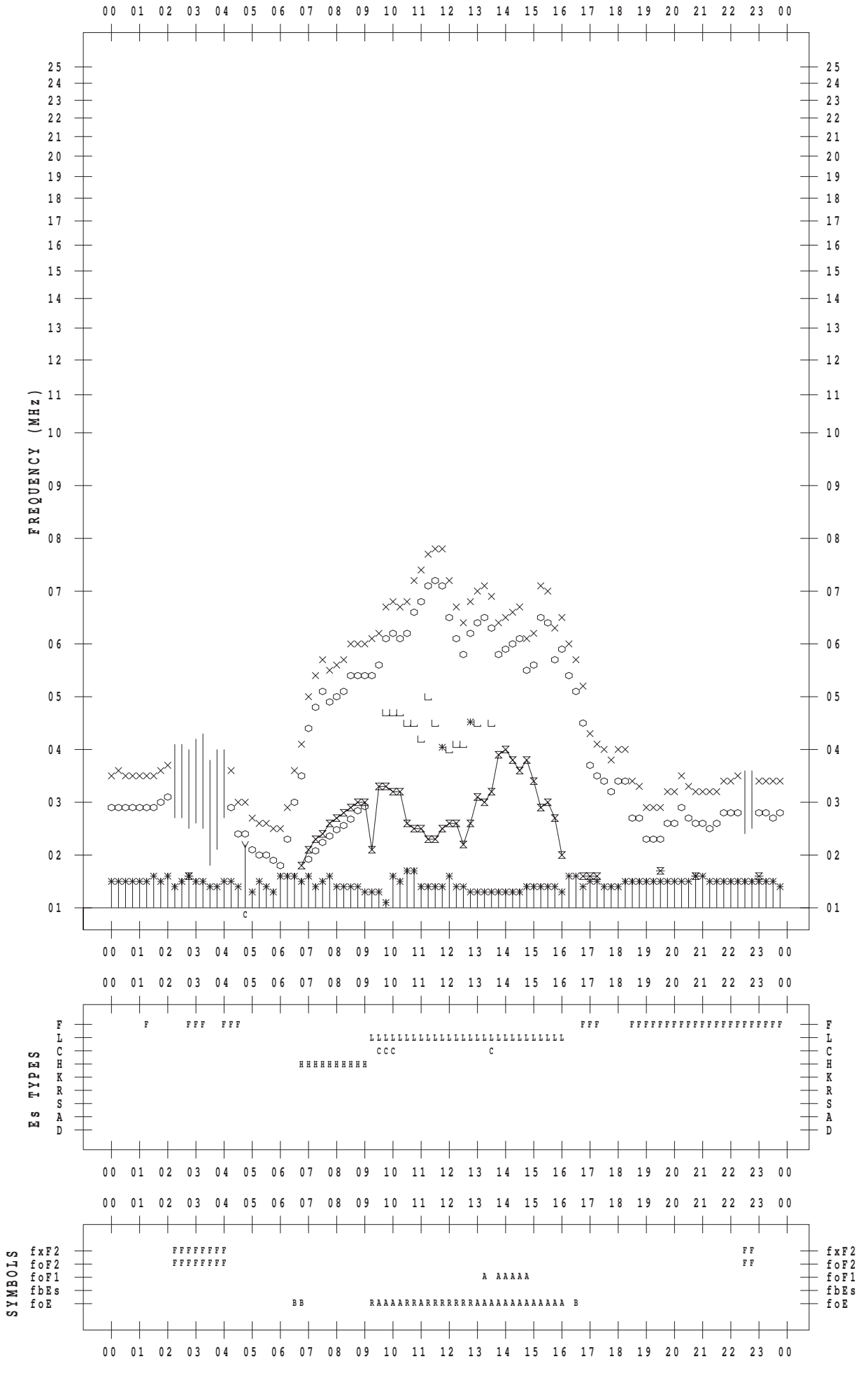
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/11

135 °E MEAN TIME



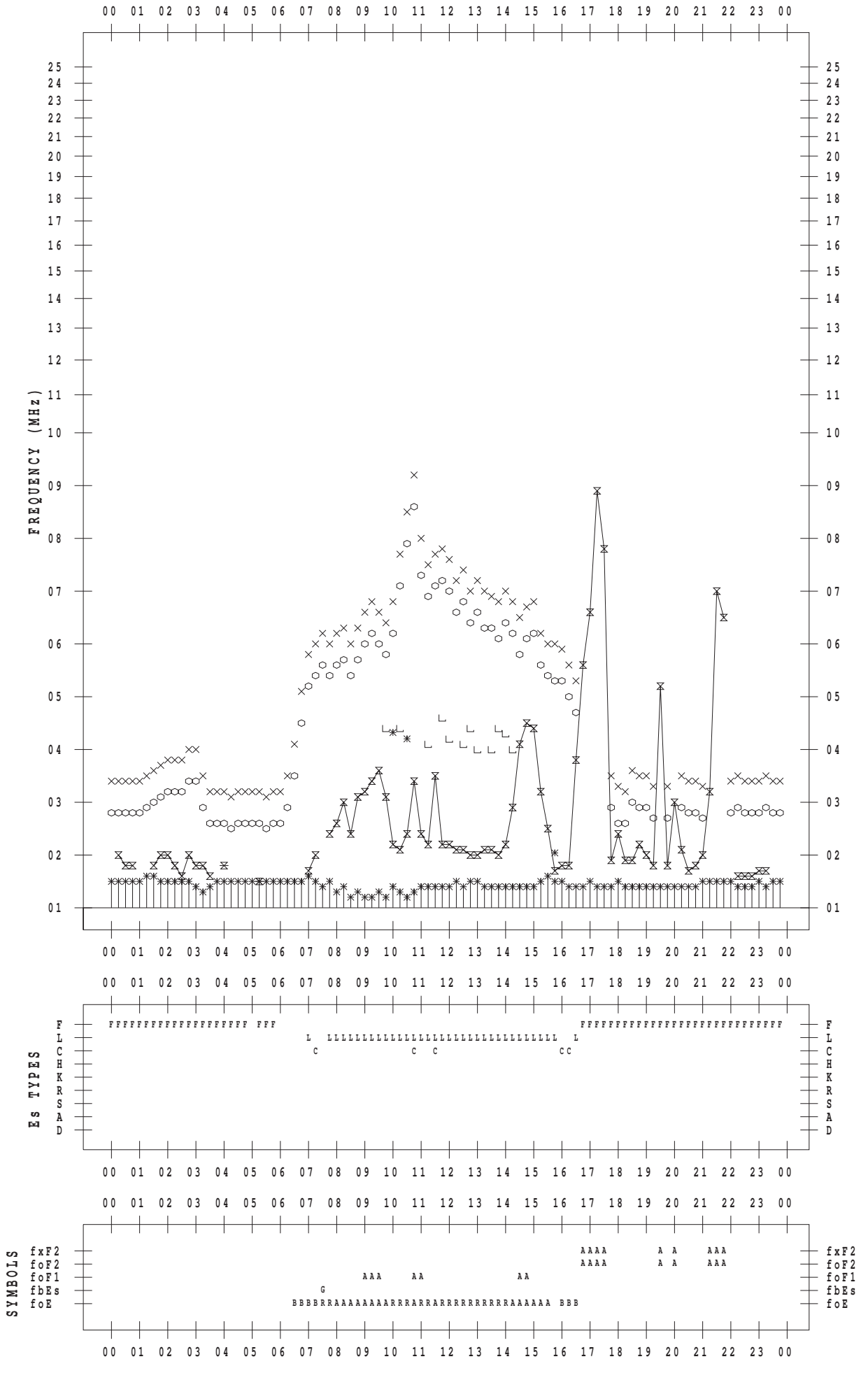
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/12

135 °E MEAN TIME



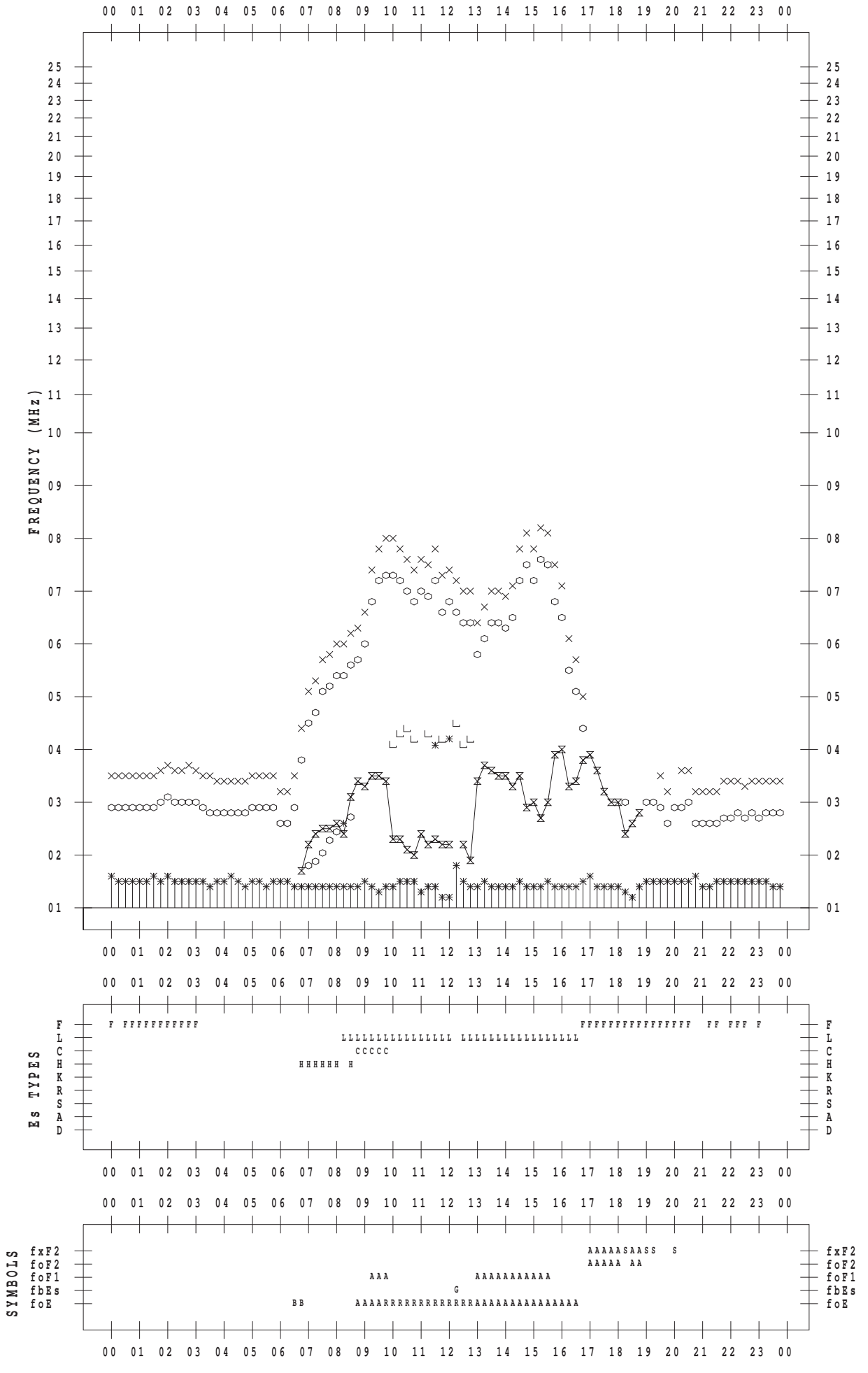
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/13

