

# IONOSPHERIC DATA IN JAPAN

FOR JUNE 2013

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## CONTENTS

Preface

Introduction . . . . . 1

### A. Ionosphere

#### A1. Automatic Scalling

Hourly Values at Wakkanai ( $f_oF2$ ,  $fEs$  and  $fmin$ ) . . . . . 4

Hourly Values at Kokubunji ( $f_oF2$ ,  $fEs$  and  $fmin$ ) . . . . . 7

Hourly Values at Yamagawa ( $f_oF2$ ,  $fEs$  and  $fmin$ ) . . . . . 10

Hourly Values at Okinawa ( $f_oF2$ ,  $fEs$  and  $fmin$ ) . . . . . 13

Summary Plots at Wakkanai . . . . . 16

Summary Plots at Kokubunji . . . . . 24

Summary Plots at Yamagawa . . . . . 32

Summary Plots at Okinawa . . . . . 40

Monthly Medians  $h'F$  and  $fEs$  . . . . . 48

Monthly Medians Plot of  $f_oF2$  . . . . . 50

#### A2. Manual Scalling

Hourly Values at Wakkanai . . . . . 51

Hourly Values at Kokubunji . . . . . 65

Hourly Values at Yamagawa . . . . . 79

Hourly Values at Okinawa . . . . . 93

$f$ -plot at Wakkanai . . . . . 108

$f$ -plot at Kokubunji . . . . . 138

$f$ -plot at Yamagawa . . . . . 168

$f$ -plot at Okinawa . . . . . 198

« Real Time Ionograms on the Web .....[http://wdc.nict.go.jp/index\\_eng.html](http://wdc.nict.go.jp/index_eng.html) »



NATIONAL INSTITUTE OF INFORMATION  
AND COMMUNICATIONS TECHNOLOGY  
TOKYO, JAPAN

# INTRODUCTION

This Series contains data on ionosphere (I) and solar radio emission (S) obtained at the following stations under the

National Institute of Information and Communications Technology, Japan.

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

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

## IONOSPHERE

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

### A1. Automatic Scaling

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

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

#### a. Characteristics of Ionosphere

<b><math>foF2</math></b>	Ordinary wave critical frequency for the <b><math>F2</math></b> layer
<b><math>fEs</math></b>	Highest frequency of the <b><math>Es</math></b> layer whether it may be ordinary or extraordinary
<b><math>fmin</math></b>	Lowest frequency which shows vertical iono-spheric reflections
<b><math>h'Es</math></b> <b><math>h'F</math></b>	Minimum virtual height on the ordinary wave for the <b><math>Es</math></b> and <b><math>F</math></b> layers, respectively

#### b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example  $Es$  ( for  $foF2$  ).
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of very small ionization density of the layer ( for  $fEs$  ).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of problems occurring in the auto matic data processing system, but existence of film record.

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

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

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

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

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

#### d. Reliability of Automatic Scaling

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

#### e. Summary Plot

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

### A2. Manual Scaling

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

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

#### a. Characteristics of Ionosphere

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



## HOURLY VALUES OF foF2 AT Wakkanai

JUN. 2013

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	65	66	66	66	63	66	67	52	71	A	A	A	A	69	74	88	107	75	N	54	A	54	58		
2	49	34	A	A	A	57	A		64	A	A	A	A	A	A	57	56	57	60	61	35	63	63		
3	64	56		34	52	61	59	A	A	A	A	A	A	A	A	64	62	64	64	66	67	29	54		
4	64	32	53	34	53	64	66	A	58	A		A	A	A	A	63	60	67	66	63	64	62	67		
5	63	63	61	58	60	62	62	62	63	64	65		A	59	64	66	A	68	68	66	67	63	63	54	
6	63	63	A	59	61	68	73	A	70	A	66	49	63	A	63	61	A	77	65	71	64		54	64	
7	66	22	52	32	57	A	64	A	A	A	A	A	A	A	A	A	A	A	A	56	52	A	A	A	
8	52	A	A	46	53	60		61		A	A			A	A	A	A	A	A	60	65	67	64	A	
9	62	58	53	51	47	58	64	60	58	A	A	A	62			64	67		A	A	A	63	67	64	64
10	62	52	53	53	52	61	60	58	A	64	A	A	A	65	65	66	66	65	68	61	63	49	64	54	
11	34	54	28	A	46	62	64	A	67	62		A	A	A	A	A	A	A	63	66	67	61	63	62	
12	59	53	58	56	57	57	62	57	A	62	60		A	A	61		60	60	61	63	66	63	62	53	
13	63	60	52	54	57	64	69	59	61	65	60		A	A	A	64	A	66	62	A	65	A	A	62	
14	A	A		62	62	63	74	70	74	A	A	A		65	65	66	67	A	68	69	N	62	66	64	
15	64	61	66	64	66	67	67	59	70	65	57		A	A	69	A	61	66	65	66	A	64	66	A	
16	66	A		58	63	62	68		67	69	A	66	64	A	A	A	57	58	58	62	67	67	A	66	64
17	65	62	61	56	55	61	64	66	69	A	A	64	A	A	A	65	66	68	68	67	67	56	A	64	
18	63	63	63	63	64	64	64	68	67	A	A	A	A	A	A	68	68	69	69	58	A	A		65	62
19	A	A	A	A	A	66	67	88	A	A	A	A		64	70	67	64	67	A		65	A	65	64	
20	66	65	63	62	62	64	68	59	65	63	68	60		A	64	A	A	A	67	69	A	A		64	32
21	63	65	61	64	66	66	66	59	55	A	67	63			A	65	67	65	A	67	66	64	65	67	
22	66	A		62	64	61	56	61	A	66	62	64	59		A	63	66	A	70	67	63	66	54	63	
23	64	63	63	60	A	61	61	67	67	57	A	A	62	62	68	68	67	70	69	67	66	42	67	A	
24	38	67	66	64	61	66		A	A	A	A	A	A	A	A	A	49	61	62	A	66	A		64	54
25	62	63	60	A	A	52	62	62		A				A	A		58	62	63	61	64	65	65	64	
26	65	63	59	54	54	54	67	67	69	A	65	60	59		A	65	62	A	A	65	67	A	65	A	
27	A	62	64	64	61	67	63	68	A	63				61	68	66	66	63	A	A	67	53	64	66	
28	62	62	60	61	61	67	67	69	67	67	69	69	62		69	A	A		A	64	66	66	A	A	
29	A	64	A	52	A	A	60	A	A	A	A		64	61	63	65	68	A	69	68	70	66	67	64	54
30	52	A		45	36	A	A	A	A	A	A	A	A	A	A	A	A	A	A	54	58	A	A	A	
31																									
	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	24	23	26	25	27	25	20	18	11	11	10	7	9	8	17	20	20	21	24	26	19	25	23	
MED	63	62	61	58	60	64	64	62	67	63	65	64	62	63	65	66	65	66	67	66	66	64	64	63	
U Q	65	63	63	63	62	66	67	67	69	65	67	64	63	67	68	68	67	68	68	67	66	66	65	64	
L Q	62	55	53	52	53	60	62	59	63	62	60	60	61	61	64	64	60	61	62	61	63	56	62	54	

## HOURLY VALUES OF fEs AT Wakkanai

JUN. 2013

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

$\frac{H}{D}$	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	G	G	G	G	31	40	34	39	64	85	76	94	70	118	101	61	54	73	42	40	52	50	29	29	
2	60	28	58	70	68	52	123		49	62	68	51	44	44	40	33	35	46	40	48	11	32	32	G	
3	34	G		G	28	26	39	52	73	72	58	42	44	56	43	35	33	48	39	40	60	G	57	34	
4	38	32	32	29	34	32	45	74	50	98	G	45	48	46	61	51	37	51	48	56	37	32	38	39	
5	38	32	27	24	G	40	39	52	38	50	54		34	33	40	60	70	56	49	55	50	38	41	48	
6	40	57	72	49	41	36	47	74	65	75	50	67	39	72	39	40	75	52	46	62	56		40	G	
7	30	G		26	24	G	67	64	144	97	66	67	84	70	77	159	127	107	72	80	40	34	92	44	30
8	39	40	69	34	40	58	80	58		39	35			45	77	71	103	69	60	50	56	38	59	71	
9	40	28	38	39	G	38	44	52	61	51	64	74	62	80	56	63	59	73	74	60	38	48	46	26	
10	G	G	G	G	G	34	44	60	75	58	42	72	71	63	49	59	69	28	40	59	37	39	40	39	
11	33	38	34	40	40	37	52	68	68	57	61	70	114	87	76	30	70	108	80	69	45	43	27	G	
12	G	G	G	G	G	36	42	55	74	52	42	63	62	54	56	35	39	35	26	32	27	25	26	28	
13	45	59	G	G	G	27	42	50	67	61	50	63	69	63	75	62	68	40	40	72	61	73	70	60	
14	70	68	40	43	33	29	63	78	95	98	78	64	62	39		49	41	78	54	40	38	48	52	45	
15	50	G	39	G	G	29	33	50	62	68	72	81	94	68	92	90	40	35	49	58	83	69	59	71	
16	44	70	34	33	27	54		62	58	74	50	40	68	100	61	38	53	55	52	69	58	60	59	59	
17	58	32	38	G	G	33	34	60	60	72	73	48	66	73	63	42	51	61	57	48	40	38	49	38	
18	33	G	G	G	G	24	40	64	58	70	69	74	74	123	72	54	49	54	69	66	60	86	38	70	
19	71	73	70	71	69	59	52	73	76	82	115	87	45	72	58	43	52	49	73		34	69	40	34	
20	40	46	57	26	28	65	53	54	50	44	34	65	73	118	60	74	76	93	33	68	71	40	40	38	
21	34	35	34	27	33	41	33	36	39	52	69	41			102	57	53	60	95	39	41	42	27	34	
22	40	60	38	29	33	52	62	72	41	40	52	40	76	60	36	42	64	64	49	28	28	26	33	40	
23	46	41	30	45	74	43	40	55	57	49	128	75	42	39	37	34	53	40	28	G	30	26	29	49	
24	30	32	38	44	66	49	70	104	66	64	96	92	100	61	49	34	33	29	40	58	43	40	36	G	
25	G	G	G		39	53	38	37	45	70	50	44	47	74	76	64	41	33	40	59	54	39	52	33	58
26	44	G		37	43	34	44	56	58	63	74	51	42	53	60	51	31	51	96	74	G	G	102	60	73
27	66	40	34	28	28	39	51	49	63	51	81	74	68	55	65	36	35	40	58	73	59	32	30	26	
28	G	G	G	G	G	34	39	39	40	38	40	G	G		65	55	96	98		68	62	32	39	59	70
29	56	36	60	26	36	50	52	61	68	55	32	34	41	33	32	58	71	35	51	G	G	G	G	33	
30	40	58		31	29	46	57	45	91	51	40	42	34	34	50	45	43	60	84	31	G		49	60	38
31																									
	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	30	28	30	30	30	29	29	29	30	30	28	28	29	29	30	30	29	30	29	30	29	30	30	
MED	40	32	34	28	30	40	45	58	63	60	56	64	64	63	58	47	53	54	52	54	40	40	40	38	
U Q	46	46	39	40	40	50	56	70	71	72	72	74	72	76	73	61	70	70	69	62	56	56	57	58	
L Q	33	G	13	G	G	34	39	50	53	51	42	42	44	45	46	36	40	40	40	39	32	32	32	29	

HOURLY VALUES OF fmin AT Wakkanai

JUN. 2013

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	15	15	14	14	14	14	14	14	15	17	27	20	20	39	16	15	17	16	14	14	14	14	14	14	15	
2	14	15	14	14	14	14	14		17	18	33	24	20	30	18	22	17	14	14	14	14	14	14	14	14	
3	14	15		20	14	15	15	14	18	27	27	22	24	23	20	26	17	15	14	14	14	15	14	14	14	
4	14	14	14	15	14	14	14	14	15	21	18	20	27	27	17	18	14	15	14	14	14	14	14	14	14	
5	14	14	14	14	17	15	14	14	17	17	45		26	21	23	15	16	14	16	14	14	14	14	14	14	
6	14	14	14	14	14	14	14	15	15	32	18	18	18	18	15	15	14	14	14	14	14		14	18		
7	15	15	15	15	16	14	14	15	15	16	20	41	39	21	28	18	16	14	14	14	14	14	14	14	14	
8	15	14	14	14	14	14	14	14		24	26			17	20	17	15	14	14	14	14	14	14	14	14	
9	14	15	14	14	17	14	14	15	17	32	21	33	39	18	20	17	14	14	14	14	14	14	14	15	15	
10	15	15	17	15	18	14	14	15	15	20	21	22	22	22	21	17	15	14	14	14	14	14	14	15	14	
11	14	14	14	14	14	14	15	14	14	17	18	34	23	24	20	17	14	15	14	14	14	14	14	15	15	
12	16	15	14	16	17	14	14	14	15	18	20	20	22	20	22	14	14	14	14	14	14	15	15	15	14	
13	14	14	15	15	17	14	14	15	17	15	26	24	18	20	18	17	15	14	14	14	15	14	14	14	14	
14	14	14	14	14	14	14	14	14	16	30	18	21	23	18		17	14	15	14	14	14	14	14	15	14	
15	14	16	14	14	18	14	14	14	14	16	20	22	35	21	20	18	15	14	14	14	14	15	14	14	14	
16	14	14	14	14	14	14		14	15	17	20	26	30	26	26	22	14	14	15	14	14	14	14	14	14	
17	14	14	14	15	16	14	14	14	15	17	20	21	21	40	26	17	15	15	14	14	14	14	14	14	14	
18	14	14	14	14	16	14	14	16	15	17	20	27	40	35	20	17	14	18	14	14	14	14	14	14	14	
19	15	15	14	14	14	14	14	15	14	15	33	21	21	17	20	20	17	15	14		15	14	15	14	14	
20	14	14	14	14	14	14	14	15	24	20	21	40	27	24	20	20	16	15	14	14	14	15	14	14	14	
21	14	14	14	14	14	14	14	15	17	20	26	16			21	15	17	14	14	14	14	14	14	16	14	
22	14	14	14	14	14	14	14	18	18	26	22	22	33	22	22	20	22	14	14	14	14	14	18	14	14	
23	14	14	14	14	14	15	14	15	14	20	20	18	28	29	22	17	14	14	14	17	14	15	14	14	14	
24	15	14	14	14	14	14	20	15	16	20	21	36	36	34	21	18	16	17	14	14	14	14	14	14	15	
25	15	15	15	14	14	14	15	14	17	18	21	21	21	28	21	18	16	14	14	14	14	14	14	15	15	
26	14	15	14	14	22	14	14	16	15	18	22	26	26	33	18	16	16	14	14	16	15	14	15	15	15	
27	14	15	14	15	14	14	14	15	15	32	21	20	29	29	24	18	15	14	14	14	14	14	14	14	15	
28	15	14	14	14	15	22	14	14	15	18	18	53	53	27	17	17	15		14	14	14	14	15	14	14	
29	14	14	14	14	14	14	14	14	17	16	24	23	24	26	21	17	15	14	14	17	15	14	15	14	14	
30	14	14		14	14	14	15	16	16	18	20	22	24	21	33	20	15	14	14	15	14	14	14	14	14	
31																										
	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	30	28	30	30	30	29	29	29	30	30	28	28	29	29	30	30	29	30	29	30	29	30	30	30	
MED	14	14	14	14	14	14	14	15	15	18	21	22	25	24	20	17	15	14	14	14	14	14	14	14	14	
U Q	15	15	14	15	16	14	14	15	17	21	26	26	31	29	22	18	16	15	14	14	14	14	15	15	15	
L Q	14	14	14	14	14	14	14	14	15	17	20	20	21	20	19	17	14	14	14	14	14	14	14	14	14	

HOURLY VALUES OF foF2 AT Kokubunji

JUN. 2013

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	A	74	A	A	63	71	A	86	80	A	A	A	A	A	A	102	114	122	A	A	A	60	64	54	
2	A	58	52	57	52	42	56	65	A	A	A	99	A	A	A		61	59	61	64	54	53	66	66	
3	67	54	42	53	54	N	49	55	62		A	A	A	A		72	66	68	72	74	73	54	55	54	67
4	74	72	63	64	56	58	66	74	80	82	81			75		76	76	76	84	88	73	63	67	73	
5		67	66	62	48	49	69	81	80	74		65	69	77	81	82	81	88	86	85	45	63	67	54	
6	52	65	52	67	59	63	81	88	91	73	A	A	A	A	A	71	A	83	88	81	79	75	77	A	
7	A	A	54	52	57	58	A	A	A	A		A	A			70	67	61	63	64	55	48		A	
8	51	46	47	42	48	62		A	A	A	A	A	A		A	62	65	69	66	A	A	58	54		
9	52	A	A	A	44	53	74		A	A	A	A		A	A	77	84	83	76	84	86	84	A	A	
10	55	A	52	54	55	66	76	72	69	A	A	58		84	A	87	91	102	82	74	58	55	53	54	
11	66	53	52	45	44	46	74	A	A	72	A	A	A		A	A	A	75	80	A	A		54	54	
12	58	55	52	54	52	59	68	A	A	A	A	A		77	80	80	74	78	A	74	76	73	55	54	
13	52		52	52	52	59	76	97	100	68	A		A		69	68	67	73	78	84	81	A	A	72	
14	73	67	54	55	58	62	75	78	88	75	A	A	A		70	68	76	76	A	84				73	
15	A	52	54	52	A	A	67	80	84	73	71			67	74	74	74	78	88	85	86	86	81	73	
16	A	76	67	72	73	84	86	64	74		A	A	A	A		73	81	88	86	83	76	70	73	74	
17	81	77	A	62	55	A	62	78	91	69	A	A	A	A	A	91	97	87	98	100	88	77	59	74	
18	66	A	73	67	A	58	77	98	80	73	A	A		A	A	88	91	89	87	38	79	74	78	74	
19	73	67	66	52	62	72	99	111	91	76			73	78	88	90	A	90	98	77	73	82	88	87	
20	A		53	67	65	65	81	77	A	59	A	69	66	79		86	86	98	91	83	73	54	72	74	
21	64	62	66	73	54	74	80	74	78	76	A	77			93	94	90	85	98	105	81	54	74	80	
22	76	76	73	54	52	54	A	84	67	68	80	68		69	76	83	84	86	N	66	73	55	74	76	
23	66	A	62	58	51	59	81	81	74	71	66	74	71	A	90	103	96	100	100	98	83	A	77	80	
24	80	A	66	52	66	74	69	A	A	A	A	A	A	A	A			73	83	83	54	67	65	54	
25	73	64	67	53	52	54	78	76	A	A	A	A	A	A	A		72	A	89	66	73	66	73	63	
26	53	A	66	55	52	61	68	82	88	77	73	A	A	81	78	73	A	72	A	81	A	73	53	54	
27	A		A	54	58	66	66	A	A	A	68	74	77	78		78	81	A	A	77	A	64	67	66	
28	52	52	A	52	A	53	72	80	82	A	A		67	87	90	101	98	81	A	A	A	81	84	A	87
29	75	54	54	58	53	53	A	59	A	A	74	76	96	81	81	84	91	90	98	88	85	80	66	78	
30	76	A	58	74	71	74	75	70	66	A	58						A	57	61	67	53	54	49	49	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	22	19	25	28	27	27	25	23	19	15	8	10	10	14	13	25	24	25	25	25	24	25	25	27	
MED	66	64	54	54	54	59	74	78	80	73	72	72	73	78	80	78	81	83	84	81	73	64	67	72	
U Q	74	72	66	63	59	66	79	84	88	76	77	76	77	81	89	89	90	89	90	85	81	76	74	74	
L Q	53	54	52	52	52	54	67	72	74	69	67	67	69	70	73	73	73	72	75	70	54	55	56	54	



# HOURLY VALUES OF fEs AT Kokubunji

JUN. 2013

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	110	51	88	79	72	60	94	60	59	80	101	110	91	95	96	93	104	107	149	92	110	53	50	58	
2	59	50	39	29	G	G	59	69	96	64	150	96	59	68	50		G	53	50	29	G	47	53	58	
3	27	45	35	32	33	34	26	50	53	153	120	73	62	60	61	51	60	29	28	G	23	G	G	33	
4	40	38	28	23	29	22	26	56	80	75	48			50	75	71	47	27	24	G	G	G	34	32	
5		G	G	G	26	G	G	G	G	G		56	G	55	50	52	60	57	49	61	53	29	26	50	
6	55	53	38	50	43	44	26	51	60	53	67	75	100	170	152	60	172	68	24	44	31	58	37	80	
7	81	59	50	44	45	51	71	180	179	72		62	62			G	62	52	30	G	G	G	G	50	
8	37	33	G	38	33	35	83	127	130	109	64	124	58		59	50	G	41	28	59	59	70	29	49	
9	58	52	82	65	29	33	72	96	162	85	94	122	81	96	61	G	G	G		81	45	33	45	67	72
10	57	58	26	30	24	39	50	60	53	61	68	51		G	81	G	G		29	60	49	47	50	45	32
11	53	24	G	31	40	33	32	68	78	60	80	78	55		69	80	79		34	78	109		46	26	
12	33	46	37	34	G	32	68	81	70	108	62	67	64	61	61	G	50	85	26	38	33	30		G	
13	G		46	46	30	G	26	G	G	G	48		64	52	G	G	G		80	59	57	81	33	39	G
14	30	34	G	33	29	32	G	G	59		75	90	64	G	56	59	96	87	76	105	92	88	114	70	
15	86	53	37	49	60	70	42	31	G	43	G		46	G	52	G	G		57	52	G	34	30	42	G
16	34	30	G	34	G	34	52	53	54	118	112	80	79	75		G	52	80	58	52	33	33	46	50	
17	50	50	80	40	G	79	46	47	61	G	50	82	109	108	96	78	G	60	61	56	53	72	57	60	
18	51	72	59	58	86	78	46	81	68	61	51	57	G	134	71	68	73	65	61	50	30	G	G	23	
19	G	26	31	59	51	45	42	59	55	60			52	68	80	83	134	78	60	45	35	26	33	27	
20	30	G	G	26	G	23	34	50	71	52		G	57	92	142	G	69	107	51	31	35	49	43	29	
21	28	G	G	25	G	23	26	28	51	46	48			50	67	58	29	51	33	30	30	36	57		
22	50	73	47	34	45	45	71	59	62	65	57	50		G	49	49	62	70	61	53	G	G	27	28	
23	33	26	26	46	28	37	45	80	69	G	57		46	90	49	G	71	64	60	39	60	53	33	53	
24	61	72	56	33	G	G	38	67	79	58	105	90	70	121	49	G		27	28	G	27	37	27	38	
25	51	46	58	58	53	54	54	48	59	81	103	136	78	91	114	108	G	80	86	104	53	54	40	50	
26	47	117	59	46	30	30	G	61	79	61	75	117	150	109	G	G	74	46	95	38	56	33	G	60	
27	70		59	37	28	G	60	81	129	90	61	65	71	51	68	106	45	102	128	44	78	36	30	59	
28	43	36	94	40	49	23	53	53	30	114	114	60	G	G	G	50	52	78	78	83	86	69	86	28	
29	46	33	28	G	G	G	93	50	51	106	51	G	G	45	G	57	67	83	57	G	G	G	G	G	
30	29	27	39	34	60	136	25	57	49	70	54					G	49	52	35	41	G	G	G	G	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	28	30	30	30	30	30	30	30	30	26	25	24	25	27	29	29	30	30	30	30	29	29	30	
MED	47	46	38	36	30	34	46	58	60	62	66	73	63	68	61	51	58	62	58	44	34	33	36	44	
U Q	57	53	58	46	45	45	60	69	79	85	101	93	78	95	80	69	72	80	61	57	59	53	46	58	
L Q	31	28	26	31	G	23	26	50	53	52	51	53	53	48	49	G	G	41	34	31	27	13	26	27	

HOURLY VALUES OF fmin AT Kokubunji

JUN. 2013

LAT. 35° 43.0' N LON. 139° 29.0' 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	13	13	17	13	13	13	13	13	37	38	38	39	40	38	38	36	36	14	13	14	17	17	13	13	
2	14	14	13	13	14	20	23	15	36	37	39	40	40	39	36		45	24	14	13	14	14	14	14	
3	14	14	13	13	14	13	14	30	37	38	38	38	39	42	35	34	33	18	13	24	14	14	14	14	
4	13	14	14	13	13	13	15	15	34	40	38			38	42	34	34	21	17	17	14	14	14	13	
5		14	14	13	15	21	14	40	21	52		42	53	39	53	37	36	13	13	14	13	14	14	13	
6	13	13	14	14	13	13	13	14	34	37	40	39	39	38	37	36	23	13	15	13	13	13	14	14	
7	14	13	14	13	13	13	13	14	29	36		39	39			49	33	25	15	21	14	21	21	14	
8	17	13	14	14	13	13	14	21	52	39	39	39	39		42	37	18	13	13	14	13	14	14	13	
9	14	13	13	13	14	14	17	34	37	36	39	40	39	38	39	51	48	38	17	13	13	13	13	14	
10	14	13	14	13	14	15	14	17	36	37	39	42		52	38	17	44	13	14	15	13	13	13	13	
11	13	14	20	13	13	13	13	33	35	39	38	39	42		38	38	37	42	20	13	14		13	37	
12	13	13	13	14	14	18	33	39	38	40	39	39	38	39	36	47	41	17	13	14	14	14		24	
13	25		14	14	13	35	14	47	50	45	42		40	39	49	45	49	22	17	26	13	14	17	26	
14	14	13	14	14	13	13	18	44	36	45	42	40	40	54	40	38	37	17	14	14	14	13	13	13	
15	13	13	14	13	13	13	15	14	52	48	54			40	52	38	50	35	13	18	13	14	14	13	
16	13	13	17	13	13	14	17	30	40	36	42	37	39	37		50	24	17	14	13	14	14	15	13	
17	13	14	14	13	13	17	17	31	34	49	40	42	39	40	38	38	20	15	14	13	15	13	13	13	
18	13	13	14	13	14	13	15	22	31	38	39	42	53	43	38	37	36	31	18	14	13	13	14	13	
19	52	14	14	13	13	13	13	22	33	36			42	40	40	38	37	18	15	13	13	13	14	14	
20	13	44	15	15	37	13	14	15	20	39		56	40	40	40	45	39	17	15	13	14	13	13	13	
21	14	44	41	14	18	14	14	20	37	45	39	55			42	36	35	15	15	13	14	14	13	14	
22	14	13	14	17	14	14	15	21	35	39	38	38		55	40	39	18	14	13	15	37	14	14	14	
23	13	14	13	13	13	13	15	20	34	52	43	54	36	33	22	52	20	15	17	13	13	13	13	14	
24	13	14	14	13	15	22	40	18	34	39	38	40	38	40	40	42		14	13	18	13	13	13	14	
25	14	13	13	14	13	13	17	13	35	42	38	39	43	38	40	40	17	31	13	13	14	13	14	14	
26	14	14	14	14	13	13	14	20	36	39	39	38	42	42	52	53	35	15	13	14	13	13	13	13	
27	13		14	13	14	39	13	18	23	37	38	42	42	38	40	40	45	31	13	13	13	14	13	13	
28	14	14	14	13	13	13	14	20	41	37	37	39	55	57	54	37	34	35	14	22	14	14	14	14	
29	13	14	13	14	14	39	17	17	42	39	38	54	53	51	54	38	18	15	14	14	14	14	17	14	
30	14	14	13	14	15	14	13	21	36	40	39					47	20	34	17	14	14	15	43	14	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	28	30	30	30	30	30	30	30	30	26	25	24	25	27	29	29	30	30	30	30	29	29	30	
MED	14	14	14	13	13	13	14	20	36	39	39	40	40	40	40	38	35	17	14	14	14	14	14	14	
U Q	14	14	14	14	14	17	17	30	37	42	40	42	42	42	42	46	40	31	15	15	14	14	14	14	
L Q	13	13	13	13	13	13	14	15	34	37	38	39	39	38	38	37	21	15	13	13	13	13	13	13	

HOURLY VALUES OF foF2 AT Yamagawa

JUN. 2013

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	80	87	78	70	62	67	78	71	73	A	68	A	A	A	86	A	95	149	105	78	54	55	54	52	
2	54	67	54	58	42	A	60	70	A	A	A	139	159	B	A	57	63	A	35	55	54	54	54	66	
3	52	A	A	60	42	42	52	A	67	A	A	A	72	64	72	78	A	88	86	87	76	74	78	54	
4	80	77	73	67	55	54	61	74	81	74	78	68	74	A	87	87	A	96	86	86	80	A	78	77	
5	80	77	74	68	60	54	64	65	58	67	68	A	73	88	88	91	93	93	89	88	80	A	A	77	
6	A	67	A	63	63	61	A	85	78	68	65	68	A	76	81	78	85	90	88	88	76	77	70	A	
7	76	A	80	A	A	63	68	60	A	A	A	B	A	A	A	72	70	71	75	72	54	43	52	44	
8	44	53	54	54	55	52	53	67	A	A	A	A	A	75	77	78	86	84	A	75	75	A	54		
9	54	A	47	A	46	57	71	67	62	A	A	A	72	75	77	82	91	94	88	88	102	80	52	67	
10	71	72	66	67	64	65	80	86	A	A	66	73	A	93	N	94	96	115	95	77	64	72	A	77	
11	77	75	65	60	57	56	70	89	50	68	A	A	B	66	73	70	80	A	92	76	A	64	54	67	
12	52	64	52	58	63	64	67	80	A	A	A	76	78	82	93	89	93	100	90	78	67	71	53	54	
13	64	63	A	53	A	52	72	90	80	59	A	A	59	71	67	A	88	88	88	87	82	78	53	77	
14	57	67	66	74	63	64	67	78	78	75	67	70	76	75	76	A	A	A	92	94	88	44	66	74	
15	74	76	67	71	67	58	68	88	85	75	68	66	70	75	77	77	77	84	92	89	82	81	80	72	
16	78	78	74	67	80	70	67	70	71	86	78	A	64	A	72	A	94	85	A	86	74	72	66	67	
17	71	64	72	72	67	65	72	96	101	A	A	A	A	A	A	A	104	98	110	A	85	84	78	79	
18	77	73	A	78	54	52	66	88	76	68	A	A	70	83	87	A	95	96	91	87	88	84	79	80	
19	75	66	66	63	62	52	76	92	A	A	68	69	76	80	91	96	109	96	88	86	81	73	77	81	
20	80	72	52	72	62	67	73	78	A	A	A	A	66	N	85	87	91	94	88	77	67	78	79	54	
21	78	84	84	72	84	78	69	67	74	76	A	189	A	78	86	94	92	89	A	A	44	A	77	77	
22	76	75	73	66	60	52	A	A	A	A	A	72	A	75	80	90	91	86	A	75	65	78	73	72	
23	75	71	A	51	A	52	76	81	70	73	73	70	77	A	91	A	107	95	114	88	A	A	A	84	
24	77	76	A	67	65	74	60	A	A	77	A	A	A	A	109	A	81	93	89	78	54	55	67	67	
25	72	72	54	55	57	63	67	47	A	A	A	A	A	83	75	77	87	84	81	73	67	A	54	71	
26	72	65	62	A	A	52	58	77	82	80	A	75	A	76	78	84	85	81	A	78	A	58	74	54	
27	62	51	66	67	58	56	63	68	78	A	A	A	A	A	A	77	78	86	86	72	76	A	75	54	
28	67	66	72	67	67	67	64	72	84	77	63	68	82	90	N	87	84	83	77	78	A	83	81	75	
29	78	77	78	75	71	67	A	A	A	63	65	74	74	75	77	86	84	82	83	88	83	80	76	81	
30	76	83	78	75	50	52	57	67	76	78	66	A	67	70	64	68	72	78	78	88	78	54	52	A	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	27	24	27	26	29	27	26	19	16	13	14	17	19	24	22	27	27	26	27	26	24	26	28	
MED	75	72	66	67	62	58	67	76	76	74	68	71	73	76	79	83	88	89	88	86	76	74	72	72	
U Q	77	77	74	72	65	66	72	86	81	77	70	75	76	83	87	89	94	96	92	88	82	79	78	77	
L Q	63	66	58	60	55	52	61	67	70	68	65	68	68	75	75	77	80	84	84	77	65	56	54	54	

## HOURLY VALUES OF fEs AT Yamagawa

JUN. 2013

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	40	48	59	48	60	41	57	48	50	82	79	86	94	83	65	90	77	164	66	49	54	32	32	41	
2	38	35	35	28	37	59	45	38	76	73	53	167	102	B	67	34	G	67	43	50	29	29	40	24	
3	49	67	65	34	G	G	33	79	41	69	83	78	60	56	52	63	87	61	53	49	43	24	G	25	
4	34	24	G	G	38	36	30	32	44	31	54	34	34	113	67	76	171	100	32	G	G	60	28	G	
5	G	G	26	28	G	G	22	34	38	40	61	74	44	46	44	65	60	67	64	64	48	102	65	49	
6	72	49	93	50	81	84	84	50	50	48	54	58	68	58	60	62	50	30	52	G	33	69	34	73	
7	71	94	54	85	79	30	36	50	106	141	64	B	86	G	60	63	50	47	35	59	40	36	31	26	
8	30	28	33	38	31	36	36	40	G	94	100	120	87	G	G	58	56	48	36	82	58	59	60	71	
9	32	72	84	58	46	36	40	41	91	76	140	182	66	62	42	36	40	46	48	40	61	60	26	41	
10	50	48	48	58	59	38	46	85	71	125	97	82	81	42	54	50	80	37	42	40	43	28	70	58	
11	70	56	39	30	24	27	34	47	46	85	53	50	B	36	47	59	87	116	49	40	45	58	26	57	
12	51	59	58	45	34	G	36	73	98	163	63	60	73	56	75	47	52	48	52	40	27	35	25	31	
13	34	40	40	G	60	G	43	57	61	54	61	71	41	56	71	66	43	53	34	40	70	32	46	34	
14	33	28	35	29	26	G	34	45	57	65	61	50	G	49	63	112	84	124	88	80	61	74	56	43	
15	49	43	45	57	49	73	60	61	47	49	41	38	39	49	43	58	46	55	79	70	44	58	59	58	
16	29	28	50	28	29	G	30	40	58	68	72	55	60	86	67	95	150	116	144	78	52	41	52	26	
17	44	49	48	73	60	29	52	45	57	84	62	80	112	90	91	106	79	82	92	95	72	59	47	82	
18	26	82	94	78	59	46	47	74	74	55	95	74	54	47	68	103	114	73	75	65	57	50	40	36	
19	30	44	50	G	49	78	84	43	91	77	50	35	40	48	52	57	53	63	84	40	50	27	49	43	
20	34	51	39	G	G	G	41	37	95	91	101	102	44	47	67	78	65	53	56	32	43	34	48	37	
21	41	44	41	G	28	39	29	55	72	56	62	154	114	79	G	G	34	52	107	94	46	35	44	49	
22	58	36	56	74	48	58	72	85	91	113	86	61	64	54	56	46	50	60	98	55	G	G	57	60	
23	49	44	59	27	57	26	34	36	48	46	G	34	95	85	80	96	119	80	91	69	59	79	82	73	
24	38	55	71	50	30	24	30	80	149	68	150	78	114	78	156	102	51	34	30	60	50	33	32	27	
25	43	49	32	29	G	G	35	49	86	95	92	116	98	52	55	50	49	41	38	30	36	73	73	36	
26	46	57	50	82	69	71	49	34	61	43	68	34	45	G	G	G	33	58	82	60	60	44	58	G	
27	G	58	46	50	40	45	34	60	71	172	154	106	86	124	97	65	35	65	30	29	38	59	46	34	
28	59	53	G	26	49	G	46	50	48	50	54	50	49	49	40	34	47	49	34	32	102	82	81	44	
29	82	59	59	45	27	35	82	59	72	47	34	35	G	G	G	42	51	80	69	G	G	G	G	40	
30	27	G	G	G	G	G	46	G	G	47	54	76	36	36	57	56	66	54	46	36	40	G	32	33	
31																									
	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	30	30	30	30	30	30	30	30	30	30	29	29	29	30	30	30	30	30	30	30	30	30	30	
MED	40	48	48	36	39	32	40	48	61	68	62	74	64	52	58	60	52	59	52	49	46	42	46	40	
U Q	50	57	59	57	59	45	49	60	86	91	92	94	90	78	67	78	80	80	82	65	58	60	58	57	
L Q	32	36	35	27	27	G	34	40	48	49	54	50	42	44	44	47	47	48	38	36	38	32	32	31	

## HOURLY VALUES OF fmin AT Yamagawa

JUN. 2013

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	15	14	14	14	15	17	21	38	39	40	39	27	21	18	14	14	14	15	14	14
2	14	14	15	14	14	14	14	14	16	18	36	36	38	<sup>B</sup>	35	24	47	17	14	14	14	15	14	15
3	14	14	15	15	14	14	14	14	22	21	28	36	38	37	28	21	17	17	14	14	14	15	15	15
4	14	14	15	14	14	14	15	14	17	20	35	26	66	37	38	22	22	15	14	17	14	15	14	15
5	15	15	14	15	14	16	14	14	16	20	21	22	34	56	24	22	20	15	14	14	14	14	14	14
6	15	14	14	14	15	14	14	15	16	20	26	24	38	20	36	18	15	14	14	15	14	14	15	15
7	14	14	14	14	14	14	14	14	14	20	18	<sup>B</sup>	38	71	36	24	20	16	14	14	15	14	14	15
8	15	14	14	14	14	14	15	15	101	27	28	35	36	91	54	21	20	15	14	14	14	14	15	14
9	14	15	14	14	14	14	14	15	21	22	24	34	34	34	27	27	17	14	14	14	15	14	15	15
10	14	15	14	14	14	14	15	15	17	21	21	27	32	29	20	21	18	15	14	14	15	14	14	14
11	14	14	14	16	14	15	14	14	17	18	30	32	<sup>B</sup>	21	22	23	21	14	14	14	15	15	15	14
12	14	14	15	14	14	14	16	16	17	18	27	24	22	27	30	20	22	16	14	14	15	14	16	15
13	14	14	14	15	14	15	14	14	20	18	21	29	28	24	22	20	17	20	17	14	15	14	14	14
14	14	14	14	15	14	17	15	14	15	18	20	22	54	40	26	21	14	14	14	14	15	14	15	14
15	14	15	14	15	14	14	14	15	15	18	22	26	26	42	53	36	18	15	14	14	15	15	14	14
16	14	14	14	14	15	14	15	16	17	17	20	27	34	32	29	24	18	16	14	14	14	15	14	14
17	14	14	14	14	14	14	14	14	15	18	22	38	39	40	27	22	17	16	15	14	14	14	14	14
18	14	14	14	14	14	15	14	15	20	22	26	36	38	30	23	27	21	16	14	14	14	15	14	15
19	14	14	14	14	15	14	14	14	16	18	26	50	33	28	26	26	15	16	14	14	14	14	14	14
20	14	14	14	16	17	17	15	16	15	20	23	28	71	39	40	36	20	18	14	14	15	15	15	14
21	14	14	14	16	14	14	14	14	15	21	27	36	53	54	59	57	20	16	14	16	14	15	15	14
22	14	14	14	14	14	14	14	16	17	22	34	35	36	39	36	26	20	16	14	15	18	15	14	14
23	14	14	14	14	14	14	14	15	18	18	50	27	44	43	28	28	18	14	14	14	15	14	14	14
24	15	14	14	14	15	15	15	16	18	17	27	38	39	35	34	24	18	16	14	14	14	14	14	15
25	14	14	15	16	15	15	15	14	17	18	34	28	34	29	29	24	18	17	14	14	14	14	14	14
26	15	14	14	15	14	14	14	15	15	20	24	24	33	54	55	38	18	16	17	14	15	14	14	15
27	18	15	14	14	18	15	15	18	18	21	30	36	40	39	35	28	50	15	14	14	15	14	14	15
28	14	15	15	14	14	14	14	14	17	20	21	38	30	36	28	22	18	17	14	14	16	14	14	15
29	14	14	16	15	15	15	16	14	18	21	51	22	57	53	52	36	18	15	14	20	15	15	15	14
30	14	15	15	18	15	15	15	16	55	18	27	27	28	27	27	22	20	17	17	14	15	17	14	15
31																								
	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	30	30	30	30	30	30	30	30	30	30	29	29	29	30	30	30	30	30	30	30	30	30	30
MED	14	14	14	14	14	14	14	14	17	20	26	29	38	37	30	24	18	16	14	14	15	14	14	14
U Q	14	14	15	15	15	15	15	15	18	21	30	36	39	42	38	27	20	17	14	14	15	15	15	15
L Q	14	14	14	14	14	14	14	14	15	18	21	26	33	29	27	22	18	15	14	14	14	14	14	14

## HOURLY VALUES OF foF2 AT Okinawa

JUN. 2013

LAT. 26° 41.0' N LON. 128° 09.0' 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	87	A	54	A	72	67	67	74	A	A	A	A	A	97	86	99	108	109	107	A	46	A	A	52		
2	54	51		47	B	38		67	61	64	66	72	B	71	68	64	72	77	73	74	67	53	67			
3	51	48	53		46	29	47	68	A	65		A	83	A	82	96	103	112	117	100	A	84	88	59		
4	A	110	109	76	67	63	72	73	70	A		A	71	84	87	102	108	100	A	88	87	87	52	83		
5	81	79	B	66	67	60	62	69	62	62	B		74	79	86	100	99	97	105	107	104	87	49	A	N	
6	66	58	A	64	64	63		86	62	66	72	A	75	76	84	91	90	90	102	90	76	73	72	49		
7	A	73	A	A	63	51	64		63		B	A	B	B	B		74	A	80	86	71	A	52	51	A	
8		51	58	60	56		53	64	B	A	A	A		87	87	96	102	98	107	111	88	79	52	52	63	
9	58	A	52	52	56	48	58	71	54		A	A	A	69	80	73	100	105	108	105	A	A	89	84	81	
10	53	52	B	53	57	54	61	74	70	67		A	A	110	113	105	120	110	108	A	A		89	84	81	
11	78	N	81	70	72	66	78	108	87	A	B		62		83	88	95	97	A	A	A		54	54	73	
12	66	A	54	59	65	65	66	76	A	64	70	A	86	A	A	A	A		120	113	88	88	87		76	
13	67	64	B	58	63	62	86	89	72	66	70	64	67	A	A		77	90	106	106	88	85	A	A	77	
14	67	80	A	72	73	64	72	74	78	73	84	68	A		80	74	84	90	105	149	A	A		54	54	
15	67	63	53	A	57	53		82	78	67	A			72	78	80	86	87	98	87	86	54	80	53		
16	81	86	84	76	64	60	67	63	72	93	70	A	B	A			92	107	106	101	A	54	74	72	55	
17		52	58	A	52	52	72	106	66	57	66	A	B		85	102	108	110	118	121	109	87	53	87	A	
18	A	54	73	A	A	A		88	67	A	A	A		82	84	87	94	88	107	117	108	86	72		B	
19	53	66	53	N	63	63	74	82	66		69	74	78	86	90	106	108	106	104	88	85	54	86	78		
20	80	52	74	67	72	67	73	77	N	A		67	A	B		88		87	87	106	88	70			A	
21	77	A	74	77	83	58	50	60	71	80	A	A	B	A			101	88	102	103	105	86	47	76	53	
22	A	72	66	80	67	64	61		A	A	A		A	A	A		98	105	98	86	83	84	74	53	A	
23	79	78	74	66	58	57	74	66	64	84	71	B		84	88	88	107	A	A		108	107	77		A	
24	A	A		83	67	64	61	69	72	A	A	A		83	A		A		97	117	101	79	A	64	A	A
25	67	B	73	74	46	52	58		A	A	A	A	A		83		86	101	90	88	87	79	68		A	A
26	A	77	67	60	52	58		80	77	A	78	A	B		83		A		86	90	97	A	A	A		48
27	72	N	52	60	52	52	60		A	A		A	A		87	A	A		83	90	102	88	72	73	71	54
28	54	67	A	60	58	58	63	72	85	71	A	A		79	101	96	101	102	87	88	86	A	A		54	A
29	A	A	N		67	63	51	54	B	A		A		76	72	80	92	82	81	80	86	86	80	53	54	79
30	A	79	88	72	67	59	54	59	77	77	73	59		B	83	77	71	80	90	A	A		62	52	74	67
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	20	21	21	23	28	28	25	25	20	17	12	9	13	20	19	27	27	29	27	24	21	22	20	19		
MED	67	66	67	66	63	58	64	74	70	67	70	72	79	84	87	92	97	102	103	88	84	59	69	59		
U Q	78	78	77	72	67	63	72	82	77	78	72	75	85	87	96	101	105	107	108	104	86	74	78	77		
L Q	56	52	53	60	56	52	58	67	63	64	68	63	73	79	80	80	87	90	88	84	74	53	54	53		

## HOURLY VALUES OF fEs AT Okinawa

JUN. 2013

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

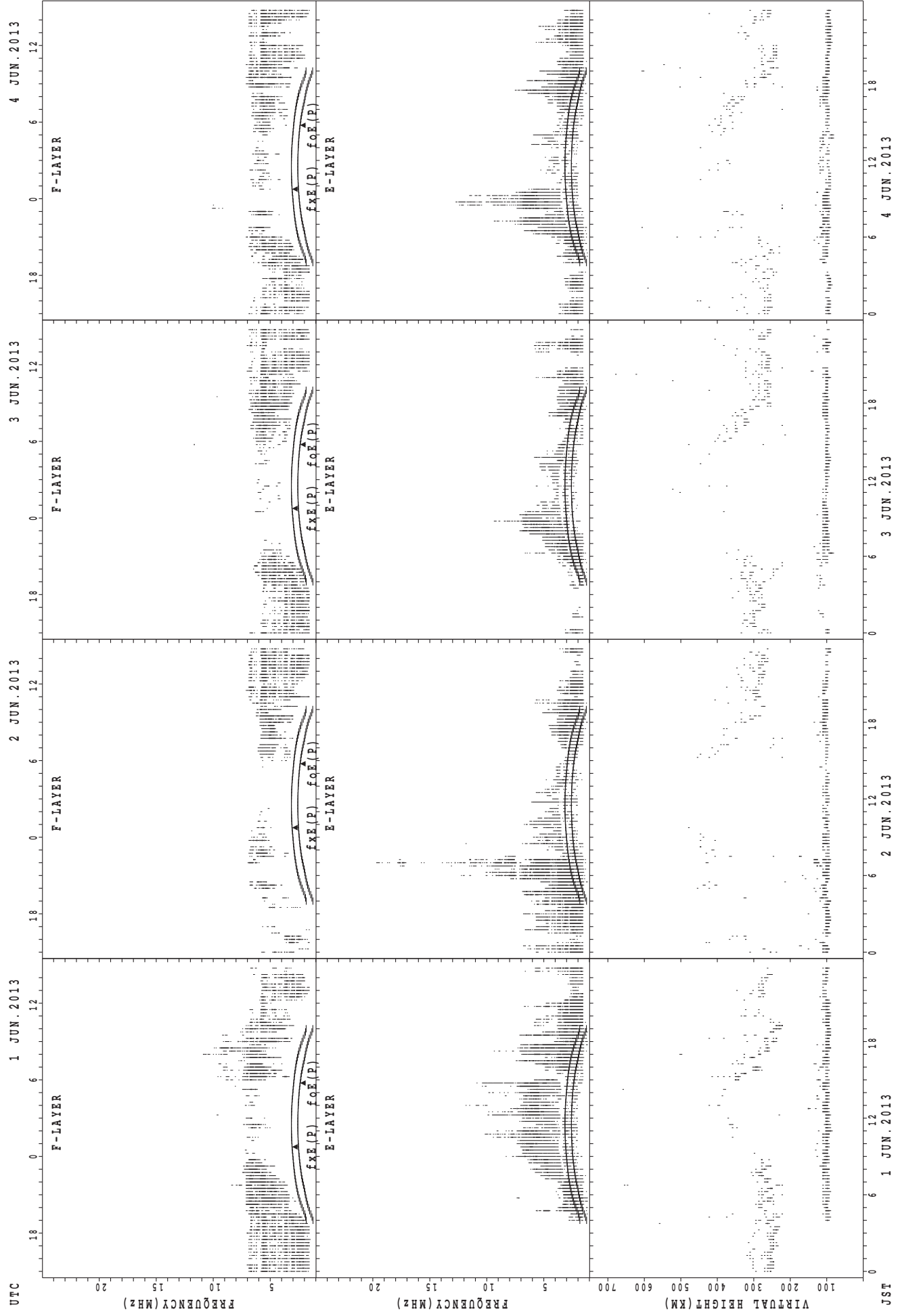
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	27	51	48	57	40	40	36	45	86	79	74	56	66	52	66	G	108	93	72	77	56	55	68	46	
2	G	G	G	G	B	G	G	40	42	53	51	51	B	G	G	G	G	G	37	26	G	33	28	G	
3	G	G	G	G	G	G	G	27	51	G	50	74	63	75	62	G	76	66	51	50	82	30	36	24	
4	26	28	25	G	G	G	G	G	48	72	G	81	G	G	G	61	58	48	91	32	77	32	G	27	
5	27	G	B	G	G	G	G	28	G	36	B	G	62	66	71	88	61	46	53	40	35	50	34	43	
6	46	50	70	29	28	G	74	59	43	60	G	58	54	50	G	55	59	59	35	G	G	27	46	27	
7	56	49	73	66	62	44	36	86	30	G	B	54	B	B	B	62	64	59	36	44	36	G	G	31	
8	G	45	46	45	36	34	38	38	B	106	84	69	G	G	G	64	48	48	36	28	30	G	G	65	
9	35	57	28	G	G	G	27	47	G	G	56	56	84	66	G	G	51	42	G	32	27	G	G	24	
10	28	G	B	G	34	26	50	60	57	61	G	72	74	60	55	78	72	67	49	68	84	58	43	66	
11	57	35	58	58	56	41	56	69	75	59	B	G	G	G	58	65	61	90	94	109	59	43	40	53	
12	40	46	40	51	35	34	G	47	73	60	78	92	74	104	132	116	123	60	104	59	36	26	G	G	
13	49	33	B	G	G	36	39	88	51	56	56	G	52	104	79	72	83	94	64	58	60	71	51	32	
14	32	35	27	G	G	G	29	40	59	56	65	69	61	G	G	58	67	54	70	70	92	58	49	33	
15	58	39	G	78	51	36	93	53	39	50	49	G	G	52	G	50	G	53	60	36	44	50	46	29	
16	35	33	G	G	G	G	G	28	G	G	55	68	B	52	G	48	52	52	34	58	65	35	26	30	
17	G	32	G	59	35	32	49	79	46	G	G	48	B	G	G	59	69	60	50	46	28	G	46	60	
18	54	58	G	50	60	88	111	88	52	64	58	67	G	G	58	60	65	81	82	62	42	56	B	G	
19	G	G	G	35	36	G	G	34	44	G	62	64	G	G	G	78	54	G	37	33	28	G	36	47	
20	G	39	27	G	41	46	G	50	56	56	48	63	B	G	B	59	59	52	47	50	46	B	59	57	
21	55	51	34	G	G	36	G	26	G	G	58	57	B	63	G	G	G	61	45	49	G	G	59	25	
22	27	G	G	G	G	29	44	84	116	94	112	G	69	98	124	59	52	38	41	54	G	26	52	50	
23	68	44	55	40	36	24	33	37	34	48	51	B	G	G	61	G	114	135	95	67	G	43	69	73	
24	59	59	44	G	G	G	G	37	138	86	194	94	72	G	92	86	61	51	51	47	33	34	29	26	
25	29	B	39	54	30	G	26	55	90	110	108	93	54	64	85	55	59	68	62	54	29	32	54	58	
26	54	G	G	52	34	34	92	36	50	78	53	78	B	G	G	76	60	50	88	91	83	70	78	36	
27	39	43	G	G	G	G	G	92	67	84	127	171	72	132	174	85	59	45	42	59	46	35	70	35	
28	24	38	35	40	G	G	G	46	67	54	59	59	G	G	G	50	36	50	43	38	35	26	50	73	
29	58	59	36	58	55	28	25	B	30	48	36	G	G	G	G	G	G	G	G	56	46	G	G	G	
30	27	48	29	24	G	G	G	G	G	G	G	G	B	G	G	60	G	61	114	116	78	46	69	G	
31																									
	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	29	27	30	29	30	30	29	29	30	27	29	22	29	28	30	30	30	30	30	30	29	29	30	
MED	34	39	28	26	30	25	26	46	50	56	56	59	54	G	26	59	59	54	50	52	39	34	43	32	
U Q	54	49	44	52	38	36	44	64	67	72	74	73	69	65	68	72	67	66	72	62	60	50	56	53	
L Q	26	14	G	G	G	G	G	35	32	G	48	24	G	G	G	36	51	46	37	36	28	13	13	25	

