

IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 2009

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«Real Time Ionograms on the Webhttp://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 (f_oF2 , fEs , $fmin$) and monthly medians of two factors ($h'Es$, $h'F$), daily Summary Plots and monthly medians plot of f_oF2 .

a. Characteristics of Ionosphere

f_oF2	Ordinary wave critical frequency for the $F2$ layer
fEs	Highest frequency of the Es layer whether it may be ordinary or extraordinary
$fmin$	Lowest frequency which shows vertical ionospheric reflections
$h'Es$ $h'F$	Minimum virtual height on the ordinary wave for the Es and F layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example Es (for f_oF2).
- 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 automatic 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 f_oF2 , 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 f_xE and f_oE 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

f_{xl}	Top frequency of spread F trace
f_oF2 f_oF1 f_oE f_oEs	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 replace 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-associated with high absorption and large *fmin*.
- n** The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.
- k** The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

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

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

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

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

B. SOLAR RADIO EMISSION

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

B1. 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 $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$ 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. 2009

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	34	50	32	29	30	28	29	44	64	62	58		56	52	48	58	A	A		A	A	A		32	28
2		25	28	30	30	28	28	44	55	65	57	57	52	60	56	56	37	A		34	A	A		32	32
3	41	40	40	46	42	32	28	33	51	55	54	61	61	51	52	52	36	29		26		32	32	32	
4	31	32	32	30	28	26	A	37	46	54	59	60		50	46	51	45	31	A	A		42	29	32	29
5	31	31	31	34	32	25	32	46	50	54	57	51	57	44	46	46	34	A			32	34	34	34	28
6		31	34	30	30	30	28	34	50	52	56	67	49	50	65	48	36			A		32	34	32	34
7	34	32	32	34	36		A	38	60	62		63	48	54	54	50	A	A	A	A		31	30	32	30
8	34	34	28	34	34	32	31	26	44	54	53	61	48	54	58	52	38		34	A		32	32	30	38
9	38	44	37	31	32	42	30	29	50	50	62	52	45	46	47	48	48	30	34	29	30	32	31	32	
10	31	34	31	31	29	29		37	42	52	56	66	57	52	52	53	26		36	44	43	47	34	37	
11	48	46	46	31	47	32	28	38	45	54	64	57	57	56	60	44	37	A		34		31	32	32	
12	31	32	32	30	31	32	32	38	54	51	54	59	54	56		47	22	A	30	A		32	A		
13		34	32	34	32	32	28	34	52		65	60	58	58	46	45	19	32	29	25	32	32	A	A	
14		32	32	32	34	30	28	32	51	55	66	60	67	62	57	43	41	34	29	32	31	34	35	34	
15	41	36	32	32	34	31	32	42	46	54	A	57	57	57	52	42	25	A	A	A		32	28	32	32
16	32	32	32	31	30	29		31	50	60	63	62	56	61		55	34	A	A	A	A		32	31	32
17		38	34	31	34	34	A	32	53	55	57	57	52	58		A	A	A	A	A		36	32	34	32
18		31	31	30	37	34	A		52	54	56	57	54	48	60	56	25	A		29	30	29	43	31	34
19	31	34	30	28	28	A	A	28	58	57	62	60	52	53	55	51						30	32	32	
20	30	30	34	32	32	29	44	42	52	58	67	54	55	46	56	48		38	30	30	31		32	34	
21	34	34	42	32	31	31	31	28	45	52	67	61	55	51	52		31		28	30	34	32	32	34	
22		32	31	29	28	29		32	52	61	64	59	57	56	60	56	38			28	31	30	32	32	
23	32	32	32	29	31	31		34	45	58	65	57	49	56	61	56	42	31		31	34	31	31	32	
24	32	34	42	34		31	30	42	52	58	62	67	59	61	67	48	41	34	32	34	37	34	36	42	
25	38	42	43	45	32	29	30	40	46	63	66	58	60	51	54	54	34	29	31	32	34	34	34	35	
26	31	34	32	37	32	37	32	40	44	62	60	71	56	52	55	47	31	30	34	30	32	34	32	32	
27	34	32	34	32	30	30	29	41	52	60	62	64	56	51	51	52		28		29	29	29	29	30	
28	30	32	32	31	32	34	31	32	46	50	57	62	48	57	54	55	34				27	30	34	32	
29	29	34	35	34	31	32	29	37	42	47	51	50	52	56	51	52	37	29		32	34	28	32	32	
30	31	31	31	31	39	28	26	36	38	44	50	54	53	56	48	29	42	31	28	29	34	34	34	32	
31	30	29	28	26		28	39	34		49	56	60	51	46	54	30	42	31	32	32	34	A	28	32	
	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	31	31	31	29	29	22	30	30	30	29	30	30	31	28	29	25	14	15	19	24	27	29	29	
MED	32	32	32	31	32	31	30	36	50	54	59	60	55	54	54	51	36	31	31	30	32	32	32	32	
U Q	34	34	34	34	34	32	32	40	52	60	64	62	57	57	57	54	41	32	34	32	34	34	34	34	
L Q	31	32	31	30	30	29	28	32	45	52	56	57	52	51	51	46	31	29	29	29	31	30	31	32	

HOURLY VALUES OF fEs AT Wakkanai

DEC. 2009

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	37	G	G	G	G	24	32	G	30	40	33	G	G	G	35	35	54	53	52	80	71	49	39	32	
2	33	26	G	G	G	24	G	G	34	38	34		G	G	G	G	26	28	38	26	67	38	G	32	
3	24	28	26	G	G	G	46	40	27	31	33	G		G		G	38		38		44	34	30	24	
4	G	G	G	G	G	G	39	24	32	37	34	G	34	G	G	G	24	44	69	60	34	31	33	26	
5	G	G		G	G		39	33	39	37	G	G	G	G	G	G	32	31	27	27	27	32	G	26	
6	34	27	G	G	G	G	G	11	G	G	G	G	41	G	G	G	43		36	36	33	G	G	G	
7	34	27	G	G	34	58	38	25	33	57		G	G	G		G	60	52	69	46	29	G	24	32	
8	38	33	30	24	28	28		28	30	33	33	34	G	G	G	G	11	35	34	56	G	29	G	G	
9	G	26	G	G	G	32	26	32	44	43	G	G	G	G	G	G	11	30	25	G	G	G	G	G	
10	24	28	G	G	G	G		26	35	G	G	G	G	G	G	G	G	32	G	G	G	G	G	G	
11	27	29	36	27	G	G	G	G	35	50	41	G	36	G	40	36	39	35	25	33		G	G	27	
12	25	G	G	G	G	G	G	G	39	40	40	34	G	G	47	35	39	31	G	40	28	24	40	36	
13	39	27	28	25	G	G	G	G	34		40	38	34	42	35	29	27	26	25	30	33	29	48	39	
14		26	G	G	G	32	26	40	37	32	34	G	G	33	33	G	29	28	23	G	G	G	G	G	
15	G	G	G	G	G	24	G	G	40	59	60	40	G	40	44	28	38	57	40	51	38	29	29	24	
16	33	G	28	G	G	27	28	34	29	33	G	G	39	37		37	34	40	29	38	60	32	32	34	
17	39	36	27	28	29	41	44	36	34	38	N	G	G	G	G	73	38		70	72	59	34	G	28	
18	34	24	25	G	G	G	49	40	38	32	G	G	G	G	G	G	G	40	G	G	34	38	G	G	
19	G	G	G	G	39		65	34	33	39	G	G	G	G	G	G	21	39	40	40	34	32	G	G	
20	26	27	26	28	25	G	G	24	40		G	G	G	G	G	G	27	G	G	G	G	39	29	27	
21	33	28	27	27	28	30		34	39	39	G	33	48	32	G	G	11		27	47	33	38	34	30	
22	36	G	26	G	G	G		24			34			G	G	G	G			G	G	G	G	28	
23	G	G	G	G	G	G	G	G	27	32	34	34	34	G	34	G	28	G	G	G	G	G	G	G	
24	G	G	G	G		G	G	26			34	34	G	G	G	G	G	G	G	G	G	G	G	G	
25	29	28	32	29	24	G	G	G	27		34	N	N	33	33	G	11	G	G	G	G	G	G	G	
26	G	G	G	G	G	G	G	G	26	39	G	G	G	G		G	11	G	G	G	G	G	G	G	
27	G	G	G	26	G	G	G	G	28	33	34	33	G	G	G		11	G		G	G	G	G	G	
28	G	G	26	24	G	G	G	G		G	38	G	G	G	G	G	G	G			G	G	26	30	
29	G	G	G	G	G	G	G		11	32	38	G	G	G	G	G	11	G		G	G	G	G	G	
30	G	G	G	G	G	G	G	26	32		39	G	G	G	N		36	29	27	G	26	29	28	28	26
31	G	G	G	G	G	G	G	11		48	42	42	G	G	G	G	G	G	G	G	60	60	35	G	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	31	31	30	30	29	31	27	24	30	28	30	29	28	30	31	26	27	29	30	31	31	31	
MED	24	G	G	G	G	G	G	24	34	38	34	G	G	G	G	G	26	29	25	26	28	28	G	24	
U Q	34	27	26	24	24	27	32	34	38	40	34	33	33	G	34	28	38	39	38	43	34	34	30	30	
L Q	G	G	G	G	G	G	G	G	30	32	G	G	G	G	G	G	11	G	G	G	G	G	G	G	

HOURLY VALUES OF fmin AT Wakkanai

DEC. 2009

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	14	14	14	14	15	14	14	14	14	14	15	14	14	14	14	14	14	14	14	14	14
2	14	14	14	14	14	15	14	15	14	14	14	14	14	14	14	14	15	15	14	14	14	15	14	14
3	14	14	14	14	14	14	15	14	14	14	14	14	14	14	16	14	14	14	14	14	14	14	14	14
4	14	14	14	14	14	15	14	14	14	14	14	14	14	14	14	15	14	14	14	14	14	15	14	14
5	14	14	14	14	14	15	14	14	14	14	14	15	14	14	15	17	14	15	14	17	15	14	27	14
6	14	14	14	14	14	14	14	14	22	16	15	17	16	15	14	20	14		14	14	14	15	14	14
7	14	14	14	14	14	14	14	15	14	14	14	14	15	14	14	14	14	14	14	14	14	15	14	14
8	14	14	14	15	15	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
9	14	15	14	14	15	14	14	14	14	18	14	15	14	14	14	14	14	14	14	14	15	15	14	14
10	14	14	14	14	14	16		15	14	14	14	17	15	17	15	18	16	14	15	14	15	14	15	14
11	15	14	14	14	14	14	14	14	14	14	15	17	15	15	14	14	14	14	15	15		14	14	14
12	14	15	14	15	14	14	14	14	14	14	14	14	14	14	14	14	15	14	20	14	14	15	14	14
13	14	14	15	14	14	15	14	14	14		14	14	14	14	14	14	15	14	14	14	15	15	15	14
14	14	15	14	15	14	14	14	14	14	14	14	14	14	14	14	17	14	15	15	14	14	14	14	14
15	15	14	14	14	14	14	15	14	14	14	14	14	14	14	14	14	14	14	14	15	14	14	14	14
16	14	14	15	15	14	15	15	14	14	14	15	14	14	15		14	14	14	14	14	14	14	14	14
17	14	14	14	14	15	14	14	14	14	14	14	15	14	14	14	14	14	14	14	14	14	14	14	15
18	14	15	14	14	14	15	14	14	14	14	14	14	16	17	14	20	14	14	14	14	14	14	14	14
19	14	16	14	14	14	14	14	14	14	14	14	14	15	18	15	14	15	14	14	14	14	14	14	14
20	14	14	14	14	14	14	14	14	16	14	15	16	18	26	26	14	16	14	14	14	14	14	14	14
21	14	14	14	14	14	14	15	15	14	14	14	14	14	14	16	20	18		14	14	14	14	14	14
22	14	15	14	14	14	15		15	14	14	14	14	14	14	15	14	15			15	15	14	14	14
23	14	14	14	14	14	15	18	14	15	14	14	14	14	14	14	15	14	17	16	14	14	14	14	14
24	14	14	14	14		14	14	14	14	14	14	14	15	15	14	15	15	14	14	14	14	14	14	14
25	14	14	14	15	14	14	14	14	15	14	14	14	15	14	14	14	14	18	14	15	14	14	14	14
26	14	14	14	14	14	14	14	15	14	14	14	15	15	14	14	14	15	14	14	14	14	14	14	14
27	14	14	14	14	14	14	14	15	14	14	14	14	14	14	24	14	14	14		14	14	14	14	14
28	14	15	15	15	14	14	14	15	17	14	14	16	15	15	14	15	16	14			14	15	14	14
29	14	14	14	14	14	15	14	14	14	15	16	18	20	28	18	14	14	14		14	14	15	14	14
30	14	14	14	14	14	14	14	14	14	14	14	18	18	15	15	14	14	15	14	16	14	14	15	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	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	31	30	31	29	31	31	30	31	31	31	31	30	31	31	28	27	30	30	31	31	31
MED	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
U Q	14	14	14	14	14	15	14	15	14	14	14	15	15	15	15	15	15	14	14	14	14	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. 2009

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

HOURLY VALUES OF fEs AT Kokubunji

DEC. 2009

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	25	31	G	22	23	G	G	G	G	G	64	49	G	35	35	G	41	34	G	29	38	31	60	31	
2	G		G	G	G	G	G	G	G	G	G		G	G	34	35	29	35	31	33	30	41	26	39	
3	G	G	G	G	G	G	G		G	G	G	G		G	35	33	38	73	36	29	50	34	36	26	
4	G		28	27	24	G		G	G	G	G	G		49	50	G	50	45	100	113	81	34	23	29	
5	33	29	G	G		24	37		40	40	G	G	G	G		G	37	103	78	50	57	50	46	34	
6	34	36	G	24	29	36	27	G	34	G	G	G	G		38	34	29	80	35	104	43	G	G	G	
7	G	28		29	29	G	G	31	50	49	37	68	51	108	59	70	60	110		80	46	47	29	G	
8	G	40	G	G	G		22	27	34	43	35	41	41	39	33	32	G	G	32	82	43	31	32	37	
9	29	24		G	G	G	G	29	52	59		G	G	G	G	G	28	24	70	70	72		34	30	
10	32	G	G	G		27	29	33	33	48	G	G	G		37	G	31	29	33	33	G	G	G	28	
11	29	G	G	G	11	G	G	29	32	35	48	51	43		53	G	35	46	32	29	29	29	29	22	
12	G	G	G	G	G		G	G	32	34	46	38	44	36	34	G	G	G	30	G	21	28	22		
13	G		G	G	G	G	G	29	32	G	55	46	41	50	39	50	G	G	G		G	G	G	G	
14	G		G	G	G	G	G	G	G	G	G	G	64	40		34	30	27		G			G	G	
15	G	G	G	G	11		G	G	N	G	G	G	G		36	37	34	29	26	29	28	40	23	G	G
16	G	G		G	G	G	G	G	G		G		G		36	35	40	47	32	33	32	32	25	25	28
17	33	33	G	23	G	G	G	45	68	53	46	G	38		34	51	70	59	40	G	G	24	G	G	
18	G	25	G		G	G	G	26	33	82	48	G	39	37	36	39	39	34	49	29	23		34	34	
19	26	G	G		G	35	27	51	47	50	60	G	40	44	58	41	G	41	48	58			40		
20									47								G	G		34	33			38	
21	43		G	G																					
22													G	G	C	G	G		G		G	G			
23		G	G		G	G		G	29	G	G	G	G	G	G	34	G				26	26	26	24	
24	G	G						G	30	33	G	G	G		37	G	37	34		G	G	G	G	G	G
25	G	G	G	G	G	G	G	G	G	G	37	G	G	G	G	G	G	G	G	G	G	G	G	G	24
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G
27	G	G	G	G	G	G	G	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	G		11	G	G	G	G	G	G
29	G	G	G	G	G	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G
30	G	G	G	G	G		24	26		G	G	G	G	G	G	G	G		G	G	G	G		G	G
31	G	G	G	G	G		G		29	33	36	G	36	37	57	34	35	40	28	28		G			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	27	24	25	24	24	20	24	25	25	27	26	25	27	26	26	28	29	27	24	26	26	23	25	24	
MED	G	G	G	G	G	G	G	G	30	33	18	G	G	G	34	16	29	32	32	29	28	24	23	23	
U Q	29	28	G	G	G	23	11	29	34	48	46	47	41	37	38	34	37	45	38	50	43	31	33	30	
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Kokubunji

DEC. 2009

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

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

HOURLY VALUES OF foF2 AT Yamagawa

DEC. 2009

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	A	A	A	28	28	A		41		46	58	51	56	57	44	58	52	55	45	A	32	26		28	
2	A	A	A		28			37	54		49		60	60	52	A	34	47		18	A	A		A	
3		28	28	28	29	32		37	47	57	47	52	57	52	54	51	50	42		31		28			
4					26			41	44	50	58	58	53	53	56	47	48	43	30			A		23	
5	A						A	A		50	39	A	50	50		58	46	51	42	28	24	28	26	25	
6		A		26	26				43	48		54	57	66	55	55	61	43	A	A	A	A	A	A	
7	26	25	28					38	A	50	62	A	66	48		A	A	60	44		A	A	A	A	26
8		26		29	26			34	44	45	60	59	60	58		A	A	54	50		A	A	A	A	A
9	A							34	42	49	46	65	50		A	46	47	50	49	29	28		28	28	
10	A		28	24				32	38	45	50	58	45	51	50	60	53	45	A			34	36	32	A
11	36	34	28	28	32	28	28	38	46	52	48		67	70	58	55		A	A	A	A		34		A
12	28	26						32	51	47	56	53	59	66	52	54	51	59		A			29		
13					26			34	52	50	42	51	68	55	52	51	50	55	41			28	34	28	
14	26		28	28	28			34	60	51	58	55	68	66	55	45	62	57	36	29	29				
15	29		30	30	30			28		50		72	52	55	51	50	38	47	49	40	29	28	29	28	
16	28	26	28	25	26			36	53	52	51	67	A	60	56	48	53	45	49		A	A	A	A	28
17	29	30	29	28	28	28		32	50	54	56	62	66	64		A	51	57	45			28			25
18	28	28	28	29	26			30	62	52	51		66	65	55	52	55	42	26	34	34	28			
19	28	28	28	28	30	25		37	58	53	52	60	92	65	54	62	52		A	A	A	28	A	A	A
20	26		49	28	26			33	55	53	48	70	65	55	50	60	58	47		A			26		
21	28		28	28	29	30	29	41		56	57	58	66	65		50	48	47				30	32		28
22	30	A	28	28	30			34	54	60	58	60	62	57	56	57	36	50		A	29			28	
23		26	28		30			30	54	48	65	62	70	59	60	55	55	47	36				34	30	A
24	26		28	29	30			30	61	60	69	62	58	57	54	55	58	50				31	32	28	28
25	29	30	32	28				28	54	47	29	59	61	62	60	58	50	44	37			29	32	26	28
26	34	34	32	30	32				40	56	56	68	70	63	52	52	50	50	42	28	34	34			28
27	30	34	28	29	29	26		28	48	62	50	52	63	64	57	60	48	46	30	28	32		28	28	
28	25	26	28	30	29			28	44	48	46	53	52		54	52	45	43	29	29	29				
29		28	28	29	32	28		29	45	48	50	55	66	55	56	51	50	48	34			30		26	
30	26	28			32	25		49	49	48	42	58	58	58	58	52	48	38	24	49			22	29	26
31		26	28	28	34	30	29	34	42	47	47	48	62	58	50	51	54	42		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	18	17	22	22	24	9	3	28	27	30	28	27	30	28	27	28	30	29	16	13	18	15	13	11	
MED	28	28	28	28	29	28	29	34	50	50	51	58	62	58	54	52	51	47	35	29	30	28	28	28	
U Q	29	30	28	29	30	30	29	37	54	53	58	62	66	64	56	56	55	50	41	32	32	34	29	28	
L Q	26	26	28	28	27	25	28	30	44	48	47	53	57	55	52	50	48	43	29	28	29	26	26	26	

HOURLY VALUES OF fEs AT Yamagawa

DEC. 2009

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	41	33	40	27	24	35	G	G		48	42	G	G	58	72	53	56	35	11	60	33	24	33	25
2	43	42	37	26	G	G		G	29	35	40	45	61	50	G	51	32	27	36	27	48	44	24	34
3	28	25	G	G	G	34	G		G	G	36	G	G	G	38	40	34	28	25	23	G	G	G	G
4	G	G	G	G	G			G	G	G	38	38	G	G	36	34	30		23	35	33	40	37	34
5	40	33	28	32	26	24		50	48	32	50	41	48		38	36	30	28	G	23	32	G	26	29
6	34	44	32	G		G	30	50	G	35		42	49	37	43	39	36	34	50	44	51	49	40	67
7	23	24	26	24	G			28	45	50	60	64	52	51	63	60	37	39	52	79	69	51	48	23
8	39	29	30	G	G			11	35	42	51	47	42	41	65	45	38	26	38	58	70	59	36	50
9	49		28	30	34		G	21		35	40	43	G	56	57	45	G	27	G	G	36	26	30	27
10	34	G	G	G	G	G		G	40	G	G	G	G	41	G	39	42	28	40	36	36	30	28	44
11	23	G	G	G	G	G	G	G	30	36	50		G	52	53	35	61	60	40	39	32		G	33
12	24	G	26	G	G			G	29	34	38	42	40	41	37	34	33	G	34	39	33	G	G	27
13	26	G	G	G	G			G	30	33	40	42	47	41	36	37	56	49	32		G	G	G	G
14	G	G	G	G	G		34	G	35	37	43	48	37	42	G		33	30	G	G	G	G	G	G
15	G		G	24	G			G	G	G	G	39	G	G	G	38	35	G	28	25	G	G	G	G
16	G	G	G	G	26	G	G	G	29	42	38	44	82	49	38	39	37	30	26	44	59	48	37	G
17	G	G	G	G	G	G	G	G	29	34	38	G	G	G	59	45	41	30	58	43	52	35	29	G
18	G	G	G	G	G	G	G	G		35	37	40	46	48	44	36	34	G	G	G	G	G		
19	G	G	G	G	G	11		G			G	G	G	39	G	36	35	36	33	28	40	50	33	38
20	27	28	G	G	G	G	27	26	28	35	35	G	G	49	46	41	G	27	33	34	36	G	G	G
21	G		G	G	G	G	G	G		36		40	G	G		G	43	27	34	27	G	G	G	G
22	G	34	G	G	G		G	G	28	38	37	40	52	48	42	G	40	49	46	28	25	26	23	
23	G	G	G		G			G	29	G	38	44	G	G	G	G	G		28	31	27	G	G	29
24	29	28	G	G	G			G	G	G	G	G	40	G	G		32	26	24		G	G	G	G
25	G	G	G	G	G			G	28	32	36	G	G	G	G	34	G	37	G		G	G	G	G
26	G	G	G	G	G			G	G	33	G	40	G	G	G	G	G	G	G	G	G	G		G
27	G	G	G	G	G	G		G	27	35	35	G	N	G	G	G	31	G	G	G	G		G	G
28	G	G	G	G	G			G		35	37	G	G	G	G	G	33	G	G	G	G	G		
29		G	G	G	G	30		G		G	G	G	G	G	G	G	G	G	29		G	G	G	G
30	G	G		G	G	G		G	G	G	42	G	G	G	39	34	34	G	G	G	G	G	G	G
31	G	G	G	G	G	G	G	G	27		G	G	G	43	46	35	34	28	33	G	33	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	30	27	30	30	30	17	13	30	23	30	30	30	30	30	30	30	31	30	31	26	31	29	28	25
MED	G	G	G	G	G	G	G	G	29	34	38	40	G	40	38	36	34	28	29	28	32	G	G	23
U Q	29	28	26	G	G	17	14	G	30	36	40	42	46	48	46	40	38	34	36	39	36	37	31	33
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

DEC. 2009

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

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

HOURLY VALUES OF foF2 AT Okinawa

DEC. 2009

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			A	A			A	35	54	57	51	59		62	62	62	68	A	50	29				
2			28					42	54	66	62	55	60	80	72	76	61	42		A				29
3	A	A	A		26			32		47	51	50	51	64	58	53	48	52	29		34	34		
4								36	48	57	45	54	57	64	63	61	46	55	38			20	A	A
5	A		26					31	49	52	44		50	57	56	51	50	56	37		29	30	30	36
6	34								59	60	51	A	A	74	80	60	64	57	38	A	A	A	A	
7	28	A			A	A	A	34	54	59	54	62	100	122	104	81	60	52		A	A		A	A
8		A	A					31	47	48	44	65	58	70	62	A	A	52	32	A	A	A	A	A
9	A	A	A					31	44	56	53		61	64	46	50	55	52	34	30	34	A	A	A
10		A	A	A				34	44	50	51	54	59	61	A	54	66	56	34			32		
11		A		23	30			35	51	50	52	A	64	71	77	73	71	72		A	A		34	
12									57	51	56	60	63	62	55	59	56	66	53		34	29		
13									51	56	52		56	67	54	56	50	51	67		34	34	28	
14				28					60	62	57	57	61	77	61	52	55	75	58	30	32			
15				28				29	54	62	53	58	51	56	58	50	59	58						
16				N				30	58	58	60	67	62	64	61	55	A	47	46	28		30		
17						29		28	55	74	63	59	69	72	66	63	48	56	43		29	34		
18						A	A		60	62	65	82	87	82	64	57	50	54	A		A	A	A	A
19	A			29	41	A		30	53	69	70	86	115	120	78	55	59	48			29	30		A
20	A	A	A		32	A	A	28	60	60	57	66	82	83	78	58	56	56				30		
21									54	70	90	66	80	96	85	70	60	59	40	29		34	32	
22	A	A						32	54	63	62	57		62	72	87	73	66	A	40		42	46	44
23				30					48	65	59	55	63	72	67	67	62	66	47	36	38	44	51	
24					34	26			47	69	80	60	57	65	67	59	64	66	45			30	29	26
25		32	30					24	48	53	56	58	65	64	65	57	52	52			34	41	36	
26	26	30	32	34	28				55	67	80	62	71	82	66	52	52	56	46	45		30	42	28
27	34				29				60	72	68	52	62	50	77	67	52	50	47			38		
28			28		28				52	50	57	50	69	59	56	41	52	50	46		32			
29									50	51	58	48	65		69	60	55	50	46	32	32		28	28
30				34					48	50	51	48	56	72	64	55	50	46	55					
31				23	32	32			48	48	45	53	59	75	68	65	52	46	A	A	A			
CNT	4	2	5	6	11	3		17	30	31	31	26	28	30	30	30	29	30	21	9	12	18	10	5
MED	31	31	28	28	30	29		31	54	58	56	58	62	68	66	58	55	54	46	30	33	33	31	28
U Q	34	32	31	30	34	32		34	55	65	62	62	69	77	72	65	61	58	48	38	34	34	42	40
L Q	27	30	27	23	28	26		29	48	51	51	54	57	62	61	54	51	50	37	29	30	30	29	27

HOURLY VALUES OF fEs AT Okinawa

DEC. 2009

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			49	27			27	G	G	G	G	G	G	50	41	51	37	72	G	34		G		
2	30		G	30	25			G	G		38	G	51	41	38	48	50	46	49	39		G	G	
3	49	50	29	28	G	G		30	30	38	G	G	39	41	37	35	G	G		24	G	G	G	
4			G		G			G		G	G	G	38	G	38	41	32	32		28	28	29	36	50
5	53	G	24	G	G	G	G	G		29	G	45	55	48	46	50	42	49	43	29	27	G	G	27
6	G		G	G		G			94	35	48	70	69	G	G		40	35	32	27	68	58	48	38
7	27	82	28	31	53	34	40	29	50	47	G		39	G	42	35	G		34	34	59	52	29	35
8	36	37	50	G	G			G	38	42	47	40	52	43	61	60	58	43	32	68	72	44	36	32
9	28	36	34	29	G			G	29	41	46	44	G	G	G	G	G		30	30	G	28	36	30
10		31	29	36				G		40	G	40	49	59	62	45	45	G		31		29	37	40
11	G	35	25	G	G			G	32	33	G	51	39	41	74	49	85	45	51	50	36	28		
12	G								29	34	36	G	G		39	37	37	37	G	11	G	28	G	
13				G					G	G	43	43	46	44	38	50	33	29	34	29	G	G	G	G
14	G			G	G			G	28	38	44	48	40	G	G	G	G	G		11	G			
15		G			G			G	32	36	G	G	G	G	G		37	34	G	25	G		G	
16	G	G	G		G			G	32	36	39	42	G	42	40	41	63	51	41	25		G	G	G
17					G			G	28	36	G	G	G	41	G	40	36	32	29		G	G	G	G
18			G	31	G	27	28	G	G	G	G	G	40	44	56	38	40	34	38	36	60	34	30	30
19	29			49	28	29		G	G	G	G	G	40	40	G	G	50	53	45	29	27	26	G	37
20	46	40	36		28	39	35	G	31	33	37	40	G	G	G	G	G	G		30	28	36	27	
21				G				G	29	35	40	G	46	G	G	G	G	G	11	G		G	G	
22	59	30			G	G		G	G	32	39	44		G	G	49	71	36	59	37	33	28	G	G
23				G				G	G	48	G	46	52	46	51	G	35	38	32	G	G	29	34	35
24	30			30	G	G		G	G	G	G	G	G	G	G	38	53	36	31	28	31	28	G	G
25	29	G	G	G		G		G	42	G	42	G	G	G	38	G		G			G	G	G	G
26	G	G	G	G	G				32	G	G	38	40	G	G	G	G	G	G	G	G	G	G	G
27	G			G	G			G	34	36	38	G	44	38	N	35	G	G	G	G		26	30	
28			G	G	G				30	G	G	38	39	G	46	G	G	30	G	G	G			
29				G	G			G	31	G	G	G	43	38	55	G	G		G	G	G	G	G	G
30				G	G			G	28	G	G	G	43	G	G	G	38	G	19					
31				G	G	G		G	30	35	40	G	G	44	50	38	36	28	50	36	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	18	13	17	23	23	12	5	25	29	30	31	30	30	31	30	31	30	31	29	27	25	25	21	17
MED	28	31	24	G	G	G	28	G	29	34	36	20	39	39	38	38	36	32	30	27	27	27	G	29
U Q	36	38	31	30	G	28	37	G	32	36	41	43	46	44	46	45	49	38	34	36	34	29	35	33
L Q	G	G	G	G	G	G	14	G	G	G	G	G	G	G	G	G	G	G	15	G	G	G	G	G

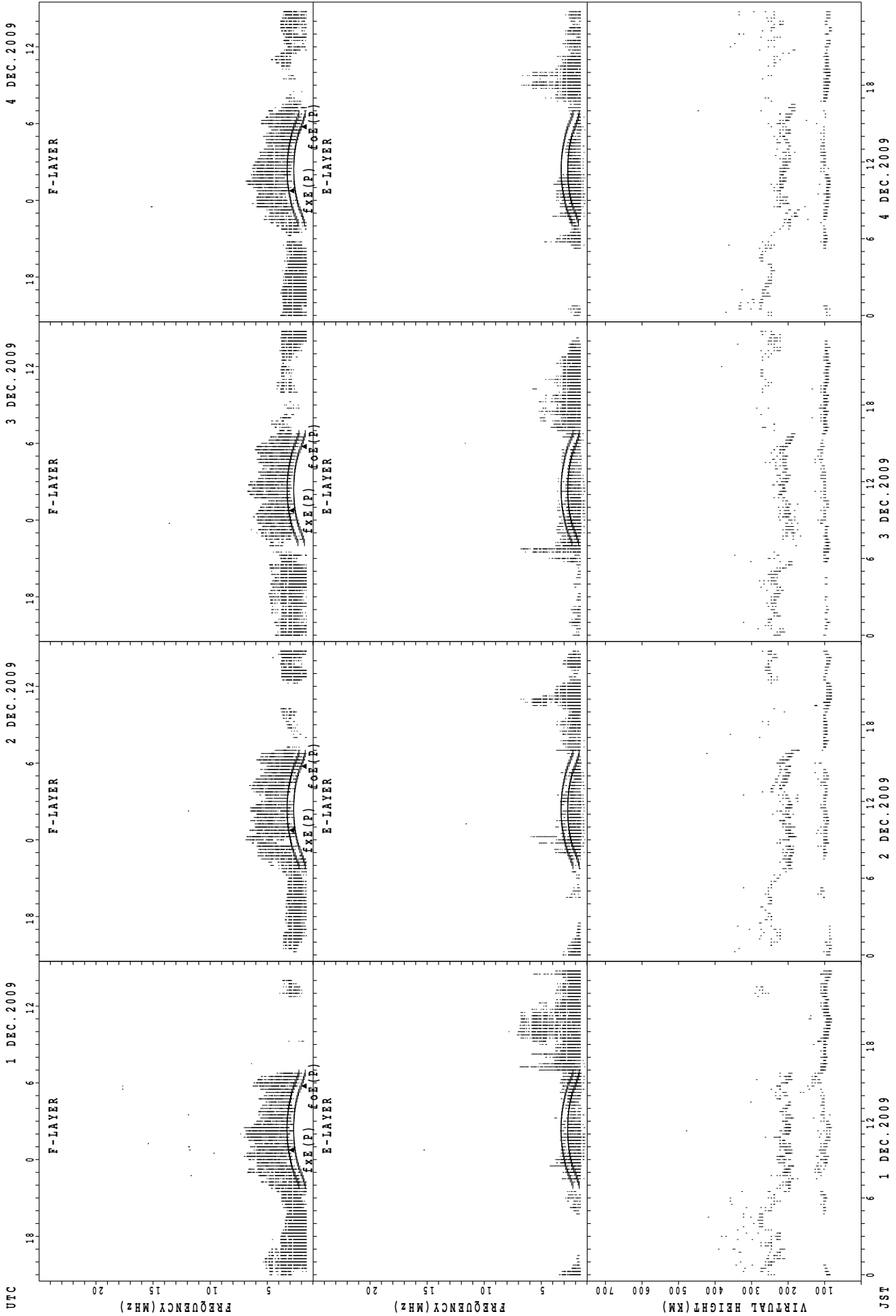
HOURLY VALUES OF fmin AT Okinawa

DEC. 2009

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

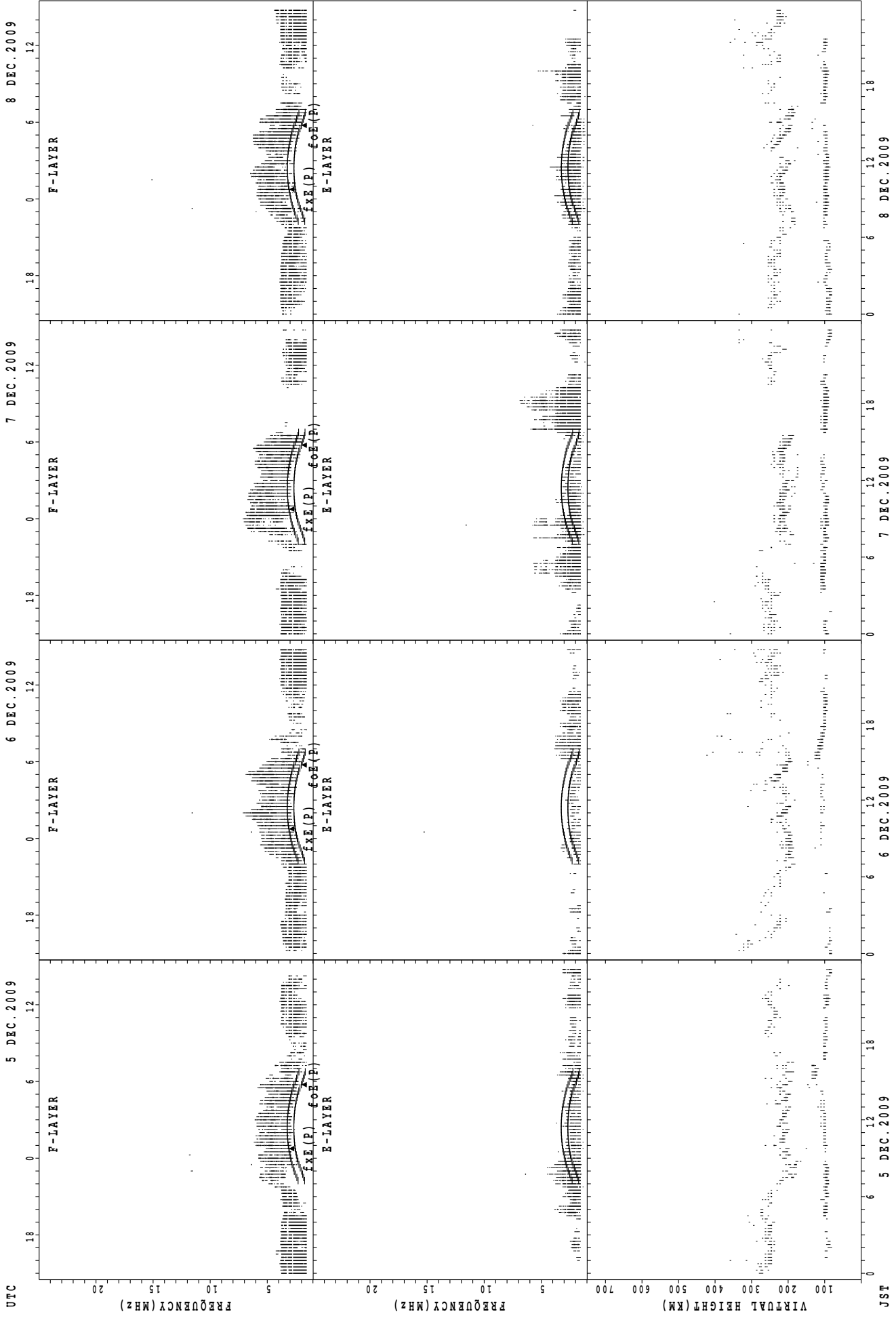
$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			14	15			16	15	14	15	18	21	48	23	15	17	14	14	16	16		21		
2	14		15	16	14			15	14	15	15	26	26	23	22	15	14	14	14	14		20	14	
3	15	15	14	14	17	21		15	14	14	17	24	23	20	21	16	14	16	15	15	14	17		
4			15		15			15	16	14	17	42	22	21	20	14	14	17	15	14	16	15	15	15
5	15	15	15	16	17	15	17	16	14	14	16	14	28	22	26	23	15	15	16	14	15	15	15	14
6	15		15	15		15			15	14	20	24	22	14	14	14	14	14	15	14	15	14	15	16
7	16	14	15	18	14	14	14	15	15	14	14	30	16	23	22	18	14	14	20	14	15	15	14	14
8	14	14	14	16	15			15	14	15	14	21	20	21	21	20	14	14	14	14	14	14	14	15
9	17	14	14	14	15			14	15	14	15	21	20	18	18	18	14	16	15	15	15	16	14	15
10		15	16	15				15	14	14	18	16	22	22	18	15	14	20	14		14	14	14	17
11	15	14	14	20	16			15	14	15	15	18	16	21	22	15	15	15	15	14	14	15		
12	16								14	15	16	38	38	16	22	17	15	14	14	16	14	22		
13					18				14	14	16	23	21	17	15	15	14	14	15	15	18	14	20	15
14	15			15	15			15	14	14	15	18	17	18	18	14	14	21	17	23	15			
15		14			15			14	18	14	32	41	27	41	36	17	14	24	15	20			21	
16	17	14	15		16			14	14	14	20	27	23	24	17	16	14	14	14	15		14	14	
17						15		15	15	14	22	23	28	24	22	15	14	14	15		22	14	15	20
18			17	14	20	15	15	17	22	14	16	20	21	21	20	18	14	15	14	14	14	14	15	15
19	15			16	14	15		15	16	15	14	23	20	23	17	20	15	16	14	14	15	15	14	14
20	15	15	15		20	14	14	16	14	14	14	15	22	14	22	17	17	18	14	14	15	16		
21				15				15	14	15	15	23	20	44	32	15	17	22	15	14		21	15	
22	17	14			17	16		14	14	14	21	23		22	44	17	14	14	15	15	15	15	18	15
23				14				15	24	15	15	20	20	18	15	18	14	14	15	17	18	16	15	15
24	15			15	17	15			14	18	15	22	23	17	14	14	14	14	14	15	15	18	14	15
25	15	15	17	14		16		15	27	18	17	26	22	21	20	16	14	20			18	15	16	18
26	15	20	14	16	14				18	14	14	14	15	15	15	14	14	22	24	15	24	15	15	20
27	21			22	15			14	18	14	16	16	22	18	17	18	17	22	20	21	14	15		
28			16	15	14				15	14	14	17	18	17	30	14	15	16	14	17	16			
29				14	15			20	18	14	36	21	26	23	42	21	16	15	15	17	15		16	15
30				17	15			18	23	14	28	18	21	28	16	15	18	22	16					
31				18	18	17		17	17	14	15	16	42	22	24	15	15	14	14	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	18	13	17	23	23	12	5	25	31	31	31	31	30	31	31	31	31	31	30	27	25	25	21	17
MED	15	14	15	15	15	15	15	15	15	14	16	21	22	21	20	16	14	15	15	15	15	15	15	15
U Q	16	15	15	16	17	16	16	15	18	15	18	24	26	23	22	18	15	20	15	16	16	16	15	16
L Q	15	14	14	14	15	15	14	15	14	14	15	18	20	18	17	15	14	14	14	14	14	14	14	15

SUMMARY PLOTS AT Wakkanai



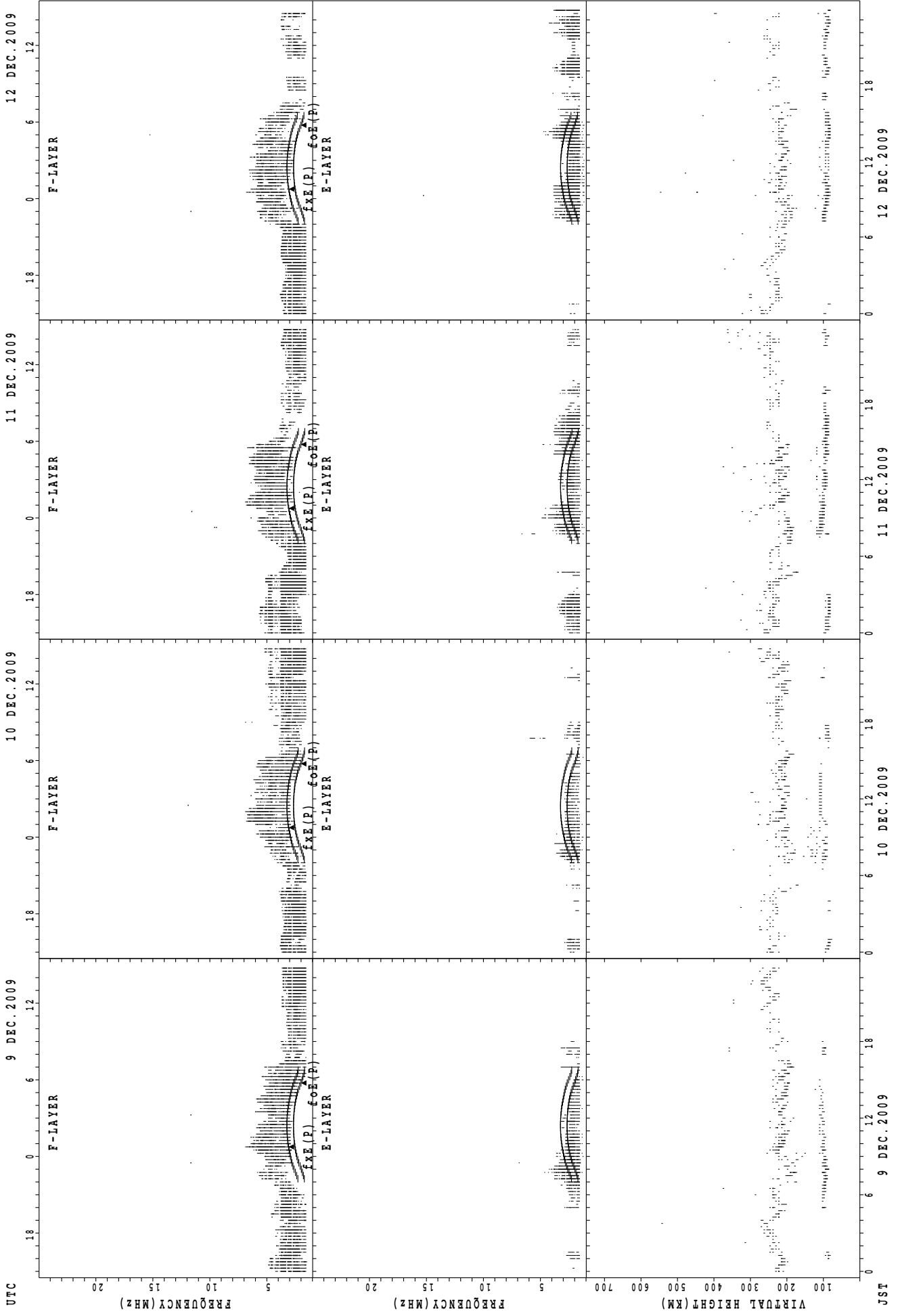
foE(P); PREDICTED VALUE FOR foE
 fxe(P); PREDICTED VALUE FOR fxe