135 °E MEAN TIME



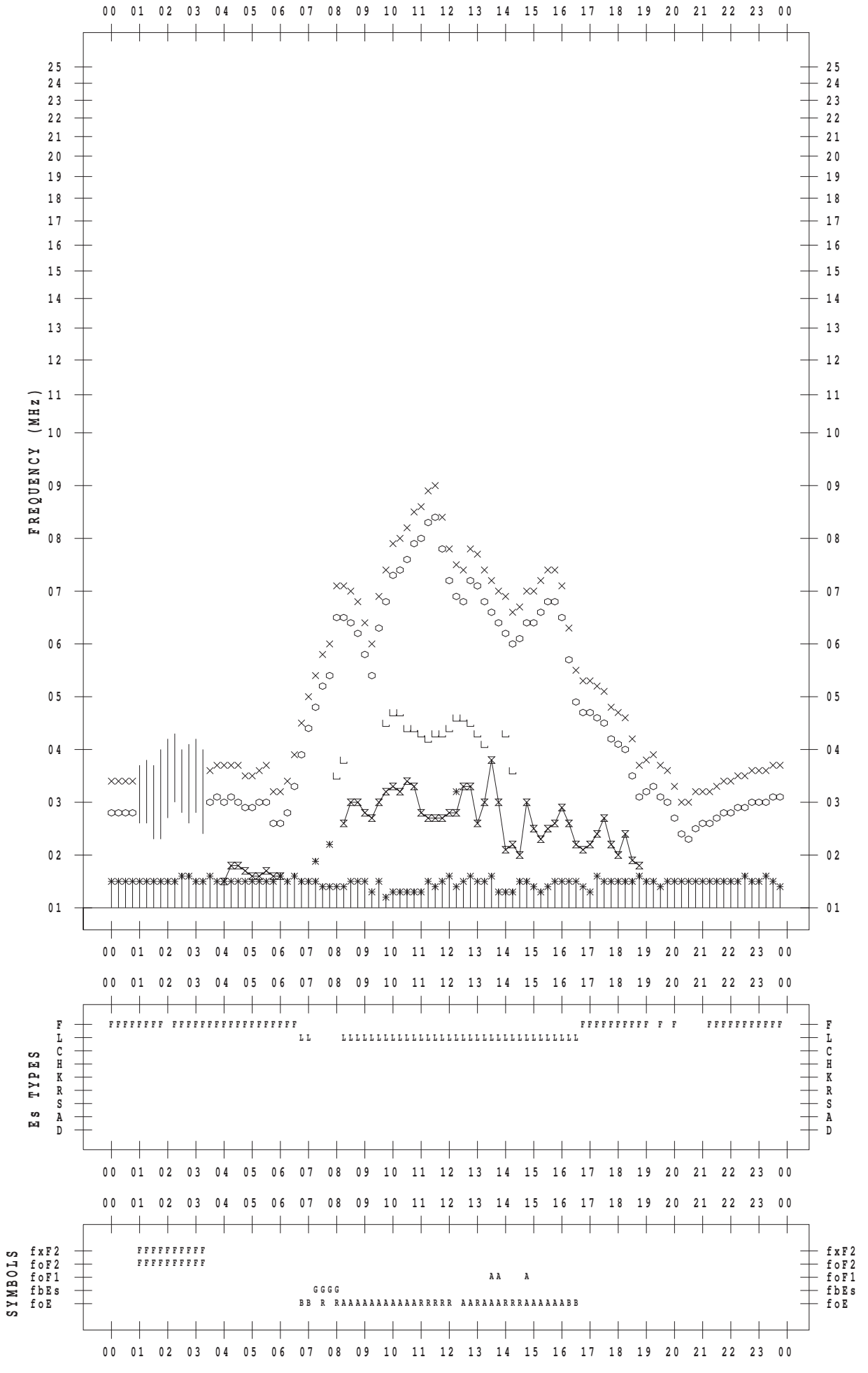
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/14

135 °E MEAN TIME



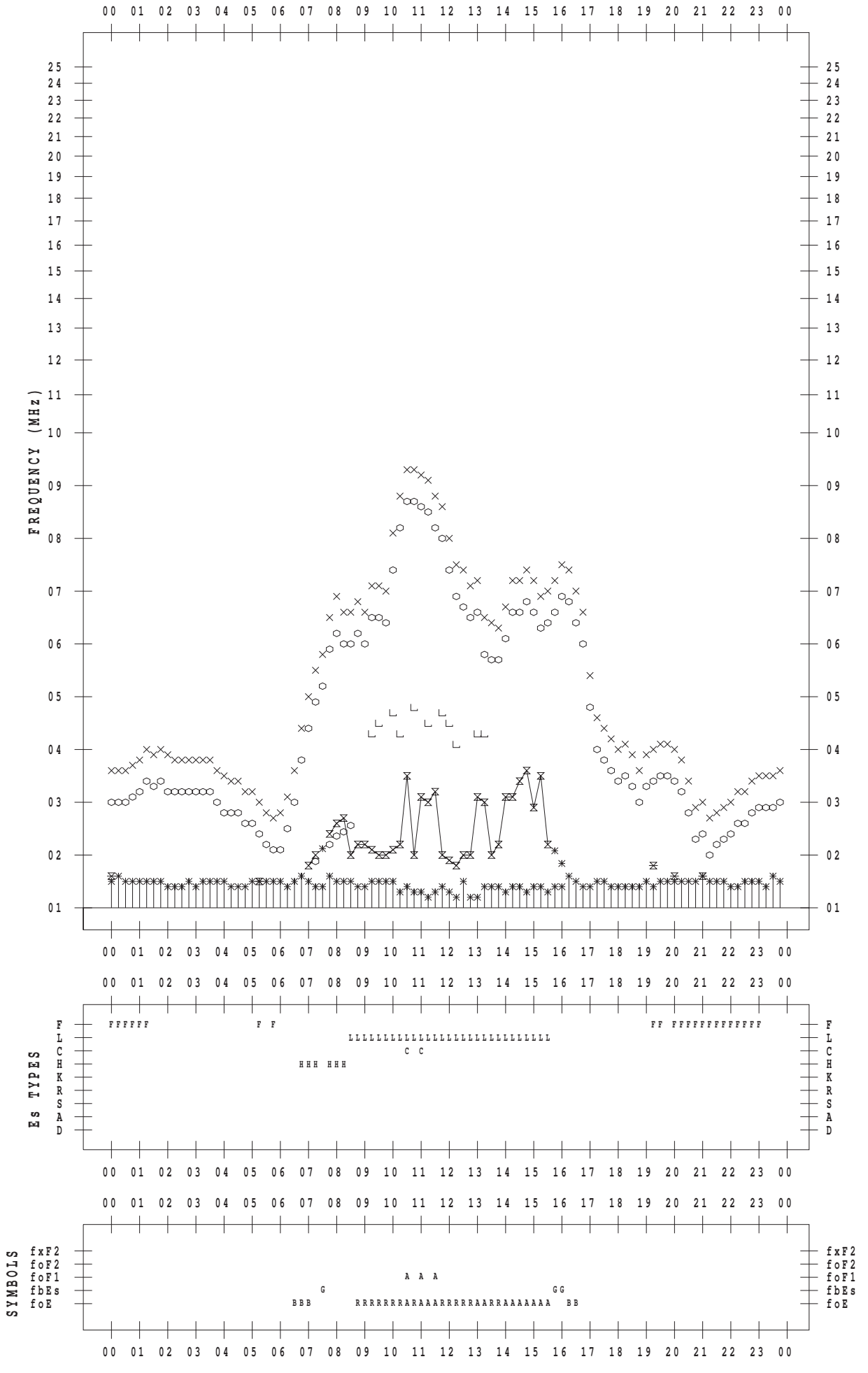
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/15

135 °E MEAN TIME



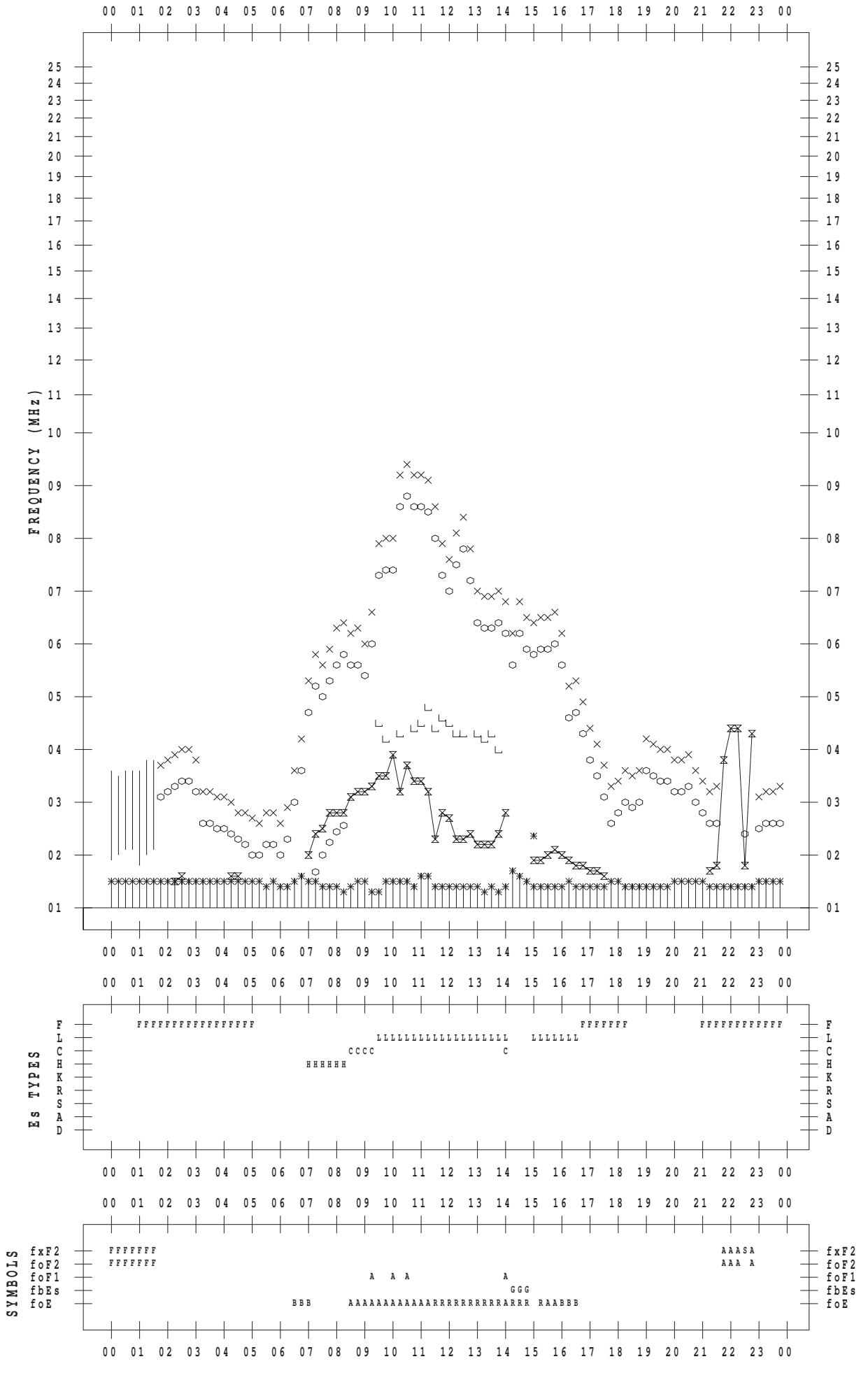
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/16