HOURLY VALUES OF fmin AT Okinawa  
 JUN. 2013  
 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	15	15	15	14	14	15	14	17	22	38	32	42	44	45	44	101	34	22	17	16	16	15	15	18	
2	18	17	66	17	B	29	22	23	40	36	42	58	B	55	58	101	50	41	21	17	21	15	17	21	
3	20	18	42	24	28	17	28	16	34	52	81	42	42	42	40	60	32	28	16	16	17	15	15	15	
4	15	15	15	15	20	18	20	16	29	40	63	46	101	62	68	40	38	22	18	15	15	16	22	14	
5	14	42	B	17	41	21	22	30	20	29	B	64	43	44	42	40	36	18	27	15	15	15	15	14	
6	16	15	15	16	14	17	16	18	27	28	53	42	42	42	64	40	39	30	21	26	40	18	15	14	
7	15	15	15	15	15	14	15	15	20	66	B	42	B	B	B	40	34	20	16	15	16	21	17	20	
8	81	16	15	20	18	15	18	37	B	39	42	43	55	64	54	41	42	30	16	14	14	16	15	23	
9	15	16	16	40	18	18	16	17	42	52	42	39	40	40	62	101	30	20	38	15	15	42	81	17	
10	16	40	B	16	14	17	17	21	21	41	91	39	42	38	39	32	21	18	14	15	15	16	15	17	
11	18	18	16	17	14	16	17	16	21	30	B	91	55	91	44	42	36	30	23	18	20	16	16	17	
12	16	17	20	17	15	16	27	21	22	38	39	42	42	42	36	36	26	20	14	14	15	15	51	22	
13	15	18	B	23	15	18	15	17	21	28	34	52	45	43	42	42	40	33	23	16	16	29	14	14	
14	15	15	16	42	39	17	18	17	18	34	40	40	43	61	62	40	35	27	21	15	15	18	18	17	
15	15	17	42	16	17	17	16	18	21	22	40	101	101	44	64	55	53	21	17	18	15	15	16	15	
16	15	16	44	21	20	28	27	20	44	51	42	39	B	43	101	40	28	18	18	18	14	16	15	14	
17	52	15	15	16	14	17	15	24	24	44	53	81	B	60	61	40	40	38	22	14	15	43	17	21	
18	15	17	34	16	16	32	17	20	27	33	39	40	59	61	44	43	40	32	16	20	15	21	B	15	
19	40	17	24	20	20	21	21	20	27	81	42	40	59	60	61	42	40	42	24	16	15	42	15	15	
20	24	15	15	15	16	22	22	18	26	39	59	42	B	56	B	40	39	29	28	17	17	B	17	15	
21	16	14	16	26	17	15	27	17	20	42	43	81	B	53	44	52	48	41	15	15	16	15	16	16	
22	16	18	18	33	15	15	15	20	27	35	42	101	40	40	40	39	30	21	22	17	22	17	15	16	
23	16	15	15	15	18	44	15	20	41	54	42	B	62	64	44	61	38	21	22	15	15	17	17	16	
24	16	20	20	21	43	34	28	21	23	34	38	42	42	62	42	36	29	24	17	14	14	18	18	18	
25	15	B	18	16	15	15	17	17	22	36	38	42	42	39	34	36	28	20	16	17	15	16	16	20	
26	18	15	20	17	17	16	22	16	17	28	39	42	B	59	101	42	36	36	16	15	15	15	18	17	
27	17	21	39	21	26	21	28	21	33	39	42	42	42	42	40	40	30	28	42	14	23	15	17	17	
28	15	36	17	18	20	20	21	14	22	32	39	45	56	63	39	62	29	20	23	18	73	21	39	18	
29	21	26	40	20	20	18	16	B	21	27	71	57	54	58	63	54	63	42	38	17	16	20	18	71	
30	66	16	15	15	20	16	22	39	41	45	53	52	B	59	54	40	58	30	24	15	18	17	18	15	
31																									
	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	29	27	30	29	30	30	29	29	30	27	29	22	29	28	30	30	30	30	30	30	29	29	30	
MED	16	17	17	17	17	17	18	18	23	38	42	42	44	55	44	40	36	28	21	16	15	16	17	17	
U Q	18	18	34	21	20	21	22	21	31	44	53	57	56	61	62	54	40	32	23	17	17	20	18	18	
L Q	15	15	15	16	15	16	16	17	21	32	39	42	42	42	41	40	30	20	16	15	15	15	15	15	

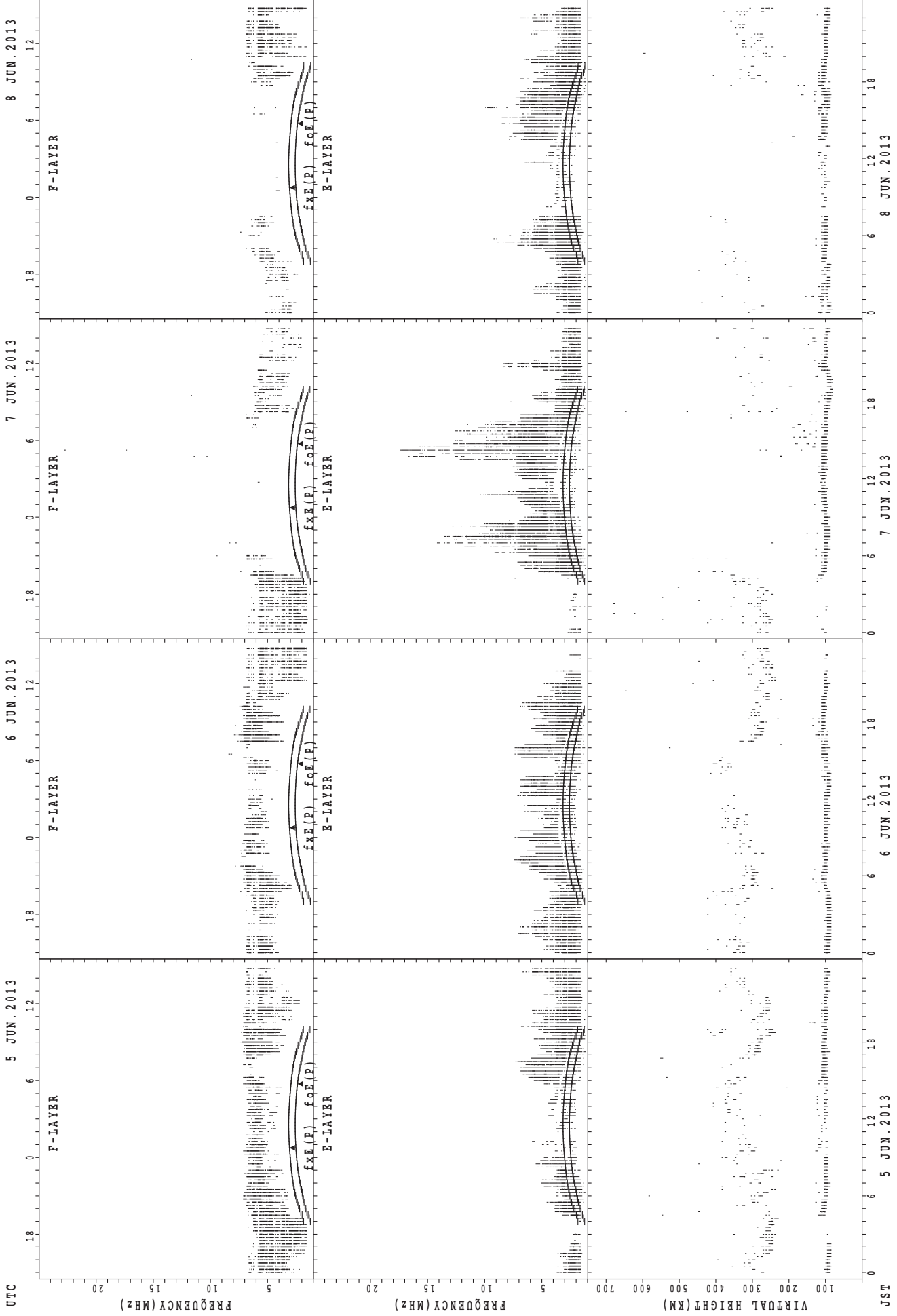


SUMMARY PLOTS AT Wakkanai



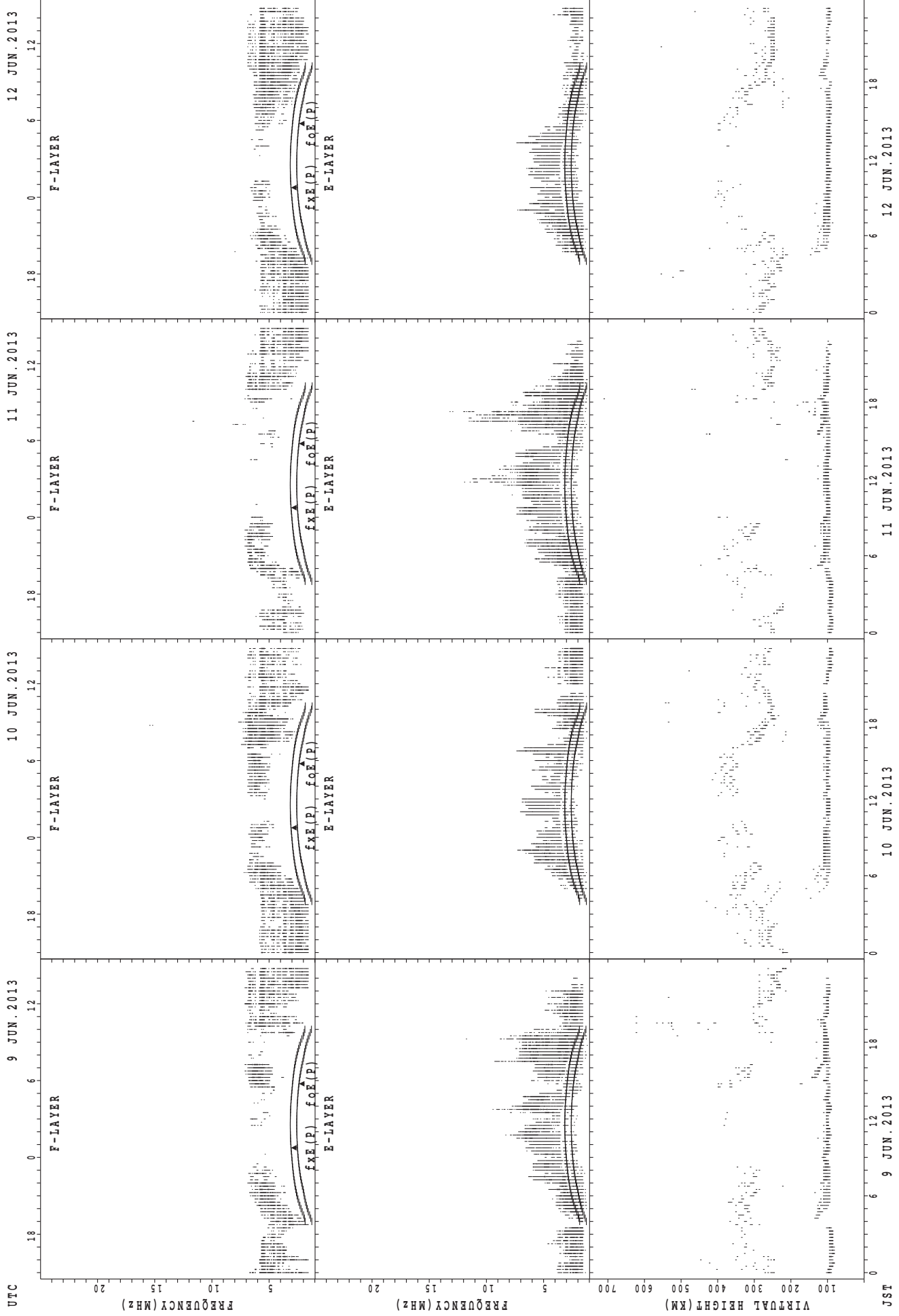
f\_xE(P) ; PREDICTED VALUE FOR f\_xE  
f\_oE(P) ; PREDICTED VALUE FOR f\_oE

SUMMARY PLOTS AT Wakkanai



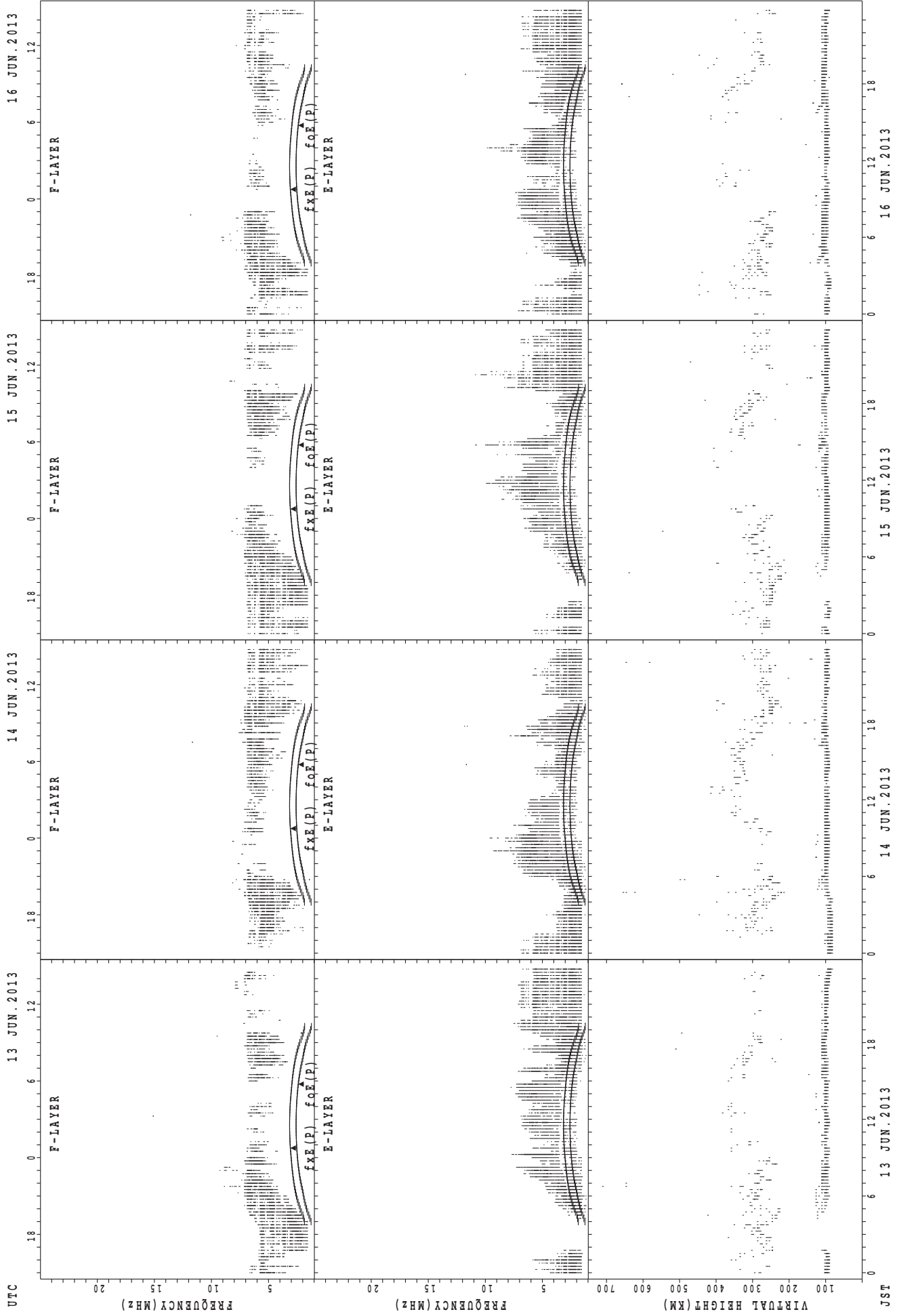
foF2(P); PREDICTED VALUE FOR foF2  
foF2(P); PREDICTED VALUE FOR foF2

SUMMARY PLOTS AT Wakkanai



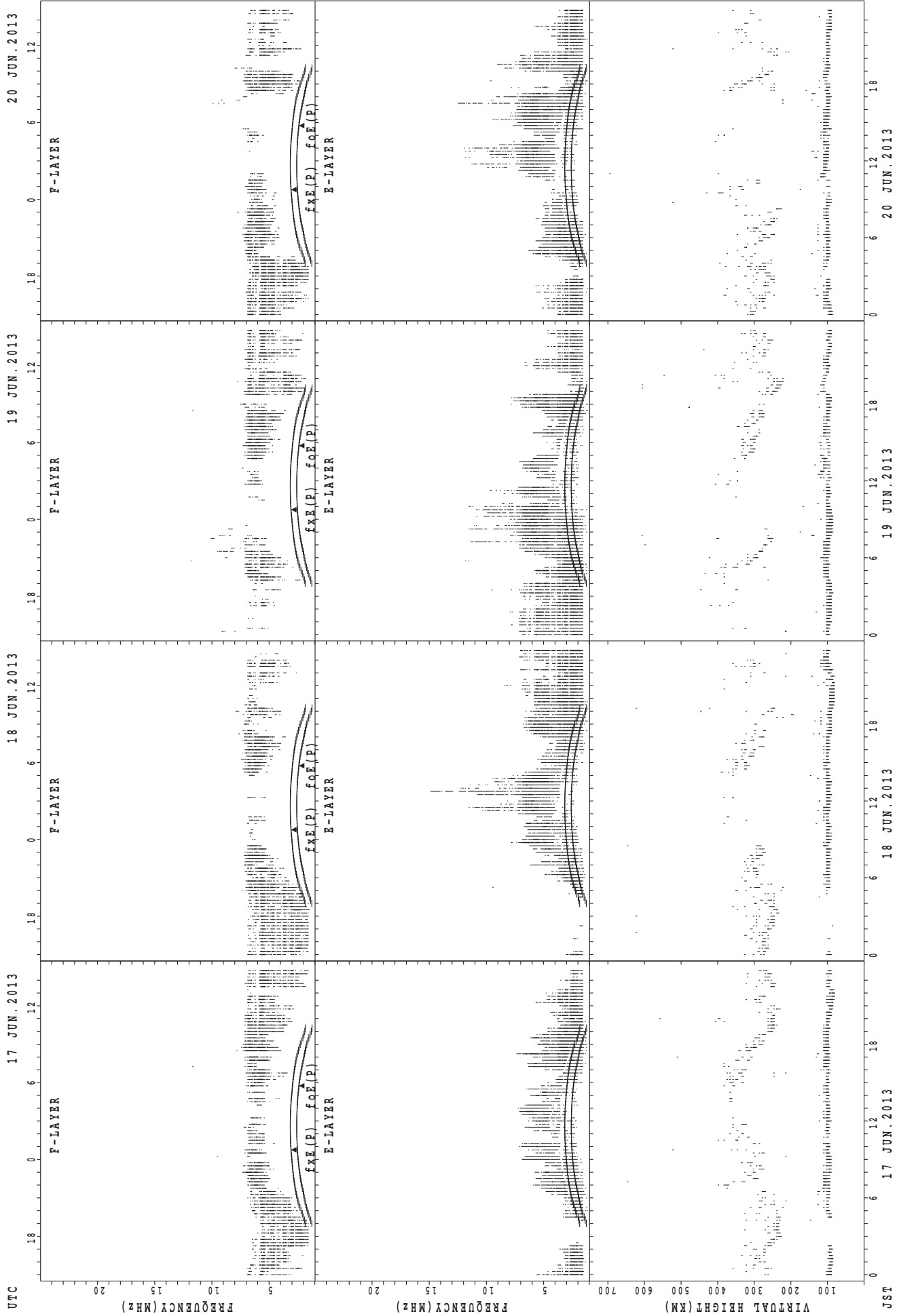
f\_xE(P) ; PREDICTED VALUE FOR f\_xE  
f\_oE(P) ; PREDICTED VALUE FOR f\_oE

SUMMARY PLOTS AT Wakkanai



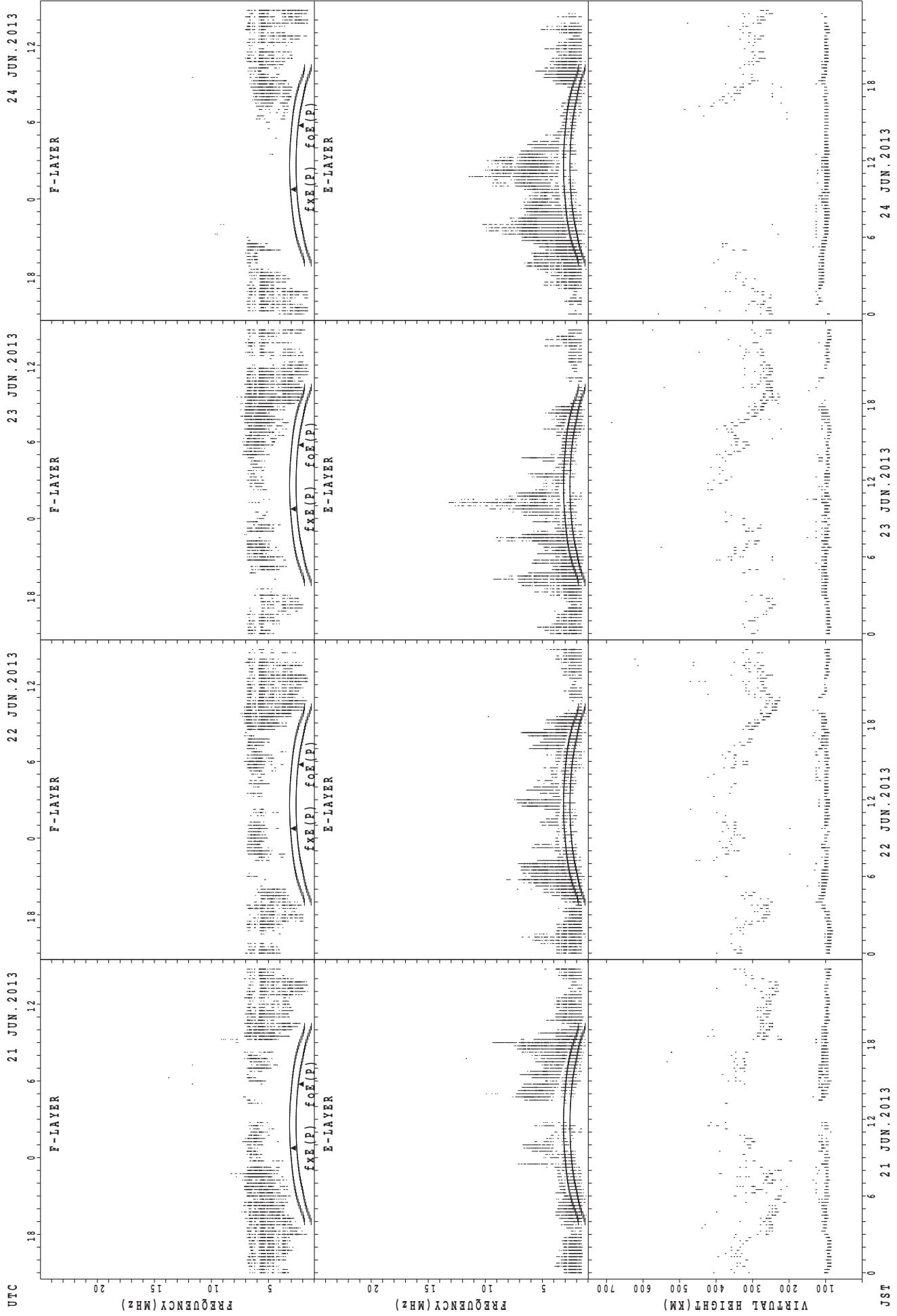
JST 13 JUN. 2013 14 JUN. 2013 15 JUN. 2013 16 JUN. 2013  
fxe(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

### SUMMARY PLOTS AT Wakkanai



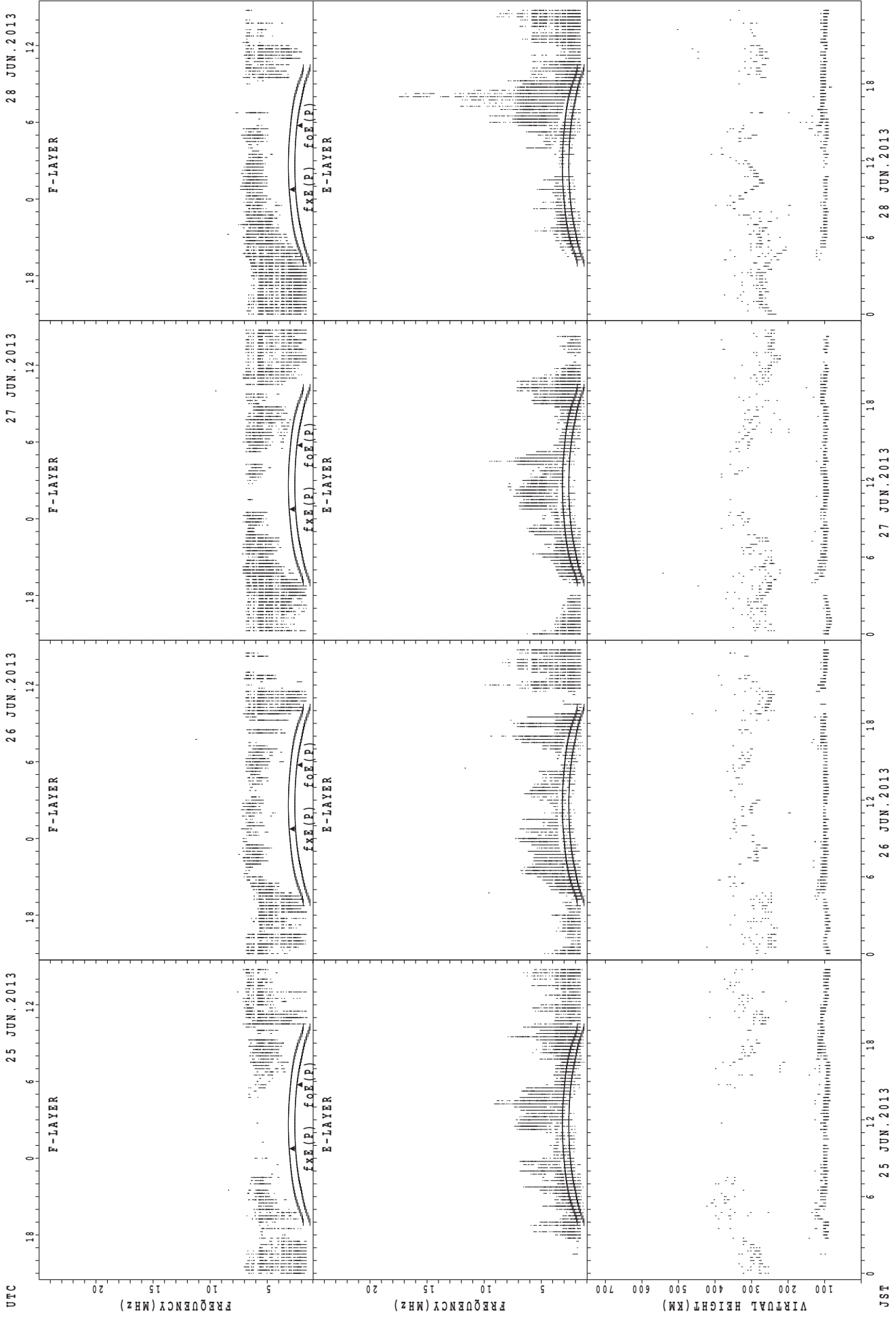
fxe(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



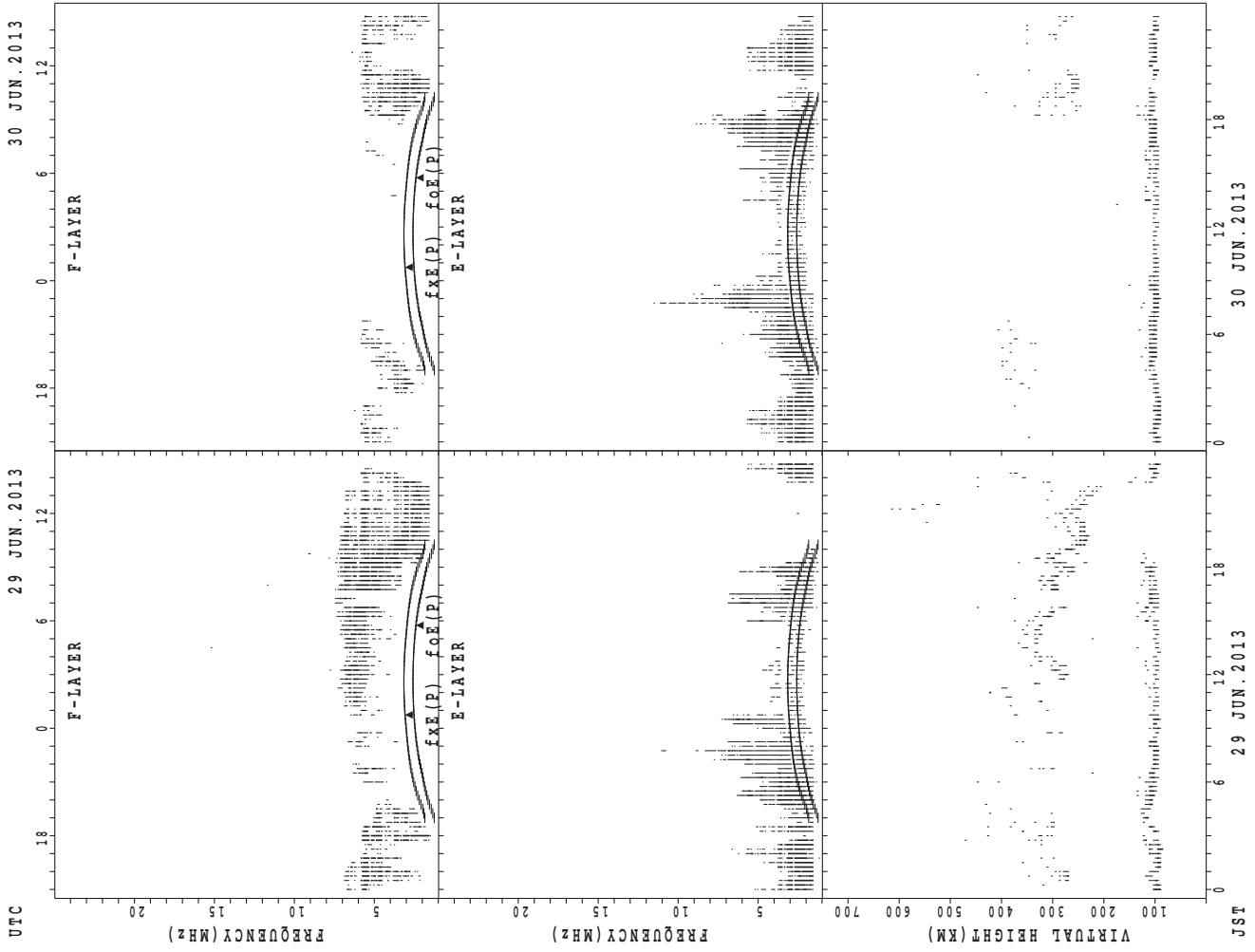
UTC  
21 JUN. 2013  
22 JUN. 2013  
23 JUN. 2013  
24 JUN. 2013  
JST  
foE(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



f\_xE(P); PREDICTED VALUE FOR f\_xE  
f\_oE(P); PREDICTED VALUE FOR f\_oE

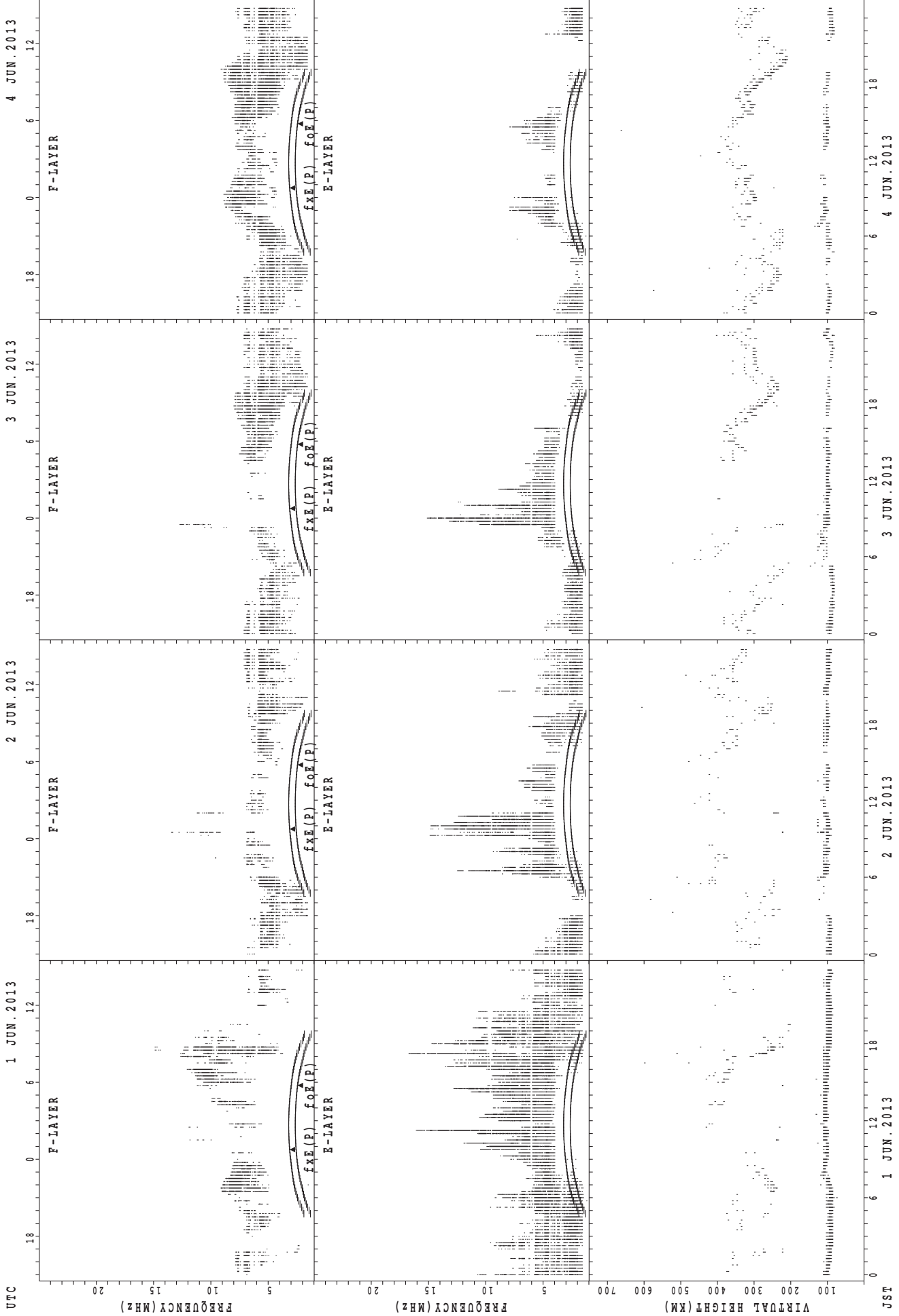
### SUMMARY PLOTS AT Wakkanai



JST 29 JUN. 2013 30 JUN. 2013  
 $f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

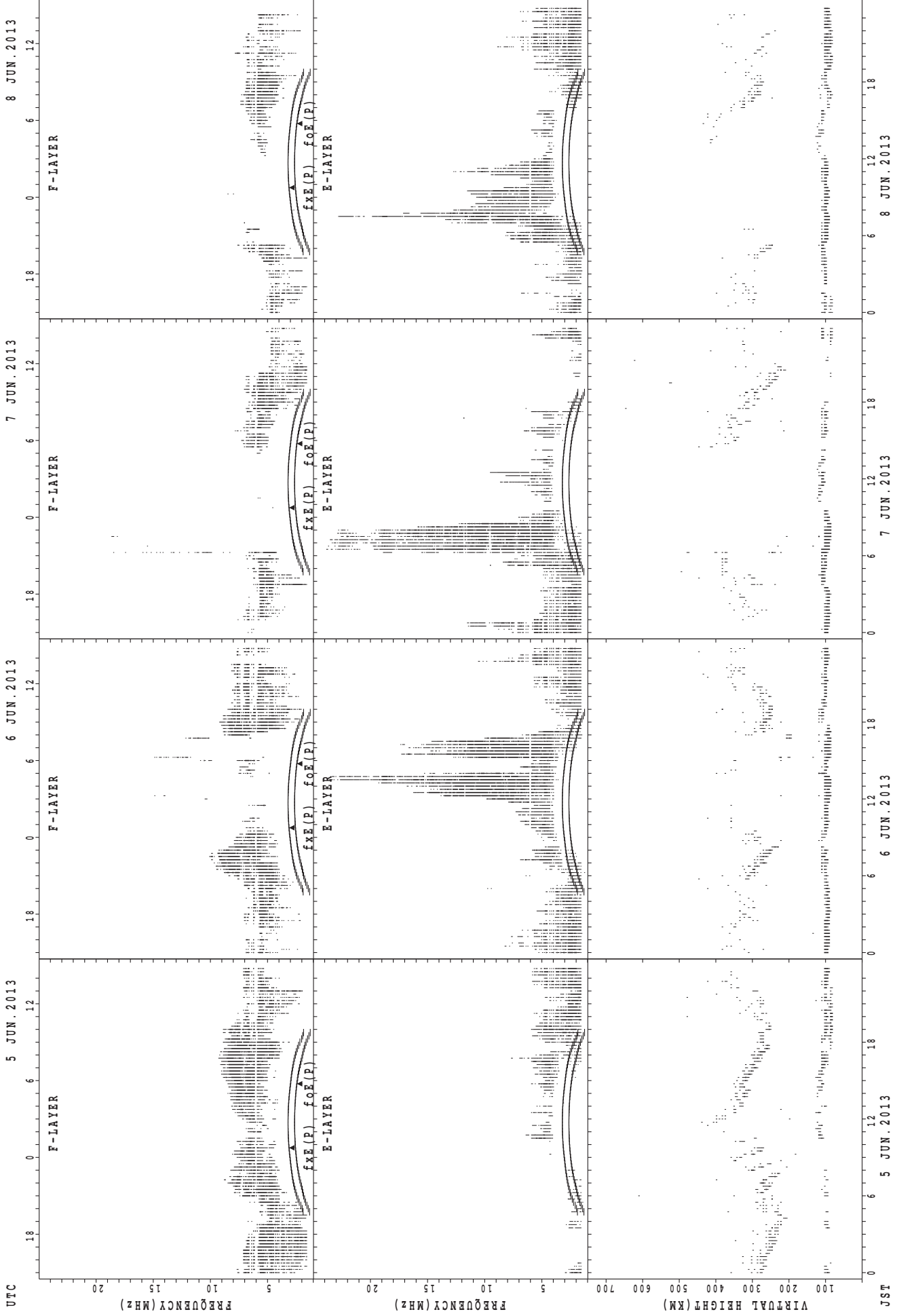


### SUMMARY PLOTS AT Kokubunji



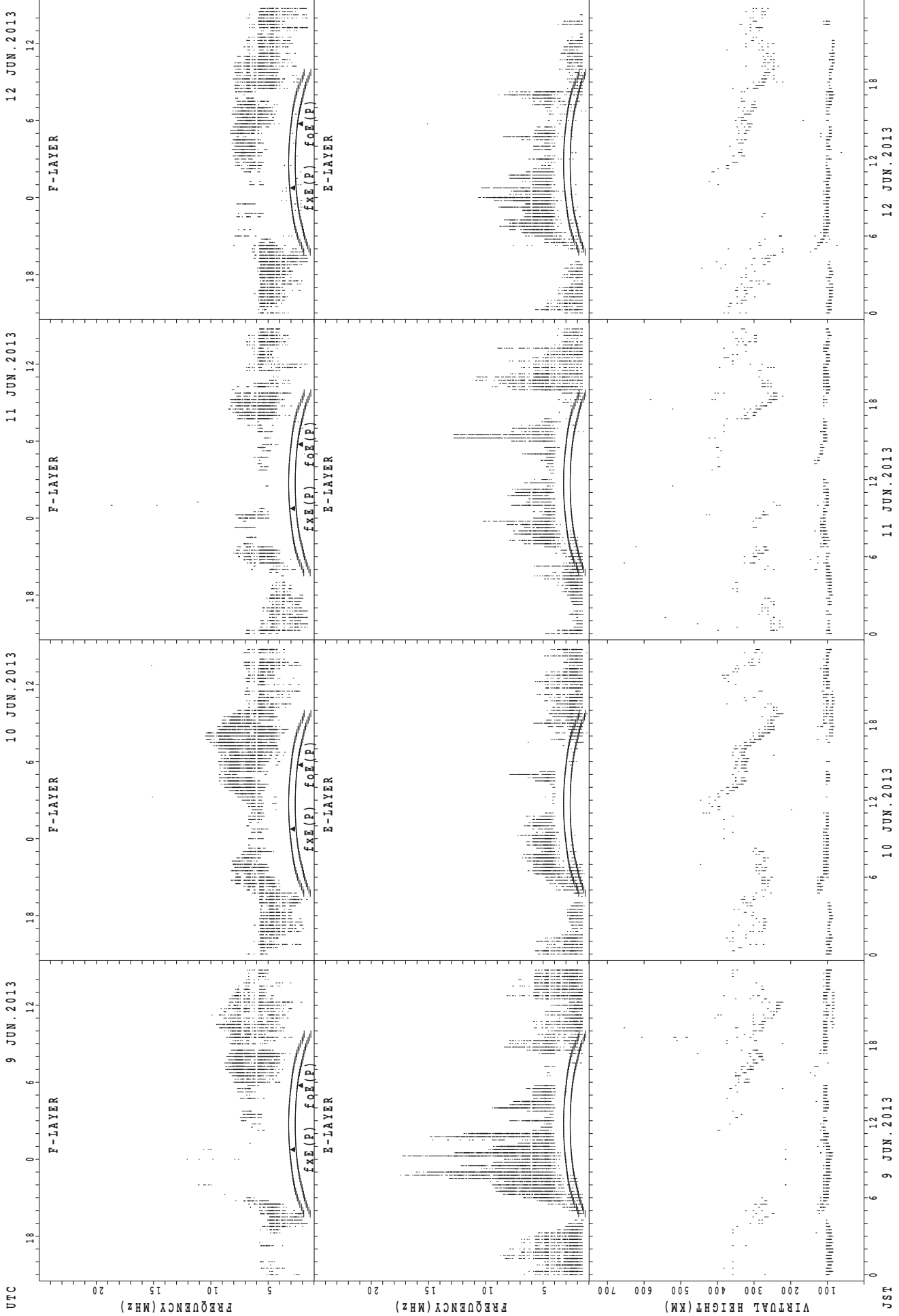
f\_xE(P) ; PREDICTED VALUE FOR f\_xE  
f\_oE(P) ; PREDICTED VALUE FOR f\_oE

SUMMARY PLOTS AT Kokubunji



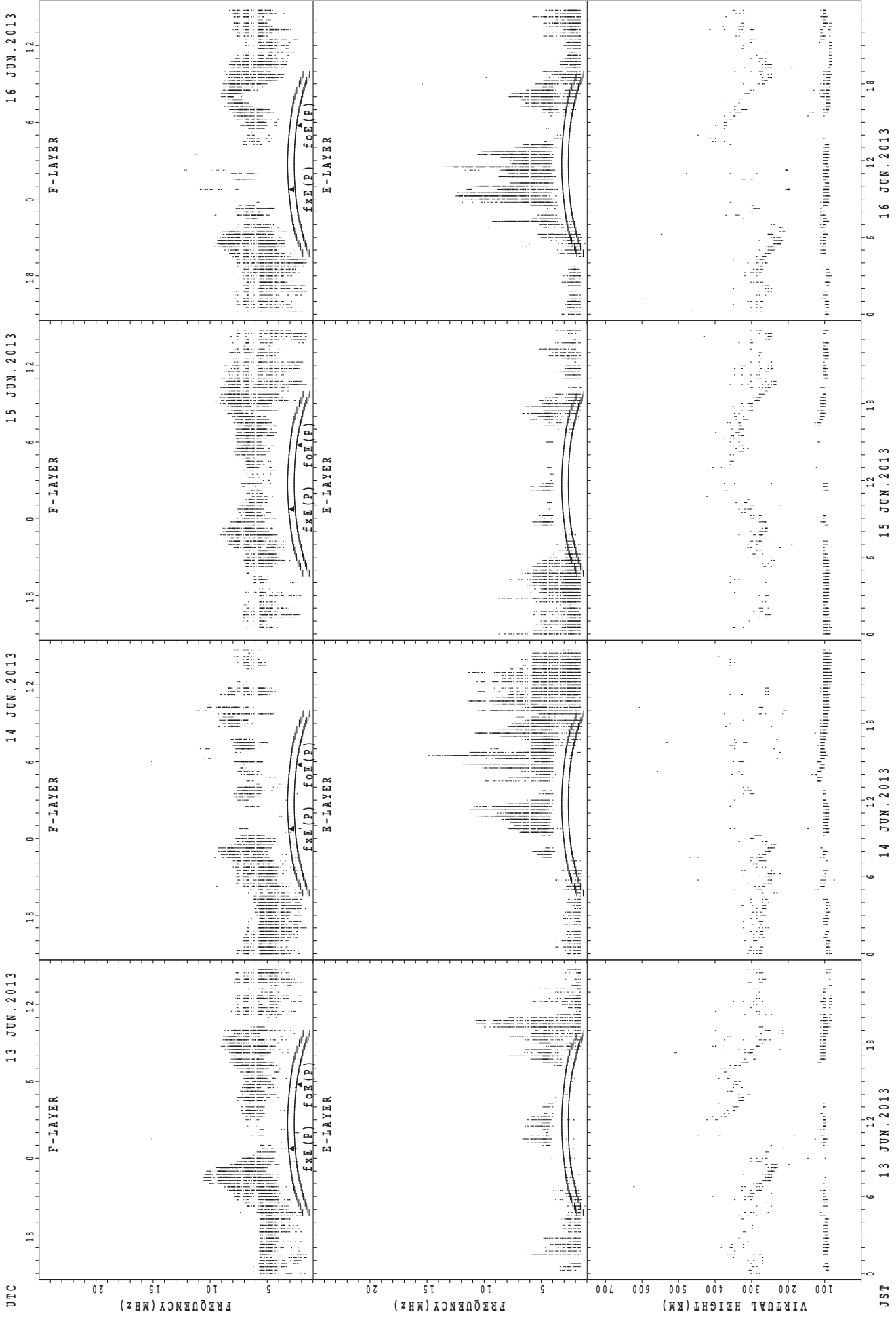
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