SUMMARY PLOTS AT Wakkanai



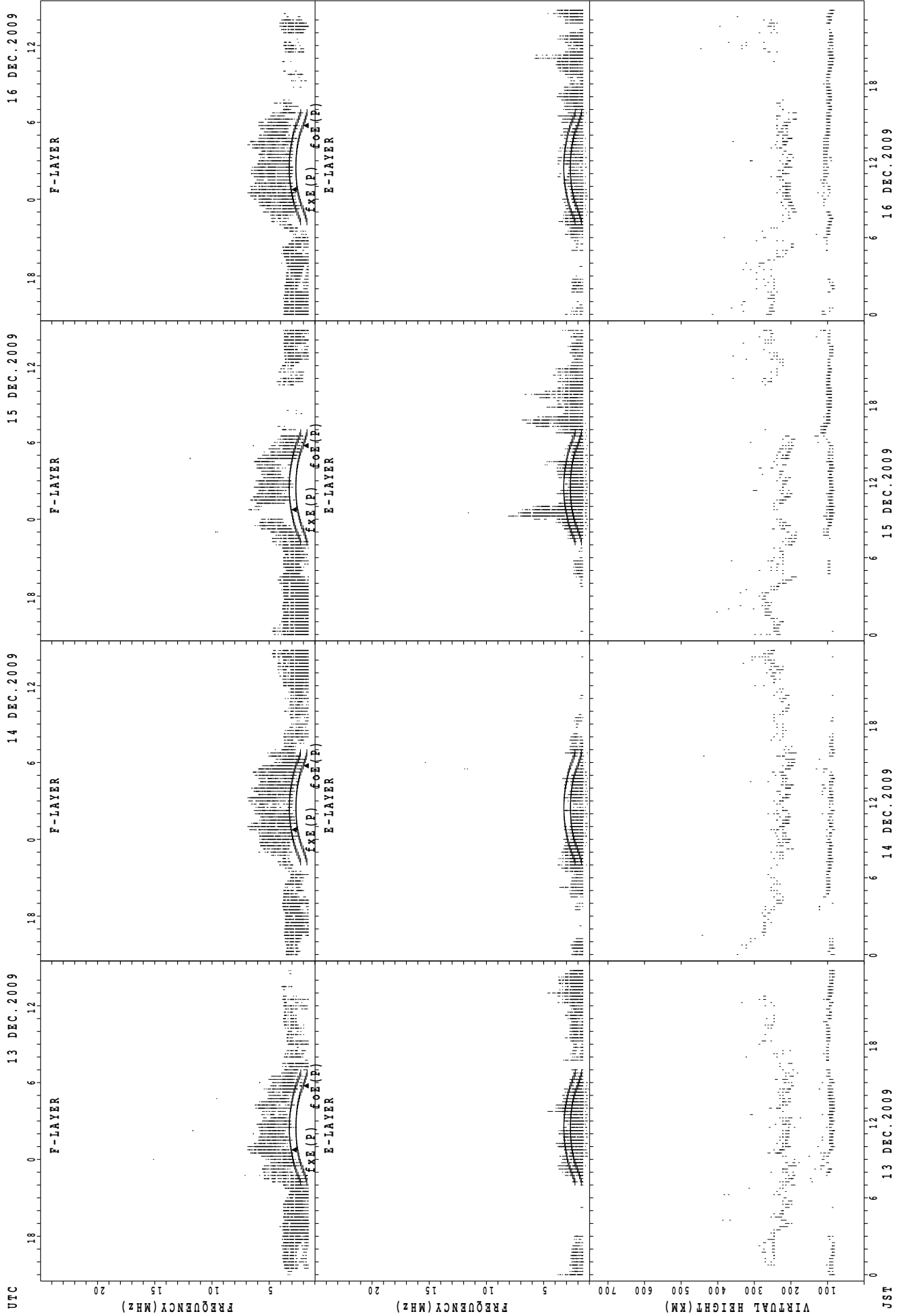
f_{XE(P)} ; PREDICTED VALUE FOR f_{XE}
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



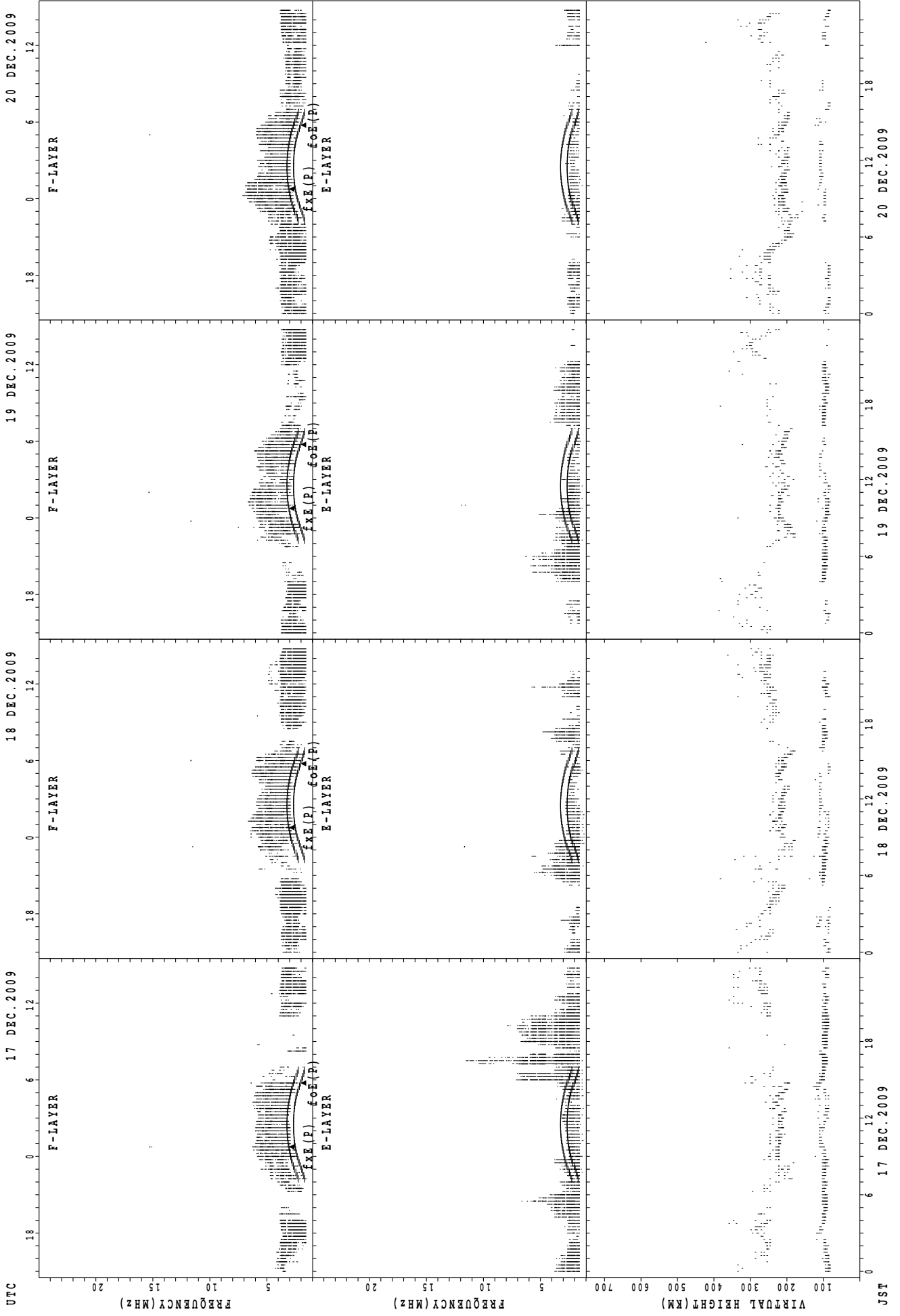
foF2(P); PREDICTED VALUE FOR foF2
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



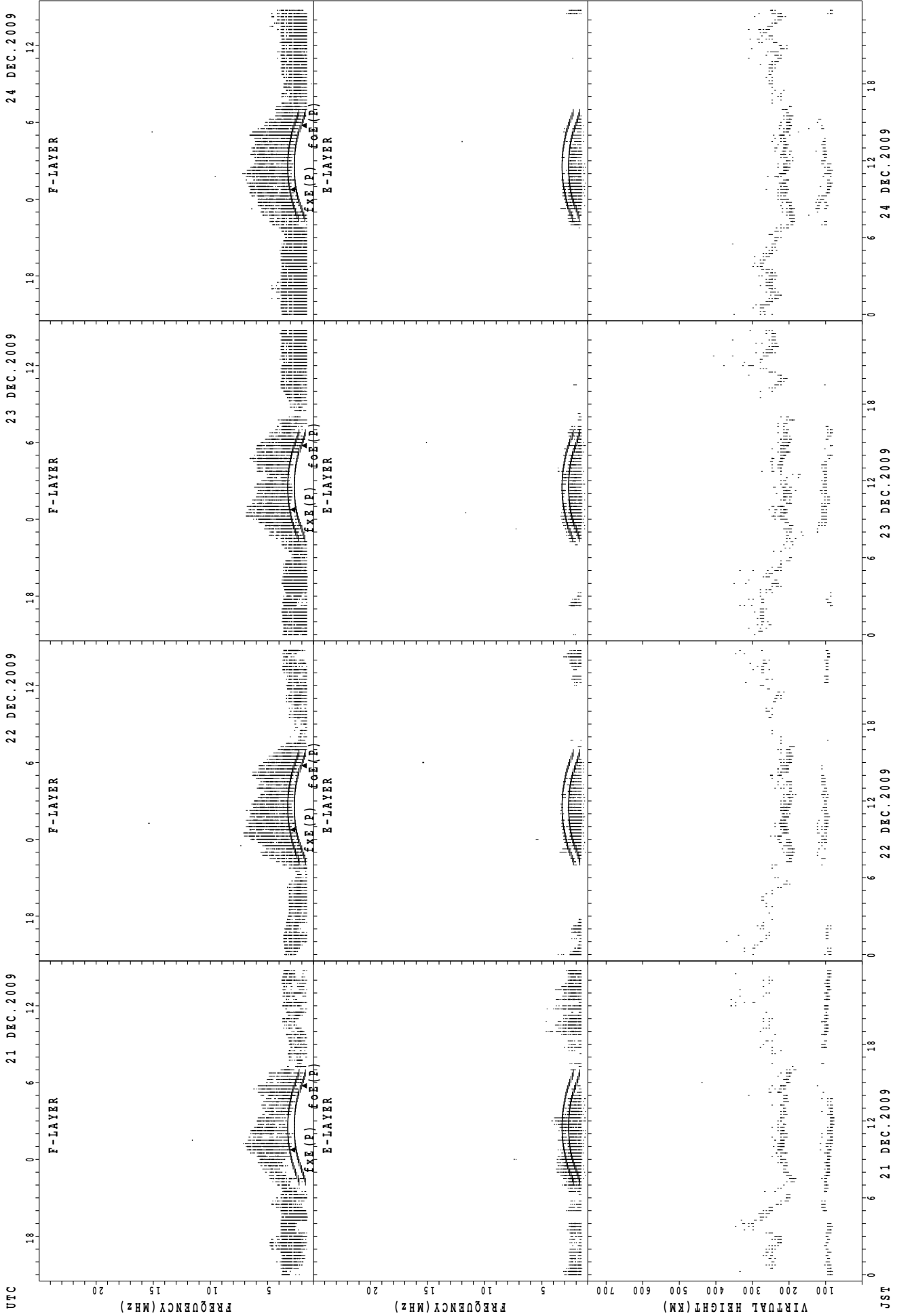
foE(P); PREDICTED VALUE FOR foE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



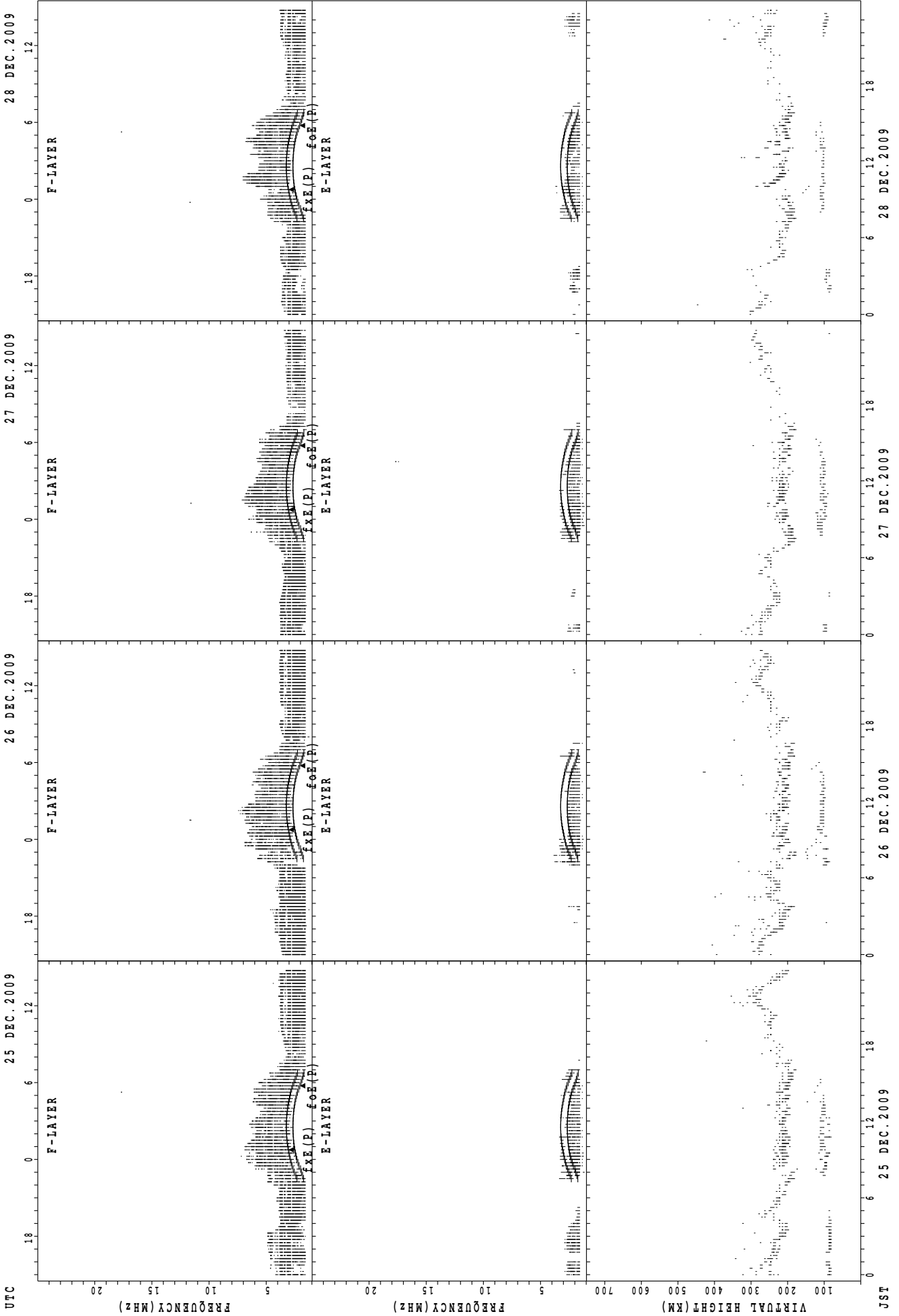
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



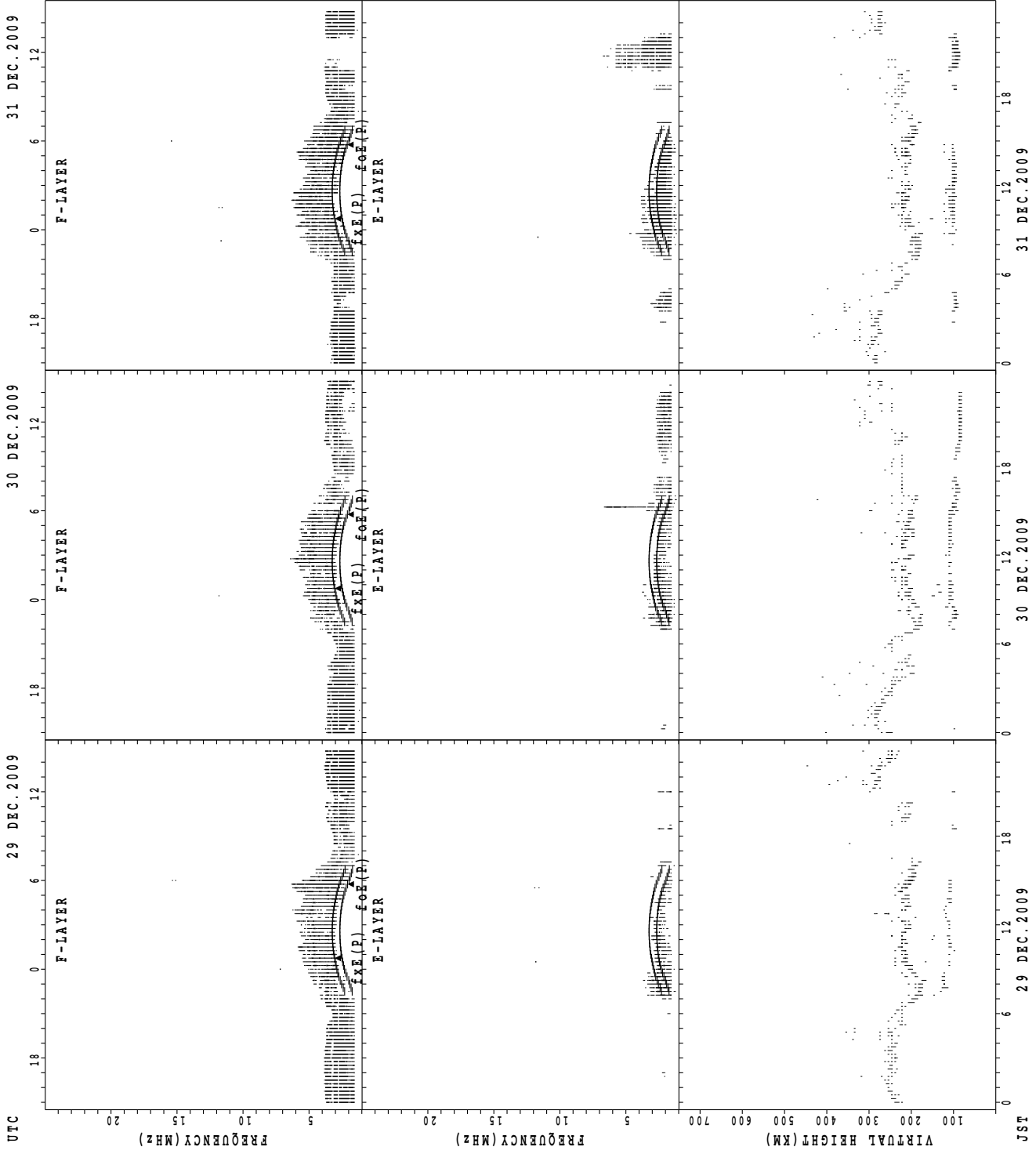
fXE(P) ; PREDICTED VALUE FOR fXE
fOE(P) ; PREDICTED VALUE FOR fOE

SUMMARY PLOTS AT Wakkanai



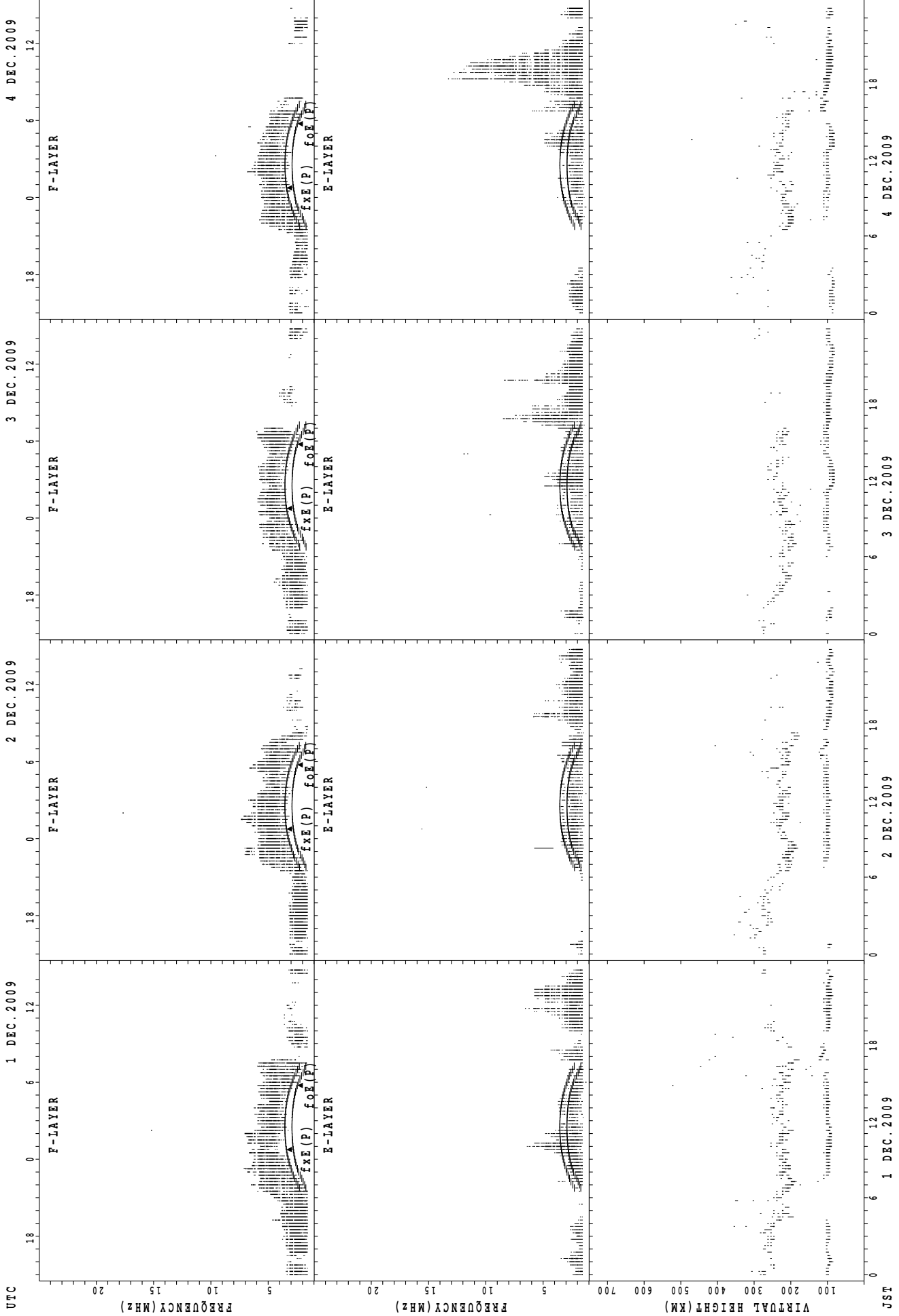
foF2(P); PREDICTED VALUE FOR foF2
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



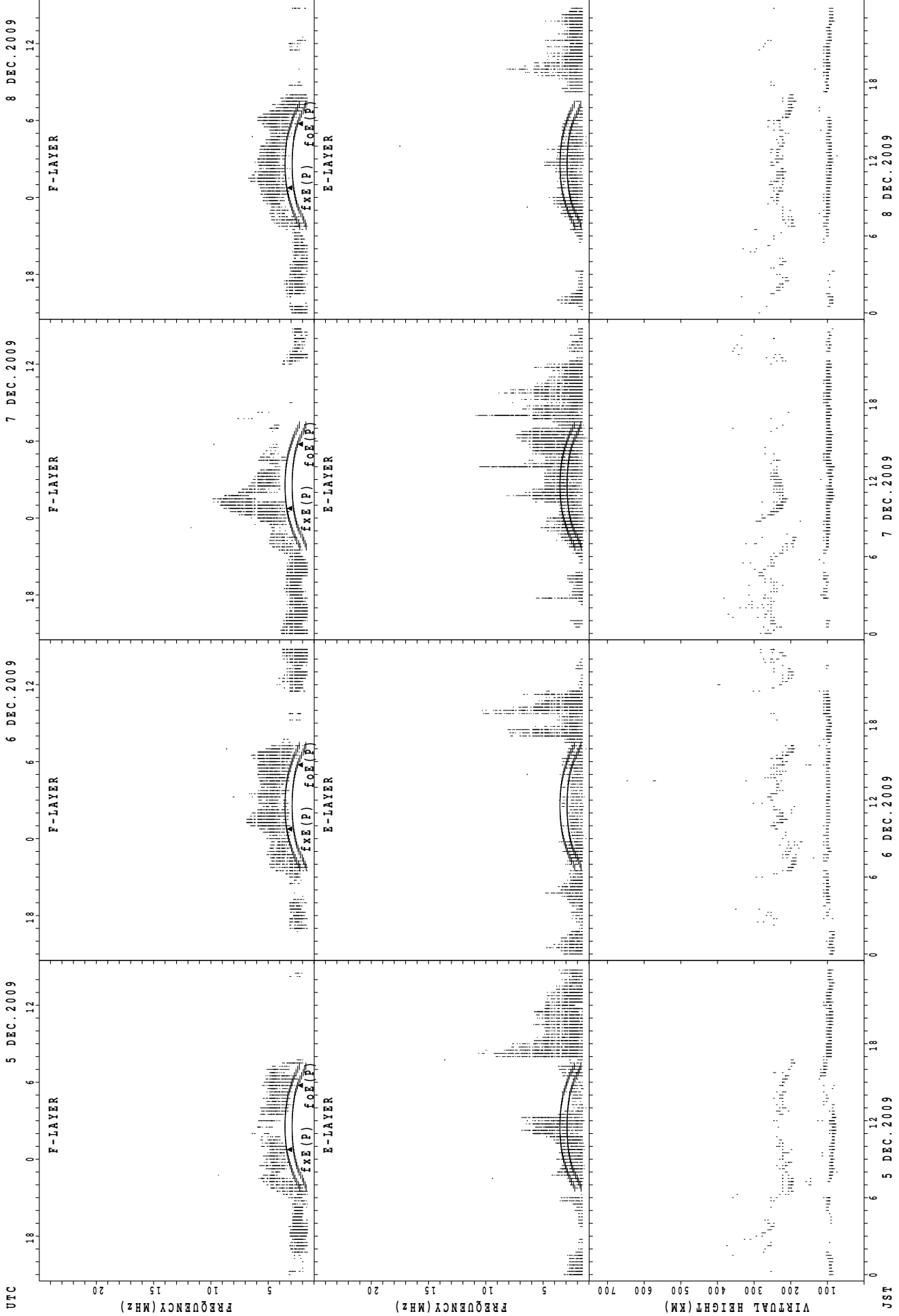
fXE(P); PREDICTED VALUE FOR fXE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



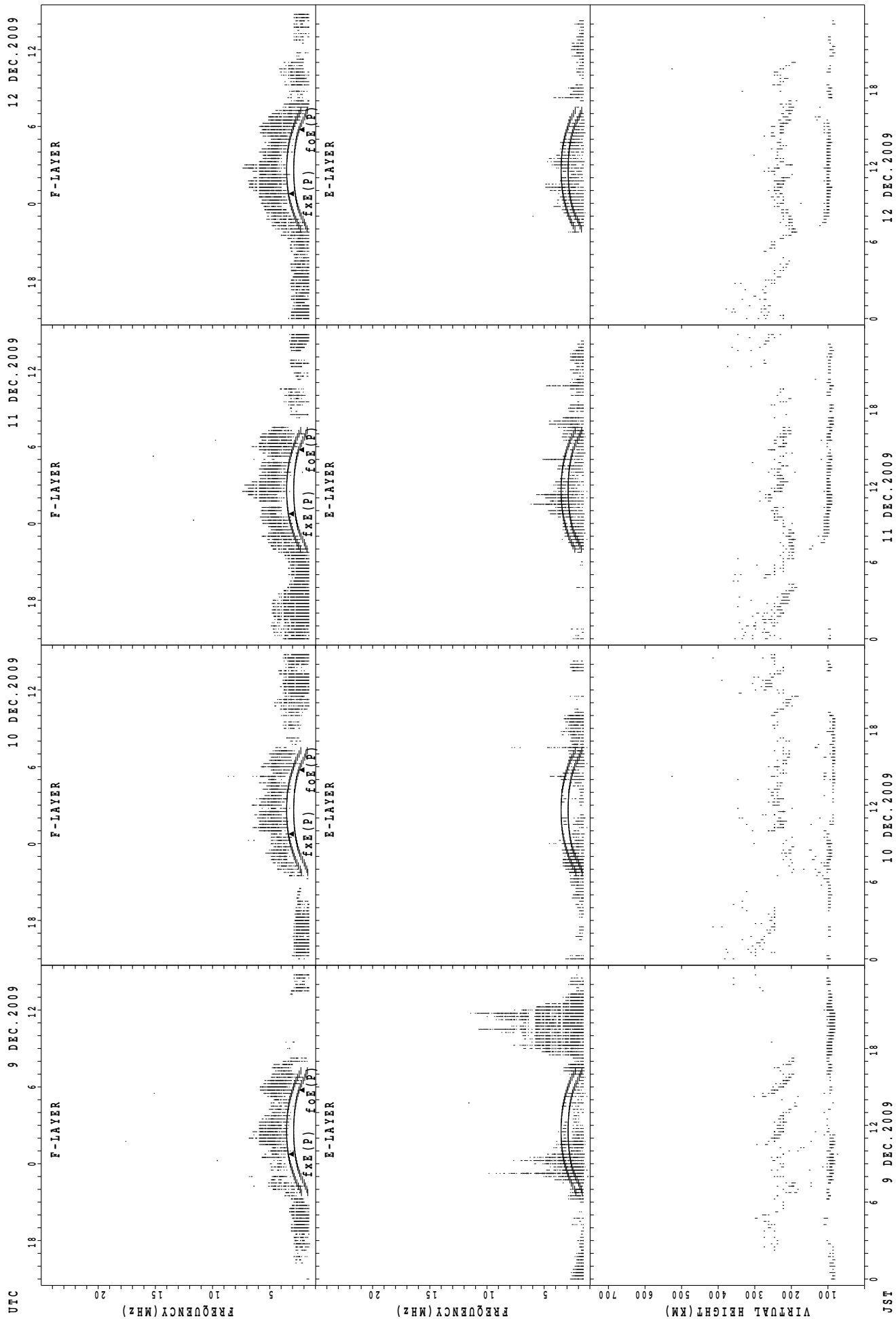
f_{x E(P)}; PREDICTED VALUE FOR f_{x E}
 f_{o E(P)}; PREDICTED VALUE FOR f_{o E}

SUMMARY PLOTS AT Kokubunji



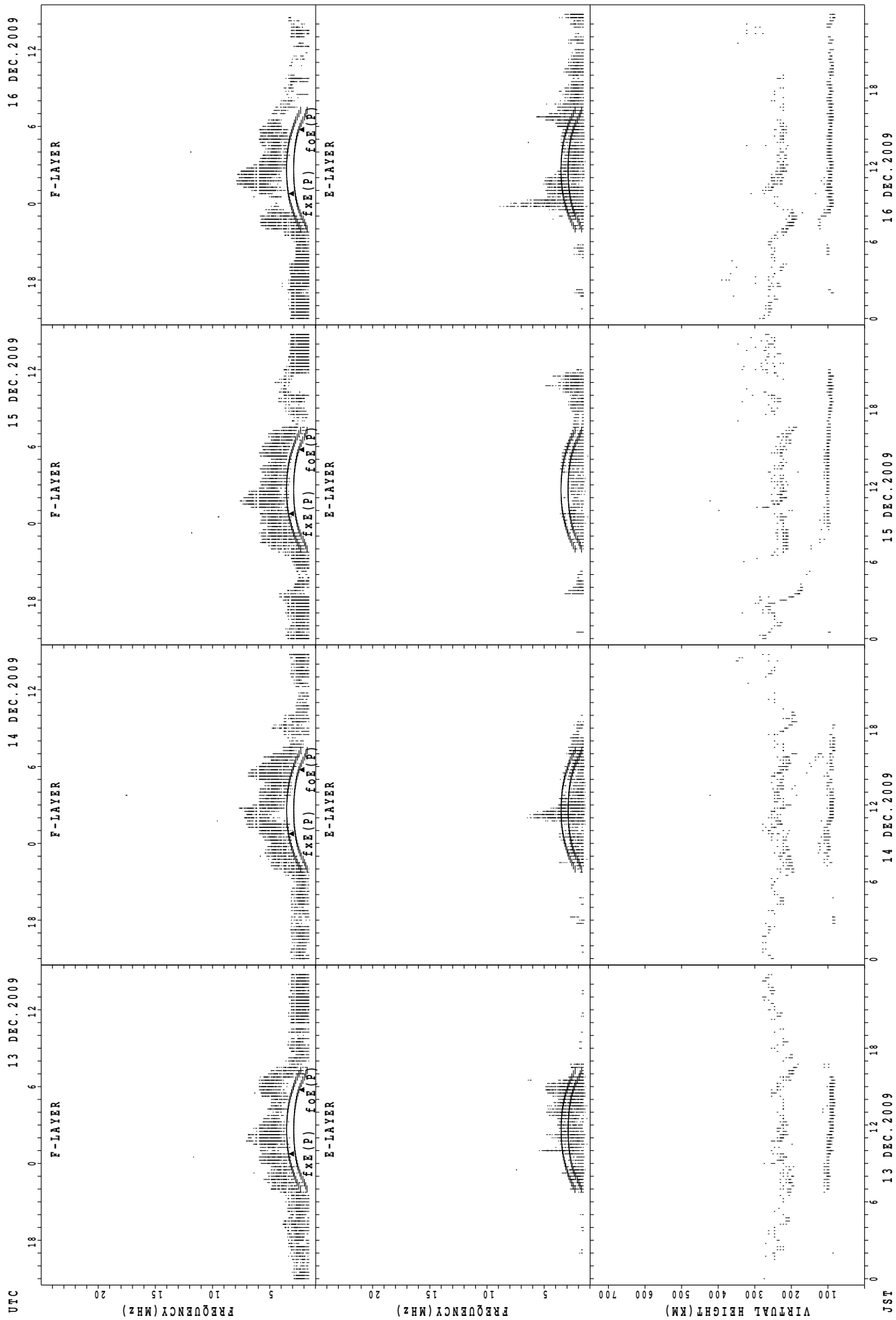
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



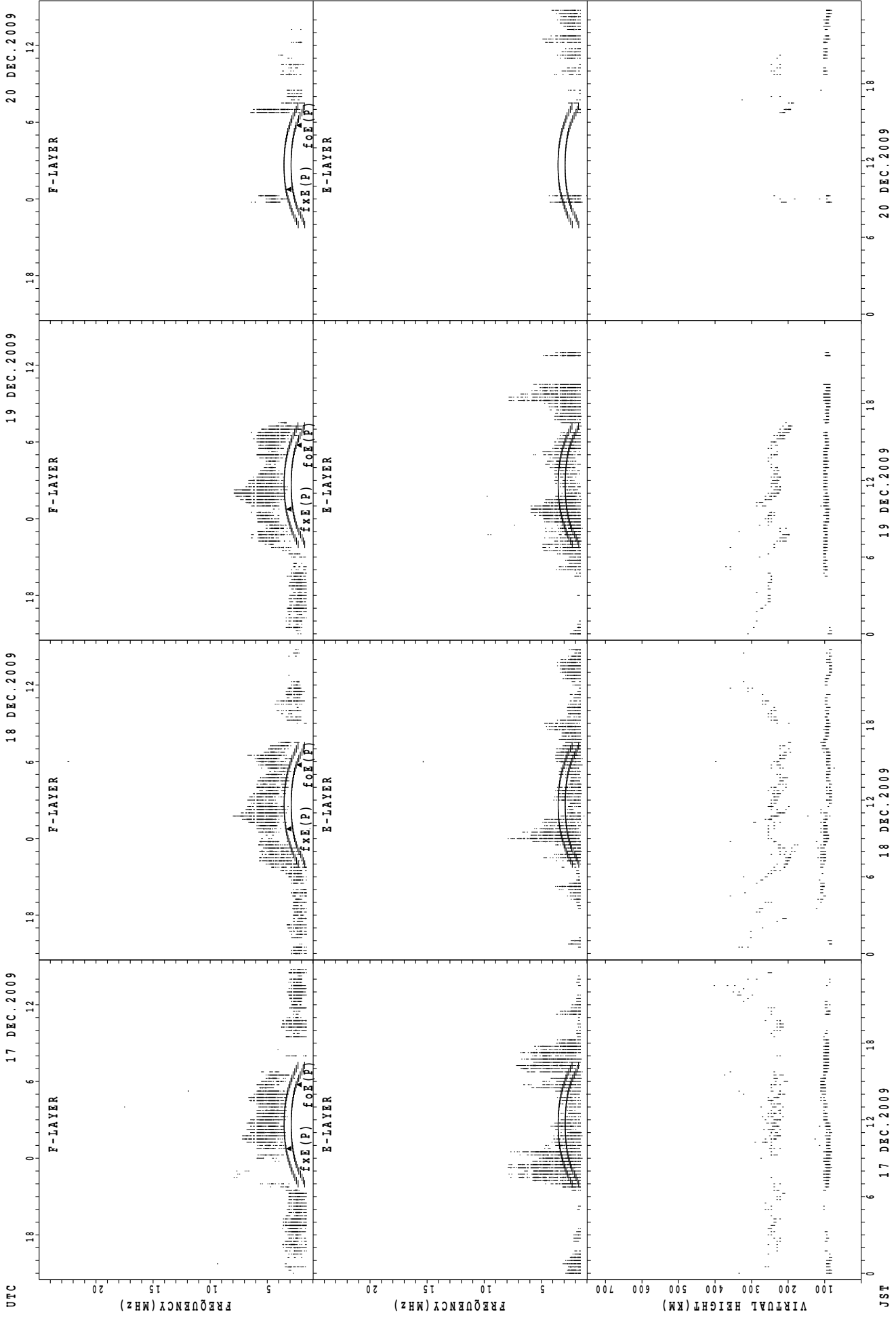
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



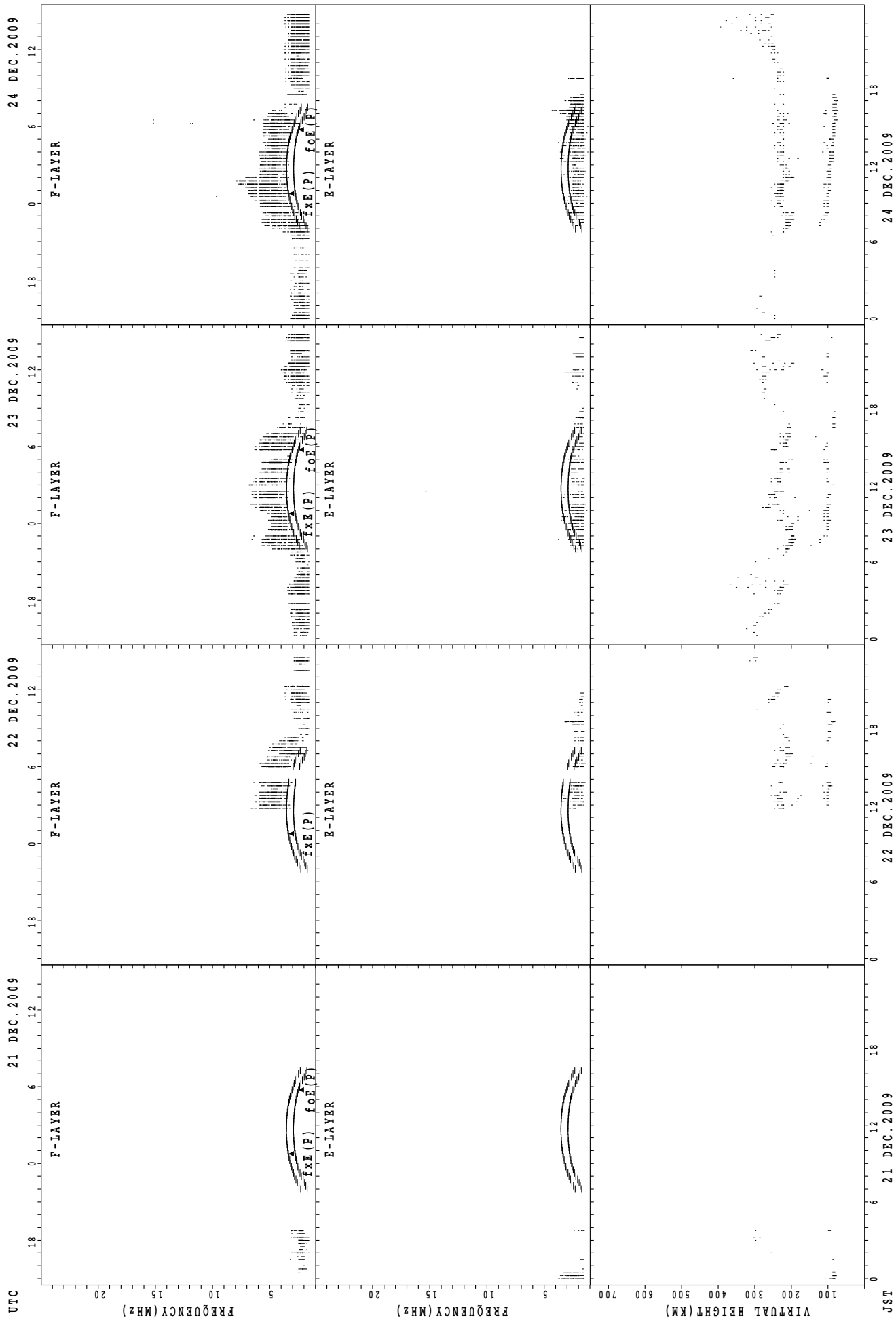
f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



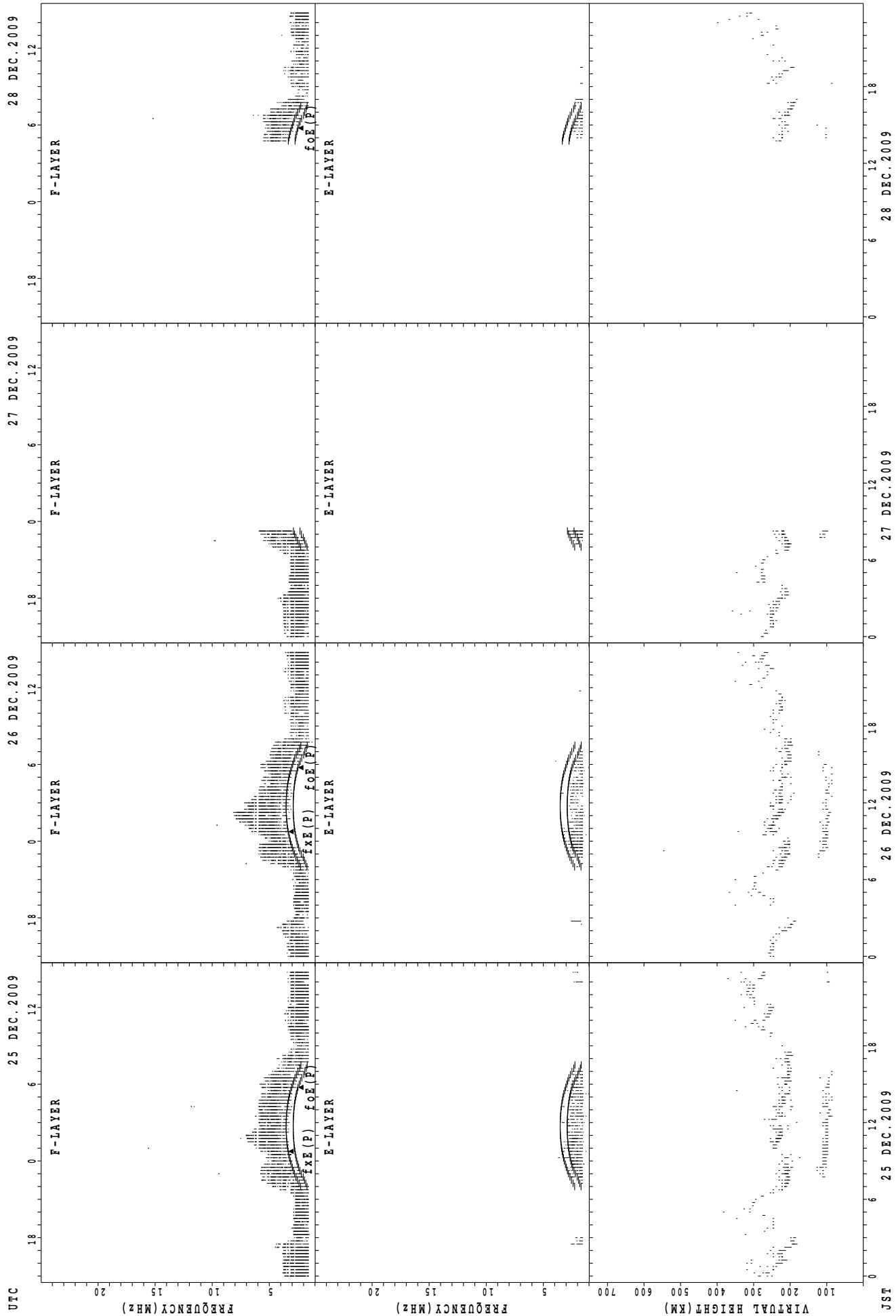
fxe(P); PREDICTED VALUE FOR fxe
foe(P); PREDICTED VALUE FOR foe

SUMMARY PLOTS AT Kokubunji



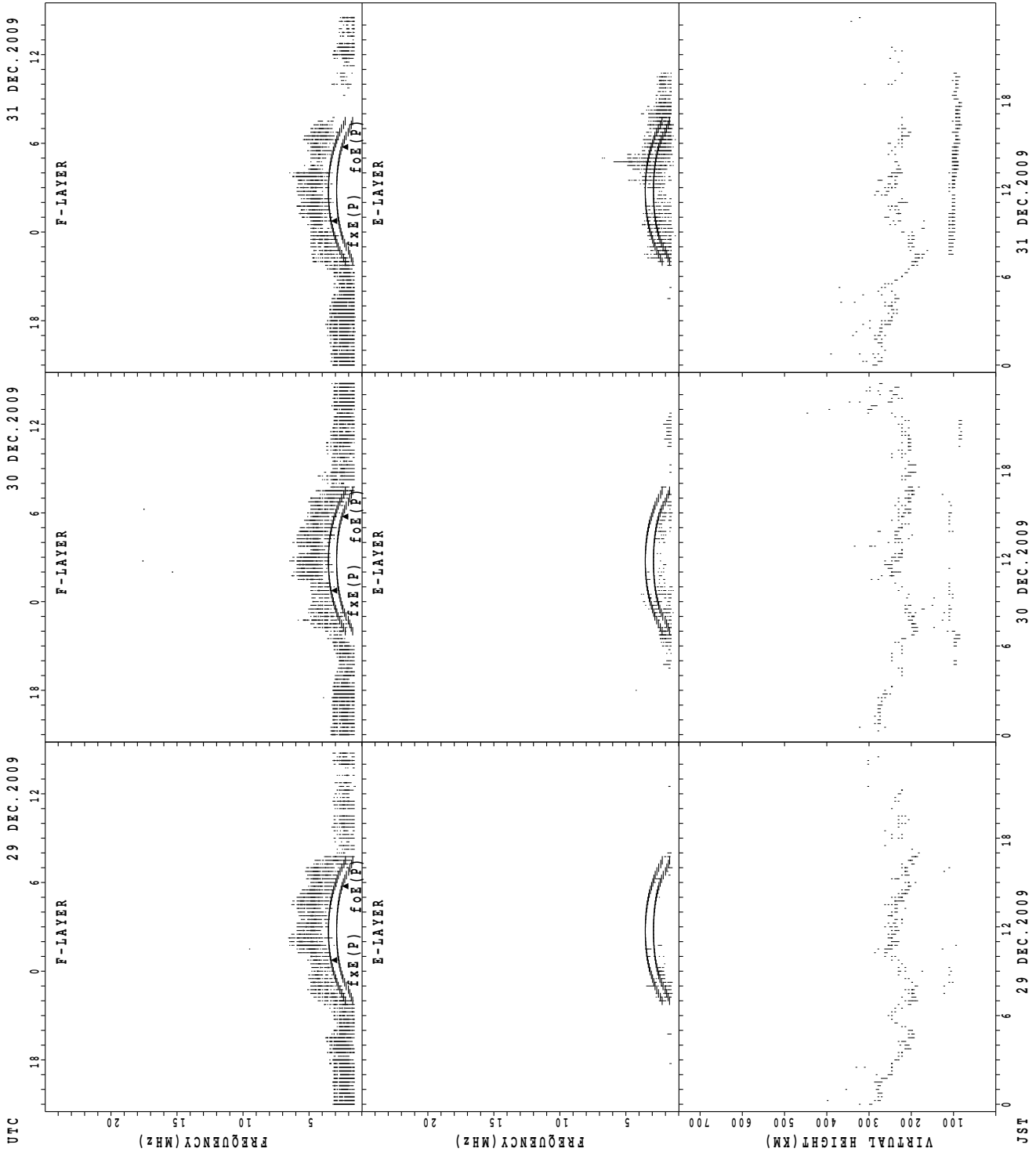
foE(P); PREDICTED VALUE FOR foE
foF(P); PREDICTED VALUE FOR foF