135 °E MEAN TIME



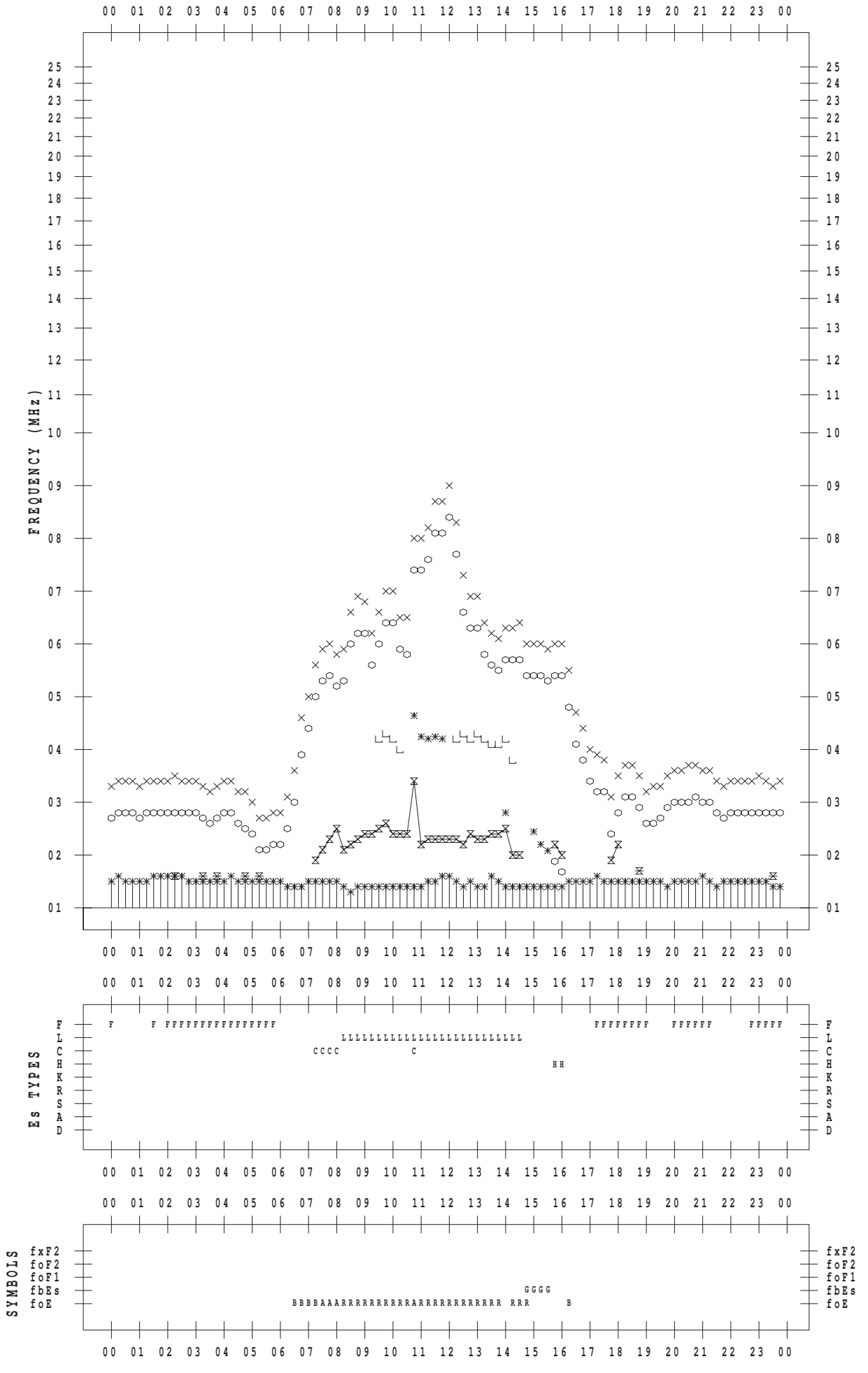
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/17

135 °E MEAN TIME



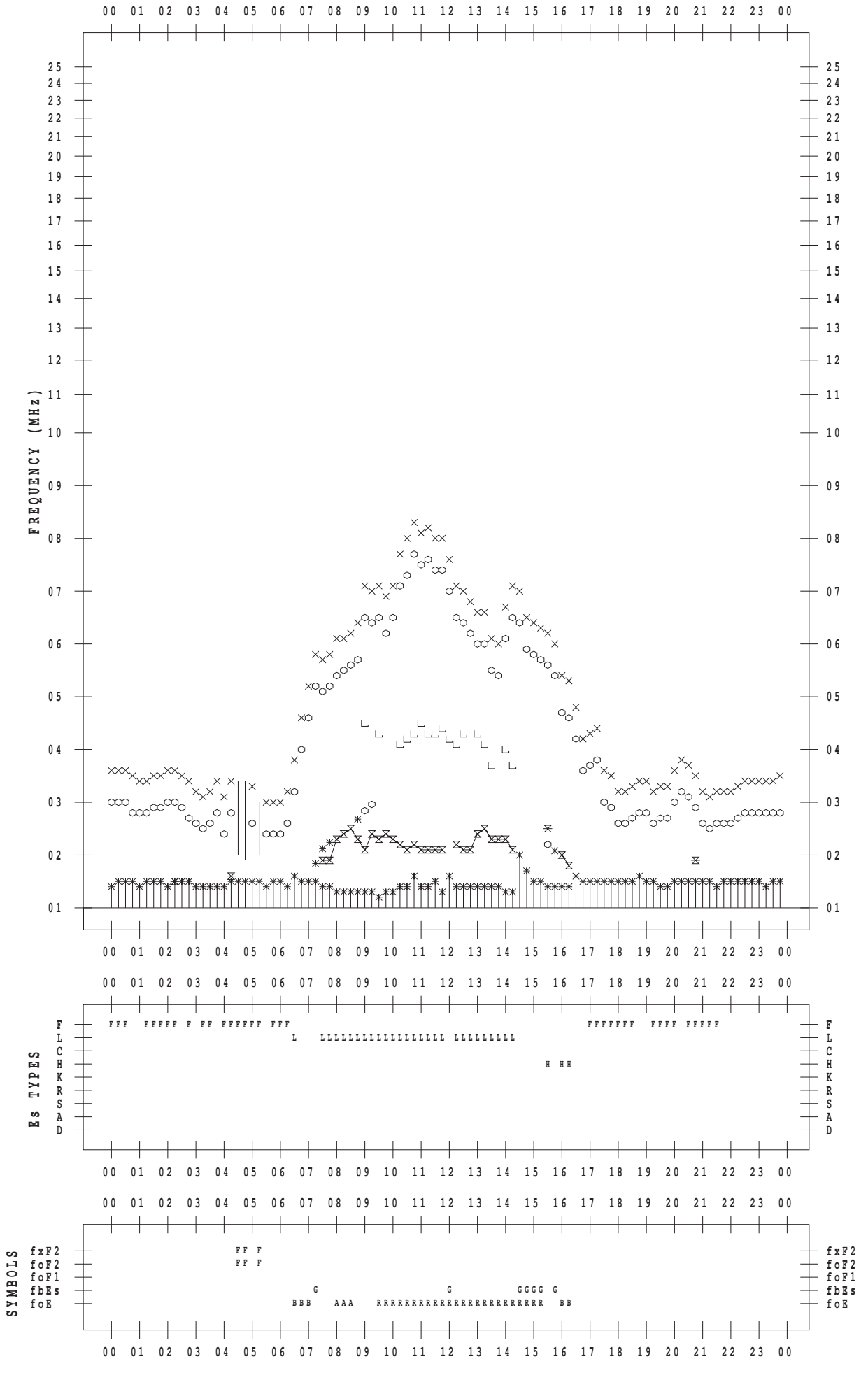
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/18