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

SUMMARY PLOTS AT Kokubunji

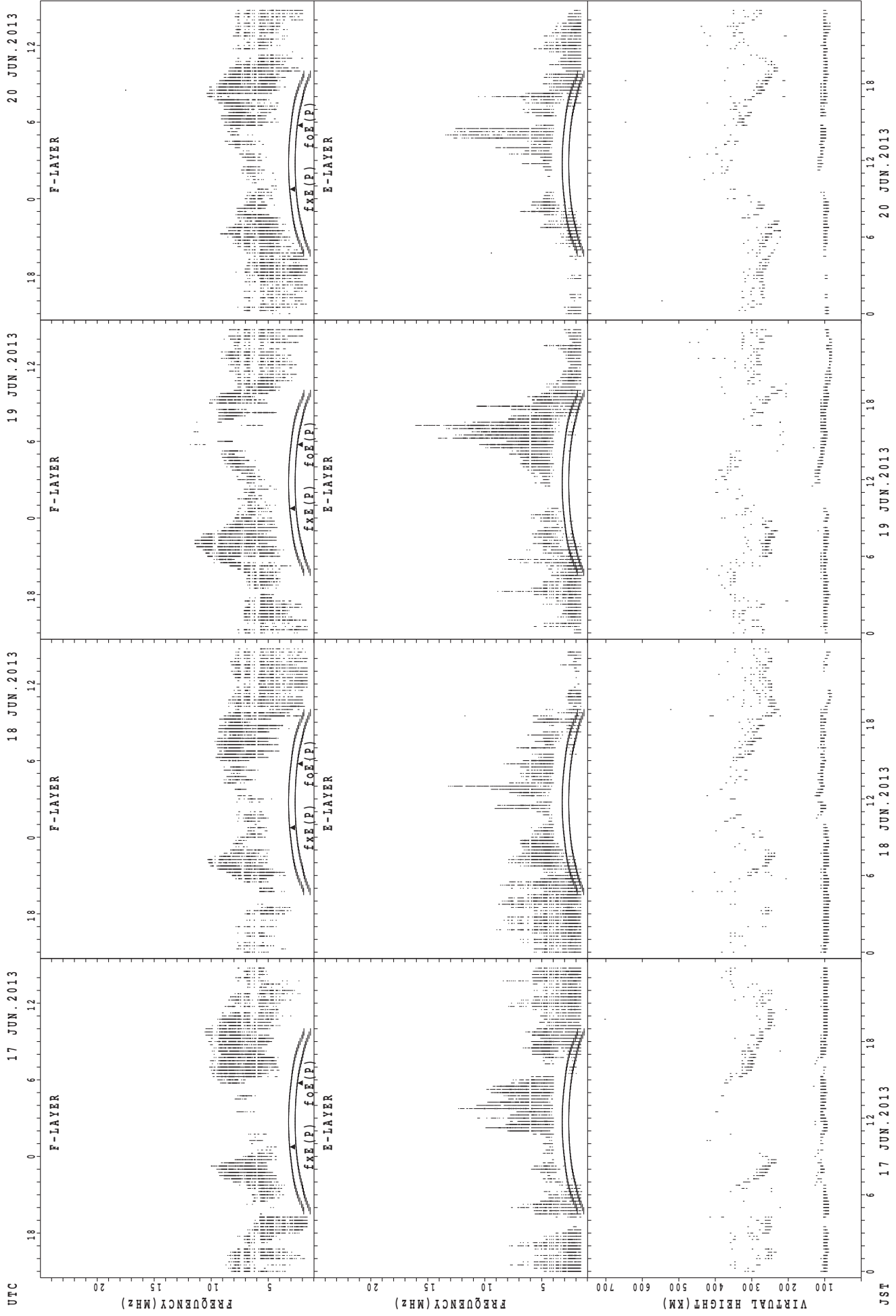


fxe(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

UTC

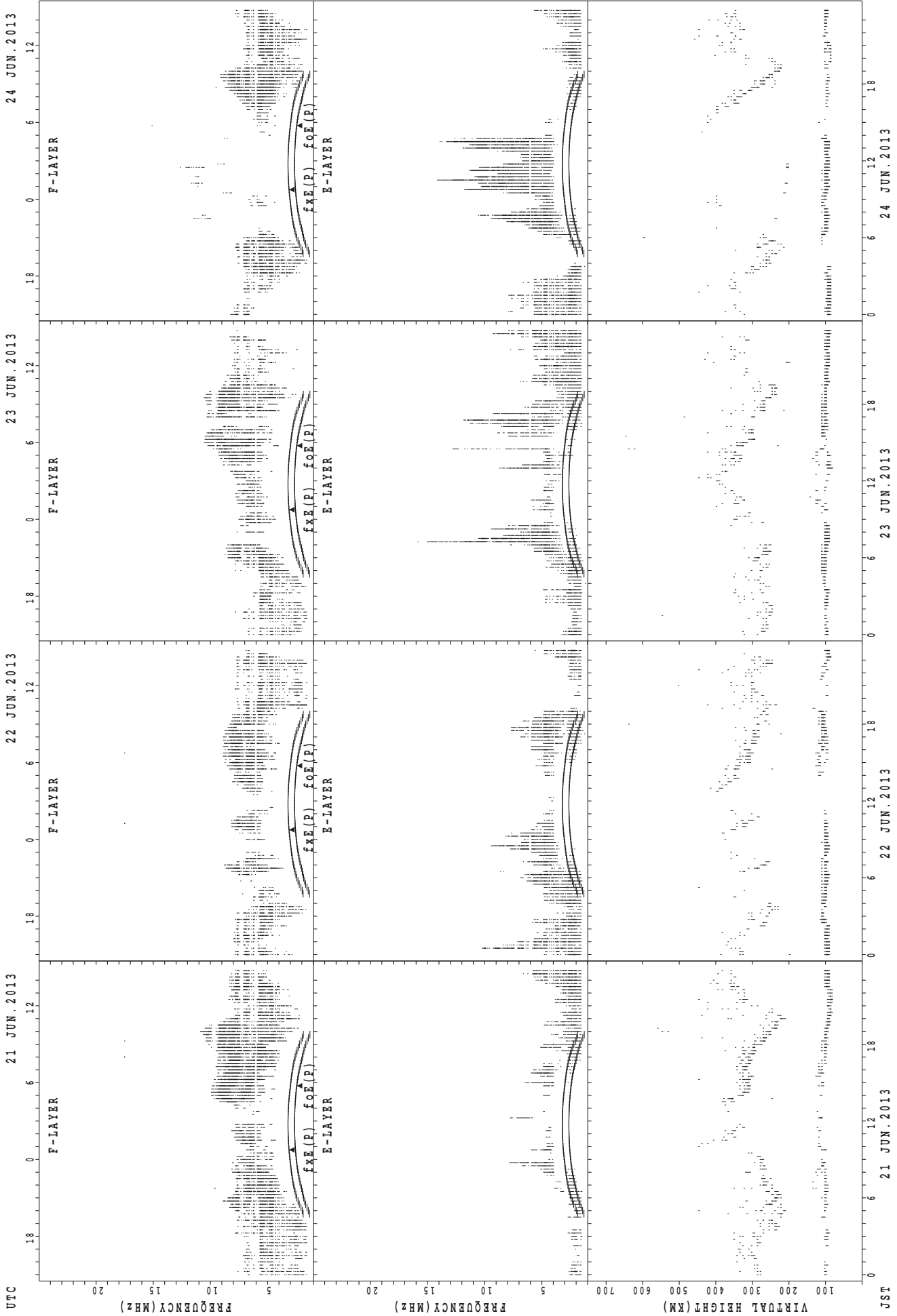
JST

SUMMARY PLOTS AT Kokubunji



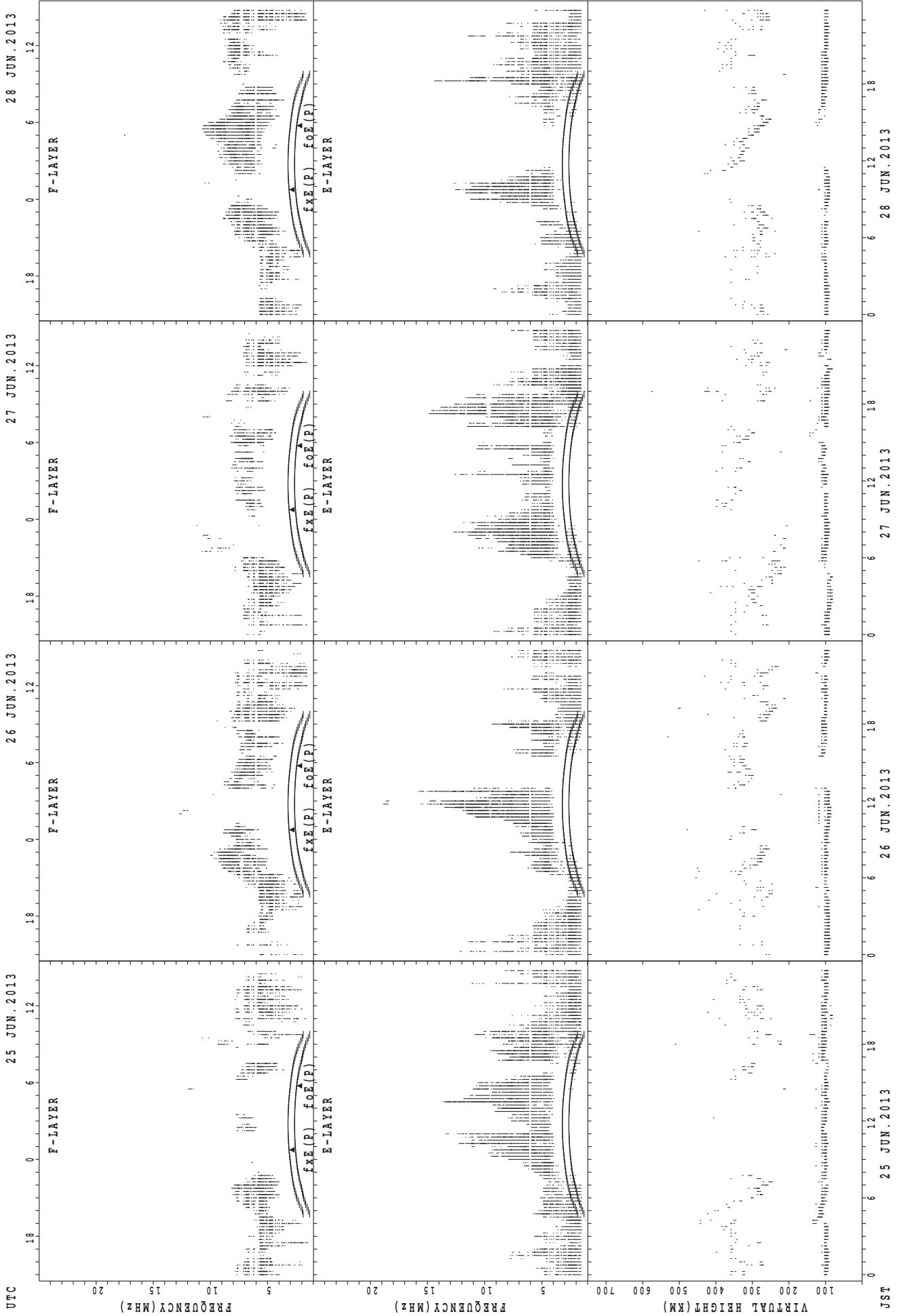
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



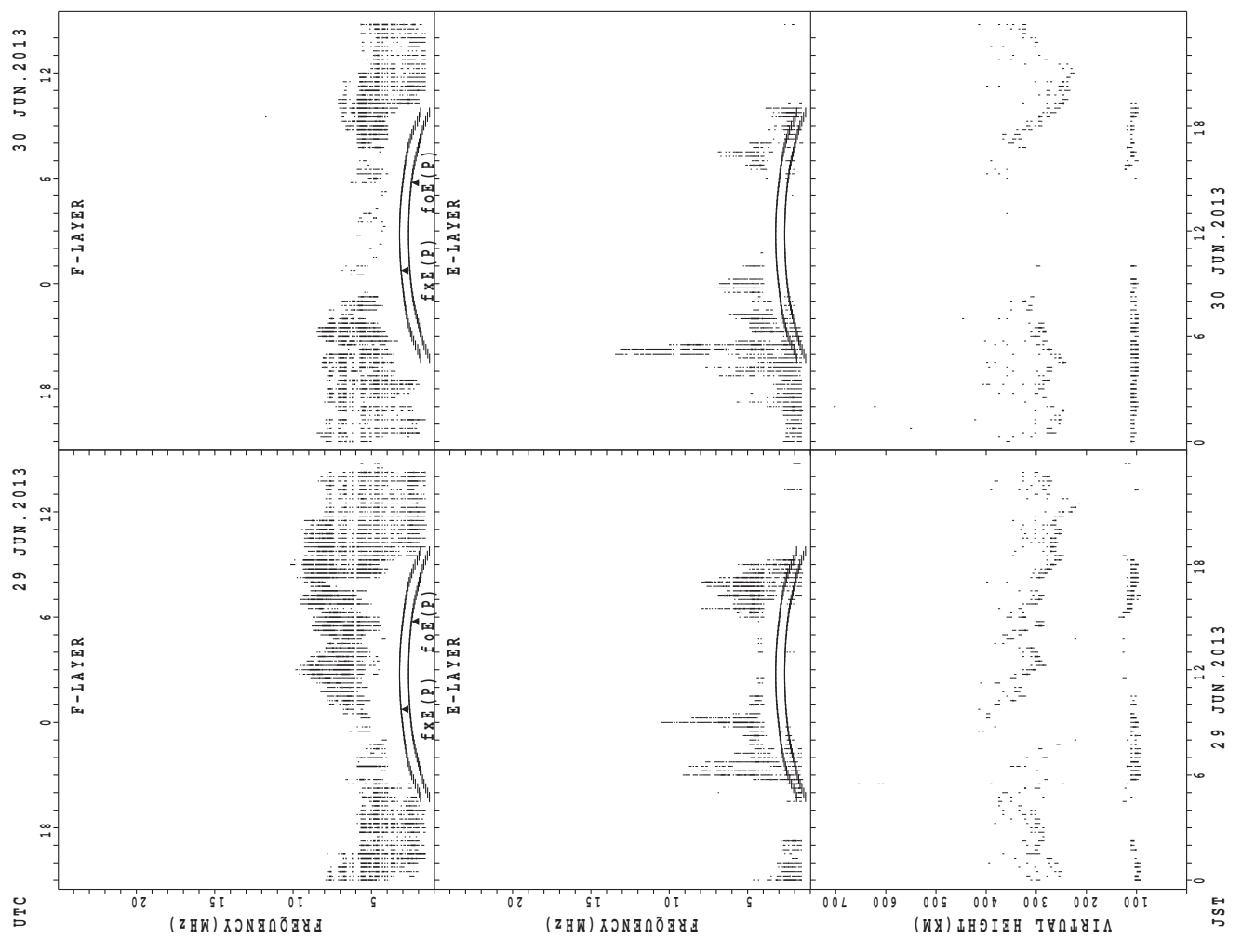
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

### SUMMARY PLOTS AT Kokubunji



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

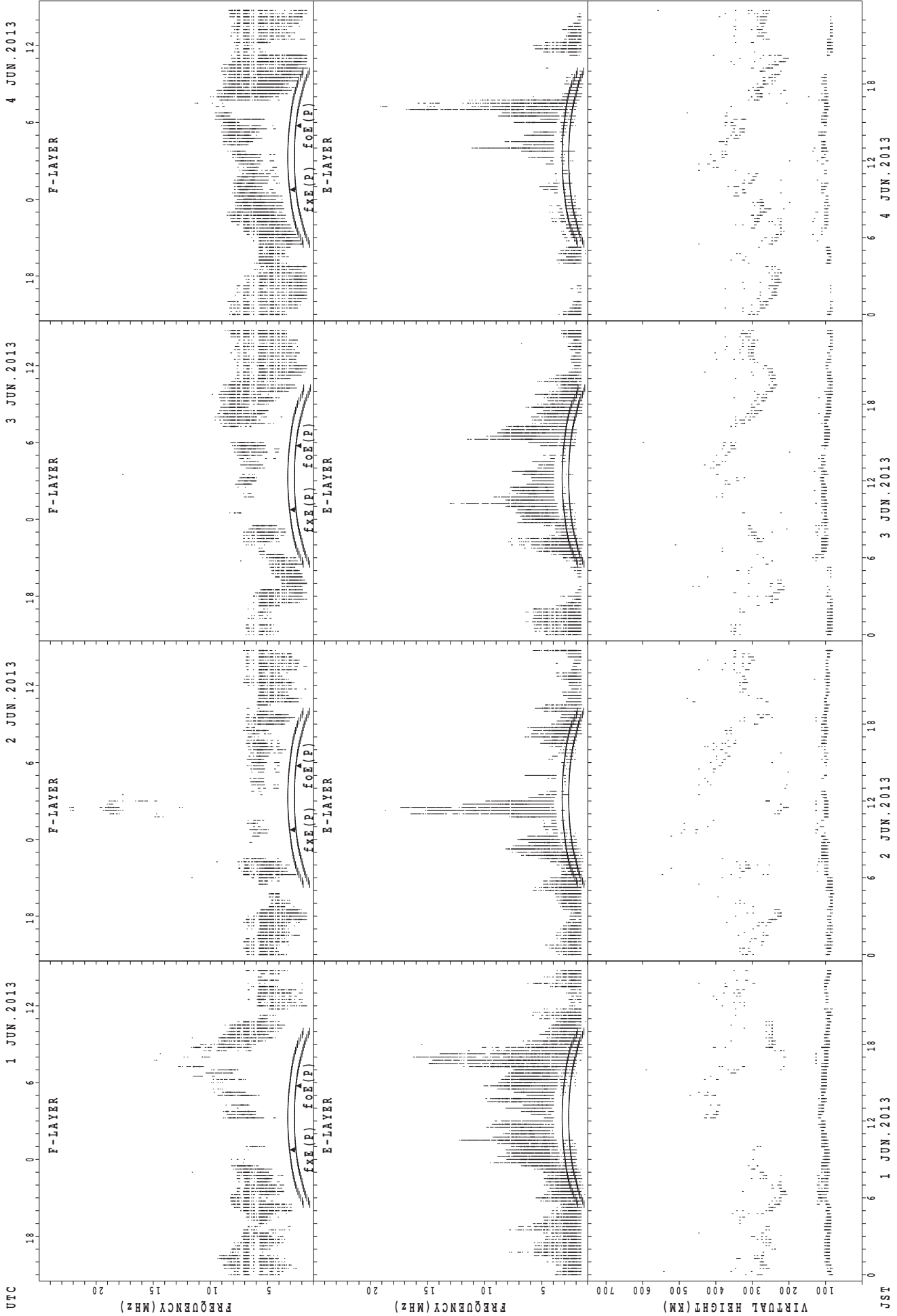
### SUMMARY PLOTS AT Kokubunji



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

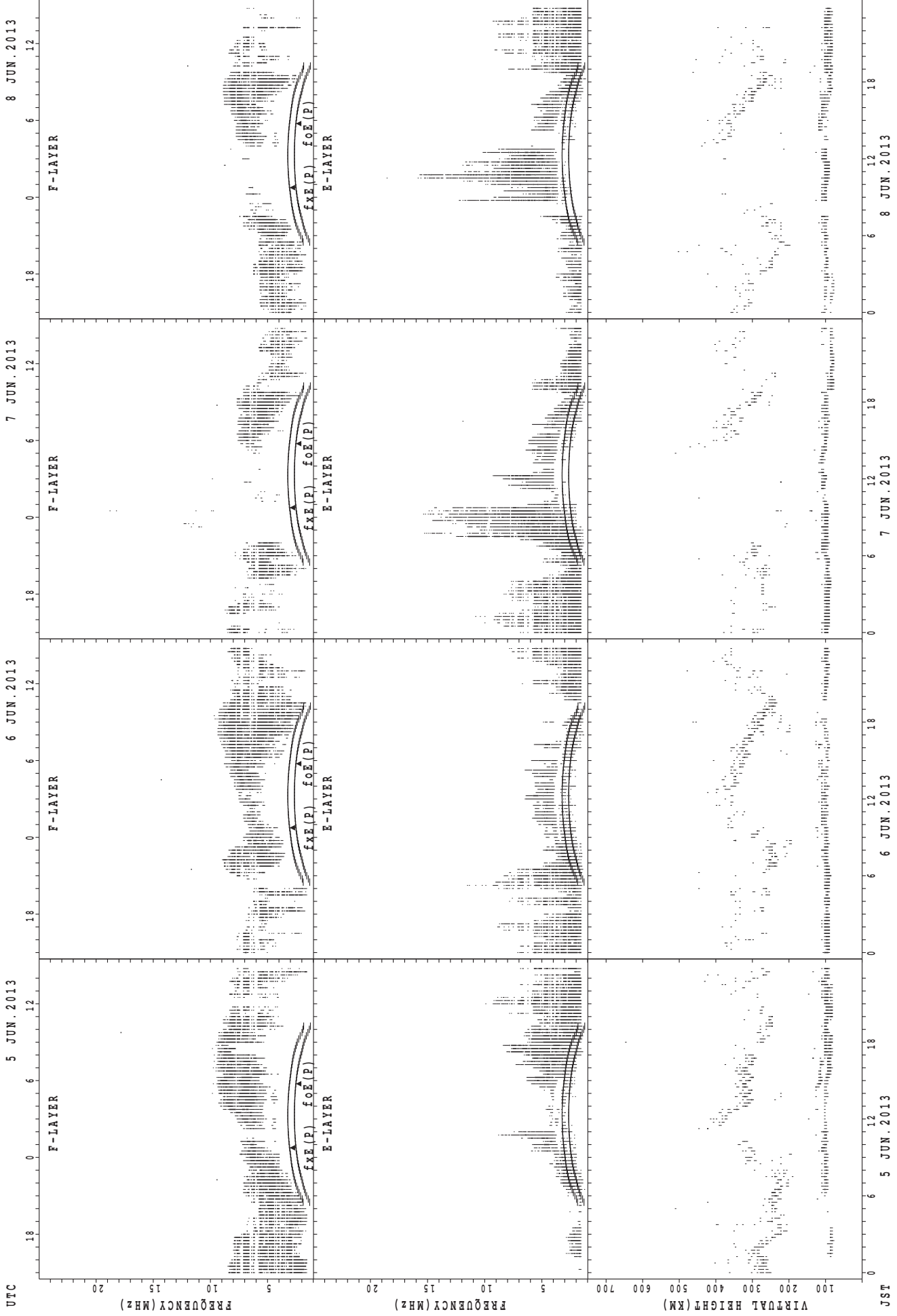


### SUMMARY PLOTS AT Yamagawa



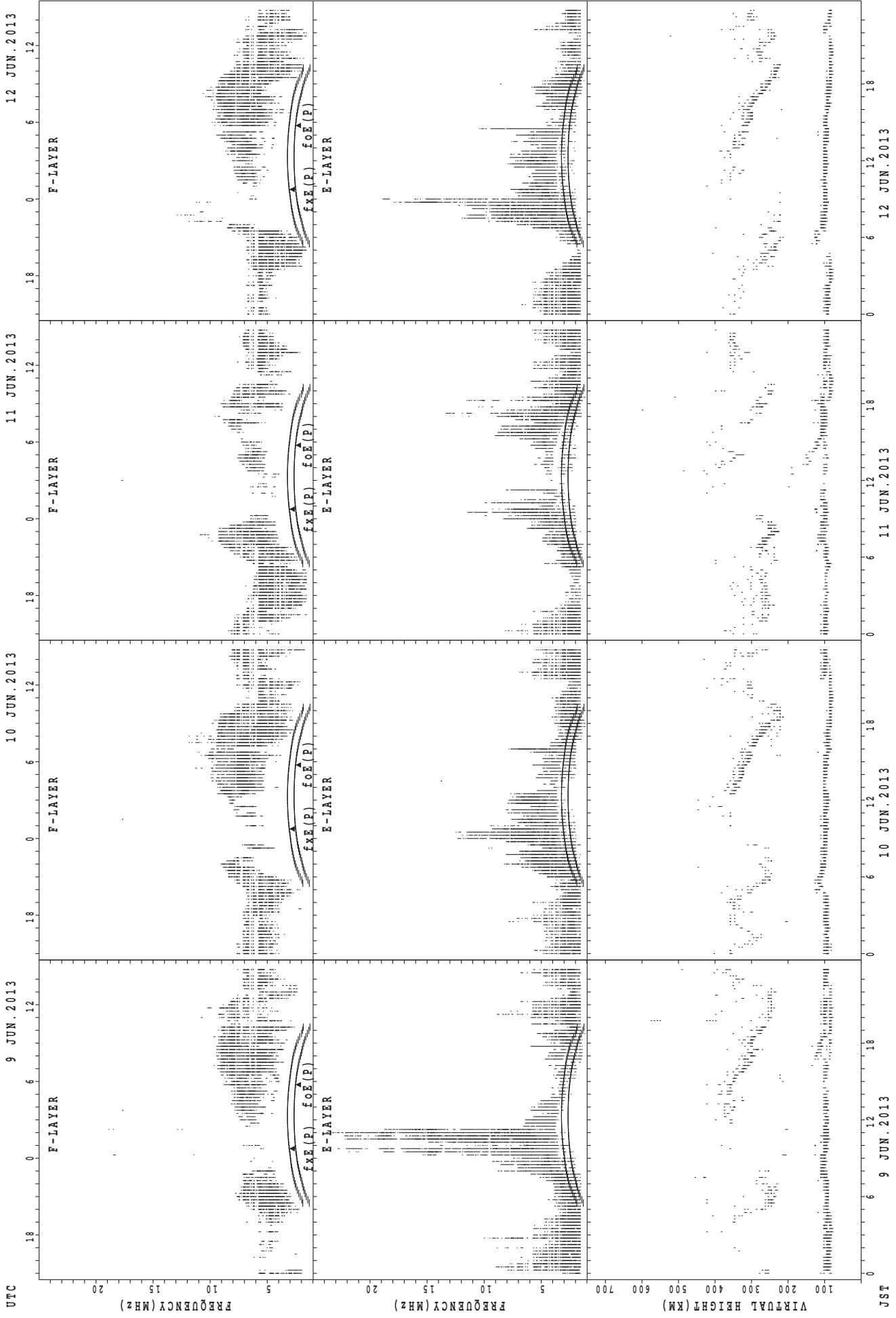
JST 1 JUN. 2013 2 JUN. 2013 3 JUN. 2013 4 JUN. 2013  
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

### SUMMARY PLOTS AT Yamagawa



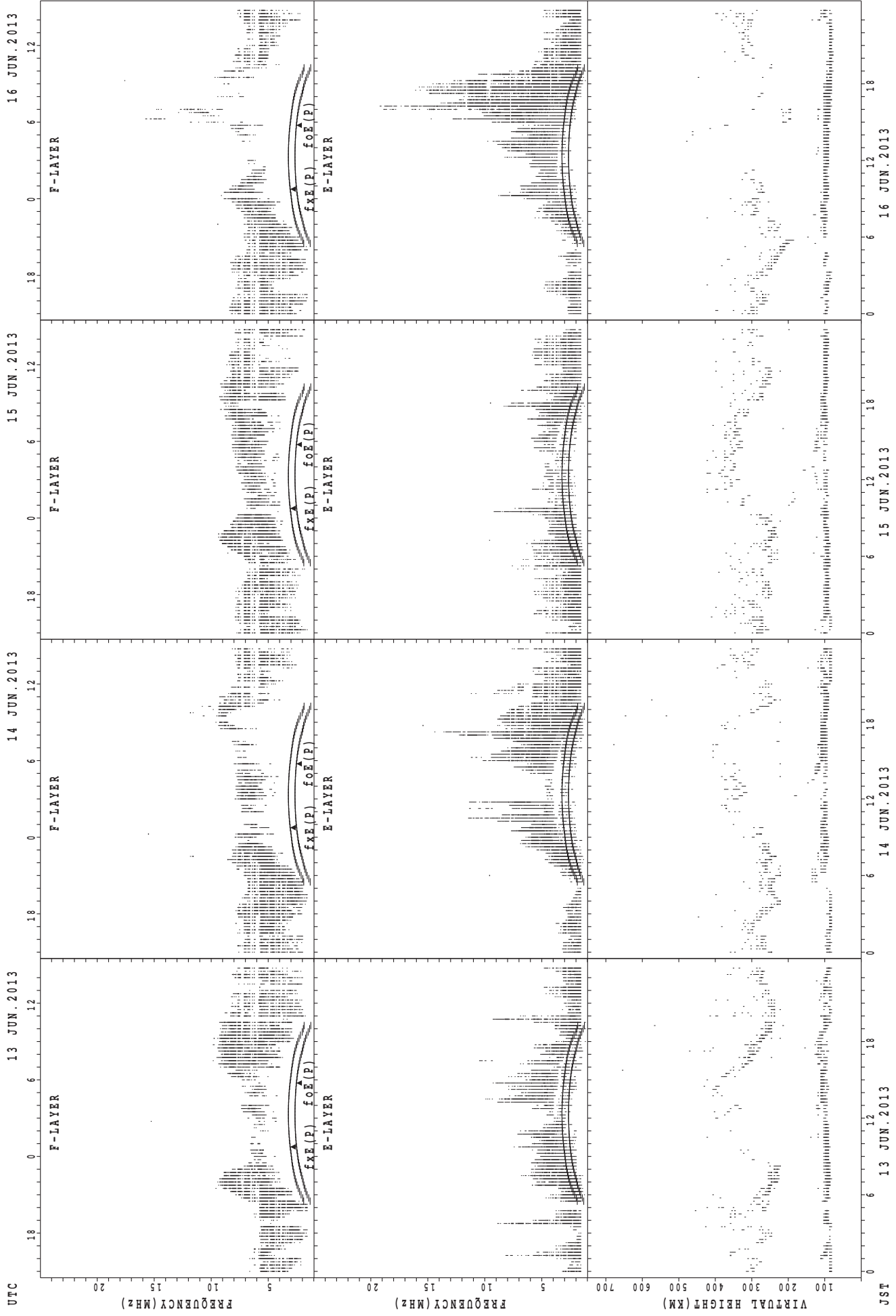
fxe(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



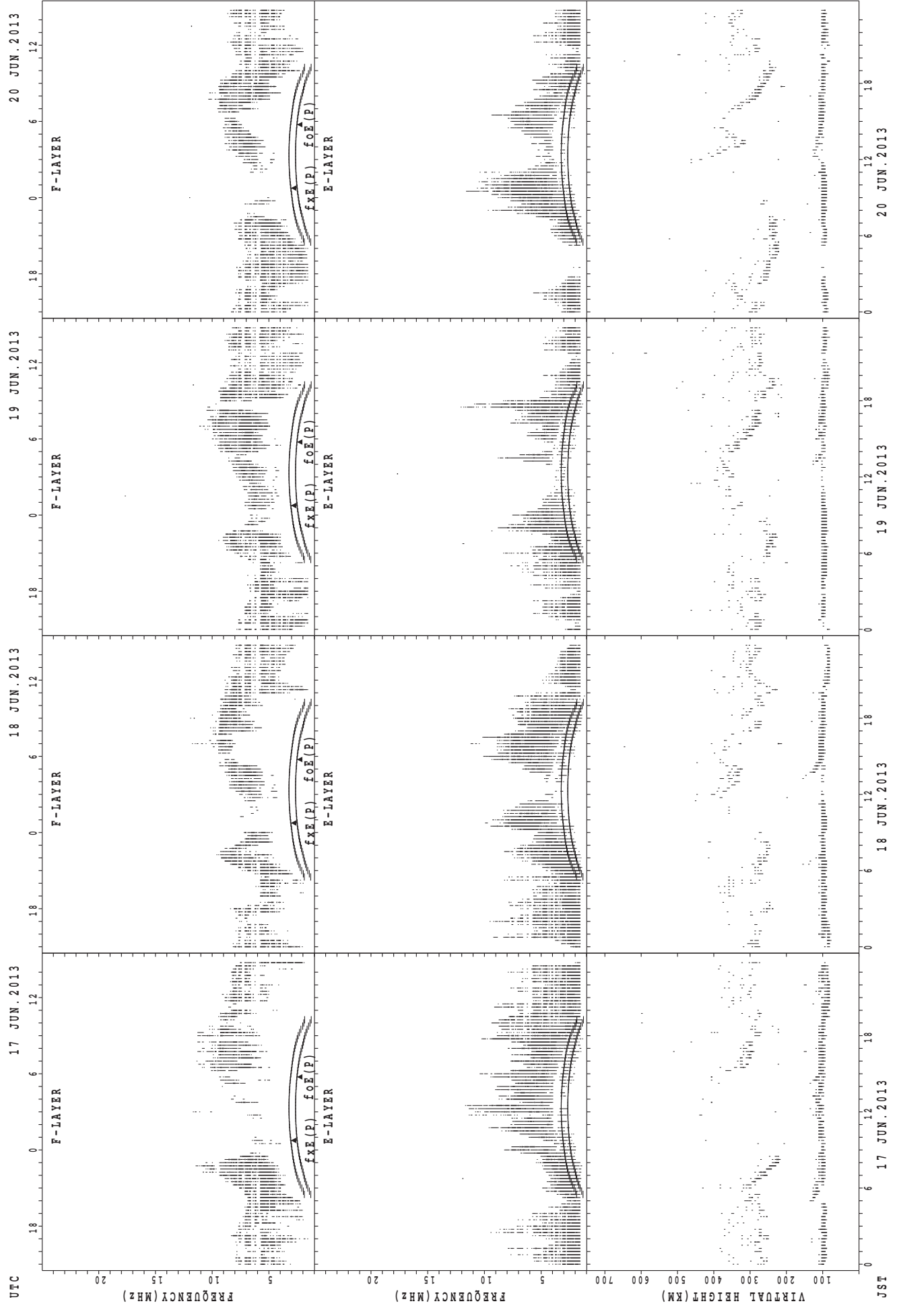
JST 9 JUN. 2013 10 JUN. 2013 11 JUN. 2013 12 JUN. 2013  
fXE(P); PREDICTED VALUE FOR fXE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



JST 13 JUN. 2013 14 JUN. 2013 15 JUN. 2013 16 JUN. 2013  
f<sub>XE</sub>(P); PREDICTED VALUE FOR f<sub>XE</sub>  
f<sub>OE</sub>(P); PREDICTED VALUE FOR f<sub>OE</sub>

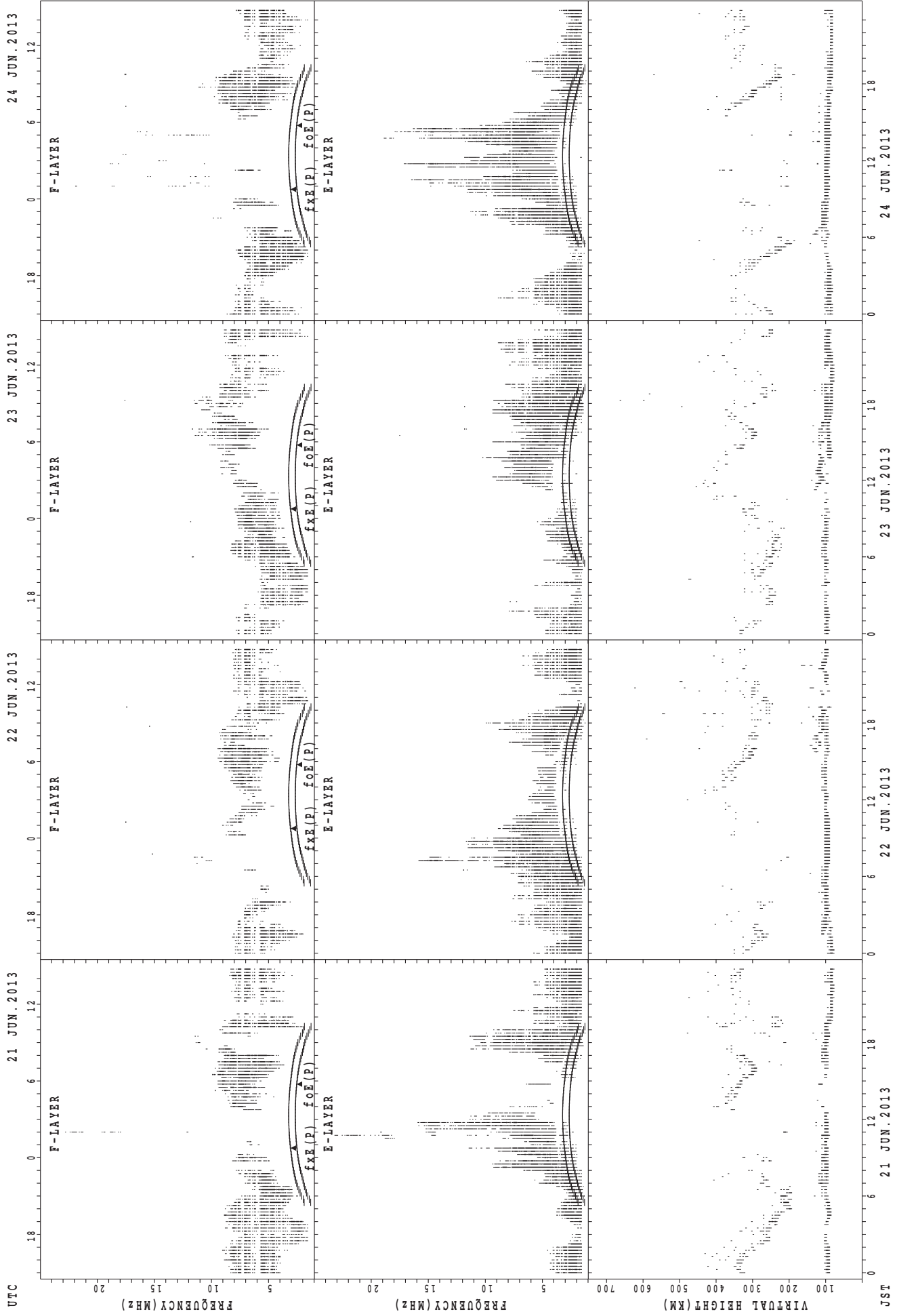
SUMMARY PLOTS AT Yamagawa



JST  
17 JUN. 2013  
18 JUN. 2013  
19 JUN. 2013  
20 JUN. 2013

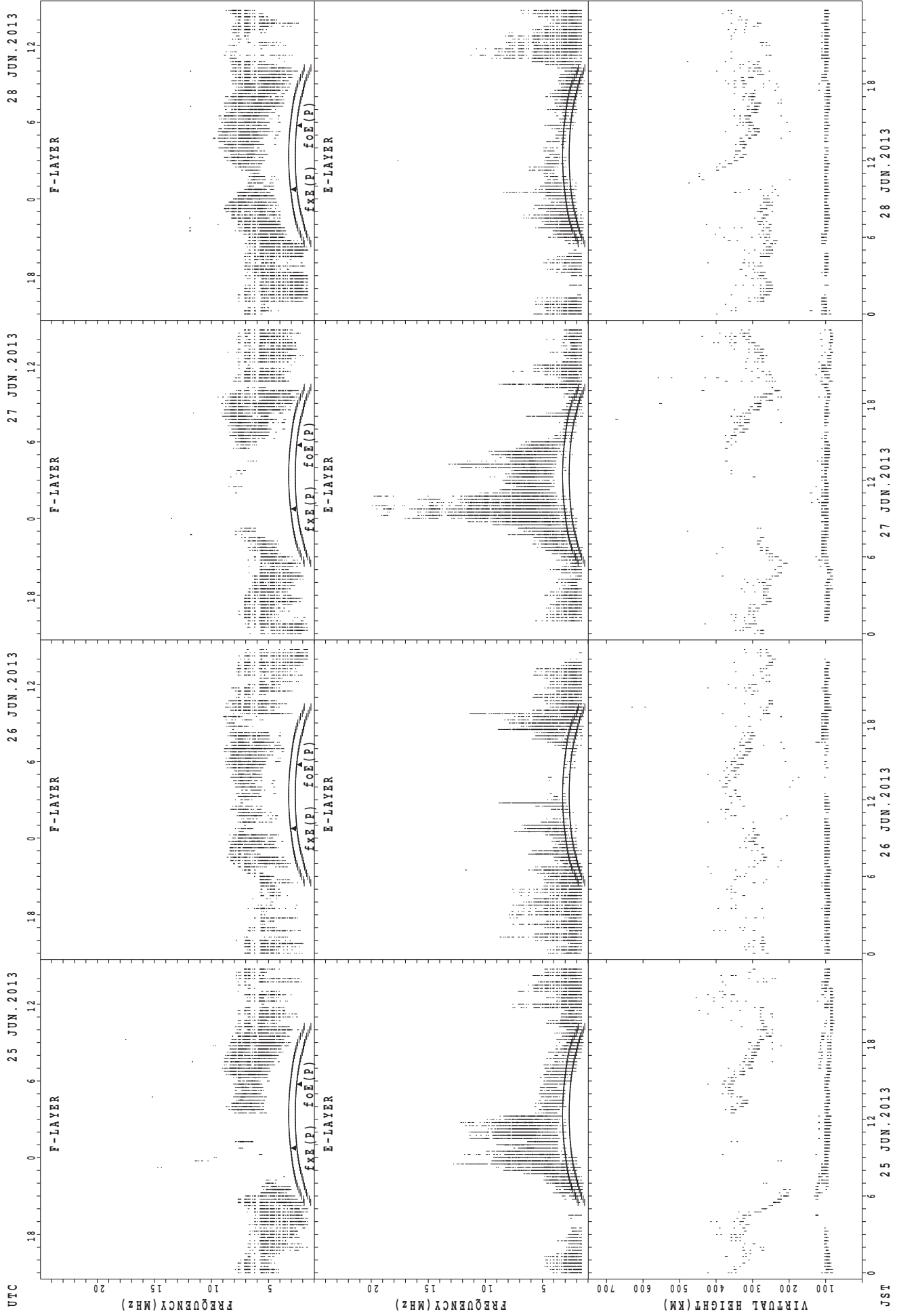
foE(P); PREDICTED VALUE FOR foE  
fxe(P); PREDICTED VALUE FOR fxe

### SUMMARY PLOTS AT Yamagawa



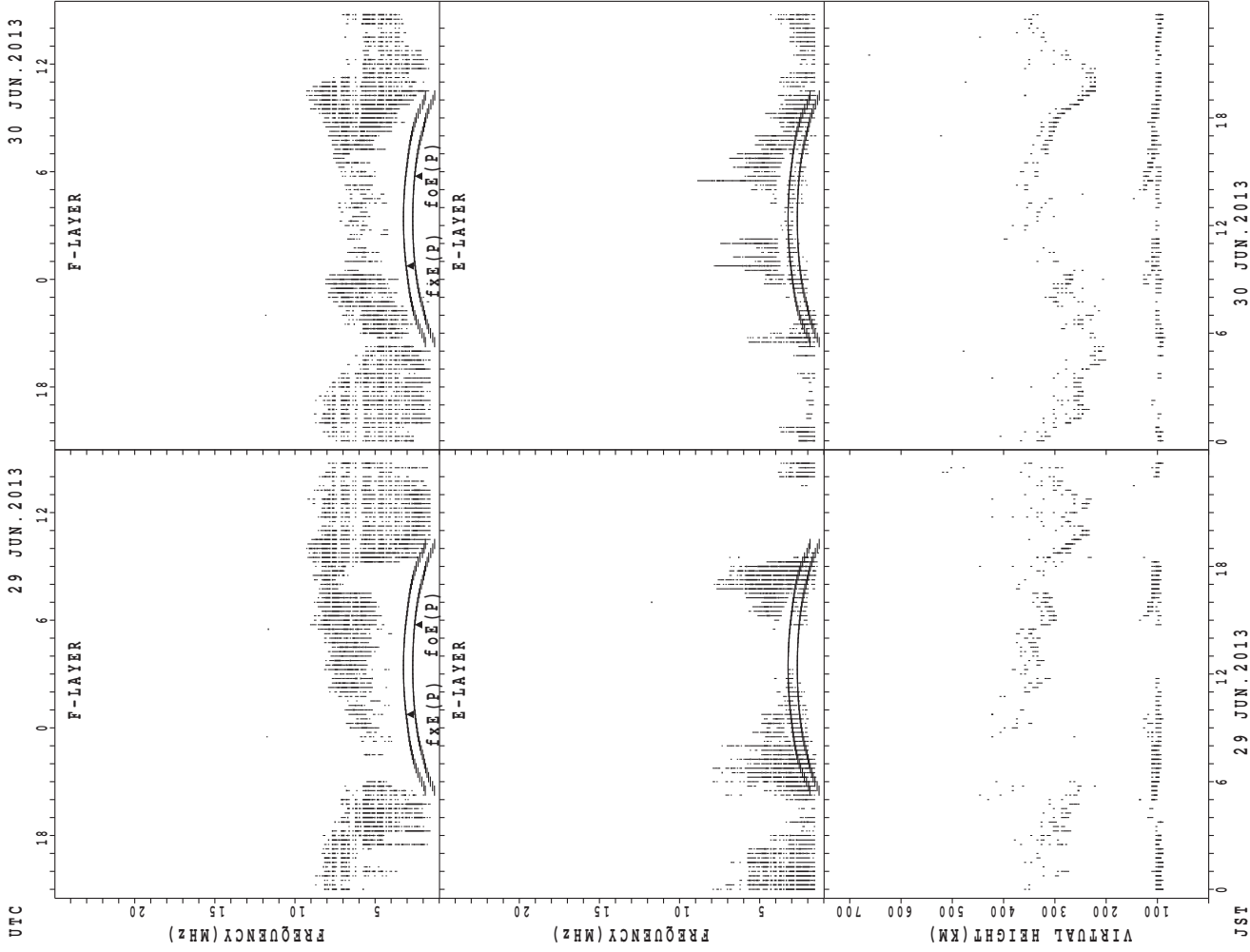
UTC  
21 JUN. 2013  
22 JUN. 2013  
23 JUN. 2013  
24 JUN. 2013  
JST  
21 JUN. 2013  
22 JUN. 2013  
23 JUN. 2013  
24 JUN. 2013  
 $f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

### SUMMARY PLOTS AT Yamagawa



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

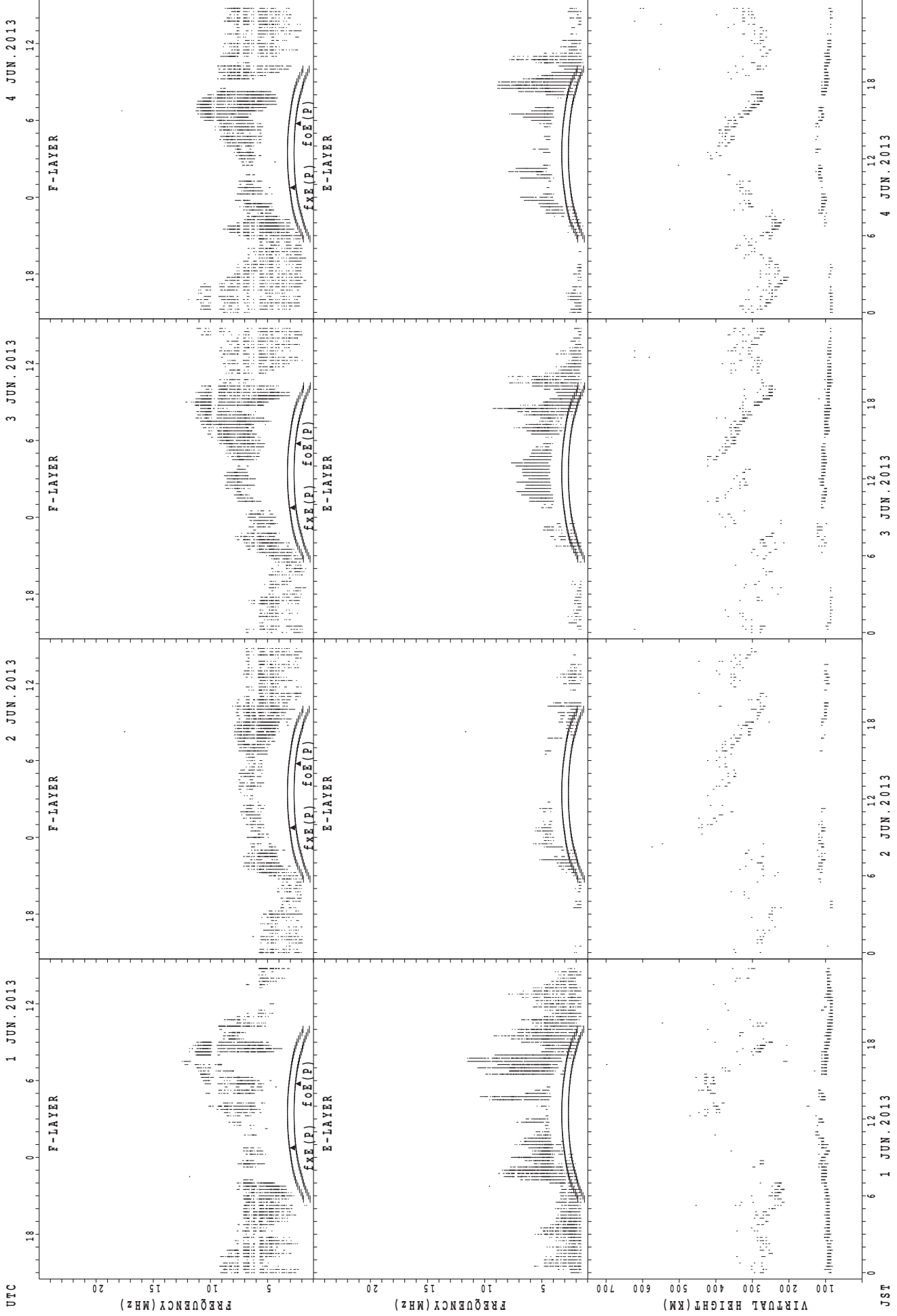
### SUMMARY PLOTS AT Yamagawa



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

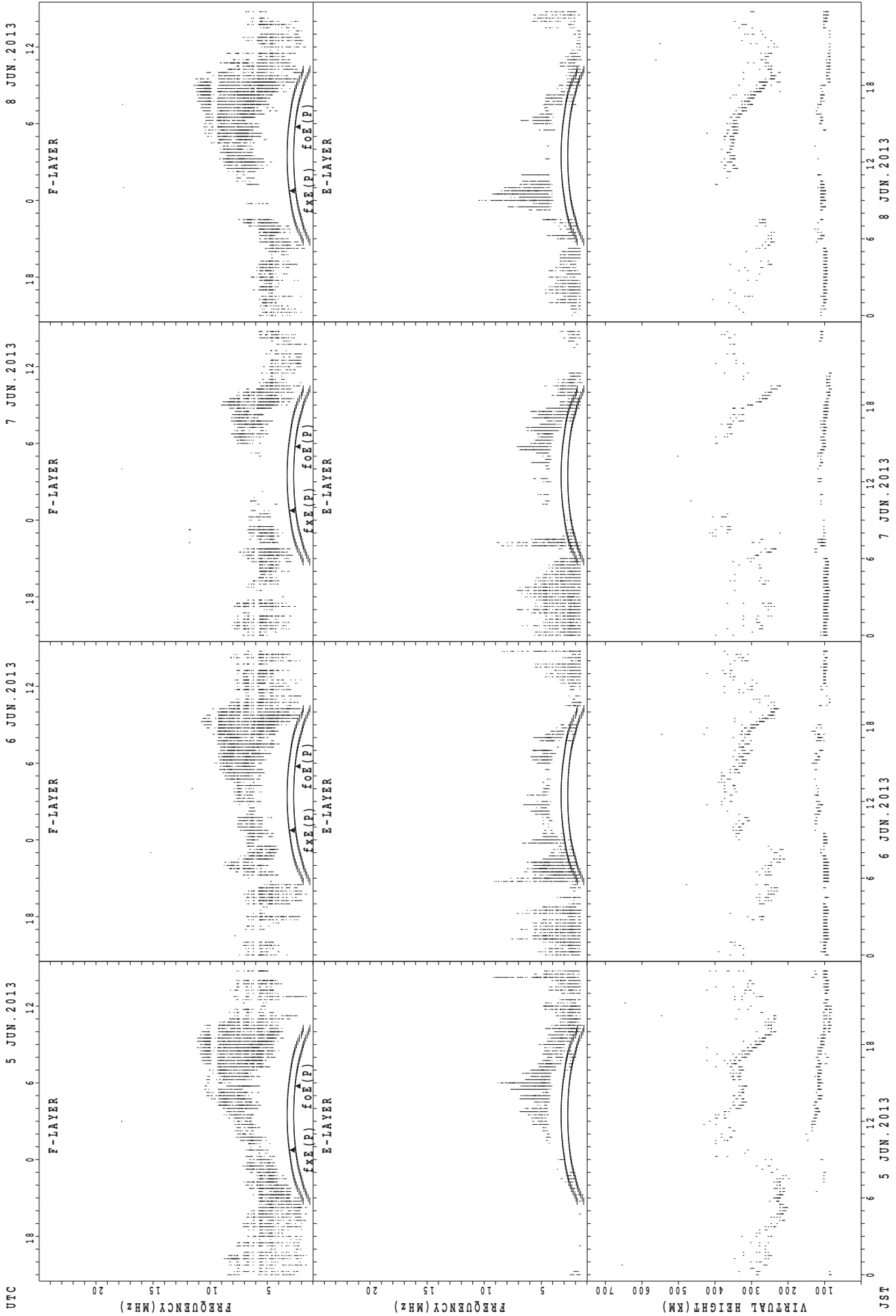


SUMMARY PLOTS AT Okinawa



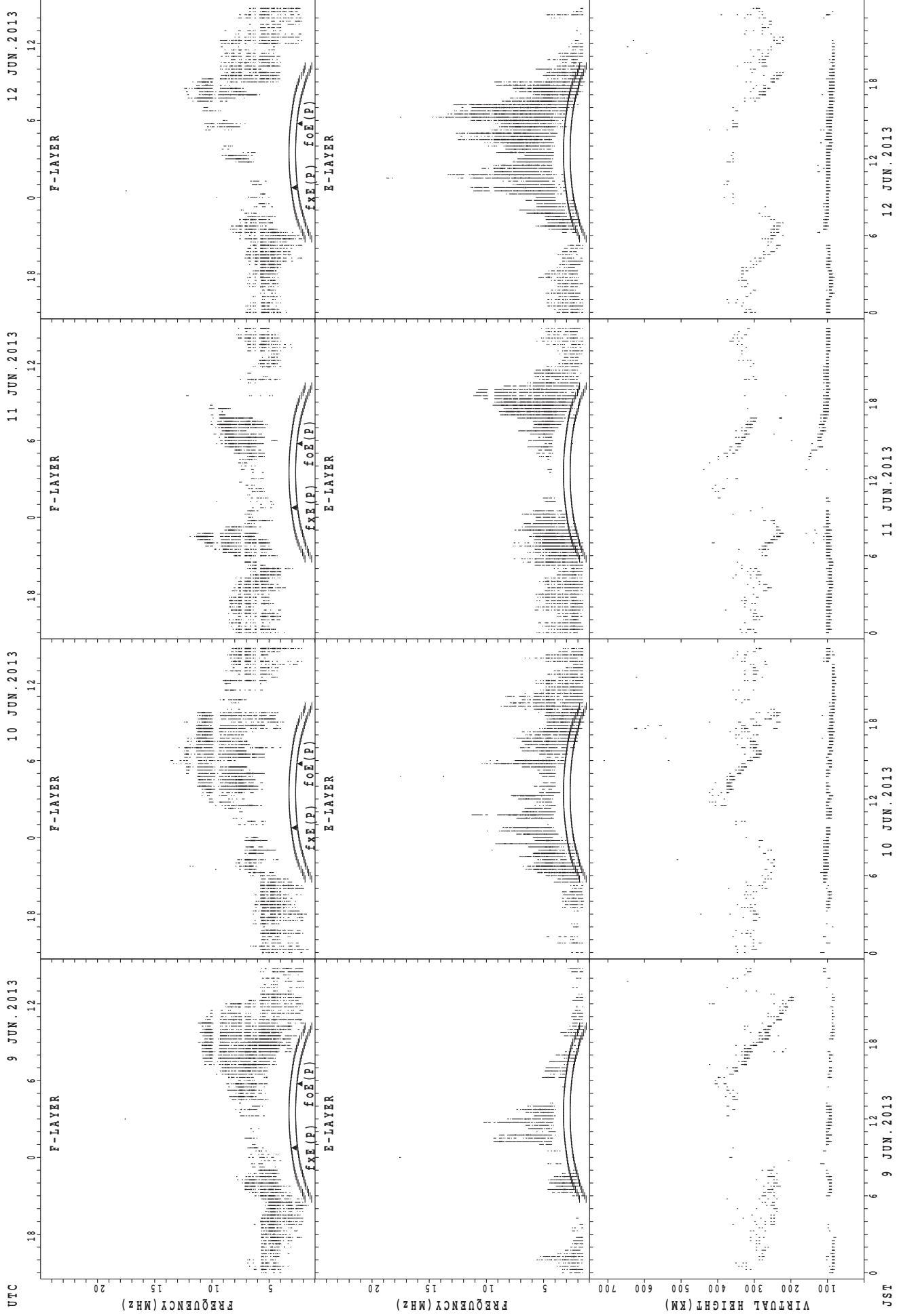
JST 1 JUN. 2013 2 JUN. 2013 3 JUN. 2013 4 JUN. 2013  
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