SUMMARY PLOTS AT Kokubunji



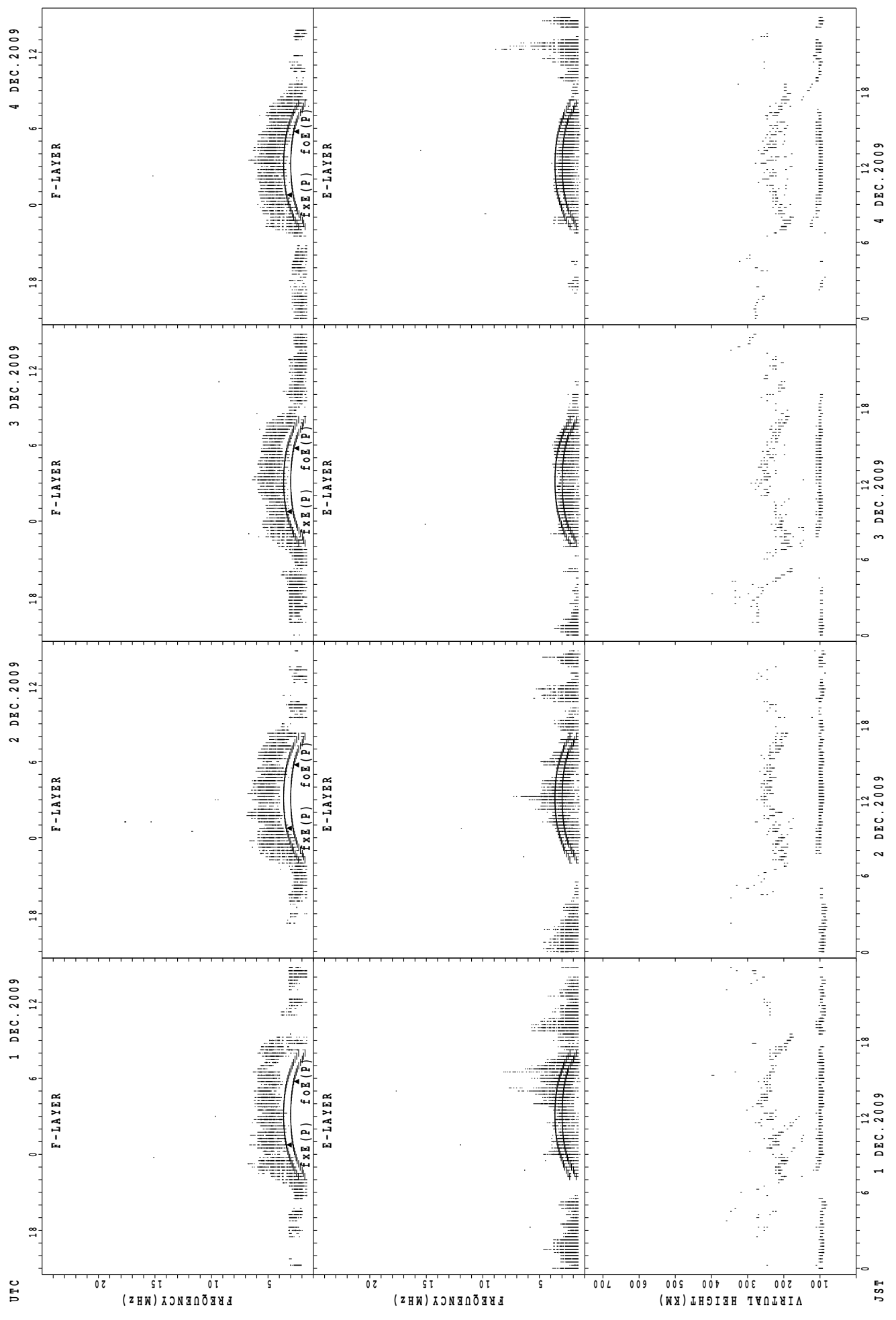
foE(P); PREDICTED VALUE FOR foE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



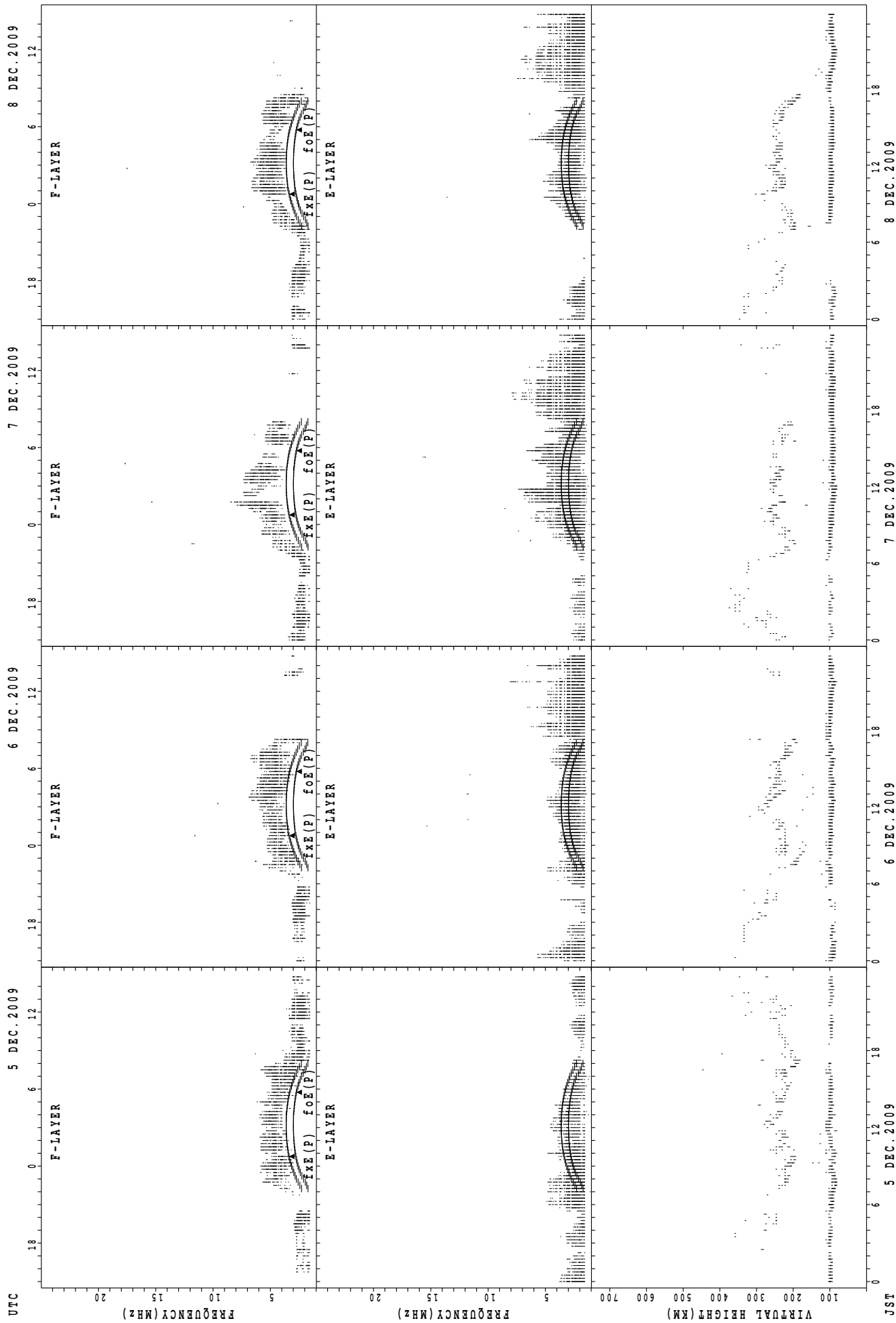
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



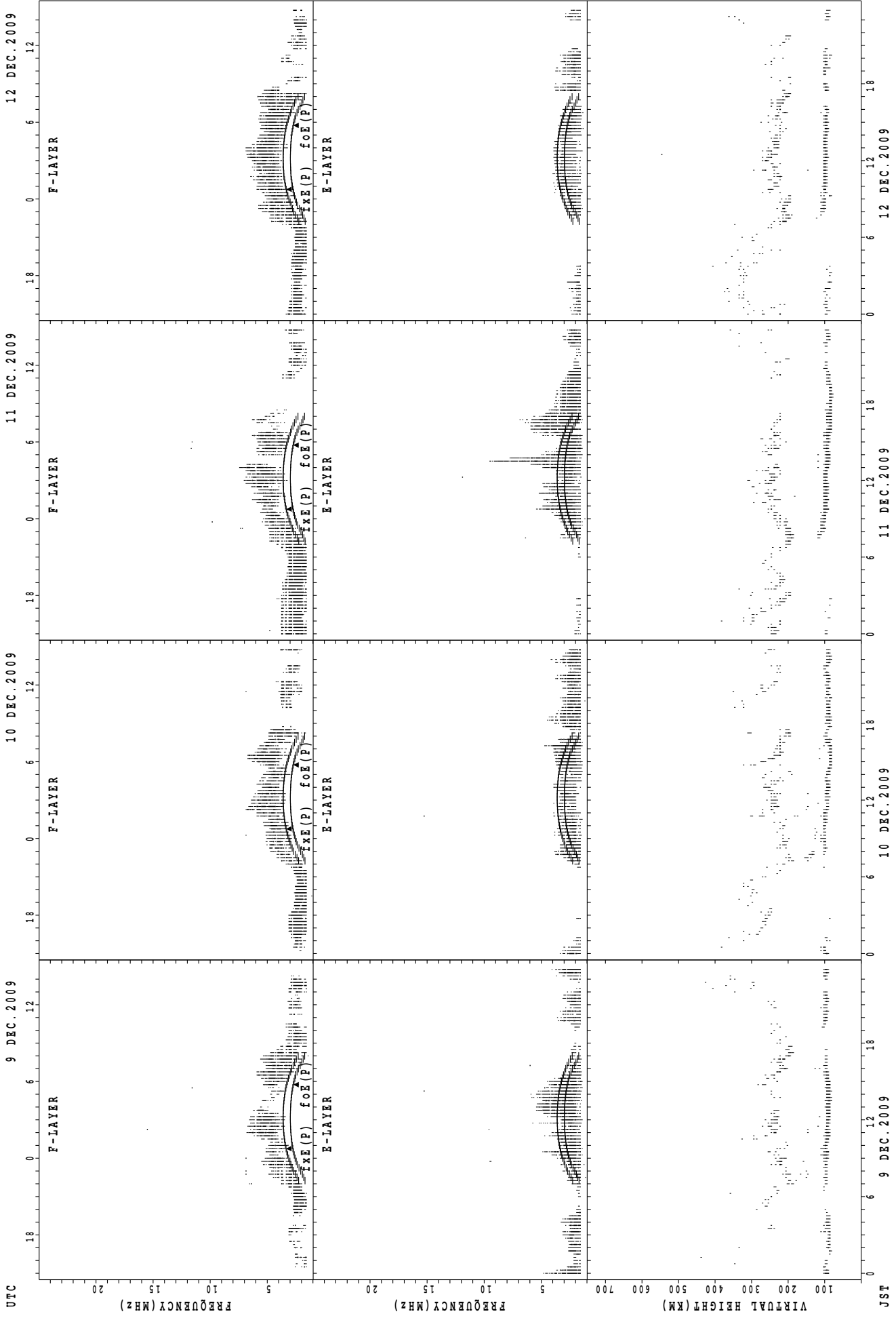
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



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

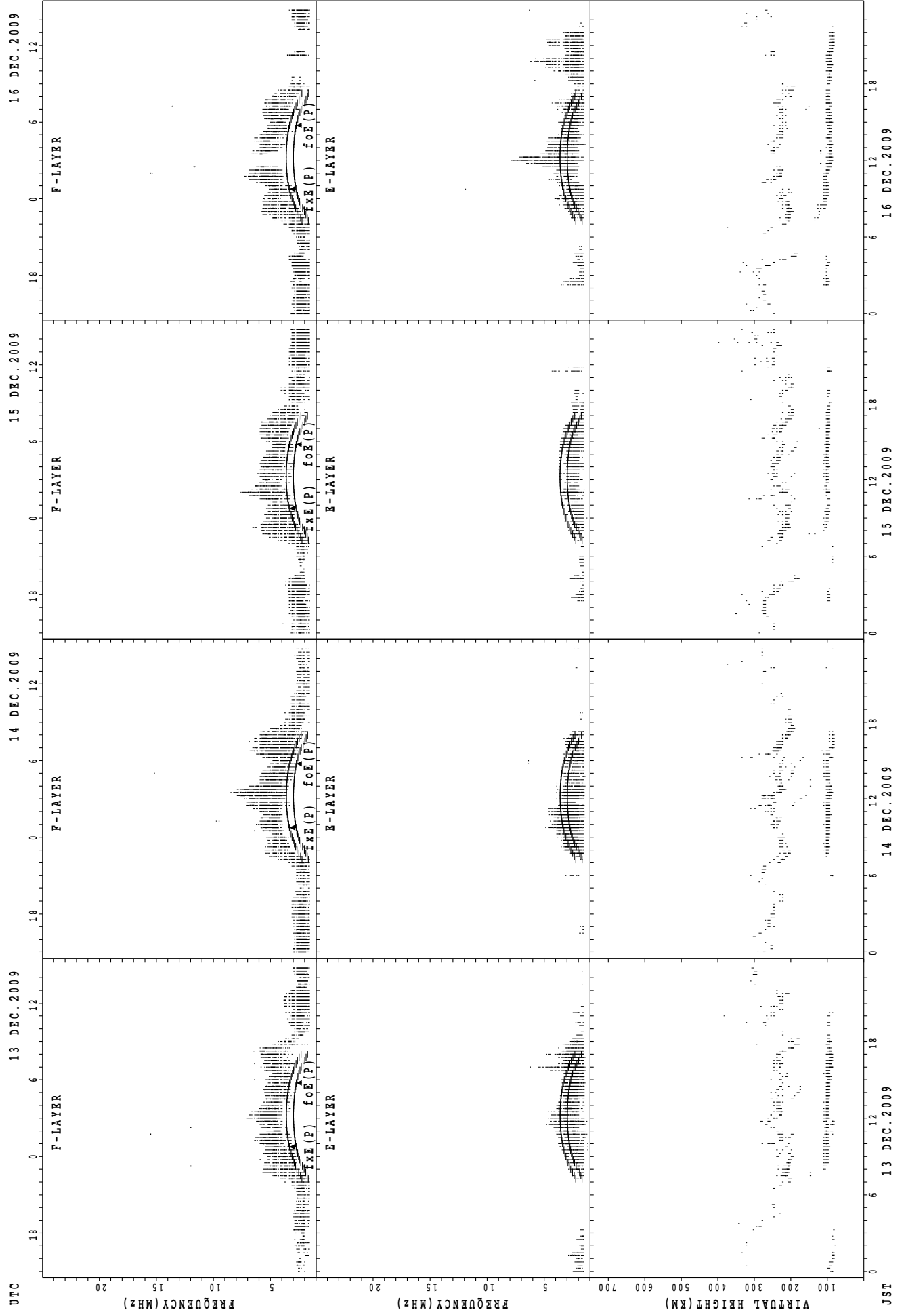
SUMMARY PLOTS AT Yamagawa



$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

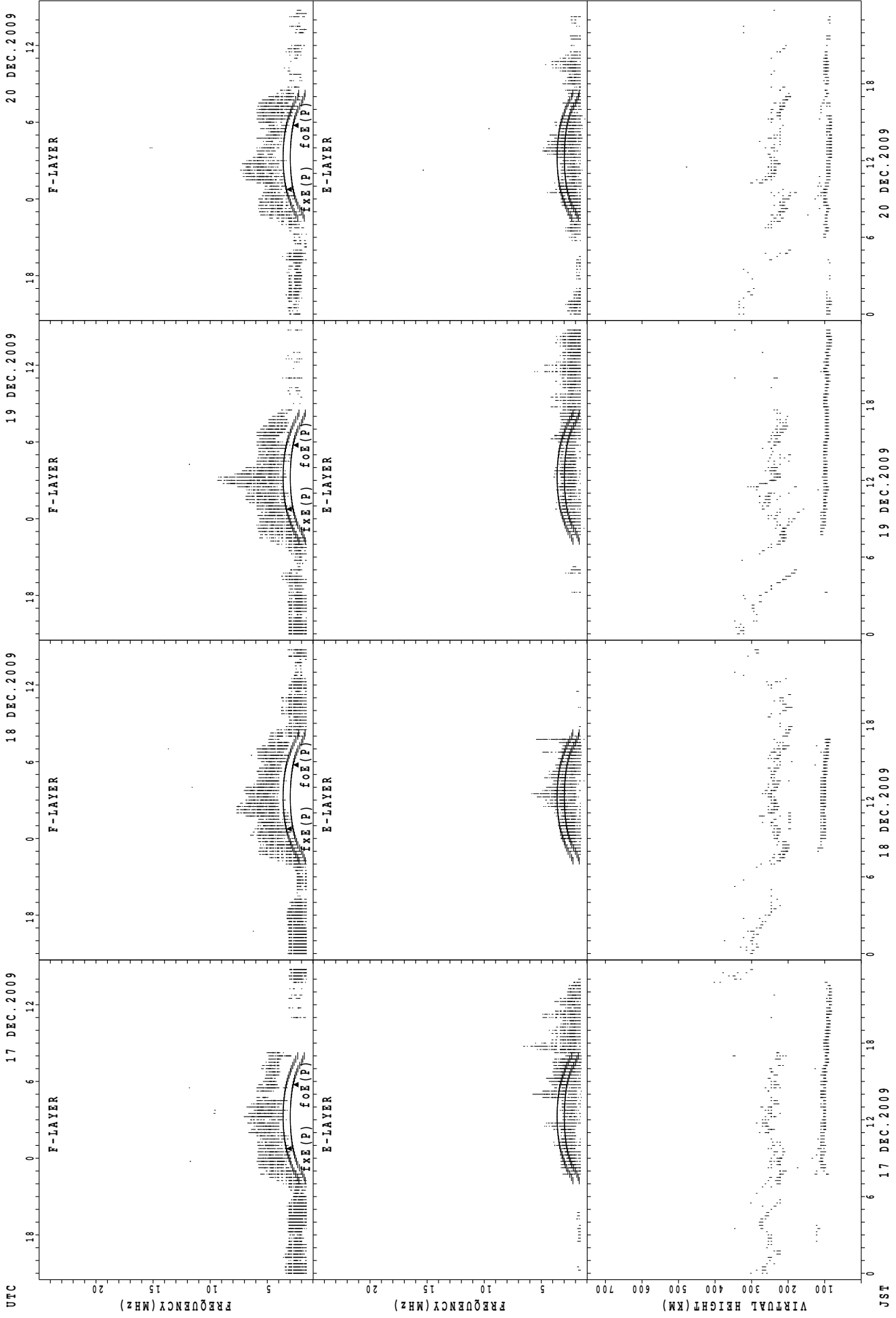
JST

SUMMARY PLOTS AT Yamagawa



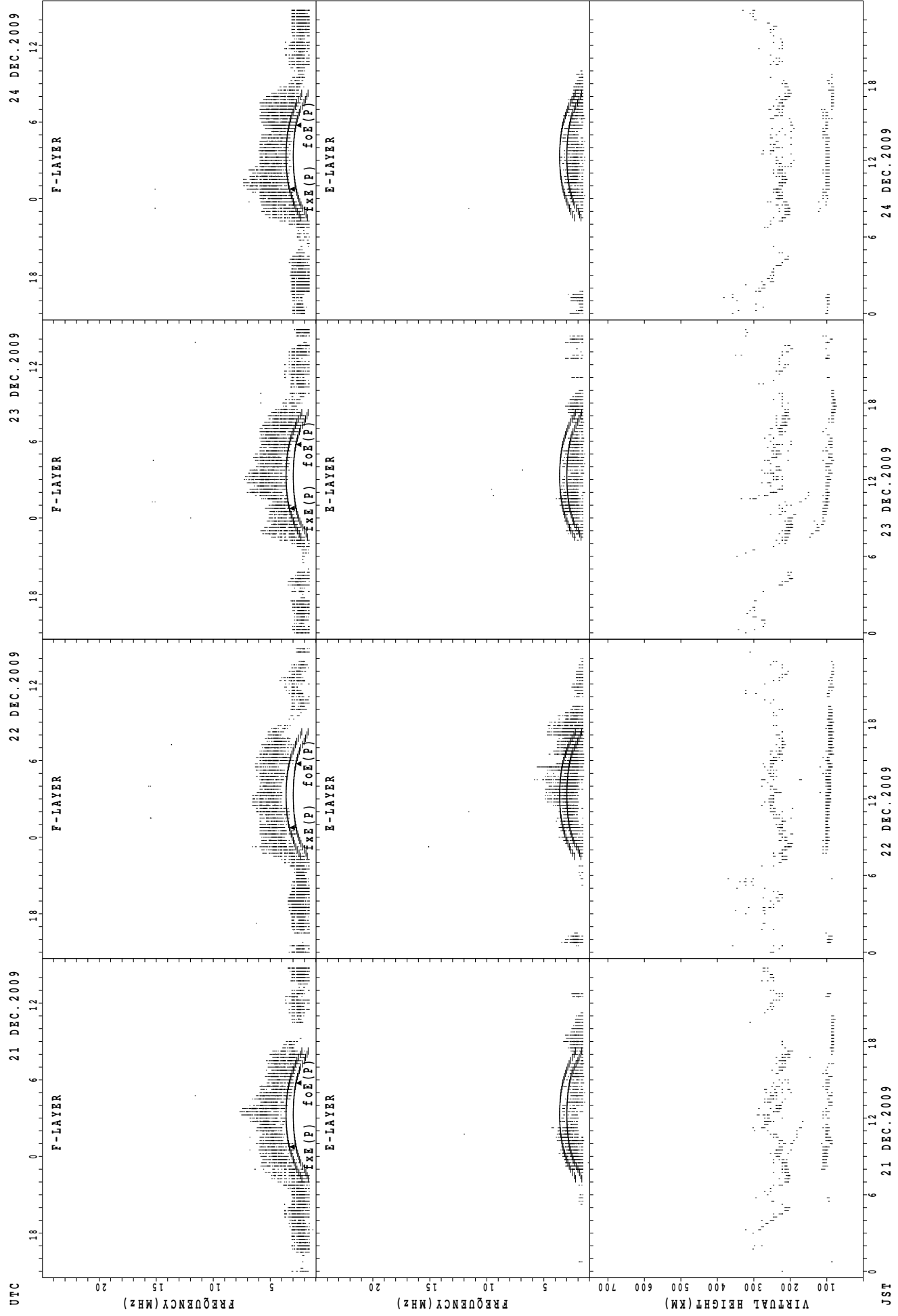
f_{xE}(P) ; PREDICTED VALUE FOR f_{xE}
 f_{oE}(P) ; PREDICTED VALUE FOR f_{oE}

SUMMARY PLOTS AT Yamagawa



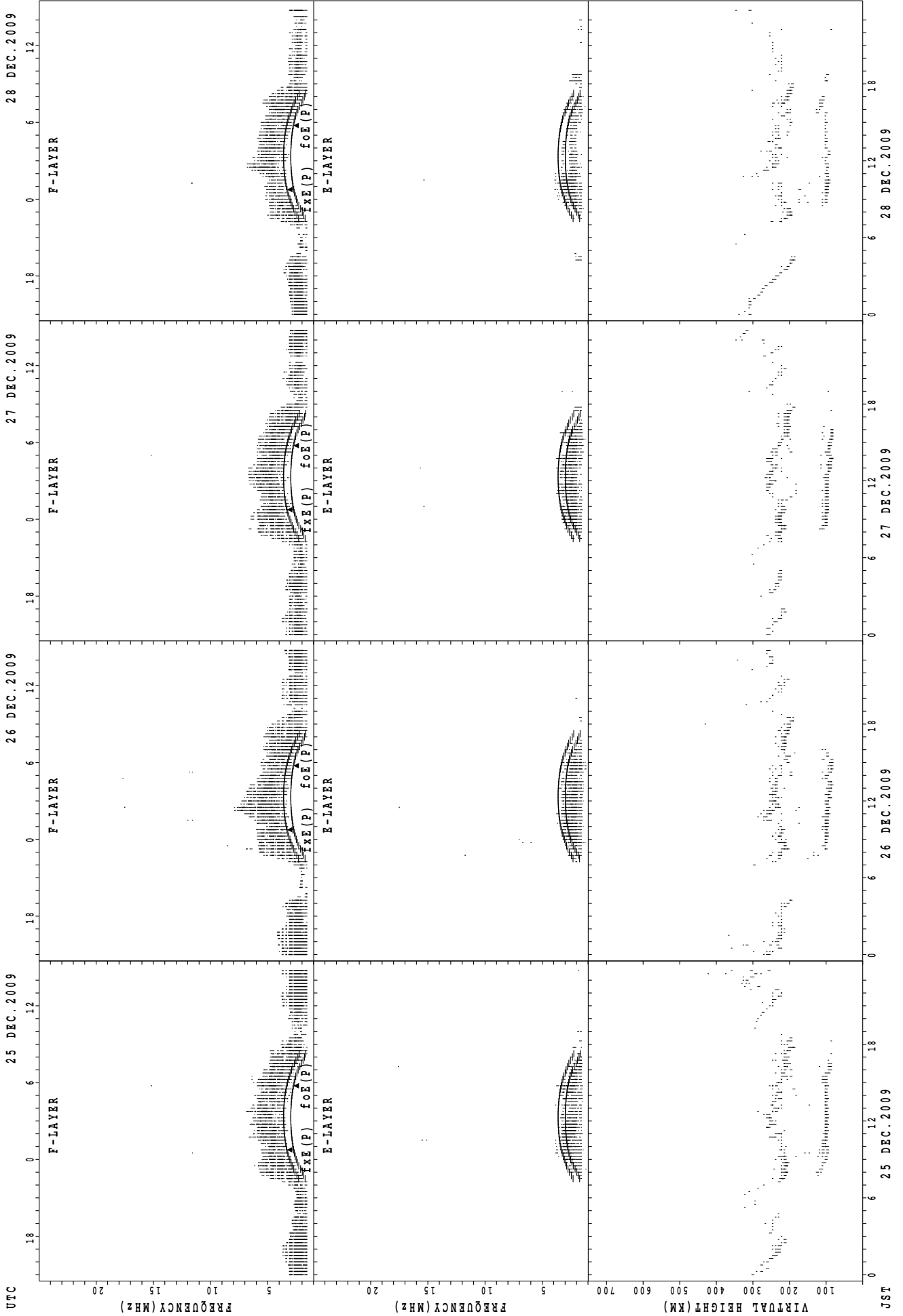
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



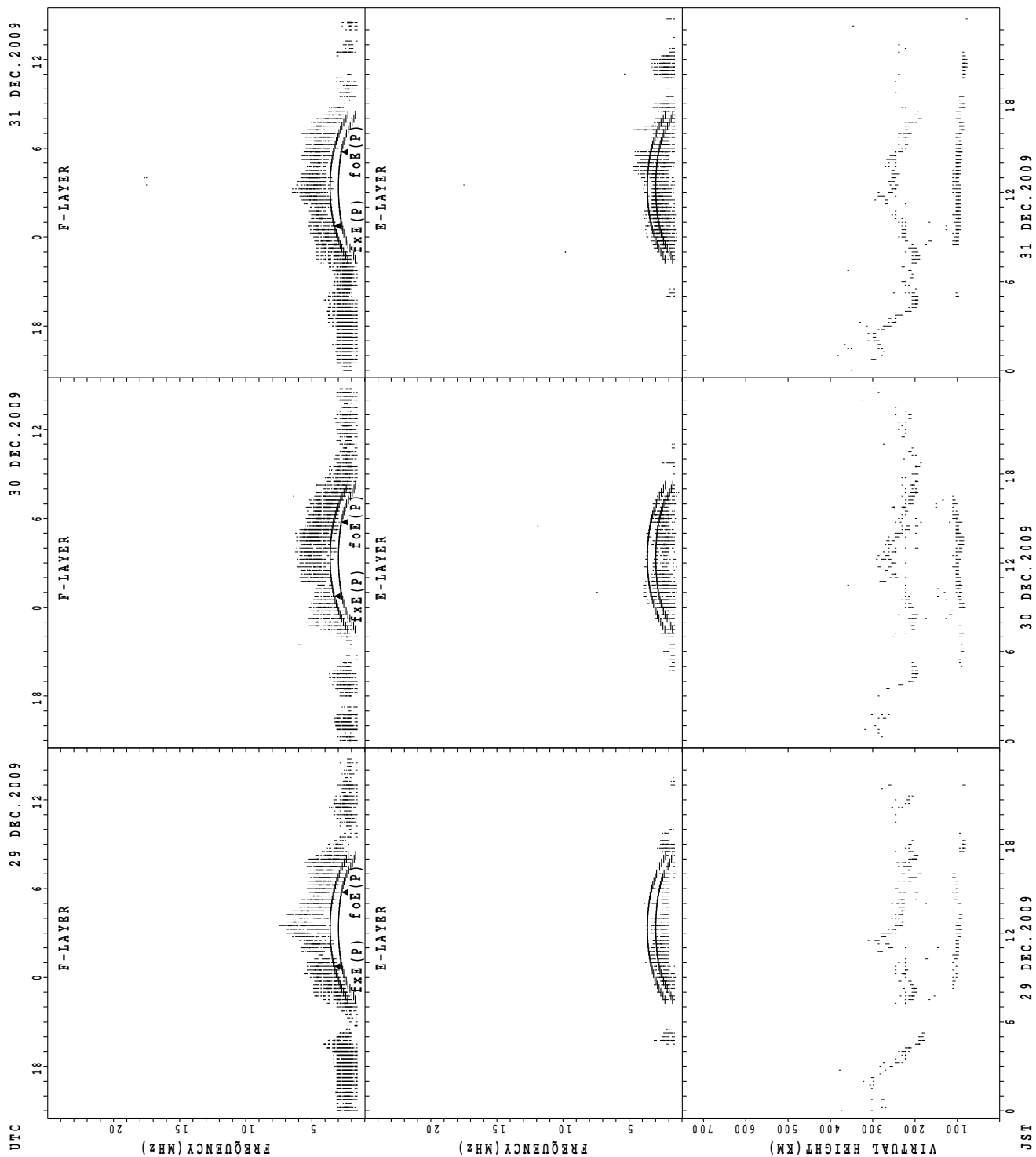
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



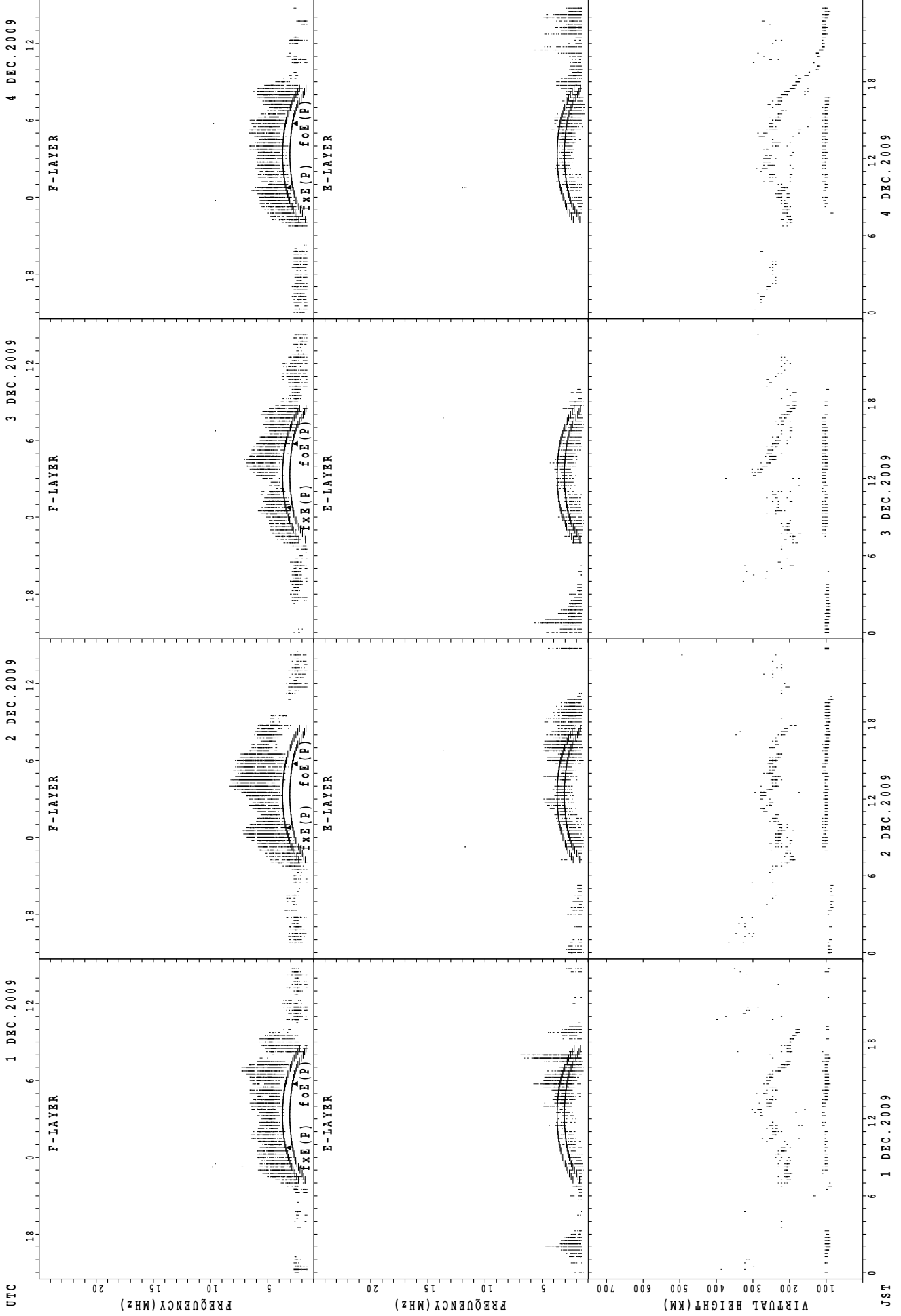
foE(P); PREDICTED VALUE FOR foE
foF(P); PREDICTED VALUE FOR foF

SUMMARY PLOTS AT Yamagawa



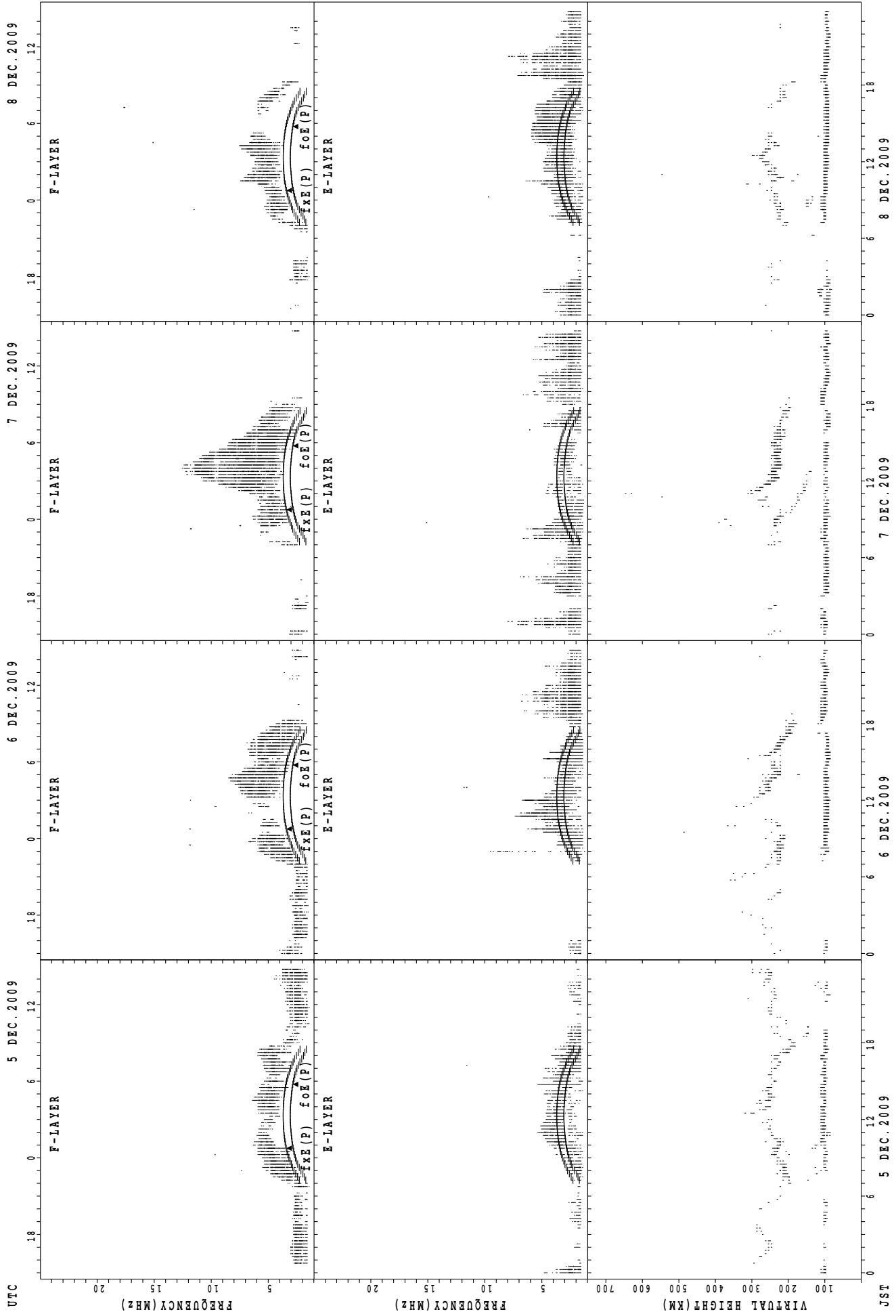
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



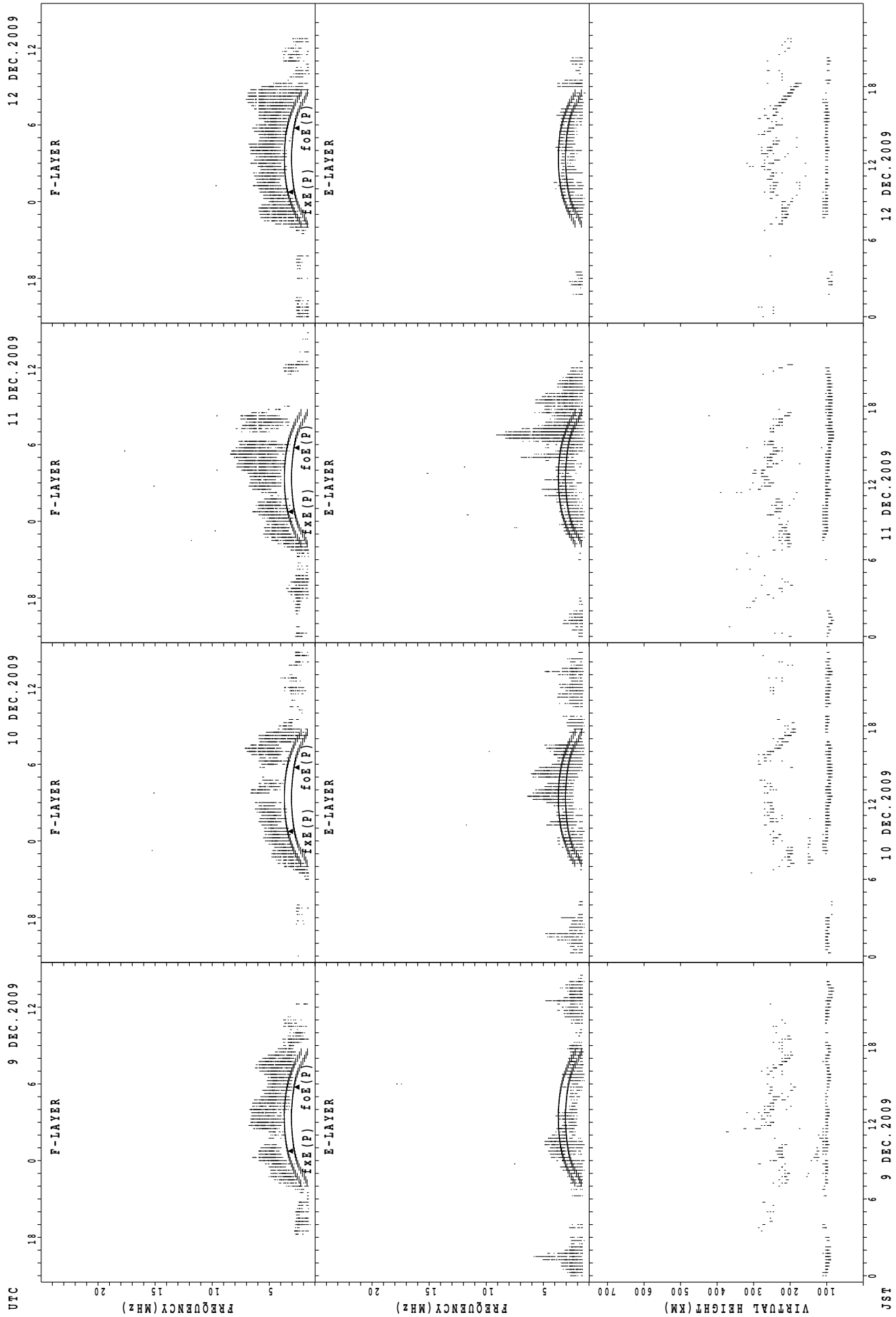
f_xE(P); PREDICTED VALUE FOR f_xE
 f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



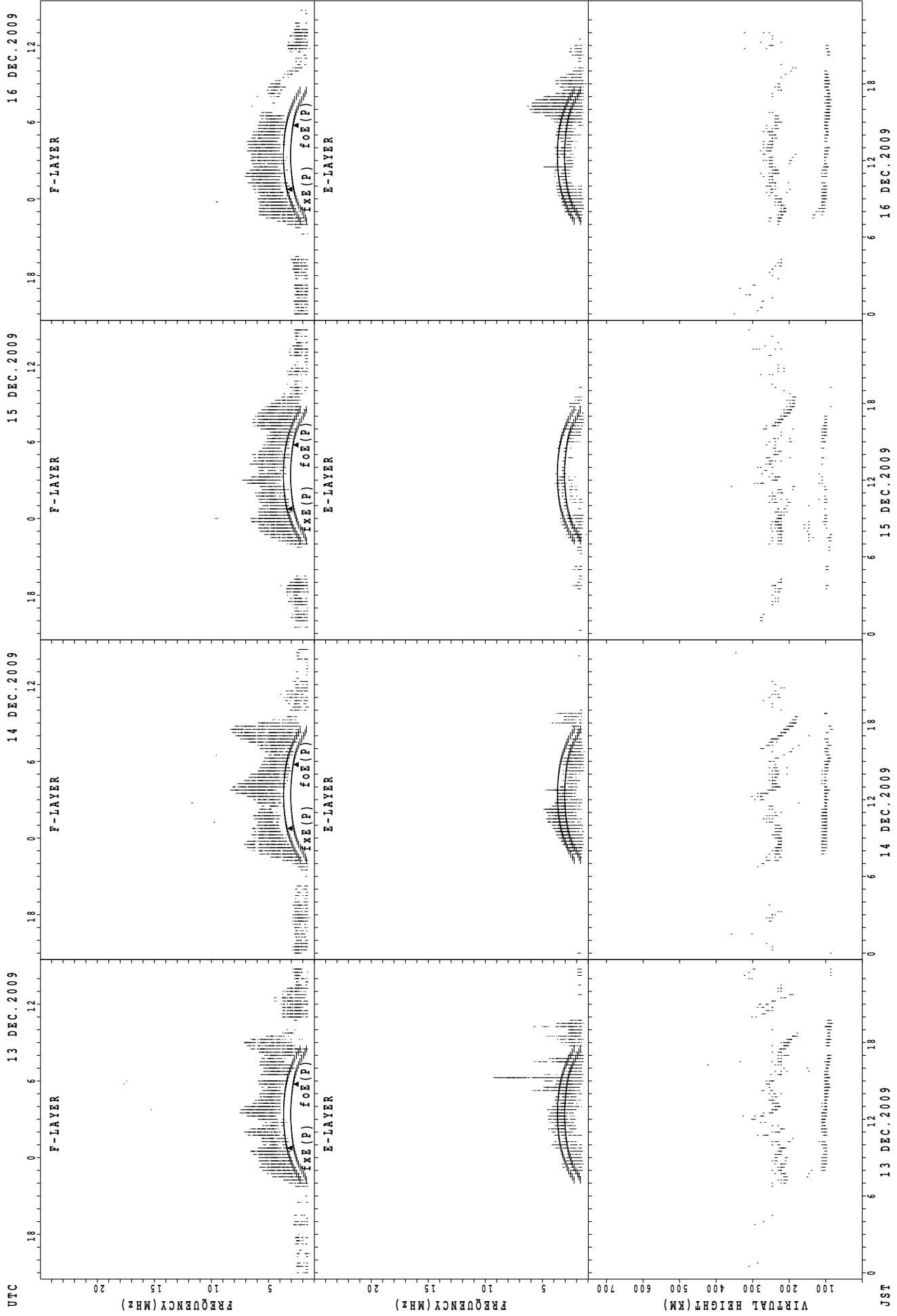
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