135 °E MEAN TIME



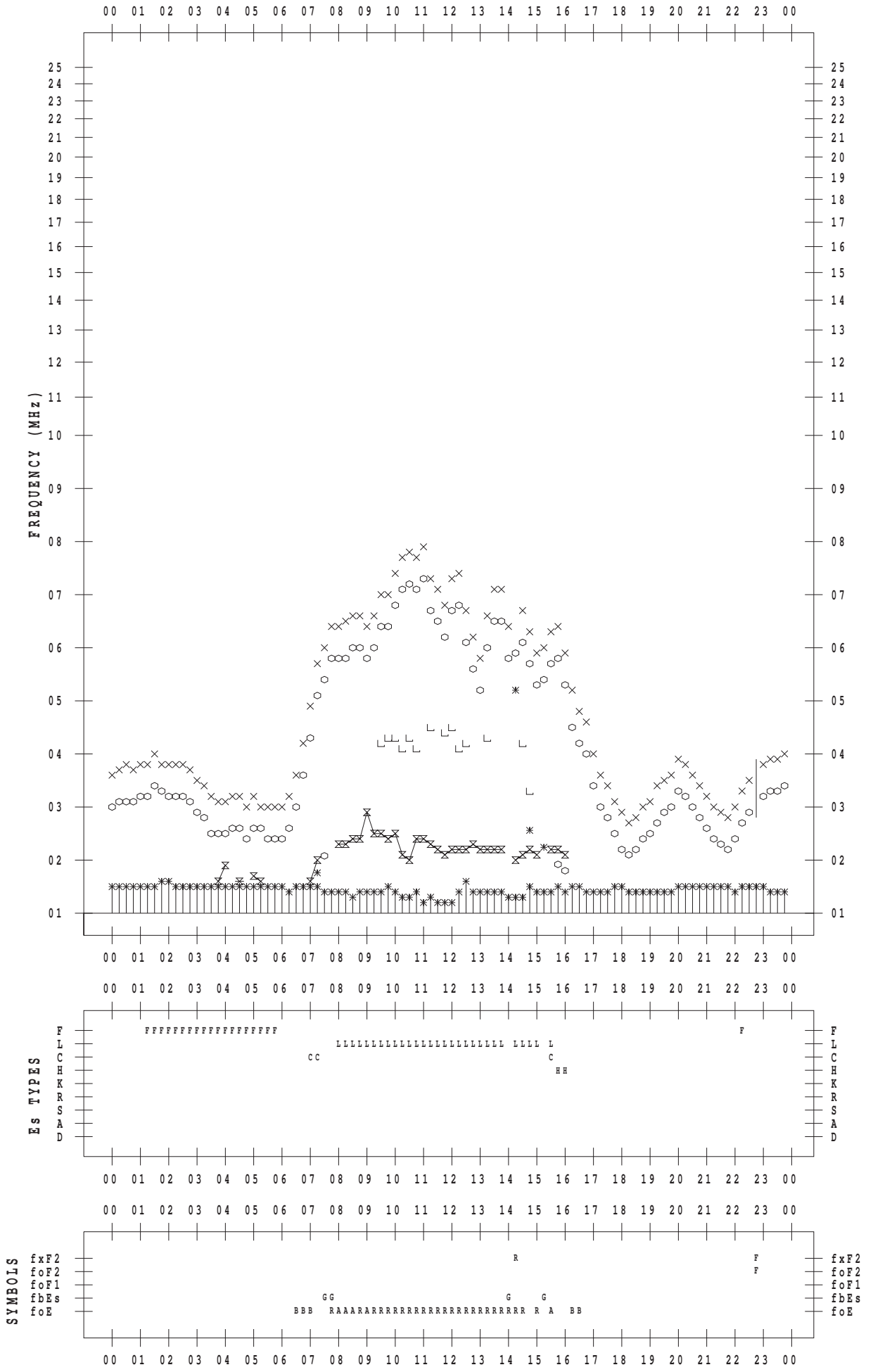
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/19

135 °E MEAN TIME



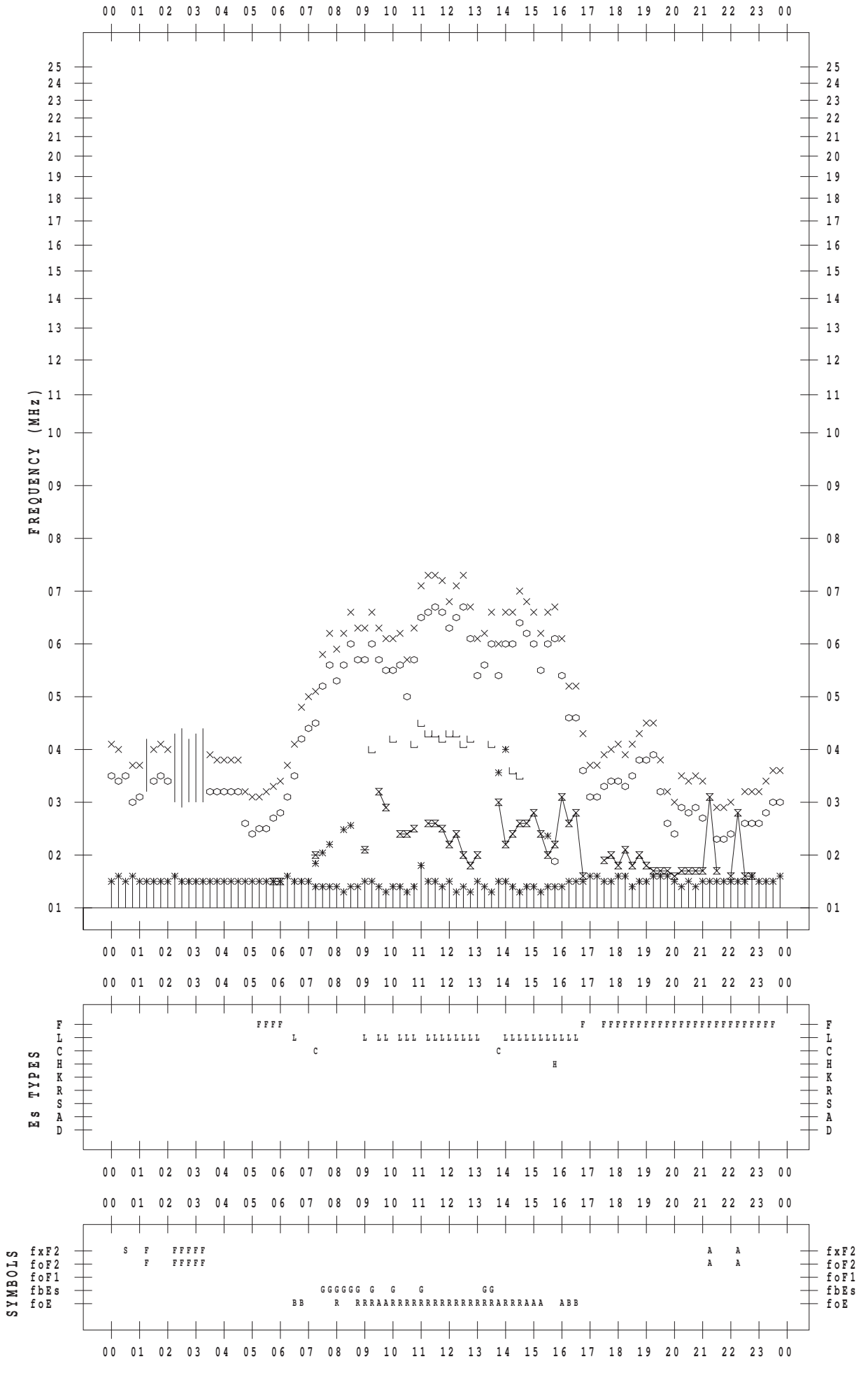
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/20

135 °E MEAN TIME



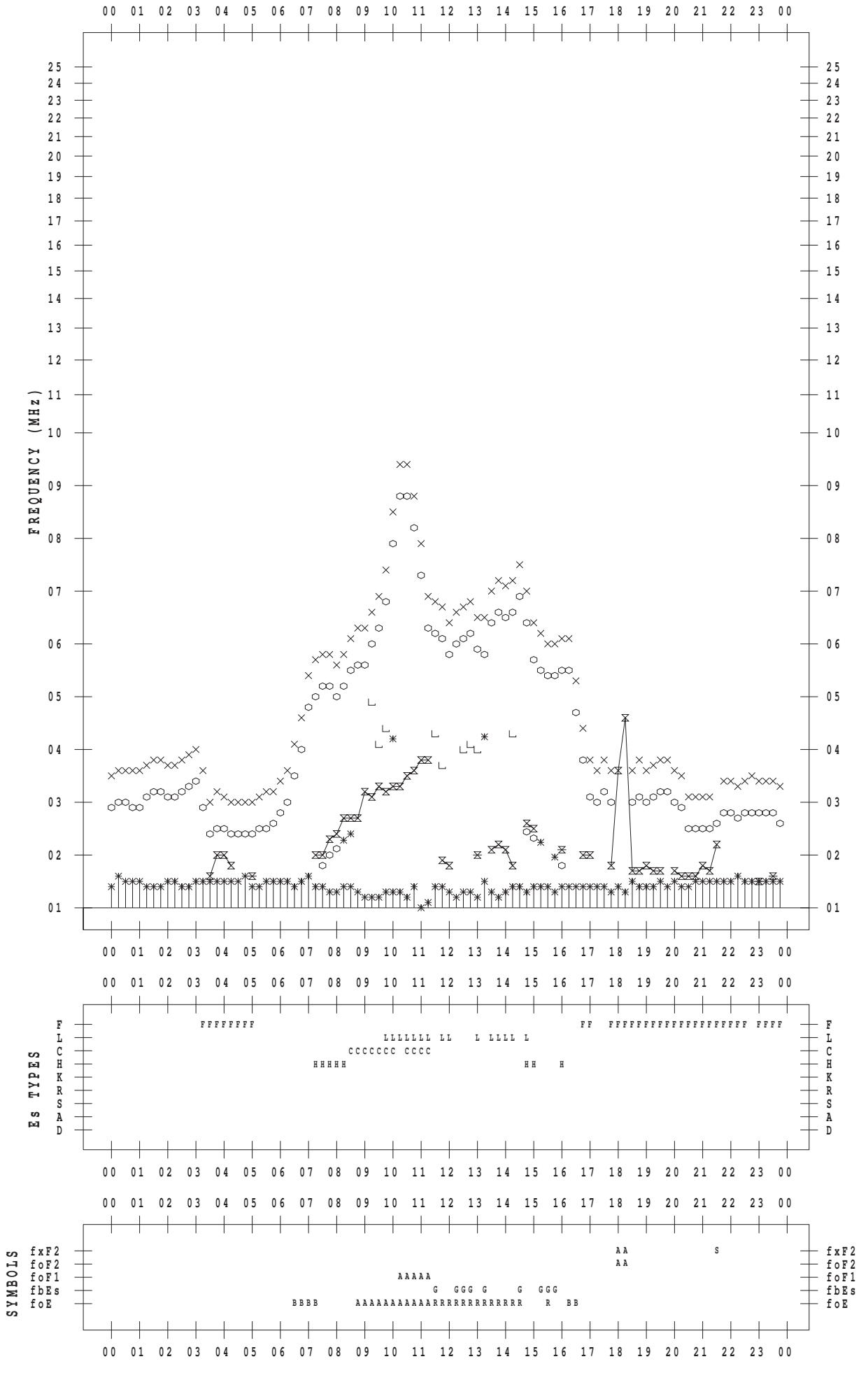
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/21