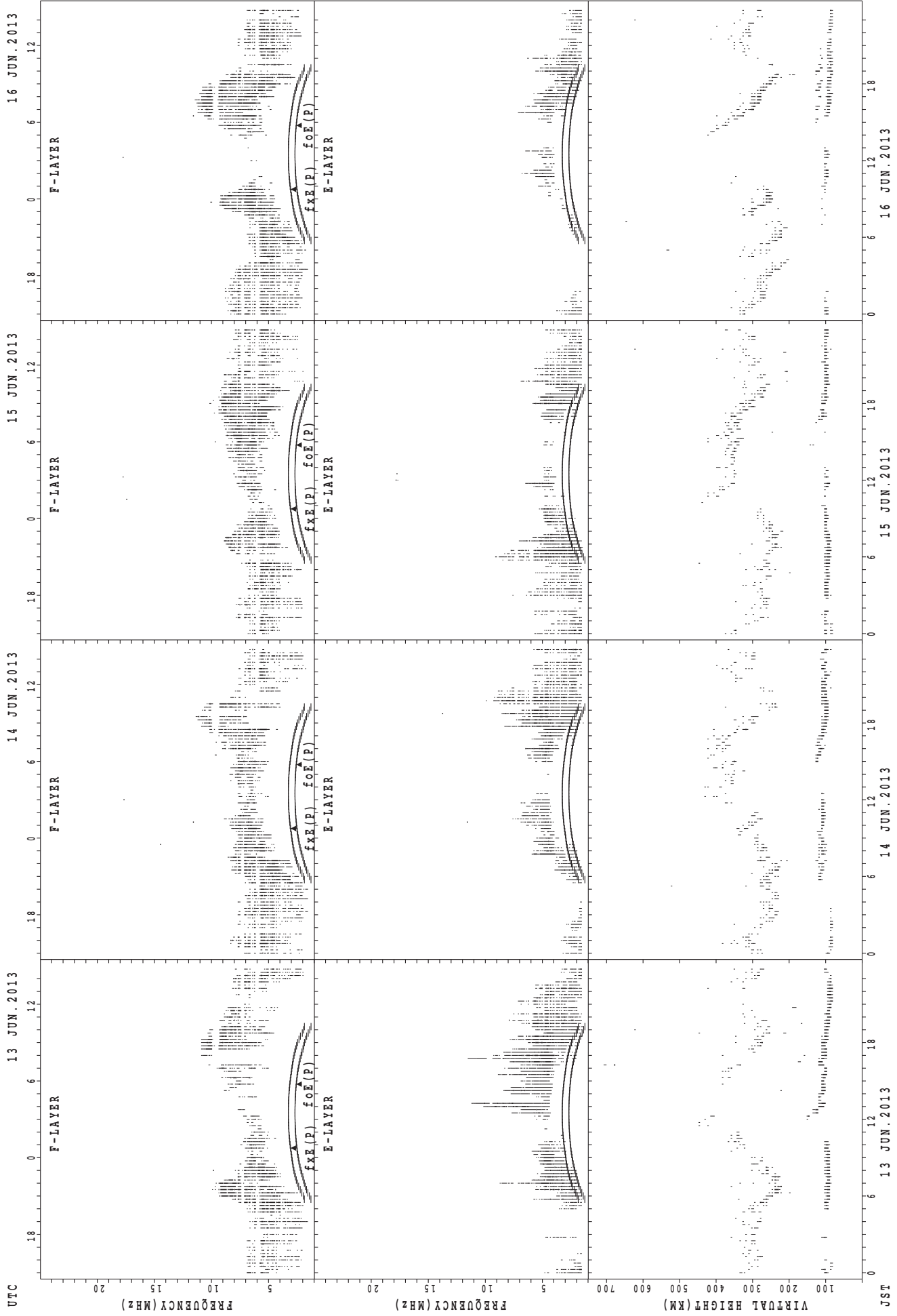
fxE(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



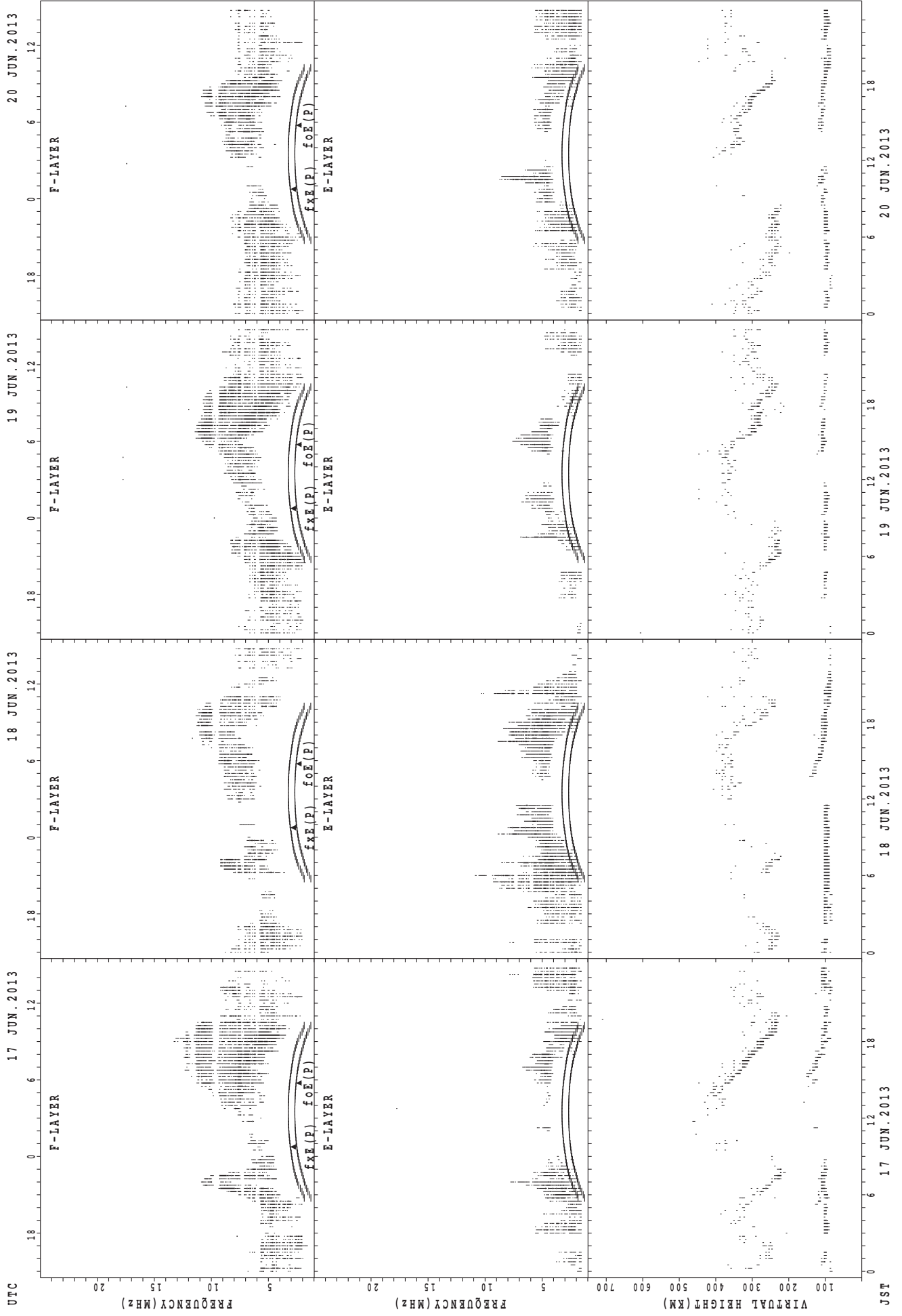
JST 9 JUN. 2013 10 JUN. 2013 11 JUN. 2013 12 JUN. 2013  
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
f<sub>o</sub>E(P); PREDICTED VALUE FOR f<sub>o</sub>E

SUMMARY PLOTS AT Okinawa



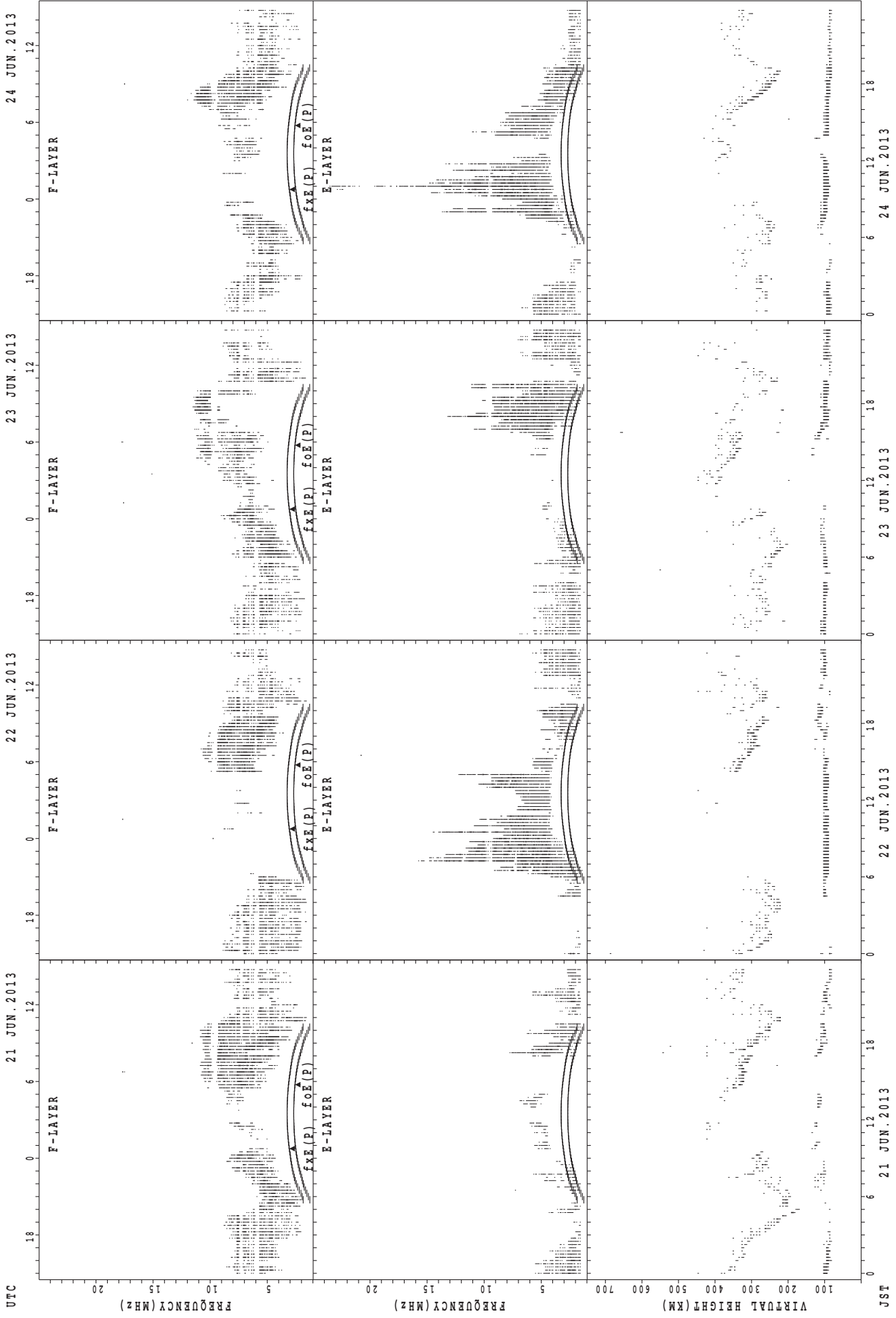
JST 13 JUN. 2013 14 JUN. 2013 15 JUN. 2013 16 JUN. 2013  
 $f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



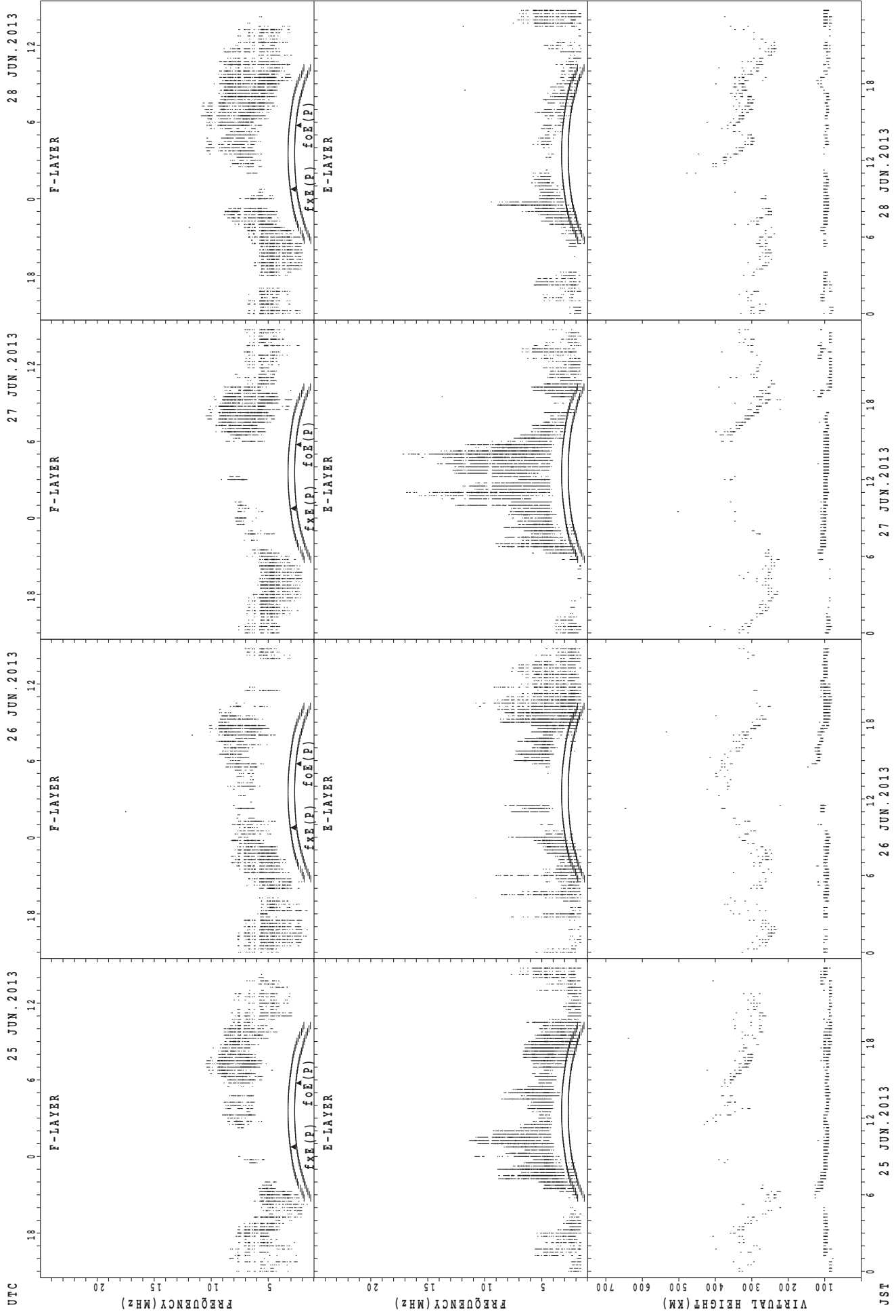
JST 17 JUN. 2013 18 JUN. 2013 19 JUN. 2013 20 JUN. 2013  
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

### SUMMARY PLOTS AT Okinawa



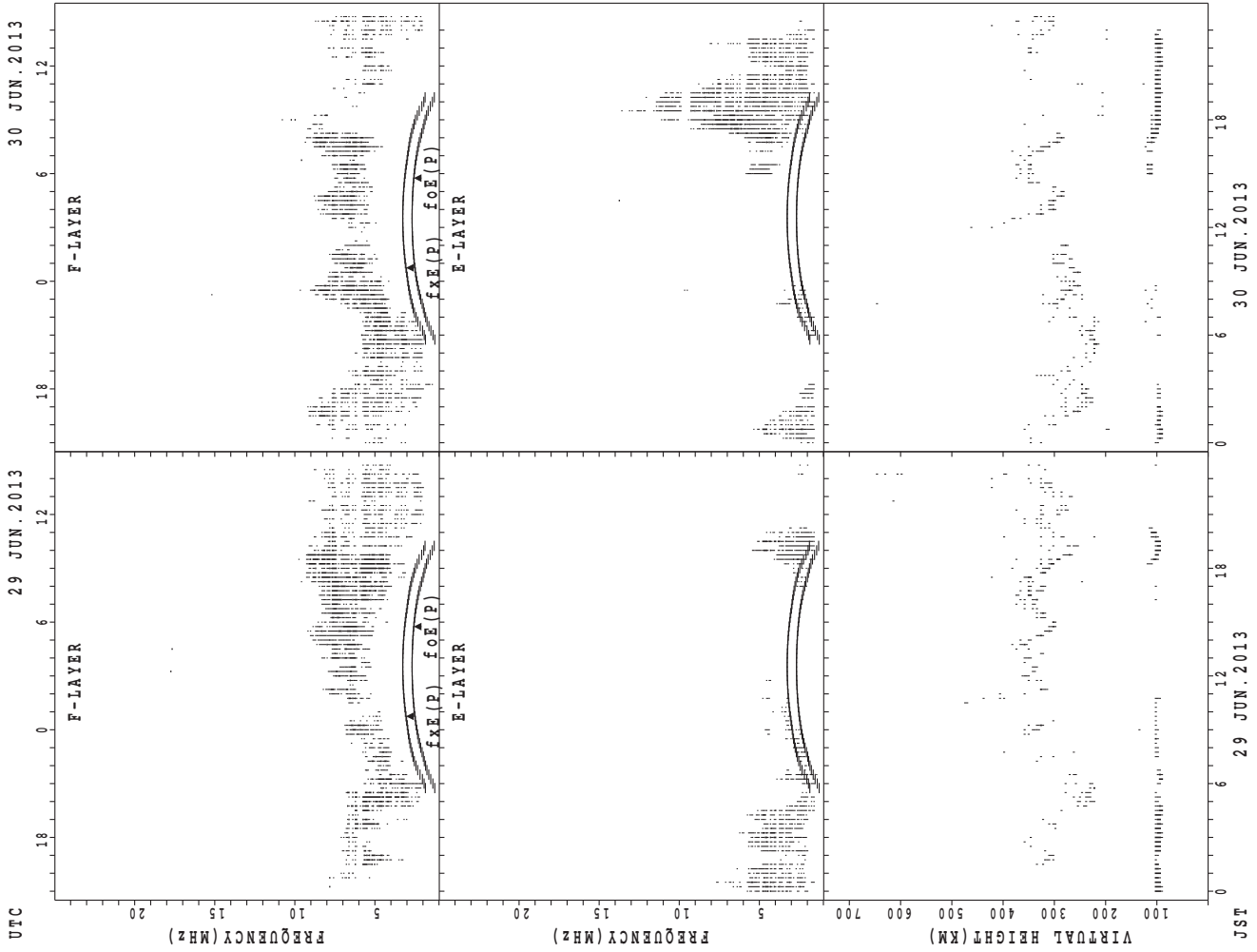
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

### SUMMARY PLOTS AT Okinawa



fx E(P); PREDICTED VALUE FOR fx E  
fo E(P); PREDICTED VALUE FOR fo E

### SUMMARY PLOTS AT Okinawa



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



MONTHLY MEDIANS OF h'F AND h'Es  
 JUN. 2013 135E MEAN TIME (UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	2	3	3	4	2	7	15											14	13	16	8	6	3	2
MED	307	316	316	325	313	312	296											302	298	279	283	296	308	315
U Q	320	318	320	339	322	322	340											336	318	299	285	316	326	334
L Q	294	298	306	317	304	286	276											286	278	269	278	280	290	296

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	20	21	21	20	30	29	29	29	30	29	27	27	29	29	30	30	29	30	26	26	27	29	26
MED	97	97	93	99	103	108	111	105	103	104	103	103	101	103	103	103	109	107	107	104	103	103	101	98
U Q	99	101	100	103	110	119	117	111	108	109	105	105	105	107	107	109	113	112	113	107	105	105	105	103
L Q	95	94	92	93	97	105	104	101	102	103	99	101	99	99	101	101	103	103	105	103	101	101	97	95

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	3		1	1	2	15	17										21	18	16	7	4	3	7
MED	318	338		326	336	311	282	268										296	275	264	288	314	318	320
U Q	159	406		163	168	320	312	289										324	288	285	300	356	344	344
L Q	159	318		163	168	302	246	259										279	268	255	276	262	302	304

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	25	23	28	22	24	27	27	27	25	25	21	20	21	22	18	21	28	30	24	24	22	23	25
MED	99	97	97	97	98	105	105	103	103	103	103	103	103	105	106	110	109	105	103	103	100	100	101	101
U Q	103	99	101	101	105	110	111	107	109	105	108	105	109	111	115	119	113	107	107	105	103	103	105	103
L Q	97	95	95	93	95	98	101	101	99	99	99	99	97	101	103	103	104	103	101	99	94	91	95	97

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	10	8	4	4	2	5	9	16	10									25	22	21	11	9	5	9
MED	340	317	292	304	323	326	276	256	287									294	279	270	270	314	312	354
U Q	354	336	341	337	378	370	309	273	306									305	296	288	286	337	333	382
L Q	318	307	256	272	268	240	233	246	246									276	254	259	238	280	299	311

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	27	24	25	20	30	29	28	30	28	29	27	25	26	28	29	30	30	27	27	27	28	28
MED	95	97	97	97	97	99	101	109	103	103	103	105	103	105	108	106	107	106	103	97	97	99	97	97
U Q	101	103	101	101	102	105	111	113	107	105	110	106	107	117	119	113	111	111	105	101	101	103	103	100
L Q	89	94	95	91	94	95	97	99	100	101	98	98	99	101	103	101	98	103	99	91	89	89	88	95

MONTHLY MEDIANS OF h'F AND h'Es  
 JUN. 2013 135E MEAN TIME (UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	4	8	5	3	3	3	16	12									26	26	17	13	6	3	10
MED	354	301	301	308	324	338	312	248	264									303	280	274	296	308	330	348
U Q	372	306	340	365	330	338	344	259	285									318	302	291	310	338	354	354
L Q	330	289	272	300	256	290	258	242	240									292	262	264	266	282	330	330

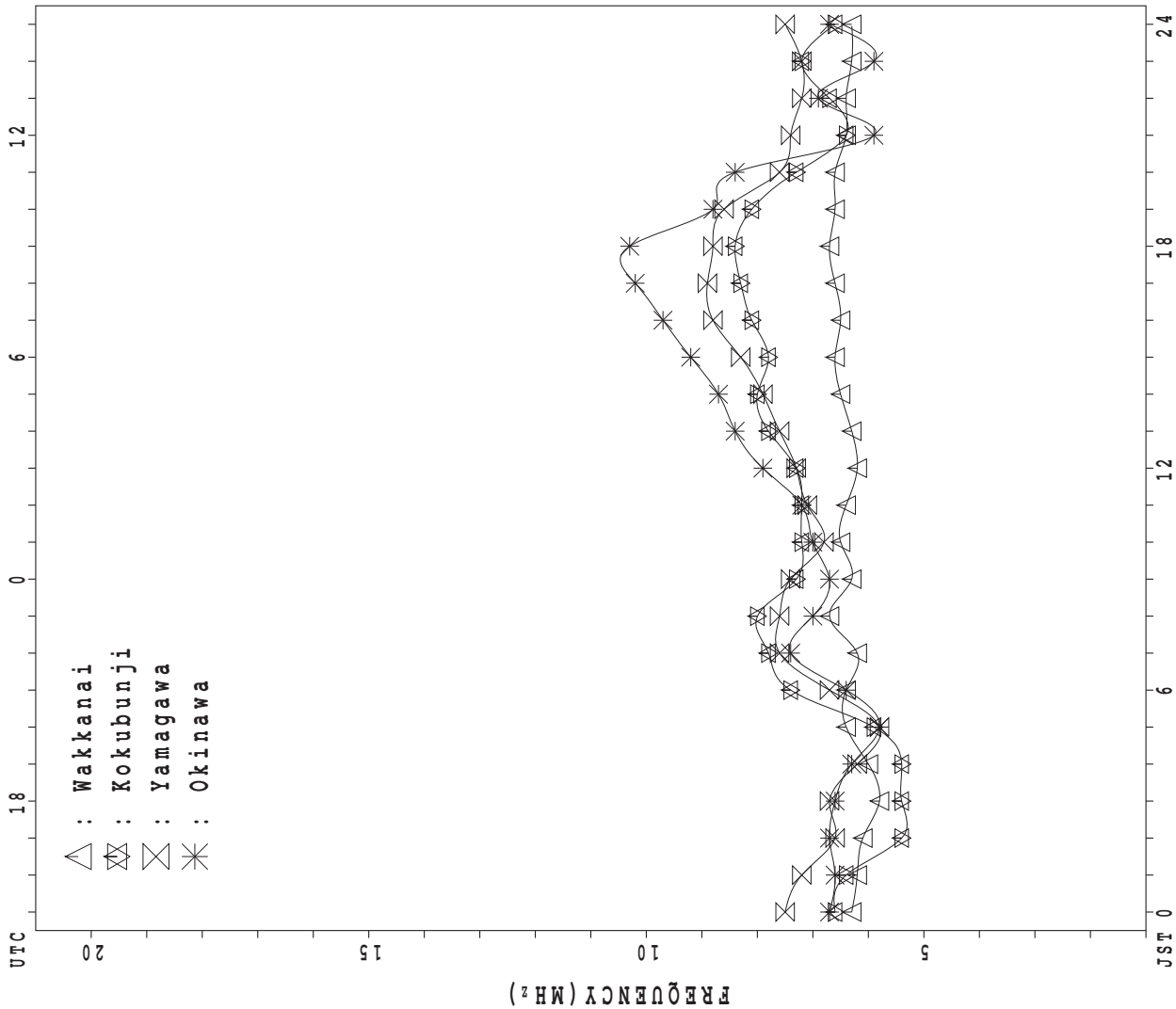
h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	22	17	16	16	16	17	27	24	22	22	22	13	14	14	23	25	27	28	29	25	22	22	25
MED	97	100	95	99	99	98	99	105	103	104	105	105	103	105	106	111	107	105	104	99	91	95	101	97
U Q	105	103	100	101	102	104	105	111	108	109	113	117	116	121	113	123	111	111	107	103	104	99	103	103
L Q	89	95	89	97	97	97	96	97	100	97	99	101	99	97	99	99	97	97	99	92	89	89	95	89

MONTHLY MEDIANS PLOT OF fOF2

JUN . 2013

AUTOMATIC SCALING



## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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	X 79	X 77	X 73	X 73																	X 75	X 70	X 69	X 67
2	66	46	X 64	X 55																	X 73	X 75	X 72	X 72
3	X 71	X 64	X 62	X 58																	X 72	X 73	X 73	X 74
4	X 72	X 66	X 64	X 61																	X 84	X 77	X 74	X 74
5	X 67	X 67	X 66	X 63																	X 82	X 79	X 76	X 74
6	71	70	X 67	X 66																	0 83	X 81	X 79	X 75
7	X 72	X 71	X 66	X 63																	X 59	A	X 58	X 57
8	X 56	X 52	A	56						Y											X 77	X 74	71	72
9	72	65	X 59	X 57																	X 79	X 88	X 87	X 76
10	X 67	X 63	X 61	X 59																	X 70	X 73	X 73	X 72
11	X 69	X 61	X 58	X 50																	X 81	X 77	X 73	X 69
12	X 64	X 60	X 64	X 63																	X 74	X 76	X 74	X 71
13	X 70	X 66	X 61	X 59																	X 81	A	X 85	X 87
14	73	73	70	70	70																X 84	X 82	X 81	X 77
15	X 75	X 74	X 72	X 71																	A	A	X 83	X 77
16	X 75	X 75	X 68	X 71																	X 84	X 86	X 77	X 74
17	X 72	X 67	X 64	X 63																	X 92	X 84	X 78	X 76
18	X 76	X 76	X 76	X 74																	X 76	X 73	X 76	X 75
19	0 76	X A	72	X 67																	X 81	X 83	X 83	X 83
20	X 80	X 77	X 76	X 69																	A	X 75	X 73	X 73
21	X 71	X 72	X 67	X 71																	X 80	X 90	X 81	X 77
22	X 74	X 74	X 74	X 71																	X 78	X 81	X 79	X 81
23	X 81	X 78	X 71	X 68																	X 82	X 81	X 82	X 82
24	X 79	X 77	X 72	X 70																	X 80	X 78	X 80	X 84
25	X 78	X 73	X 67	X 64																	X 76	X 79	X 82	X 81
26	X 78	X 73	X 63	X 61																	X 87	X 77	X 78	X 78
27	78	78	76	69	75																X 81	X 81	X 81	X 79
28	X 73	X 70	X 65	X 66																	X 83	X 88	X 88	X 83
29	X 78	X 71	X 60	X 63																		X 84	X 78	X 62
30	X 63	X 63	X 64	X 52																	X 64	X 66	X 59	X 60
31																								
	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	29	29	30	2																27	27	30	30
MED	X 72	X 71	X 66	X 64	72																X 80	X 79	X 78	X 75
U Q	X 78	X 74	X 72	X 70																	X 83	X 83	X 81	X 79
L Q	X 70	X 64	X 64	X 59																	X 75	X 75	X 73	X 72

JUN. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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	72	70	66	66	61	71	76	82	80	72	72	70	74	76		92	97	110	92	92	68	63	62	60	
2	54	39	50	48	49	58	64	70	63	63		62	58	51	52	54	56	54	57	58	66	68	65	65	
3	64	57	55	51	50	57	54	45			55	56	56	55	56	60	62	62	63	64	65	66	66	67	
4	65	60	58	54	54	64	67	62	64		63	61	63	58	60	60	62	62	68	74	76	70	67	66	
5	60	60	59	56	57	60	66	67	62	66	66	62	65	63	63	68	69	73	75	74	75	72	69	67	
6	64	62	61	59	58	66	72	77	74	66	68	63	63	63	62	65	71	78	71	81	76	74	73	68	
7	65	64	59	56	55	57	64										63	64	56	54	52		51	50	
8	49	46		45	50	56	59	59			45	49	51	47		57	57	56	57	60	70	67	64	64	
9	62	58	52	50	48	56	61	66	59	51		58	62		55	66	67	67	65	69	72	81	80	69	
10	60	57	54	52	51	57	64	63		63	60	58	63	65	65	67	74	71	76	65	63	66	66	65	
11	62	54	51	43	46	60	61	70	70	60	58					46				62	72	74	70	67	63
12	58	54	57	56	55	56	62	54	56	60	61	56	56	61	47	58	60	60	60	63	67	69	67	64	
13	63	59	54	52	56	68	75	86	94	70	67	64	63	62		63	62	65	66	72	73		78	78	
14	65	65	61	58	58	71	65	75			70	66	64	64	69	66	69	68	74	80	78	75	73	70	
15	69	67	65	64	64	68	73	74	87	81	74	72		62	64		66	66	71	73			76	70	
16	68	68	58	64	67	78	87	75	71	62	66	69	63	60	60	57	58	58	64	72	78	79	70	68	
17	65	60	57	56	53	58	62	64	74	74	71	70	70		66	67	68	71	75	84	85	77	71	69	
18	69	69	69	67	66	69	71	74	74	72	67	70	68		70	74	75	76	76	79	69	66	66	69	
19	69		58	58	70	80	92	75	75	62	66	69	74	75	74	68	74	75	75	74	76	76	76	76	
20	75	68	68	60	59	68	74	80	71	62	73	64	67		70	75	72	70	72	78		68	66	66	
21	64	65	60	64	67	66	67	75	70	68	75	68	65	70		71	71	71		76	73	83	74	70	
22	67	67	67	64	60	54	63		66	68	65	59		67	62	70	68	70	77	78	72	74	72	74	
23	74	71	64	61		60	65	72	69	63		62	68	67	73	73	71	78	78	74	75	75	75	75	
24	72	70	65	63	66	65	72						64	62	53	53	55	59	61	62	63	70	72	76	74
25	72	66	60	57	53	55	59	60	54	56	56	58			64	61	59	61	62	63	70	72	76	74	
26	72	66	57	53	52	54	66	74	82	75	72	76	72	67	66	68	61			71	80	75	71	72	
27	67	64	64	62	64	70	66	74	68	68	70	66	67	67	67	69	68	62	62	72	74	74	74	72	
28	66	63	58	61	58	68	75	77	71	75	81	77	69	68	73					68	71	77	81	80	77
29	71	64	53	51	44	47	52	61	60	53	61	68	75	70	71	74	74	78	77	87	88	77	71	55	
30	56	56	48	42	44	48	54	40			44		47	47	43	49	51	50	50	51	57	56	52	53	
31																									
	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	29	29	30	29	30	30	27	23	23	25	26	25	23	24	27	28	27	28	30	28	27	30	30	
MED	65	64	58	56	56	60	66	72	70	66	66	64	64	63	64	66	68	67	68	72	73	72	71	68	
U Q	69	67	64	62	60	68	72	75	74	72	72	69	68	67	70	71	71	73	75	78	76	76	74	72	
L Q	62	58	54	52	50	56	62	62	63	62	60	59	62	60	58	58	60	61	62	65	68	68	66	65	

JUN. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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	L		A	A	A	A	A	A	A	A	U	A	A	A						
2						A	A	U	A	A	A	U	A	U	A	A	U	R	U	L					
3							L	U	L	A	A	A	R												
4					L		U	L	A		A	R	U	A	A	A	U	L	U	L					
5					U	L	U	L	U	A	L	L	U	L											
6					3	8	4	4	2	4	L	A	A	A	A	A	L	A	A	A					
7					L	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A					
8						A	R	R	B	Y						A	A		A	A	A				
9					U	L		L		R	A	A	U	A	A					A	A	A			
10					L	L		A	A	A		A	A		U	R	U	A	U	A					
11					L	A	A	A		4	8	0					4	6	0						
12					L	L	L	A	A	U	A	A	A	R	A				L	L					
13					L	Y	U	A	A	U	A			A	A				U	L					
14					L	A	A	A	A	A	U	A	A		U	A			A						
15					U	L	L	L	A	A	U	A	A	A	A	A			L	U	L	A			
16					A	A	U	A	L	A	A	R	A	A	A	A	L	L	L	A					
17					L	L	L	A	A	A	A	L	A	A	A				L	A	A				
18					L	L	L	L	A	A	A	A	A	A	A				A						
19					A	U	L	L	A	A	A	A	R	A	U	A	R	A	A	L	A				
20					L	A	A	U	A	U	A	L	R	A	A	U	A	A	A	A	L				
21							L	L		L			B	Y	A				A	A	A				
22						A	A		R	R			U	A	R		U	A	A	U	L	L			
23					A	L	U	A	L	U	L	A	U	R	U	L			L	U	L				
24					A	U	A	A	A	A	A	A	A	A	A				L	L	L	A			
25					3	4	8	3	9	2	4	2	4	R	A				L						
26						A	U	A	A	A	L								A	A	L				
27					L		L	L	A		A	A	A						L	A					
28						L	L	L	A				R	U	A	A			A	A	A				
29						A	U	A	A	A	L		R						L	L	L				
30					U	L	A	A	A	A	A	R	A	U	Y	U	R	A	A	L					
31					2	7	6				4	4	4	3	2	4	3	2		3	7	6			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT					3	9	12	15	10	10	17	17	13	13	14	21	21	15	9						
MED					U	L	L												L	L					
U Q					2	9	6	4	2	4	4	4	4	4	7	2	4	8	8	4	4	8	3	9	4
L Q					U	L		U	A										L	L					
					2	7	6	3	5	6	4	0	4	2	4	4	3	6	4	6	0	4	6	4	7

JUN. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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					176	236	276	304	344	360		U A	U A	U A	U A	A	340	316	280		A			
2					A	236	260	292	324	344	348	U A	U A	U A	U A	340	304	276	224		A			
3					180	208	260	308	340	352	376		U A	U A	U A		312	288	224		A			
4					A	224	284	304	336	344	380	R	U R	380	376	364	348	320	280	224		A		
5					A	U A	268	U A	A	A	A	U A	U A	R		364	360	324	280	240		A		
6					A	240	276	300	332	356	368	U A	U A	A	U R		356	340	316	276	228		A	
7					168	224	272	304		A	A	A	U A	A	A		A		A	A	A			
8					A	A	A	A	B	A	A	A	U A	U A	364	336	304	276	232		A			
9					156	228	276	308	324		A	A	A	A	A		344	316	272	224		A		
10					168	232	268	308	332	356	364	U A	U A	U A	352	328	308	272	232		A			
11					A	224	264	296	332	348	360	U A	U A	A	A		324	312	268	220		A		
12					168	216	272	304	324	344	U A	U A	U A	U A	A		A		A		A			
13					156	220	272	304	324	344	364	U A	U A	U A	U A		316	296	232		A			
14					A	232	300	308	332	344	348	A	A	A	A		344	324	292	240		A		
15					160	208	260	312	328	336	344	A	U A	U A	U A		372	340	312	284	240		A	
16					A	U A	252	276	324	340	352	R	U A	A	A	A		316	280	244		A		
17					A	280	328	344	356	360	A	A	A	A	A		328	292	240		A			
18					B	U A	284	A	U A	U A	A	A	A	U A	U A		A	A	A	A	A			
19					A	U A	U A	U A	U A	A	A	A	U R	372	348	320	284			A	A			
20					A	U A	U A	U A	A	A	A	A	U A	U A	U A		316	288	228		A			
21					A	U A	224	272	308	336	360	372	380	B	R		384	348	336	280		A		
22					A	240	284	332	348		A	A	A	A	A		356	336	324	276	228		A	
23					A	228	276	320	344	364	A	A	A	A	A		360	344	316	276	240	U R		
24					A	216	284	308	336		A	A	A	A	A		348	328	296	248		A		
25					A	236	280	308	324		A	A	A	A	A		332	320	304	236	U A			
26					C	236	284	312	328	344	360	U A	U A	U A	A	A		360	320	280	248	188		
27					A	U A	U A	U A	U A	U A	U A	A	A	A	A	U A		332	316		U A	U A		
28					A	240	280	312	324	U A	U A	U A	A	A	U A		384	404	348	304	276		A	
29					A	228	256	288	332	336	340	R	356	364	348	336	328	312	284	228	168	B		
30					R	A	260	276		A	A	A	A	360	352	344	336	308	276		A	A		
31					192																			
	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	28	28	28	25	19	18	12	13	15	20	27	29	27	23	4				
MED					168	228	276	308	332	348	360	368	372	368	356	340	316	280	232	170				
U Q					176	236	282	312	340	356	372	378	380	376	364	348	320	288	240	180				
L Q					160	224	268	302	324	344	348	360	364	352	346	332	310	276	224	162				

JUN. 2013 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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 15	B 15	E 15	B 12	E 23	J 32	J 34	A 38		J 63	J 77	J 67	J 88	J 63	J 115	J 93	J 56	J 46	J 82	J 37	J 31	J 49	J 52	J 27	J 23
2	J 71	J 94	J 54	J 63	J 62	J 44	J 95	J 191	J 41	J 57	J 61	J 53	J 46	J 47	J 42	G	J 35	J 37	J 34	J 40	J 27	J 27	J 26	J 16	
3	J 25	J 15	J 14	J 13	J 18	J 24	J 32	J 44	J 65	J 63	J 51	J 42	J 43	J 49	J 44	J 36	J 32	J 40	J 34	J 33	J 60	J 12	J 53	J 49	
4	J 35	J 29	J 25	J 21	J 28	J 24	J 39	J 66	J 43	J 90	G	J 46	J 46	J 45	J 56	J 38	J 37	J 43	J 41	J 49	J 31	J 28	J 30	J 37	
5	J 30	J 25	J 20	J 20	J 27	J 33	J 34	J 45	J 39	J 42	J 47	J 40	J 40	J 25	J 40	J 52	J 61	J 48	J 46	J 47	J 51	J 44	J 35	J 46	
6	J 32	J 52	J 63	J 51	J 38	J 26	J 40	J 65	J 58	J 68	J 44	J 61	J 41	J 65	J 42	J 41	J 68	J 43	J 43	J 56	J 49	J 43	J 34	J 20	
7	J 27	J 13	J 18	J 24	J 18	J 59	J 63	J 136	J 101	J 61	J 58	J 83	J 62	J 77	J 154	J 121	J 101	J 66	J 47	J 40	J 30	J 109	J 55	J 36	
8	J 31	J 31	J 70	J 28	J 31	J 50	J 65	J 53	B	J 40	J 40	G	J 42	J 43	J 69	J 65	J 97	J 63	J 67	J 48	J 54	J 31	J 71	J 67	
9	J 52	J 24	J 45	J 31	J 20	J 34	J 36	J 42	J 52	J 51	J 57	J 75	J 55	J 111	J 48	J 57	J 53	J 67	J 67	J 55	J 30	J 40	J 47	J 17	
10	E 14	B 14	E 16	B 13	G	J 27	J 35	J 53	J 68	J 51	J 42	J 65	J 65	J 56	J 43	J 51	J 61	J 30	J 32	J 58	J 30	J 30	J 31	J 31	
11	J 25	J 30	J 25	J 31	J 33	J 28	J 46	J 60	J 60	J 51	J 53	J 65	J 114	J 83	J 69	J 41	J 65	J 116	J 71	J 69	J 40	J 35	J 20	J 14	
12	E 14	B 20	E 14	B 12	G	J 28	J 32	J 47	J 67	J 51	J 44	J 55	J 55	J 49	J 50	J 35	J 30	J 29	J 25	J 26	J 27	J 17	J 17	J 19	
13	J 41	J 51	J 21	J 17	G	J 27	J 36	J 49	J 59	J 55	J 52	J 59	J 61	J 59	J 66	J 55	J 62	J 37	J 33	J 64	J 60	J 76	J 63	J 58	
14	J 64	J 63	J 43	J 40	J 28	J 28	J 55	J 71	J 88	J 91	J 69	J 59	J 55	J 39	J 52	J 43	J 40	J 78	J 42	J 34	J 31	J 46	J 46	J 36	
15	J 51	J 25	J 33	J 12	G	J 24	J 31	J 42	J 55	J 61	J 65	J 65	J 87	J 60	J 89	J 88	J 40	J 36	J 41	J 50	J 95	J 83	J 58	J 63	
16	J 40	J 86	J 32	J 27	J 26	J 51	J 59	J 54	J 53	J 63	J 46	J 40	J 61	J 94	J 54	J 37	J 45	J 54	J 45	J 65	J 55	J 59	J 52	J 57	
17	J 59	J 25	J 31	J 14	G	J 27	J 33	J 53	J 53	J 66	J 73	J 50	J 59	J 67	J 62	J 45	J 44	J 54	J 55	J 48	J 37	J 57	J 44	J 33	
18	J 27	J 22	J 17	J 17	J 18	J 26	J 35	J 57	J 53	J 63	J 61	J 67	J 85	J 118	J 65	J 46	J 41	J 56	J 63	J 59	J 55	J 104	J 49	J 73	
19	J 72	J 100	J 76	J 89	J 64	J 51	J 45	J 65	J 66	J 75	J 109	J 79	J 46	J 65	J 51	J 43	J 44	J 41	J 67	J 26	J 25	J 63	J 31	J 27	
20	J 44	J 44	J 49	J 19	J 20	J 57	J 47	J 47	J 43	J 41	J 42	J 57	J 107	J 114	J 53	J 67	J 67	J 109	J 30	J 63	J 86	J 43	J 43	J 36	
21	J 29	J 28	J 28	J 23	J 25	J 33	J 32	J 36	J 38	J 44	J 60	J 44	J 48	J 35	J 100	J 72	J 51	J 52	J 94	J 32	J 33	J 42	J 23	J 24	
22	J 36	J 59	J 31	J 26	J 25	J 45	J 60	J 65	J 41	J 40	J 51	J 41	J 68	J 54	J 46	J 43	J 57	J 61	J 43	J 24	J 23	J 19	J 30	J 33	
23	J 44	J 37	J 30	J 37	J 68	J 36	J 34	J 47	J 38	J 43	J 123	J 74	J 44	J 41	J 45	G	J 50	J 37	J 27	J 21	J 22	J 19	J 26	J 41	
24	J 23	J 23	J 30	J 37	J 59	J 41	J 61	J 96	J 59	J 66	J 91	J 95	J 102	J 57	J 41	J 32	J 32	J 32	J 32	J 49	J 36	J 33	J 37	J 19	
25	E 14	B 14	B 20	J 31	J 46	J 31	J 37	J 37	J 62	J 43	J 43	J 50	J 67	J 69	J 55	J 35	J 39	J 40	J 50	J 50	J 33	J 44	J 29	J 61	
26	J 46	J 19	J 30	J 35	J 25	J 37	J 49	J 51	J 57	J 66	J 44	J 43	J 47	J 59	J 54	J 39	J 44	J 87	J 71	J 28	J 15	J 96	J 62	J 78	
27	J 61	J 33	J 26	J 19	J 19	J 29	J 42	J 43	J 54	J 42	J 66	J 72	J 61	J 56	J 57	J 36	J 34	J 33	J 51	J 67	J 52	J 24	J 24	J 24	
28	E 14	B 21	J 13	E 14	G	J 17	J 24	J 32	J 37	J 39	J 39	J 39	J 39	J 36	J 58	J 49	J 89	J 88	J 170	J 68	J 55	J 31	J 40	J 59	J 84
29	J 49	J 29	J 65	J 56	J 31	J 42	J 37	J 60	J 61	J 49	G	J 39	J 41	J 39	G	J 51	J 63	J 36	J 45	J 15	J 14	J 14	J 14	J 25	
30	J 32	J 53	J 37	J 24	J 20	J 40	J 51	J 41	J 90	J 52	J 40	J 44	J 39	J 40	J 43	J 46	J 44	J 58	J 77	J 23	J 12	J 54	J 53	J 38	
31																									
	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	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	J 34	J 28	J 30	J 24	J 25	J 32	J 38	J 52	J 57	J 54	J 52	J 56	J 55	J 58	J 52	J 44	J 46	J 50	J 45	J 48	J 33	J 42	J 36	J 36	
UQ	J 49	J 51	J 43	J 35	J 31	J 42	J 51	J 65	J 64	J 66	J 65	J 67	J 65	J 69	J 65	J 56	J 62	J 66	J 67	J 56	J 52	J 57	J 53	J 57	
LQ	E 25	B 21	B 20	E 17	B 18	G 27	J 34	J 43	J 43	J 43	J 43	J 43	J 44	J 45	J 44	J 37	J 40	J 37	J 34	J 31	J 27	J 28	J 27	J 24	