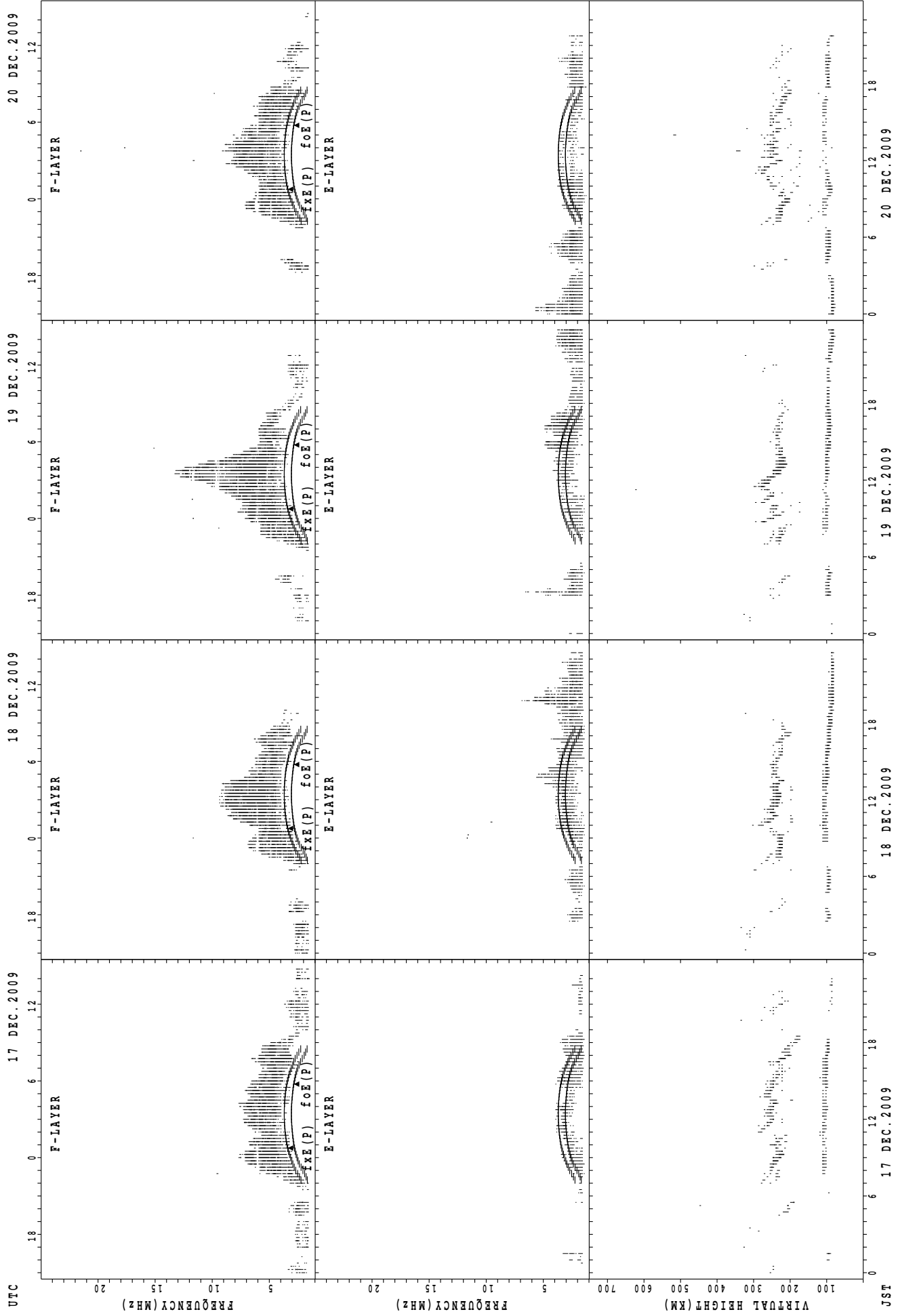
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



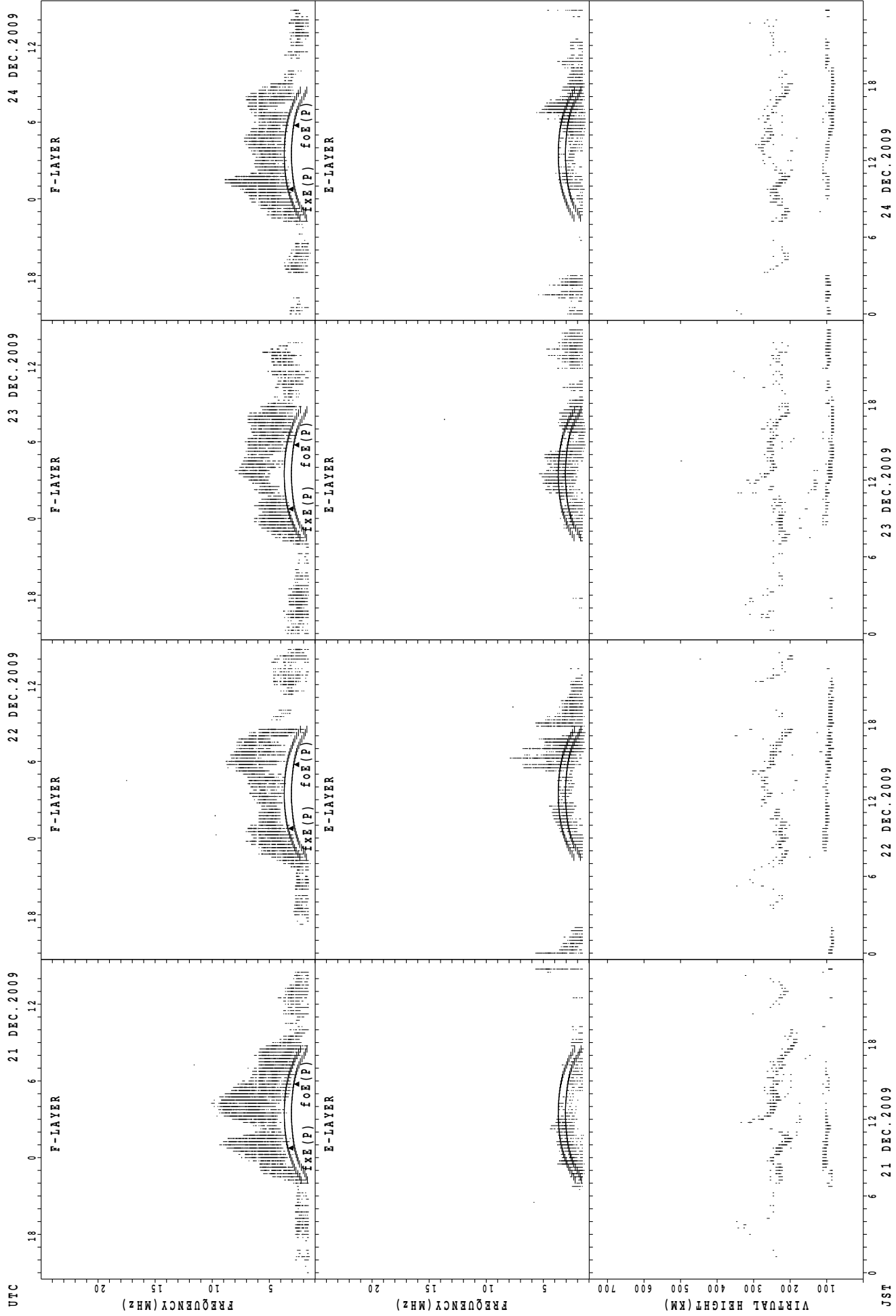
f_{xF}(P); PREDICTED VALUE FOR f_{xF}
foF₂(P); PREDICTED VALUE FOR foF₂

SUMMARY PLOTS AT Okinawa



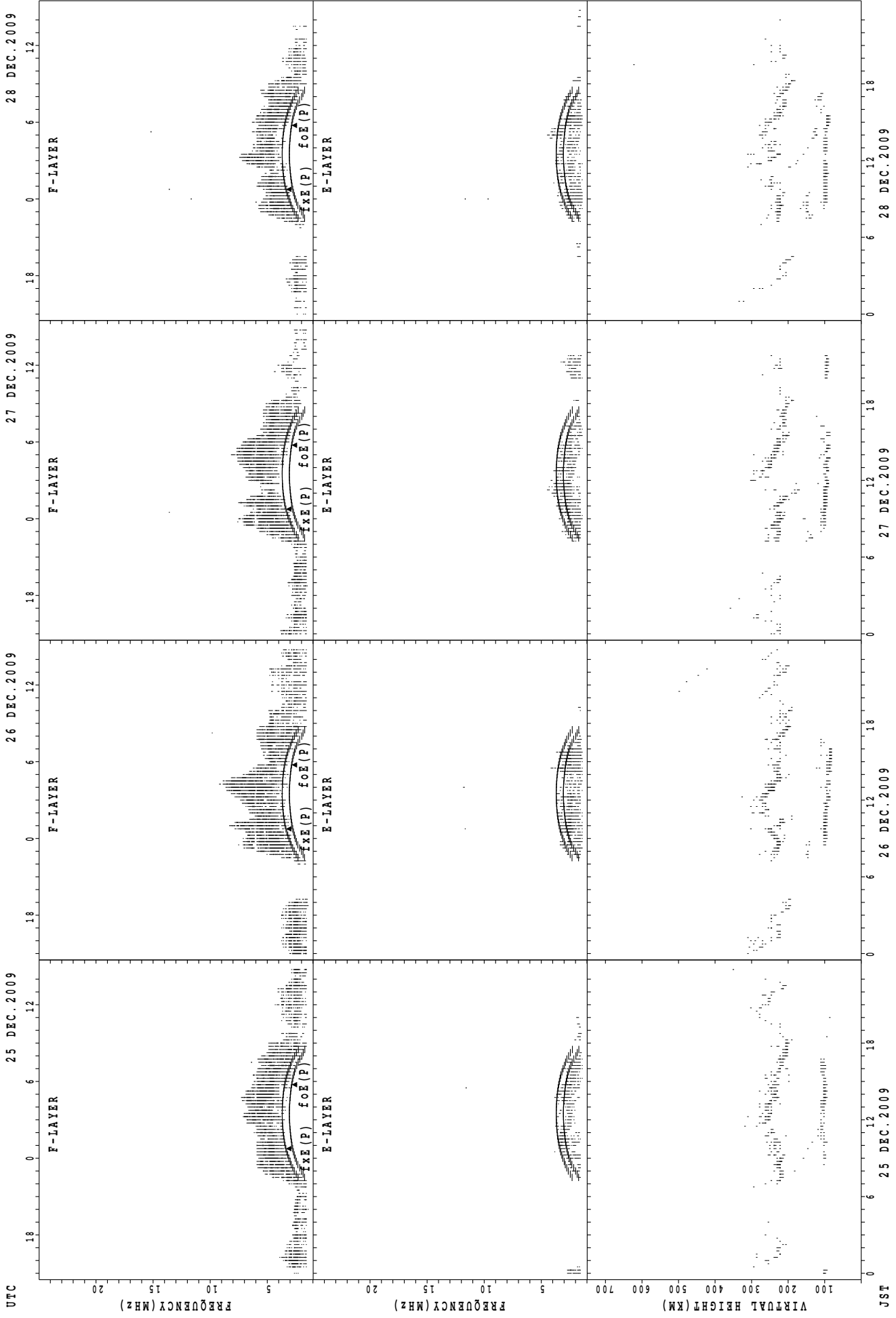
f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



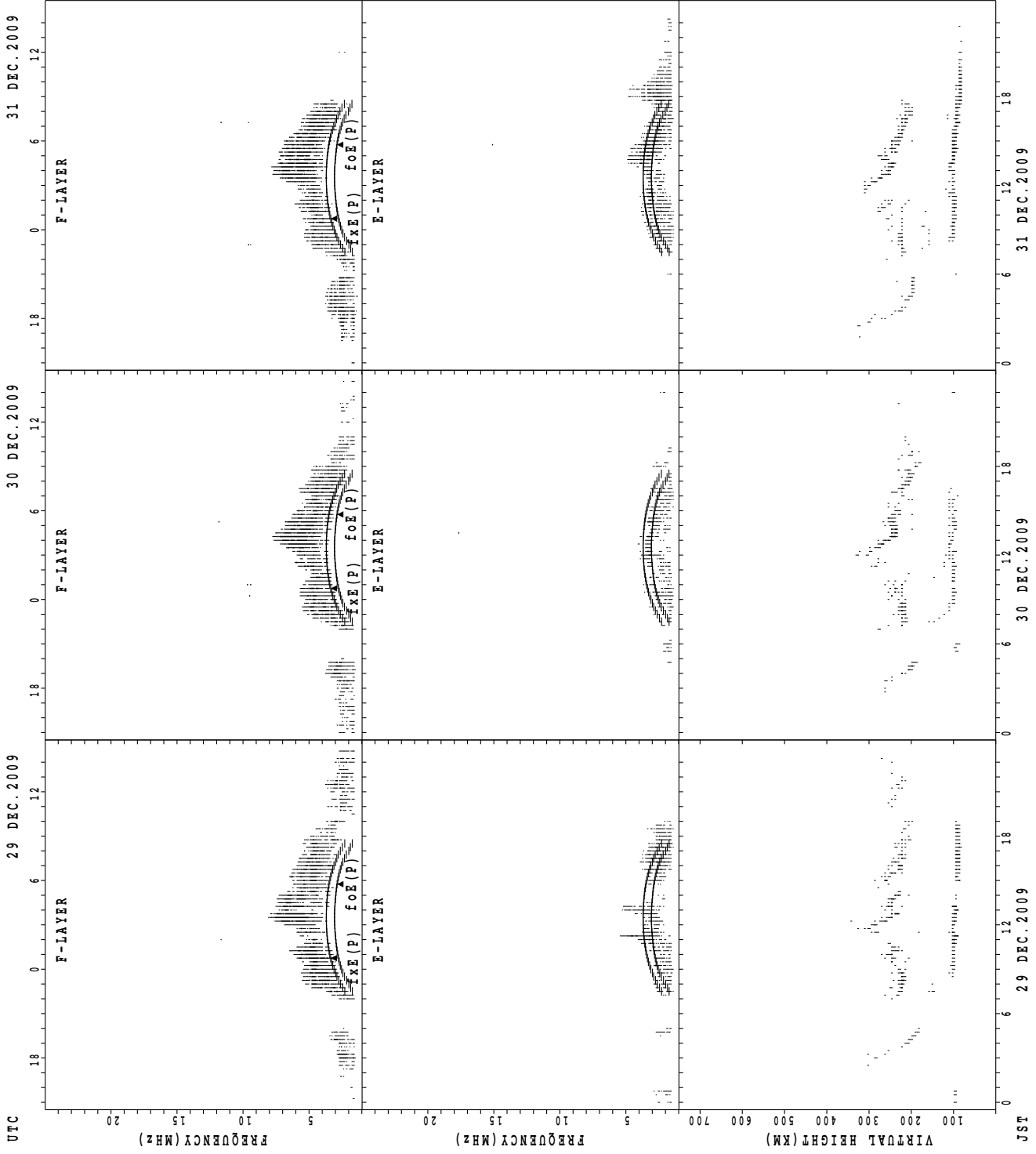
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



foF2(P); PREDICTED VALUE FOR foF2
foE(P); PREDICTED VALUE FOR foE

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									2	6	14	18	4	8	3									
MED									226	224	229	224	234	252	238									
U Q									236	230	242	232	239	270	238									
L Q									216	220	224	222	228	238	232									

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	15	14	9	8	11	11	18	26	20	18	9	9	6	10	8	18	17	17	16	17	18	13	17
MED	91	91	89	91	95	103	97	100	97	106	106	107	107	94	102	96	100	99	99	97	95	95	97	95
U Q	96	95	95	105	104	105	103	105	109	131	107	107	122	105	149	108	111	101	105	98	101	99	100	95
L Q	89	89	89	89	92	95	97	97	95	95	97	92	92	87	89	93	95	95	96	94	92	95	92	90

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								1	1	1	4	18	13	6	1	3	1							
MED								218	200	232	269	233	236	252	234	240	214							
U Q								109	100	116	285	246	250	256	117	248	107							
L Q								109	100	116	240	226	229	246	117	240	107							

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	9	2	5	3	6	6	12	15	16	13	9	12	12	17	14	17	19	16	17	16	14	14	13
MED	91	91	89	99	103	100	101	103	101	98	99	95	94	95	101	101	97	99	95	97	96	97	95	95
U Q	97	94	91	101	105	103	105	117	105	105	105	99	99	99	105	113	111	105	100	102	101	99	97	97
L Q	89	89	87	93	95	95	97	98	95	95	98	92	91	91	95	95	95	93	94	95	95	91	93	92

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									7	3	5	12			6	3	2							
MED									232	228	246	245			249	248	239							
U Q									238	246	264	262			264	288	248							
L Q									228	224	228	241			248	240	230							

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	10	8	6	4	4	3	5	17	21	22	17	12	18	18	22	25	22	21	18	18	13	13	13
MED	97	95	94	96	98	144	99	97	113	103	101	99	97	97	98	95	95	97	95	97	96	95	95	97
U Q	99	97	99	99	100	185	103	105	123	107	105	105	103	103	99	103	103	101	101	103	97	97	97	98
L Q	95	91	91	95	94	96	91	97	102	99	101	97	95	95	93	93	95	91	89	95	91	89	89	91

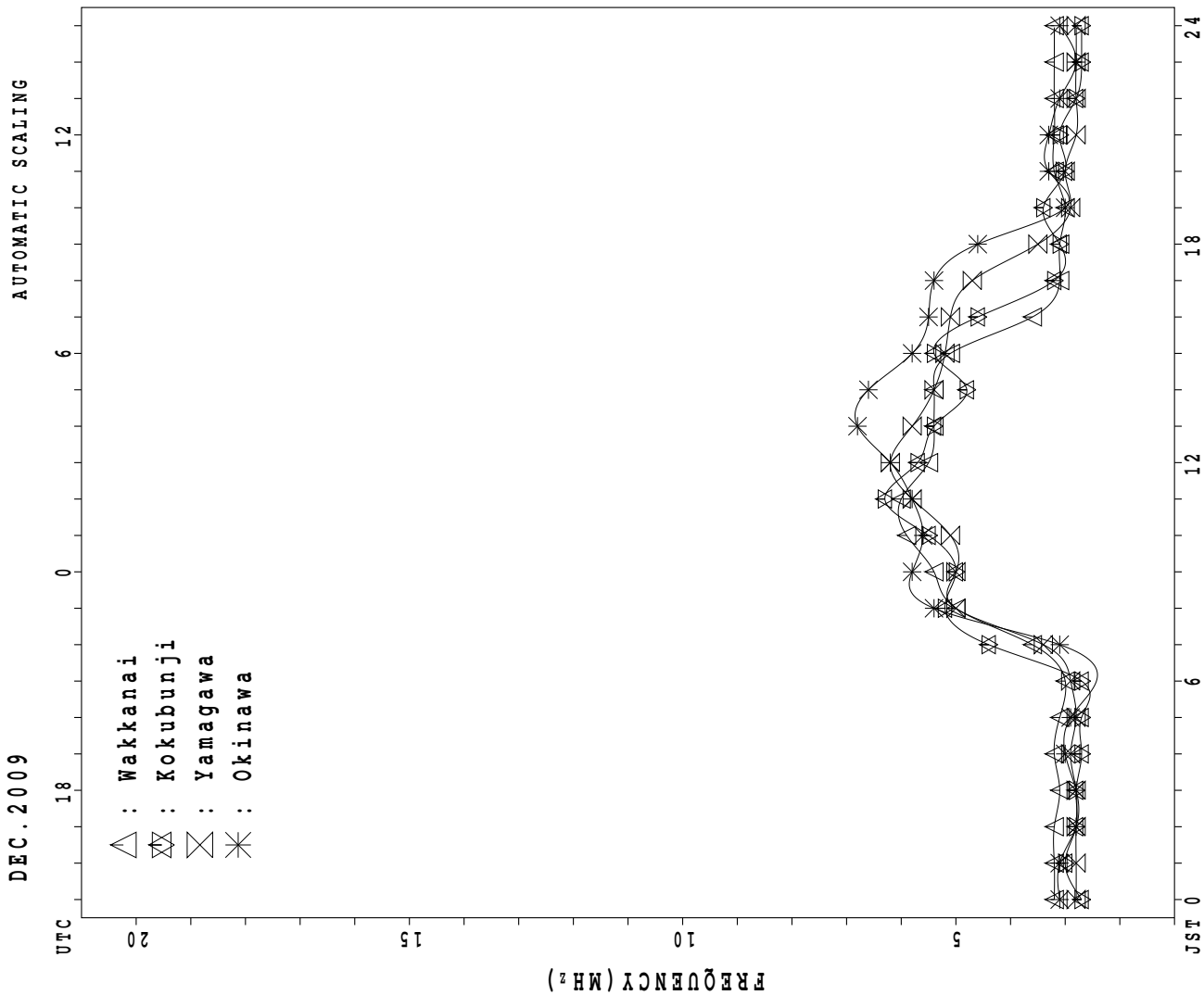
h'F STATION Okinawa LAT. 26°41.0'N LON. 128°09.0'E

	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	16	16					12	7	6	1					
MED									243	238	238					247	246	230	216					
U Q									247	245	260					265	272	232	108					
L Q									235	231	230					238	236	228	108					

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	8	9	9	4	4	4	2	21	18	16	15	20	17	17	21	21	20	21	16	15	13	10	9
MED	97	95	97	97	97	97	97	141	119	107	105	103	105	103	103	101	97	95	97	97	95	97	95	95
U Q	105	101	106	97	103	97	116	183	150	143	112	119	133	105	105	104	105	100	102	105	101	101	97	101
L Q	93	89	96	95	92	96	96	99	105	103	101	97	98	97	96	96	95	95	94	92	95	95	91	92

MONTHLY MEDIANS PLOT OF fOF2



IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 f_{XI} (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

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

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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	F	28	29	F	F	F	39	59	63	59	59	65	57	58	52	51	48	A	27	30	35	30	A	25
2	26	26	F	26	F	24	25	51	72	55	60	62	61	48	49	55	51	36	24	30	31	25	27	23
3	28	29	29	F	F	F	32	46	50	48	53	54	53	53	48	52	50	26	32	33	A	28	27	28
4	27	28	27	26	24	21	24	53	51	52	53	63	56	53	50	46	38	29	A	A	A	F	F	F
5	27	23	25	25	24	23	27	46	45	48	52	58	55	52	47	51	48	A	24	A	34	30	A	28
6	28	A	28	25	26	25	27	46	46	46	61	60	55	54	55	55	48	A	A	24	A	36	32	F
7	33	32	F	F	F	F	26	45	42	62	89	71	59	A	51	51	46	A	29	A	28	33	F	24
8	25	27	29	26	26	23	24	42	43	50	54	58	56	52	43	56	42	32	27	26	26	28	F	A
9	24	23	27	26	26	26	24	42	43	46	49	65	56	48	47	55	44	38	A	A	A	A	28	F
10	F	F	F	F	21	20	18	37	45	45	58	56	62	50	55	53	46	34	35	38	40	33	F	28
11	F	F	F	F	F	F	F	42	52	51	53	60	67	54	51	61	52	A	32	34	30	A	26	28
12	F	F	F	26	27	25	28	40	48	54	60	59	68	57	47	56	44	30	30	33	36	A	25	25
13	25	26	30	30	33	29	31	45	47	54	53	68	57	48	47	53	49	32	29	27	28	29	30	28
14	28	28	29	27	28	26	26	42	48	48	59	67	60	57	60	57	43	31	44	35	24	22	28	30
15	30	33	32	34	24	21	24	44	54	54	47	68	53	54	48	53	47	24	36	36	41	33	F	F
16	27	28	F	F	24	22	24	49	54	49	61	74	59	51	57	51	44	36	35	32	27	24	28	F
17	30	30	32	30	31	29	26	42	A	55	55	62	59	54	58	51	A	29	30	33	31	25	F	F
18	F	22	26	27	22	22	26	48	53	52	58	68	63	57	48	57	46	A	A	38	32	28	29	28
19	30	29	28	26	28	24	24	48	53	56	58	75	62	49	55	58	52	A	A	A	C	C	A	C
20	C	C	C	C	C	C	C	C	C	49	C	C	C	C	C	C	58	31	C	36	36	C	C	30
21	A	28	28	27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	57	55	C	54	43	38	27	26	31	34	21	25
23	C	27	29	C	F	F	22	45	50	44	55	61	62	56	49	58	49	C	29	29	32	36	24	C
24	28	25	28	28	27	26	C	44	51	57	66	68	53	55	50	52	48	34	29	32	31	33	F	F
25	F	F	F	F	24	24	22	43	55	50	58	66	55	56	54	54	43	39	25	29	31	F	F	F
26	F	30	F	24	24	F	F	39	56	48	64	76	68	57	51	53	43	34	29	36	35	28	31	F
27	32	33	34	F	27	26	27	43	55	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	52	50	45	30	27	33	28	26	27	27
29	26	27	28	30	30	27	26	40	46	46	49	60	56	56	57	46	48	30	27	29	28	28	28	28
30	29	28	28	28	25	22	25	38	47	44	45	58	58	58	53	48	44	33	33	32	30	28	27	F
31	F	F	F	F	F	F	24	41	44	45	52	52	56	56	46	48	44	34	30	28	28	28	23	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	22	19	18	20	20	24	27	26	27	26	26	27	26	27	28	28	21	23	24	24	22	17	15
MED	28	28	28	26	26	24	26	44	50	50	56	62	57	54	51	53	46	32	29	32	31	28	27	28
U Q	30	29	29	28	28	26	27	46	54	54	60	68	62	56	55	56	48	35	32	34	34	33	28	28
L Q	26	26	28	26	24	22	24	42	46	46	53	59	56	52	48	51	44	30	27	29	28	28	26	25

DEC. 2009 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	U L 384		L											
2										L	U L 388	L	U L 404											
3									L		U L 376	L	U L 396	L	L									
4											L		L		A									
5											L	U L 392	A	A	L									
6										L	U L 360	U L 396	L	L	L									
7										L	U L 408	A	A	A	L	A								
8										L	L	L	L	L		L								
9											L	A	L											
10											A	U L 524	L		U L 440									
11										L	A	A	A	L	A	A								
12											U L 416	A	A	L										
13										L	A	L	L	A		A								
14											L	A	A	U L 408										
15												U L 408	L	U L 416										
16											L	L	L	L			A							
17									A	A		L	A		A		A							
18											A		L	L										
19											L	L	L		A									
20									C	C	L	C	C	C	C	C								
21									C	C	C	C	C	C	C	C	C							
22									C	C	C	C	C	L	L	C								
23													L	L	L		A							
24										L	L			L	A									
25										L	L		L	L										
26											L	L	L	L	L									
27										C	C	C	C	C	C	C	C	C						
28									C	C	C	C	C	C	C	L								
29										L		A	L	L	L									
30											U L 384	U L 388	L	L	L									
31										L	U L 380	L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	8	4	2	2	1									
MED										U L 360	U L 390	U L 398	U L 400	U L 412	U L 440									
U Q											U L 402	U L 466												
L Q											U L 382	U L 386												

DEC. 2009 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									BUR		A	A	R	R		R	B							
2									236	268					260									
3									B	R	R	R	R	R	RU	A	A							
4									240						232									
5									B		UR		A	A	A	A	A							
6									220	264	288	304												
7									BUR		UR		R	A	AUR		A							
8									228	288	296	308				224								
9									B	A	A	A	A	A	A	R	A							
10									A	A	R	R	A				A	B						
11									B	A	A	A	A	A	268									
12									B	A	A	A	A	A	A	A	A							
13									B	A	A	R	A	A	A	A	A	B						
14									B	A	A	A	A	A	A	A	A							
15									B	A	AUR		A	R	R	R	A							
16									B	A	A	A	A	A	A	R	B							
17									B	A	A	A	A	A	A	A	A							
18									B	A	AUR		A	R	R	R	A							
19									B	A	A	A	A	A	A	A	A							
20									B	A	A	A	A	A	A	R	B							
21									B	A	A	A	A	A	A	A	A							
22									B	A	A	A	A	A	A	A	A							
23									B	A	A	A	A	A	A	A	A							
24									B	A	A	A	A	A	A	A	A							
25									B	A	A	A	A	A	A	A	A							
26									B	A	A	A	A	A	A	A	A							
27									B	A	A	A	A	A	A	A	A							
28									B	A	A	A	A	A	A	A	A							
29									B	A	A	A	A	A	A	A	A							
30									B	A	A	A	A	A	A	A	A							
31									B	A	A	A	A	A	A	A	A							
									B	A	A	A	A	A	A	A	A							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									16	8	10	7	1	2	6	9	6							
MED									224	270	298	304	316	290	268	224	188							
UQ									UR	UR	UR				U	U								
LQ									228	284	304	328			268	232	192							
									220	266	288	300			260	222	184							

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A	J A	20	22	J A	19	20	E B	G	J A	J A	G	G	32	G	20	23	J A	J A	J A	J A	J A	J A	J A
2	19	J A	J A	E B	E B	E B	20	G	G	G	G	G	G	26	28	28	24	E B	J A	J A	29	31	J A	J A
3	J A	J A	20	19	20	16	17	25	27	33	25	35	38	34	34	28	33	74	46	27	53	31	31	24
4	22	J A	J A	J A	E B	E B	E B	E B	G	33	26	36	27	43	46	20	G J	J A	J A	J A	J A	J A	J A	J A
5	J A	J A	20	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	G	J A	J A	J A	J A	J A	J A	J A	J A
6	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
7	E B	J A	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
8	19	J A	38	22	19	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
9	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
10	J A	E B	14	21	19	22	25	28	25	31	42	36	36	21	32	38	24	27	22	32	30	22	15	13
11	J A	E B	E B	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
12	E B	E B	E B	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
13	E B	E B	15	21	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
14	20	18	14	20	15	18	14	23	25	31	26	66	40	31	32	28	23	J A	J A	E B	J A	E B	E B	E B
15	E B	E B	15	20	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
16	E B	E B	J A	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
17	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
18	E B	J A	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
19	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
20	C	C	C	C	C	C	C	C	C	30	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	J A	J A	E B	E B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	C	27	21	26	20	21	22	21	14
23	C	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	19	E B	E B	E B	E B	E B	E B	E B	E B	G	G	J A	G	G	G	G	J A	J A	E B	E B	E B	E B	E B	E B
25	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	J A	G	G	G	G	G	J A	E B	E B	E B	E B	E B	E B	E B
26	19	19	21	E B	E B	E B	E B	E B	E B	G	24	33	23	27	25	23	19	21	15	15	14	16	15	15
27	E B	E B	E B	E B	E B	E B	E B	E B	E B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	32	37	36	G	33	G	G	21	15	15	15	14	15	20
30	E B	J A	E B	E B	E B	E B	E B	J A	J A	G	33	33	27	G	G	G	23	22	28	21	14	14	18	21
31	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J 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	27	28	28	27	27	27	26	27	27	27	26	26	27	27	27	28	29	28	28	29	28	27	28	27
MED	19	19	17	E B	E B	E B	16	16	19	27	33	36	35	34	32	32	28	24	J A	J A	J A	J A	23	
U Q	J A	J A	20	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
L Q	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1	E B	20	E B	E B	E B	E B	E B	E B	G	18	28	34	32	G	G	29	19	20	A A	E B	E B	18	19	A A	19			
2	E B	E B	E B	E B	E B	E B	E B	E B	G	19	22	24	25	G	G	26	28	26	20	E B	15	18	18	26	E B	15	18	16
3	E B	E B	E B	E B	E B	E B	E B	E B	G	25	31	23	33	32	31	30	26	30	21	17	17	A A	53	19	19	E B	15	
4	E B	17	18	16	E B	E B	E B	E B	G	32	25	33	27	32	29	20	G	19	18	A A	A A	A A	98	18	E B	E B	E B	15
5	20	17	17	E B	16	E B	15	17	20	32	30	32	46	36	31	30	G	29	A A	107	17	54	19	22	A A	43	20	
6	23	A A	E B	15	17	16	17	16	16	23	28	25	25	28	25	32	25	21	A A	A A	A A	18	A A	E B	E B	E B	E B	15
7	E B	E B	E B	E B	E B	E B	E B	E B	19	28	32	30	38	36	108	30	45	32	107	17	98	17	18	E B	E B	E B	E B	15
8	E B	17	15	15	E B	E B	E B	E B	17	23	29	25	30	32	30	26	24	18	17	17	E B	16	19	E B	E B	E B	E B	15
9	16	E A	E B	16	E B	E B	16	17	32	32	21	34	33	23	22	22	18	22	A A	A A	A A	72	79	72	95	19	17	
10	E B	E B	14	15	E B	E B	15	23	26	28	34	34	21	32	35	23	G	23	19	19	19	E B	E B	E B	E B	E B	E B	17
11	E B	E B	E B	E B	E B	E B	E B	E B	18	24	27	38	38	35	26	43	26	18	A A	45	21	15	23	A A	E B	E B	E B	E B
12	E B	E B	E B	E B	E B	E B	E B	E B	16	26	32	30	34	34	30	25	25	G	E B	15	24	15	18	29	A A	E B	E B	16
13	E B	E B	16	15	E B	E B	15	15	18	26	30	37	31	31	36	29	30	20	16	15	15	15	15	15	14	15	15	
14	15	E B	E B	E B	E B	E B	E B	E B	17	23	28	23	38	31	29	30	26	21	16	15	15	14	16	15	15	15	15	15
15	E B	E B	E B	E B	E B	E B	E B	E B	17	24	20	32	25	27	G	26	29	24	19	16	20	17	22	E B	E B	E B	E B	14
16	E B	E B	E B	E B	E B	E B	E B	E B	17	18	38	29	35	25	30	30	29	37	20	18	20	19	17	15	15	E B	E B	E B
17	17	20	E B	E B	E B	E B	E B	E B	A A	66	38	35	32	32	32	25	A A	64	17	21	E B	E B	E B	E B	E B	E B	E B	15
18	E B	17	E B	E B	E B	E B	E B	E B	G	18	34	37	22	32	30	31	29	29	A A	A A	A A	18	18	16	24	19	19	
19	18	E B	E B	E B	E B	E B	15	16	17	28	35	30	32	33	29	32	30	20	A A	A A	A A	A A	C	CA	A A	C	C	
20	C	C	C	C	C	C	C	C	C	28	C	C	C	C	C	C	C	C	E B	16	C	20	16	C	C	C	22	
21	A A	43	17	E B	E B	E B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	C	26	18	19	18	E B	E B	E B	E B	E B	E B	E B	E B
23	C	E B	E B	E B	E B	E B	E B	17	25	24	32	26	30	24	29	27	G	C	16	E B	E B	E B	15	15	E B	E B	E B	C
24	E B	E B	E B	E B	E B	E B	E B	C	E B	G	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
25	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
26	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
27	E B	E B	E B	E B	E B	E B	E B	E B	E B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	18	20	21	E B	E B	E B	E B	E B	E B	E B	E B	E B
29	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	29	35	34	G	G	G	G	19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
30	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	30	32	26	G	G	G	26	21	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
31	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	28	22	21	19	17	E B	E B	E B	E B	E B	E B	E B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	27	28	28	27	27	27	26	27	27	27	26	26	27	27	27	28	29	28	28	29	28	27	28	27				
MED	E B	E B	E B	E B	E B	E B	E B	E B	17	24	29	32	32	31	30	29	25	20	18	18	E B	16	16	15	15	15	15	15
U Q	16	17	15	15	16	16	16	18	26	32	34	34	32	31	30	26	25	26	21	20	20	18	17	17				
L Q	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B

DEC. 2009 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

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

DEC. 2009 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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	F		346	334	F	F	F	337	390	379	390	349	405	344	376	370	374	382	A	385	340	369	390	A	338		
2		335	320	F	334	F	329	350	378	405	392	372	387	387	384	394	373	383	389	335	340	375	338	358	315		
3		314	320	331	F	F	F	362	413	388	366	381	374	333	380	368	364	392	421	344	393	A	333	313	325		
4		317	331	328	328	333	342	346	393	388	389	397	391	395	366	395	366	387	353	A	A	A	F	F			
5		346	306	332	330	356	342	356	393	407	385	388	376	387	397	391	376	384	A		A	A	F	A	338		
6		353	A	335	345	318	331	330	403	418	387	376	379	366	366	360	347	399	A	A		A	350	345	F		
7		320	302	F	F	F	F	374	408	398	342	375	374	380	A	372	365	398	A		A	311	379	F	343		
8		321	345	348	345	375	318	372	397	401	379	363	388	381	388	402	381	361	386	356	378	340	356	F	A		
9		357	322	332	358	340	325	370	381	376	389	355	372	379	402	340	372	396	387	A	A	A	A		314	F	
10	F	F	F	F	F	362	342	373	403	393	375	366	347	378	359	320	373	385	397	342	335	372	340	F	322		
11		F	F	F	F	F	F		386	392	369	358	355	398	354	383	382	392	A		A	314	367	389	A	309	308
12	F	F	F		335	366	337	344	407	390	378	359	397	411	355	363	379	391	383	333	340	394	A	344	341		
13		317	337	349	342	342	338	346	390	399	361	358	382	405	393	348	379	385	351	336	354	332	341	311	328		
14		328	323	322	341	343	335	338	371	386	350	345	370	400	378	309	386	397	322	379	399	349	286	322	330		
15		313	349	332	350	407	300	330	365	386	369	397	394	376	364	358	368	382	318	352	317	375	317	F	F		
16		318	326	F	F	378	344	350	380	405	383	354	374	393	380	380	386	369	358	390	371	368	341	299	F		
17		319	322	338	341	346	321	379	373	A	367	347	348	386	368	379	401	A		A	373	380	345	365	293	F	
18	F	317	321	341	303	362	329	336	387	371	380	327	396	383	374	375	381	381	A	A	A	344	322	311	316	304	
19		322	320	332	331	338	340	350	390	402	373	344	369	383	395	376	361	389	A	A	A	C	C	A	C		
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
21	A		317	344	332	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	305	323	C	F	F		325	382	396	406	325	359	374	390	366	383	385	C		360	319	317	319	332	C	
24	340	324	319	339	337	318	C	374	372	365	385	402	395	385	373	353	383	349	328	342	352	330	F	F			
25	F	F	F	F	343	315	328	370	383	384	352	382	347	368	370	386	393	365	333	351	312	F	F				
26	F		341	F	397	338	F	F	350	377	396	356	373	381	381	396	392	397	374	349	344	353	306	329			
27	332	333	338	F	317	319	316	384	380	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
29	315	330	325	350	350	380	350	390	401	400	339	373	375	364	382	379	388	362	352	361	325	367	330	317	F		
30	315	317	317	310	368	355	363	382	410	397	394	375	390	379	381	381	379	333	350	363	362	356	306	F			
31	F	F	F	F	F	F		353	386	398	396	348	400	373	392	367	366	377	354	370	350	352	331	365	F		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT		19	22	19	18	20	20	24	27	26	27	26	26	27	26	27	28	28	21	23	24	24	22	17	15		
MED		320	322	332	340	344	333	350	386	392	380	358	376	381	380	372	376	385	367	350	344	356	340	317	325		
U Q		335	333	338	345	364	342	362	393	401	390	376	391	393	390	382	382	392	386	370	364	368	356	338	338		
L Q		317	320	325	331	338	320	336	378	383	367	348	372	375	366	363	367	382	352	335	340	334	319	310	315		

DEC. 2009 M(3000)F2 (0.01)

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DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	U L 411			L										
2										L	U L 420	L	U L 399											
3									L	U L 427	L	U L 401	L	L										
4										L		L			A									
5										L	U L 400	A	A	L										
6									L	U L 414	U L 387	L	L	L										
7										L	U L 386	A	A	A	L	A								
8										L	L	L	L	L			L							
9										L	A	L												
10											A	U L 375	L		U L 399									
11									L	A	A	A	L	A	A									
12											U L 386	A	A	L										
13										L	A	L	L	A			A							
14											L	A	A	U L 389										
15												U L 392	L	U L 387										
16											L	L	L	L				A						
17									A	A		L	A		A		A							
18											A		L	L										
19										L	L	L	L		A									
20									C	C	L	C	C	C	C	C	C							
21									C	C	C	C	C	C	C	C	C	C						
22									C	C	C	C	C	L	L	C								
23													L	L	L		A							
24										L	L			L	A									
25										L	L		L	L										
26											L	L	L	L	L									
27										C	C	C	C	C	C	C	C	C						
28									C	C	C	C	C	C	C	L								
29										L		A	L	L	L									
30											U L 427	U L 415	L	L	L									
31										L	U L 417	L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	8	4	2	2	1									
MED										U L 414	U L 408	U L 402	U L 400	U L 388	U L 399									
U Q										U L 424	U L 413													
L Q										U L 386	U L 384													

DEC. 2009 M(3000)F1 (0.01)

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										226		222		246											
2										220	234	214	230												
3									224		234	234	256	246	246										
4										228		236		228											
5										230	238	232	234	226											
6									214	236	244	224	258	244											
7										276	226	224	232	A	240	E A	242								
8										244	250	226	236	232		234									
9											246	246	242												
10											248	328	240		246										
11										248	234	264	228	242	E A	238	228								
12											242	218	210	240											
13										248	238	234	216	226		228									
14											262	238	212	242											
15												222	242	268											
16											266	236	224	236			E A	242							
17								A	250		244	226		226			A								
18											238		236	244											
19										246	268	242	236		238										
20								C	C		C	C	C	C	C	C									
21								C	C	C	C	C	C	C	C	C	C								
22								C	C	C	C	C			C										
23											244	234	240		222										
24										236	230			232	226										
25										228	248		254	244											
26											254	236	230	230	232										
27										C	C	C	C	C	C	C	C	C							
28								C	C	C	C	C	C	C		222									
29										226		236	232	242	228										
30											240	228	228	238	228										
31										224	264	228	256	242											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										2	15	21	22	25	20	12	5	1							
MED										219	236	242	234	234	241	229	228	E A	242						
U Q										248	252	242	241	244	239	238									
L Q										226	234	224	228	232	227	225									

DEC. 2009 h'F2 (KM)

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IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								B			A	A					B								
2								B	118	124			120	120	120	120									
3								B	118	124	118	120	120	124	128	126	116								
4								B	114	122	120	124		A	A	118	122								
5								B	114	122	122	122	124		A	A	120								
6								B	A	A	A	A		118	114	118	120								
7								B	A	A		A	A	A	A	A	A								
8								B	A	A	124		A	A	A	A	A								
9								B	A	A		A													
10								B			114	108	120	122	118	114									
11								B	126	A	112	112	112	118	112	112									
12								B	118	A	A	A	A	120		122	A								
13								B	A	A	A	A	A	A	A	A	A								
14								B		120			A	A	A										
15								B	122	122	124					118	116								
16								B	118	120	124	126	122	122	A	A	A	A							
17								B	124	A	126	120	116		A										
18								B	A	A	118	114		118	118										
19								B	120	A	A		A	A	A	A	A								
20								C	C	A	C	C	C	C	C	C	C								
21								C	C	C	C	C	C	C	C	C	C								
22								C	C	C	C	C	120	120		C	118								
23								B	114	122	124	124		A	118	120	116	122							
24								B	122	122	118	120		A	114	112	118								
25								B	120	124	128	126	118	114	112	116	122								
26								B	116	118	120	118	118	118	114	114									
27								B	122	C	C	C	C	C	C	C	C								
28								C	C	C	C	C	C	C			118	132	122						
29								B	118	122	122	122	124	120	116	128									
30								B	122	122	124	124	122	116	118	120	108								
31								B	116	A	130	122		A	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									18	13	18	19	13	16	17	20	8								
MED									118	122	123	122	120	119	118	120	121								
U Q									122	123	124	124	122	120	119	122	122								
L Q									116	121	118	120	118	117	115	116	118								

DEC. 2009 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23									
1	102	96	106	100	100	104	100		B	98	142	102	100	100	100	150	106	130	120	112	108	98	98	98	96								
2	104	100	100		B	B		104	G	104	102	102	102	100	102	124	120		B	106	102	94	90	92	98								
3	94	98	96	96	98		98	96	B	148	166	106	152	94	94	116	124	102	102	100	96	98	92	90	90								
4	98	94	90	90		B	B		B	G	158	102	150	102	92	92	100	108	116	104	100	94	98	96	104								
5	96	96	96		B		96	96	100	146	92	92	90	90	116	120	120		G	108	102	98	98	96	96								
6	92	92	96	100	96	100	102	114	100	98	104	100	100	100	158	104	120	100	98	98	104	110	110	104									
7		B		B																													
8	94	94	94	94		B	B	108	106	104	98	98	98	96	94	98	96	114	114	106	104	102	100	96	96								
9	94	90	94	98	102	108	106	138	94	96	94	150	126	104	106	90	100	102	100	92	92	96	96	96									
10	104		B	98	96	96	92	92	130	130	98	140	116	96	112	114	94	88	90	94	92	92		B	100								
11	98		B	B	B	B	B		B	140	120	106	102	102	98	102	100	166	98	94	90	98	96	94	94	94							
12		B	B	B	B	B	B		B		108	104	104	150	104	104	100	156		G	100	96	98	96	96	94	92						
13		B	B		B			B	B	100	100	120	98	96	94	94	90	92	130	110	100	98	96	96		B	B						
14	98	90		86		B	96		B	122	140	126	104	94	94	94	156	138	120	92	92		98		B	B	B						
15		B	B		B	B	B		B		136	156	98	118	104	104	102	106	106	100	100	96	96	92	96		B	B					
16		B	B		B																												
17	90	94	90	92	92	100		B	98	96	94	122	118	96	122	116	104	100	100	96	94	94	94	94	94	94	92						
18		B		B																													
19	88	88		B																													
20		C	C	C	C	C	C	C	C		98		C	C	C	C	C																
21	88	114		B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
22		C	C	C	C	C	C	C	C	C	C	C	C																				
23		C	B	B	C	B	B		B																								
24	100		B	B	B	B	B	C	B																								
25		B	B	B	B	B	B	B	B																								
26	98	98	98		B	B	B	B	B																								
27		B	B	B	B	B	B	B	B																								
28		C	C	C	C	C	C	C	C																								
29		B	B	B		B	B	B	B																								
30		B		B	B																												
31		B	B	B	B	B	B	B	B																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23									
CNT	16	16	14	13	12	13	13	17	22	27	26	26	25	27	26	26	27	22	22	23	23	20	18	17									
MED	97	95	95	96	97	100	102	114	107	104	104	103	100	102	103	104	108	100	97	98	96	96	94	96									
U Q	99	99	98	103	103	106	110	137	130	120	122	126	102	104	116	124	122	102	100	100	98	98	96	98									
L Q	93	91	92	93	95	96	99	100	100	98	102	100	95	94	100	96	100	96	94	94	94	92	90	92									