135 °E MEAN TIME



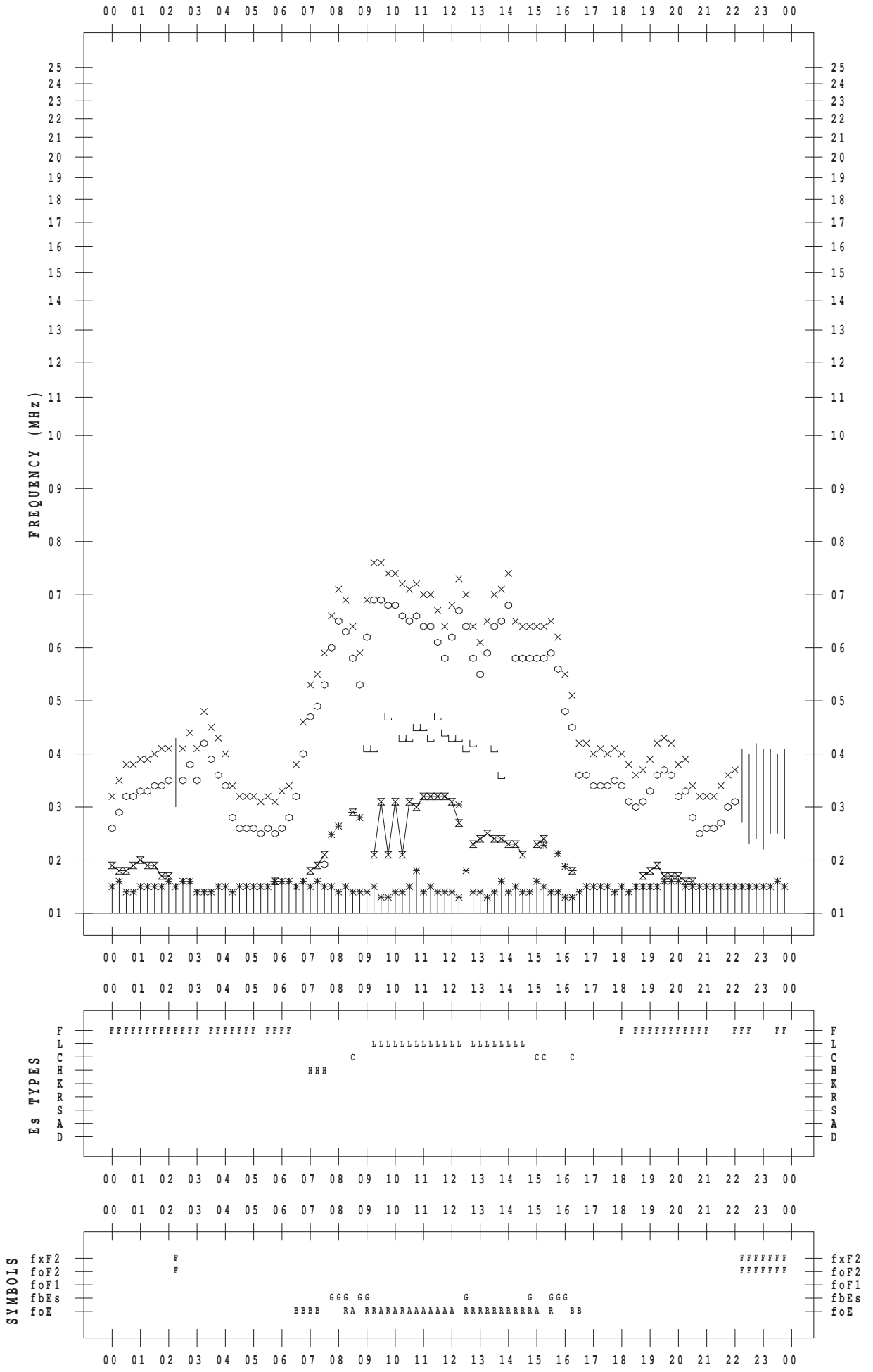
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/22

135 °E MEAN TIME



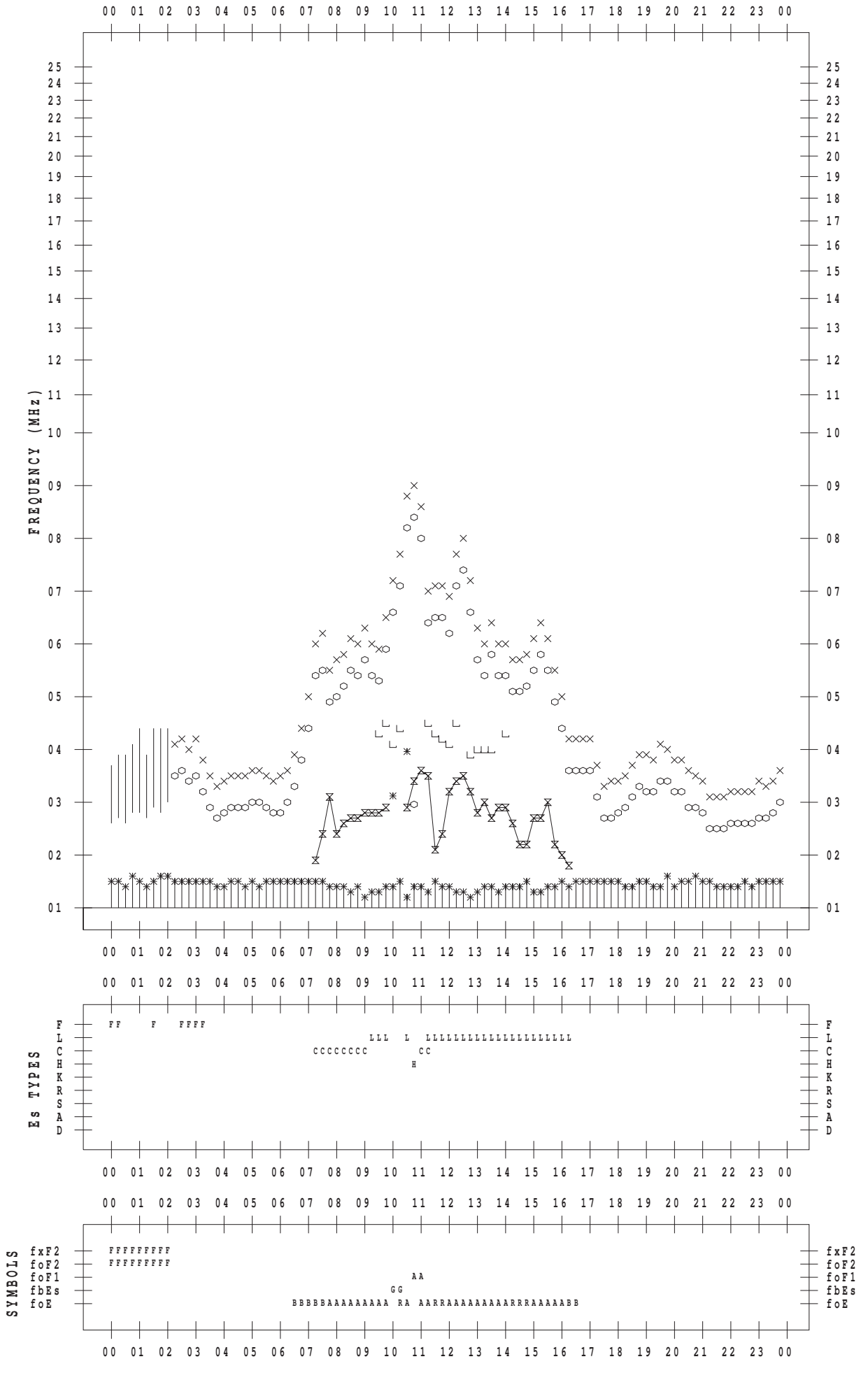
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/23

135 °E MEAN TIME



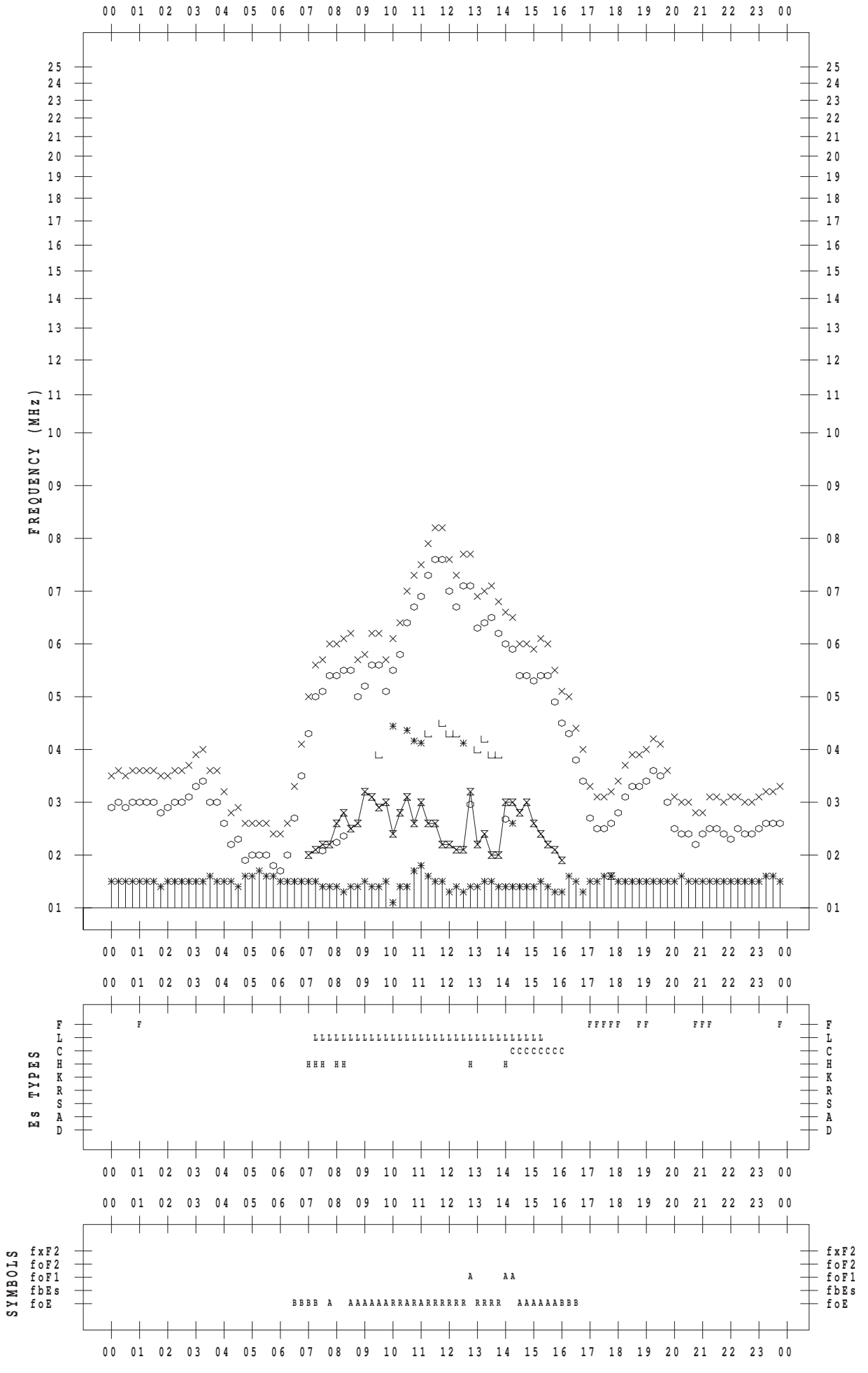
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/24