JUN. 2013 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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 15	B 15	E 15	B 12	E 16	G 27	29	35	53	59	66	65	54	60	A 93	A 50	40	46	28	23	20	22	E 14	B 18	
2	14	E 12	B 32	E 34	B 34	G 38	48	44	40	50	A 61	A 52	44	46	38	G 34	34	29	33	16	17	16	E 15		
3	E 15	B 15	E 15	B 15	E 14	G 23	28	39	A 65	A 63	A 47	40	39	43	40	G 36	G 28	G 39	G 20	G 27	E 24	B 12	E 17	B 12	
4	E 13	B 14	E 15	B 20	E 19	G 17	34	48	40	A 90	G 41	40	40	48	37	34	31	29	44	18	18	19	19		
5	17	17	17	E 12	B 17	G 25	28	44	36	36	45	36	37	G 20	G 38	40	55	45	39	25	24	24	25	40	
6	27	27	54	30	30	G 18	36	62	53	54	40	43	U 39	Y 51	41	40	45	33	32	48	34	32	19	18	
7	18	E 14	B 13	E 13	G 51	51	A 136	A 101	A 61	A 58	A 83	A 62	A 77	A 154	A 121	49	41	40	25	23	A 109	A 22	28		
8	21	27	A 70	A 23	23	38	30	30	B 38	U 38	Y 38	A 57	56	48	A 111	44	38	38	50	50	47	18	26	25	25
9	E 14	B 14	E 16	B 17	E 18	27	32	34	34	40	A 57	56	48	111	44	38	38	56	48	52	26	30	21	E 15	
10	E 14	B 14	E 16	B 13	G 24	30	43	A 68	A 48	40	50	44	48	40	46	46	29	25	31	25	18	22	21		
11	21	20	20	24	23	25	43	46	50	45	52	65	114	83	69	39	E 65	B 116	A 47	34	24	30	E 14	B 14	
12	E 14	B 14	E 14	B 12	G 24	30	42	47	46	41	48	50	44	44	32	G 27	G 22	24	23	19	E 15	E 15	B 12		
13	32	29	E 15	B 17	G 25	29	44	52	49	44	44	58	44	A 66	50	37	33	30	52	44	A 76	47	47		
14	40	29	20	20	20	G 23	39	48	A 88	A 91	65	51	53	37	47	G 24	G 30	51	36	23	22	25	25	32	
15	22	E 12	B 15	E 12	G 24	28	39	48	52	48	52	A 87	51	56	A 88	37	32	32	44	A 95	A 83	42	54		
16	30	18	E 14	B 16	E 18	46	52	44	43	56	44	40	49	53	53	31	35	38	37	46	46	47	27	42	
17	27	18	18	E 14	G 22	32	47	51	59	59	43	53	A 67	58	43	43	44	44	36	26	26	28	22		
18	18	E 12	B 12	E 12	G 17	24	28	34	49	57	53	64	64	118	58	43	38	35	41	32	32	30	25	28	
19	A 63	A 100	E 14	B 42	42	26	30	51	54	58	59	62	U 42	Y 58	46	41	40	34	44	20	E 12	B 44	28	21	
20	22	20	20	E 14	B 14	50	40	42	43	40	40	51	60	114	48	58	58	58	24	35	A 86	30	25	24	
21	18	18	18	17	18	26	30	32	37	41	42	42	E 48	B 34	U 100	A 54	48	48	A 94	A 26	24	24	17	16	
22	29	37	25	19	18	33	46	A 65	A 37	37	40	40	A 68	50	U 45	40	41	53	23	19	E 13	B 15	24	24	
23	43	34	18	18	A 68	34	30	42	37	39	A 123	54	41	40	42	G 35	G 33	26	17	18	E 14	B 18	34		
24	17	17	22	29	49	36	58	A 96	A 59	A 66	A 91	A 95	56	56	40	31	30	30	30	44	26	28	26	E 12	
25	E 14	B 14	E 14	B 16	E 29	28	31	U 36	Y 48	38	38	45	A 67	A 69	52	G 24	37	33	32	28	E 12	B 24	17	23	
26	27	17	17	18	E 23	30	43	43	52	55	43	43	44	51	50	39	38	A 87	A 71	17	G 12	B 45	45	45	
27	45	25	18	E 14	B 17	26	34	35	45	41	56	56	54	45	45	35	G 28	A 27	A 48	44	18	18	17	E 16	
28	E 14	B 14	E 14	B 14	E 15	E 22	G 25	G 29	34	33	35	U 37	Y 34	50	47	A 89	A 88	A 170	60	27	20	24	40	30	
29	33	18	18	E 12	B 22	39	37	56	42	48	G 38	38	36	G 48	58	31	31	G 15	B 14	B 14	B 14	B 19			
30	24	30	24	16	G 16	34	46	36	A 90	A 52	38	A 44	U 38	39	39	42	36	40	25	18	E 12	B 29	40	22	
31																									
	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	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	21	18	17	16	18	26	32	43	48	50	44	46	48	50	47	40	38	38	32	30	22	26	23	22	
U Q	29	27	20	20	23	34	43	48	A 54	A 58	A 58	A 56	A 58	A 60	A 58	48	46	50	44	44	26	30	27	30	
L Q	E 15	B 14	E 15	B 13	G 24	30	36	40	40	40	40	41	40	41	41	G 35	G 35	33	28	23	E 18	B 18	17	E 16	

JUN. 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL 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	15	15	15	12	12	12	12	14	14	12	15	15	15	18	16	16	15	15	13	13	14	14	14	14
2	12	12	12	12	12	13	13	12	14	15	19	24	21	18	17	16	16	16	16	16	10	10	15	15
3	15	15	15	15	11	11	11	11	14	15	13	16	20	17	18	16	16	16	13	13	13	12	12	12
4	13	14	14	14	14	14	14	13	14	13	16	16	16	16	16	16	16	16	16	14	11	11	12	12
5	12	12	12	12	12	12	12	12	12	13	13	28	22	16	16	16	16	16	15	13	12	12	14	14
6	12	14	14	13	12	12	12	14	14	17	17	14	14	15	15	13	13	14	15	14	14	14	14	14
7	14	14	13	13	13	12	11	11	11	14	19	15	13	16	12	12	11	11	11	11	14	14	14	14
8	14	14	14	14	16	14	14	14	B	21	22	22	22	17	16	16	15	15	13	13	13	12	12	13
9	14	14	13	13	13	13	13	13	13	14	18	17	21	17	16	16	16	16	16	12	15	15	15	15
10	14	14	16	13	13	13	13	13	13	12	18	20	21	17	17	16	16	14	12	12	12	12	14	14
11	13	14	14	14	14	14	13	13	13	12	17	16	16	17	16	16	16	15	12	12	14	14	14	14
12	14	14	14	12	12	12	15	15	15	15	16	16	20	20	17	16	16	18	18	17	15	15	15	10
13	14	14	15	17	12	11	9	12	16	16	18	17	17	17	17	16	16	16	13	13	14	12	12	12
14	12	12	12	12	14	10	13	13	13	12	14	16	20	18	17	15	15	15	14	14	12	15	15	15
15	12	12	12	12	12	12	12	12	13	12	12	16	22	19	18	15	15	15	11	11	11	11	11	11
16	14	14	14	13	12	12	12	12	12	10	19	18	26	21	14	14	14	14	14	13	12	11	11	11
17	11	12	14	14	14	12	12	12	12	14	18	18	20	25	20	15	15	15	14	13	10	10	11	11
18	12	12	12	12	15	15	15	14	14	14	14	17	19	20	13	12	11	10	10	13	12	12	13	12
19	12	12	14	14	14	14	15	15	12	12	12	12	12	12	16	16	12	12	12	12	12	12	12	12
20	14	14	14	14	12	11	11	11	18	17	17	30	22	22	15	15	14	14	14	14	16	14	14	14
21	13	12	12	12	12	12	12	12	12	12	14	14	48	29	21	18	17	17	15	15	15	15	14	14
22	12	12	12	12	12	12	12	12	12	14	14	13	20	18	18	15	16	13	13	11	13	12	12	12
23	13	13	13	13	14	11	11	11	11	11	11	11	14	19	18	18	12	12	12	12	12	14	14	14
24	12	12	12	14	14	14	15	15	15	15	17	20	17	17	17	17	16	16	16	13	10	12	12	12
25	14	14	14	14	13	12	12	12	12	12	15	15	20	20	18	15	16	16	16	14	12	12	12	12
26	15	15	15	12	E C 23	11	11	16	12	12	15	15	14	20	16	16	16	15	10	13	12	12	11	14
27	14	14	14	14	14	14	14	14	12	12	16	15	15	26	18	18	14	12	12	12	16	16	16	16
28	14	14	14	14	13	E C 22	11	11	13	16	16	19	21	21	18	17	10	10	10	11	13	13	12	12
29	12	12	12	12	12	12	12	12	12	17	16	16	17	17	18	16	15	15	15	15	15	14	14	14
30	14	14	12	12	12	12	12	12	15	16	16	20	18	17	16	16	17	16	16	12	12	12	11	11
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	14	14	14	13	12	12	12	12	13	14	16	16	20	18	17	16	16	15	14	13	12	12	14	14
U Q	14	14	14	14	14	14	13	14	14	15	18	19	21	20	18	16	16	16	15	14	14	14	14	14
L Q	12	12	12	12	12	12	12	12	12	12	14	15	16	17	16	15	14	14	12	12	12	12	12	12

JUN. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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	301	297	308	309	291	292	320	U R	R	U R	A	A	315	304	284	A	R	288	295	320	324	278	275	275	282		
2	311	275	271	278	276	252	261	256	268	270	A	256	246	240	266	273	288	282	301	297	272	273	283	284			
3	288	260	275	278	293	309	301	348	A	A	A	U R	269	264	275	264	296	288	302	287	298	299	285	292	289	285	
4	289	282	295	304	286	299	295	310	V	A	288	277	298	294	285	288	285	290	300	317	310	284	282	284			
5	290	292	296	295	303	287	318	326	356	288	309	302	303	279	311	300	295	310	328	313	310	313	287	287			
6	296	287	293	283	284	293	307	297	311	V	A	316	287	289	303	288	275	294	307	300	300	329	317	294	283		
7	279	285	278	284	271	260	280	A	A	A	A	A	A	A	A	A	289	324	279	289	277	A	282	286			
8	286	271	A	276	292	285	268	297	B	Y	G	U R	242	268	R	A	280	291	299	299	306	290	291	279	272		
9	285	286	282	286	289	298	314	302	337	320	A	A	280	308	R	A	U R	287	299	301	317	304	302	304	289	313	310
10	310	287	305	292	277	303	310	319	A	A	A	A	A	A	A	A	289	324	279	289	277	A	282	286			
11	308	303	323	295	285	308	287	305	307	299	R	A	A	A	A	A	G	A	A	303	309	303	294	299	282		
12	293	306	301	310	312	287	334	302	290	284	299	289	285	296	317	302	290	299	328	310	308	301	301	304			
13	294	291	294	281	295	301	308	R	305	345	314	298	302	315	A	309	303	302	309	286	321	A	301	311			
14	305	299	303	309	307	284	362	328	R	A	A	323	314	296	286	299	311	301	A	287	306	315	314	312	309		
15	291	299	298	305	311	324	293	310	R	R	323	329	R	A	302	314	A	308	297	295	303	A	A	293	319		
16	301	A	299	293	292	305	316	332	359	A	305	298	316	287	283	294	280	284	287	295	307	294	302	302			
17	299	299	301	315	313	308	314	303	311	329	327	303	313	A	290	299	298	299	322	315	309	295	318	301			
18	286	287	288	298	304	292	302	314	341	321	300	301	297	A	298	296	308	325	328	313	289	302	290	284			
19	285	A	286	276	275	280	R	R	U R	U R	282	334	282	293	305	303	309	307	296	322	318	330	313	293	292	293	
20	289	294	294	297	302	293	329	R	354	317	298	284	296	A	283	307	306	307	296	333	R	A	286	276	279		
21	280	277	272	300	292	318	291	358	A	375	290	324	279	262	276	A	287	288	291	A	309	310	308	290			
22	277	258	282	294	314	299	307	A	293	304	305	286	A	300	270	305	284	289	309	319	300	291	303	294			
23	294	298	300	298	A	303	298	318	326	312	A	281	288	284	286	309	289	305	323	301	294	292	300	305			
24	286	302	297	281	275	278	309	A	A	A	A	A	304	274	256	270	268	292	297	297	294	293	286	281			
25	291	276	272	267	273	270	295	293	A	261	257	261	A	A	302	279	284	312	311	289	302	285	270	280			
26	305	304	314	287	290	294	291	296	318	309	307	330	339	277	283	305	311	A	A	291	301	267	284	315			
27	315	320	295	302	310	306	320	R	329	292	301	335	284	288	315	300	320	311	309	290	306	295	295	295	303		
28	296	279	284	270	302	278	309	332	U R	R	325	312	298	315	A	A	A	314	298	299	286	285	296				
29	298	288	276	264	294	275	277	274	A	J R	296	306	319	270	345	312	296	296	297	304	314	317	303	302	294	253	
30	276	268	290	281	278	274	261	299	R	A	A	A	G	A	U R	Y	G	R	286	301	300	292	291	295	287	278	
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	30	28	29	30	29	30	29	23	21	19	23	26	25	23	24	25	28	26	28	30	28	26	30	30			
MED	292	288	294	292	292	293	307	310	311	304	305	286	297	287	290	299	294	302	304	306	302	292	291	288			
U Q	301	299	300	300	304	303	315	328	342	320	319	302	306	302	301	306	302	310	319	315	310	295	301	303			
L Q	286	278	282	281	281	280	291	297	292	290	288	279	284	276	283	284	288	292	298	297	292	286	284	282			

JUN. 2013 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUN.2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'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	L			A	A	A	A	A	A	A	A	A					
2								A		A	A	A	A	A		A	U	R						
3								L	U	L		A	A	A										
4						L				A	A	A	R		A									
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
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24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						3	8	10	8	7	8	14	13	8	10	10	17	18	14	8				
MED						U	L	L																
U Q						303	348	358	376	381	401	398	388	386	354	372	372	364	342	336				
L Q						U	L	L	L															
						313	355	368	378	388	416	407	402	400	375	385	380	372	358	348				
						L	L	L	L															
						301	337	350	366	355	382	379	367	366	340	361	353	352	336	332				

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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						286	276	270	270		A E A	A		A	A	358	300	300	246					
2						A E A	A				A			A										
3						406	418	408	412	392		502	490		492	450	398	386	340					
4						284	304	E A	A	A	A	464	438	486	382	382	364	340	298					
5					324		312	318	336		A			Y										A
6						324	284	284	268	342	318	344	330	414	352	352	352	302	286					
7						332	302	E A	A	A	A	A	A	A	A	A	A	A	A					A
8						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
9						322	364																	
10						344	388	388		B	Y	G			G	A E A	A	E A E A	E A	E A	E A	E A		
11						326	326	326	320	E A	A	A	A		A	A	A	A	A					
12						336	336	332	320		A	340	336	434	396	352	376	356	338	288	274			
13						280	354	314	314	362		A	A		A	A	G	A	A					326
14						266	316	268	364	394	394	354	404	416	382	E A	A	376	358	328	298			
15						288	288	294	294	258	308	366	370	334		A	334	334	328	300	340			
16						304	242	270		A	A	A		E A	A									
17						260	302	L	298	288	270	284	284		A	376	356		344	344	304	304		
18						298	278	274	252		A	358	350	338	E A	E A	E A	358	374	374	324	308		
19						278	278	346	306	306	306	328	310		A	E A	A	374	346	340	318	288		
20						286	302	294	294	294	294	308	384	384		A	A	346	338	302	292	292		
21						E A	340	356	310	274		A	E A	A		E A	352	328	318	280	280			
22						E A	280	314	274	272	262	314	332	378	E A	A		382	352	352	316	320		
23									244	242	298	304	372	E E	E Y	A		334	334	334				
24								A	A					A										
25								336		340	338	346	388		A	360	394	314	338	338	302	256		
26						A	296	328	300	308	320		A E A	424	378	390	372	330	356	316	288	272		
27						E A	358	322	322		A	A	A		A									A
28										A														
29						360	350	350		468	498	472			A	356	384	384	326					
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					10	24	28	25	21	20	22	25	25	21	24	27	28	26	26	12				
MED					U	314	312	309	300	300	309	325	376	360	377	374	352	343	320	300	U			
U Q					E A	336	340	343	332	331	352	380	429	397	399	392	384	370	344	324	E A			
L Q					286	292	286	279	279	299	308	344	341	351	349	330	331	302	288	278				

JUN. 2013 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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	252	252	252	252	254	254	232	232	A	A	A	A	A	A	A	A	E A	A	A	240	252	270	270	270
2	244	306	E A	E A	A	A	A	A	A	A	A	A	A	A	A	220	220	220	HE A	E A	278	278	278	278
3	270	286	282	282	282	252	244	A	A	A	A	214	214	E A	A	218	218	A	A	218	262	270	270	270
4	268	268	268	268	294	246	236	A	E A	A	210	210	246	E A	A	A	224	224	230	240	A	240	240	274
5	274	274	274	252	252	240	240	A	240	214	A	214	212	212	212	A	A	A	A	A	236	256	256	278
6	310	310	A	A	306	306	224	A	A	A	224	E A	248	Y	A	248	248	A	A	250	A	252	252	262
7	268	260	274	270	284	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	264	300	A	E A
8	276	320	A	320	320	A	250	250	B	Y	218	218	490	E A	A	A	A	A	A	A	A	258	284	310
9	244	244	266	272	276	270	270	240	240	A	A	A	A	A	A	A	HE A	A	A	A	A	276	276	266
10	222	258	258	268	268	254	254	A	A	A	196	A	E A	A	A	A	A	A	A	A	214	240	240	276
11	262	270	242	318	276	276	A	A	A	220	A	A	A	A	A	A	A	A	A	A	266	266	266	262
12	282	278	260	260	256	248	248	A	A	A	232	A	A	A	A	A	224	224	224	236	264	258	258	258
13	278	278	258	276	268	252	252	A	A	A	216	E A	270	A	A	A	246	244	244	A	288	A	288	288
14	302	302	280	280	274	258	A	A	A	A	A	A	A	A	208	208	208	A	264	264	264	264	264	272
15	272	272	272	266	260	236	226	A	A	A	A	A	A	A	A	A	260	234	E A	A	A	A	292	E A
16	270	A	270	270	270	A	A	A	A	A	E A	E A	A	A	A	A	226	226	A	A	A	274	282	282
17	282	282	282	254	254	240	200	A	A	A	A	A	A	A	A	A	264	A	A	A	264	264	258	258
18	276	276	276	274	256	H	244	232	232	A	A	A	A	A	A	A	A	A	A	A	240	292	292	292
19	A	A	278	E A	A	E A	A	A	A	A	A	A	A	A	A	A	234	A	244	A	244	242	294	286
20	308	300	300	268	268	A	A	A	A	A	H	194	186	A	A	A	A	A	A	234	252	A	264	280
21	284	284	322	276	250	246	246	220	220	E A	256	A	E Y	B	Y	A	A	A	A	A	250	260	260	258
22	340	352	322	280	264	264	A	A	A	214	214	248	226	A	A	A	E A	A	A	E A	252	252	244	256
23	290	290	258	258	A	A	238	A	198	230	A	A	A	A	E A	224	224	224	224	240	246	246	266	266
24	270	270	288	306	A	A	A	A	A	A	A	A	A	A	A	266	244	232	236	236	A	268	290	290
25	276	276	276	280	358	278	258	250	A	248	216	A	A	A	A	216	216	216	274	274	274	288	280	284
26	262	258	254	254	254	258	A	A	A	E A	258	202	A	A	A	202	262	A	A	A	256	256	328	328
27	292	278	278	278	260	234	234	234	A	218	A	A	A	A	A	210	210	H	A	A	286	270	264	264
28	252	256	256	268	268	236	236	228	228	216	216	204	Y	A	A	A	A	A	A	A	272	272	280	280
29	280	280	286	304	304	A	A	A	A	A	228	228	214	214	214	A	A	228	A	A	254	252	252	246
30	308	356	310	310	314	A	A	A	A	A	202	A	Y	B	234	A	234	A	234	262	262	312	A	312
31																								
CNT	29	28	28	30	27	21	18	8	7	9	14	12	7	8	8	17	17	14	14	22	28	27	29	30
MED	276	278	274	273	268	248	240	233	224	217	215	214	217	U	227	223	222	225	230	238	259	263	270	276
U Q	287	295	284	304	294	258	250	245	240	239	232	238	288	E A	A	A	E A	A	A	A	264	273	284	284
L Q	265	269	259	268	256	240	234	230	214	214	210	212	214	213	216	213	219	224	234	244	254	258	261	266

JUN. 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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					A	104	112	112	112	108	108	108	108	108	108	108	108	108	A						
2					A	108	108	108	108	108	108	108	108	108	108	108	108	108	108	A					
3					118	118	126	120	104	104	104	A	104	104	104	104	118	118	118	A					
4					A	136	134	110	110	110	110	108	108	108	108	108	108	108	108	A					
5						108	108	108	108	A	A		108	108	108	108	108	108	108	A					
6						122	122	116	116	118	106	106	106	A	106	106	106	106	106	A					
7					122	122	114	112			A	A	112	112	112	112	112	A							
8						110		A	A	B		110	110	110	110	110	110	110	110	A					
9					126	126	116	116	116	116	114		A			114	114	114	114	A					
10					146	126	124	124	120	118	114	114	A	114	114	114	114	114	126	A					
11						114	114	114	112	108	106	106	106	A	A		106	106	106	106	A				
12					E B	182	136	132	114	110	110	110	110	110	A	110	110	110	124	A					
13					134	116	116	120	106	106	106	106	106	106	A	106	106	106	106	A					
14						116	116	116	116	110	110	110				110	110	110	110						
15					B	182	130	112	112	112	112	112		112	112	112	112	114	114	114					
16						112	112	112	112	112	112	112		A	A		112	112	112						
17					E B	222		106	106	106	106	106	106		A	106	106	106	106						
18					B	106	106		106	106	A	A		A	106	106	106		A	A					
19						106	106	108	108		A		108	108	108	108	108	108	A	A					
20					A	110		110	110		110		110	110	110	110	110	110	110	A					
21					A	110	110	110	110	110	110	110		B	A	110	110	110	110	110	A				
22						110	110	110	110		A	A			110	110	110	110	110						
23					A	110	110	106	106	106		106		A		106	106	106	114	136					
24					132	128	128	116	110		110		A	A		110	110	110	110	A					
25					A	112	112	112	110		110		A	A		110	110	110	110	110					
26					C	112	110	110	108	108	108	108		A	A		108	108	108	108	138				
27					132	118	112	110	110	110		A		A		110	128		128	A					
28					A	126	122	122	116	116	116		A		114	114	114	114	114	A	A				
29						114	114	110	110	110	110	108	108	108	108	108	108	108	108	114	B				
30					A	126		120	120		A	A		108	108	108	108	108	108	A	A				
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT					10	28	28	28	27	21	23	16	16	16	19	29	30	27	24	4					
MED					130	114	114	112	110	110	110	108	108	108	108	108	110	110	110	125					
U Q					E B	182	126	121	116	112	112	110	110	110	111	110	110	112	110	114	137				
L Q					126	110	110	110	108	107	108	106	107	108	108	107	108	108	108	112					

JUN. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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		B	B	B	B	100	116	132	126	120	120	116	108	108	108	108	120	120	118	118	106	106	106	106	106	
2		104	130	108	108	112	112	112	128	114	114	114	114	114	114	114	G	120	120	120	120	158	116	116	116	
3		106	122	122	122	122	132	128	120	114	114	114	114	112	112	112	112	112	112	112	112	110	B	122	120	
4		106	106	102	102	108	108	108	108	108	108	G	122	122	122	122	126	126	126	126	114	112	112	112	112	
5		106	104	104	102	100	106	106	106	106	106	106	112	114	98	126	124	122	122	118	116	116	116	116	116	
6		108	106	106	106	106	106	122	116	112	108	108	108	108	106	122	122	122	122	122	122	112	104	104	104	
7		110	124	108	108	120	118	114	108	100	100	100	102	118	118	118	118	118	118	102	94	124	122	120	124	
8		108	108	108	108	108	108	108	108	B	108	108	G	130	130	126	122	122	122	122	118	110	110	110	104	
9		118	102	102	102	128	128	128	128	124	124	110	110	110	120	118	122	122	122	122	122	122	122	118	106	
10		B	B	B	B	G	152	124	122	122	114	114	114	114	114	114	114	114	132	132	114	114	114	114	114	
11		106	104	104	102	102	138	122	122	118	118	110	110	110	110	110	112	118	118	162	116	116	112	108	108	
12		B	100	B	B	G	116	116	116	116	116	116	114	114	114	114	114	100	100	126	126	114	114	114	114	
13		106	106	134	B	G	134	130	128	118	118	118	112	112	112	110	108	108	108	108	108	108	108	108	108	
14		106	106	106	100	100	140	110	102	102	102	102	102	102	102	102	100	114	114	114	114	114	114	114	106	
15		106	134	106	B	G	122	122	114	114	114	114	114	114	114	114	114	114	114	114	110	106	106	106	106	
16		104	104	104	104	132	126	118	118	118	110	110	110	104	112	112	112	122	122	122	116	116	116	116	114	
17		112	92	92	B	G	98	138	120	120	118	108	108	108	110	110	110	110	112	112	112	112	112	114	92	92
18		100	108	108	108	E G	230	202	122	110	110	110	110	126	112	112	112	112	112	112	112	100	120	120	120	
19		110	108	98	98	98	102	110	110	110	108	106	106	118	118	118	118	118	118	106	114	114	110	108	108	
20		102	102	102	102	108	108	108	108	108	108	132	128	142	112	112	112	112	112	114	114	114	114	114	114	
21		112	110	106	106	106	106	140	140	132	122	122	122	B	108	108	114	114	114	114	112	112	112	112	112	
22		98	98	98	98	122	122	120	116	116	116	116	116	108	108	130	130	130	112	112	116	116	116	110	98	
23		98	98	98	98	102	102	102	102	112	112	112	108	104	116	124	G	124	124	124	146	128	104	104	104	
24		94	132	132	118	118	118	118	114	114	114	114	110	116	116	116	102	102	146	134	120	118	116	106	106	
25		B	B	106	106	100	118	118	118	116	118	114	114	112	112	106	104	154	132	132	126	112	110	110	110	
26		110	104	104	104	104	120	120	116	116	116	112	104	104	102	102	126	126	122	110	110	110	110	110	110	
27		112	104	104	104	126	126	118	118	108	114	114	114	110	122	116	116	112	112	112	112	110	110	104	104	
28		B	114	114	B	126	126	116	116	114	114	114	114	114	114	120	118	118	118	108	108	108	108	108	108	
29		108	108	108	128	128	124	124	116	116	116	G	130	130	144	G	120	120	120	120	G	B	B	B	120	
30		106	100	100	100	114	114	114	114	112	112	112	108	124	124	124	124	124	122	122	114	B	114	114	114	
31																										
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		25	27	27	23	25	30	30	30	29	30	28	29	29	30	29	28	30	30	30	29	28	28	29	30	
MED		106	106	106	104	108	118	118	116	114	114	113	112	114	113	114	115	118	118	118	114	113	113	110	109	
U Q		110	110	108	108	124	126	124	120	118	116	114	114	118	118	121	122	122	122	122	119	116	116	115	114	
L Q		104	102	102	102	102	108	112	110	110	108	109	108	108	110	110	112	112	112	112	112	110	110	107	106	

JUN. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

JUN. 2013 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'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 2	CL 12	CL 22	CL 12	C 3	C 2	C 2	CL 21	CL 21	C 2	C 2	C 2	C 2	C 3	C 6	FO 21	FO 21	F 1	F 2		
2	F 5	FF 21	F 5	F 4	CL 12	C 2	CCO 12	CCO 12	CL 11	C 1	C 1	C 1	C 1	C 1	C 1		C 1	C 2	C 3	C 3	FF 12	F 3	F 2	F 2	
3	F 1	F 1	F 1	F 1	L 1	C 1	CL 21	CL 21	C 2	C 2	C 1	C 1	C 1	C 2	C 1	C 1	L 1	C 2	C 4	C 4	F 7		FF 13	FF 12	
4	F 2	F 2	F 2	F 2	C 2	L 2	C 2	C 2	C 2	C 2		C 1	C 1	C 1	CL 11	CL 11	CL 11	C 3	C 3	C 3	F 2	F 3	F 5	F 5	
5	F 2	F 3	F 3	F 1	LC 11	C 3	C 2	C 2	C 1	C 1	C 1	C 1	C 1	L 1	C 1	C 2	C 2	C 4	C 2	L 5	F 5	FO 41	FO 41	F 5	
6	F 4	F 4	F 4	F 4	L 3	L 2	C 2	C 4	C 2	C 2	CL 11	C 1	C 1	C 2	CL 11	C 1	C 2	C 3	C 3	C 3	F 4	F 4	F 2	F 2	
7	F 2	F 1	F 1	FF 11	C 1	CL 32	C 3	C 2	CO 21	CO 11	L 2	C 2	C 2	C 2	C 3	C 3	C 2	C 3	C 3	C 4	FF 33	FO 41	FF 13	FF 52	
8	FF 32	FF 32	FF 42	F 3	L 3	C 4	CO 21	C 2		L 1	C 1		C 1	C 1	C 3	C 2	CL 21	CL 31	CL 31	CL 31	F 3	F 4	F 6	F 6	
9	FF 13	F 2	F 3	F 2	CL 11	CL 21	CL 21	C 2	C 1	C 1	C 1	C 2	L 1	CC 12	C 1	C 1	CL 11	C 3	C 3	L 4	F 7	F 5	F 7	F 1	
10					H 1	C 2	C 2	C 2	C 1	C 1	C 2	C 2	C 2	C 2	C 1	C 2	C 2	C 1	C 1	CL 31	L 3	F 2	F 3	FO 31	
11	F 3	F 3	F 3	F 4	L 3	C 2	C 2	C 2	C 2	C 1	C 1	C 1	C 2	C 3	C 2	C 1	C 2	C 3	HC 23	HC 33	F 3	F 6	F 2	F 1	
12		F 1			CL 21	C 2	C 2	C 2	C 1	C 1	C 1	C 1	C 1	C 2	C 1	C 1	L 2	L 1	CL 11	C 5	F 3	F 2	F 2	F 3	
13	F 7	F 4	F 1		H 1	C 2	C 2	C 3	C 1	C 1	C 1	C 1	C 1	C 1	C 2	C 3	C 2	C 3	C 3	L 6	L 4	F 5	F 5	F 5	
14	F 4	FO 31	F 2	F 3	L 3	CL 11	C 2	C 3	C 2	C 3	C 2	C 2	C 1	C 1	C 1	LC 11	CL 11	C 2	C 4	C 4	F 3	F 4	F 4	F 4	
15	F 4	FF 11	FO 31		CL 12	C 1	C 2	C 2	C 2	C 2	CO 21	C 2	C 2	C 2	C 2	C 4	C 1	C 2	C 3	C 4	FO 41	FO 61	F 4	F 5	
16	F 5	F 8	F 2	F 2	CL 11	CL 21	C 3	C 2	C 1	C 2	C 1	C 1	LC 21	CL 11	LO 1	L 1	CL 11	C 2	C 2	C 3	F 4	F 5	F 5	F 6	
17	F 4	F 3	F 3		L 2	C 1	C 2	C 1	C 2	C 2	C 1	CO 11	L 2	CO 21	C 1	C 2	C 3	C 5	C 5	FF 52	FF 13	F 3	F 3	F 3	
18	F 2	F 1	F 1	F 1	H 1	H 1	C 1	C 2	C 2	C 2	CL 21	C 2	HC 12	C 2	C 2	C 2	C 2	C 2	L 3	L 4	F 4	FF 26	FF 24	FF 24	
19	F 8	F 7	FO 41	F 4	F 3	CO 21	C 2	C 2	C 2	C 2	C 2	C 2	C 1	C 2	C 1	C 1	C 1	C 2	C 2	C 2	F 1	F 4	F 3	F 4	
20	F 3	F 3	F 3	F 1	C 2	C 2	C 3	C 2	C 1	C 1	C 1	C 2	HC 12	CH 21	C 2	C 2	C 2	C 5	C 2	C 3	F 7	F 4	FO 31	F 4	
21	F 2	F 4	F 3	F 2	C 2	C 2	H 1	H 1	C 1	C 1	C 2	C 1	L 1	C 2	C 1	C 1	C 1	C 2	C 5	C 4	F 6	F 6	F 2	F 3	
22	F 4	F 4	F 2	F 2	C 1	C 3	C 3	C 2	C 1	C 1	C 1	C 1	L 2	L 2	HL 11	HL 11	C 2	C 2	C 3	C 3	F 1	F 2	F 4	F 4	
23	F 4	F 6	F 3	F 3	L 3	C 3	C 1	C 2	C 1	C 2	C 2	C 1	CL 11	CL 11	CL 12		CL 11	CL 21	CL 21	C 1	F 2	F 1	F 3	F 3	
24	F 3	F 4	F 3	F 7	C 5	C 2	C 3	C 2	C 2	LO 11	L 3	LO 31	CL 12	CL 2	C 1	L 1	L 1	H 1	C 3	C 4	F 6	F 4	F 4	F 1	
25			F 1	F 3	LO 31	CL 21	C 2	C 2	C 1	C 1	C 1	C 1	CL 22	CL 21	LC 21	L 2	HL 22	HC 1	C 3	C 7	F 3	F 4	F 3	F 3	
26	F 3	F 2	F 3	F 3	L 1	CL 21	C 2	C 2	C 2	C 2	C 1	C 1	L 1	L 1	L 1	C 1	C 2	C 3	C 3	L 1	F 1	F 5	F 5	F 7	
27	F 4	F 4	F 2	F 1	CL 11	CL 31	C 2	C 3	C 2	C 1	C 1	C 1	LO 11	CL 11	C 2	C 1	L 1	L 2	CL 41	C 5	FO 31	F 3	F 3	F 3	
28		F 1	F 1		L 1	L 1	C 2	C 2	C 2	C 1	C 1	C 1	C 1	C 1	C 1	CH 21	C 3	C 4	C 3	L 2	F 2	F 5	F 5	FO 31	
29	F 5	FF 32	FF 22	FF 11	C 3	CL 31	C 2	C 2	C 2	C 1		H 1	HL 11	HL 11		C 1	C 2	C 2	C 2					F 3	
30	F 4	F 5	FO 31	FO 11	L 3	L 3	C 2	C 1	C 3	C 1	C 1	C 1	H 1	H 1	C 1	C 1	C 1	C 2	CO 21	C 2		F 3	F 5	F 2	
31																									
	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																									

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## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 f<sub>XI</sub> (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	84	85	88	76	76															X 97	A 70	X 72	X 68	X	
2	X 74	X 64	X 67	X 64	X 57															X 70	X 70	X 68	X 72	X 78	
3	X 74	X 72	X 69	X 65	X 61															X 79	X 74	X 75	X 76	X 74	
4	X 79	X 76	X 77	X 71	X 61															X 94	X 80	X 76	X 75	X 78	
5	X 80	X 76	X 72	X 67	X 60															X 92	X 81	X 77	X 74	X 72	
6	X 75	X 71	X 77	X 71	X 67															X 89	X 87	X 81	X 87	X 85	
7	X 79	X 76	X 71	X 68	X 69	68														X 73	X 74	X 58	X 56	X 57	
8	X 58	X 55	X 52	X 54	X 54															X 71	X 78	X 74	X 66	X 71	
9	X 60	X 68	X 76	X 68	X 54															X 94	X 104	X 92	X 88	X 76	
10		X 65	X 65	X 63	X 60																X 72	X 72	X 72	X 76	
11	X 71	X 60	X 57	X 50	X 48															A 0	X 74	X 77	X 76	X 76	
12	X 70	X 68	X 69	X 63	X 65															X 83	X 80	X 73	X 72	X 71	
13	X 70	X 66	X 64	X 60	X 59															X 93	X A	X 80	X 82	X 81	
14	X 78	X 74	X 71	X 69	X 65															A	X 96	X 83	X 77	X 79	
15	X 78	X 76	X 75	X 69	X 70															X 97	X 95	X 93	X 87	X 86	
16	X 82	X 83	X 74	X 76	X 77															X 90	X 83	X 78	X 78	X 83	
17	X 89	X 93	X 81	X 75	X 66															X 107	X 97	X 90	X 81	X 77	
18	X 78	X 81	X 83	X 79	X 63															X 89	X 88	X 84	X 86	X 88	
19	X 81	X 74	X 76	X 72	X 74															X 86	X 86	X 91	X 96	X 94	
20	X 85	X 77	X 72	X 75	X 72															X 90	X 80	X 84	X 83	X 85	
21	X 81	X 77	X 77	X 80	X 78															X 110	X 92	X 83	X 86	X 89	
22	X 88	X 86	X 80	X 76	X 68															X 82	X 80	X 82	X 86	X 82	
23	X 77	X 76	X 72	X 66	X 62															X 104	X 92	X 89	X 84	X 87	
24	X 86	X 80	X 73	X 74	X 79															X 90	X 71	X 74	X 78	X 80	
25	X 82	X 75	X 75	X 73	X 69															X 78	X 80	X 78	X 78	X 79	
26	X 74	X 74	X 71	X 70	X 58															X 88	X 81	X 79	X 80	X 81	
27	X 78	X 78	X 76	X 72	X 67															X 89	X 82	X 76	X 75	X 76	
28	X 68	X 63	X 63	X 60	X 58															X 84	X 91	X 93	X 98	X 96	
29	X 85	X 81	X 72	X 66	X 60															X 97	X 102	X 100	X 90	X 87	
30	X 86	X 88	X 84	X 80	X 79	83	88	80												X 75	X 72	X 66	X 61	X 60	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	30	30	30	30	2	1	1												27	28	30	30	30	
MED	X 78	X 76	X 72	X 70	X 65	76	88	80												X 89	X 81	X 78	X 78	X 79	
U Q	X 83	X 80	X 77	X 75	X 70															X 94	X 92	X 84	X 86	X 85	
L Q	X 74	X 68	X 69	X 65	X 60															X 82	X 76	X 74	X 74	X 76	

JUN. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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

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	F	F	F	F	F	69	77	86	80	75	A	A	84	92	A	104	117	122	A	91	A	64	66	61	
2	68	58	F	58	50	46	57	67	A	67	A	68	64	A	62	58	62	60	60	64	64	62	66	F	
3	68	66	63	59	55	45	52	57	62	A	A	64	62	63	71	66	68	71	75	73	68	69	70	68	
4	72	70	70	65	55	60	66	70	79	85	80	76	68	75	72	76	76	78	83	88	74	70	69	72	
5	74	70	65	60	54	53	69	81	78	73	68	66	69	78	80	82	87	89	85	86	75	70	68	66	
6	F	65	F	65	61	62	80	94	93	73	66	A	A	A	72	73	81	86	88	83	80	74	F	79	
7	73	70	65	F	F	F	60	A	A	A	53	A	A	R	61	70	66	61	63	67	68	52	50	51	
8	52	49	46	48	48	68	A	A	A	A	A	A	A	A	61	62	61	68	70	64	65	72	67	60	
9	54	F	F	F	48	56	70	A	A	A	A	A	68	A	72	76	82	82	79	88	98	86	F	F	
10	65	59	59	57	54	63	75	75	70	64	63	64	70	85	91	90	92	102	87	75	66	66	66	70	
11	65	54	51	44	42	54	72	68	A	72	A	A	A	61	A	65	61	73	80	A	68	F	F	F	
12	F	F	F	F	F	58	60	A	A	A	65	71	78	79	80	74	77	74	75	77	74	67	66	65	
13	64	60	57	54	53	58	76	94	100	69	58	64	64	70	71	66	72	79	88	87	A	74	76	75	
14	72	68	65	63	59	64	74	79	91	75	70	A	73	74	71	75	75	A	87	A	90	76	71	F	
15	72	69	69	F	F	64	67	78	88	73	71	66	64	70	73	73	75	80	88	91	89	87	81	80	
16	76	77	68	70	70	86	91	70	74	A	A	78	70	70	67	71	80	87	86	84	77	71	72	77	
17	F	F	F	F	F	A	V	60	78	94	71	61	A	72	78	84	91	98	94	97	101	91	84	75	70
18	72	F	F	F	57	58	77	98	79	72	66	72	74	A	90	89	92	90	89	83	82	78	80	82	
19	75	68	70	F	F	73	97	109	93	75	70	72	72	84	88	91	A	92	97	80	80	85	90	88	
20	79	71	66	69	66	70	83	78	73	66	63	72	72	79	85	86	86	99	93	84	74	77	77	79	
21	75	70	70	74	72	70	82	74	78	76	68	78	74	85	96	95	90	92	96	104	86	77	80	F	
22	F	F	74	70	62	55	64	83	68	68	80	68	R	72	77	84	84	86	81	76	74	76	80	76	
23	71	70	66	60	56	61	81	83	74	72	71	74	74	86	90	101	96	100	99	98	86	83	78	81	
24	80	74	67	F	F	72	67	60	A	64	A	A	68	A	59	60	64	73	82	84	64	68	F	F	
25	F	69	F	F	F	59	76	74	55	A	64	74	A	A	A	A	71	A	68	71	74	72	71	F	
26	68	68	65	F	52	58	71	89	93	80	82	A	A	82	79	73	71	71	A	A	82	75	72	76	
27	F	F	F	F	61	66	66	A	78	68	69	75	77	78	73	80	78	A	A	83	76	70	69	F	
28	62	56	56	54	52	56	71	80	84	81	A	80	88	90	101	98	82	72	70	78	F	F	92	90	
29	F	F	66	60	53	53	A	60	A	A	72	79	96	82	79	82	92	92	98	91	96	94	84	80	
30	80	82	78	74	73	F	F	F	66	A	64	61	R	60	59	59	58	60	62	69	66	60	55	54	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	22	22	21	18	22	27	27	24	22	21	21	20	22	23	27	29	29	27	27	28	27	28	26	20	
MED	72	68	66	60	55	60	71	78	78	72	68	72	72	78	73	76	78	82	85	83	75	72	72	76	
U Q	75	70	70	69	61	68	77	84	91	75	71	76	74	84	85	90	88	92	89	88	86	78	80	80	
L Q	65	60	61	57	52	56	66	70	73	68	64	66	68	70	71	68	70	72	75	76	68	68	66	67	

JUN. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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						A	A	A	A	A	A	A	A	A	A	U L 484	A	A	A						
2							A	A	A	A	A	A	A	A	A	A	476	432	A	A					
3						U L 428		A		A	A	A	A	A	A	A	484		A U L 420	L					
4								L	A U L 496	508	U L U L 516 520		U L U L 516		A U L 516		A	456	436	L					
5							L	L U L U L 492 524	520	532	504	U L U L 508 496					A	A	A	A					
6						A	L	A	A U L 492		A	A	A	A	A	U L 496	540	A	A	L					
7						A	A	A	A	A U L 464		A	U L U L 492	464	468	460	432	U L	L						
8						A	A	A	A	A	A	A	A	A	A	A U L 480		A	A	A					
9							A	A	A	A	A	A	A	A	A	A	484	452	L	A					
10	A							A	A	A	A U L 504		A	A	A	A	472	452	A						
11							A	A	A	A	A	A	A	A	A	A	A	A	A						
12							A	A	A	A	A	A	A	A	A	A	472		A	A	L				
13							L	452	L U L 484	532	U L U L 500		A	A	492	472	464	A	A						
14							L	472	A U L 492		A	A	A U L 492		A	A	A	A	A	A					
15							L U L 448	480	480	496	564	496	532	492	488	472	U L	A	A						
16									484	A	A	A	A	A U L 496	484	U L	A	A	A						
17						A	L	460	A	480	528	U L	A	A	A	A	U L 472	A	A						
18						U L 468	L	A	L	A	L U L 512	U L 512	A	A	A	A	A	A	A						
19							L	A	A	A	A U L 520	548	U L	A	A	A	A	A	A						
20							L	L	A U L 532		L U L 528		A	A	A	A U L 484	500	A	A						
21							L U L U L 476 520		A U L U L 512 528		A	A	A	A	A	A	A	A	L	A					
22							A	A	A	A	A	A U L 556	U L 500		A	A U L 500		A	A						
23						A	L	A	A U L 536	544	536	528	U L	A	516	508	476	U L	A						
24							L	A	A	A	A	A	A	A	A	A U L 472	444	440	U L	L					
25						A	A	A	A	A	A	A	A	A	A	A	A U L 484		A	A					
26							L	A	A	A	A	A	A	508	496	476	U L	A	A						
27							A	A	A	A	512	A	U L U L 520 512		A U L 492	472		A	A						
28							A	A	L	A	A	A	U L U L 496 496	516		A U L 460		A	A						
29						L	A	A	A	A	A U L 512	U L U L 508	U L U L 500	508		A	A	A	A						
30							L	A	A	A	A U L 496	U L U L 488	U L U L 472	472		A	448	420	U L	L					
31																									
	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	5	5	9	10	12	10	10	12	18	15	6							
MED						U L U L 468 428	460	484	492	516	522	510	500	496	484	460	426	U L							
U Q							474	506	528	528	534	520	508	512	488	472	436	U L							
L Q							450	476	482	508	508	496	492	492	472	452	420	U L							

JUN. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
2						U A 180	A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A	272	A	A	A	A	A	A	A	A	A	A	A	R	A				
4						B U A 264	A	A	A	A	A	R	A	A	A	A	A	R	A					
5						U R 196	A	R	A	R	R	A	R	A	A	A	A	A	A					
6						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
7						A	A	A	A	A	R	A	A	A	A	A	A	A	A					
8						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
9						A	A	A	A	A	A	A	A	A	A	R	A	A	A					
10	A					A	A	A	A	A	A	A	R	A	A	A	A	A	A		A			
11						A	A	A	A	A	A	A	A	404	A	A	A	A	A					
12						U A 192	A	A	A	A	A	A	A	A	A	A	A	A	A	U R 212				
13						U R 224	A	R	R	R	A	A	A	A	A	R	R	A	A					
14						A	R	R	A	R	A	A	A	R	A	A	A	A	A					
15						A	A	A	A	A	A	R	A	A	R	A	A	A	A					
16						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
17						B	A	A	A	A	A	A	A	A	A	A	A	R	A	A				
18						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
19						A	A	A	A	A	A	R	A	A	A	A	A	A	A					
20						A	A	A	A	A	A	A	A	A	A	R	A	A	A					
21						A	R	A	A	A	A	A	A	A	A	A	A	A	A					
22						A	A	A	A	A	A	A	R	R	A	A	A	A	A					
23						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
24						U A 196	A	A	A	A	A	A	A	A	A	A	A	A	R	U R 212				
25						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
26						A	A	A	A	A	A	A	A	A	A	R	A	A	A					
27						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
28						A	A	A	A	A	A	A	R	R	R	A	A	A	A					
29						B	A	A	A	A	A	R	R	A	A	A	A	A	A					
30						A	A	A	A	A	A	R	R	R	A	A	A	A	A					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						5	2							1					2					
MED						U A 196	268							404					U R 212					
U Q						U R 210																		
L Q						U A 186																		