DEC. 2009 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2009 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	F3	F2	F4	F2	F1	F2		L3	HL22	L3	L2	L2	L2	HL12	L2	H2	F3	F2	F2	F2	F3	F4	F5	
2	F2	F2	F1				F1		L3	L2	L2	L2	L2	L2	L2	CL22	C3		F3	F4	F5	F3	F3	F2	
3	F2	F2	F3	F2	F1		F2	LH22	HL22	HL22	L2	HL12	L2	L2	CL22	CL12	L4	F3	F2	F2	F3	F3	F4	F2	
4	F2	F2	F4	F2						HL12	L2	HL11	L2	L2	L2	L2	L2	FF22	F4	F5	F5	F3	F2	F2	
5	F3	F4	F2		F3	F2	F3	H3	L3	L3	L2	L3	CL23	CL12	CL11		L2	F3	F3	F3	F3	F4	F3	F3	
6	F5	F5	F2	F2	F2	F3	F2	C1	L3	L3	L2	L2	L2	L2	HL22	L3	CL22	F3	F5	F4	F4	F2	F1	F1	
7		F2		F2	F1	F1	F1	L3	L3	L3	L2	L2	L3	L3	L2	L3	L3	F4	F3	F3	F5	F4	F2	F1	
8	F2	F4	F2	F2			F3	L2	L3	L2	L2	L2	L2	L2	L2	L2	C2	F2	F3	F2	F2	F2	F2	F4	
9	F4	F2	F2	F2	F1	F1	F1	HL22	L3	L2	L2	HL12	CL22	L2	L2	L2	L2	F3	F5	F5	F4	F4	F3	F3	
10	F2		F1	F1	F2	F3	F2	C3	CL23	L3	HL12	CL12	L2	CL12	CL12	L2	L3	L2	F3	F2	F1			F2	
11	F2							H1	CL22	L2	L2	L2	L2	L2	L2	HL12	L2	F3	F4	F2	F3	F3	F2	F1	
12									L3	L2	L2	HL12	L2	L2	L2	L2	HL12		F1	F4	F1	F2	F3	F2	
13			F1		F1	F2		L3	L3	CL11	L3	L2	L2	L2	L3	L3	HL12	F2	F1	F1	F1	F1			
14	F1	F2		F2		F1		CL11	HL12	CL22	L2	L2	L2	L2	HL12	HL12	CL22	F2	F3		F1				
15			F1					H2	HL21	L2	CL12	L2	L2	L2	L2	L2	L2	F2	F3	F2	F5	F1			
16			F2			F2	F1	C2	L2	L2	L2	CL22	L2	L2	L3	L3	L3	F3	F3	F4	F6	F2	F2	F2	
17	F3	F2	F1	F2	F1	F2		L4	L5	L3	CL12	CL22	L2	CL11	CL11	L2	L4	F3	F2	F2	F1	F2	F1	F1	
18		F2		F2	F2	F2	F2	L2	L2	L3	L2	L2	L2	L2	L2	L3	L2	F4	F5	F3	F2	F2	F3	F3	
19	F2	F1		F2		F2	F3	L3	L2	L2	L2	HL12	L2	L2	L2	L2	HL22	F4	F5	F5			F3		
20										L2							C2	F1		F2	F2			F2	
21	F3	F2																							
22													L2	L2			HL22	H1	F3	F2	F2	F2	F1		
23								H2	HL11	L2	HL11	L2	L2	L2	HL11	HL11			F2		F1	F1	F1		
24	F2								L2	L2	CL22	CL22	L2	CL22	CL22	L2	LL22	F3							
25										L2	L2	L2	L2	L2	L2	L2	L2							F2	
26	F1	F1	F1							L2	HL12	L2	L2	L2	L2	L2	H1								
27									CL12																
28															L2	L2	H2			F1					
29			F1	F1					H1	H2	CL22			CL22			C2						F1		
30		F1			F1	F2	F2	L2		HL22	CL11	L2		L2	L2	C1	H1			F1	F1	F2	F2		
31									HL22	L2	L2	L2	L2	L1	L2	CL22	L2	F2	F2	F2	F1	F1			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

f-PLOTS OF IONOSPHERIC DATA

KEY OF f-PLOT	
	SPREAD
◊	f _o F ₂ , f _o F ₁ , f _o E
×	f _x F ₂
*	DOUBTFUL f _o F ₂ , f _o F ₁ , f _o E
⊗	f _b E _s
└	ESTIMATED f _o F ₁
†,‡	f _{min}
^	GREATER THAN
∨	LESS THAN

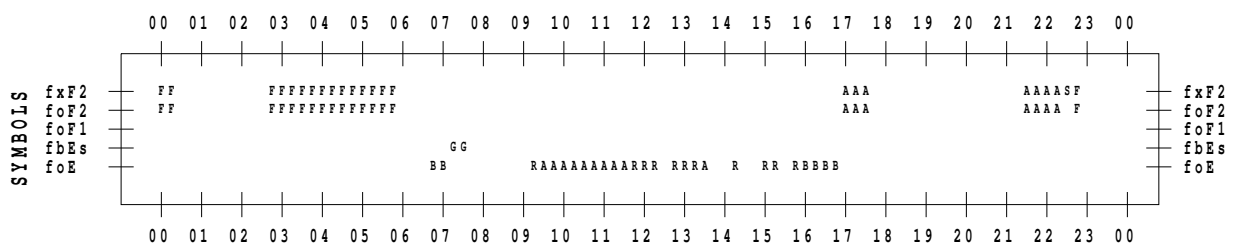
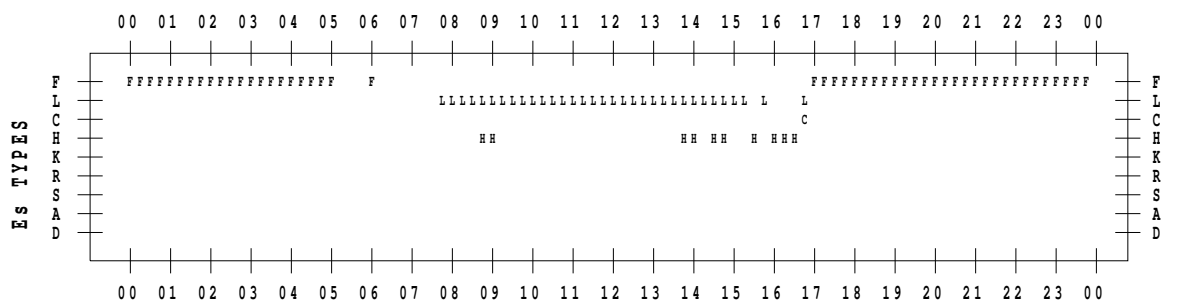
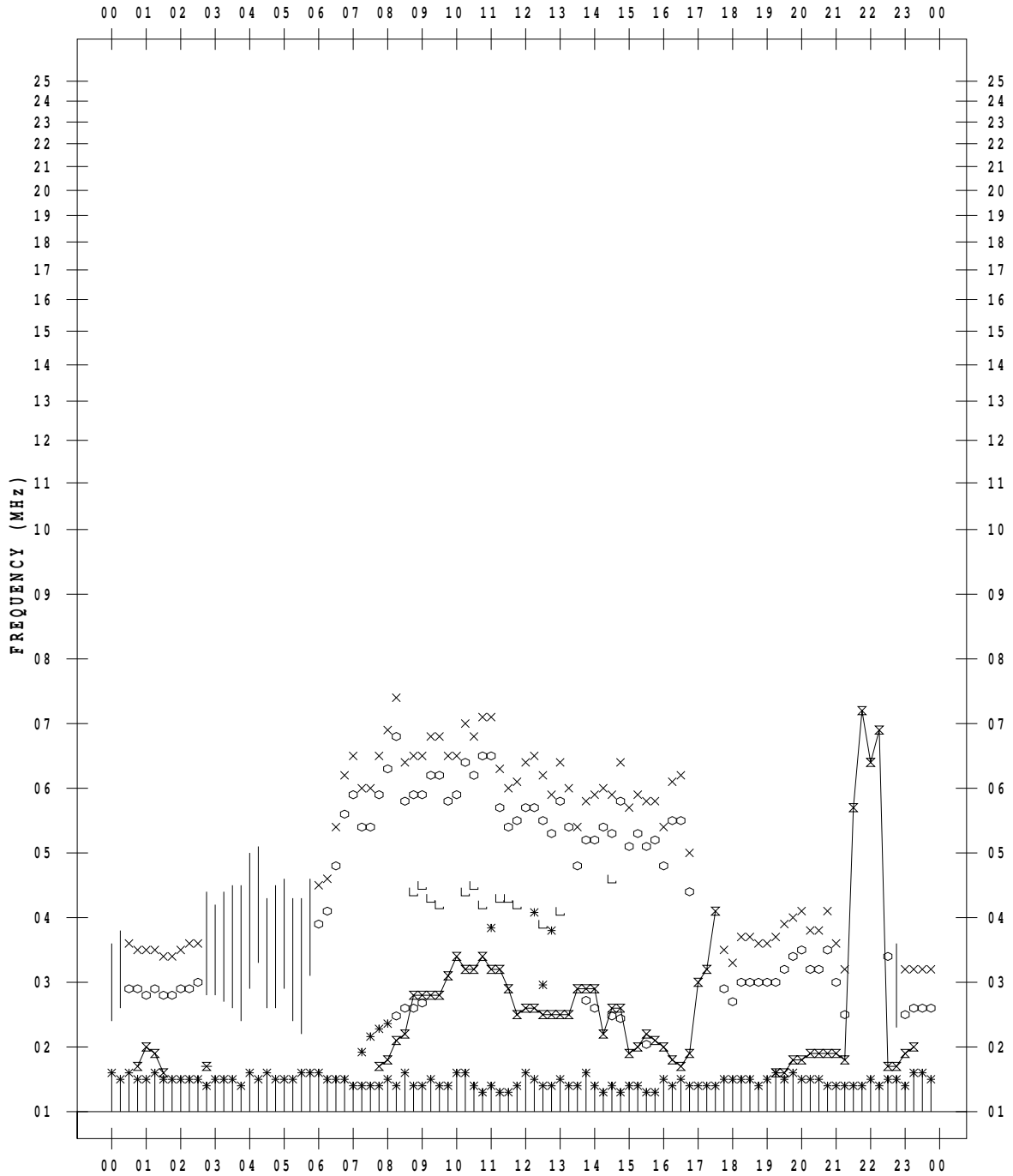
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 1

135 ° E MEAN TIME



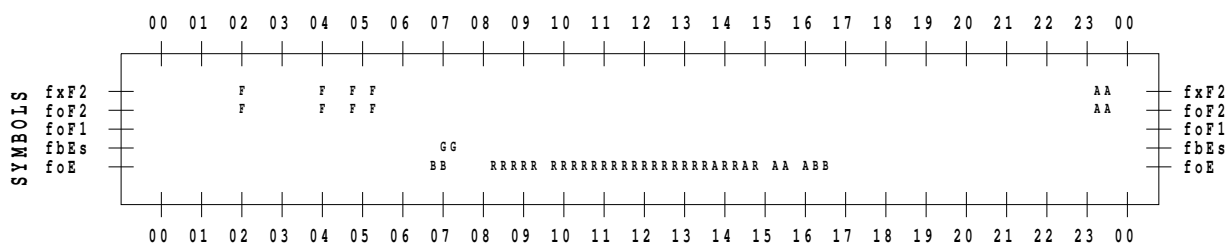
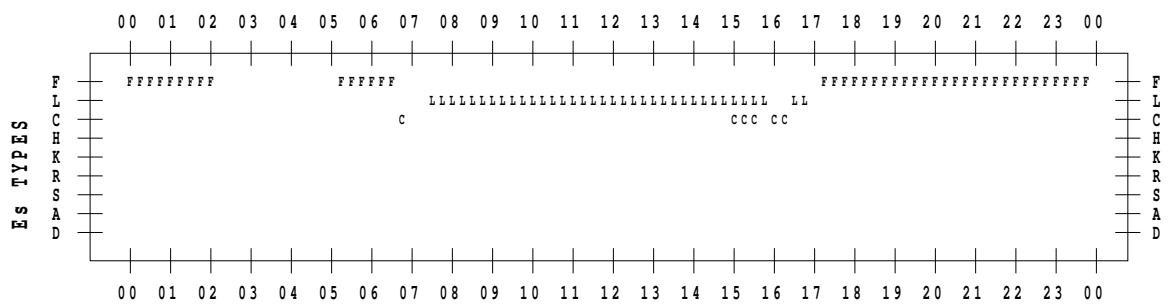
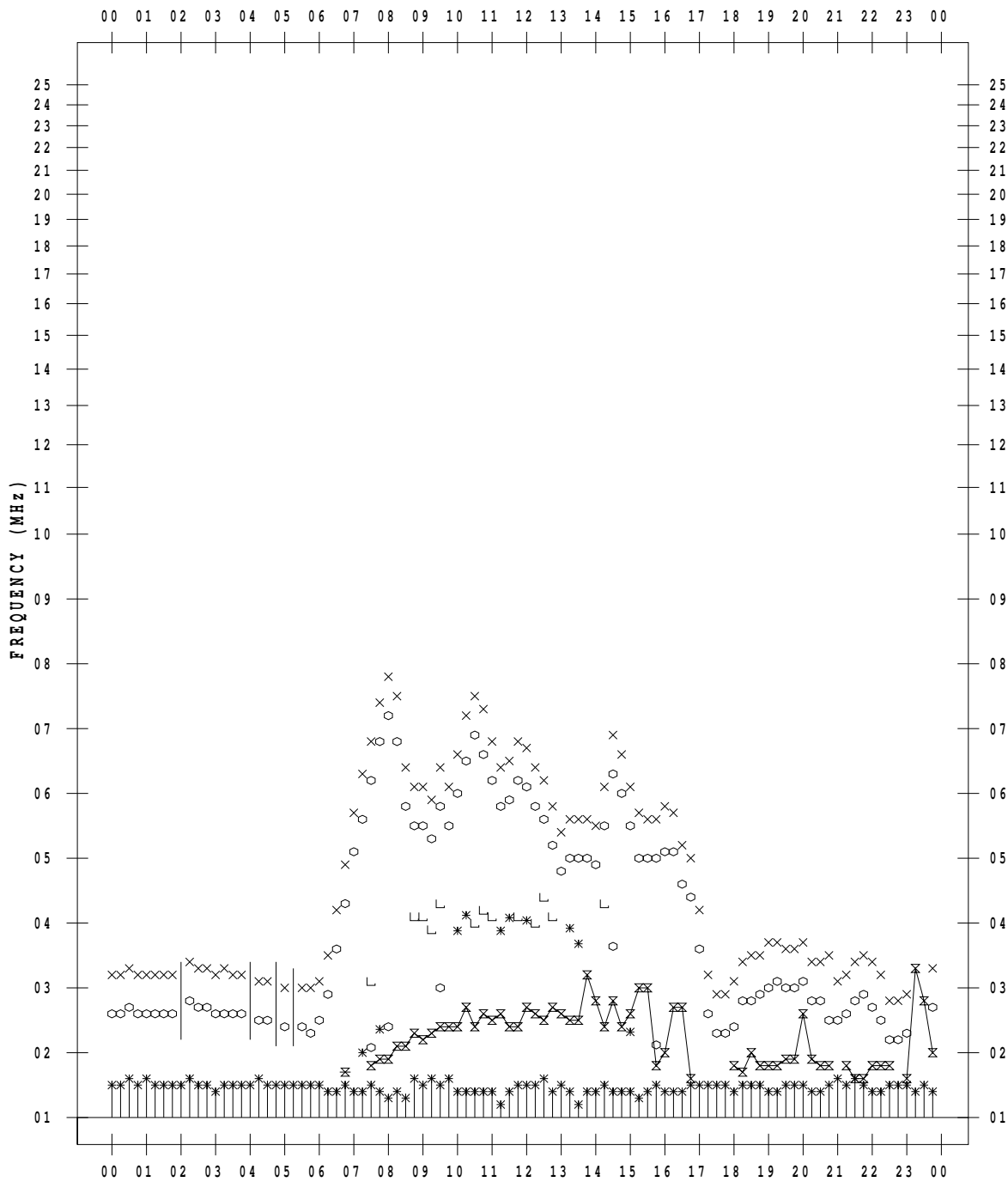
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 2

135 ° E MEAN TIME



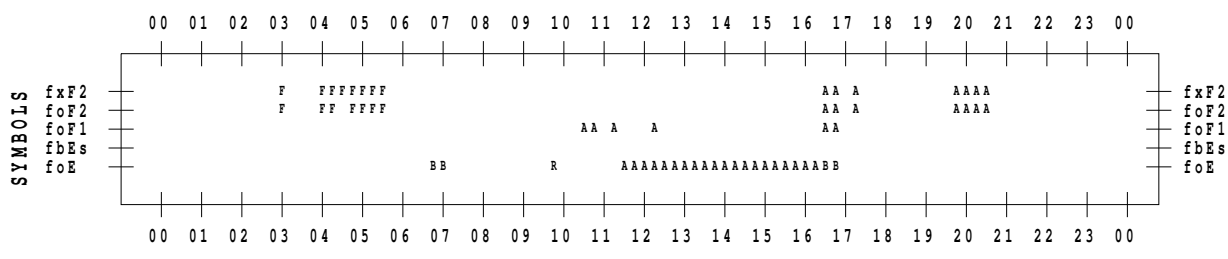
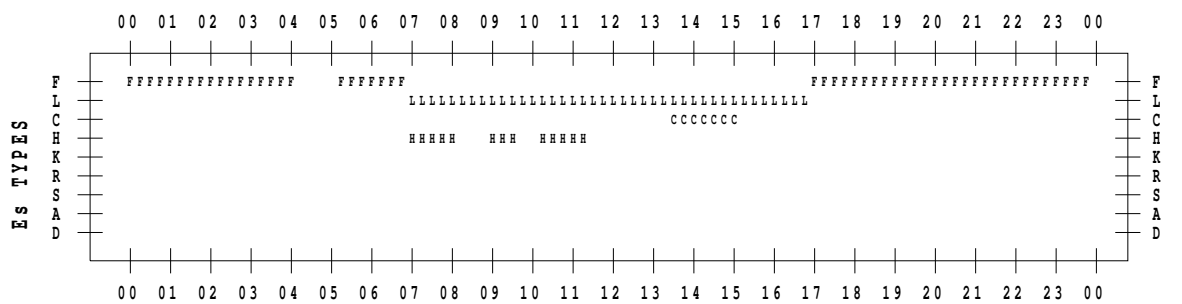
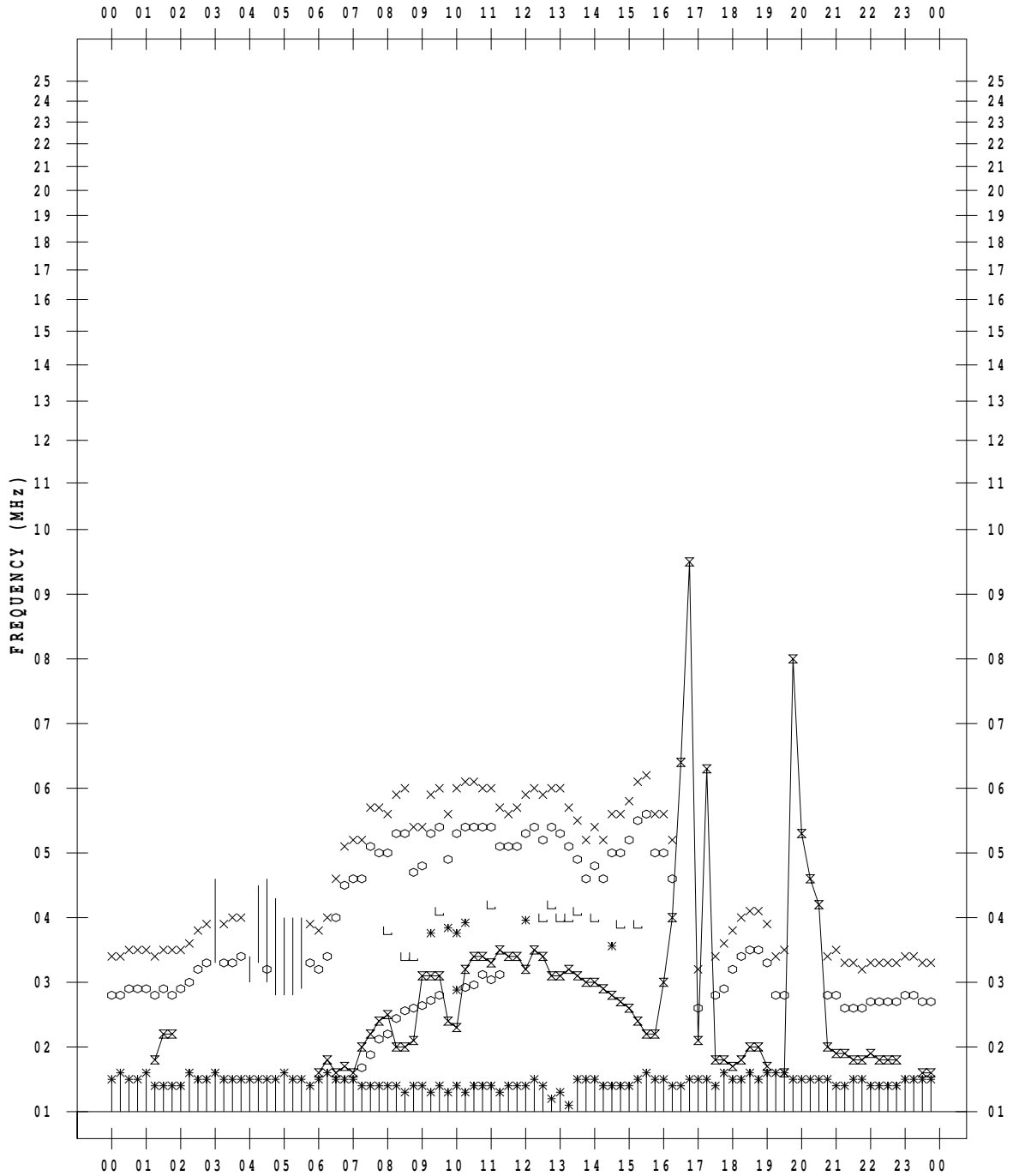
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 3

135 ° E MEAN TIME



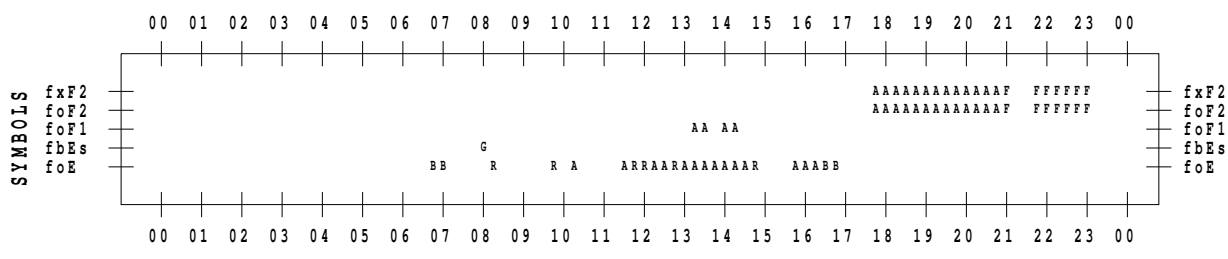
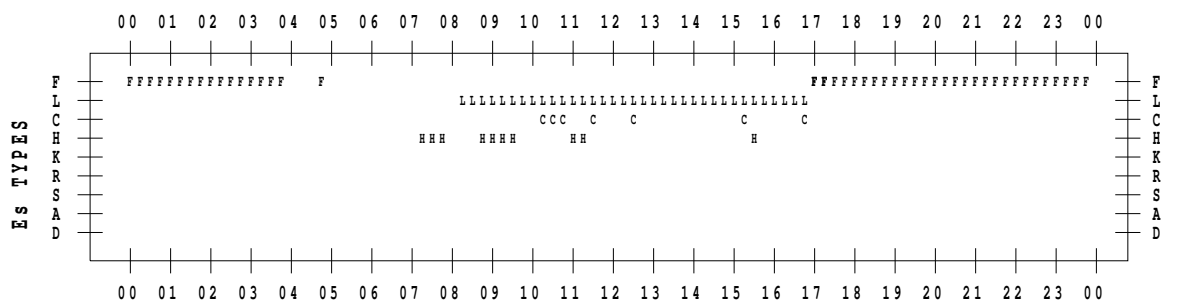
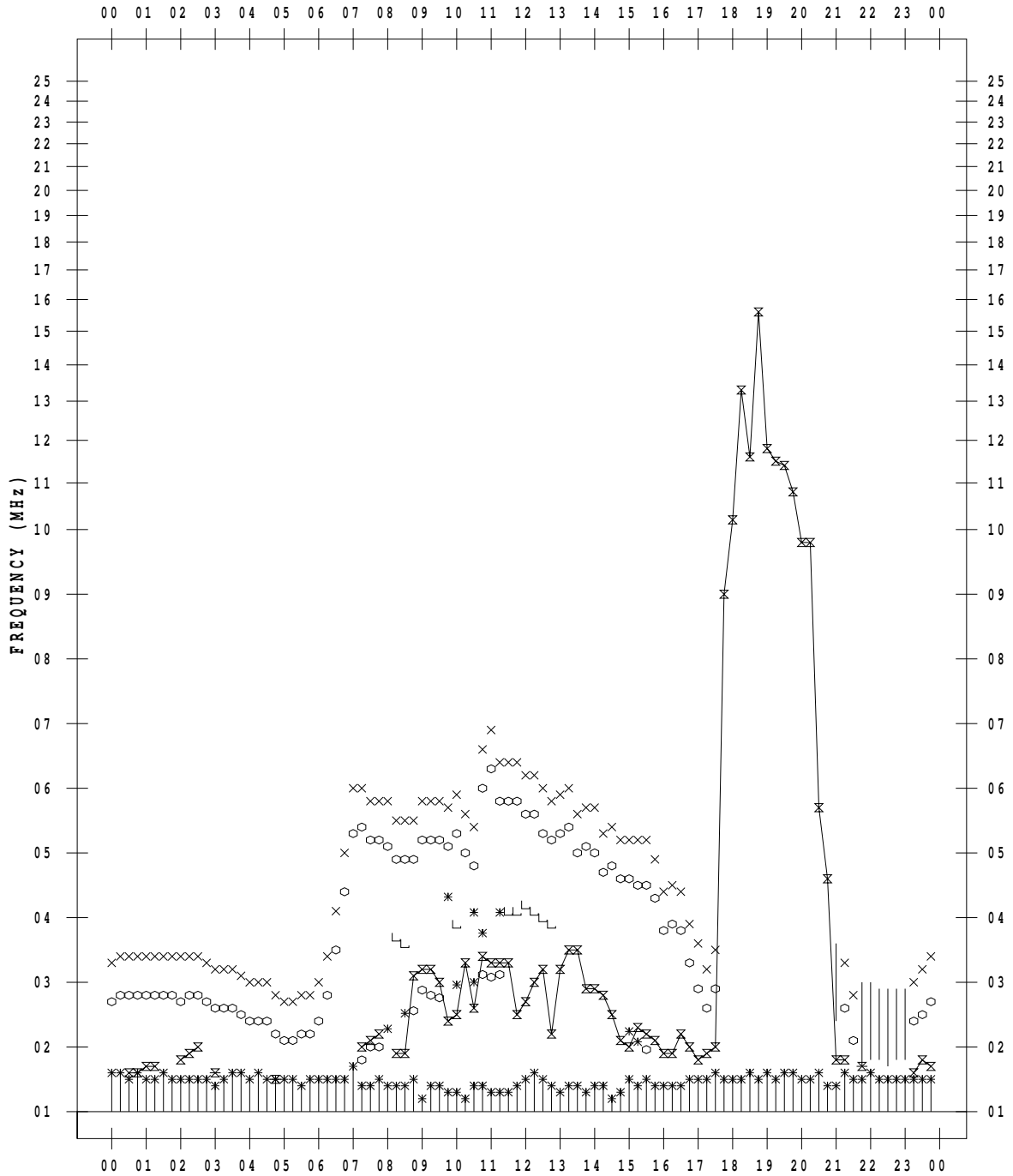
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 4

135 ° E MEAN TIME



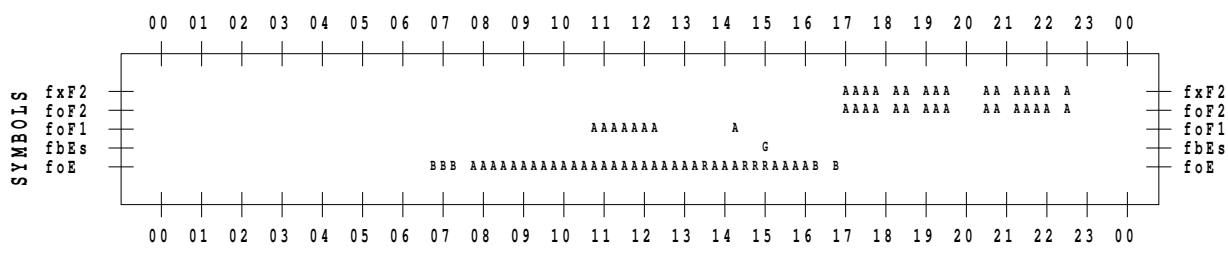
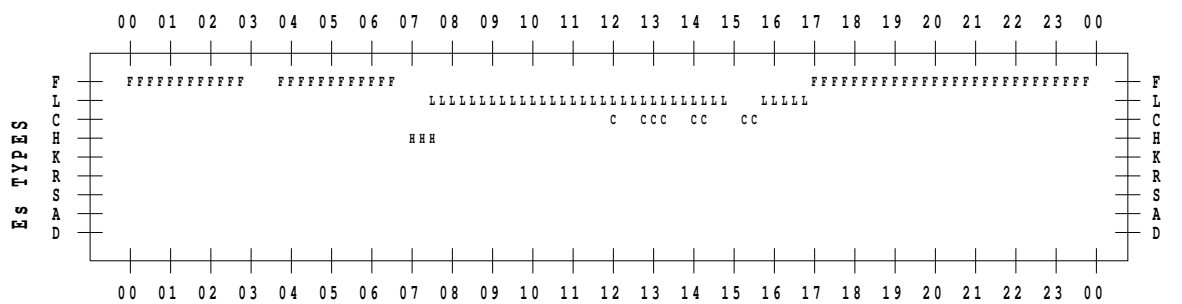
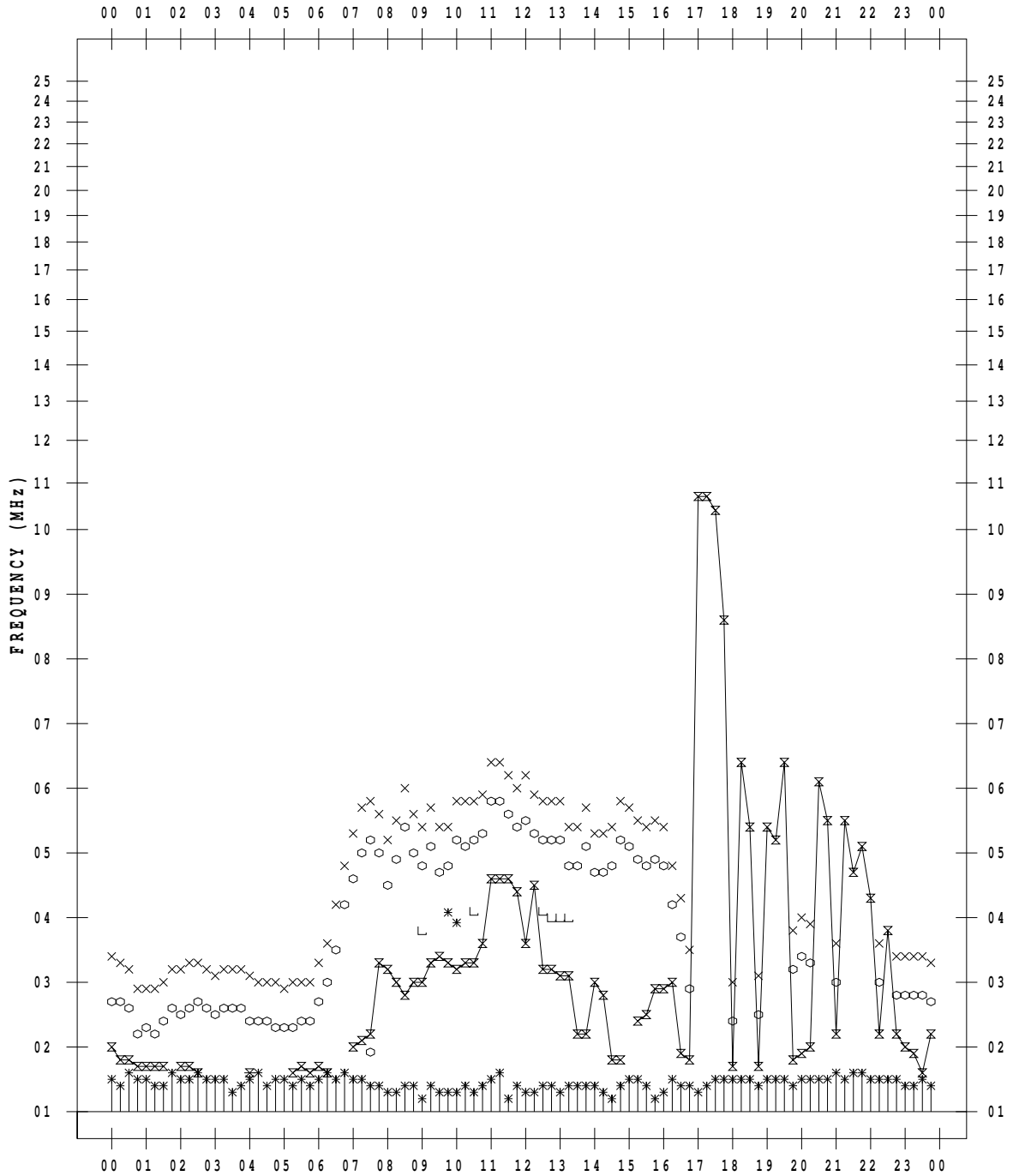
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 5

135 ° E MEAN TIME



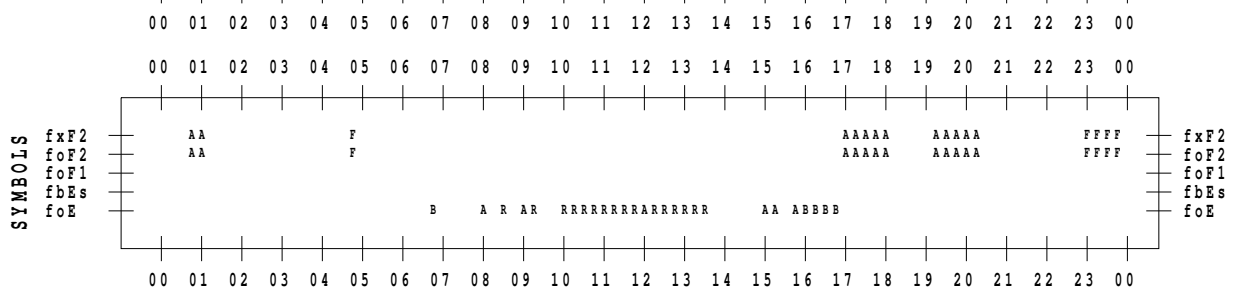
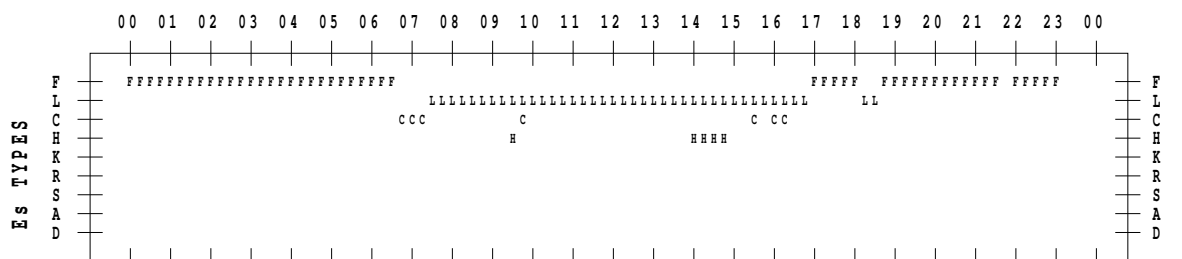
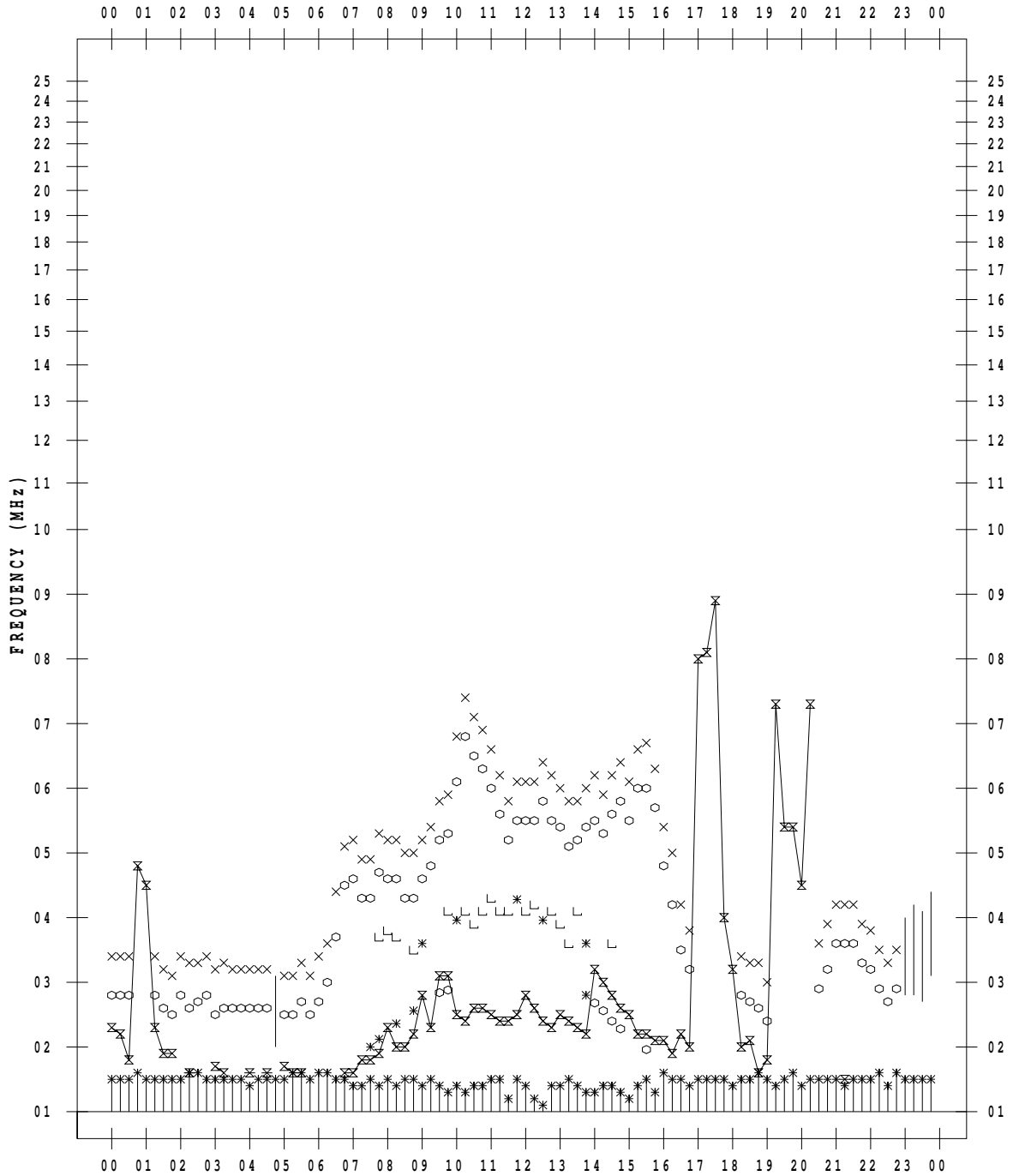
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 6

135 ° E MEAN TIME



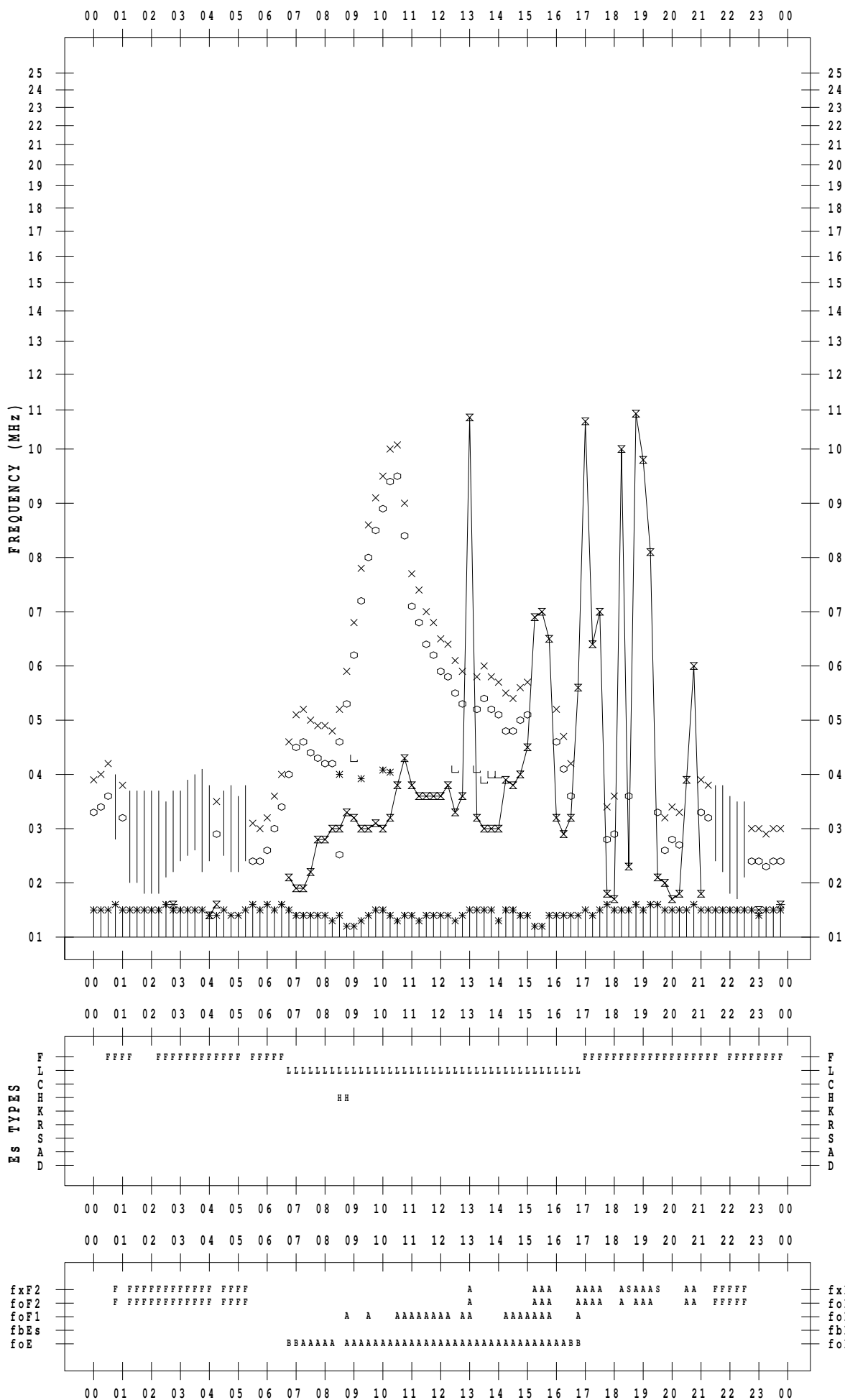
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 7

135 ° E MEAN TIME



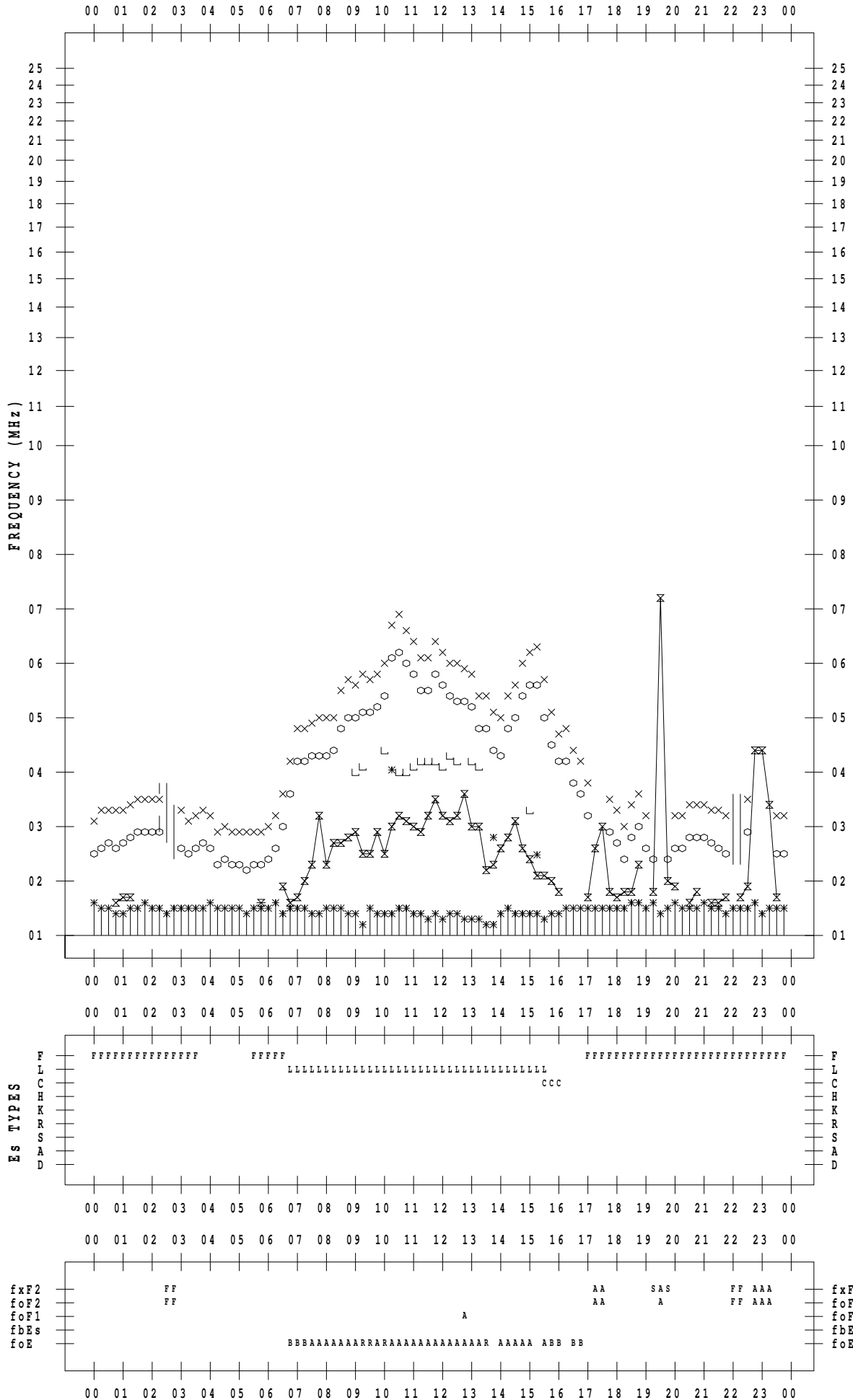
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 8