135 °E MEAN TIME



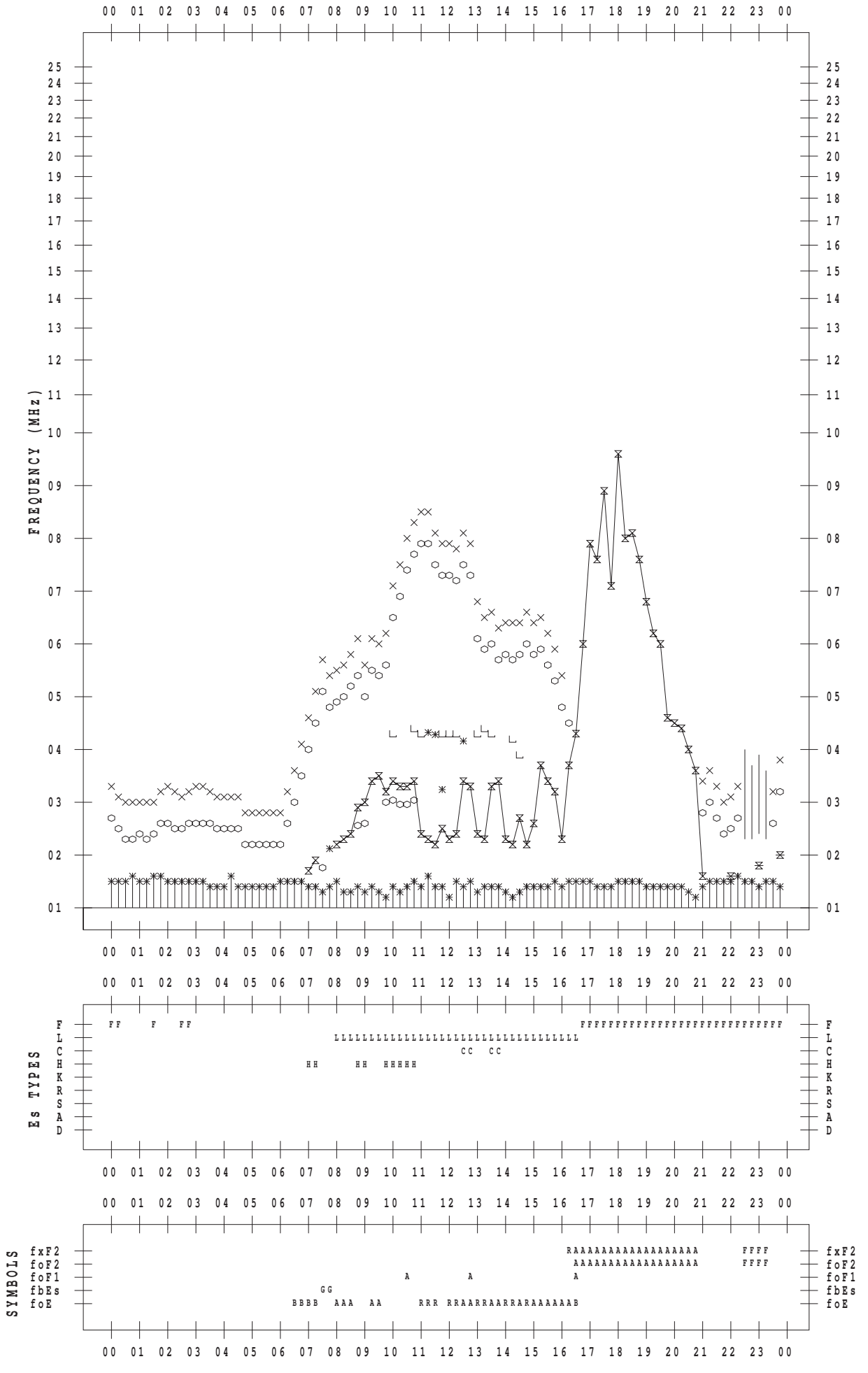
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/25

135 °E MEAN TIME



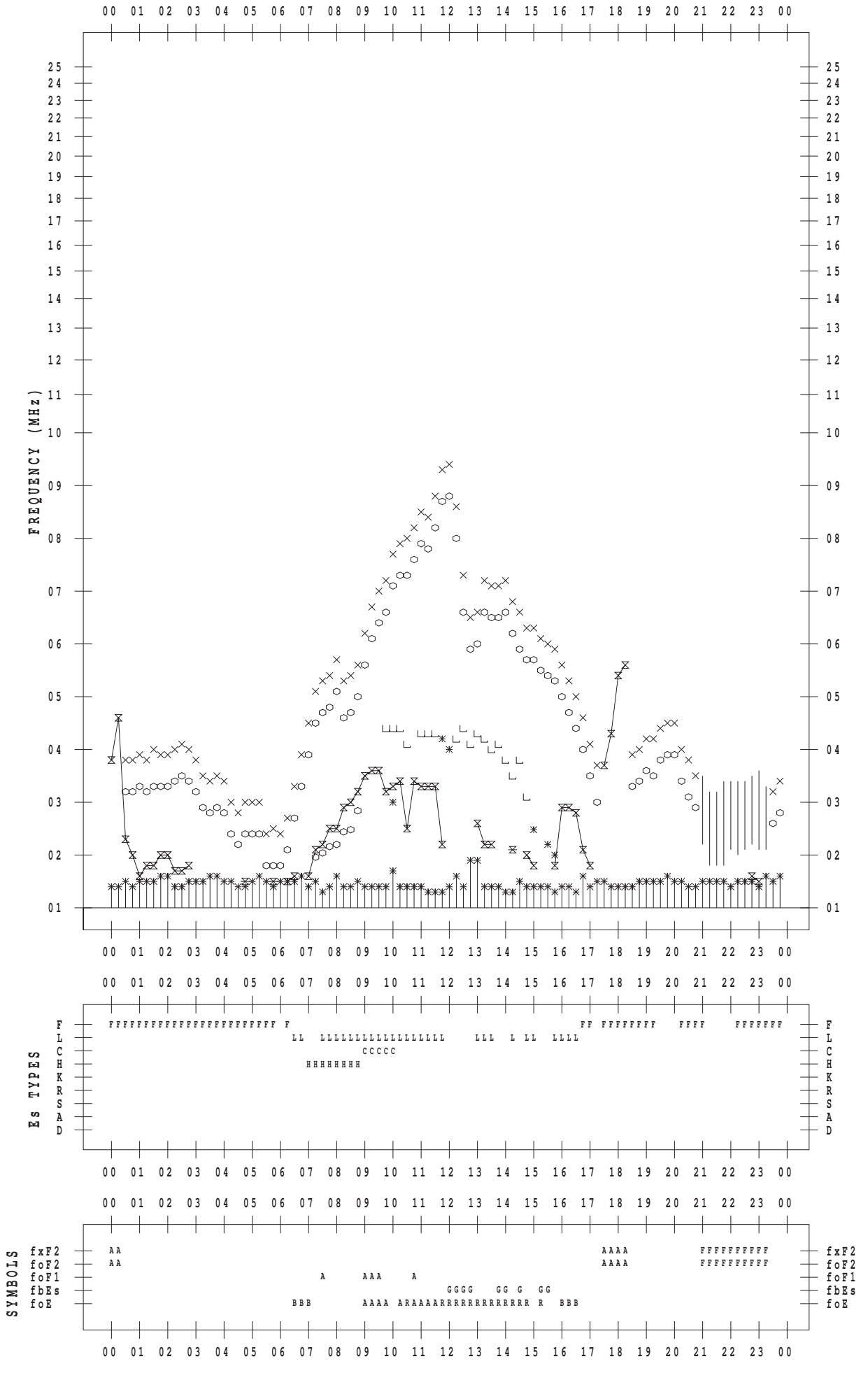
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/26

135 °E MEAN TIME



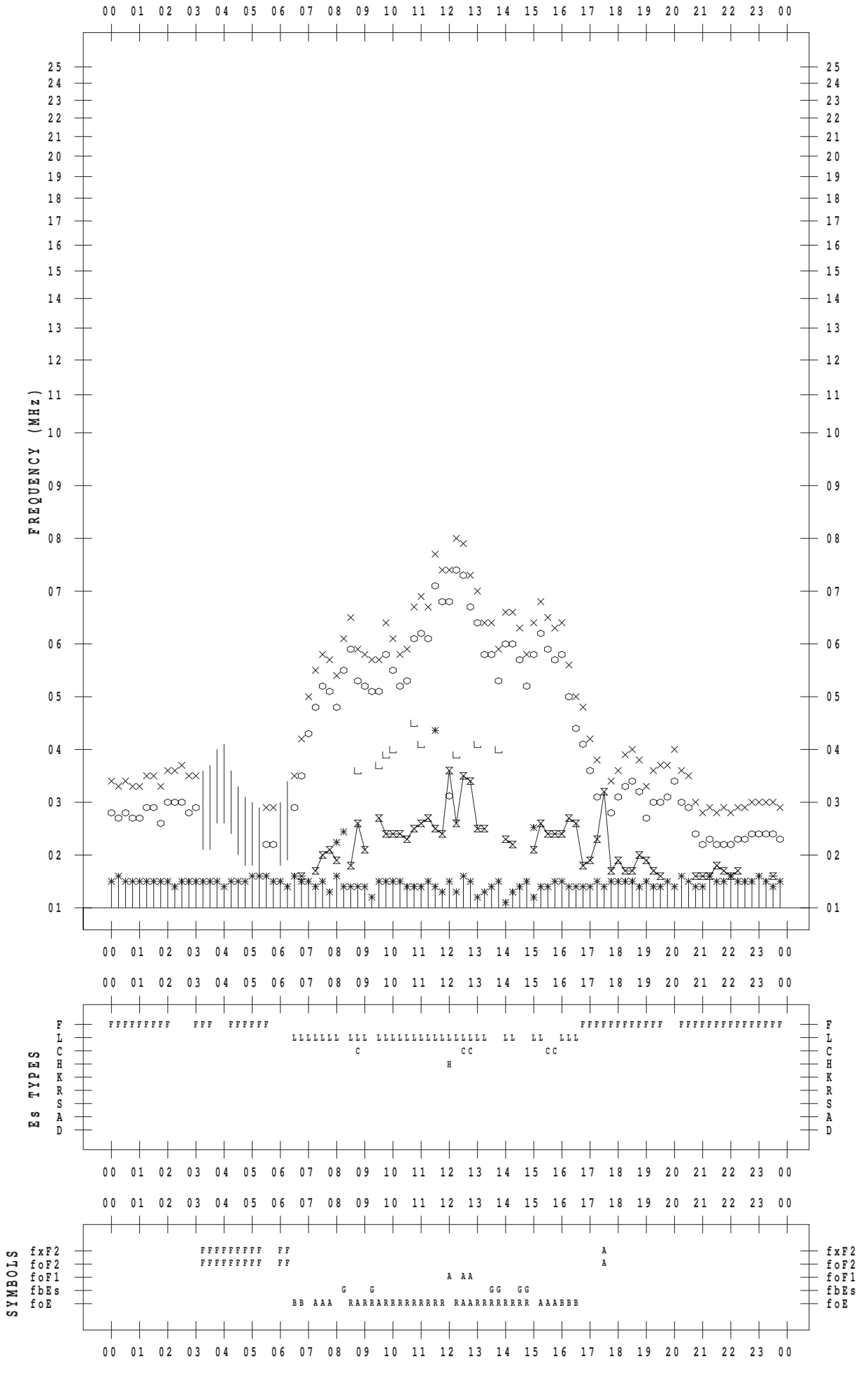
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/27