JUN. 2013 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
2	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
3	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
4	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
5	J	A	J	A	J	A	J	A	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
7	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	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
10	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
11	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	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	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
15	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	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
18	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	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
21	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
22	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
23	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
25	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
26	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
27	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
28	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
29	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
30	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
LQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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	39	35	41	37	35	49	48	44	50	67	A A A A	96	104	80	68	92	41	56	46	A A	84	A A	109	43	31	34			
2	42	31	27	E B	E B	14	20	38	53	A A	96	49	A A	56	50	A A	65	47	37	35	44	38	25	E B	15	19	32	25	
3	E B	15	21	22	22	25	22	34	40	37	A A A A	146	118	53	52	54	50	40	46	G	20	18	E B	E B	E B	E B	E B		
4	37	25	19	E B	15	19	23	32	45	56	42	46	43	G	48	41	54	36	G	22	E B	E B	E B	E B	20	17			
5	19	E B	E B	E B	E B	19	G	32	G	36	G	G	G	G	44	43	41	44	42	34	30	43	40	19	E B	15	28		
6	19	22	26	27	28	32	30	39	50	42	54	A A A A	69	94	172	43	48	59	60	24	18	22	23	26	54				
7	42	36	22	29	30	34	40	A A A A	253	227	70	40	58	62	44	40	40	39	31	26	E B	E B	E B	E B	18	32			
8	E B	16	21	15	20	20	27	A A A A	127	128	104	68	125	58	40	50	39	38	38	29	46	24	44	20	33				
9	E B	15	34	36	33	15	25	57	93	156	84	97	133	54	93	49	G	38	G	44	30	24	29	46	31				
10	28	34	E B	15	20	15	30	36	50	43	53	63	43	G	41	66	35	34	36	47	32	23	18	32	20				
11	38	E B	E B	15	16	21	25	32	58	75	44	74	74	56	45	66	54	44	34	35	A A	74	20	16	26	25			
12	25	24	22	20	15	25	55	A A A A	81	64	104	52	56	60	48	51	34	40	45	G	31	24	20	20	E B	15			
13	E B	15	14	25	19	19	G	29	G	G	G	44	44	52	46	40	G	G	48	46	39	A A	76	31	21	23			
14	19	24	E B	15	17	19	23	G	G	47	G	60	88	52	G	54	51	52	A A	81	62	A A	100	58	35	37	40		
15	50	42	19	E B	16	15	45	32	32	38	41	41	G	42	44	G	41	38	37	42	19	22	21	21	E B	14			
16	24	19	E B	15	22	15	30	31	35	38	A A A A	122	108	52	57	58	41	39	44	72	50	46	25	22	27	34			
17	23	E B	15	38	22	E B	A A	14	74	34	39	49	41	46	A A	76	60	76	74	60	G	24	53	46	47	42	33	20	40
18	38	29	38	21	41	33	35	44	45	47	44	41	44	A A	129	56	60	64	56	56	23	19	15	15	15	E B	E B	E B	
19	E B	15	14	19	38	28	23	40	44	46	43	39	G	51	57	70	64	A A	130	69	51	35	24	17	25	16			
20	20	17	E B	E B	E B	E B	21	27	34	55	40	41	43	50	67	53	G	35	43	40	21	25	32	32	19				
21	E B	14	20	E B	E B	E B	22	G	35	42	43	46	44	48	50	47	48	42	35	44	28	E B	15	19	25	30			
22	31	35	30	22	16	37	53	47	52	51	52	44	G	G	42	42	48	46	46	43	20	E B	14	19	18				
23	20	17	17	31	18	30	28	54	53	41	43	44	42	74	45	40	38	40	35	26	39	38	30	31					
24	51	44	39	22	E B	15	22	29	54	80	48	100	84	54	A A	114	42	40	37	G	22	19	18	18	15	15	31		
25	37	18	38	33	18	37	37	38	48	76	58	61	A A A A	74	85	109	116	A A	37	77	41	40	E B	15	17	26	17		
26	E B	15	26	42	35	21	22	29	43	64	52	63	A A A A	111	208	45	41	G	50	38	91	28	40	E B	14	15	34		
27	40	18	27	29	20	22	46	A A	76	69	52	43	57	44	43	58	41	41	A A A A	97	124	28	30	19	20	37			
28	22	28	36	30	30	20	46	44	34	57	A A	109	54	G	G	G	42	36	53	60	54	56	40	37	E B	14			
29	28	18	E B	E B	E B	A A	19	88	40	A A A A	54	100	48	G	G	G	42	41	41	50	57	43	15	E B	E B	E B	E B	E B	
30	18	18	21	26	21	30	28	45	40	A A	64	46	G	G	G	37	41	36	35	27	32	E B	E B	E B	E B	E B	E B		
31																													
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30			
MED	24	22	22	22	19	25	34	44	50	50	52	54	52	48	47	41	40	44	42	30	24	19	21	25					
U Q	38	31	36	29	21	32	46	A A A A	54	64	70	74	74	58	68	56	48	48	56	50	43	39	31	30	33				
L Q	E B	E B	E B	E B	E B	22	29	38	42	42	44	43	42	43	41	39	36	35	29	21	E B	E B	E B	E B	E B	E B			

JUN. 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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	15	15	13	13	14	14	15	14	22	23	25	24	26	27	26	26	17	14	14	15	15	15	15	15
2	16	13	14	14	14	15	14	14	16	17	21	20	27	24	22	20	18	14	14	13	15	14	15	14
3	15	14	15	14	14	15	14	14	15	23	22	19	18	26	23	20	16	16	14	15	14	14	16	16
4	16	15	15	15	14	15	15	14	14	19	22	22	16	19	20	22	14	12	14	15	15	15	15	15
5	14	15	14	14	14	14	14	18	16	23	22	22	20	17	20	13	17	14	13	14	15	14	15	14
6	14	14	13	14	15	14	14	13	15	17	24	23	25	22	22	22	17	14	13	14	15	16	15	14
7	14	14	14	13	15	14	13	13	14	15	16	16	16	15	18	14	14	13	13	16	14	15	15	15
8	16	15	14	15	14	14	14	13	24	22	22	23	20	16	18	17	17	14	12	14	15	15	15	14
9	15	14	15	14	15	13	12	12	18	16	20	23	22	22	21	19	18	15	13	15	15	16	14	13
10	14	15	15	15	15	14	14	15	17	22	16	20	19	20	22	14	12	12	13	14	14	15	15	14
11	16	15	15	15	13	14	12	13	18	23	20	24	18	18	17	20	20	18	12	12	13	16	14	13
12	14	14	14	14	15	14	14	16	20	30	26	22	22	22	19	20	20	15	12	13	14	14	14	15
13	15	14	14	13	14	13	11	15	19	16	26	23	21	18	17	20	18	17	14	12	15	15	15	15
14	14	14	15	15	14	13	13	12	20	16	23	21	20	22	21	19	15	14	12	12	13	15	15	14
15	15	15	14	16	15	14	15	12	14	18	18	17	17	22	21	16	17	14	14	14	15	15	14	14
16	14	15	15	14	15	14	13	13	18	24	29	22	24	25	19	17	12	15	14	14	15	13	14	16
17	16	15	14	15	14	15	13	11	18	15	21	23	21	29	26	19	18	13	14	14	14	15	14	15
18	15	15	15	15	14	14	14	14	18	22	24	22	21	23	25	18	18	14	12	13	15	15	15	15
19	15	14	15	15	14	14	13	13	18	19	22	22	20	21	21	26	20	16	13	15	14	14	14	14
20	14	14	14	14	14	16	14	12	15	18	21	23	24	22	24	21	18	15	13	12	14	14	14	13
21	14	14	14	16	15	14	14	18	16	18	20	22	25	18	19	19	17	14	12	13	15	14	15	14
22	15	14	14	14	15	14	15	20	19	17	23	18	26	20	15	17	14	14	15	14	14	14	14	14
23	15	14	13	14	14	14	13	18	16	18	22	26	18	21	19	19	15	14	14	14	14	14	14	14
24	15	13	15	14	15	15	15	16	14	20	24	26	20	25	29	18	20 <sup>A</sup>	15	14	14	15	15	15	15
25	15	14	12	15	14	14	14	14	14	18	22	24	27	24	26	27	18	15	15	14	15	15	13	15
26	15	15	14	14	14	14	15	16	18	18	22	24	27	22	19	18	16	14	14	14	15	14	15	15
27	15	16	14	14	15	14	12	14	14	18	20	22	24	22	26	24	20	18	14	14	14	15	14	15
28	15	14	14	14	14	13	15	18	16	17	20	20	21	19	18	21	17	14	13	13	15	14	13	14
29	15	15	16	14	14	14	14	14	16	22	20	18	18	21	18	19	18	14	14	15	14	14	15	14
30	14	16	14	14	14	14	14	17	18	20	18	22	22	20	18	18	16	16	15	12	14	14	15	14
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	15	14	14	14	14	14	14	14	16	18	22	22	21	22	20	19	17	14	14	14	15	15	15	14
U Q	15	15	15	15	15	14	14	16	18	22	23	23	24	23	23	21	18	15	14	14	15	15	15	15
L Q	14	14	14	14	14	14	13	13	15	17	20	20	19	19	18	18	16	14	13	13	14	14	14	14

JUN. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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

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	F	F	F	F	F	298	299	330	311	296	A	A	256	253	A	256	284	293	A	326	A	255	265	275	
2	296	293	F	295	279	271	260	261	A	261	A	282	271	A	287	257	289	303	302	302	260	253	254	F	
3	277	259	293	291	310	350	275	294	305	A	A	273	267	283	310	288	286	309	316	307	277	281	278	281	
4	288	288	297	309	294	311	308	281	286	306	301	287	290	303	275	301	302	291	298	315	293	284	279	280	
5	287	280	306	316	325	309	306	333	318	307	282	292	289	303	306	301	310	308	303	320	289	277	282	267	
6	F	288	F	288	299	284	285	320	341	328	283	A	A	A	300	297	300	304	308	299	285	279	F	273	
7	286	296	287	F	F	F	281	A	A	A	239	A	A	R	257	293	292	279	297	307	296	267	269	266	
8	266	284	287	290	283	331	A	A	A	A	A	A	A	A	279	302	281	311	314	307	287	301	283	303	
9	281	F	F	F	294	319	345	A	A	A	A	A	A	A	291	305	309	297	283	288	320	327	F	F	
10	287	287	289	287	281	315	325	314	337	286	296	273	273	285	287	286	282	310	312	322	286	276	277	281	
11	320	304	295	300	291	297	307	312	A	331	A	A	A	291	A	276	291	311	324	A	309	F	F	F	
12	F	F	F	F	F	299	290	A	A	A	276	281	287	293	301	298	307	306	317	309	305	289	286	288	
13	297	300	281	271	288	307	288	323	336	346	267	298	289	302	306	294	290	298	308	312	A	290	298	297	
14	293	289	283	301	294	309	313	324	343	322	343	A	316	302	303	301	291	A	284	A	323	311	276	F	
15	300	304	314	F	F	326	301	309	331	329	322	287	294	284	299	297	296	284	289	304	293	297	296	295	
16	298	300	303	287	290	315	318	305	322	A	A	325	267	297	260	286	289	306	310	308	287	286	274	288	
17	F	F	F	F	F	A	V	303	305	338	342	288	278	264	268	283	287	290	297	320	309	293	293	279	
18	291	F	F	F	302	283	287	326	317	338	320	291	289	A	292	285	291	A	302	297	307	293	278	288	297
19	284	276	277	F	F	272	314	329	334	298	310	268	293	291	296	305	A	309	323	336	283	285	291	296	
20	262	290	291	290	303	309	320	356	329	305	318	289	290	286	300	286	293	304	312	304	281	272	274	281	
21	281	284	283	282	290	302	335	331	311	331	271	288	267	277	287	292	284	282	305	319	319	283	262	F	
22	F	F	283	277	315	279	295	331	294	288	307	308	R	281	288	304	306	306	314	302	276	272	292	293	
23	289	293	297	280	291	315	312	334	311	299	291	298	263	275	279	292	281	295	298	316	275	271	269	288	
24	290	284	276	F	F	294	327	293	A	288	A	A	284	A	246	275	280	288	307	335	265	256	F	F	
25	F	283	F	F	F	282	304	346	349	A	288	280	A	A	A	A	305	A	313	299	295	277	291	F	
26	296	298	298	F	284	300	269	296	328	281	307	A	A	297	299	307	305	304	A	315	308	285	297	F	
27	F	F	F	F	295	338	333	A	323	312	282	306	307	299	301	293	295	A	A	319	307	291	288	F	
28	305	288	285	290	299	305	307	301	306	283	A	256	287	286	304	325	310	302	292	277	F	F	292	294	
29	F	F	274	278	284	290	A	328	A	A	290	279	301	314	300	288	311	295	301	291	295	312	270	274	
30	270	297	284	286	292	F	F	F	293	A	343	251	R	303	251	295	300	305	310	316	306	309	280	275	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	22	22	21	18	22	27	27	24	22	21	21	20	22	23	27	29	29	27	27	28	27	28	26	20	
MED	288	288	287	289	293	305	306	322	322	306	291	287	288	291	296	293	293	303	307	308	293	283	281	281	
U Q	296	297	297	295	299	315	318	330	336	330	314	295	293	302	301	301	306	306	312	319	307	290	292	294	
L Q	281	284	283	282	288	290	288	303	311	288	282	276	271	281	279	286	288	293	297	302	283	274	274	275	

JUN. 2013 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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						A	A	A	A	A	A	A	A	A	A	U L 347	A	A	A					
2							A	A	A	A	A	A	A	A	A	A	357	364	A	A				
3						U L 306		A		A	A	A	A	A	A	A	349		A U L 345	L				
4							L	A	U L 395	374	U L 377	U L 379		U L 329		A	371	337	L					
5							L	L	U L 387	U L 384	U L 385	U L 371	408	U L 369	369		A	A	A	A				
6						A	L	A	A	U L 382	A	A	A	A	A	364	U L 371	A	A	L				
7						A	A	A	A	A	U L 400	A	A	U L 273	U L 385	336	337	U L 325	L					
8						A	A	A	A	A	A	A	A	A	A	U L 371	A	A	A					
9							A	A	A	A	A	A	A	A	A	A	353	385	L	A				
10	A							A	A	A	A	U L 380	A	A	A	A	361	362	A					
11							A	A	A	A	A	A	A	A	A	A	A	A	A					
12							A	A	A	A	A	A	A	A	A	A	358	A	A	L				
13							L		U L 353	U L 390	U L 364	U L 435	A	A	A	345	375	342	A	A				
14							L		A	U L 406	A	A	A	U L 375		A	A	A	A					
15							L	U L 388	391	416	412	340	398	365	380	382	367	A	A					
16									380	A	A	A	A	A	U L 376	U L 365	A	A	A					
17						A	L		A		U L 413	347	A	A	A	A	A	U L 342	A	A				
18						U L 314	L	A	L	A	L	U L 386	400	A	A	A	A	A	A	A				
19						L	A	A	A	A	U L 394	U L 369	A	A	A	A	A	A	A	A				
20							L	L	A	U L 372	L	U L 352	A	A	A	U L 384	342	A	A					
21							L	U L 351	U L 376	A	U L 374	U L 377	A	A	A	A	A	A	L	A				
22							A	A	A	A	A	A	U L 270	U L 338		A	U L 329	A	A	A				
23						A	L	A	A	U L 381	U L 369	U L 378	U L 313	A	A	334	U L 338	U L 340	A	A				
24							L	A	A	A	A	A	A	A	A	A	U L 373	U L 363	U L 347	L				
25						A	A	A	A	A	A	A	A	A	A	A	A	U L 354	A	A				
26							L	A	A	A	A	A	A	A	388	389	366	A	A	A				
27							A	A	A	A	382	A	U L 385	U L 357	U L 357	A	U L 358	362	A	A				
28							A	A	L	A	A	A	U L 360	U L 382	U L 378		A	U L 354	A	A				
29						L	A	A	A	A	A	U L 369	U L 343	U L 355	U L 347		A	A	A	A				
30							L	A	A	A	A	U L 391	U L 385	U L 362	U L 392		A	U L 348	U L 365	L				
31																								
	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	5	5	9	10	12	10	10	12	18	15	6						
MED						U L 314	U L 306	359	380	390	378	377	382	364	372	U L 360	354	U L 346						
U Q								374	389	410	394	383	398	375	382	371	364	365						
L Q									352	362	382	369	369	343	355	346	349	342	337					

JUN. 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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						E A 292	296	248	290	E A 328	A	A	E A 482	E A 408	A	386	326	306	A					
2							414	E A 406	A	416	A	E A 382	E A 416	A	E A 382	478	360	324	304					
3							402	358	348	A	A	E A 414	E A 414	E A 402	332	356	364	298	276					
4								350	E A 332	294	320	336	362	334	372	332	308	322	286					
5							306	280	298	326	292	356	374	334	320	322	290	282	274					
6						302	318	274	258	276	E A 346	A	A	A	342	346	E A 332	E A 292	E A 272					
7						E A 324	E A 356	A	A	A	508	A	A	456	466	344	354	354	316					
8						E A 256	A	A	A	A	A	A	A	E A 404	E A 376	400	322	286	278					
9						E A 270	A	A	A	A	A	A	348	A	340	320	306	284	E A 298					
10	E A 284							276	270	E A 364	E A 408	E A 408	400	348	E A 330	E A 326	328	280						
11							296	E A 284	A	284	A	A	A	386	A	E A 428	380	306	260					
12							E A 396	A	A	A	394	E A 384	E A 338	326	320	326	300	300	276					
13							312	284	252	262	462	370	390	336	312	338	354	286	272					
14							272	288	254	300	E A 280	A	334	312	E A 322	E A 328	E A 318	E A 324						
15							308	296	268	274	300	388	332	384	354	336	328	330	302					
16									304	A	A	288	E A 396	E A 356	E A 396	374	316	E A 320	E A 270					
17						A	324	312	260	258	390	A	E A 368	E A 480	E A 414	E A 328	304	290	276					
18						366	306	260	298	272	310	326	344	A	322	E A 316	E A 308	E A 280	E A 268					
19						332	264	262	238	262	296	382	364	340	E A 338	306	A	E A 290	E A 264					
20							264	238	E A 272	292	316	378	352	E A 382	E A 330	326	324	294	262					
21							258	274	312	272	334	352	E A 316	E A 364	332	314	320	310	288					
22							E A 352	262	344	370	316	298	370	388	340	316	308	284	286					
23						286	282	252	256	342	384	346	392	E A 394	E A 336	318	304	294	270					
24							264	E A 378	A	386	A	A	E A 376	E A 386	E A 416	392	332	274						
25						E A 348	306	264	E A 294	A	E A 394	E A 384	A	A	A	A	322	A	290					
26							346	294	264	358	294	A	A	340	304	328	324	318	A					
27							E A 256	A	E A 304	E A 306	376	326	320	332	356	334	316	A	A					
28							E A 288	272	272	338	A	E A 398	E A 324	320	306	264	296	E A 310	E A 324					
29						326	A	284	A	A	376	334	306	304	334	322	290	308	266					
30							300	E A 312	310	A	294	444	488	R 358	458	356	368	338	296					
31																								
	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					9	25	24	22	21	21	20	24	24	27	29	29	27	26					
MED	E A 284					U 313	301	278	275	288	325	U 354	U 354	U 346	335	328	321	297	275					
U Q						340	335	304	304	350	392	386	394	E A 391	376	356	343	320	296					
L Q						E A 289	271	263	260	273	298	335	336	334	322	321	307	286	270					

JUN. 2013 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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 A E A E A E A E A	314	304	268	286	294	A	A	A	A	A	A	A	A	A	E A	A	A	A	E A	A	E A	E A	E A	E A	
2	E A E A E A E A E A	316	278	296	248	240	250	A	A	A	A	A	A	A	A	222	214	A	A	E A	E A	250	250	326	362	326
3	E B E A E A E A E A	288	314	286	260	246	212	272	A	A	A	A	A	A	A	E A	A	A	220	234	230	242	278	280	282	
4	E A E A E A E A E A	310	286	250	230	266	222	210	264	A	198	232	210	200	A	E A	A	224	220	212	234	212	248	286	278	
5	E A E B E B E B	276	260	250	234	216	224	228	208	192	192	198	222	192	216	214	A	A	A	A	E A	E A	E A	E A	E B	E A
6	E A E A E A E A E A	274	274	338	288	276	A	228	A	A	218	A	A	A	E A	E A	A	A	216	244	248	264	322	322	326	
7	E A E A E A E A E A	324	306	260	288	288	A	A	A	A	238	A	A	E A	E A	E A	E A	218	238	260	228	218	310	372		
8	E B E A E B E A E A	274	294	286	300	300	A	A	A	A	A	A	A	A	A	216	A	A	A	E A	E A	E A	E A	E A	E A	
9	E B E A E A E A E A	244	314	336	308	276	248	A	A	A	A	A	A	A	A	240	222	214	A	E A	E A	250	224	280	280	
10	E A E A E A E A E A	314	274	284	298	252	252	A	A	A	A	216	A	A	A	242	206	A	238	220	288	284	326	270		
11	E A E A E A E A E A	270	220	246	258	314	244	A	A	A	A	A	A	A	A	A	A	228	A	A	E A	E A	E A	E A	E A	
12	E A E A E A E A E B	312	306	288	278	260	210	A	A	A	A	A	A	A	A	206	A	A	214	238	240	244	270	262		
13	E B E B E B E A E A	256	258	308	288	284	250	212	204	206	200	216	184	A	210	234	218	A	A	E A	E A	262	254	260		
14	E A E A E A E A E A	270	268	252	268	258	232	208	202	A	194	A	A	A	224	A	A	A	A	A	E A	E A	E A	E A	E A	
15	E A E A E A E B E A	308	296	244	252	248	254	224	188	198	198	186	222	216	198	194	212	218	A	E A	256	234	242	250	252	
16	E A E A E B E A E A	272	270	244	276	264	238	218	216	200	A	A	A	A	A	216	226	A	A	E A	E A	268	246	274	306	298
17	E A E B E A E A E A	286	244	292	254	248	A	252	228	A	200	234	A	A	A	A	A	214	A	E A	E A	240	256	230	322	
18	E A E A E A E A E A	314	308	260	246	320	258	250	A	238	210	198	210	A	A	A	A	A	A	A	224	238	242	264	244	
19	E B E B E A E A E A	256	282	272	310	320	246	A	A	A	A	198	206	A	A	A	A	A	A	A	216	274	270	272	258	
20	E A E A E B E B E B	274	270	260	264	244	234	212	192	A	200	194	214	A	A	A	208	210	A	A	232	252	300	318	294	
21	E B E A E B E B E B	270	278	292	278	232	210	214	216	216	A	E A	214	A	A	A	A	A	208	E A	250	212	260	300	326	
22	E A E A E A E A E A	318	316	290	256	224	284	A	A	A	A	A	A	A	A	232	212	A	A	E A	272	254	258	286	280	246
23	E A E A E A E A E A	274	258	244	302	254	A	248	A	A	188	206	206	308	A	250	242	222	A	A	230	270	304	312	288	
24	E A E A E A E A E B	308	290	340	294	252	220	206	A	A	A	A	A	A	A	A	220	222	220	234	230	234	342	316	324	
25	E A E A E A E A E A	314	270	320	316	342	A	A	A	A	A	A	A	A	A	A	242	A	A	E A	E A	264	252	268	294	292
26	E B E A E A E A E A	244	268	304	268	276	244	224	A	A	A	A	A	A	A	232	192	210	A	A	244	260	252	266	314	
27	E A E A E A E A E A	316	276	284	270	242	220	A	A	A	A	198	A	208	214	A	236	240	A	E A	250	244	258	280	276	
28	E A E A E A E A E A	248	302	324	280	292	222	A	A	204	A	A	A	208	208	206	A	214	A	E A	318	312	324	276	262	
29	E A E A E B E B E B	282	256	290	284	300	280	A	A	A	A	A	214	218	214	216	A	A	A	E A	264	248	230	270	272	
30	E A E A E A E A E A	310	252	264	280	260	238	224	A	A	A	A	212	212	202	214	A	232	232	236	252	230	228	266	298	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	29	30	30	30	30	23	17	9	8	9	12	12	10	10	12	18	15	8	8	28	28	30	30	30		
MED	E A E A E A E A E A	282	278	285	278	265	238	218	206	204	198	205	213	210	214	212	224	220	220	234	E A	E A	E A	E A	E A	290
U Q	E A E A E A E A E A	313	304	296	288	294	250	249	222	225	200	226	215	218	224	241	254	232	224	237	262	259	286	312	322	
L Q	E B E B E A E A E A	270	268	260	258	248	222	212	197	199	193	198	206	208	208	208	216	214	216	215	233	239	244	270	270	

JUN. 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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						A	A	A		A	A	A	A	A	A	A	A	A	A					
2						116	112		A	A	A	A	A	A	A	A	A	A	A					
3						A		112	116	114		A	A	A	A	A	A		112					
4						B		122	108		A	A			A	A	A	A	122					
5						114	114	114	114	122	118	122	122		A	118	118		A	A				
6						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
7						A	A	A	A	A		116	116		A	120	118	118		A	A			
8						A	A	A	A	A	A	A	A		122	122	120		A	A				
9							A	A	A	A	A	A	A		A	A								
10	A					116	122		A	A	A	A		A	A		A		116	118	114			
11						A		A	A	A	A	A			116	116		A	A	A				
12						124		A	A	A	A	A	A	A	A	A	A	A	A					
13						124		A		120	120	120		A	A	A	A		120	120				
14						116	114	114		A	118			A	120	124	118		A	A				
15						A	A	A	A	A		108	110		A	116	118	118	114					
16						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
17						B	A		A		A	A	A	A	A	A	A		120		A	A		
18						A	A	A	A	A	A	A		110		A	A	A	A	A				
19						A	A	A	A	A	A		114	112	114		A	A	A	A				
20						A	A	A	A	A	A		118	116		A	116		A	A				
21						A				A								A	A					
22						A	A	A	A	A	A									A	A			
23						B	A	A	A	A	A		114		A	A	A		A	A				
24						114	114		A	A	A	A	A	A	A		A		A		110	110		
25						A		114		A	A	A	A	A	A	A		A		110	106			
26						A		108		A	A	A	A	A		A	122	126		A	114			
27						112		A	A	A	A	A	A	A	A	A		A		120				
28						A	A	A	A	A	A		A	124	128	118	118	108		A	A			
29						B	A	A		A	A										A	A		
30						A	A	A	A	A	A		126	120	120	122	122	114		A	A			
31												118	118	114		A	110	110						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						9	11	7	6	4	5	10	11	11	11	16	10	7	4					
MED						116	114	114	115	119	116	116	118	120	118	118	114	112	113					
U Q						120	118	116	118	121	117	118	122	122	122	120	120	114	118					
L Q						114	112	110	114	114	111	114	114	116	118	116	110	110	108					

JUN. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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	104	102	96	96	98	98	98	120	116	104	104	104	112	104	104	104	104	104	96	98	98	98	102	102
2	96	96	96	100	132	124	118	106	106	104	102	106	110	104	104	104	110	106	104	102	106	106	102	100
3	100	98	94	90	90	90	164	122	120	102	104	104	104	104	102	100	102	G	104	102	100	94	94	94
4	104	96	98	98	102	98	118	120	108	106	116	118	G	106	102	104	106	G	B	B		98	92	90
5	94	94	96	92	100	G	132	G	114	G	G	120	G	104	124	118	106	106	106	100	102	96	106	102
6	102	98	98	98	98	100	106	104	104	104	104	102	100	98	102	102	96	96	114	114	102	102	104	104
7	104	102	98	94	108	108	106	98	96	96	120	120	108	116	116	110	100	100	104	B	94	94	94	104
8	110	106	106	104	104	106	106	98	102	100	100	102	102	118	116	116	106	94	98	104	92	94	94	94
9	96	96	96	96	100	112	102	102	102	102	100	104	106	104	106	G	118	G	108	106	106	98	102	100
10	100	100	96	96	96	122	120	106	104	104	100	102	G	106	104	100	112	120	114	100	104	108	108	108
11	96	98	98	98	98	124	116	104	110	110	104	104	104	136	120	106	106	110	106	106	104	106	106	106
12	100	94	94	94	96	128	108	104	104	100	106	102	102	98	98	98	102	94	G	94	92	88	90	100
13	112	98	98	98	96	G	104	G	G	G	108	106	106	104	104	G	106	106	104	104	104	96	102	92
14	88	92	94	94	94	120	G	G	102	G	96	96	100	G	126	120	108	104	102	102	102	102	94	94
15	98	98	100	104	98	98	102	102	106	102	102	98	122	G	116	120	106	106	104	98	100	100	104	
16	100	94	100	96	94	108	102	106	106	100	96	100	98	98	100	102	100	112	112	110	88	88	106	100
17	104	98	96	96	112	98	98	118	106	122	108	102	102	106	104	104	104	104	C	102	100	96	96	96
18	100	100	100	100	96	98	100	100	100	98	102	106	G	114	106	108	104	106	106	102	106	92	92	100
19	92	100	100	100	100	100	102	96	98	100	100	100	116	118	106	104	104	104	102	100	98	92	90	92
20	94	96	96	96	B	104	102	100	102	102	100	120	116	106	102	G	104	104	102	102	102	106	100	98
21	100	102	100	100	B	108	G	124	122	106	118	118	G	116	118	118	110	108	104	104	96	94	94	96
22	98	98	96	104	104	104	102	102	104	102	102	102	G	G	114	120	118	108	106	106	98	98	112	102
23	100	102	100	94	104	106	106	98	100	102	104	128	96	90	126	130	108	106	104	100	98	98	94	94
24	94	94	94	92	94	142	112	102	98	108	102	100	98	96	104	118	104	96	92	96	90	90	104	102
25	100	100	100	102	102	116	116	106	106	106	106	106	104	104	100	102	98	114	112	104	104	106	106	104
26	102	100	100	100	98	102	118	104	104	100	100	96	94	104	114	G	108	116	102	104	104	104	B	98
27	98	102	98	92	92	116	106	104	100	100	100	100	102	104	106	106	128	104	102	102	100	98	112	102
28	98	102	102	102	102	104	102	104	102	98	92	98	G	G	G	120	118	106	102	102	102	102	102	102
29	102	102	110	B	B	114	102	106	120	104	104	G	G	G	128	122	128	116	104	104	B	B	B	B
30	116	110	110	106	104	104	108	106	104	108	108	G	G	G	100	130	120	112	104	104	B	B	B	B
31																								
	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	30	30	29	27	28	28	27	29	27	29	26	23	26	28	26	29	27	29	27	27	28	27	28
MED	100	98	98	98	98	106	106	104	104	102	102	104	104	104	105	106	106	106	104	102	100	98	102	100
U Q	102	102	100	100	104	116	116	106	107	106	106	106	110	116	116	118	114	108	106	104	104	104	102	106
L Q	96	96	96	94	96	100	102	102	102	100	100	102	100	104	102	104	104	104	102	100	96	94	94	94

JUN. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUN. 2013 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

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	F3	F7	F5	F5	F3	L3	L2	CL12	CL22	L2	L2	L2	L3	L2	L2	L2	L3	L3	F4	F4	F4	F2	F2	
2	F4	F4	F3	F3	F1	C2	C2	L2	L3	L2	L2	L2	L2	L2	L2	L2	L2	L2	F2	F2	F3	F3	F5	
3	F2	F4	F3	F4	F3	L3	H1	C2	C1	L3	L2	L2	L2	L2	L2	L2	L2	L2	F1	F2	F2	F2	F2	
4	F7	F4	F3	F2	F3	L2	C2	C2	L3	L2	C1	C1	L2	L2	L2	L2	L2	L2				F1	F3	F2
5	F2	F1	F1	F1	F3		C2		C1		C2		L2	C1	C2	L2	L2	L1	F3	FF34	F3	FF22	F4	
6	F3	F3	F4	F3	F5	L3	L2	L2	L3	L2	L2	L2	L2	L3	L2	L2	L2	L3	C2	F2	F4	F3	F4	F4
7	F4	F4	F3	F4	F5	L3	L2	L3	L3	L2	C1	C2	L2	C1	C1	C1	L2	L2	L2		F2	F1	F2	FF22
8	FF22	FF22	F2	F3	F3	L2	L3	L3	L2	L2	L2	L2	L2	C2	C2	C2	L2	L2	L2	F3	F5	F3	F4	F3
9	F4	F4	F5	F3	F4	C2	L3	L3	L2	L2	L3	L2	L2	L2	L2		C1		L2	F4	FF23	F3	F5	F3
10	L4	F5	F2	F5	F2	C3	C2	L3	L2	L2	L2	L2		L2	L2	L2	C1	CL11	CL23	L3	FF33	F4	F4	F4
11	F3	F2	F3	F2	F3	CL23	C2	L3	L2	L2	L2	L2	L2	H1	C2	C2	L2	L2	L2	F3	F3	F2	F4	F3
12	F4	F3	F5	F3	F2	C2	L3	L3	L3	L2	L2	L2	L2	L2	L2	L2	L2	L3		F3	F3	F3	F2	F1
13	F2	F2	F3	F3	F3		L2				L2	L2	L2	L2	L2			L3	L3	F4	F4	F3	F2	F2
14	F2	F3	F2	F2	F2	C2			L2		L3	L3	L2		C2	C2	L2	L3	L3	F4	F4	F4	F3	F3
15	F3	F3	F3	F2	F2	L2	L2	L2	L2	L2	L2	L2	L2	C1		C1	C1	L2	L3	F2	F3	F2	F4	F2
16	F3	F2	F1	F2	F1	L3	L3	L3	L2	L2	L2	L2	L2	L2	L2	L2	L2	CL33	CL32	FF23	F3	F2	F2	F3
17	F3	F4	F4	F4	F2	L4	L2	C2	L2	C1	L1	L3	L2	L3	L2	L2	L2	L3	L4	F4	F4	F3	F3	F5
18	F6	F4	F3	F3	F4	L2	L3	L2	L2	L2	L2	L2	C1	L2	L2	L2	L3	L2	L3	F3	F4	F2	F2	F2
19	F2	F2	F3	F3	F3	L2	L2	L2	L3	L2	L2		C2	C2	L2	L3	L3	L2	L3	F4	FF43	F2	F4	F2
20	F3	F2	F2	F2		L2	L2	L2	L3	L2	L2	C1	C2	L2	L2		L2	L2	L2	F3	F2	F4	F4	F4
21	F2	F2	F1	F2		L2		C2	C1	L2	C1	C1	C1	C2	C1	C2	L2	L2	L2	F3	F3	F2	F2	F3
22	F4	F4	F6	F3	F2	L3	L3	L2	L2	L2	L1	L2			C1	C1	C2	L3	L4	F4	F2	F2	F2	F3
23	F3	F3	F3	F4	F3	L3	L2	L3	L2	L2	L2	L1	L2	L3	CL12	C2	L2	L2	L2	F3	F4	F4	F3	F3
24	F4	F3	F3	F2	F1	H1	C1	L2	L3	L2	L2	L2	L3	L2	L2	L2	L2	L1	L2	F1	F4	F2	F2	F5
25	F6	F4	F3	F4	F4	C3	C2	L2	L2	L2	L2	L2	L2	L2	L2	L3	L2	L3	L3	F2	F2	F2	F3	F2
26	F3	F3	F3	F4	F4	L2	C1	L2	L2	L2	L2	L2	L2	LC11	C2		L2	C2	L4	F3	FF8	F2		F3
27	F3	F3	F3	F3	F2	C1	L4	L4	L3	L2	L2	L1	L2	L2	L2	L2	C1	L4	L3	F2	F3	F2	F3	F3
28	F3	F3	F3	F6	F5	L2	L2	L2	L2	L2	L3	L2				C1	C2	L2	L4	F4	F5	F5	F4	F2
29	F4	F2	F2			C2	L2	L3	C2	L2	L1			C1	C1	C1	C2	L2	L3					
30	F3	F4	F4	F3	F3	L2	L2	L2	L2	L2	L2			L1	C1	C1	C1	L2	L2	F3				
31																								
	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																								

JUN. 2013 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	X 90	X 94	X 90	X 78	X 70	X 76															X 74	X 67	X 69	X 69	
2	X 70	X 77	X 72	X 67	X 54	X 54																X 69	X 71	X 72	X 73
3	X 72	X 70	X 69	X 66	X 51	X 48																X 82	X 82	X 86	X 86
4	X 90	X 90	X 82	X 75	X 64																	X 87	X 87	X 87	X 86
5	X 87	X 85	X 85	X 79	X 66																	X 92	X 83	X 82	X 84
6	X 80	X 80	X 78	X 70	X 71																	X 87	X 82	X 79	X 83
7	X 90	X 84	X 85	X 74	X 72																	X 62	A	X 59	X 58
8	X 59	X 60	X 60	X 65	X 60																	X 82	X 80	X 75	X 71
9	X 73	X 70	X 67	X 52	X 68	X 68	X 78															X 109	X 94	X 72	X 77
10	X 80	X 80	X 76	X 76	X 75	X 74																X 76	X 77	X 78	X 84
11	X 86	X 86	X 78	X 75	X 69																	X 69	X 70	X 70	X 76
12	X 74	X 74	X 73	X 71	X 70	X 70																X 77	X 83	X 72	X 70
13	X 68	X 70	X 64	X 66	X 69	X 67	X 78															X 90	X 85	X 83	X 84
14	X 81	X 78	X 78	X 77	X 74																	X 101	X 76	X 78	X 81
15	X 85	X 84	X 83	X 81	X 79	X 68		X 95														X 94	X 92	X 87	X 85
16	X 87	X 86	X 80	X 84	X 88																	X 80	X 76	X 74	X 74
17	X 82	X 86	X 85	X 82	X 80	X 72	X 78															X 98	X 92	X 92	X 85
18	X 84	X 82	X 85	X 87	X 68	X 66	X 73															X 96	X 93	X 88	X 86
19	X 81	X 76	X 73	X 73	X 70	X 66																X 88	X 92	X 98	X 91
20	X 86	X 79	X 81	X 79	X 79																	X 81	X 88	X 87	X 85
21	X 92	X 92	X 94	X 91	X 96																	X 91	X 84	X 86	X 89
22	X 90	X 90	X 85	X 78	X 71	X 65																X 80	X 84	X 84	X 82
23	X 84	X 84	X 74	X 68	X 62																	X 90	X 90	X 94	X 98
24	X 90	X 83	X 78	X 77	X 75	X 82																X 66	X 70	X 74	X 75
25	X 78	X 80	X 72	X 70	X 69	X 70																X 81	X 80	X 78	X 82
26	X 80	X 79	X 76	X 75	X 67	X 66	X 67															X 83	X 82	X 81	X 80
27	X 76	X 76	X 76	X 76																		X 82	X 77	X 81	X 83
28	X 78	X 80	X 80	X 76	X 76	X 74	X 72	X 79														X 92	X 92	X 85	X 82
29	X 92	X 93	X 92	X 89	X 78																	X 98	X 98	X 92	X 94
30	X 86	X 98	X 86	X 82	X 77		X 62															X 89	X 72	X 71	X 71
31																									
	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	30	30	30	29	16	7	2													30	29	30	30	
MED	X 83	X 81	X 78	X 76	X 70	X 68	X 73	X 87													X 85	X 83	X 81	X 82	
U Q	X 87	X 86	X 85	X 79	X 76	X 73	X 78														X 92	X 91	X 87	X 85	
L Q	X 78	X 77	X 73	X 70	X 68	X 66	X 67														X 80	X 76	X 74	X 75	

JUN. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	V	84	85	83	70	F	V	F					A	A					A	R						
2		64	F	F	F	F	F	F			A		A	A					J	R	J	R				
3		66	64	F	F	F	F	F			A	A														
4		84	84	F	F	F	F	F																		
5		81	F	F	F	F	F	F		V																
6	F	F	F	F	F	F	F	F																		
7		84	77	F	F	F	F	F		V																
8		53	F	F	F	F	F	F		U	R	R									U	R			F	
9	F	F	F	F	F	F	F	F																		
10	F	F	F	F	F	F	F	F																		
11	F	F	F	F	F	F	F	F		U	R	R														
12	F	F	F	F	F	F	F	F		A															Z	
13		62	V	F	F	F	F	F																		
14		75	F	F	F	F	F	F		R															F	
15	F	F	F	F	F	F	F	F		J	R															
16		81	80	F	F	F	F	F																	F	
17		74	F	F	F	F	F	F																		
18		78	F	F	F	F	F	F																		
19		75	F	F	F	F	F	F																	Z	
20		80	73	F	F	F	F	F																		
21		86	86	F	F	F	F	F													U	A		V	V	
22	F	F	F	F	F	F	F	F		A	J	R	J	R												
23		78	78	F	F	F	F	F																	F	
24		84	F	F	F	F	F	F																		
25		72	F	F	F	F	F	F																	F	
26	F	F	F	F	F	F	F	F																		
27	R	F	F	F	F	F	F	F																	F	
28	F	F	F	F	F	F	F	F																	F	
29	F	F	F	F	F	F	F	F		E	G	J	R													
30		80	92	F	F	F	F	F		V																
31																										
		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	30	30	30	30	30	29	28	27	25	26	25	23	26	27	27	29	28	29	30	30	29	30	30	
MED		74	F	F	F	F	F	58	65	72	76	68	67	69	74	77	82	85	90	92	93	88	79	77	74	75
U Q		81	79	F	F	F	F	64	68	84	82	76	72	73	78	87	92	96	98	101	96	94	86	85	81	79
L Q		70	F	F	F	F	F	55	59	67	68	62	62	65	69	70	75	77	81	84	84	78	74	71	67	67

JUN. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	A	A	A	A	A	A	A	A	A						
2								U	L	A	A		A	A	A		468	472	444	348				
3								440	468			A	U	A				A	A	L	A	L		
4								U	L	U	L	U	L		A	A		A	A	U	L	U	L	
5								L	L	L	A	A					U	A	U	A	A	A		
6								A	U	L	U	L	L		A	U	A	U	A	488	476	468		L
7								L	L	A	A			A	U	A		A						
8								392	408			468	480		480	476		464	456	420				
9									L	A		A		A			U	A	U	A	L	L		
10									A	A	A	L	A	A				A	L					
11								L		L	L	A			R	U	A		A					
12								412	448			488	504	500	452	500		A				376		
13								L	A	A	A	U	A									U	L	
14								U	L	U	L	U	L		L							U	L	
15								408	424	396	472		492	508	504	484	484	472	456	424				
16									L	U	L	L	L		R	U	A	U	A	A	A	A	A	
17								416	468	456	552	508	504	480	484									
18								U	L	L	L	L			U	A	A	U	A	A	A	A	A	
19								444	452	460	524	540	512	472	508	504	472	456			L	A	A	
20								L	U	L	A	A		U	A	A	A	A	A	A				
21								464	496			504	564		504									
22								436	424		A	A	A	A	A	A	A	A	A					
23								L	L	A	A	L	L											
24								404				524	520	516										
25								L	L	A	A	L	L									A	A	
26								A	L	A		528	528	516	512	516	504	484						
27									L	A		A	U	A	R	R	A	U	A	A	A	U	L	
28								A	L	A		492	504	500				520				A	U	L
29									A	U	L	L	A	A	A							A	A	
30									A	U	L	L	A	A										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	12	12	15	13	15	16	22	21	18	19	17	12		2			
MED							U	L	U	L	L	L	U	L	U	L	U	L	U	L	U	L	U	L
U Q							392	428	458	484	516	508	512	504	504	494	476	456	406		322			
L Q							U	L	U	L	L	L	L	U	A	U	A	A	L	U	L	U	L	
							312	410	444	464	486	492	504	496	486	480	468	452	394					

JUN. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 f<sub>o</sub>E (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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						A	228	292	312	340	356	388	396	396	392	384	356	300		A	A			
2						A	A					R	R		R	R								A
3						B	U	A		U	A	U	A		A		U	A		A	A	A	A	A
4						A	208	276	320	336	348	360	376	384	372	368	332	288	240	168				
5						B	220	296	324	352	364	376	392	384	372	360								
6						A	A	A	U	A			R	U	R						U	A		
7						B	228	260	304		A	U	A	U	A	U	A							A
8						A	A	272		B	U	A				R								A
9						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
10						A	A	280	324	352		A	A	A	A	A	A	A	A	A	A	A	A	A
11						A	A	272	312	336	344	372	392	380	372	360	332	296	256					A
12						B	A				U	A	A	U	A		A							A
13						A	228		A	A	A	A		A	A									A
14						B	200	268	324	364	376	392		396	380	368	344	308	248					A
15						A	220		A	A	A	R												A
16						B	232	276	344		A	A	A	A	A	A	A	A	A	A	A	A	A	A
17						A	192	276		A	A	U	A											A
18						B	A	A	A	A	A	A									U	A		A
19						A	A	A	A	A	A										U	A		A
20						B	A	R	A	A	A	A				U	A			U	A		A	
21						A	A				U	A	A	B	B	R	R							A
22						A	200	276	316		A	372					360	352	316	260				A
23						B	212	292	324		A													A
24						B	240	288	328		A	A	A	A	A	A	A	A	A	A	A	A	A	B
25						B	204	280	336	360		A	A	A	A	A	A	A	A	A	A	A	A	A
26						A	A	R	A	R	A	R	A		U	R								A
27					A	A	A	256		376		380					372	352	340	324	248			A
28						B	212	288	320	348		A	A	A	A	A	A	A	A	A	A	A	A	A
29						A	176	264	312	340		R	368		R	R	R	R	R	R	U	R		A
30						B	A	260		B	348	356	380	392	388	376	372	356	308	280				A
31																								
	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	23	19	17	15	16	14	17	19	21	21	23	23	3				
MED							216	280	320	352	364	380	392	384	372	360	340	308	252	172				
U Q							228	288	324	362	372	386	396	394	380	368	352	312	260	172				
L Q							202	272	316	340	352	372	380	378	368	354	332	300	248	168				

JUN. 2013 f<sub>o</sub>E (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
2	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
3	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
4	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
5	J	A	J	A	J	A	J	A	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
7	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	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
10	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
11	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	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	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
15	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	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
18	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	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
21	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
22	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
23	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
25	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
26	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
27	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
28	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
29	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
30	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
LQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A

JUN. 2013 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	26	27	17	31	31	27	45	36	36	68	50	A A A A	81	92	74	55	84	67	A A	158	31	30	36	E B	17	23				
2	20	22	19	17	20	25	25	29	60	A A	66	41	A A A A	166	96	G A	A A	69	38	G	44	25	43	21	16	16	E B	12		
3	24	24	24	E B E B E B	E B E B E B	11	11	22	31	31	64	80	58	51	45	43	50	77	35	40	20	20	E B E B E B	E B	E B	E B	E B			
4	18	E B E B E B E B	14	14	14	24	25	22	30	32	G	G	41	39	40	A A	106	53	62	A A	168	32	14	G E	B	13	26	22	E B	13
5	E B E B E B E B E B	13	13	14	14	14	14	G	G	G	14	14	37	49	50	43	43	43	54	47	58	50	32	37	37	37	E B	E B	12	
6	E B	12	33	23	20	24	14	62	28	38	37	42	48	56	52	50	58	40	G		27	18	18	30	17	45				
7	26	28	22	21	26	E B	14	16	33	A A A A	103	137	41	40	83	41	48	53	40	40	23	29	19	A A	29	19	18			
8	18	E B	12	19	18	17	18	20	28	E B	42	40	59	59	62	G	40	47	46	36	20	35	30	31	30	23				
9	E B	15	30	28	20	20	20	21	31	35	38	40	A A	233	54	45	42	39	35	34	32	32	43	30	22	22				
10	28	27	23	22	22	20	35	69	63	55	44	54	58	38	42	42	70	24	33	26	25	18	22	22						
11	22	22	22	15	E B E B	E B	13	23	35	35	46	42	41	42	44	45	45	64	79	26	26	33	24	18	28					
12	21	24	23	24	18	E B	13	21	63	A A	93	54	46	49	46	44	54	36	G	31	30	35	19	19	22	16	19			
13	18	17	17	17	23	E B	12	15	37	40	40	41	40	40	43	42	42	38	38	28	27	19	18	18	16					
14	19	17	16	16	16	E B	14	24	34	40	46	51	43	43	48	48	A A	97	72	A A	117	68	68	52	22	18	18			
15	E B E B	12	13	12	12	E B E B	13	14	17	27	28	34	33	38	41	47	40	47	36	36	68	64	30	48	40	31				
16	17	17	23	16	E B E B	E B	14	14	12	28	35	46	54	45	56	A A	82	50	68	79	48	80	52	31	30	30	18			
17	18	E B	11	17	17	19	18	32	32	42	50	50	58	A A	112	63	73	A A	101	63	68	57	80	62	44	30	20			
18	E B	12	32	26	19	18	17	19	27	45	45	63	48	47	45	54	A A	97	73	52	62	40	18	29	26	25				
19	18	18	18	E B E B	E B	14	14	16	20	24	73	52	41	G	G	44	44	41	40	49	59	33	33	17	41	22				
20	22	22	23	E B E B	E B	12	12	12	30	25	51	48	96	A A	49	43	43	54	65	52	47	47	18	37	24	23	23			
21	19	18	18	E B E B	E B	15	15	22	24	37	37	38	48	A A A A	191	109	66	38	G	39	36	50	88	25	28	28	28			
22	36	20	26	33	23	23	A A A A	68	84	67	75	63	49	53	46	46	40	44	40	A A	100	26	18	E B	14	17	30			
23	24	32	29	20	29	16	23	30	33	36	G	G	65	78	58	95	48	66	55	42	31	64	49	45						
24	18	27	32	32	18	E B	13	24	A A	73	57	44	142	60	114	77	156	58	42	27	27	32	30	20	20	17				
25	22	25	18	17	E B	12	15	26	37	A A A A A A	79	88	85	112	94	50	50	41	40	38	29	23	22	53	32	24				
26	19	26	E B E B E B	E B E B E B	13	13	12	15	28	28	62	32	46	31	38	G	41	G	G	40	60	41	49	36	18	E B	15			
27	E B E B	14	16	25	24	23	26	26	38	A A	56	164	54	60	66	A A A A	116	92	43	32	48	18	19	18	18	19	19			
28	35	16	E B E B E B E B	E B E B E B	15	15	17	26	27	36	40	45	43	43	38	38	36	28	26	22	48	19	26	23						
29	27	27	38	17	E B	13	18	24	32	50	40	33	40	32	35	30	37	41	54	47	G E	B E B E	E B	E B	E B	E B	23			
30	19	E B E B E B E B E B	12	12	12	12	24	19	34	34	40	55	G	42	49	46	50	41	33	23	18	16	23	22						
31																														
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30			
MED	19	22	20	17	18	15	24	31	40	46	46	49	52	45	48	46	43	40	34	30	28	24	22	22						
U Q	24	27	24	20	23	20	26	37	60	A A	55	54	59	66	63	54	62	64	52	57	41	36	30	30	24	E B	18			
L Q	E B E B E B E B E B	18	16	17	14	14	14	20	28	35	37	41	40	42	43	42	40	38	35	27	22	19	18	18	18	E B	18			