135 ° E MEAN TIME



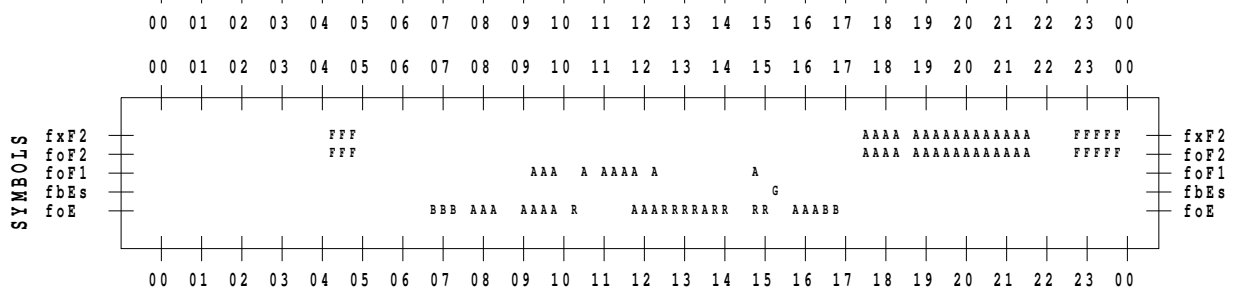
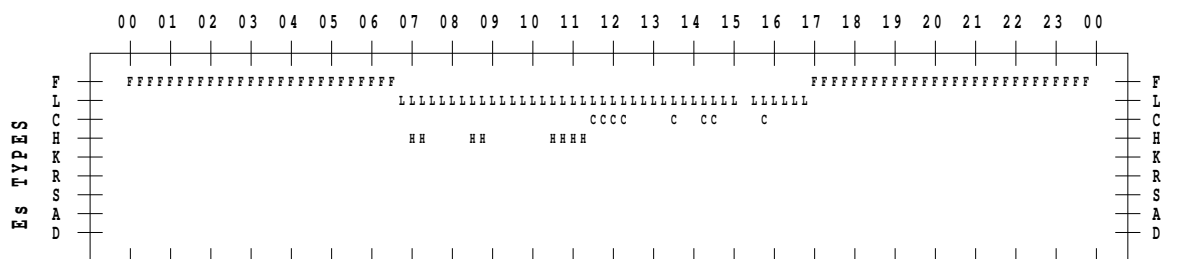
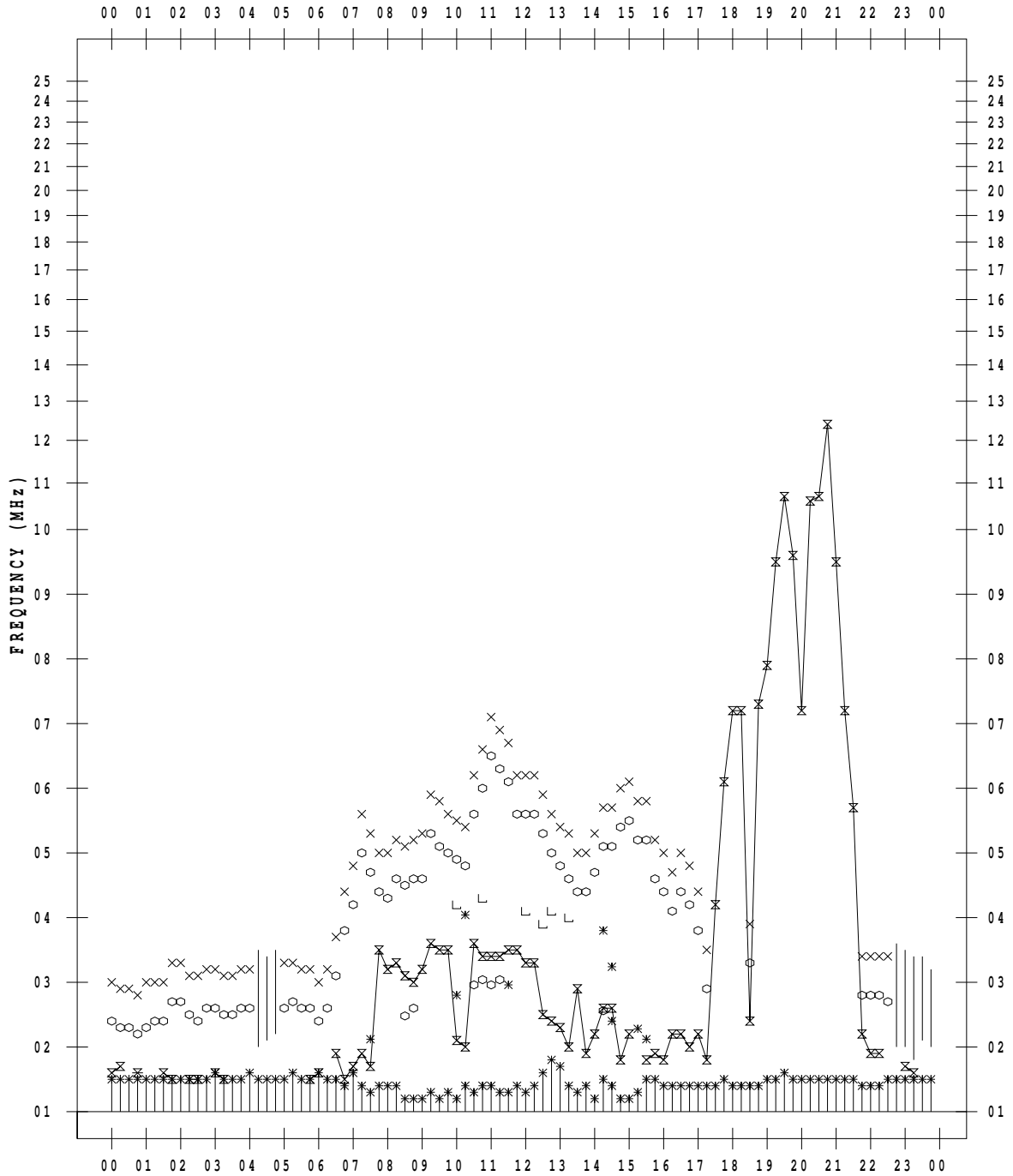
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/ 9

135 ° E MEAN TIME



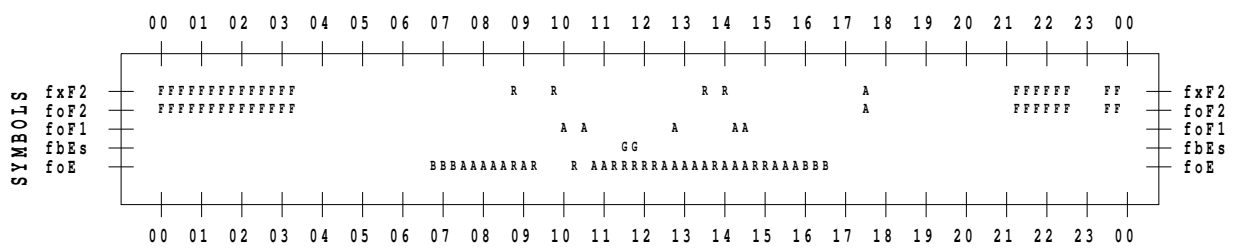
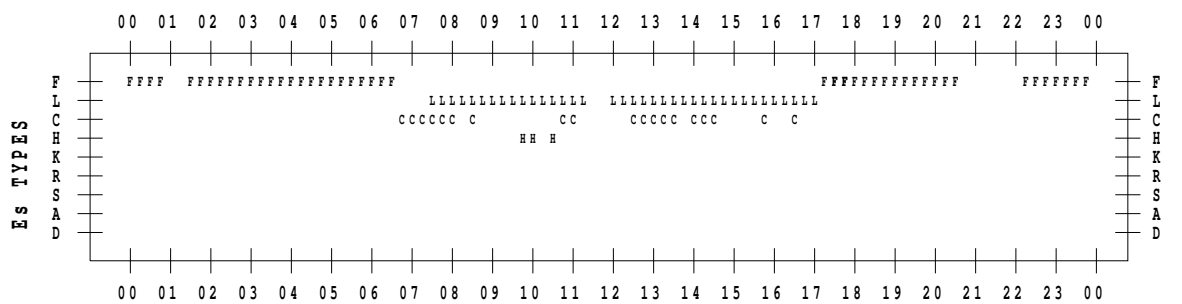
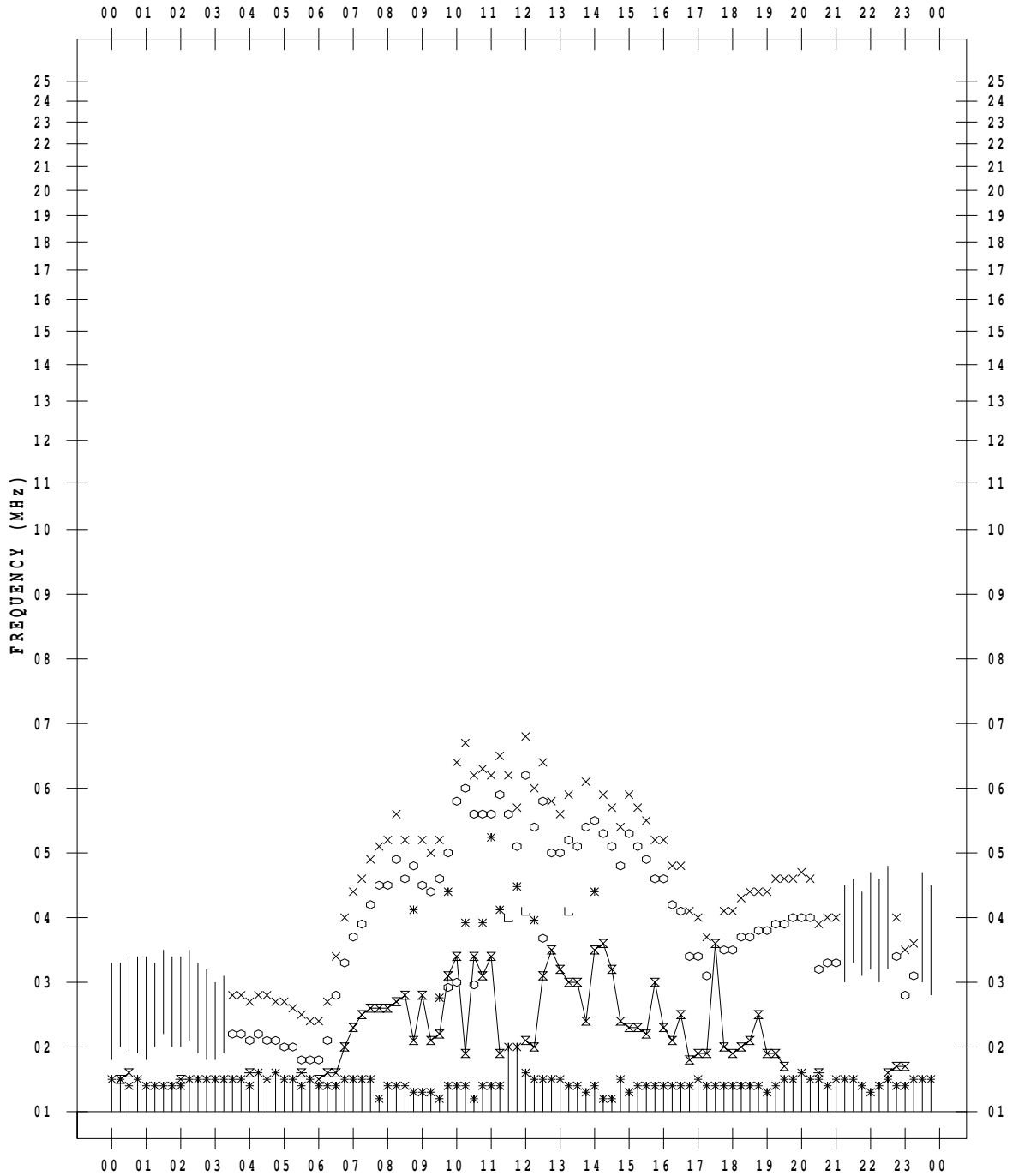
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/10

135 ° E MEAN TIME



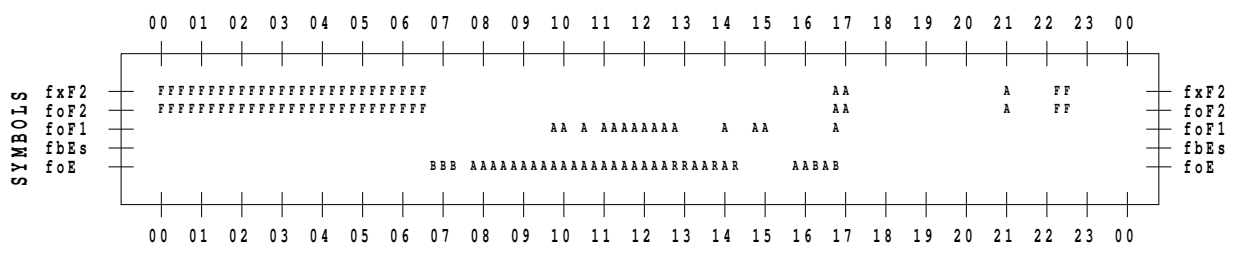
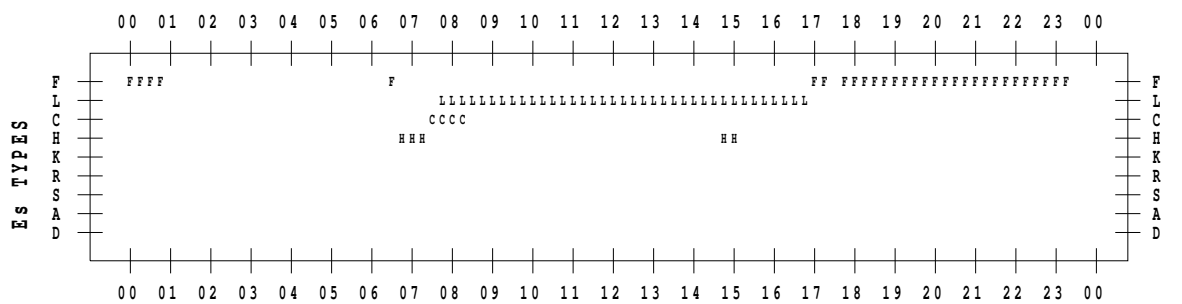
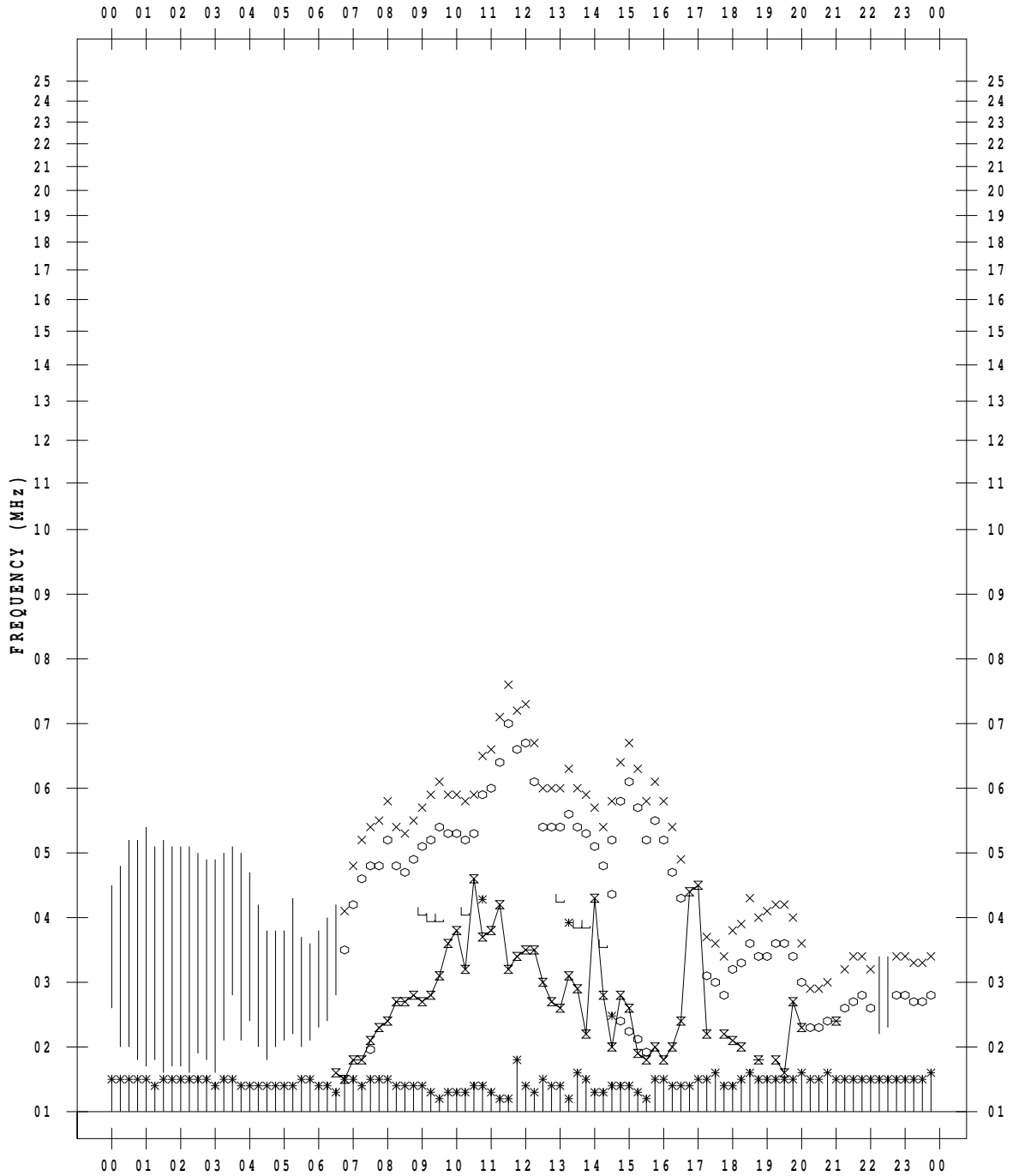
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/11

135 ° E MEAN TIME



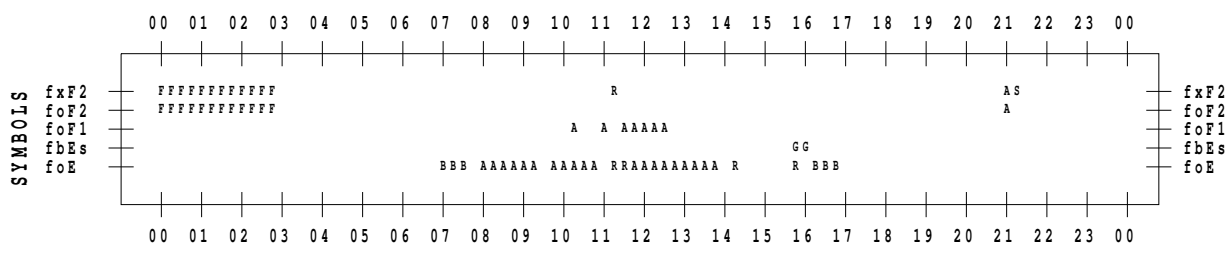
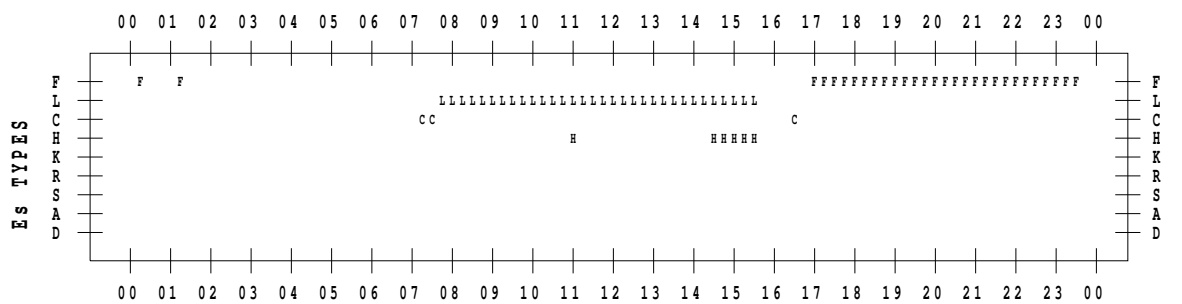
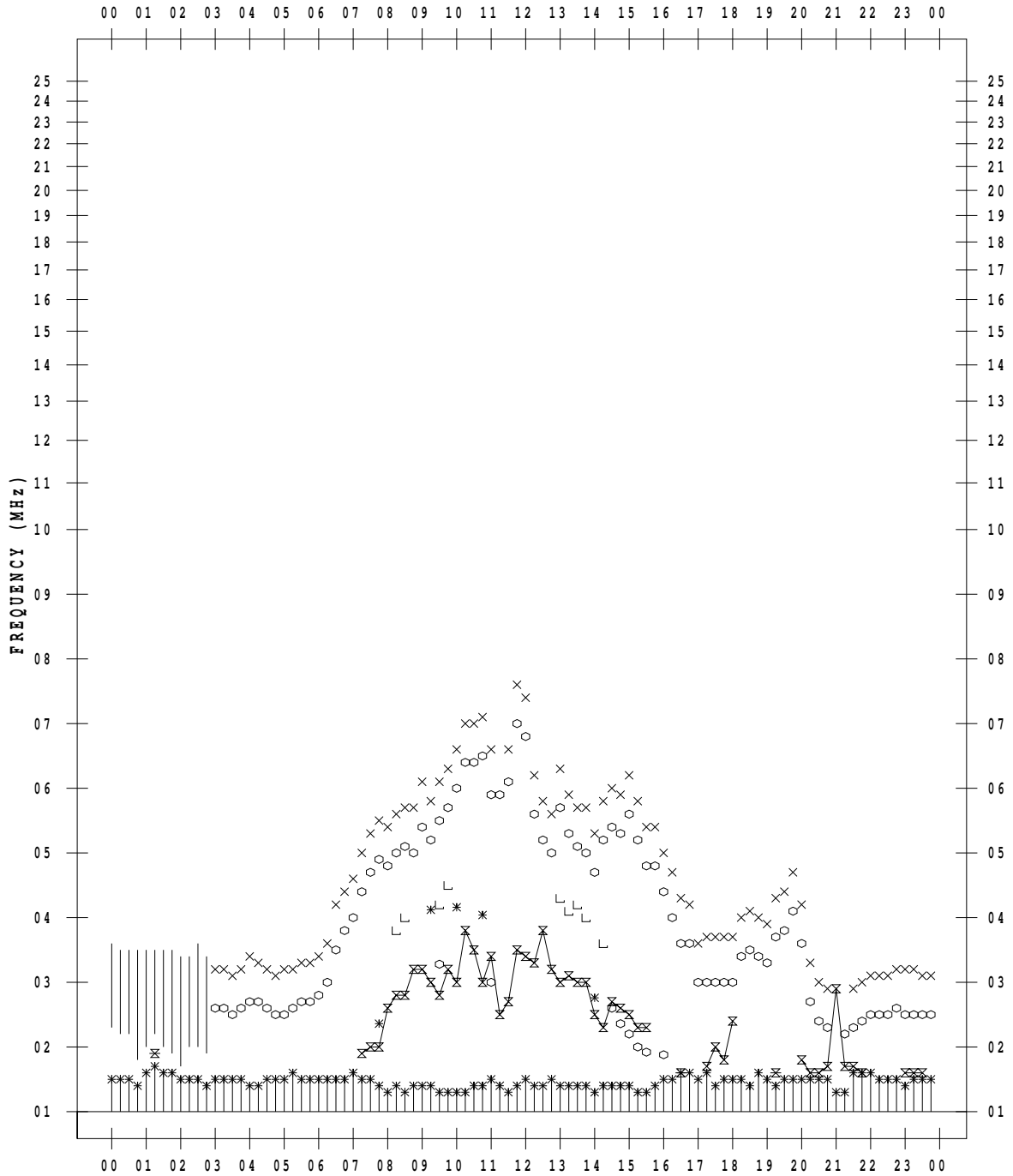
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/12

135 ° E MEAN TIME



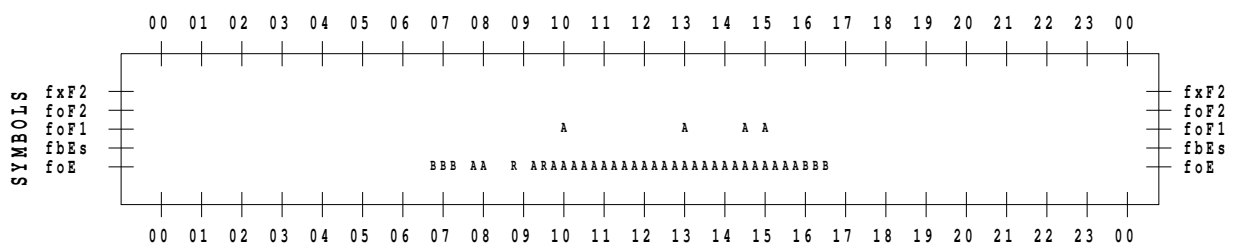
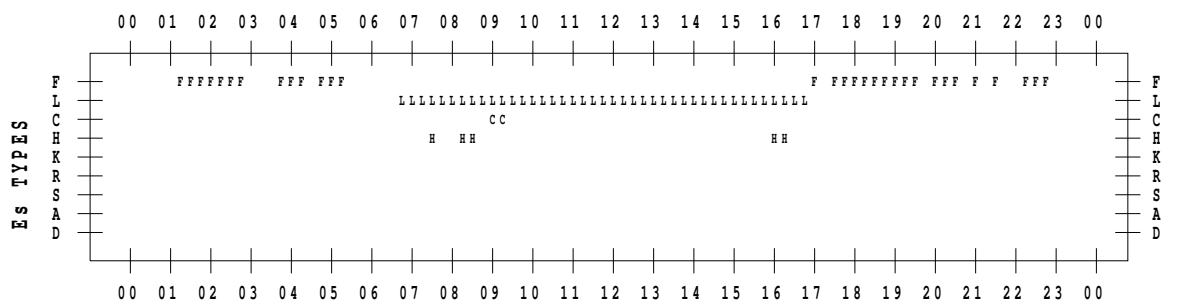
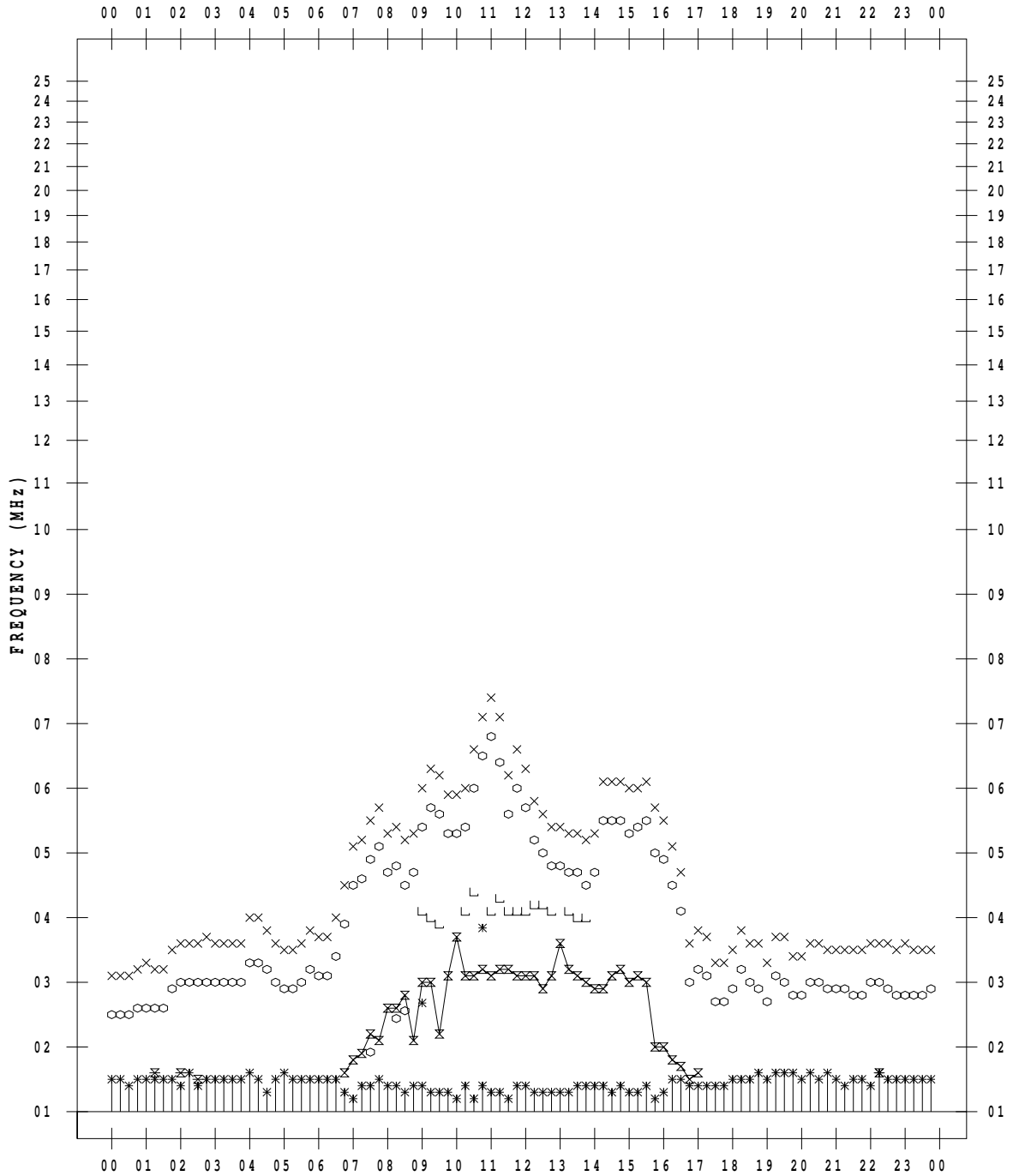
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/13

135 ° E MEAN TIME



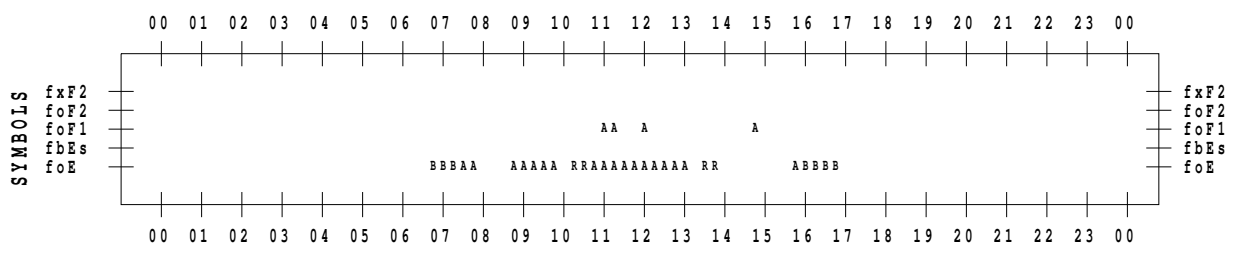
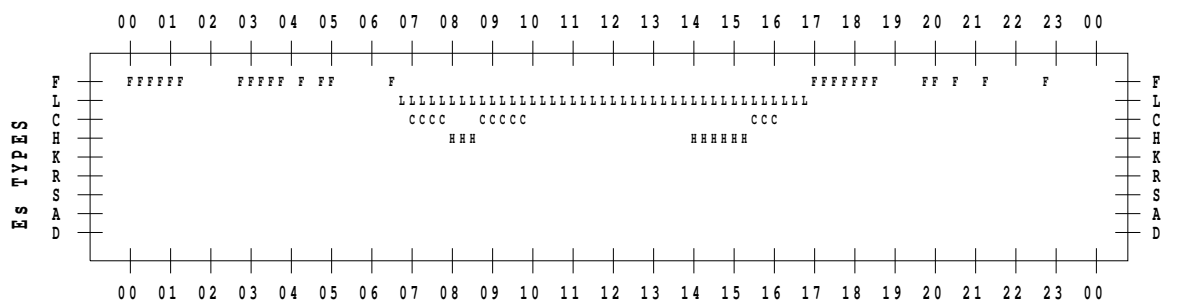
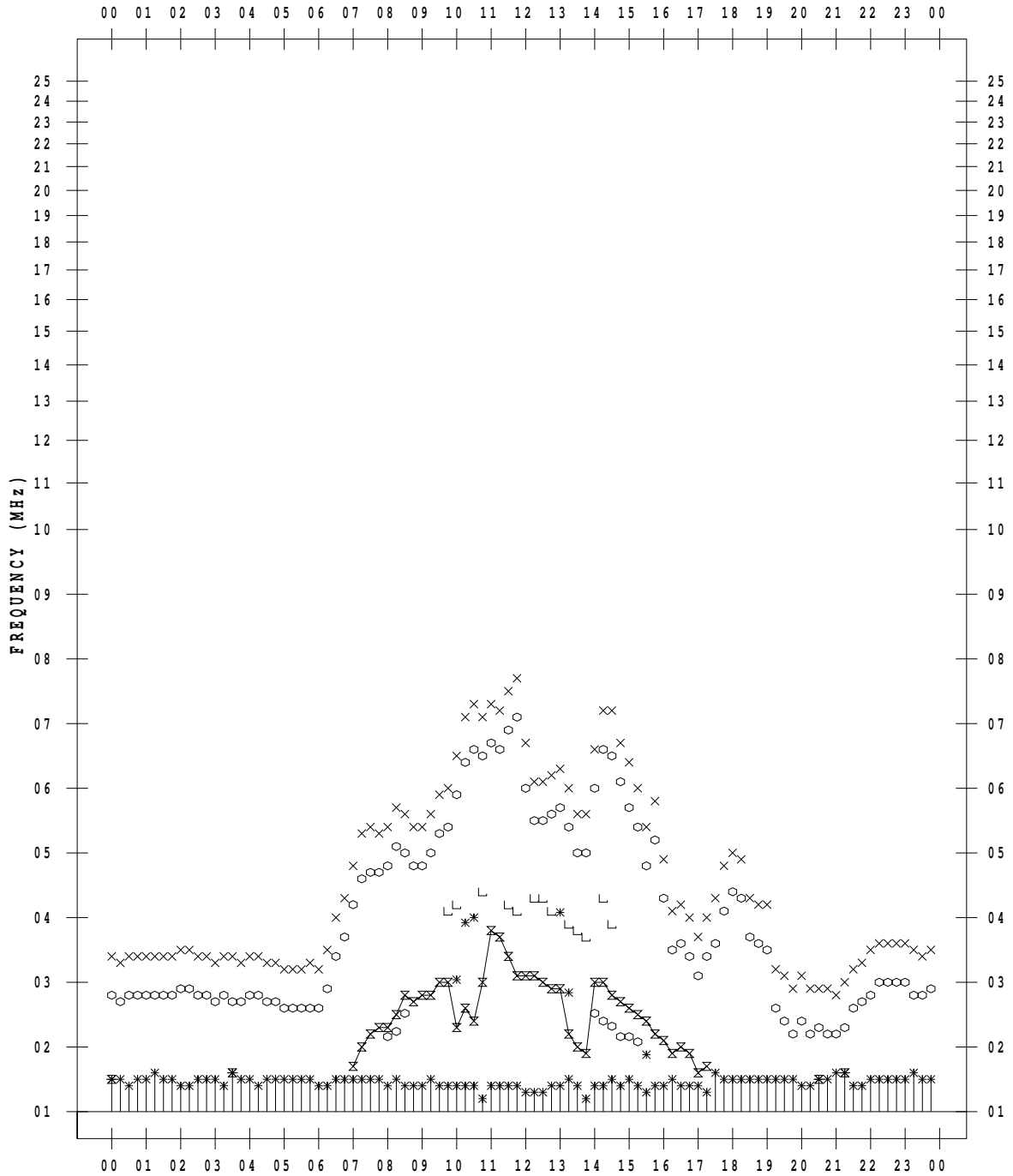
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/14

135 ° E MEAN TIME



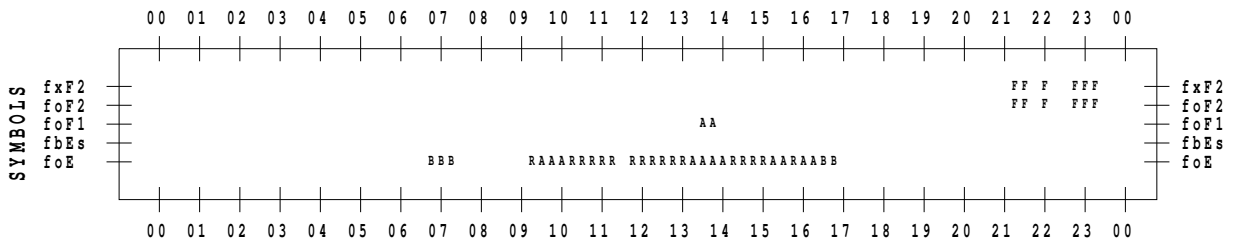
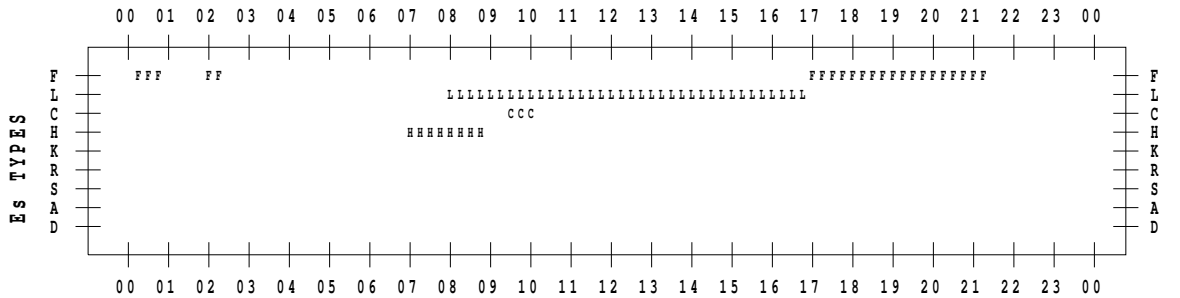
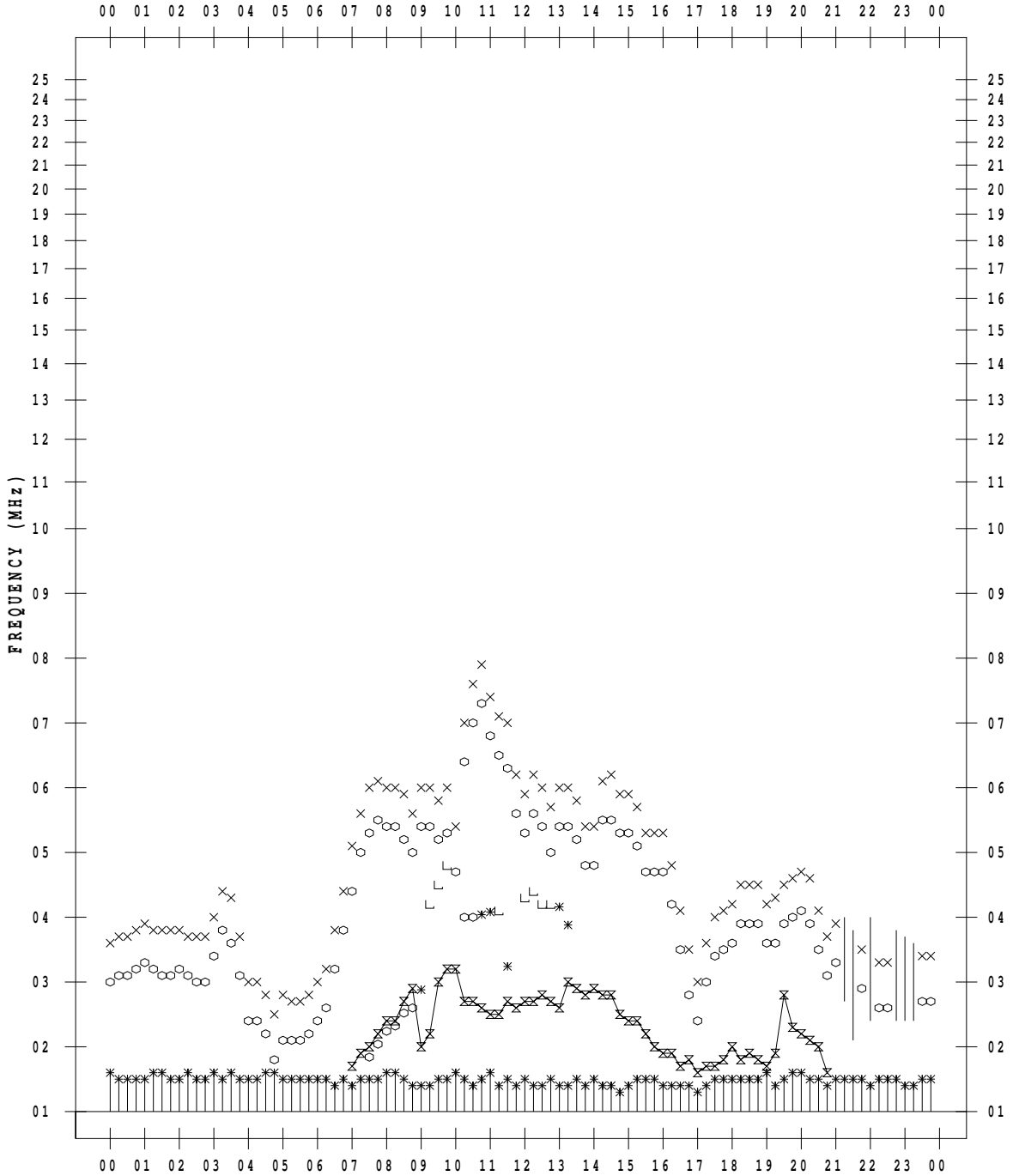
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/15