135 °E MEAN TIME



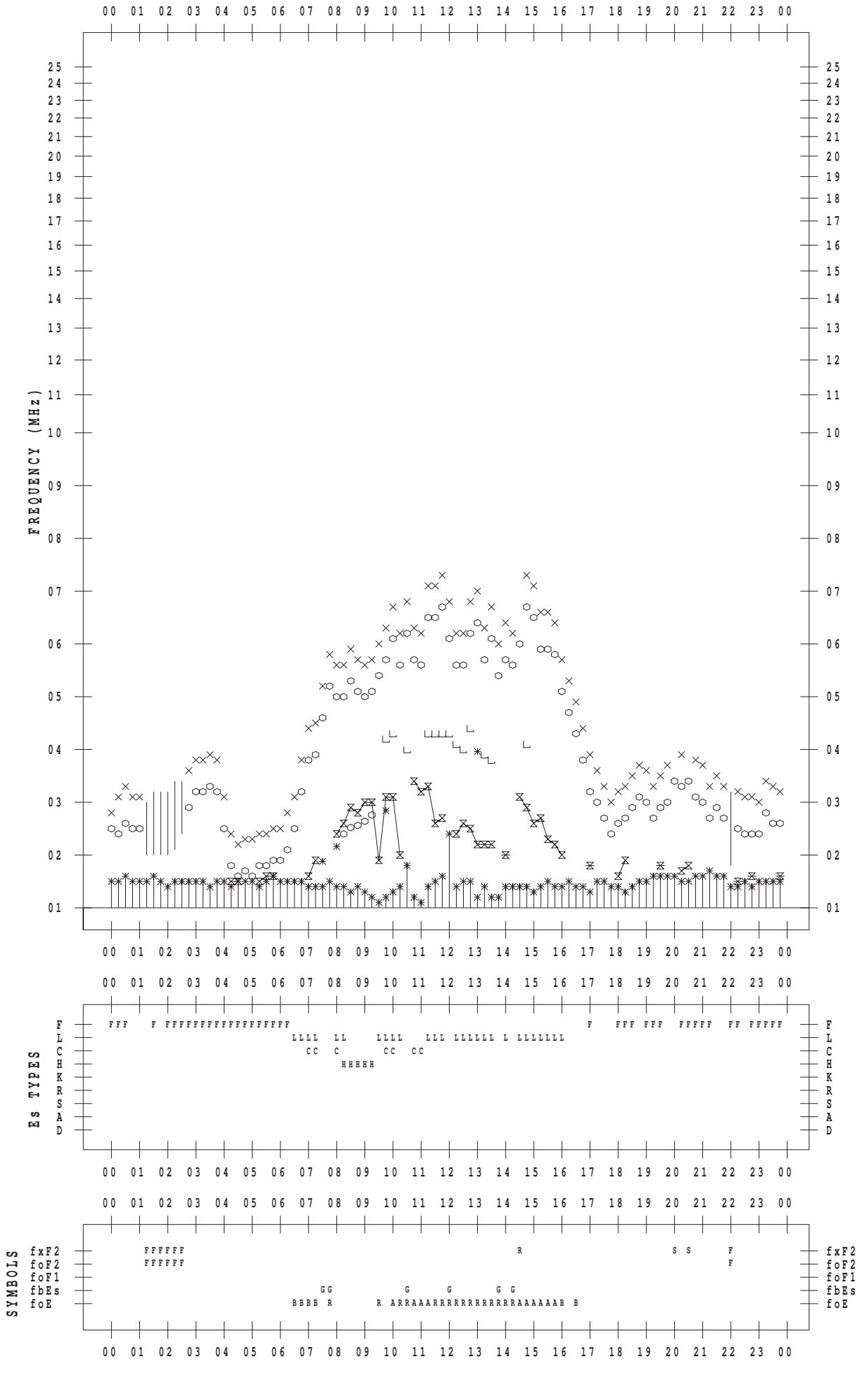
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/28

135 °E MEAN TIME



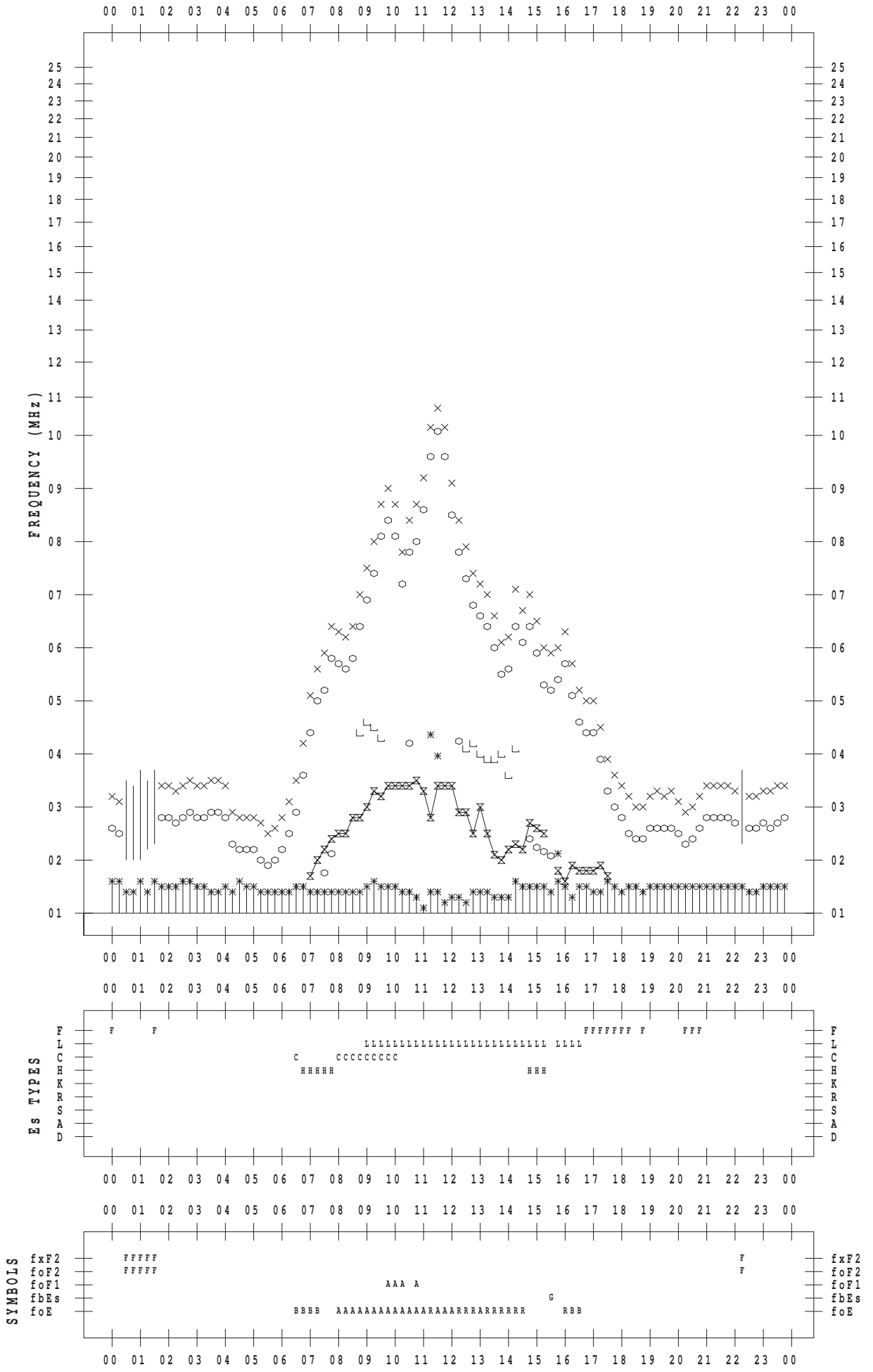
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/29