JUN. 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL 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	12	12	12	13	12	12	12	10	12	13	13	23	26	24	24	24	21	14	10	10	14	14	14	14
2	14	14	14	15	15	15	15	15	15	15	16	18	22	24	23	22	21	21	13	13	12	12	12	12
3	12	12	12	12	11	11	12	14	17	16	17	21	38	31	26	18	18	12	12	12	12	14	14	14
4	14	14	14	14	14	14	14	14	14	16	18	17	17	17	20	20	20	14	14	14	13	13	13	13
5	13	13	14	14	14	14	14	14	14	14	14	14	20	20	20	14	15	15	15	15	12	12	12	12
6	12	12	14	14	14	13	13	13	13	14	16	17	18	18	19	18	15	13	12	12	12	12	12	12
7	14	14	14	14	14	14	14	14	14	9	14	22	22	22	22	22	17	16	14	12	12	12	12	12
8	12	12	12	13	12	12	12	12	42	23	24	28	35	27	27	22	20	18	14	14	14	14	14	14
9	15	15	15	13	12	15	15	15	16	16	21	20	28	23	22	15	15	15	15	15	14	14	14	15
10	14	13	13	13	13	14	14	14	20	17	16	18	24	28	22	16	17	16	14	14	16	14	14	14
11	14	14	14	14	15	13	12	12	16	16	16	16	16	16	16	16	16	16	16	12	12	12	12	12
12	12	12	12	12	12	13	11	15	15	15	22	18	18	18	27	19	19	18	15	13	13	14	14	14
13	12	12	12	14	14	12	13	12	12	19	18	18	17	22	22	18	16	13	12	12	14	14	14	14
14	12	12	14	14	14	14	14	14	14	14	17	18	17	17	16	16	16	12	14	14	13	12	12	12
15	12	13	12	12	13	10	10	10	10	10	11	16	16	19	18	18	18	18	12	12	16	15	15	15
16	12	14	14	14	14	14	14	14	14	14	19	21	22	20	20	19	19	15	15	15	15	14	14	14
17	11	11	11	11	12	13	13	13	13	14	16	23	22	25	25	18	17	16	15	12	12	12	12	12
18	12	13	14	14	14	14	14	13	16	16	21	30	30	21	20	19	16	16	17	15	12	12	12	12
19	12	12	12	14	14	11	11	13	13	13	21	20	22	22	22	18	17	16	15	15	15	15	15	15
20	12	12	12	12	12	12	12	12	14	17	20	20	20	21	23	22	22	16	16	16	14	14	14	14
21	15	15	15	15	15	15	14	12	12	15	15	18	52	44	28	23	20	16	15	12	13	14	14	14
22	13	13	13	13	13	13	13	12	16	16	23	26	27	26	21	20	17	16	16	16	14	14	14	14
23	14	14	12	12	12	12	12	12	16	18	18	17	19	20	21	20	16	16	12	11	13	12	12	13
24	13	13	13	13	13	13	14	14	14	14	14	16	27	22	22	19	18	18	16	13	13	13	13	12
25	12	12	12	12	12	12	12	12	15	17	23	25	27	26	26	26	20	16	15	11	11	11	11	11
26	14	13	13	13	12	12	12	17	13	16	18	18	21	26	17	18	17	16	16	17	15	15	15	15
27	14	16	16	14	14	14	14	14	14	17	20	28	25	25	24	22	22	15	15	13	12	12	12	12
28	15	15	15	15	16	15	15	15	14	14	15	32	28	29	25	19	18	17	16	16	16	14	14	14
29	14	14	14	13	13	13	13	14	14	16	15	16	21	31	21	19	17	14	14	15	15	13	12	14
30	14	12	12	12	12	12	14	13	31	20	20	20	22	22	22	18	19	16	15	15	14	15	10	14
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	13	13	13	13	13	13	13	14	14	16	18	19	22	22	22	19	18	16	15	14	13	14	14	14
U Q	14	14	14	14	14	14	14	14	16	17	20	23	27	26	24	22	20	16	15	15	14	14	14	14
L Q	12	12	12	12	12	12	12	12	13	14	15	17	19	20	20	18	16	15	14	12	12	12	12	12

JUN. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	V				F	V	F					A	A					A	R					
2		F	F	F	F	F	F	F	A			A	A	255	252	252	281		J	R	J	R		
3			F	F	F	F	F			A	A			278			289	287	313	271	310	280	274	269
4			F	F	F	F	F							278	289	284	277	A						
5		F	F	F	F	F	F		V									A						
6	F	F	F	F	F	F	F																	
7			F	F	F	F	F			A	A													
8		F	F	F	F	F	F			U	R	A									U	R		F
9	F	F	F	F	F	F	F					A												
10	F	F	F	F	F	F	F																	F
11	F	F	F	F	F	F	F			U	R	A												F
12	F	F	F	F	F	F	F				R													Z
13			V																					
14		F	F	F	F	F	F			R														F
15	F	F	F	F	F	F	F			J	R													F
16		F	F	F	F	F	F																	F
17		F	F	F	F	F	F																	
18		F	F	F	F	F	F																	
19		F	F	F	F	F	F																	
20			F	F	F	F	F																	
21		F	F	F	F	F	F																	V
22	F	F	F	F	F	F	F																	V
23		F	F	F	F	F	F																	
24		F	F	F	F	F	F																	
25	F	F	F	F	F	F	F																	F
26	F	F	F	F	F	F	F																	F
27	R	F	F	F	F	F	F																	F
28	F	F	F	F	F	F	F																	F
29	F	F	F	F	F	F	F			G	R													
30																								
31																								
	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	30	30	30	30	30	29	28	25	23	25	25	23	26	27	27	28	28	29	30	30	29	30	30
MED	282	288	294	292	296	295	317	328	330	319	305	291	285	282	284	288	292	298	301	310	298	283	283	280
U Q	293	297	302	304	303	319	332	340	339	325	320	305	298	294	294	294	298	304	316	319	305	297	292	291
L Q	274	280	286	286	284	284	298	306	318	312	290	278	270	278	280	279	287	290	296	302	287	276	271	273

JUN. 2013 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	A	A	A	A	A	A	A	A	A																											
2								U	L	A	A		A	A		A			A	U	L	A																							
3								3	3	3	4	A	A	A	A	A		A	A	L	A	L																							
4								U	L	U	L	U	L	U	L	A	A	A	A	U	L	U	L																						
5								3	6	8	3	6	1	3	7	2	3	7	6	3	7	9	3	9																					
6								L	L	H	A	A					A	A	A	A																									
7								A	U	L	U	L	L	A	A	A	A	A	L	U	L	L																							
8								3	8	3	3	9	3	3	6	0	3	5	0	3	3	7	3	4	5																				
9								L	L	A	A			A	A		A	A	A	L																									
10								3	0	4	3	4	5	A	A		A	A	A	L																									
11								L	L	A	A			A	A		A	A	L																										
12								3	6	8	3	6	2	L	L	A	A	A	A	L																									
13								U	L	A	A	L	L	L	L				A	U	L																								
14								3	6	1		3	9	9	4	0	2	4	0	0	3	7	1																						
15								L	U	L	A	A		R	A	A	A	A	A	A	A																								
16								3	8	5	3	7	1	L	L					A	A																								
17								U	L	L	L	L	L	A					A	A	A																								
18								3	4	5	3	9	1	4	1	2	3	8	2	3	7	0	3	9	1																				
19								L	U	L	A	A	A	A	A	A	A	A	A	A	A																								
20								3	7	0	A	A	A	A	A	A	A	A	A	A																									
21								3	7	0	A	A	A	A	A	A	A	A	A	A																									
22								3	7	0	A	A	A	A	A	A	A	A	A	A																									
23								3	7	0	A	A	A	A	A	A	A	A	A	A																									
24								3	7	0	A	A	A	A	A	A	A	A	A	A																									
25								3	7	0	A	A	A	A	A	A	A	A	A	A																									
26								3	7	0	A	A	A	A	A	A	A	A	A	A																									
27								3	7	0	A	A	A	A	A	A	A	A	A	A																									
28								3	7	0	A	A	A	A	A	A	A	A	A	A																									
29								3	7	0	A	A	A	A	A	A	A	A	A	A																									
30								3	7	0	A	A	A	A	A	A	A	A	A	A																									
31								3	7	0	A	A	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							3	11	10	13	11	12	14	16	12	13	14	14	11	2																									
MED							U	L	U	L	L								U	L																									
U Q							3	6	1	3	6	2	3	6	7	3	6	7	3	6	4	3	5	4	3	5	6	3	5	4															
L Q							U	L	U	L									U	L																									
							4	6	9	3	8	3	3	7	1	3	9	0	3	8	1	3	8	2	3	9	4	3	8	3	3	9	4	3	8	2	3	6	8	3	6	7	3	6	4
							L	L	U	L									L	L																									
							3	0	4	3	4	2	3	5	8	3	5	8	3	4	7	3	5	8	3	7	1	3	7	2	3	6	7	3	5	6	3	5	1	3	4	5	3	4	4

JUN. 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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										A		A				E A		A						
2								316	A	A	428	A	A	444	A	400	394	340	298	284				
3								308	308		A	A	374	354	390	384	362	E A	A	306	296	262		
4								302	282	282	346	310	416		352	352		A	294	294	292			
5								246	246	324	324	E A	A	390	390	340	324	324	A	302	294			
6							E A	326	252	252	296	356	330	350	350	348	342	338	318	310	280			
7								316	316		A	A	514	416		A	510	466	386	386	362	310		
8								278	298	272		A	A	352	352	412	370	370	342	310	294			
9								288		312	366		A	348	348	368	368	336	320	320				
10								A E A	A	A		A	348	344	376	356	338	326	290					
11								304	280	238	278		A	412	528	394	330	380	E A E A	362	362	280		
12								274	274		A	330	410	346	350	348	324	324	322	312	266			
13								282	240	240	272	326	350	390	346	396	396	A	A	A	A			
14								286	274	294	334	340	342	324	334							286		
15								282	262	262	322	416	346	346	354	346	A E A	A	E A	346	326	E A	E A	
16								266	288	288	288	308	434		A	438	382	346	292	302				
17								276	232		A	E A	A	A	A	A	A					E A	E A	
18								292	254		E A	A	334	334	400	342	342		A	368	318	318		
19								264	258	E A E A	A	324	352	352	378	366	328	282	282	282				
20								248	248	260		A	360	440	342	342	342	342	292	282	266			
21								282	288	286	E A	A		A	E A	A	382	348	348	304	318	314		
22								A	A	A	A	E A	332	296	442	384	374	344	312	306				
23								270	258	312	296	296	380	E A E A	E A	E A	E A	E A	E A					
24								254	A	318	318	E A	E A	A	A	A	E A	E A	396	384	314	268		
25										A	A	A	A		A	352	352	352	316	310	300	292		
26								300	300	300	300	366	330	378	360	360	318	314	314					
27								306	288		A	298	348		A	A	344	336	336	290	232			
28								302	296	268	L	434	442	358	340	304	304	304	304	322	314			
29								G	A	376	374	354	354	354	352	306	320	320	312	A	296			
30								314	282	288	E A	A	416	366	334	350	350	336	322	304	254			
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							10	25	22	21	24	25	22	26	27	27	28	28	24	13				
MED							275	280	283	288	331	351	359	353	352	349	330	312	298	283				
U Q							304	302	308	310	370	401	400	394	374	380	346	321	313	302				
L Q							264	258	260	276	299	342	350	346	342	342	317	305	289	264				

JUN. 2013 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	270	270	228	274	274	270	226	226	226	A	A	A	A	A	A	A	A	A	240	240	258	310	314	314
2	308	272	272	242	302	A	380	280	266	A	A	A	A	218	A	232	230	A	228	A	278	294	308	292
3	320	338	316	258	258	314	252	264	238	A	A	A	A	A	272	246	A	246	A	A	246	258	282	282
4	280	272	252	252	280	318	256	236	236	220	218	194	194	A	A	A	A	198	212	212	H	268	268	268
5	272	270	270	234	244	244	244	210	210	180	H	A	A	180	184	190	A	A	A	A	226	246	296	294
6	294	294	294	294	314	264	A	216	E	A	230	212	240	A	A	A	A	220	220	248	248	A	E	A
7	316	302	238	256	256	256	256	256	A	A	A	A	A	A	A	A	A	A	E	A	252	252	252	A
8	318	318	318	292	258	242	242	240	B	A	A	A	A	210	210	A	A	A	E	A	244	234	270	276
9	258	324	290	300	330	282	254	232	232	222	A	A	A	A	A	180	212	212	E	A	254	254	274	272
10	334	302	302	302	308	308	260	A	A	A	A	A	A	200	A	200	A	200	258	228	270	286	300	300
11	272	272	272	272	272	272	236	270	242	A	A	A	200	200	200	A	A	A	A	248	248	296	296	334
12	322	302	288	298	290	258	230	A	A	A	A	A	A	244	264	206	206	214	A	236	238	248	248	276
13	288	288	288	278	328	274	244	A	A	E	A	230	220	212	212	212	212	212	212	250	250	250	250	268
14	274	274	274	274	236	252	250	238	238	A	A	232	202	A	A	A	A	A	A	A	248	248	282	302
15	278	278	278	252	254	274	252	252	190	188	188	188	188	188	188	188	188	274	A	A	264	294	294	294
16	302	282	282	282	242	228	228	226	246	A	A	A	A	A	A	A	A	A	A	A	246	276	278	306
17	258	258	258	258	258	268	296	226	A	A	A	A	A	A	A	A	A	A	A	290	290	298	296	294
18	290	288	288	214	284	280	254	224	246	A	A	A	A	246	246	A	A	A	A	A	260	252	254	276
19	276	276	278	278	278	316	248	238	A	A	202	190	190	242	242	242	228	A	A	244	256	262	292	292
20	298	298	298	274	262	240	218	A	250	A	A	A	228	340	A	A	A	A	A	212	304	304	304	316
21	310	310	310	274	254	216	214	A	220	234	A	A	A	A	234	234	244	238	A	A	238	276	314	322
22	340	282	284	310	262	278	A	A	A	A	A	A	A	226	226	226	A	A	A	248	254	268	288	344
23	294	294	292	258	312	278	240	232	H	196	196	196	196	A	A	A	A	A	A	264	262	262	382	326
24	246	280	280	316	302	236	174	A	A	A	A	A	A	A	A	A	286	220	232	232	316	318	318	318
25	320	320	294	310	322	280	220	252	A	A	A	A	A	A	A	268	274	E	A	E	A	A	H	248
26	286	286	286	286	290	288	288	240	A	A	240	202	198	194	238	232	224	E	A	264	264	278	284	270
27	296	274	276	276	276	242	242	260	A	A	A	A	A	A	A	A	220	A	A	220	224	268	268	296
28	346	272	272	272	272	272	248	244	244	234	E	284	208	218	214	212	220	220	220	226	290	242	290	290
29	312	302	302	302	302	272	244	268	A	E	A	218	A	246	248	202	252	A	A	282	266	266	266	284
30	324	282	254	254	254	224	224	224	238	224	224	A	202	234	A	A	A	A	A	A	230	232	294	318
31																								
	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	30	30	30	30	30	27	24	15	14	11	10	14	15	13	11	13	15	16	22	30	27	30	30
MED	295	284	283	274	275	272	244	236	234	224	219	200	202	219	214	232	222	229	237	248	257	276	293	294
U Q	318	302	294	294	302	280	254	254	242	240	238	216	228	246	240	242	259	264	256	260	276	294	306	318
L Q	276	274	272	258	258	244	230	226	220	212	202	194	194	200	196	212	212	220	220	232	248	258	276	282

JUN. 2013 h'F (KM)

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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						A	120	120	122	112	112	102	102	102	102	102	102	102		A	A			
2						A		A	102	102	102	102	100	100	100	100	108	108	108	108		A		
3						B	118	118	118		110	110		A	110	110		A		A				
4						A	106	106	106	106	106	106	108	108	108	108	108	108	108	108	138	B		
5						B	108	108	108	108	108	108		108		118			A	A	A			
6						A		A	108	108	108	108	108	108	108	108	108	108	108	108	124			
7						B	124	124	118		A	108	108	108	108	108	108	108	108	108		A		
8								110		110			A	A		A	110	110	110		A			
9						A				114			A	A	A	A				A	A			
10							A				A	A	A	A			A		A					
11								118	114	114	114	114	112	106	106	106	106	106	106		A			
12						B	110	110	110	110	110		A		A	A	A		A	A				
13							126	A	A	A	A	A				110	110	110	110	110		A		
14						B	122	120	120	112	112	116		A	116	116	116	116	116	116		A		
15						A	114			114	114	114	114	114	114	114	114	114	114		A			
16						B	126	112	112			A			A			A	A	A		A		
17							106	106		106	106	106	106	106	106	106	106	106	106	106		A		
18						B		106		A		A			106	106	106	106	106	106				
19						A	A	A	A	A			108	108	108	108	108	110	110	110				
20						B			A	A	A													
21						A		110	110	110	110	110		B	B	A						A		
22							116	116	116		A						110	A						
23						B		116	116		116	108	108	108		A			108					
24						B	118	118	114		A	114			A	A	A				114	114		
25						B	120	118	118	110	110				A	A	A		A					
26						A	A	A			A			A										
27					A	A	A		116		114	A	106		A	106	106	108	108	108	112			
28						B	A	A	A	A	A			A	A	A	A				112	112		
29						A	114	114	114	112		A	110		A	A	A					E	B	
30						B	A		B	120	108	108	108	108	108		A	108	108	108	108			
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							15	24	19	19	17	17	13	18	17	19	22	23	23	3				
MED							118	116	114	110	110	108	108	108	108	108	109	110	110	131				
U Q							122	118	118	114	113	110	111	110	110	110	110	110	112	198				
L Q							110	110	110	108	108	106	107	106	106	108	108	108	108	124				

JUN. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	102	102	102	98	98	112	124	124	112	112	112	112	122	122	122	122	116	110	110	110	110	110	110
2	104	104	104	100	100	96	96	122	122	108	114	104	102	G	108	132	G	120	118	112	112	110	108	104
3	100	98	98	98	98	98	136	114	118	108	108	108	108	108	108	108	108	108	102	102	102	102	102	102
4	104	104	104	104	104	104	132	132	132	G	118	118	118	118	118	118	114	150	114	G	110	108	108	106
5	116	106	102	98	98	98	G	98	98	168	106	106	142	142	142	124	90	114	114	114	112	112	112	110
6	104	104	104	104	104	104	104	104	106	116	116	116	116	112	112	112	112	G	136	136	114	108	108	108
7	110	106	104	104	104	104	104	120	116	110	110	118	118	126	120	120	120	120	120	94	94	92	92	92
8	104	104	104	104	104	104	104	118	B	104	104	104	104	112	142	122	122	122	92	92	98	102	108	108
9	106	106	106	104	104	104	104	104	104	104	124	100	100	100	160	162	116	116	116	116	116	116	110	110
10	98	98	98	98	98	126	126	118	112	110	110	110	110	110	108	108	108	108	104	102	100	100	100	100
11	108	108	108	106	106	102	102	122	122	102	104	104	152	182	156	130	126	126	126	124	116	112	112	110
12	112	106	106	106	106	108	120	120	120	118	118	112	112	112	110	110	110	100	100	100	100	100	100	100
13	94	118	104	104	104	118	118	102	102	102	102	102	128	128	124	124	124	124	148	118	112	106	106	106
14	112	102	102	102	102	102	130	128	126	110	110	110	110	134	126	124	120	116	112	94	94	94	102	112
15	106	106	106	106	106	106	106	104	104	104	104	126	126	142	142	134	134	132	116	110	106	104	104	104
16	102	102	102	102	102	102	102	124	122	106	106	106	106	108	106	106	120	120	88	88	86	86	86	114
17	110	114	114	114	114	138	128	128	110	110	110	110	110	110	110	110	110	110	110	110	110	110	94	98
18	98	98	98	98	98	98	98	110	110	110	110	110	110	158	134	122	122	122	110	110	110	104	100	100
19	120	108	108	108	108	102	102	102	100	100	100	G	G	132	126	126	124	122	112	112	112	110	108	108
20	108	108	108	108	102	102	102	102	102	102	102	114	114	114	114	114	114	114	114	114	114	114	114	114
21	112	112	112	110	110	106	136	126	116	116	116	116	108	108	108	G	162	124	124	118	112	108	106	104
22	92	92	102	102	102	102	102	102	102	102	102	102	102	102	100	100	136	136	120	120	124	98	98	98
23	104	104	104	104	104	104	104	130	124	120	G	G	120	120	120	120	120	120	112	112	98	98	98	98
24	96	96	96	96	96	118	142	124	120	118	108	108	108	108	108	106	106	102	222	94	94	94	94	94
25	110	110	110	110	110	130	130	130	114	108	108	108	106	96	96	96	118	118	118	90	104	104	104	104
26	102	102	118	118	118	116	104	138	114	102	102	102	102	162	G	G	120	116	116	116	116	116	116	116
27	B	104	104	102	102	100	126	124	122	112	112	112	110	110	102	102	102	102	102	102	116	116	116	116
28	100	100	100	100	100	112	112	112	110	110	110	110	106	106	104	126	100	100	118	118	118	118	118	114
29	120	112	112	110	110	110	110	110	110	116	110	128	112	112	110	134	134	130	114	G	B	B	B	114
30	106	106	114	114	B	108	106	106	154	130	126	122	G	160	132	128	118	114	114	112	106	106	106	106
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	29	30	29	30	29	29	29	28	28	28	30	28	28	29	30	28	29	29	29	30
MED	104	104	104	104	104	106	119	114	110	110	110	110	112	116	121	119	120	114	111	110	106	106	106	
U Q	110	108	108	108	106	110	127	124	122	116	113	115	117	130	132	126	123	123	118	116	114	111	110	110
L Q	101	102	102	102	100	102	103	104	105	104	104	105	106	108	108	109	110	112	110	101	100	100	100	100

JUN. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUN. 2013 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'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	F5	F7	F4	F5	F5	C3	CL41	CL41	CL21	C3	C1	C2	C2	C2	C2	C4	C5	C5	C7	F4	F1	F3	F3		
2	F3	F5	F3	F3	F3	L4	L3	C1	C3	C2	C1	C2	C2	C1	CL11	C11	C3	C4	C3	F3	F2	F5	F2		
3	F5	F5	F5	F2	F1	L2	C2	C2	C1	C2	C2	C1	C1	C1	C3	C5	L2	L3	L4	F3	F2	F2	F2		
4	F2	F3	F2	F1	F6	L6	C1	C1	C1	C1	H1	CL11	CL3	C1	C2	C4	HC11	L1		F1	FO41	F4	F4		
5	FO11	F1	F2	F3	F2	L1		L1	L1	H1	C1	C1	HL11	C1	CL11	CL21	L2	CL33	CL33	L6	FF83	FFF25	FF31	FF33	
6	FO21	F6	F3	F3	FF26	L3	L5	L3	C1	C1	C2	C1	C1	C1	C2	C1	CL11		C1	C2	F2	F4	F3	F8	
7	F4	F5	FO41	FO41	FO41	CO21	L2	CL31	C4	C2	C2	C1	C3	C1	C1	C2	C2	C3	CO31	F3	F5	F2	F3		
8	F5	FF22	FF22	F3	F1	L3	L2	C1		C2	C2	L2	L2	C3	H1	C1	C2	CL21	L3	FF31	FF23	FF13	FF31		
9	FF12	F3	FF22	FF21	FF31	L2	L3	L3	CL21	CL21	CL12	L3	L2	L2	HL11	HL11	L2	CL21	CL22	CL25	FF63	FF32	FF22	FF8	
10	F4	FF41	F5	F5	F2	C6	C3	C4	C5	C2	L2	L2	L2	L1	L1	L2	L3	L3	L5	F4	F2	FF32	F4		
11	F5	F5	F5	F3	F2	L3	L3	CL21	C1	C2	C1	C1	H1	H1	H1	C2	C2	C3	C3	CL23	FF23	FF12	FF21	FF4	
12	FO31	FO41	FO41	FO31	FF21	L1	C2	C4	C2	C2	C1	CO21	C1	L3	C1	L1	L1	L3	L3	L3	L3	L3	FF31	FF31	
13	F4	F13	FF22	F1	F3	L1	L2	L3	L2	L3	LC11	LC11	CL11	CL11	CO21	C1	C1	C1	HL11	FF51	FF32	FF22	FF22		
14	F3	F3	F5	F3	F2	L1	CL21	C2	C2	C2	C1	C1	C1	HL11	C1	C2	C3	C4	C8	C3	F5	FF32	FF32	FF33	
15	FF22	FF22	FF22	F2	F2	C2	L3	L2	L2	L1	L1	CL11	C1	C1	C1	C2	C1	C3	C3	C4	F4	F6	F8	F5	
16	F4	F2	F3	F2	F2	C1	L1	C1	CH11	C1	C1	C1	C1	L3	L2	L3	CL26	CL26	LQ81	LQ81	F6	F5	F5	FF23	
17	FO21	FF12	FF13	FF4	F4	C2	C3	C2	CL22	C1	C1	C1	C3	C3	C3	C4	C2	CL31	CL62	CO81	FF85	FF34	FF41	FF21	
18	F2	FF34	FO31	FO21	F2	LQ21	LQ21	CL21	CL21	C2	C3	C2	C1	HH11	H3	C3	C6	C3	C3	C7	F3	F3	F3	F6	
19	FF14	F3	F3	F1	F1	L6	L2	L2	L3	L3	L1			C1	C1	C1	C2	C3	C4	CL22	F5	F2	F7	F3	
20	F4	F3	F3	F1	F1	C1	C2	L2	C2	C2	L2	CL11	C1	C1	C2	C3	C2	C2	CL31	CL31	F5	FF63	FF42	FF8	
21	F8	F8	FO31	F1	F2	LQ21	HL22	C3	C2	C2	C1	C2	L1	L1	L1		H1	C1	C6	C6	F3	F5	F5	FO31	
22	FO31	FO21	FF42	FF61	F3	L4	L5	L4	C2	L3	C2	C1	C1	C1	C1	C1	H2	HL21	C4	C3	FF21	F1	FO21	F4	
23	F6	F8	F8	F2	F4	L1	C2	CL11	C1	C1			C2	C2	CL23	CL22	CL31	CL42	CL53	CL53	F3	FF64	F5	F5	
24	F3	F4	F3	F4	F2	CL11	CL11	C3	C3	C1	C3	L2	L4	L2	LQ41	L3	L2	L2	HL12	LQ21	LQ41	F3	F3	F3	
25	FF22	F3	F3	F2	F1	C1	CL21	CL21	C3	C3	C2	L3	LQ21	L1	L1	L2	CL11	CL11	CL21	L3	FF23	FF34	FF64	FF31	
26	F3	FF13	FF12	F3	F4	L2	L3	CL12	CL11	L1	L2	L1	L1		H1			C2	C6	CL53	F7	F7	F3	F1	
27		F2	F2	F3	L2	L2	CL22	C2	C2	C2	CO11	CO21	C2	C2	L2	L1	L1	L2	L2	L2	FF22	FF32	FF13	FF14	
28	FF62	F3	F1	F1	F3	L1	L2	L2	L2	L1	C1	C1	C1	L1	L1	L1	CL11	C1	L2	CL12	CL31	L3	FO31	FO31	
29	F3	F3	F6	F3	F2	C4	C4	CL21	C2	C1	L1	C1	L1	L1	L1	H2	C2	C3	C5					C4	
30	F2	F1	F1	F1		L1	L2	L1	H1	C1	C1	C3		H1	HL11	C1	CL21	CL21	CL21	C3	F3	F1	F3	F6	
31																									
	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																									

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	X 102	X 98	X 87	X 82	X 77																X 81	X 72	A	X 70	
2	X 67	X 69	X 63	X 59	X 44																	X 77	X 74	X 76	X 76
3	X 79	X 78	X 71	X 70	X 58																	X 96	X 102	X 110	X 122
4	X 128	X 130	X 129	X 101	X 78																	X 99	X 96	X 89	X 90
5	X 91	X 91	X 82	X 73	X 74																	X 98	X 89	X 86	X 87
6	X 84	X 81	X 82	X 77	X 76	X 71																X 85	X 84	X 81	X 84
7	X 88	X 85	X 82	X 72	X 69	X 63																X 59	X 58	X 59	X 62
8	X 63	X 63	X 65	X 66	X 63																	X 94	X 81	X 74	X 77
9	X 77	X 80	X 72	X 70	X 66	X 60	X 66															X 114	X 92	X 68	X 68
10	X 70	X 69	X 64	X 69	X 66																	X 104	X 100	X 95	X 87
11	X 88	X 92	X 90	X 91	X 80	X 78																X 78	X 76	X 77	X 82
12	X 81	X 77	X 78	X 77	X 73	X 74																X 101	X 104	X 93	X 81
13	X 76	X 77	X 75	X 70	X 72		X 99															X 98	X 90	X 84	X 84
14	X 84	X 86	X 84	X 80	X 80																	X 96	X 79	X 76	X 82
15	X 82	X 87	X 83	X 80	X 76																	X 93	X 89	X 88	X 88
16	X 90	X 93	X 92	X 87	X 73																	X 76	X 81	X 78	X 76
17	X 72	X 72	X 70	X 71	X 67	X 67	X 79															X 104	X 97	X 98	X 93
18	X 96	X 82	X 80	X 67	X 66	X 66		X 98														X 97	X 91	X 90	X 88
19	X 85	X 78	X 75	X 73	X 72																	X 98	X 94	X 98	X 96
20	X 89	X 88	X 85	X 81	X 78																	X 85	X 86	X 85	X 85
21	X 88	X 86	X 86	X 86	X 92	X 71																X 98	X 85	X 88	X 91
22	X 89	X 98	X 87	X 88	X 77																	X 98	X 86	X 82	X 82
23	X 86	X 89	X 82	X 75	X 72	X 66																X 96	X 88	X 90	X 99
24	X 100	X 97	X 93	X 79	X 75	X 70																X 77	X 80	X 79	X 86
25	X 90	X 92	X 86	X 81	X 73																	X 86	X 85	X 76	X 80
26	X 88	X 86	X 78	X 70	X 71	X 69																0 64	X 77	X 64	X 80
27	X 85	X 82	X 79	X 70	X 67	X 65																X 81	X 82	X 78	X 85
28	X 80	X 78	X 79	X 71	X 68	X 66	X 70		X 90													X 110	X 93	X 77	X 80
29	X 80	X 84	X 83	X 80	X 77	X 72																X 96	X 98	X 92	X 91
30	X 87	X 96	X 102	X 84	X 73																	X 78	X 76	X 84	X 90
31																									
	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	30	30	30	30	14	4	1	1												30	30	29	30	
MED	X 86	X 86	X 82	X 76	X 73	X 68	X 74	X 98	X 90												X 96	X 86	X 84	X 84	
U Q	X 89	X 92	X 86	X 81	X 77	X 71	X 89														X 98	X 93	X 90	X 90	
L Q	X 80	X 78	X 75	X 70	X 67	X 66	X 68														X 81	X 80	X 76	X 80	

JUN. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	96	92	81	76	71	68	70	73	A	73	70	70	87	97	100	109	118	118	110	94	75	66	A	64		
2	61	63	57	53	38	38	50	70	60	64	68	72	67	72	74	69	73	78	74	76	71	68	70	70		
3	73	72	V	H	52	42	50	68	60	65	68	81	84	77	85	96	104	111	119	107	90	96	104	R	R	
4	122	124	123	95	72	65	74	74	69	A	73	A	78	86	91	104	112	100	87	92	93	90	83	84		
5	85	85	76	67	68	60	62	65	62	62	68	75	80	94	100	101	R	100	105	109	105	92	83	80	81	
6	F	F	F	F	66	62	63	85	65	66	72	71	76	80	86	94	92	93	103	97	79	78	75	78		
7	F	F	R	F	F	F	64	60	64	64	61	58	56	60	62	75	74	80	87	72	53	52	53	56		
8	57	57	59	60	57	47	54	64	67	A	69	78	92	96	102	104	106	110	114	105	88	75	68	F		
9	71	72	F	F	F	F	F	67	60	64	68	70	72	78	80	88	101	106	111	111	108	86	62	62		
10	64	63	58	62	60	56	69	75	68	70	77	89	101	114	128	138	128	115	122	109	J	R	98	94	89	V
11	F	F	F	R	F	F	77	108	89	71	65	68	72	73	85	93	96	98	100	A	72	70	71	76		
12	F	F	F	F	67	66	73	76	A	64	71	83	88	94	R	A	107	116	122	113	93	95	98	87	75	
13	70	71	69	64	66	71	87	90	77	66	70	68	70	A	78	87	97	106	106	100	92	84	78	78		
14	78	80	78	74	74	67	72	77	79	74	85	76	71	80	86	83	87	94	108	113	90	73	70	74		
15	F	81	77	F	67	69	U	R	82	77	68	62	69	77	79	84	85	88	92	98	96	87	83	82	82	
16	84	87	86	81	67	62	68	64	78	95	70	59	64	67	81	96	113	108	101	80	R	70	75	72	70	
17	66	66	F	F	61	57	F	106	65	58	65	66	76	90	103	115	124	R	129	133	123	98	91	92	87	
18	90	F	F	F	60	59	60	75	R	F	90	68	69	72	74	85	92	96	R	110	118	112	91	85	84	82
19	79	72	69	V	66	64	75	81	65	66	70	75	81	86	93	108	116	108	104	100	92	88	92	90		
20	83	82	79	75	72	70	72	77	74	62	66	64	78	91	91	92	103	107	91	77	79	80	79	79		
21	F	80	80	80	86	63	49	59	76	80	65	70	B	90	94	104	104	102	104	107	92	79	82	85		
22	83	92	81	82	71	65	59	58	A	A	A	79	78	A	A	100	105	98	86	87	92	80	76	76		
23	80	F	F	F	66	60	71	65	66	85	72	75	90	101	113	114	114	A	115	112	90	82	83	93		
24	94	88	87	67	68	62	67	73	88	78	A	88	86	87	A	90	104	118	101	79	71	74	73	80		
25	84	86	80	75	67	56	59	51	A	77	A	A	88	91	88	92	101	97	89	88	80	79	70	70		
26	J	R	F	F	F	F	64	79	78	80	79	80	79	85	85	88	94	94	98	94	R	R	R	74		
27	F	76	70	62	59	57	59	A	71	79	82	A	90	A	A	85	95	102	95	93	75	76	71	F	F	
28	F	F	F	F	62	58	62	72	84	71	60	74	90	107	98	103	103	93	92	93	104	87	71	67		
29	J	R	R	F	F	F	55	57	R	56	66	59	76	79	80	88	85	82	83	94	95	90	92	86	85	
30	81	90	96	78	67	61	56	60	H	78	79	74	66	66	83	78	72	80	90	A	A	72	70	78	V	
31																										
	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	30	30	30	30	30	30	29	26	27	27	27	29	27	26	30	30	29	29	28	30	30	29	30		
MED	79	79	76	67	66	62	65	73	68	69	70	74	79	86	88	95	102	102	103	96	90	80	78	78		
U Q	83	85	80	75	68	65	72	80	78	78	72	78	88	94	98	104	112	110	112	107	92	87	84	84		
L Q	71	72	69	F	F	57	59	64	65	64	65	68	72	79	84	87	94	94	93	90	75	74	70	70		

JUN. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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								A	A	A	A	L	A	U	A	A	A	A	A						
2								L	U	L		R	R	U	R	R	R	472	436	412	L				
3								L	A	U	L	A	U	A	A	A	496	504		A	A				
4								L	U	L	A	R	A	R	R	R	A	L	L	A					
5								L	U	L	L	L	U	A	U	A	A	A	L	A					
6							A	A	L	U	L	520	A	U	A	Y		A	L	U	L				
7							L	A	460	468	480	484	U	R	A	U	R	R	A	A	A				
8										A	A	A	524	488	516	492	480	468	L						
9								L	U	L	A	A	A	R			L	L	L	L					
10							A	A	A	A	516	A	A	U	A	A	A	A	A						
11								A	A	A		516	500	U	Y	U	A	A	A	A	A				
12							L		A	A	A	A	A	A	A	A	A	A	A	A					
13							L	A	L	U	L	U	L	U	A	A	A	U	A	A	A				
14							L	L	L			A	A	A	U	U	L	A		A					
15								L	L	L	L	U	L	528	520	512	504	480	476	480	U	L	A		
16								L	L	L		A		516	492	472	476	472	452	L					
17									L	L		U	L	516	U	L	A	A	A						
18								A	L	A	L	A	B	L	U	A	A	A	A	A					
19							L	L			L	U	R	L	L	A	A	492	456	428	U	L			
20							L	L	L	L	U	L	A	512	504	484	500	496	452	A	L				
21									L	L	U	L		B	A	A	508	520	460	L					
22								A	A	A	A	L	A	A	A	U	A	L	L						
23									L	L	L	L	U	L	504	A	A	A	A						
24									A	A	A	A	A	524	A	A	U	A	L						
25								A	A	A	A	A	R	A	A	U	U	A	A	A					
26								L	L	A	U	L	A	U	R	R	A	A	A						
27								A	A	L	A	A	A	A	A	U	U	A	A	A					
28							L	L	L	L	U	L	A	U	U	A	U	U	A	L	L				
29								U	L	L	460	524	488	476	492	476	472	472	452	404					
30								L	U	L	L	L	496	488	488	488	456	A	A	A	A				
31									436	470	502	492	492	500	484	478	474	452	402						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								1	7	12	17	12	17	22	18	17	20	16	8						
MED								U	L	L	L														
U Q								480	500	528	528	534	524	516	510	498	468	424							
L Q													R	R											

JUN. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



# IONOSPHERIC DATA STATION Okinawa

JUN. 2013 f<sub>o</sub>E (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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						A	A	A	A	A	A	R	B	B	B	A	U	A	A	A				
2						B	A	A	U	A	A	B	B	B	B	B	U	R	340	288				
3						B	208	A	A	R	B	B	B	B	B	B	A	A	A	A				
4						B	208	272	308	324	U	R	B	B	B	B	B	336	A	A	A			
5						B	196	276	328	356	408	U	R	B	432	412	392	376	348	304	264			
6						B	A	A	A	A	U	R	B	B	B	B	U	R	348	304	244			
7						A	A	A	324	332	B	B	B	B	B	R	U	A	A	A	A			
8						A	A	260	B	A	B	A	428	B	B	A	340	U	A	U	A	A		
9						B	A	A	U	A	B	A	B	A	A	A	A	A	A	240				
10						A	A	A	A	A	B	B	B	A	B	A	A	A	A	A	A			
11						A	A	A	A	A	B	A	B	B	R	B	R	R	336	300	232			
12						A	208	U	A	A	A	A	B	B	B	A	A	A	A	A	A			
13						A	A	A	A	A	A	A	U	A	B	B	A	U	A	U	A	A		
14						B	A	A	308	344	R	B	U	R	B	U	R	384	340	316	248			
15						A	A	A	U	A	A	A	A	B	R	A	R	292	248					
16						B	240	264	U	R	A	A	B	A	U	R	U	R	A	A	252			
17						A	A	272	A	A	B	B	B	B	B	B	B	U	A	304	256			
18						B	A	A	A	A	A	A	B	B	B	B	R	U	A	304	256			
19						B	B	A	A	A	A	A	B	B	A	U	R	U	A	380	348	308	248	
20						A	A	A	A	A	A	A	B	B	B	R	U	R	380	360	304	244		
21						A	A	200	276	312	A	A	B	B	B	U	R	U	R	376	360	316	244	
22						B	A	A	A	A	A	A	B	B	B	A	A	A	U	A	236			
23							A	A	A	A	A	R	A	B	U	R	R	348	A	244				
24						A	B	272	324	340	U	A	A	B	A	U	R	A	A	A	A	A		
25						B	A	U	A	U	A	A	A	A	A	A	A	A	A	A	A	A		
26						B	A	A	A	A	U	A	B	B	B	R	436	396	356	312	256			
27						B	A	A	312	340	U	A	A	A	B	A	A	A	A	A	260			
28						B	A	A	A	A	A	B	A	B	B	A	A	A	A	248				
29						B	A	U	R	A	A	A	A	R	B	B	R	R	280	244				
30						B	184	256	300	352	B	B	B	B	B	B	B	304	A	A				
31																								
	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	16	15	11	3		4	2	5	7	14	17	21					
MED							208	264	312	344	392		430	416	400	380	348	304	248					
U Q							208	272	324	352	408		436		424	384	356	306	254					
L Q							196	256	308	336	372		416		392	376	340	298	244					

# IONOSPHERIC DATA STATION Okinawa

JUN. 2013 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
2	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
3	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
4	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
5	J	A	J	A	J	A	J	A	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
7	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	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
10	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
11	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	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	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
15	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	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
18	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	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
21	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
22	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
23	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
25	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
26	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
27	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
28	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
29	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
30	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30
MED	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
LQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	19	38	23	28	21	25	27	39	A A		61	48	58	50	60	U Y	88	86	49	58	41	38	A A	29	
2	18	E B	E B	E B	E B	E B		22	31	34	42	44	46	E B	E B	E B	G		34	29	24	E B	E B	E B	
3	E B	14	17	14	14	14		G	30	44	U Y	42	66	55	66	56	45	44	58	43	32	46	22	E B	
4	20	21	15	E B	E B	E B		G	A A	E B	A A	E B	E B	E B	E B		44	55	45	40	78	24	31	23	
5	E B	E B	E B	E B	E B	E B		G	G	G	G		45	46	55	56	62	80	53	38	45	31	23	38	
6	21	E B	31	E B		E B		43	45	36	48	44	50	55	U Y	E B		47	52	41	30	22	17	20	
7	32	23	29	32	22	22	26	49		G	G		44	46	49	44	46	54	50	51	30	26	19	E B	
8	E B	14	22	E B	20	22	25	23	31	U Y	A A	101	65	59		G	E B		47	44	47	40	40	29	
9	30	32	22	E B	E B	E B		22	32	36	41	50	52	64	48	U Y	U Y			G			20	E B	
10	18	E B	19	E B			18	43	44	45	53	41	62	66	49	54	63	40	62	37	56	70	41	34	
11	20	32	31	40	39	24	33	41	53	55	45	42	E B	U Y		54	58	50	80	82	A A	103	45	30	
12	22	32	32	30	24	24		G	A A				68	73	A A	A A	83	102	52	41	41	27	21	E B	
13	30	16	20	E B	E B	18	30	56	36	44	44	47	52	A A	97	68	66	50	97	55	56	30	59	30	
14	20	26	22	E B	E B	E B		24	31	43	46	46	58	56	U Y		48	49	57	41	67	61	54	39	
15	24	23	E B	14	26	20	17	42	35	35	43	42	44	44	45	U G		42	41	42	53	32	40	37	
16	20	22	20	E B	E B	E B		G		G			39	46	56	44	44		44	47	45	33	40	32	
17	16	E B	E B	E B	20	19	22	39	72	38	40	E B	46	48	52	46	54	63	53	43	32	24	17	30	
18	32	17	20	31	27	32	46	47	39	55	47	62	E B	56	46	54	56	59	73	51	58	31	38	22	
19	21	E B	E B	E B	18	E B	E B	28	36	40	43	50	43	E B	45	45	72	46	35	29	24	17	E B	26	
20	E B	14	21	21	18	30	31	21	32	38	44	45	56	43	E B	46	46	50	50	37	40	30	23	30	
21	38	38	E B	14	19	17	18	22	30	34	38	46	49		B	69	52		39	33	38	27	E B	16	
22	27	17	E B	14	19	13	16	38	53	A A	A A	A A	A A	46	61	A A	A A	52	43	32	31	53	22	19	
23	32	17	16	17	21	U Y	23	24	28	34	41	44		G	E B		U G		A A			E B	14	18	
24	40	44	37	16	24	20	E B	25	32	82	63	A A	294	56	63	45	A A	86	82	48	42	38	28	20	
25	22	20	22	25	23	E B	14	24	43	A A	A A	A A	A A	48	57	72	52	50	60	58	45	20	24	34	
26	30	E B	14	17	22	E B	14	42	30	37	56	45	71	E B	E B	46	69	54	41	77	82	31	40	37	
27	21	32	25	19	E B	E B		A A	96	55	44	62	A A	183	60	A A	A A	51	50	32	30	55	36	25	
28	17	20	25	21	E B	E B		20	38	42	44	43	55	45	51	48	40	40	37	30	28	24	30	22	
29	51	39	30	38	23	E B		G		32	41	43	45	40	U G	E B	E B		G		G		31	47	
30	20	39	23	E B	E B	E B		G	U Y	G	E B	E B	E B	E B	E B	E B		54	41	49	A A	A A	33	30	
31																									
	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	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	
MED	21	21	20	18	19	16	24	32	38	44	45	51	48	48	48	52	49	42	40	36	26	24	28	20	
U Q	30	32	25	25	23	22	33	44	50	55	50	62	57	56	60	58	53	58	55	56	36	37	34	25	
L Q		E B	E B	E B	E B	E B		G		30	34	40	43	46		E B	E B						E B	E B	
	18	16	14	14	14	14	20	30	34	40	43	46	44	45	44	43	41	37	30	27		20	18	18	

JUN. 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL 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	15	21	20	24	42	42	40	31	24	17	16	16	14	14	14	14
2	14	14	14	14	14	14	14	17	16	24	24	42	42	45	44	43	22	20	18	14	14	14	14	14
3	14	14	14	14	14	14	14	15	21	22	40	42	43	41	41	39	22	20	14	14	14	14	14	14
4	14	14	14	14	14	17	14	14	16	20	48	44	43	44	40	40	24	20	16	14	14	14	14	14
5	14	14	14	14	14	14	15	14	20	20	25	42	32	32	31	24	20	15	22	14	14	14	14	14
6	14	14	14	14	14	14	16	14	21	22	30	41	42	42	43	41	20	20	16	15	14	14	14	14
7	14	14	14	14	14	14	14	16	18	23	39	42	40	43	41	24	20	16	14	14	14	14	14	14
8	14	14	14	14	14	14	15	20	42	32	40	33	36	44	44	26	22	18	15	14	14	14	14	14
9	14	14	14	14	14	14	14	15	21	41	31	38	37	36	31	26	24	20	16	14	14	14	14	14
10	14	14	14	14	14	14	14	18	20	21	35	34	41	32	38	25	22	15	14	15	14	14	14	14
11	14	14	14	14	14	14	14	14	19	23	35	29	46	43	30	42	21	21	15	14	14	14	14	14
12	14	14	14	14	14	14	14	15	16	21	24	35	41	37	37	23	20	20	14	14	14	14	14	14
13	14	14	14	14	14	14	14	13	20	20	24	33	32	42	40	24	25	19	16	14	14	14	14	14
14	14	14	14	14	14	14	14	15	16	21	41	40	24	44	24	25	22	17	13	14	14	14	14	14
15	14	14	14	14	14	14	14	16	20	22	26	27	32	39	34	21	21	20	15	18	14	14	14	14
16	14	14	14	14	14	14	16	15	20	24	24	40	34	39	32	24	22	20	14	14	14	14	14	14
17	14	14	14	14	14	14	14	20	20	22	43	42	46	45	43	40	38	20	15	14	14	14	14	14
18	14	14	14	14	14	14	14	17	20	24	33	40	56	44	43	42	24	22	14	14	14	14	14	14
19	14	14	14	14	14	14	21	20	21	23	33	36	40	45	31	26	24	20	14	17	14	14	14	14
20	14	14	14	14	14	14	14	16	20	23	25	38	38	46	42	32	26	18	16	14	14	14	14	14
21	14	14	14	14	14	14	14	15	16	24	34	44	B	48	43	25	24	20	15	14	14	14	14	14
22	14	14	14	14	13	14	14	15	22	27	33	40	42	40	39	30	21	18	15	16	14	14	14	14
23	14	14	14	14	14	14	14	20	20	22	24	33	31	44	32	32	25	18	16	14	14	14	14	14
24	14	14	14	14	14	14	25	20	21	22	26	41	33	31	38	26	23	19	14	14	14	14	14	14
25	14	14	14	14	14	14	15	16	20	24	36	41	42	37	33	33	26	20	16	14	14	14	14	14
26	14	14	14	14	14	14	14	15	15	20	24	42	49	45	31	25	20	21	14	14	14	14	14	14
27	14	14	14	14	14	14	14	16	21	22	26	32	42	40	36	23	24	21	16	14	14	14	14	14
28	14	14	14	14	14	14	14	15	22	22	24	41	38	37	32	28	24	17	20	14	14	14	14	14
29	14	14	14	14	14	14	14	19	20	21	22	29	33	34	43	42	24	16	15	14	14	14	14	14
30	14	14	14	14	14	14	14	15	16	23	43	42	44	44	44	40	35	18	20	14	14	14	14	14
31																								
	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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	14	14	14	14	14	14	14	15	20	22	30	40	41	42	38	27	24	20	15	14	14	14	14	14
U Q	14	14	14	14	14	14	14	17	21	24	36	42	43	44	43	40	24	20	16	14	14	14	14	14
L Q	14	14	14	14	14	14	14	15	16	21	24	33	34	37	32	25	21	18	14	14	14	14	14	14

JUN. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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								A	A	A	A	L	A	A	A	Y	A	A	A						
2								L	U	L	346	358	392	383	389	391	381	380	358	351	345				L
3								L	A	U	L	335	351				371	339	A	A	A				
4								L	U	L	A	B	A	R	R	R	A	A	A	A	A				
5								L	433	U	L	L	A	A	A	A	A	A	L	A					
6							A	A	L	U	L	352	345				A	A	L	U	L				
7							L	A	350	370	363		A	A	U	R	A	A	A	A					
8											A	A	A	365	A	B	A	351	347						
9								L	383	U	L	A	A	A	A			L	L						L
10							A	A	A	A	373							A							
11								A	A	A			391	370	B	Y	A	A	A	A	A				A
12							L		A	A	A	A	A	A	A	A	A	A	A	A					
13							L	A	L	A	U	L	A	A	A	A	A	A	A	A					
14							L	L	L	A	A	A	A	A	A	A	A	A	A	A					
15								L	L	L	L	U	L	385	404	378	369	391	377	330					
16								L	L	L	A	A	A	405	421	407	404		A	A	L				
17									L	L	H	U	L	396	359	L	A	L	A	A					
18								A	L	A	A	A	A	B	L	A	A	A	A	A					
19							L	L			L	A	U	R	L	A	A	A	A	A					
20							L	L	L	L	U	L	A	425	386	379	A	A	A	356	U	L			L
21									L	L	U	L	353	330	B	A	A		L	H	L				
22								A	A	A	A	L	A	A	A	A	A	349	L	L					
23									L	L	L	L	U	L	369	380	410	A	A	A					
24									A	A	A	A	A	A	361	A	A	A	A	A					
25								A	A	A	A	A	A	381	A	A	A	A	A	A					
26								L	L	A	U	L	A	U	R	R	A	A	A						
27								A	A	L	A	A	A	A	A	A	A	A	346	379					
28							L	L	L	L	U	L	A	A	A	A	U	L	U	L	L				
29								U	L	L	365	346	382	399	380	399	R	Y	U	L					
30								L	Y	L	L	L	400	411	404	381	A	A	A	A					A
31									349	371								372							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								1	7	11	14	9	13	13	13	9	10	13	8						
MED								U	L																
U Q								379	350	365	360	382	391	386	379	371	353	346	344						
L Q								U	L	U	L	383	379	373	388	404	406	392	391	371	354	352			
								U	L	U	L	346	354	350	356	380	379	371	367	346	336	340			