135 ° E MEAN TIME



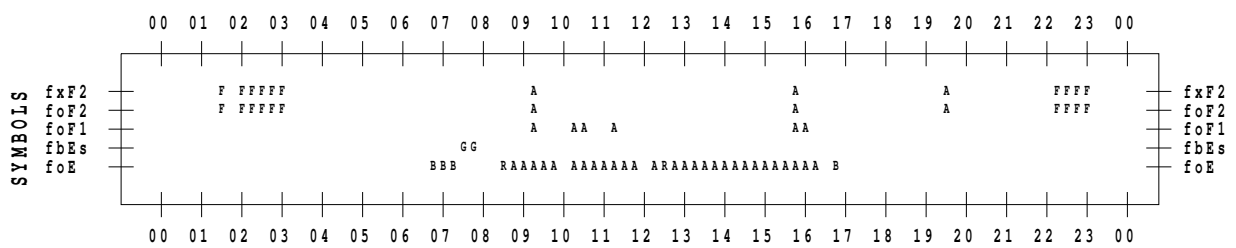
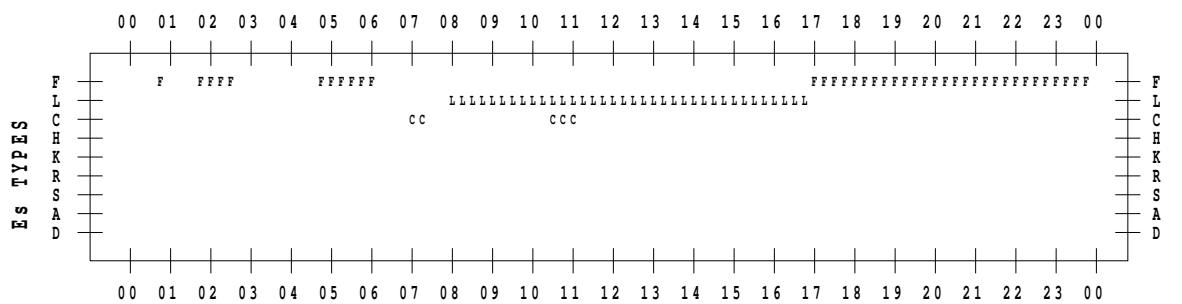
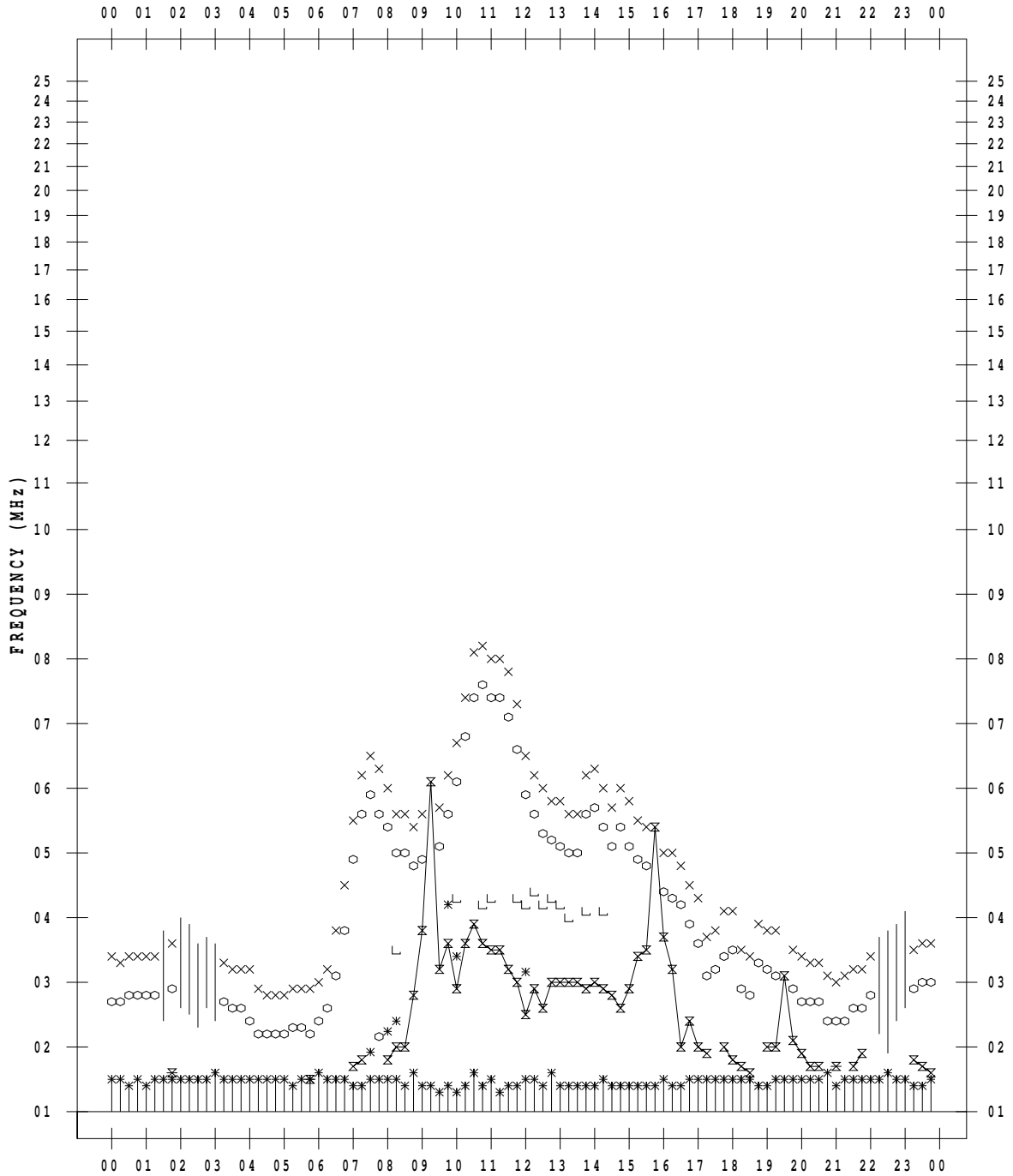
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/16

135 ° E MEAN TIME



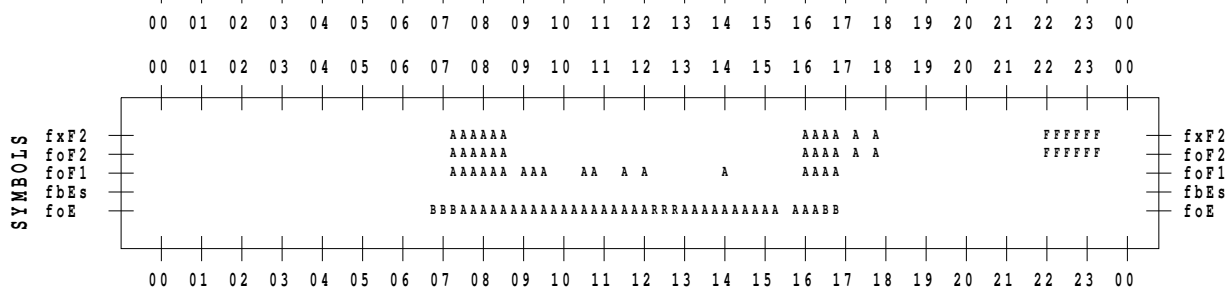
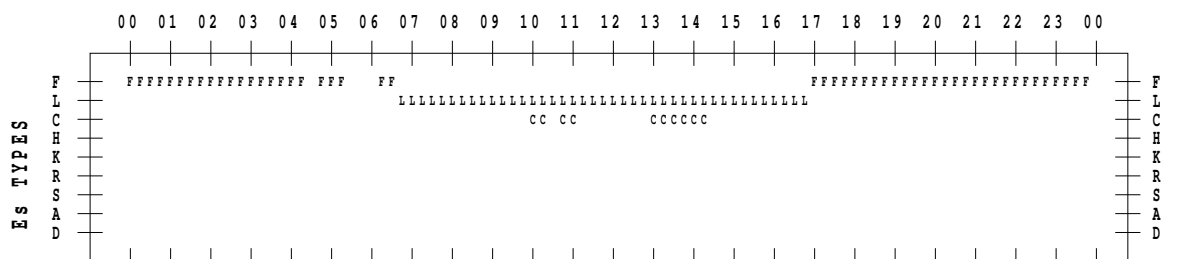
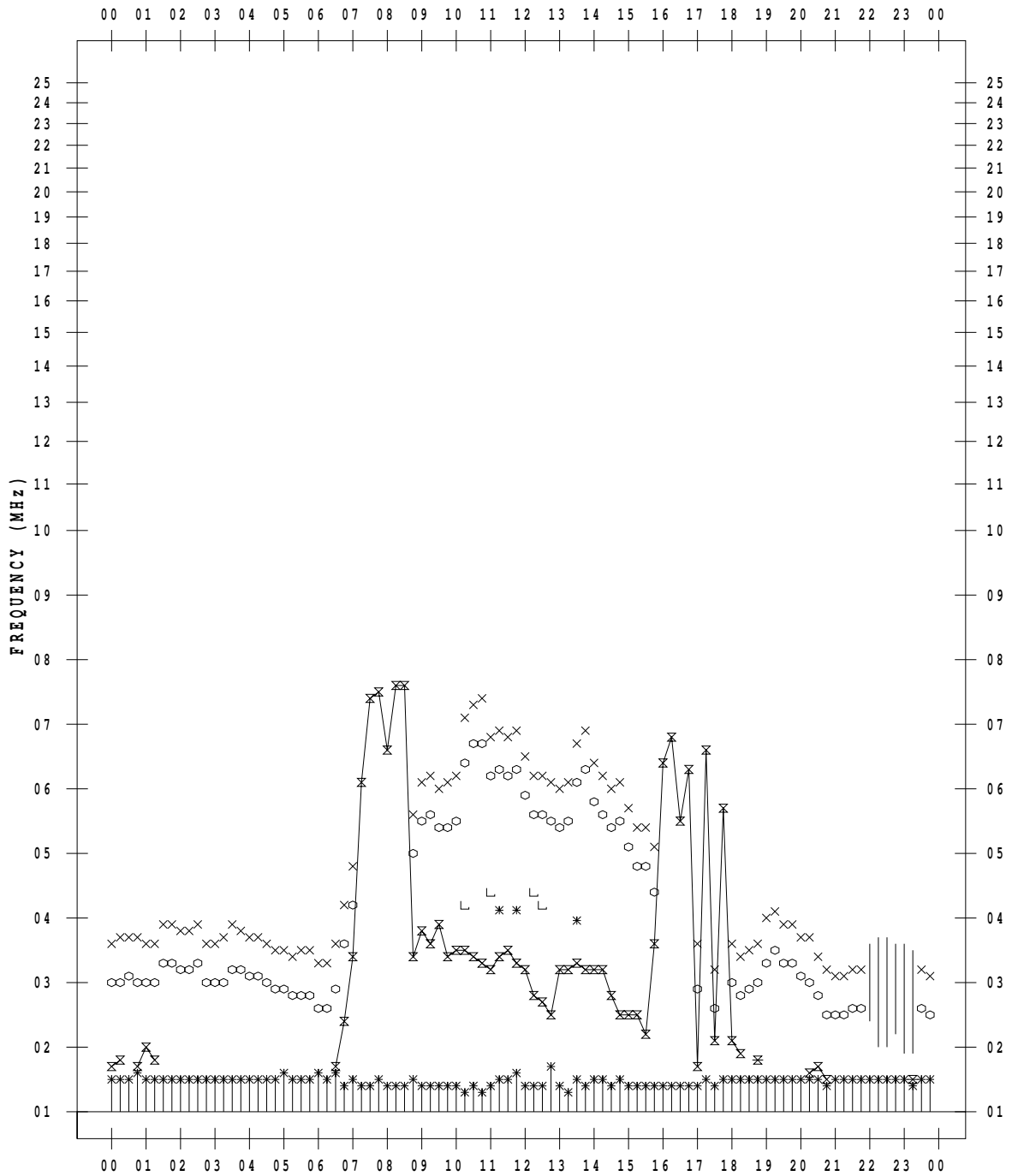
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/17

135 ° E MEAN TIME



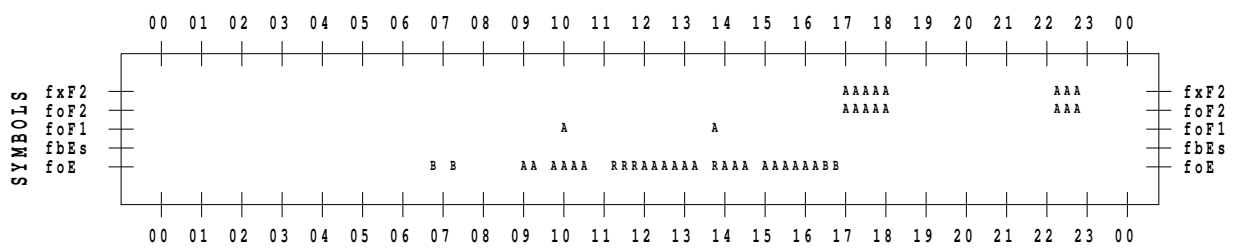
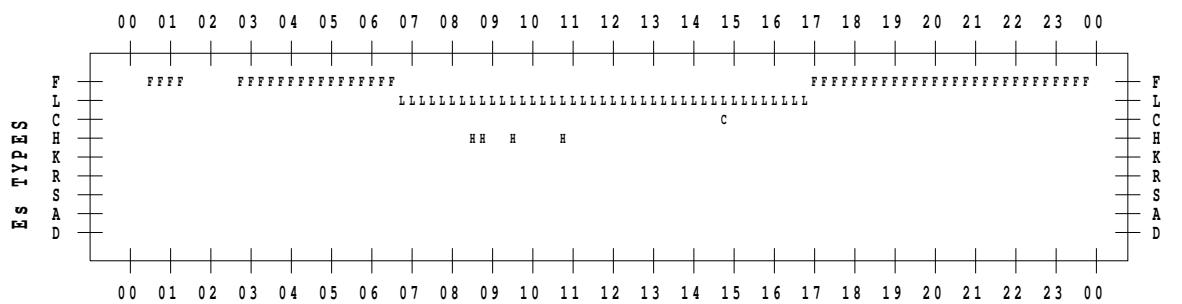
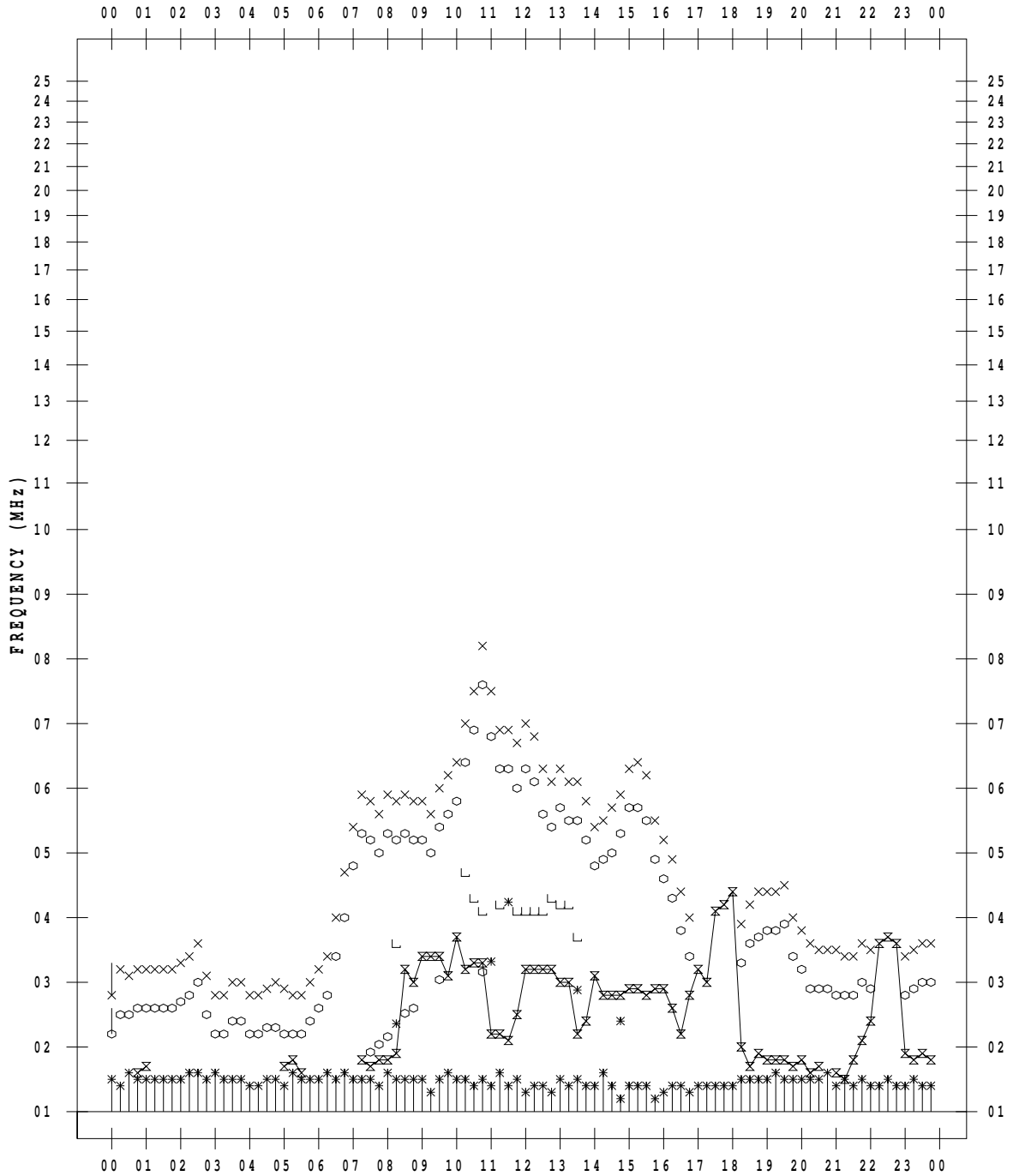
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/18

135 ° E MEAN TIME



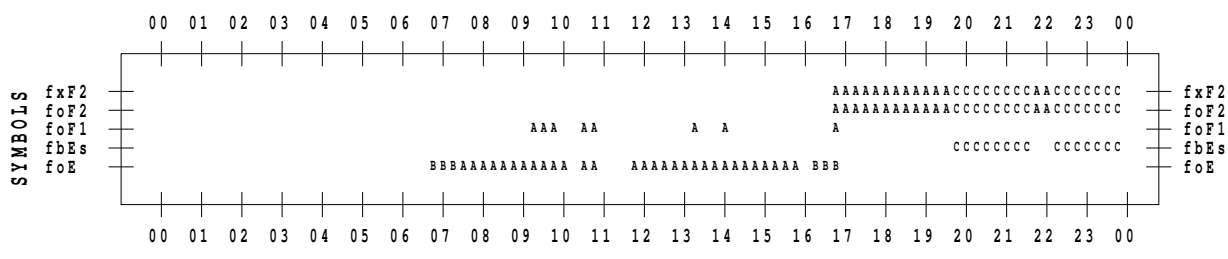
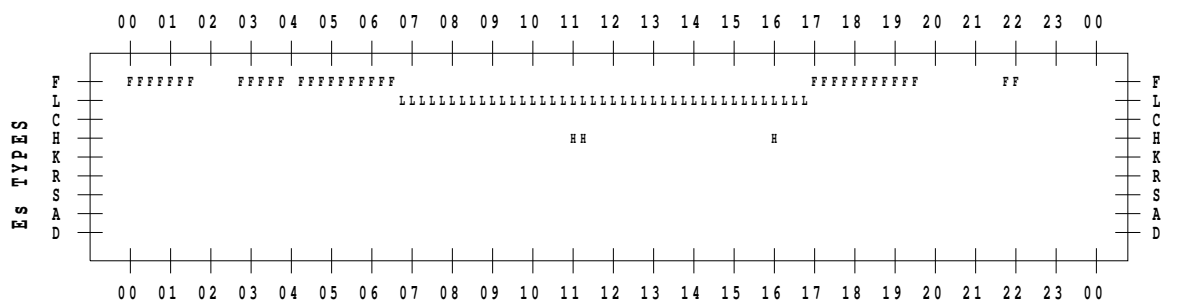
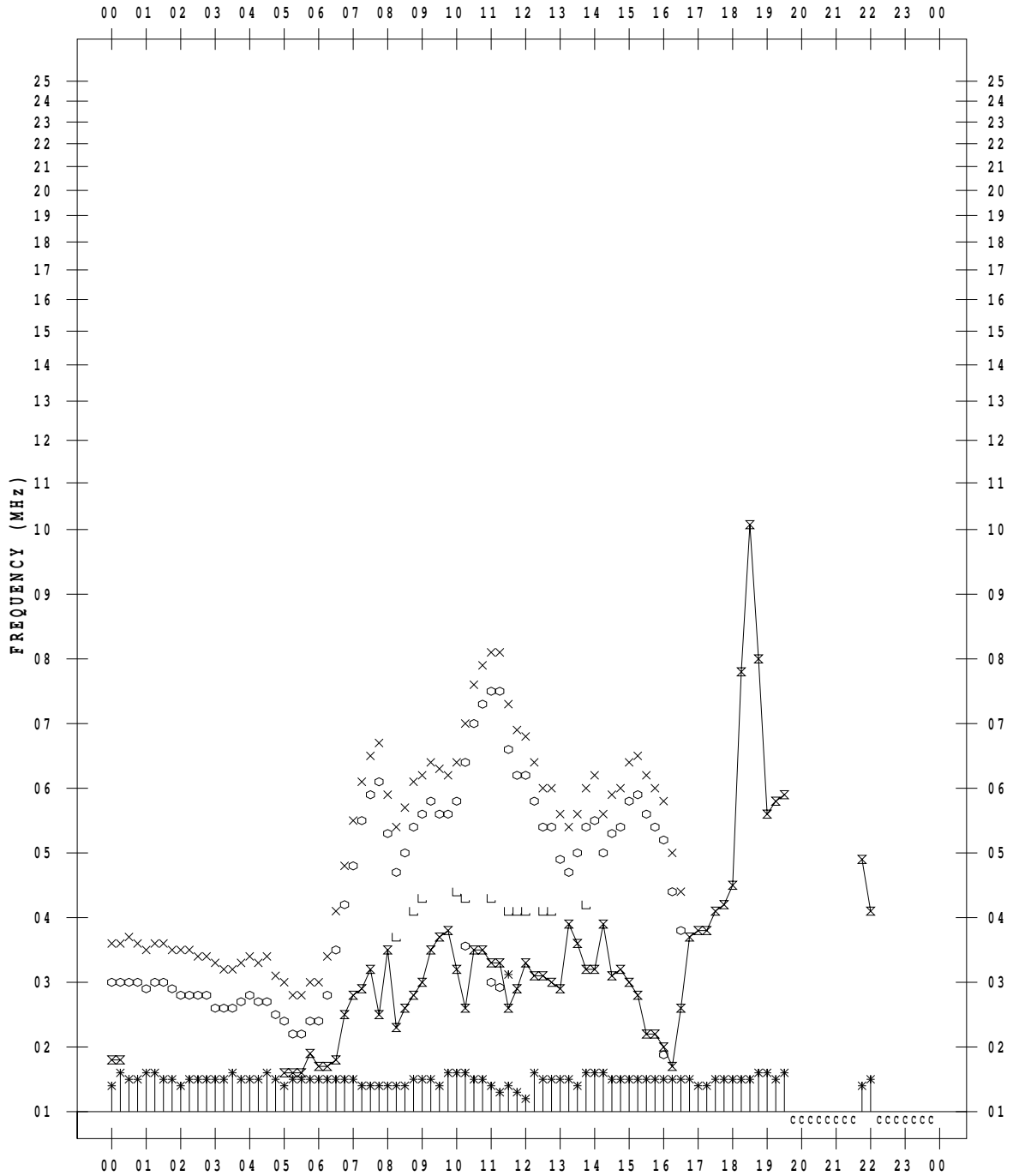
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/19

135 ° E MEAN TIME



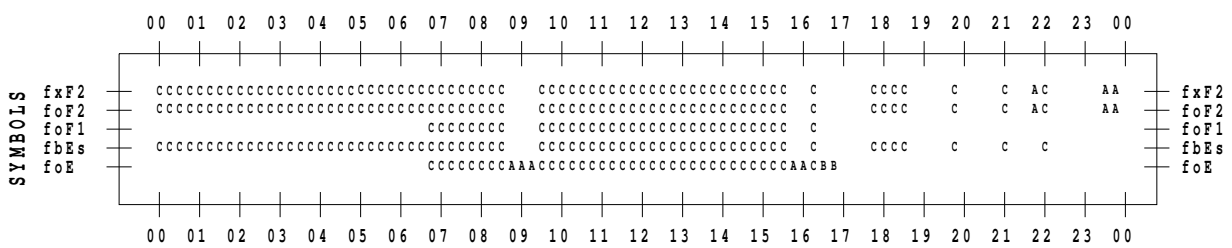
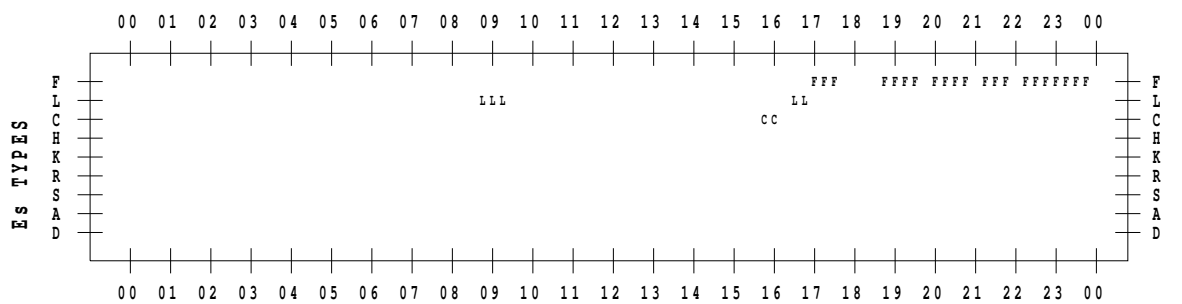
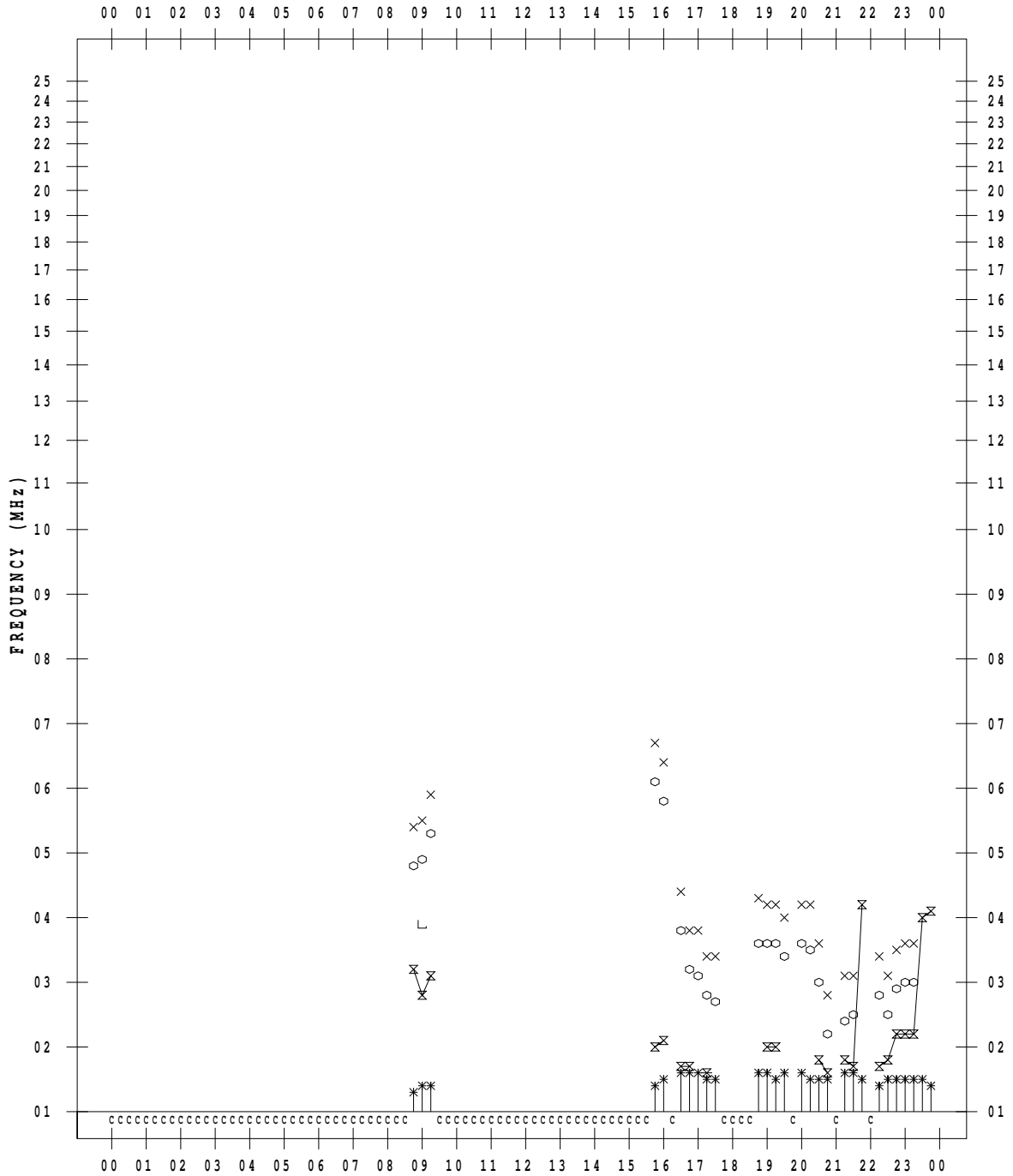
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/20

135 ° E MEAN TIME



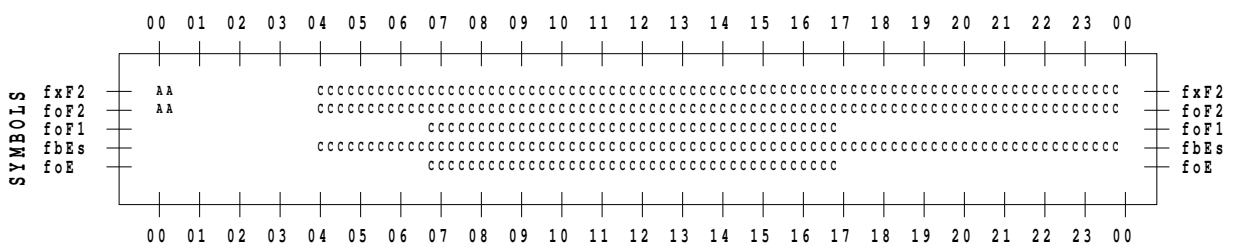
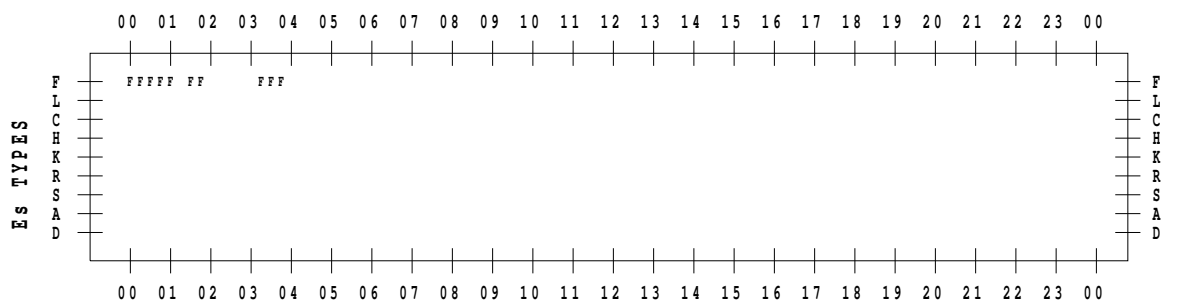
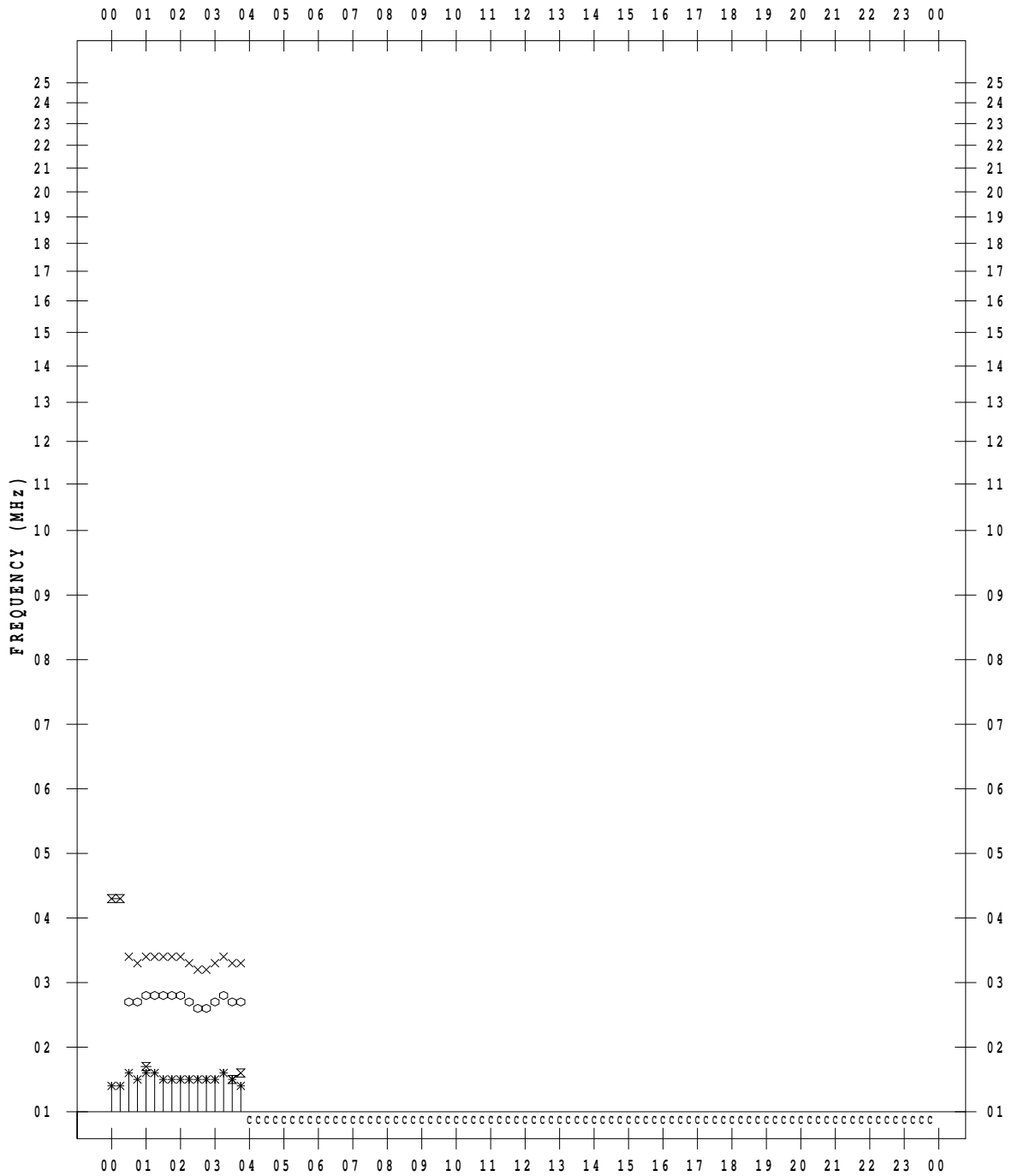
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/21

135 ° E MEAN TIME



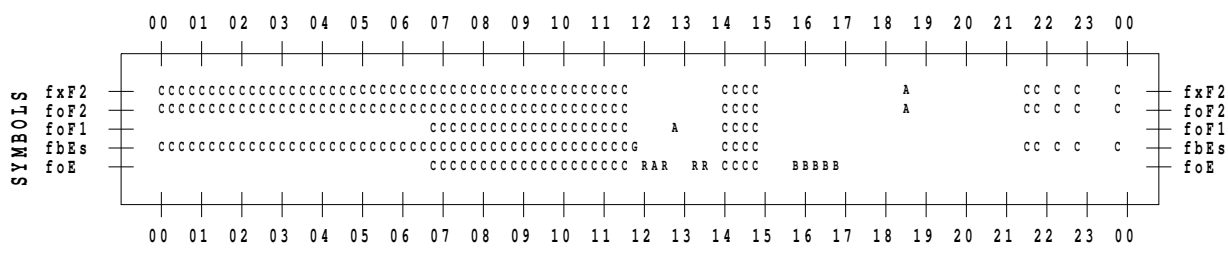
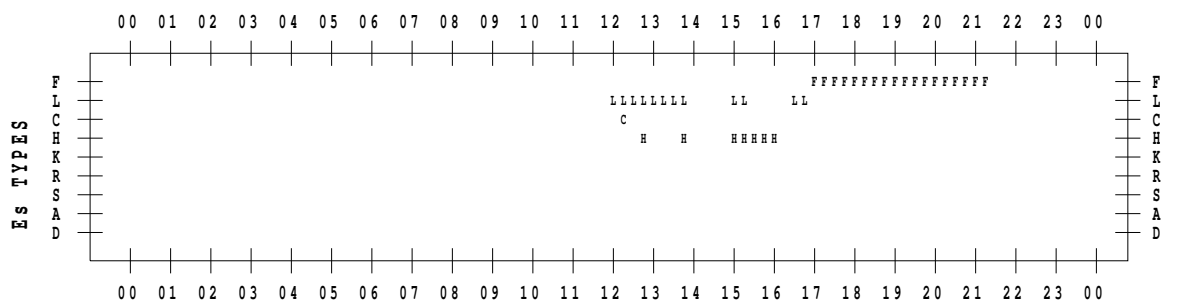
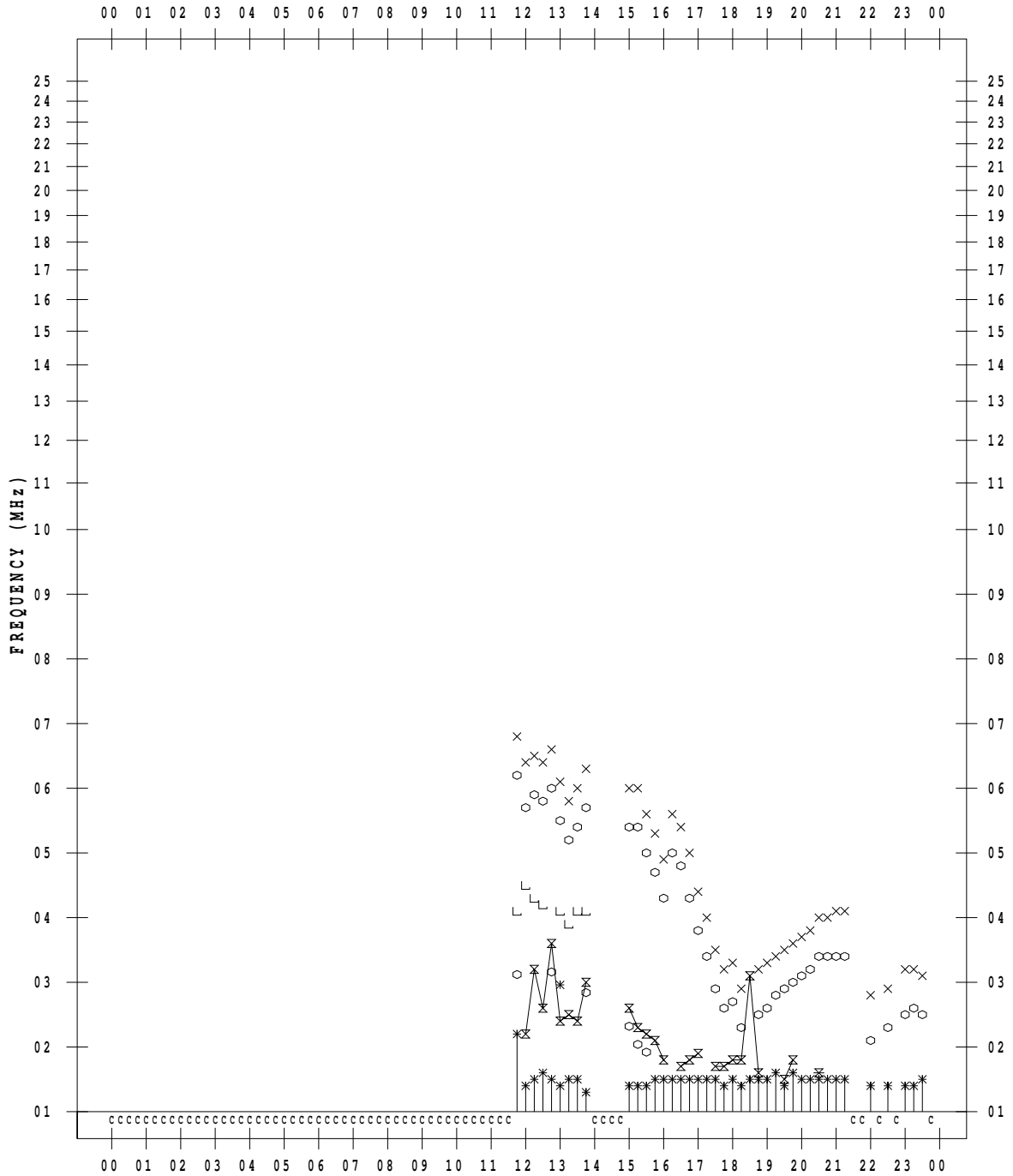
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/22

135 ° E MEAN TIME



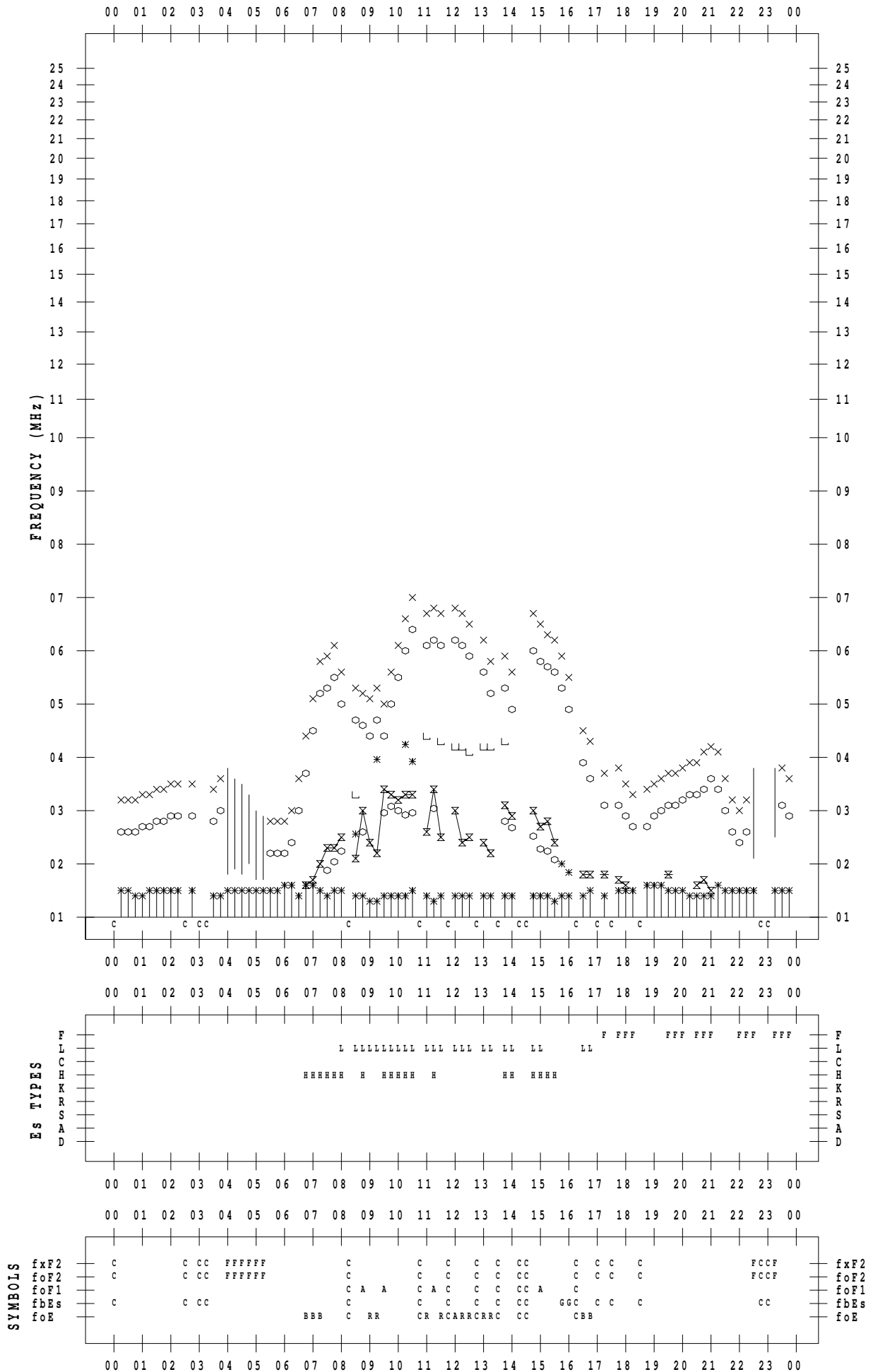
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/23

135 ° E MEAN TIME



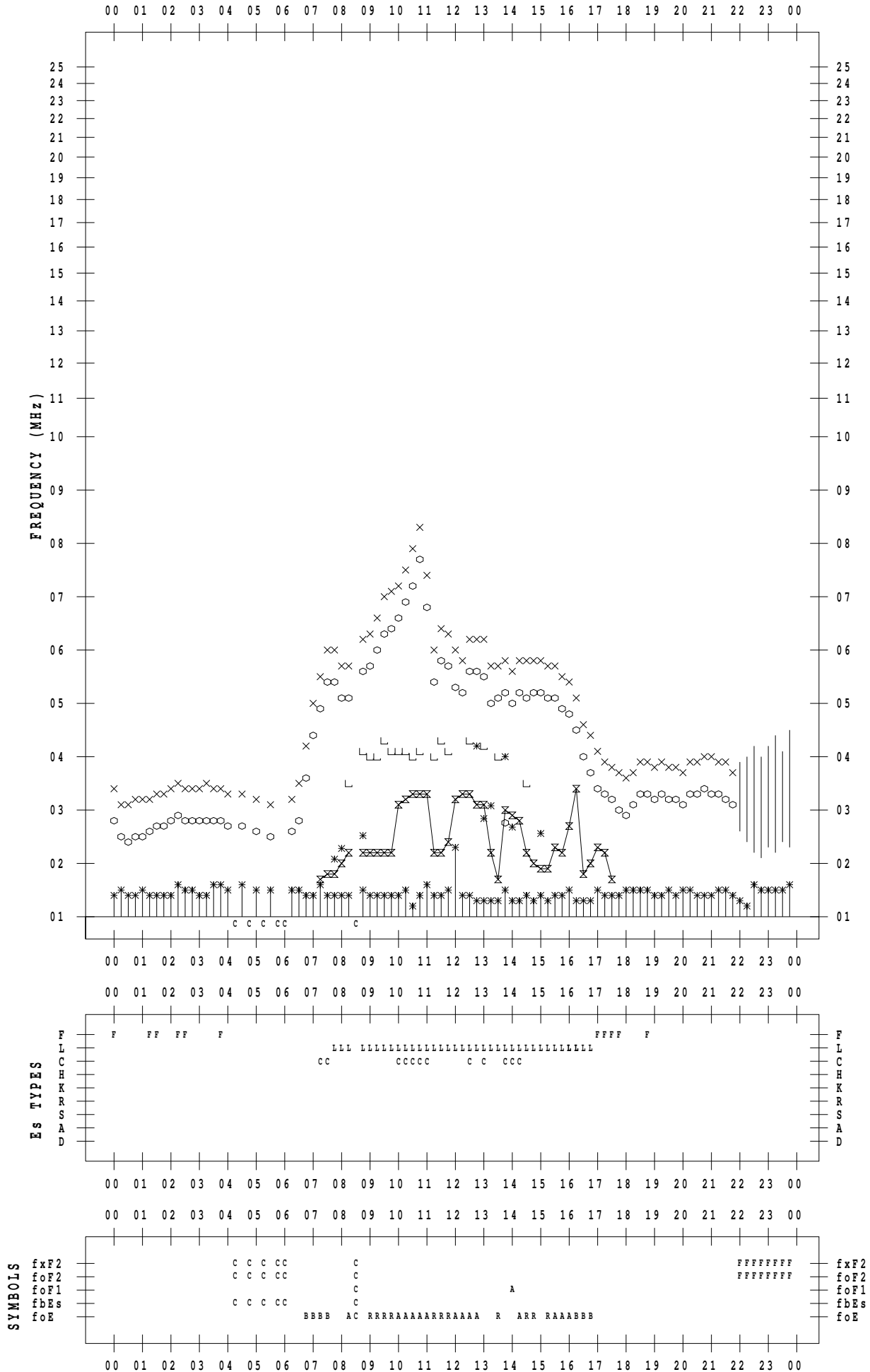
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/24