135 °E MEAN TIME



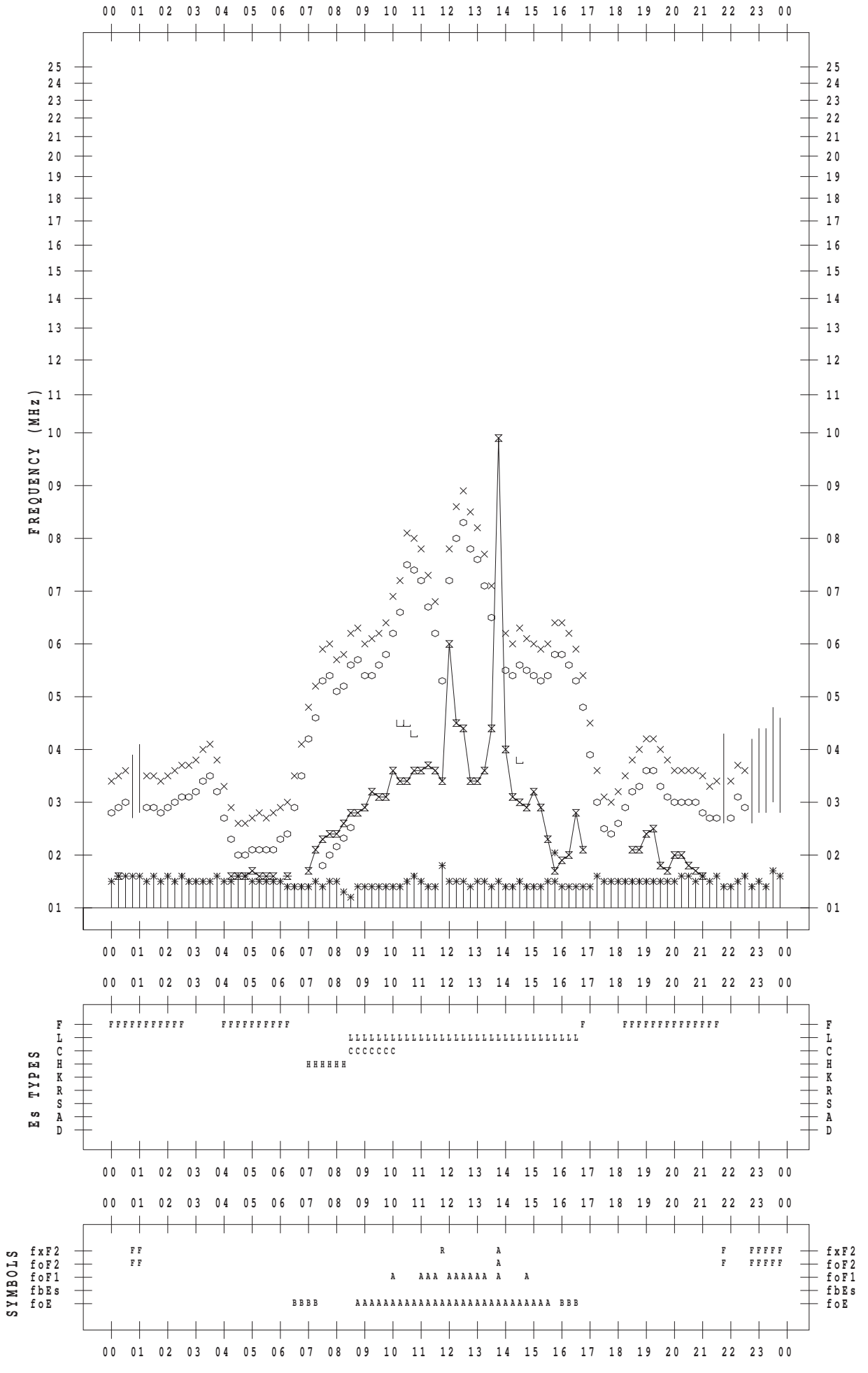
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/30

135 °E MEAN TIME



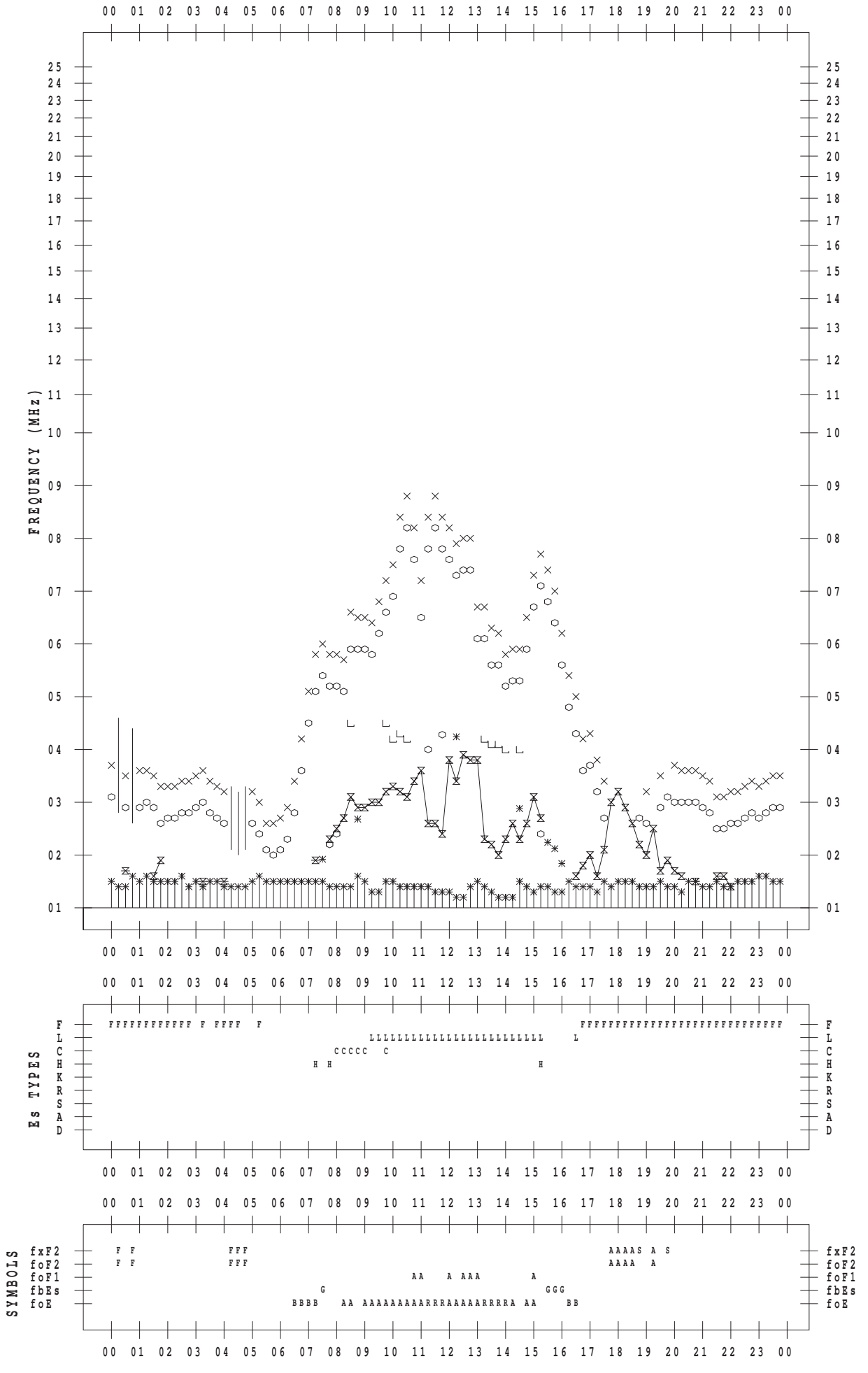
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2010/12/31

135 °E MEAN TIME



B. Solar Radio Emission

B1.Outstanding Occurrences at Hiraiso

Hiraiso December 2010

Single-frequency observations

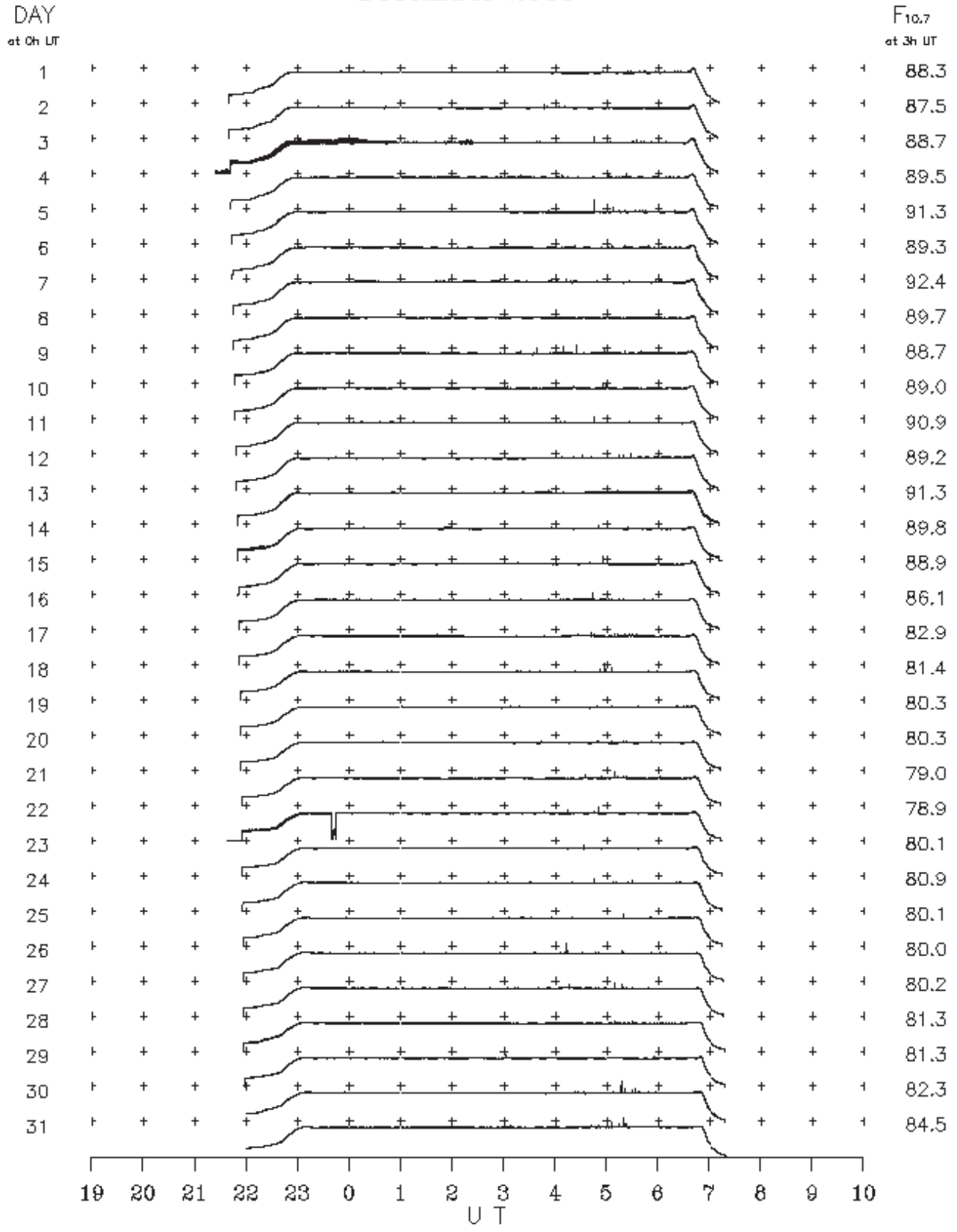
Normal observing period: 2135 - 0730 U.T. (sunrise to sunset)

DEC.	FREQ.	TYPE	START TIME	TIME OF MAXIMUM	DUR.	FLUX DENSITY (10^{-22} W m^{-2} Hz^{-1})		POLARIZATION
2010	(MHz)		(U.T.)	(U.T.)	(MIN.)	PEAK	MEAN	REMARKS

B.Solar Radio Emission

B2. Summary Plots of $F_{10.7}$ at Hiraiso

December 2010



Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range ≧ 6°.
A link to the daily plot data directory : http://sunbase.nict.go.jp/solar/denpa/hirasDB/2010/12/