135 ° E MEAN TIME



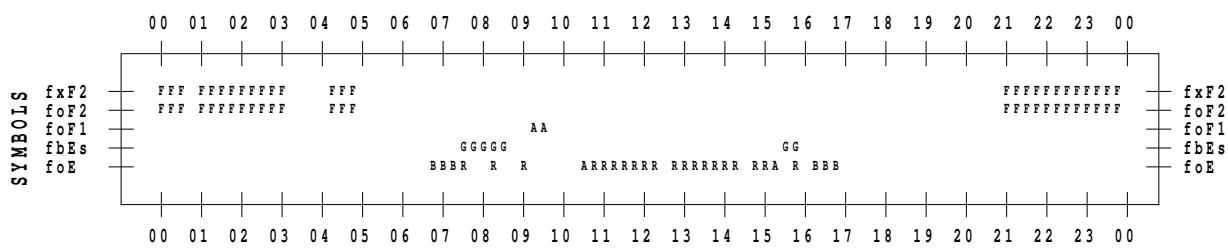
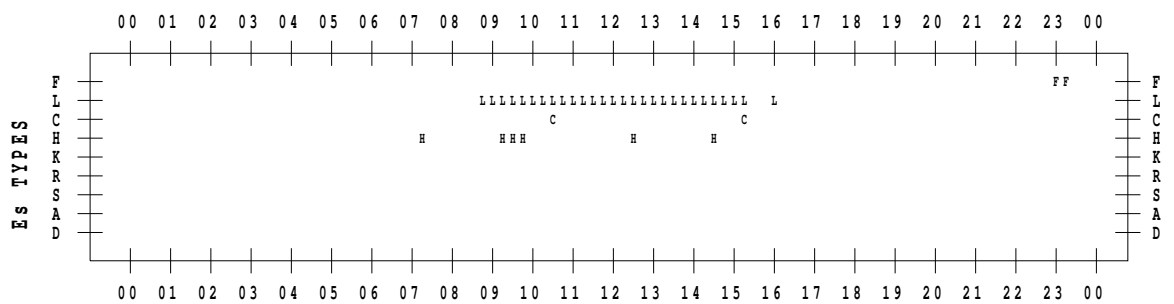
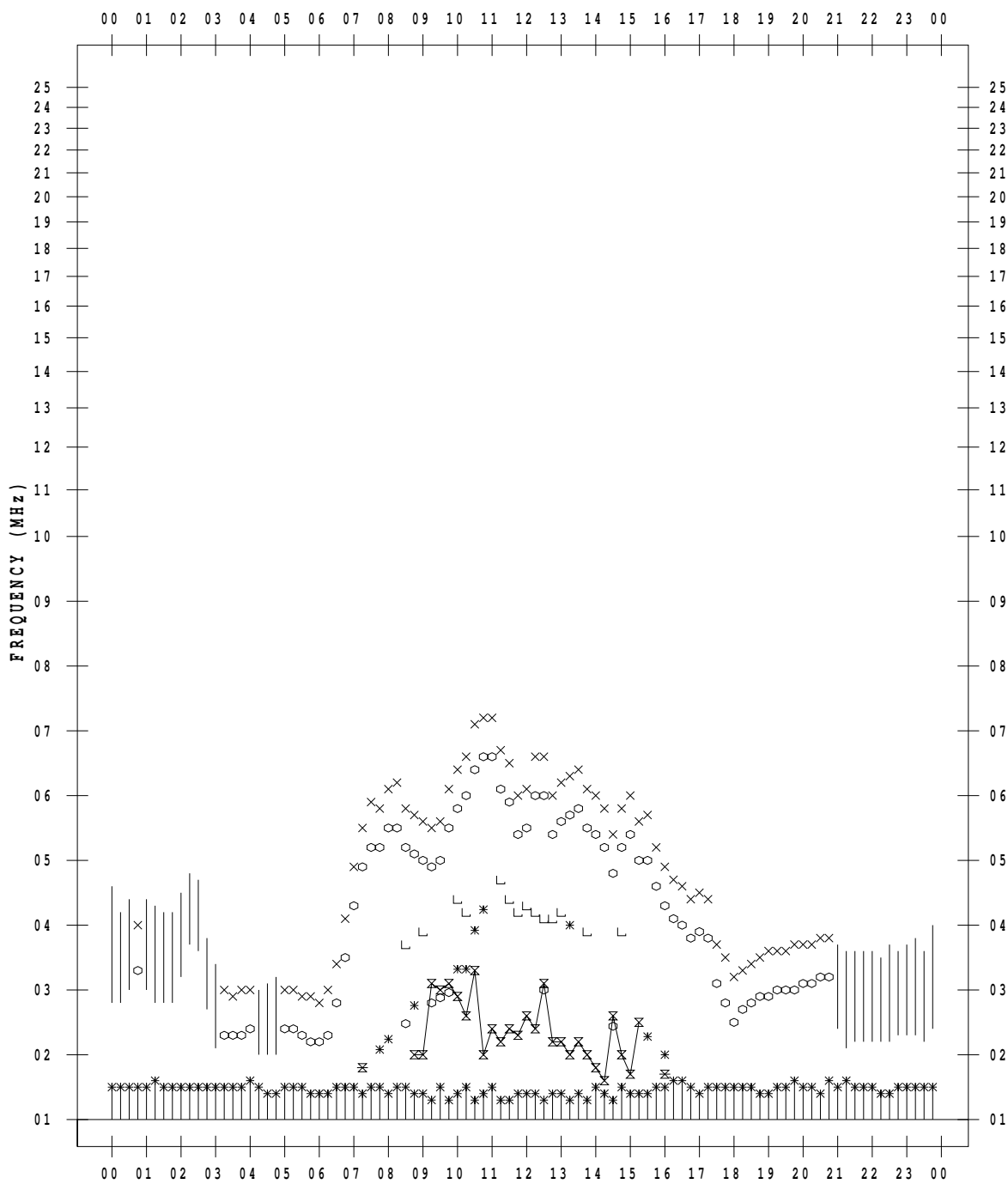
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/25

135 ° E MEAN TIME



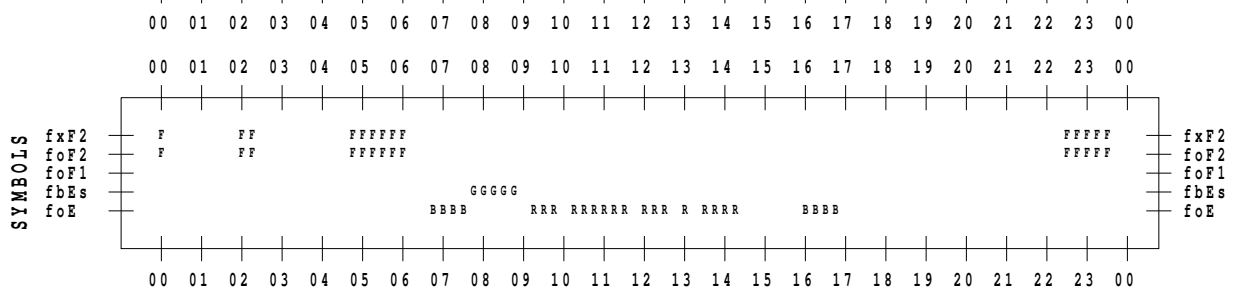
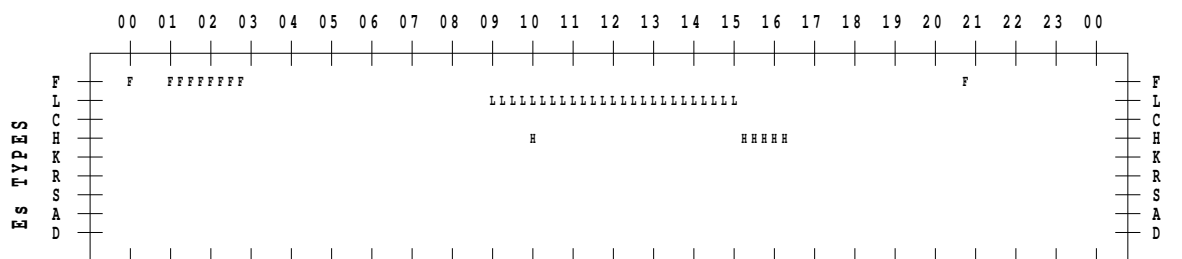
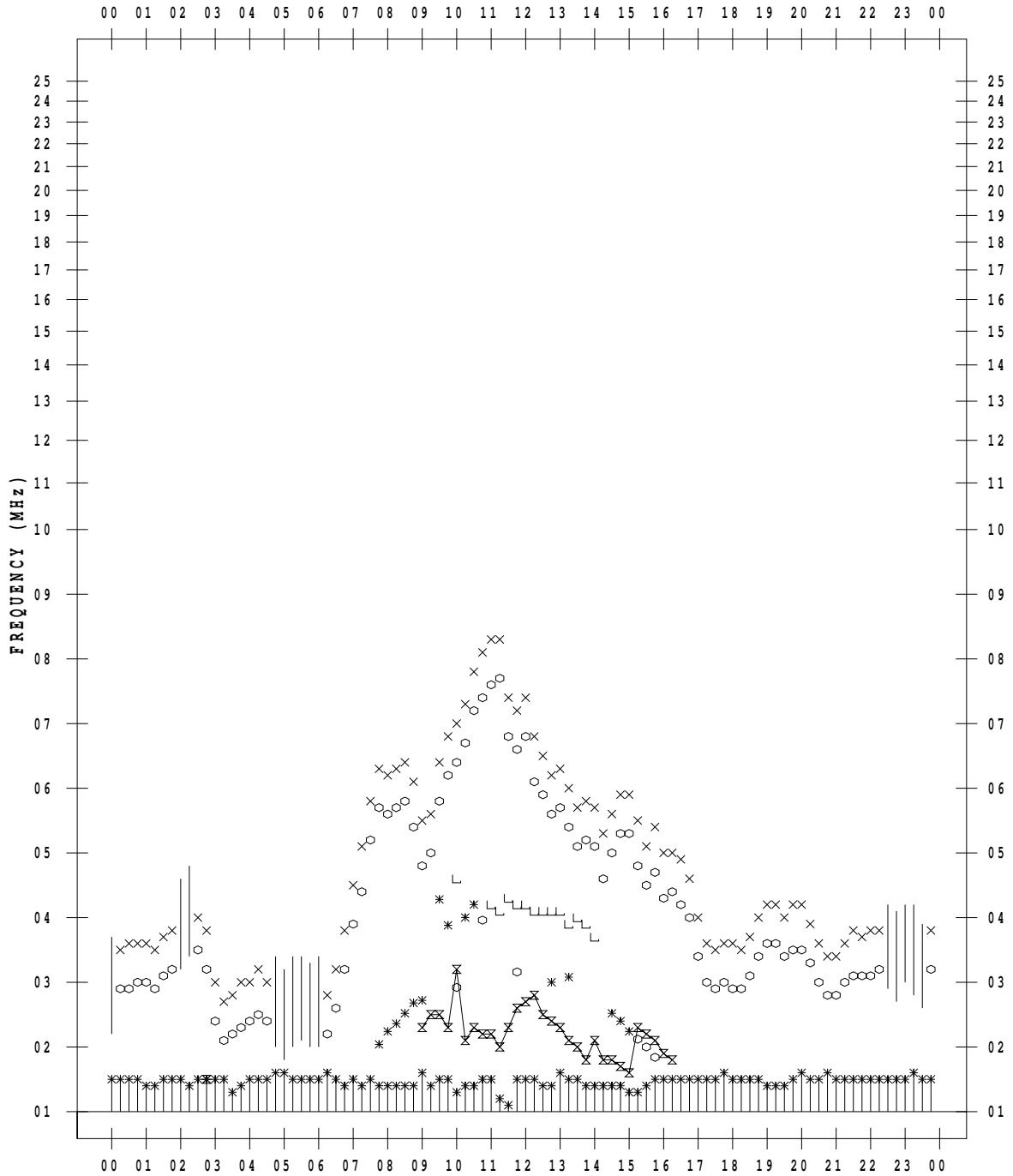
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/26

135 ° E MEAN TIME



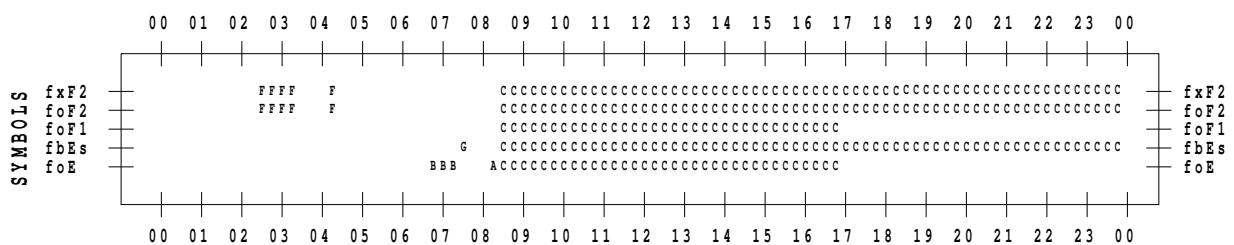
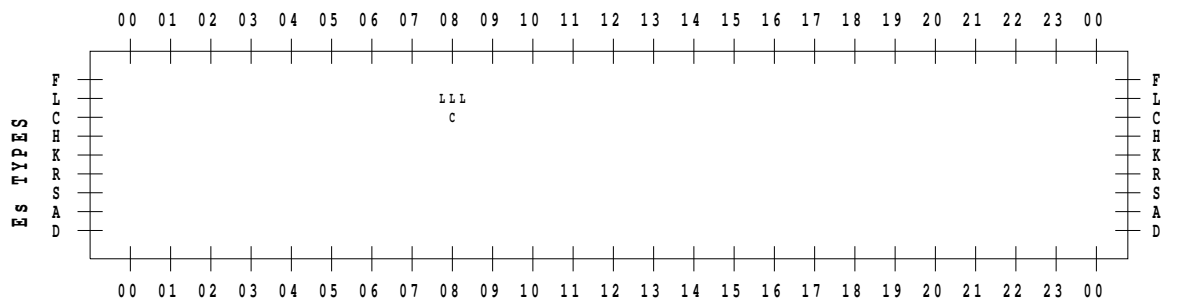
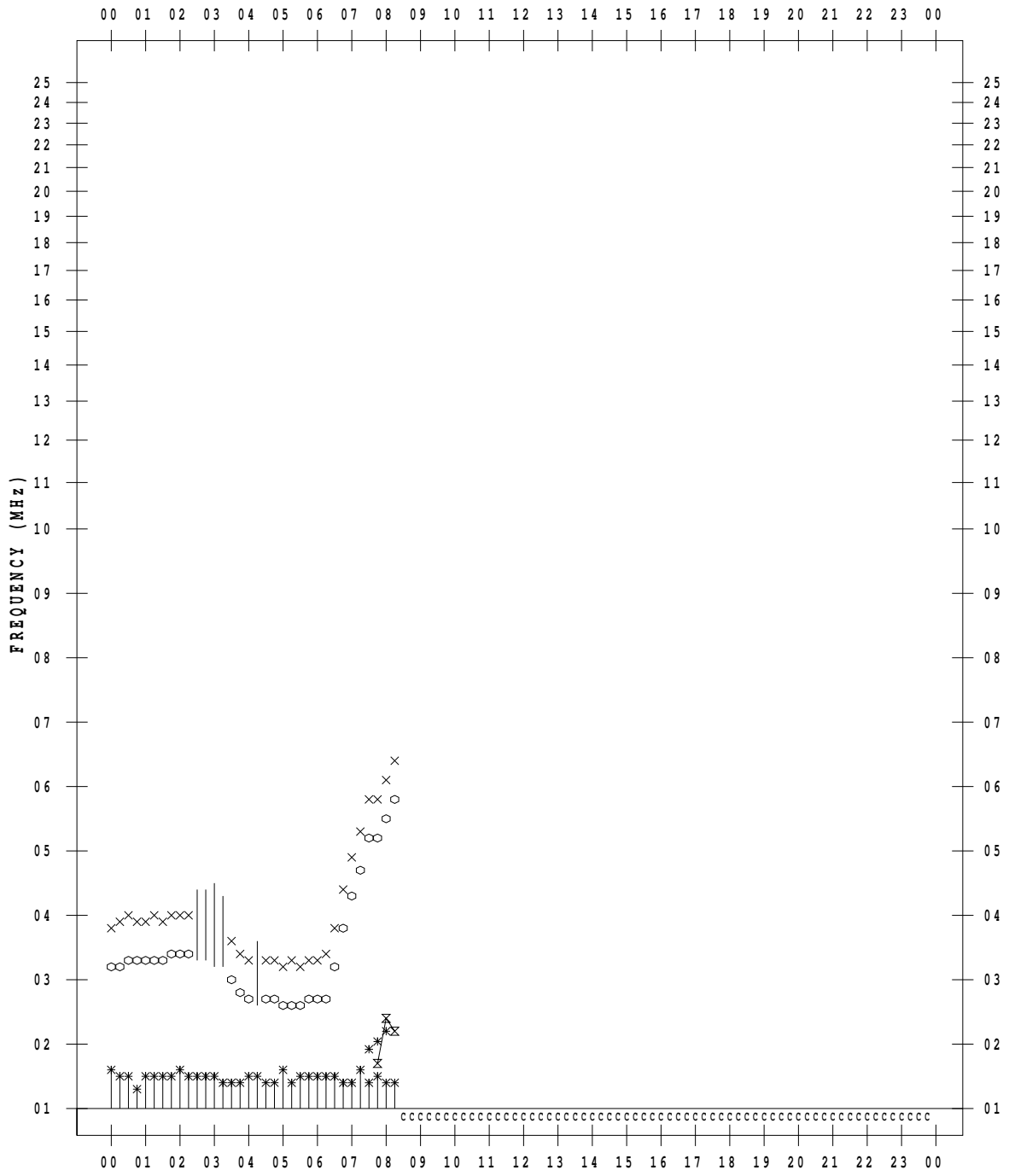
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/27

135 ° E MEAN TIME



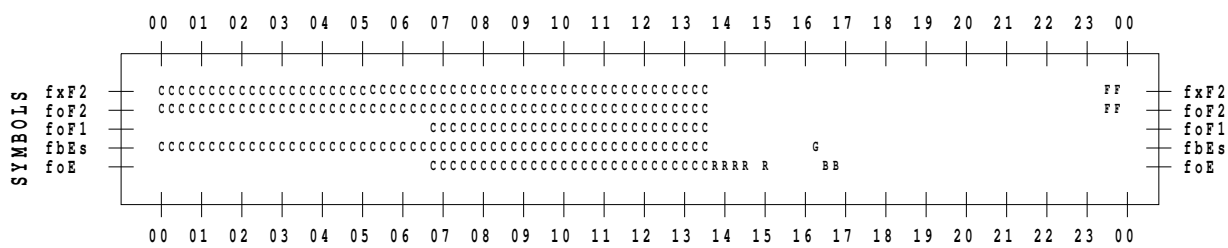
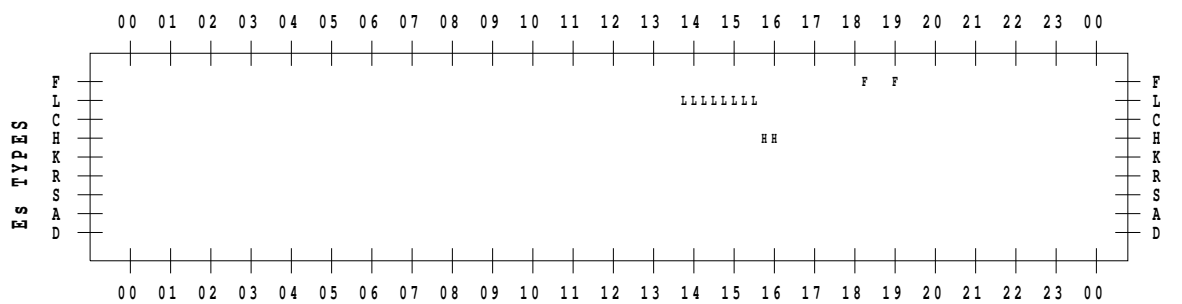
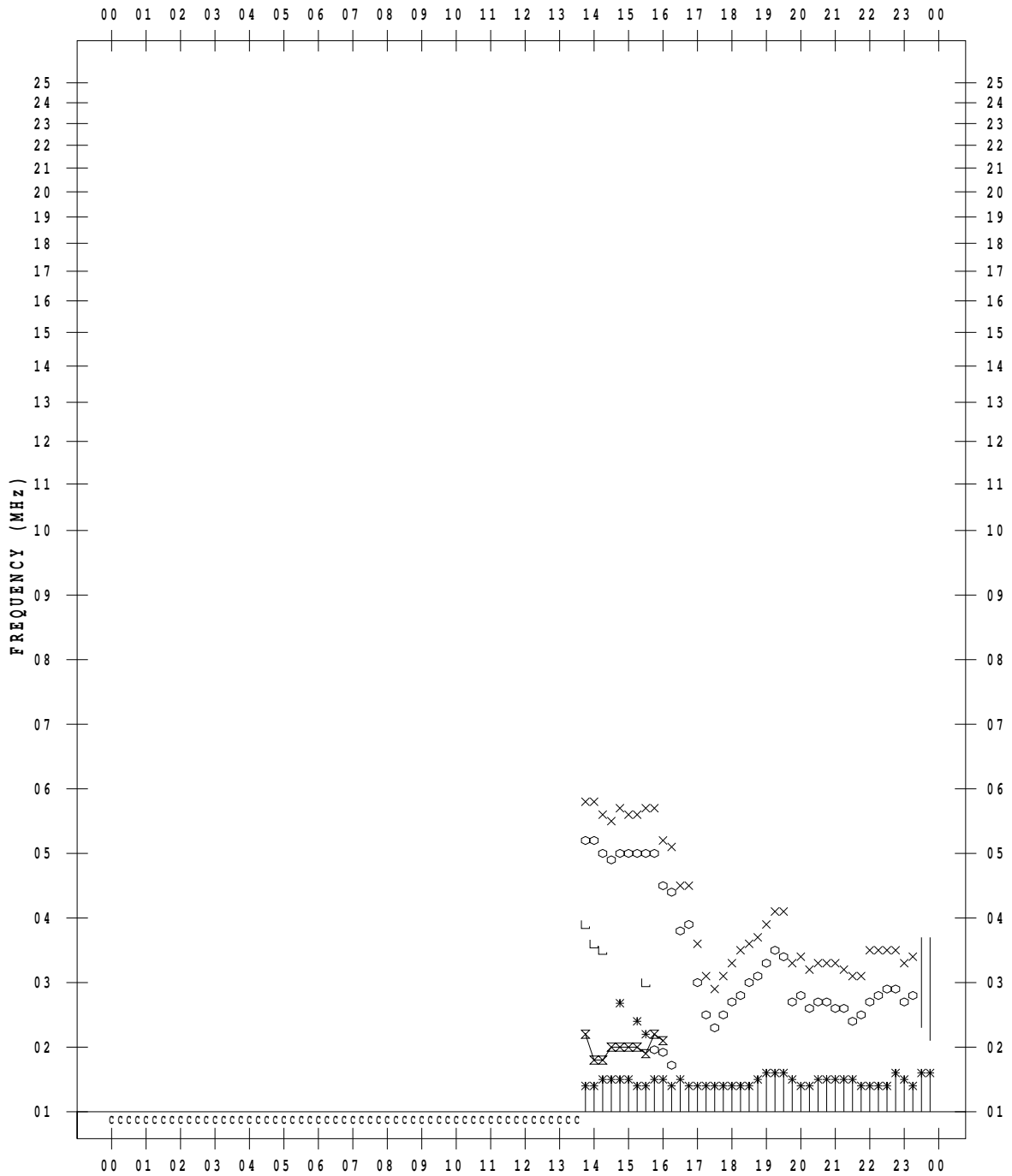
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/28

135 ° E MEAN TIME



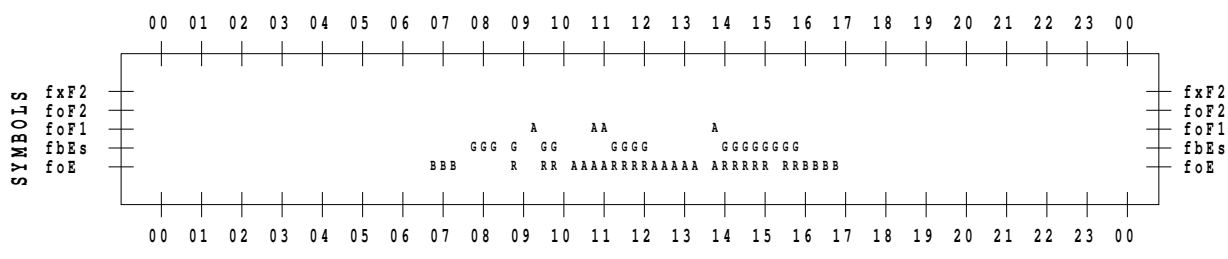
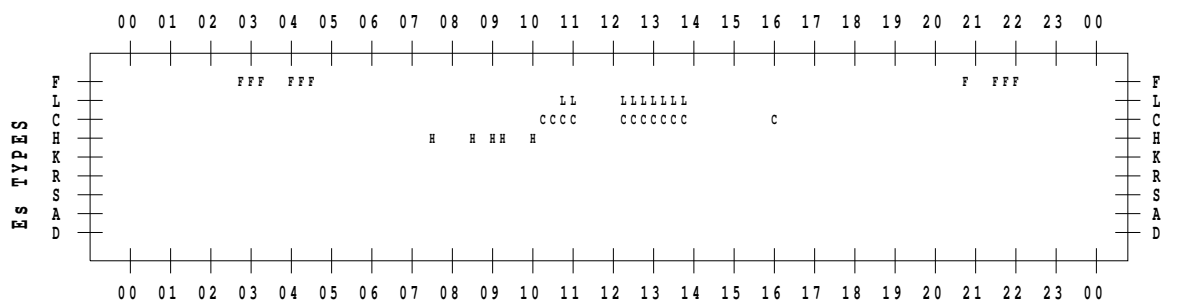
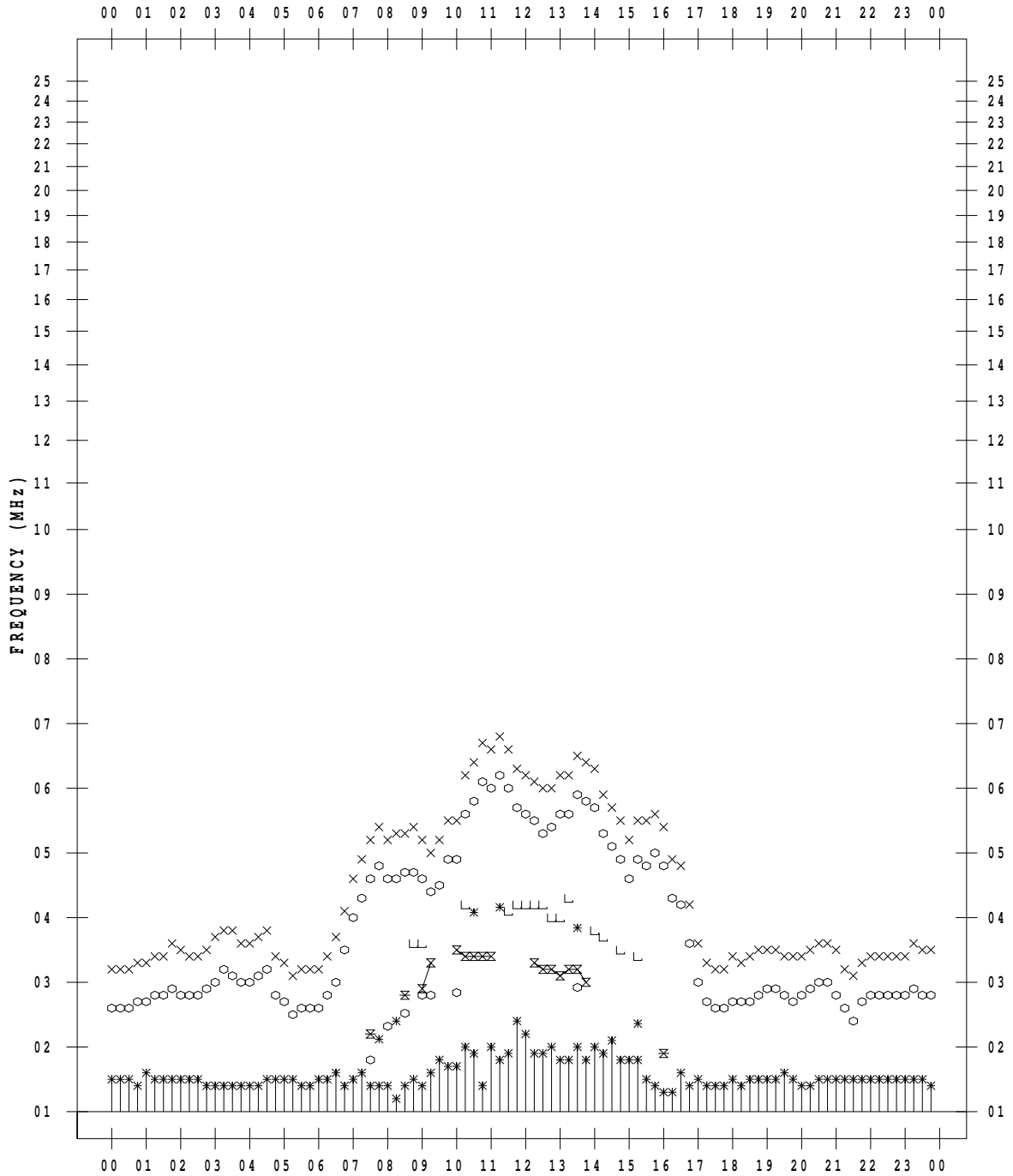
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/29

135 ° E MEAN TIME



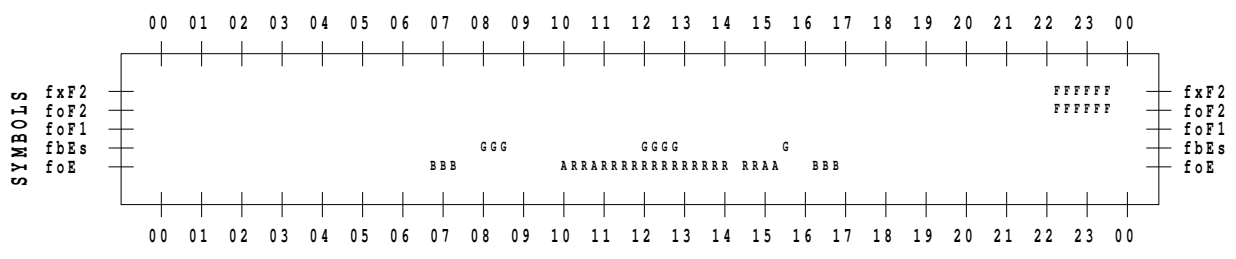
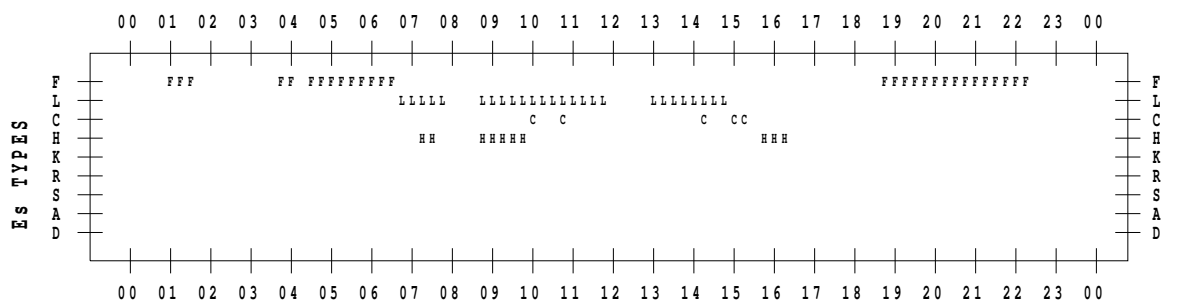
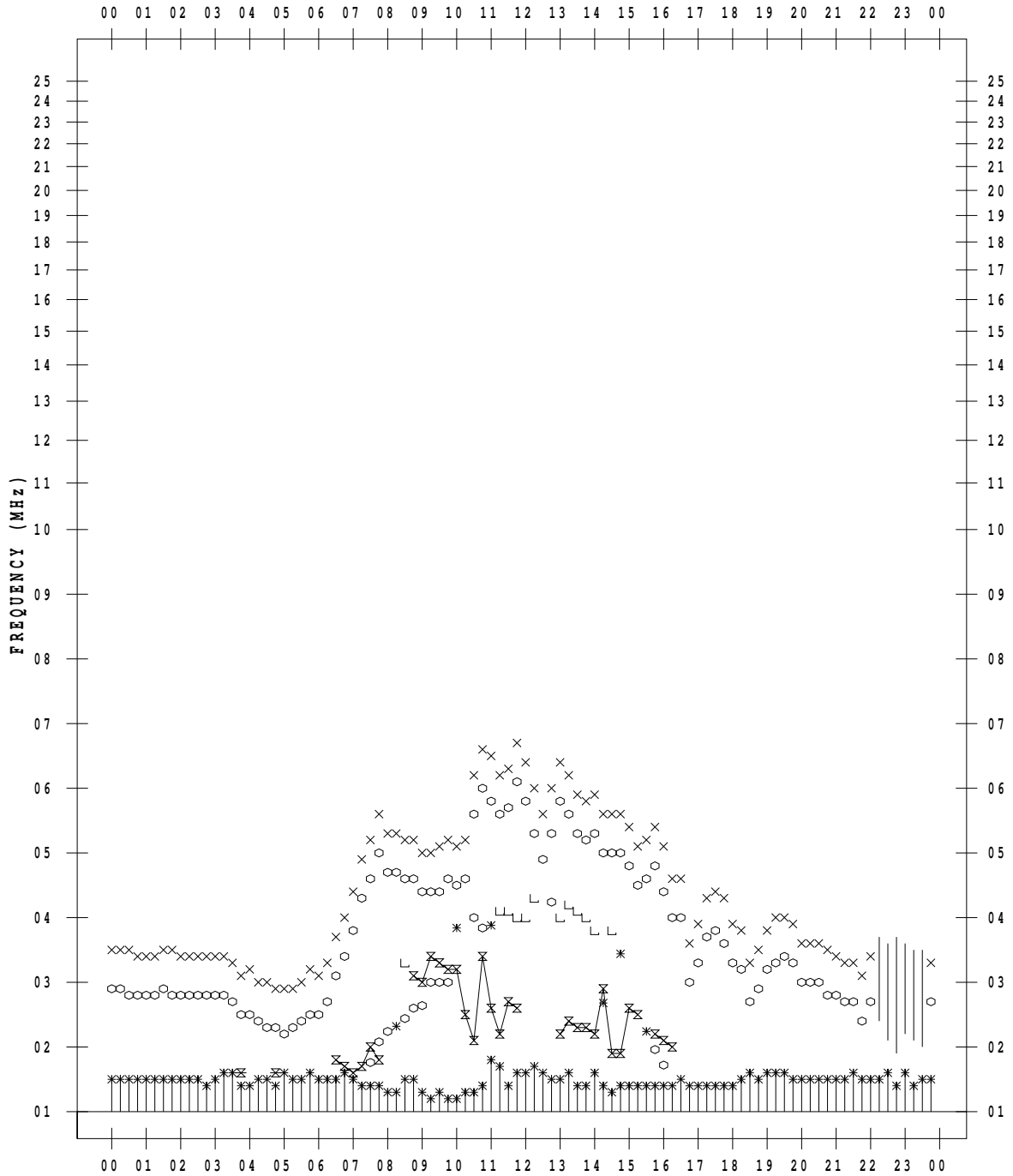
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/30

135 ° E MEAN TIME



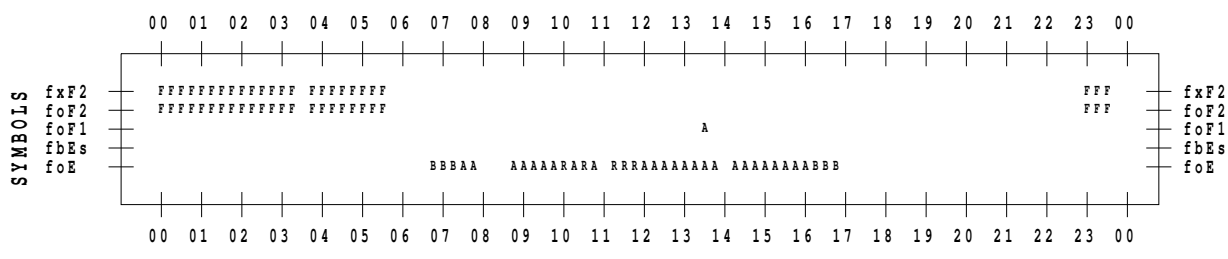
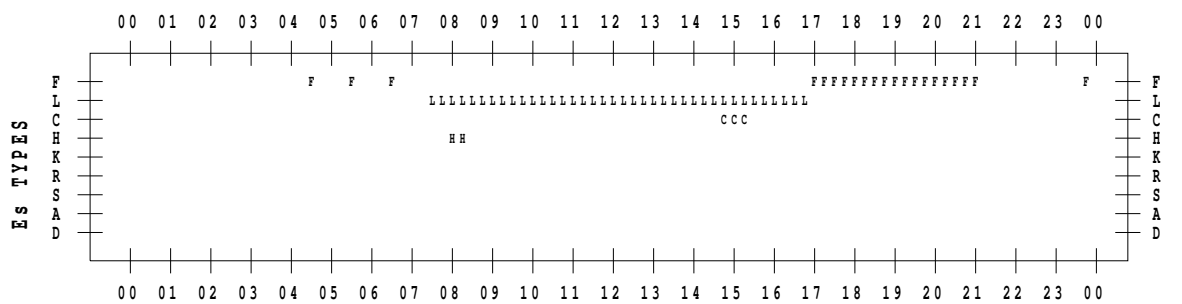
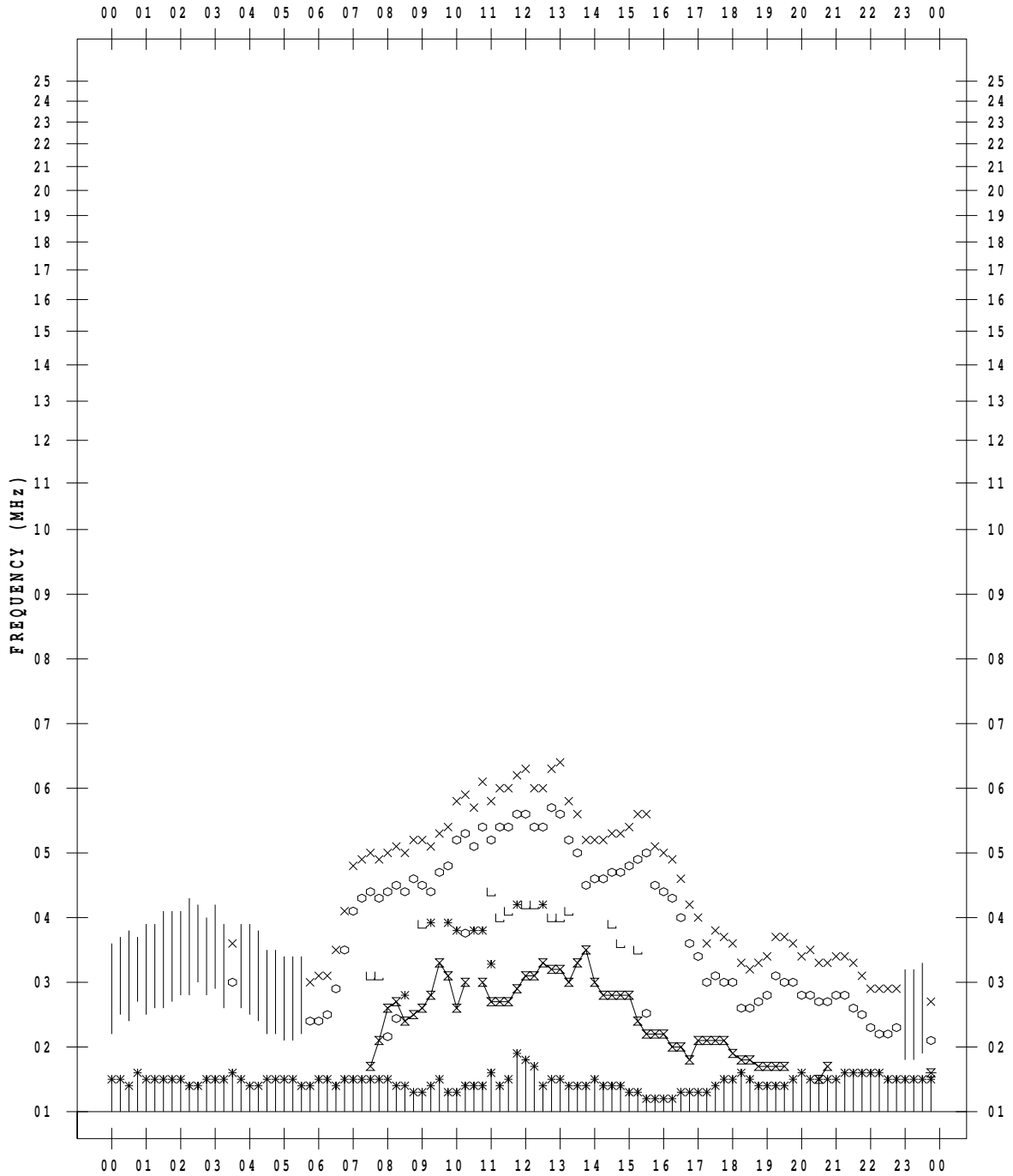
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2009/12/31

135 ° E MEAN TIME



B. Solar Radio Emission
B1.Outstanding Occurrences at Hiraiso

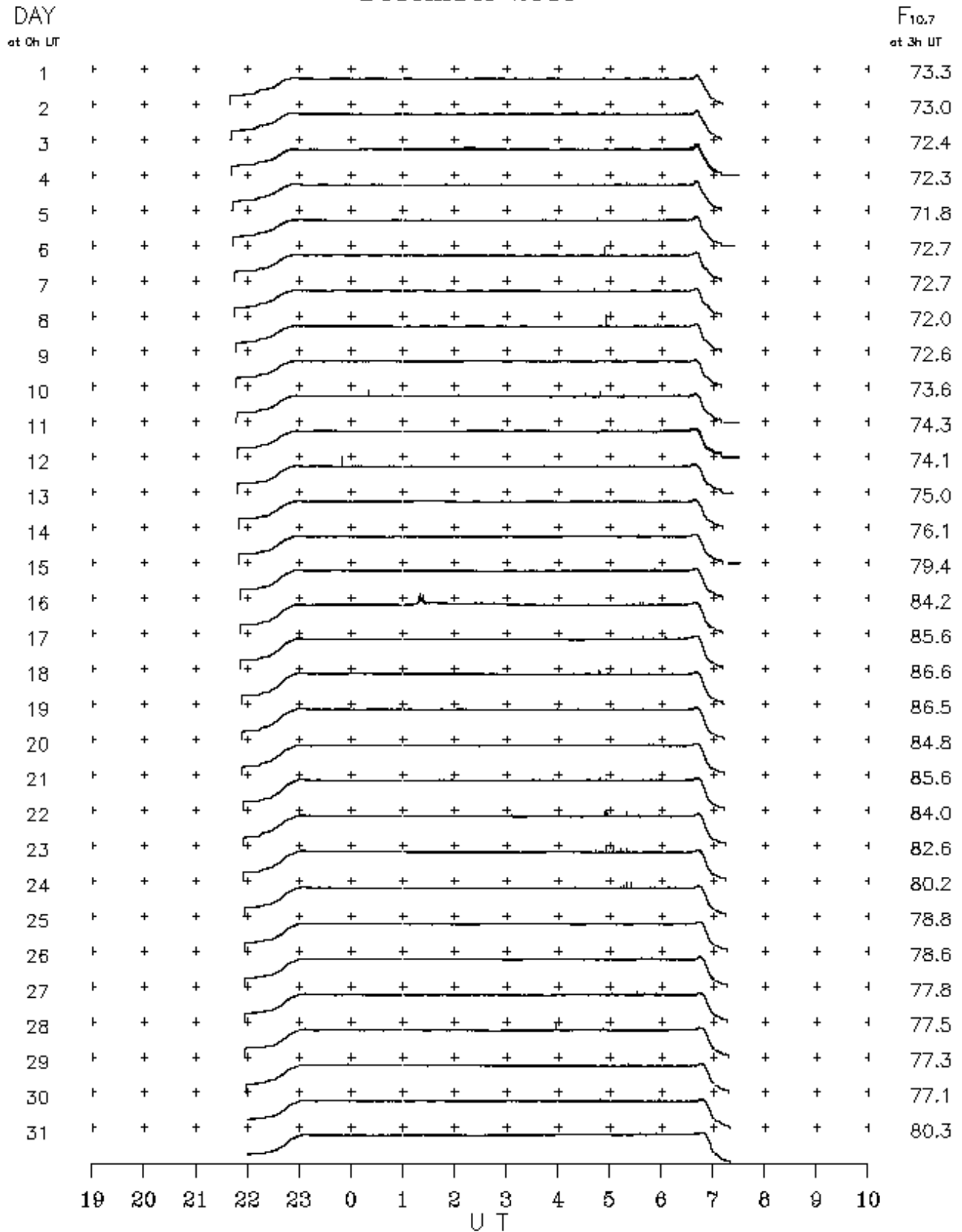
Hiraiso

December 2009

Single-frequency observations								
Normal observing period: 2135 – 0730 U.T. (sunrise to sunset)								
DEC.	FREQ.	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY ($10^{-22} \text{ W m}^{-2} \text{ Hz}^{-1}$)		POLARIZATION REMARKS
						PEAK	MEAN	
2009	(MHz)							
16	2800	4 S/F	0121.0	0121.0	7.0	25	–	
22	2800	7 C	0453.0	0454.0	5.0	10	–	
22	2800	8 S	0519.0	0519.0	1.0	10	–	

B.Solar Radio Emission

B2. Summary Plots of $F_{10.7}$ at Hiraïso December 2009



Note: A vertical grid space corresponds to a 100 sfu.
Elevation angle range $\geq 6^\circ$

A link to the daily plot data directory : <http://sunbase.nict.go.jp/solar/denpa/hirasDB/2009/12/>