JUN. 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Okinawa

JUN. 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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								228	A E A 298	A 336	L 360		430	396	406	404	A 360	294	254					
2								280	310	436	416	356	398	372	346	400	358	310	300	282				
3								272	254	364	404	346	A 326	E A 400	382	352	344	310	282					
4								228	332	A 324		A 324	412	372	366	344	298	280	E A 410					
5								224	246	262	L 318	362	388	338	334	A 344	332	318	284					
6							262	248	240	330	334	314	356	348	362	322	304	338	286					
7							304	266	368	390	420	A 498	534	490	504	392	362	324	304					
8									A E A 456	A 384	A 360	A 360	360	354	342	316	300	270						
9								250	256	368	348	360	390	374	346	392	352	322	282	268				
10							260	228	A 248	A 298	A 350	A 382	A 368	A 368	A 342	A 308	A 298	A 286						
11								260	220	290		400	346	398	358	336	314	E A E A 322	308	A				
12							246		A 350	374	E A E A 412	E A E A 358	A 384	A 350	A 354	A 278	A 250							
13							248	236	262	276	324	344	410	A E A 432	380	348	366	278						
14							266	240	282	290	302	288	E A 352	390	354	348	378	366	298					
15								242	254	270	278	410	352	370	354	340	338	352	312					
16								L 266	302	252	270	E A 368	488	468	416	362	304	286	256					
17									222	256	370	418	430	382	392	360	326	298						
18								254	290	300	A 352	416	358	348	378	360	372	340	288					
19							240	238			378	364	366	356	372	350	298	284	284					
20							252	236	L 234	416	376	442	392	354	346	338	310	298	252	352				
21									270	278	434	466	B 348	A 372	A 324	A 328	A 304	A 292						
22								A 420	A 320	A 320	A 320	A 328	A 402	A 332	A 302	A 294	A 268							
23									242	300	298	L 406	390	384	348	342	A 344	A E A 322						
24									E A 404	A 298	A 330	A 376	A 360	A 402	A 340	A 286	A 256							
25								E A 280	A 378		A 380	A 338	A 382	A 356	A 316	A 304	A 288							
26								284	266	318	342	E A 404	374	366	376	366	324	318	288					
27								A 276	A 312	332		A 348	A 358	A 340	A 300	A 264								
28								270	292	246	266	342	452	376	328	306	338	302	310	328				
29								362	326	L 334	510	360	358	352	350	300	342	328	312					
30								266	288	266	300	278	424	304	286	346	348	292	A	A				
31																								
	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	23	24	26	26	27	29	27	26	30	30	29	27	3				
MED							260	252	262	299	344	365	376	367	358	348	335	302	284	282				
U Q							268	280	296	350	378	412	406	384	382	362	348	323	304	352				
L Q							247	236	246	276	324	346	358	348	346	338	310	293	268	268				

JUN. 2013 h'F2 (KM)

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	266	258	240	256	248	238	232	A	A	A	A	E A	A	A	A	E Y	A	A	A	A	A	E A	A	A	
2	278	266	236	242	276	300	236	242	232	256	222	232	238	216	238	236	264	238	224	266	256	324	312	308	
3	272	280	278	222	258	248	256	214	A	260	226	A	A	A	A	E A	E A	A	A	A	246	268	268	290	284
4	266	250	234	218	242	292	248	216	226	A	E B	A	200	214	204	A	A	A	A	A	258	256	262	258	284
5	276	246	252	238	220	208	226	210	180	188	240	258	A	A	A	A	A	248	A	242	234	248	274	282	
6	302	316	298	260	260	234	A	A	214	272	284	A	A	A	204	A	A	E A	250	238	242	246	284	340	302
7	304	266	240	238	250	262	236	A	218	212	260	300	A	250	288	A	A	A	A	238	250	272	272	328	334
8	312	316	284	274	246	290	236	230	262	A	A	A	232	A	E B	A	A	244	260	238	232	258	228	254	278
9	274	266	252	270	240	226	240	214	222	216	A	A	A	A	Y	Y	A	A	216	250	224	206	252	302	
10	304	266	308	282	286	266	A	A	A	A	196	A	A	A	A	A	E A	A	A	236	228	304	294	286	278
11	288	288	294	274	266	286	258	A	A	A	252	196	248	Y	A	A	A	A	A	A	294	292	314	310	
12	286	298	302	302	280	230	218	226	A	A	A	A	A	A	A	A	A	A	A	264	260	230	242	260	
13	302	278	278	280	276	282	A	A	218	256	252	A	A	A	A	A	A	A	A	260	258	312	294	280	
14	276	304	260	232	238	242	232	204	242	A	E A	A	A	A	A	A	A	E A	A	250	238	302	336	288	
15	302	276	254	252	266	234	248	224	208	238	206	200	186	228	242	214	228	298	A	272	262	292	298	292	
16	296	280	260	252	212	258	222	198	206	218	A	A	196	190	224	224	A	A	238	240	270	306	306	282	
17	272	238	248	332	294	290	282	242	210	196	188	262	268	A	E A	256	A	A	278	240	228	274	272	292	
18	272	232	240	284	300	326	284	A	200	A	E A	A	A	B	A	A	A	A	A	258	256	310	300	284	
19	290	266	288	284	272	272	226	210	206	212	218	A	196	214	238	A	A	212	216	242	248	280	282	298	
20	280	300	274	256	244	230	220	214	212	252	246	A	210	232	254	A	A	228	244	314	292	300	356		
21	352	324	282	276	228	176	196	230	204	214	232	292	A	B	A	A	216	210	208	276	260	224	258	344	312
22	318	256	252	242	226	236	304	A	A	A	A	224	A	A	A	A	262	226	234	322	262	264	354	320	
23	300	268	260	260	262	258	238	208	190	226	224	208	198	188	A	238	A	A	258	230	294	368	354		
24	266	256	270	254	282	260	250	236	A	A	A	A	A	234	A	A	A	A	224	278	316	340	306		
25	302	292	278	308	272	206	238	A	A	A	A	A	238	A	A	A	A	A	A	266	256	268	248	296	
26	292	256	238	278	272	264	280	214	226	A	256	A	E A	282	194	260	A	A	264	330	246	318	322	284	
27	294	292	248	234	240	236	240	A	A	E A	248	A	A	A	A	A	A	214	230	268	278	250	276	278	
28	268	274	266	286	252	242	246	264	A	A	224	A	240	A	A	204	240	230	234	284	260	236	262	360	
29	318	298	296	300	270	220	226	208	196	262	248	248	190	222	222	254	236	216	242	268	294	290	264	298	
30	320	294	238	238	270	222	230	202	H E Y	252	222	226	198	200	206	232	A	A	244	A	218	304	328	302	
31																									
	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	30	30	30	30	30	27	20	20	17	21	12	15	13	14	10	10	14	14	28	30	30	29	30	
MED	291	275	260	260	261	245	238	214	212	220	233	220	205	216	230	220	237	228	237	256	257	284	298	297	
U Q	302	294	282	282	272	272	250	230	226	256	254	276	240	233	254	248	262	260	238	267	270	304	328	308	
L Q	274	258	248	242	242	230	226	209	205	213	223	204	196	200	224	216	236	216	230	242	246	262	268	284	

JUN. 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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						A	A	A			A	A	B	B	B	A			A	A				
2						B	A		110	110		A	B	B	B	B	110	110			A			
3						B		A			B	B	B	B	B	B	A	A	A	A				
4						B			112	108		B	B	B	B	B	108		A	A	A			
5						B			138	110	110	108				A	A				A			
6						B	A	A		A			B	B	B	B	108	108	110		A			
7						A	A		108	108	108		B	B	B	B	108	108		A	A	A		
8						A	A			B	A	B	A		B	B	A				A			
9						B	A	A			B	A	B	A	A	A	A	A	A		A			
10						A	A			A	A	B	B	B	A	B	A	A	A	A				
11						A	A	A		A	A	B	A	B		B	108	108	108		A			
12						A				A	A	A	B	B	B	A	A	A	A		A			
13						A	A	A		A	A	A	A	B	B	A	A				A			
14						B	A				B	B		B		108	108	108	108	110				
15						A	A	A		110		A	A	A	B	A	A	A			A			
16						B					A	A	B	A	A		A	A	A		A			
17						A	A		112	112			B	B	B	B	B	B		110	110			
18						B	A	A		A	A	A	B	B	B	B				110	110	110		
19						B	B	A		A	A	A	B	B	A		110	110	110	110				
20						A	A	A		A	A	A	B	B	B		110	110	110	110				
21						A					A	A	B	B	B	B	108	108	108	110				
22						B	A	A		A	A	A	B	B	B	A	A	A						
23							A	A		A	A		A	B		A		A			110			
24						A	B				A	B	A		108	A	A	A	A	A				
25						B	A				A	A	A	A	A	A	A	A	A		A			
26						B	A	A		A		B	B	B		108	108	108	108	108				
27						B	A	A			108	108		A	A	A	A	A			116			
28						B	A	A		A	A	B	A	B	B	A	A	A			110			
29						B	A				A	A	A	A	B	B								
30						B			108	108		B	B	B	B	B	108	108	110		A			
31							120	108	108	108								108						
	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	15	15	12	3	1	3	2	6	7	15	17	20					
MED							120	110	110	108	108	110	110	109	109	108	108	108	110					
U Q							124	110	110	108	110		110		110	110	110	110	110					
L Q							120	108	108	108	108		108		108	108	108	108	108					

JUN. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

JUN. 2013 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	94	98	96	100	100	100	100	110	110	114	114	126	120	146	116	108	108	104	102	96	94	106	98	98	
2	102	98	96	92	92	114	116	116	116	116	114	112	112	B	B	B	G	114	110	108	B	98	106	102	
3	98	92	92	92	102	110	G	120	118	118	112	110	112	110	110	108	122	98	102	100	98	94	94	94	
4	94	92	96	94	92	B	128	148	112	108	B	120	B	B	120	118	116	108	106	104	100	98	96	94	
5	92	B	94	B	94	B	G	G	G	G	164	152	126	122	118	116	116	120	114	110	104	102	100	100	
6	114	108	100	102	106	102	102	104	112	104	120	118	118	120	B	126	112	114	116	124	112	108	104	104	
7	104	106	104	104	102	102	102	112	G	G	118	112	116	120	114	108	106	104	100	96	94	96	122	114	
8	112	106	102	104	104	104	114	118	114	110	112	122	G	128	B	116	118	110	106	98	94	92	92	100	
9	94	104	104	102	102	102	102	100	122	B	108	104	100	100	104	98	98	98	98	92	90	90	104	102	
10	116	104	108	102	106	104	112	110	110	106	106	102	104	102	100	112	98	98	94	94	90	106	90	106	
11	106	104	104	98	98	102	104	120	102	108	108	106	B	166	140	126	116	110	108	108	108	108	102	102	
12	102	104	98	98	100	100	G	110	108	108	106	124	106	120	104	98	98	116	96	92	92	90	86	116	
13	104	104	92	116	90	102	100	100	98	100	100	184	156	116	114	114	106	108	108	104	98	92	96	94	
14	100	92	92	92	92	126	118	112	116	114	114	110	112	152	150	124	116	114	112	106	110	110	106	118	
15	108	104	112	102	102	100	100	98	130	118	108	110	102	100	106	132	148	112	112	108	106	104	104	104	
16	104	106	100	92	88	B	G	118	G	106	108	104	108	106	G	126	124	120	118	128	114	94	94	94	
17	92	108	B	104	104	102	120	112	104	108	B	134	180	156	154	130	132	126	106	106	102	102	110	108	
18	108	100	114	108	104	102	102	102	102	102	106	104	B	168	134	126	116	108	108	106	116	108	94	94	
19	94	92	B	106	106	104	B	104	102	106	104	104	110	B	124	108	110	112	112	106	104	B	104	104	
20	100	100	96	98	102	102	108	102	102	110	110	118	104	B	114	114	112	112	106	104	108	96	106	102	
21	106	98	98	94	92	94	132	136	136	110	124	132	B	120	118	G	144	122	108	108	94	106	108	92	
22	112	92	92	88	110	102	102	102	100	102	102	106	104	104	104	102	124	102	114	114	116	114	106	108	
23	108	108	108	104	104	104	100	106	108	108	106	G	106	B	134	100	112	110	108	100	104	114	104	102	
24	96	96	96	96	90	94	B	110	106	106	102	104	106	158	100	100	100	100	98	94	92	92	92	92	
25	92	90	104	102	102	102	126	116	108	104	102	100	104	102	B	98	100	114	112	106	102	92	92	108	108
26	108	100	100	106	102	102	100	100	98	98	112	110	B	B	178	118	124	116	108	104	108	112	104	106	
27	100	92	96	94	90	90	114	110	108	108	104	102	104	102	102	102	100	100	128	114	94	92	114	114	
28	108	110	106	102	104	104	106	104	102	102	102	102	104	100	100	102	100	100	110	104	94	104	102	104	
29	104	104	104	104	102	104	102	G	106	134	126	102	100	106	B	B	G	G	114	106	112	B	118	B	
30	102	102	102	102	106	B	102	122	124	100	B	B	B	B	B	116	124	112	106	106	126	100	100	100	
31																									
	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	29	28	29	30	26	24	28	27	27	27	28	23	23	24	27	28	29	30	30	29	28	30	29	
MED	103	102	100	102	102	102	103	110	108	108	108	110	106	120	114	114	115	110	108	105	102	101	104	102	
U Q	108	105	104	104	104	104	115	117	116	110	114	121	116	146	129	124	123	114	112	108	109	107	106	107	
L Q	96	94	96	94	92	102	102	103	102	104	104	104	104	102	104	102	106	103	106	100	94	93	96	96	

JUN. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUN. 2013 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'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	F2	F5	F3	FO31	FO31	L4	L2	CL21	C4	C2	CL11	C1	C1	H1	C1	L1	C4	C4	L5	L6	F7	FF25	FF32	F2	
2	F1	F1	F1	F1	F1	CL12	CL11	C1	C1	C1	C1	C1	C1					C1	C1	C3		F2	FO21	F1	
3	F1	F2	F2	F1	FO21	C1		C1	C1	C1	C1	C1	C1	C1	C1	C1	CL22	L2	L4	L3	F4	F4	F3	F2	
4	F3	F4	F4	F3	F2		L1	H1	C1	C2		C1			C1	C1	C1	C1	C2	L2	F5	F3	F1	F1	
5	F2		F1		F1						H1	H1	C1	C1	C2	CL31	CL21	CL11	C2	CL21	FF33	FF73	F6	F4	
6	FF14	F4	FO41	F3	F3	L1	L3	L2	C1	C2	C1	C1	C1	C1		C1	C1	C2	C2	CL11	FF11	FF21	FF41	FF22	
7	FO51	FO41	F5	F4	F5	L5	L3	C2			C1	C1	C1	C1	C1	C1	C2	C2	C3	L2	F2	F2	FF11	F1	
8	F1	F3	F5	F3	F4	L3	C1	C1	C1	C2	C1	CL21		C1		CL11	C1	C2	CL21	L2	F4	F3	F2	F2	
9	F2	FF25	FF12	F1	F2	L1	L1	L3	C1		C2	L1	L2	L1	L1	L1	L1	L1	L1	L2	F2	F2	F1	FF11	
10	F2	F1	FF11	F1	FO21	L3	C2	C3	C2	C2	C1	L2	L1	L1	L1	CL12	L2	L2	L2	L6	F3	FF24	F3	FF22	
11	FF21	F3	F3	F3	F5	L3	L2	LC22	LC21	C2	C1	L1		H1	H1	CH11	C2	C4	C8	C6	FF71	F3	F2	F2	
12	F2	F2	F2	F4	F2	L3		C1	C2	C2	C2	CL13	L2	CL12	CL23	L3	L4	CL14	L4	L3	F3	F2	F1	FF31	
13	FF31	F1	F1	F1	F1	L2	L2	L5	L2	L2	L1	HCL11	HCL11	C2	C1	C1	L1	CH31	C5	L5	F4	F5	F5	F5	
14	F3	F3	F2	F1	F1	C1	C2	C1	C2	C2	C1	C1	C1	H1	H1	C1	C1	C2	CL21	L3	F7	FF22	FF51	F2	
15	FF33	FF21	FF11	FF22	F2	L2	L3	L2	HL11	CL11	L1	C1	L1	L1	L1	HL11	HL11	C1	C2	C5	F9	F5	F4	F3	
16	F3	F3	F2	F1	F1			C1		C1	C1	L2	L1	L1		C1	CL11	CL12	CL21	CL23	FF24	F3	F3	F2	
17	F2	F2		F3	F2	L4	CL43	C2	L1	C1		H1	H1	H1	H1	H2	H2	HC21	CL21	L2	F3	F1	FF22	F2	
18	FF42	F2	FF11	FF22	FF22	CL31	LQ51	L4	L1	L2	L1	L1		H1	H1	C1	C2	C2	CL31	L4	FF14	FF24	F3	F1	
19	F2	F1		F2	F2	C1		C1	L2	C1	L1	L1	C1	C1	C2	C2	C1	C1	C1	C1	FF31		F3	F2	
20	F1	F2	F2	FF12	F4	L4	C1	C1	L1	C1	C1	CL11	L1		C1	C2	C1	C1	C1	F3	FF32	F1	F3	F3	
21	F3	FF33	F2	F2	F2	L2	HL11	H1	H1	C1	C1	H1		C1	C1		H1	C1	CL12	C2	F1	FF12	FF31	F2	
22	FF12	F1	F1	F1	F1	L1	L2	L2	L6	L3	L3	L1	L1	L2	L3	L1	CL11	L1	CL11	C5	FF21	FF11	FF5	FO41	
23	F3	FO31	F4	F3	F2	L1	L2	C1	C1	C1	L1		L1		H1	L1	CL41	CL52	C8	L6	FF11	FF12	FF22	FF42	
24	F2	F3	F3	F1	F2	L1		C1	C3	C3	C4	L2	L2	L1	L1	L2	L2	L2	L2	L3	F3	F2	F3	F3	
25	F3	F1	FF31	F4	F4	L1	C1	C3	C4	C2	L4	L2	L1	L1	L1	L1	CL11	CL23	CL22	CL34	F4	F2	FF22	FF21	
26	FF21	F1	F2	F2	F4	L2	L4	L1	L2	L2	C1	C2			H1	C2	C2	C1	CL52	CL73	FF33	FF41	F5	F2	
27	F2	F2	F2	F1	F1	L1	C1	C3	C2	C1	C2	L2	L1	L2	L3	L2	L2	L1	CL11	CL31	F2	F2	FF24	FF12	
28	FF11	FF21	FF21	FF42	F1	L1	C1	L2	L2	L2	L1	L1	L1	L1	L1	L1	L2	L2	C1	C2	F2	FF11	F1	FF31	
29	F3	F2	F1	F3	F2	L2	L1		L1	H1	CL11	L1	L1	L1					C1	C2	F5		F1		
30	F1	F6	F5	F2	F1		L1	CL11	C1	L1						C1	C1	C2	C4	L7	FF13	F3	F3	F3	
31																									
	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 <sub>o</sub> F <sub>2</sub> , f <sub>o</sub> F <sub>1</sub> , f <sub>o</sub> E
×	f <sub>x</sub> F <sub>2</sub>
*	DOUBTFUL f <sub>o</sub> F <sub>2</sub> , f <sub>o</sub> F <sub>1</sub> , f <sub>o</sub> E
⊗	f <sub>b</sub> E <sub>s</sub>
└	ESTIMATED f <sub>o</sub> F <sub>1</sub>
†, ‡	f <sub>min</sub>
^	GREATER THAN
∨	LESS THAN

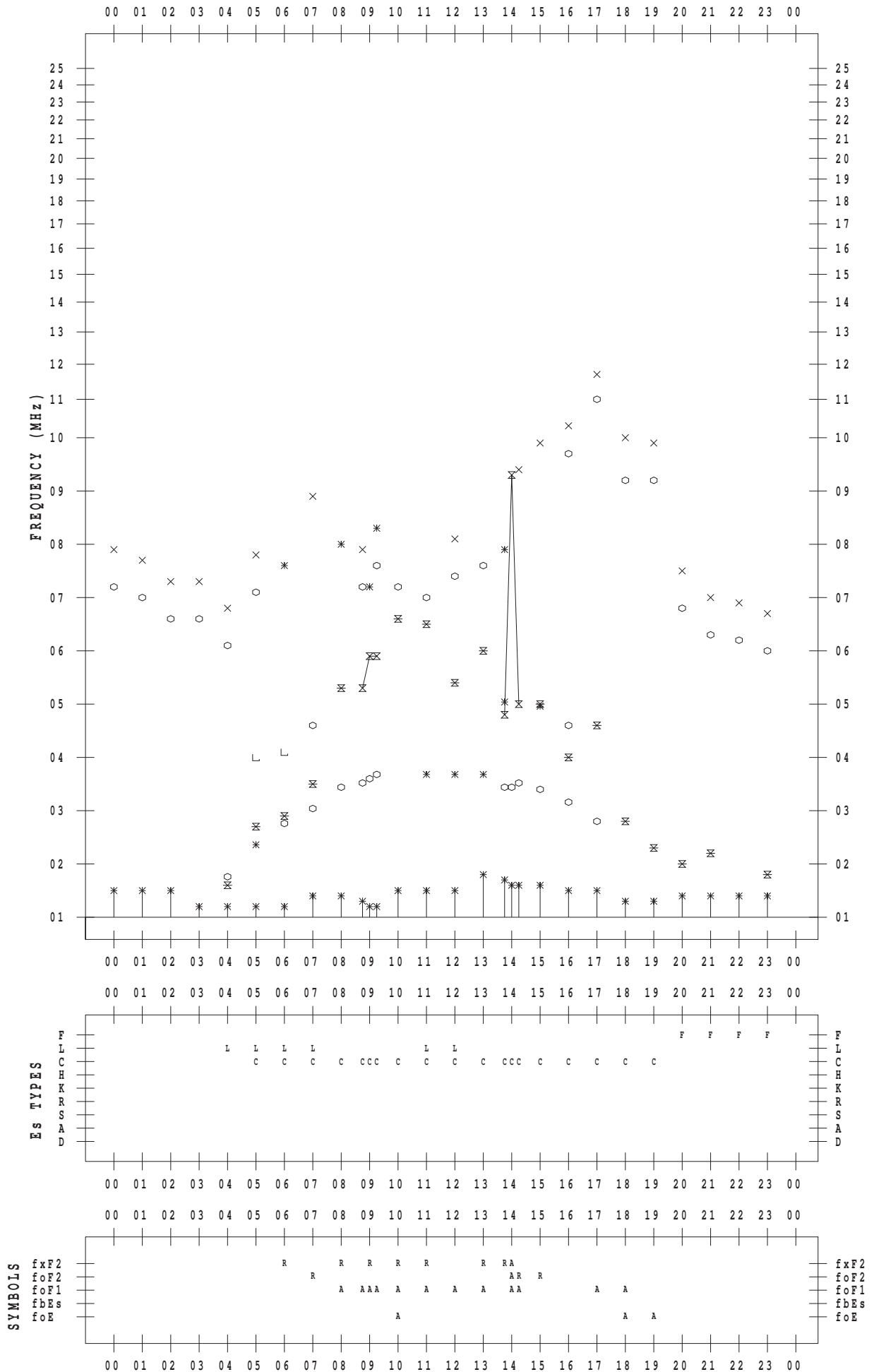
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/ 1

135 ° E MEAN TIME



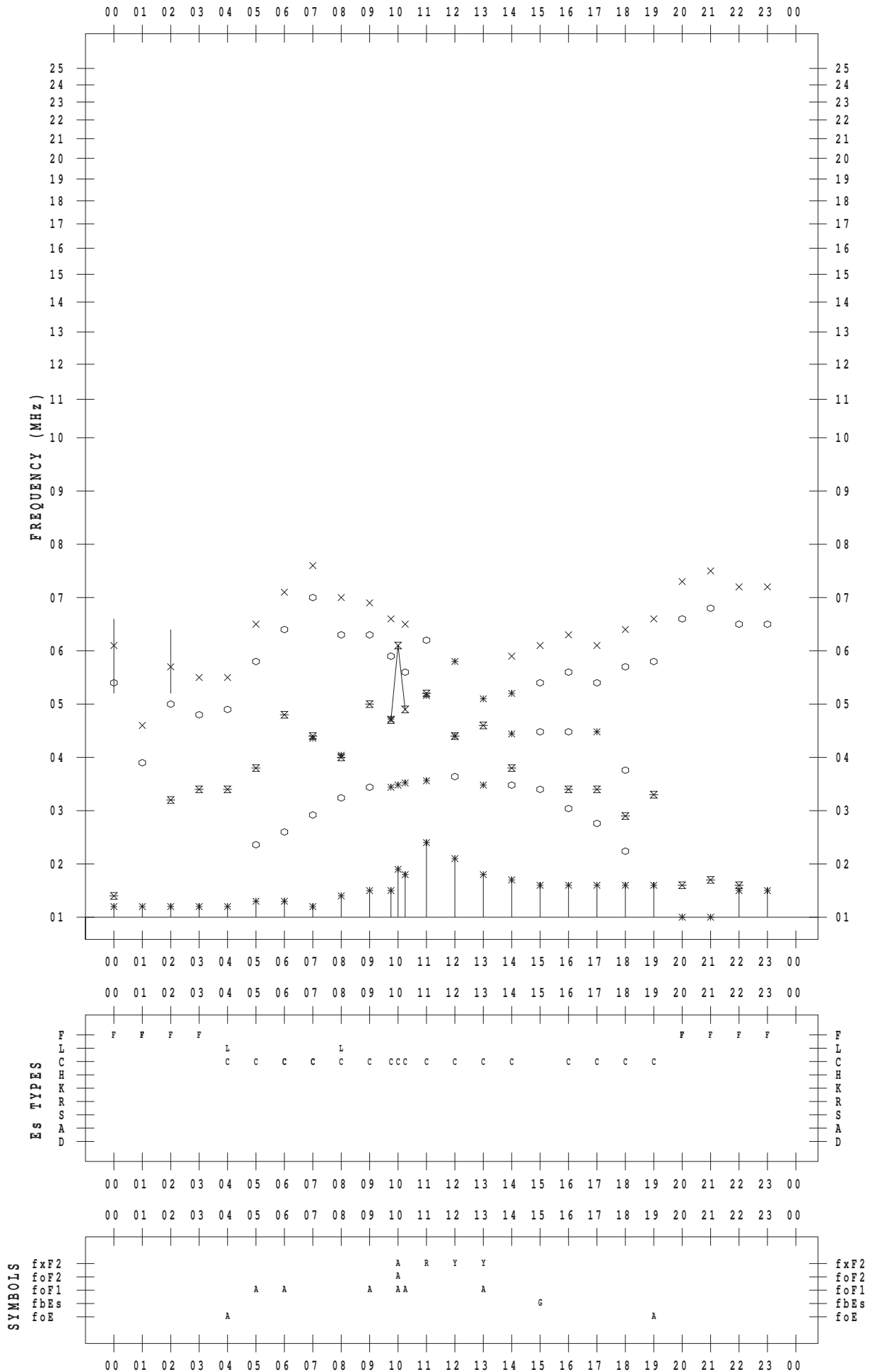
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 2

135 ° E MEAN TIME



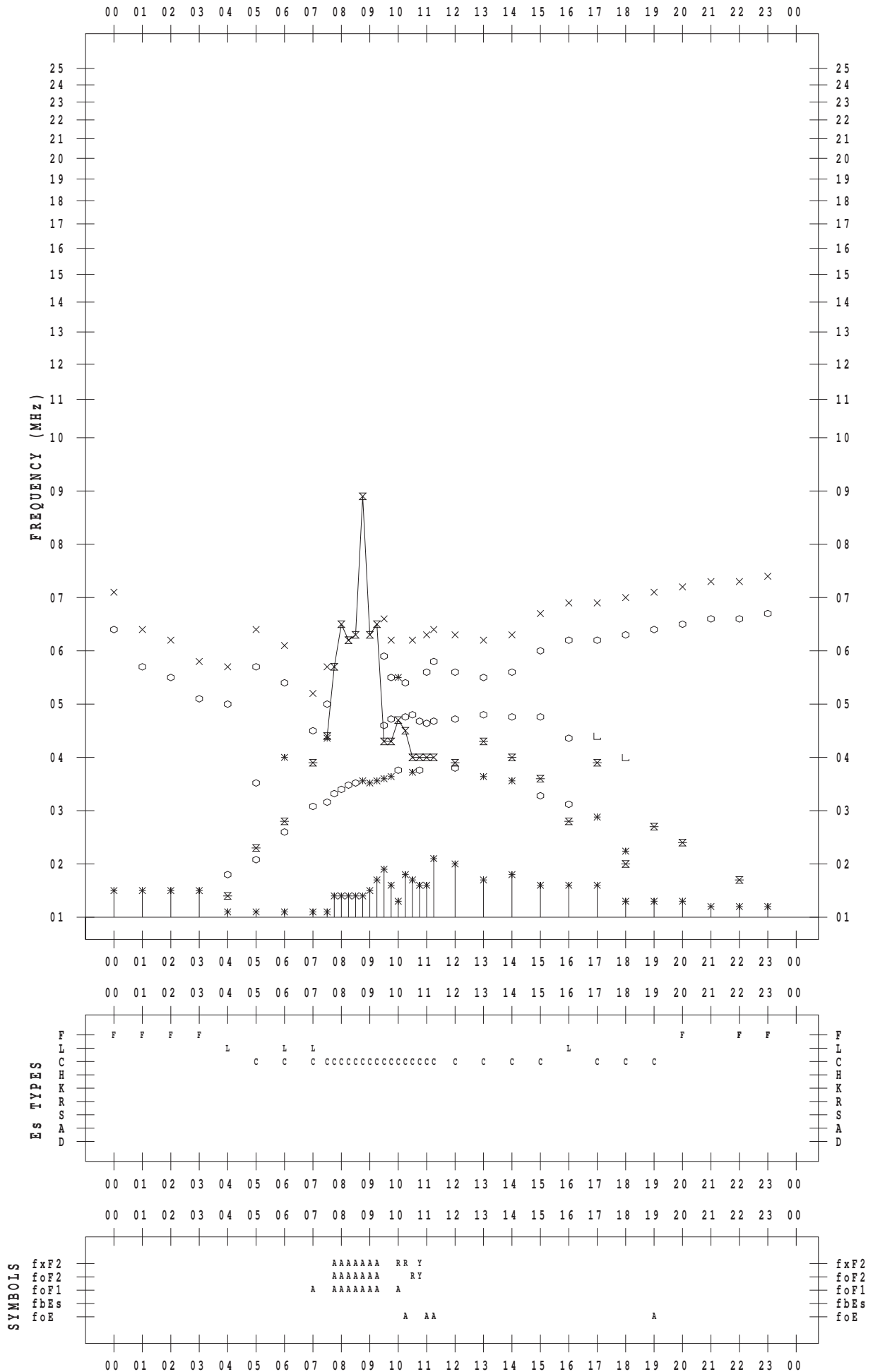
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 3

135 ° E MEAN TIME



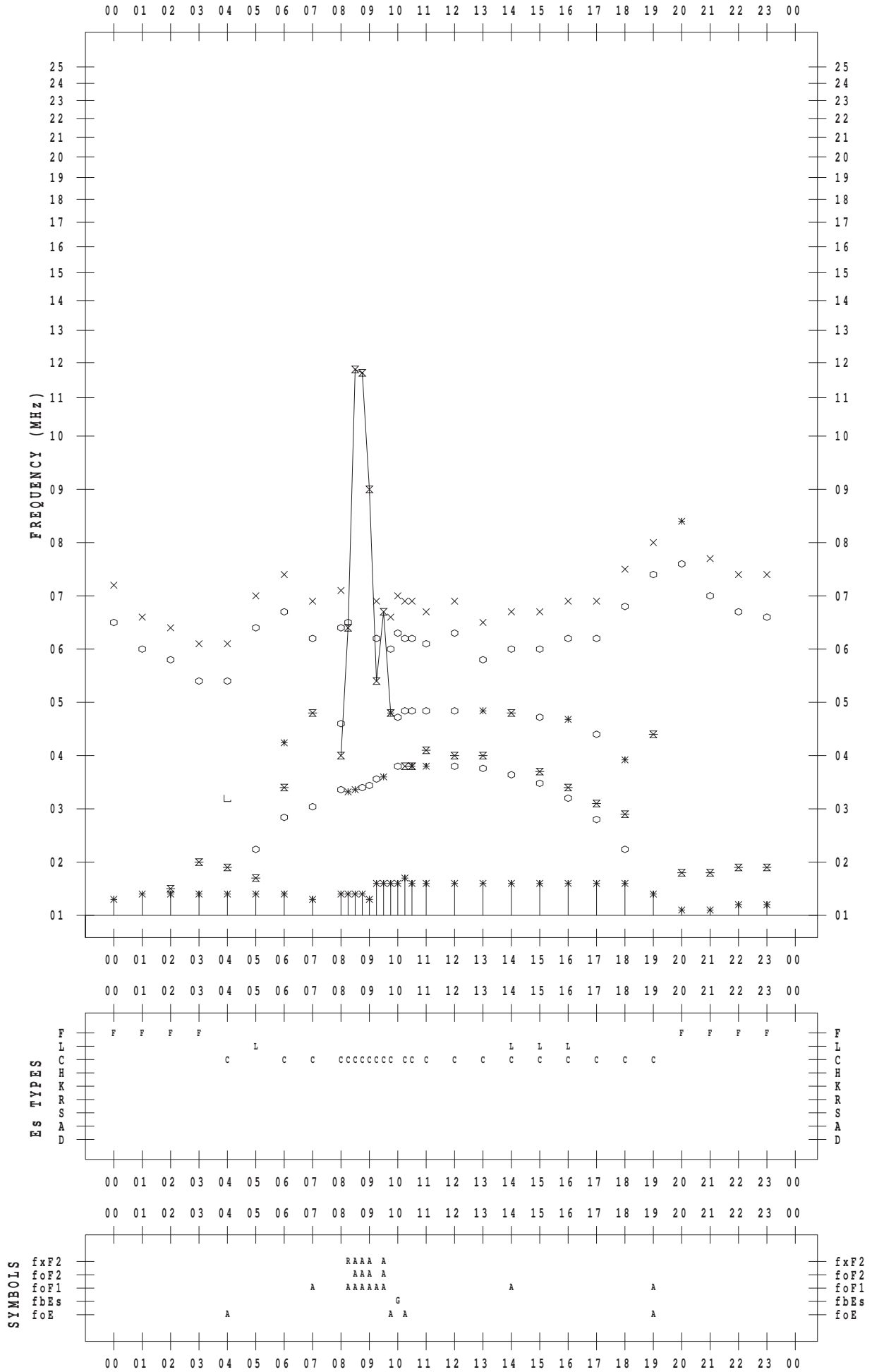
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 4

135 ° E MEAN TIME





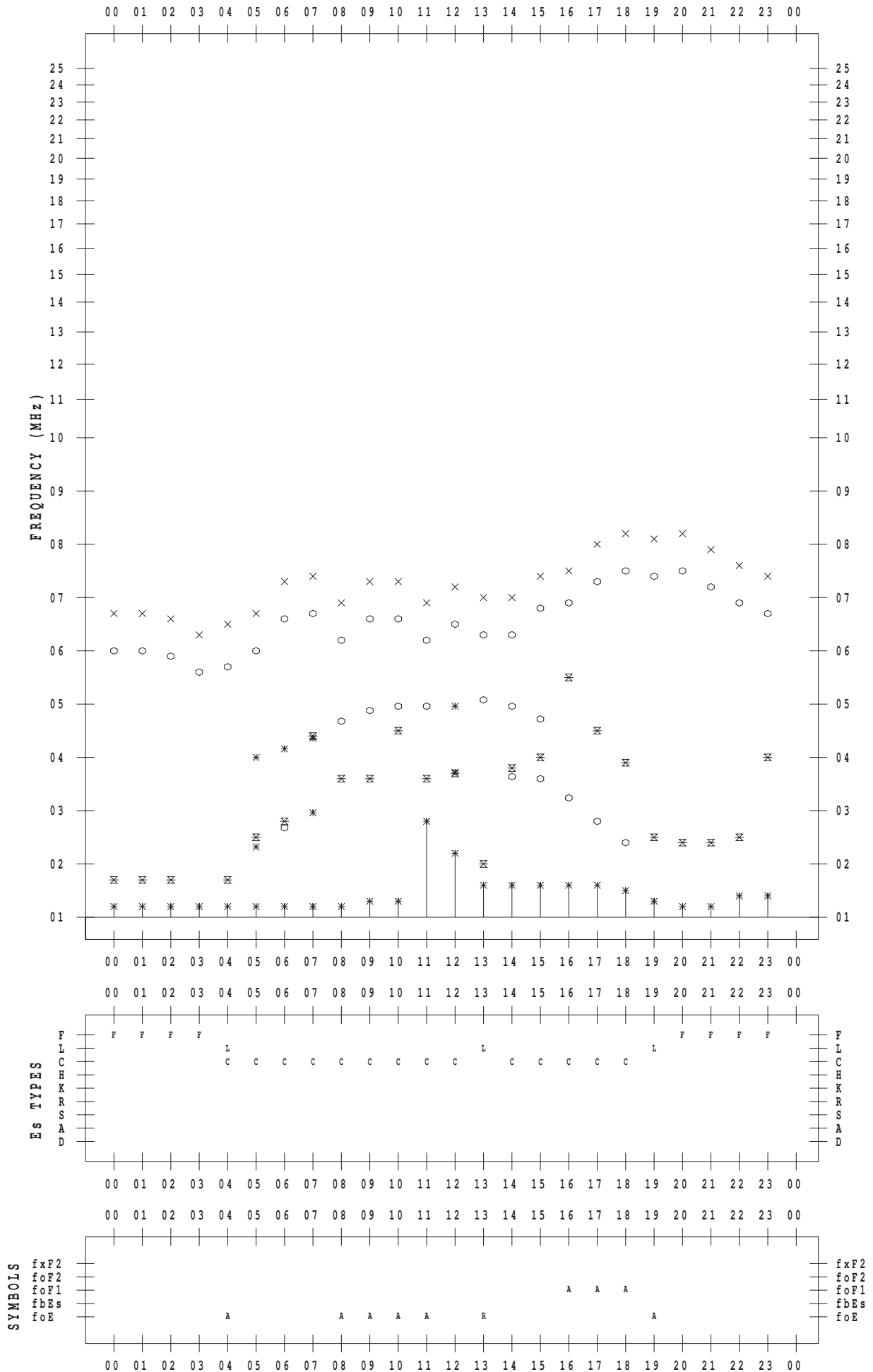
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 5

135 ° E MEAN TIME



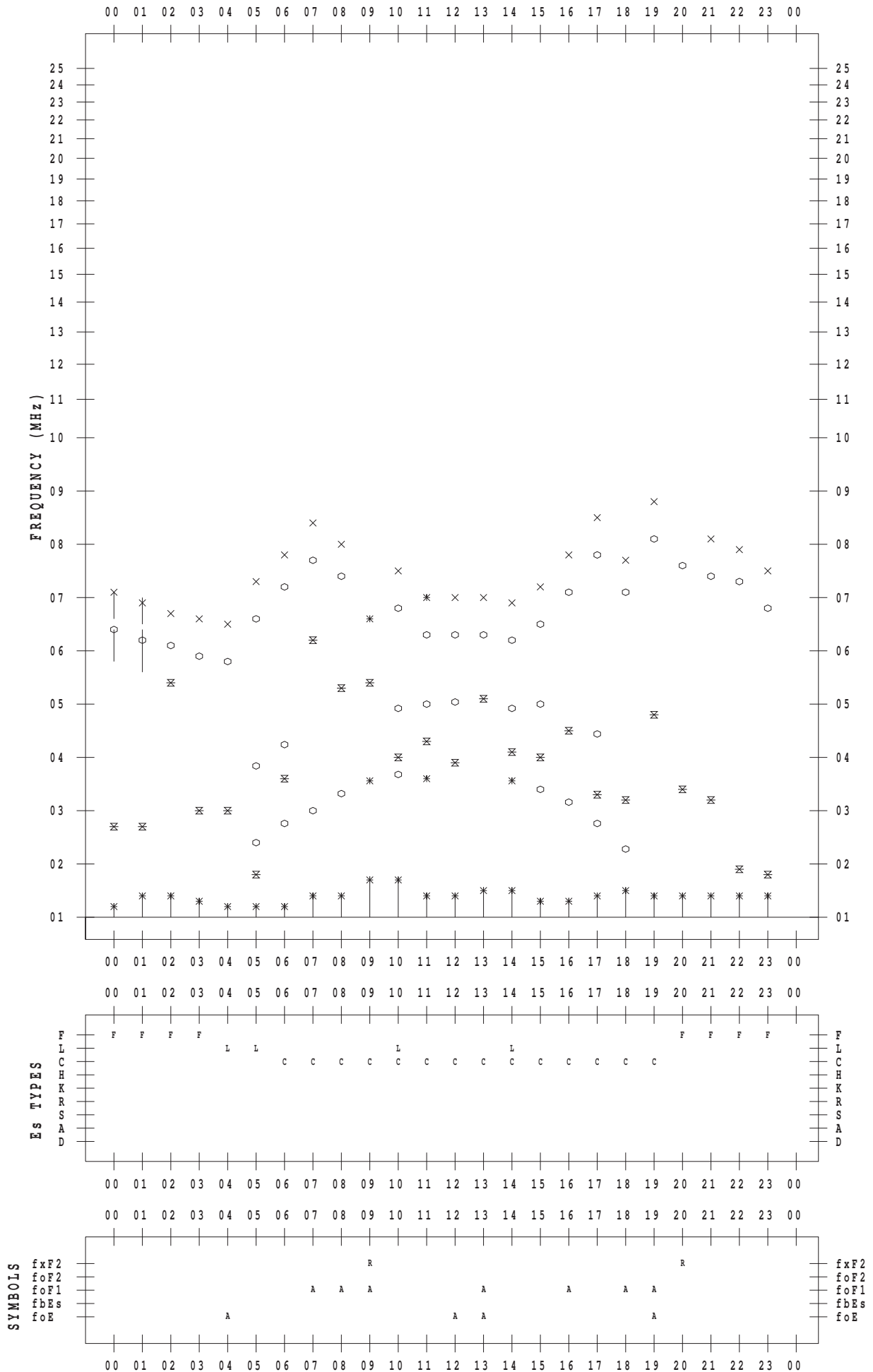
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/ 6

135 ° E MEAN TIME



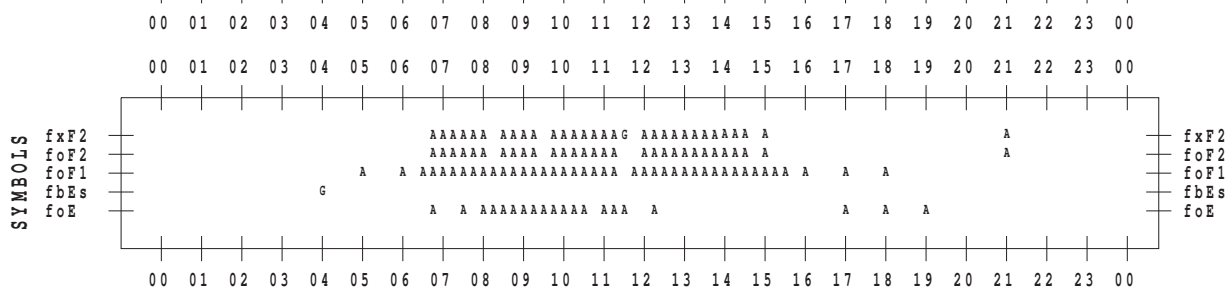
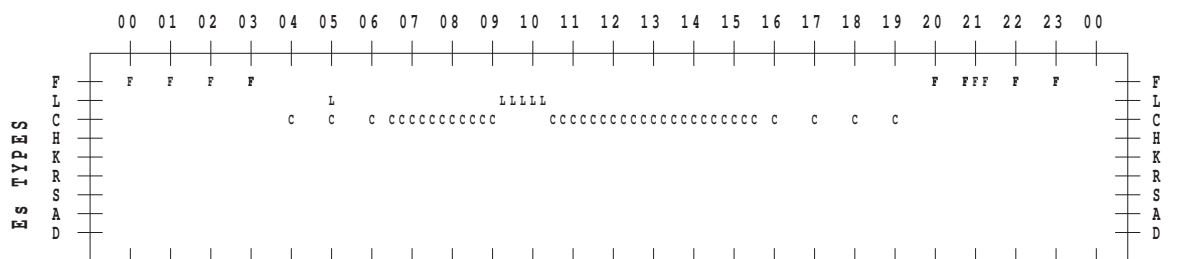
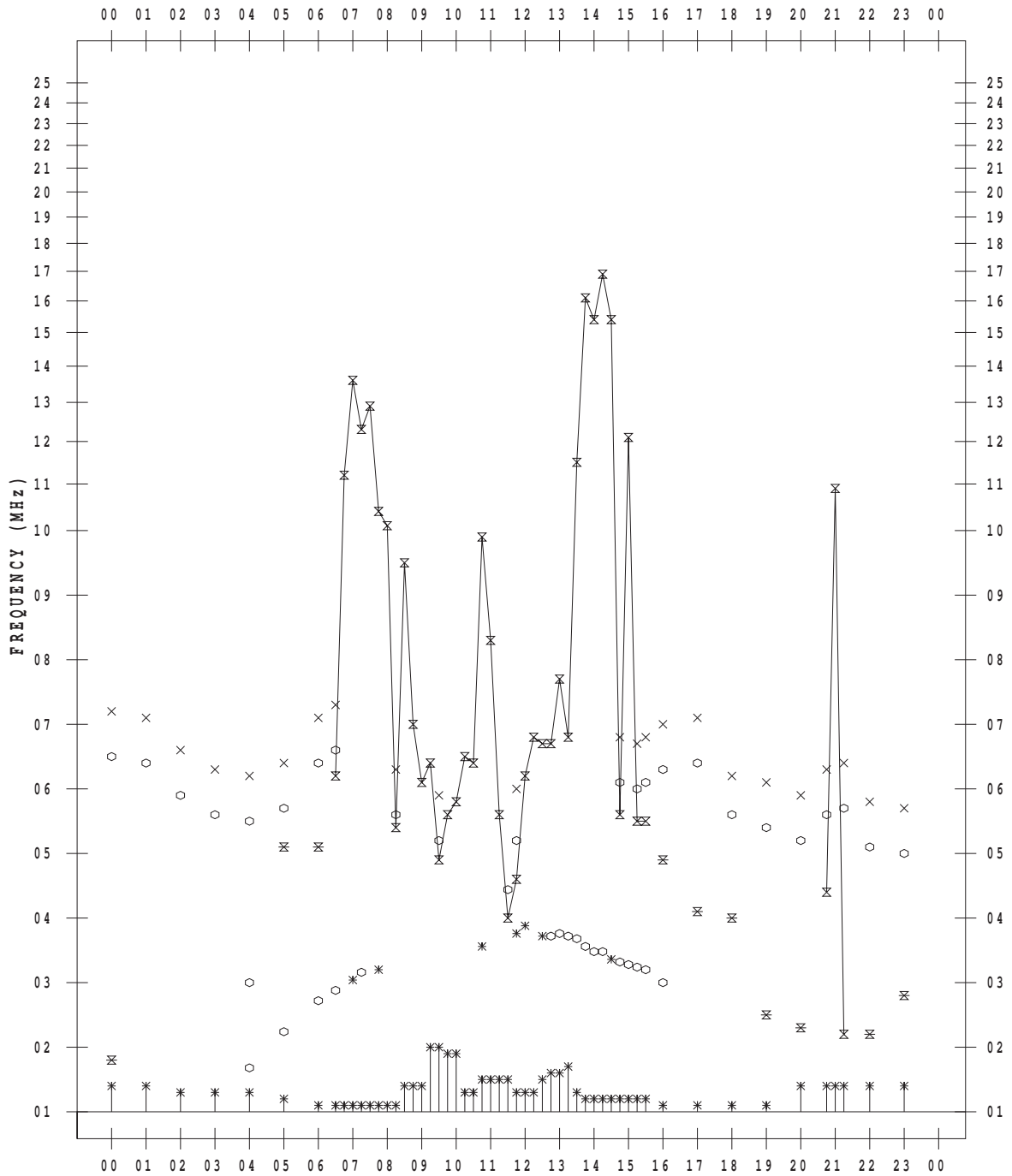
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/ 7

135 ° E MEAN TIME



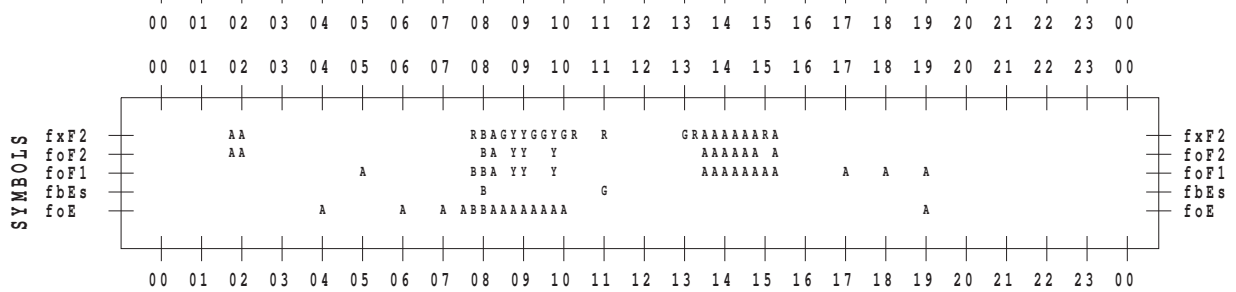
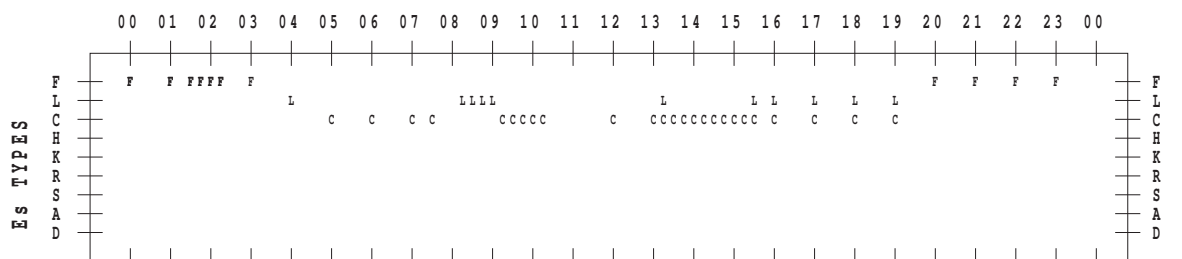
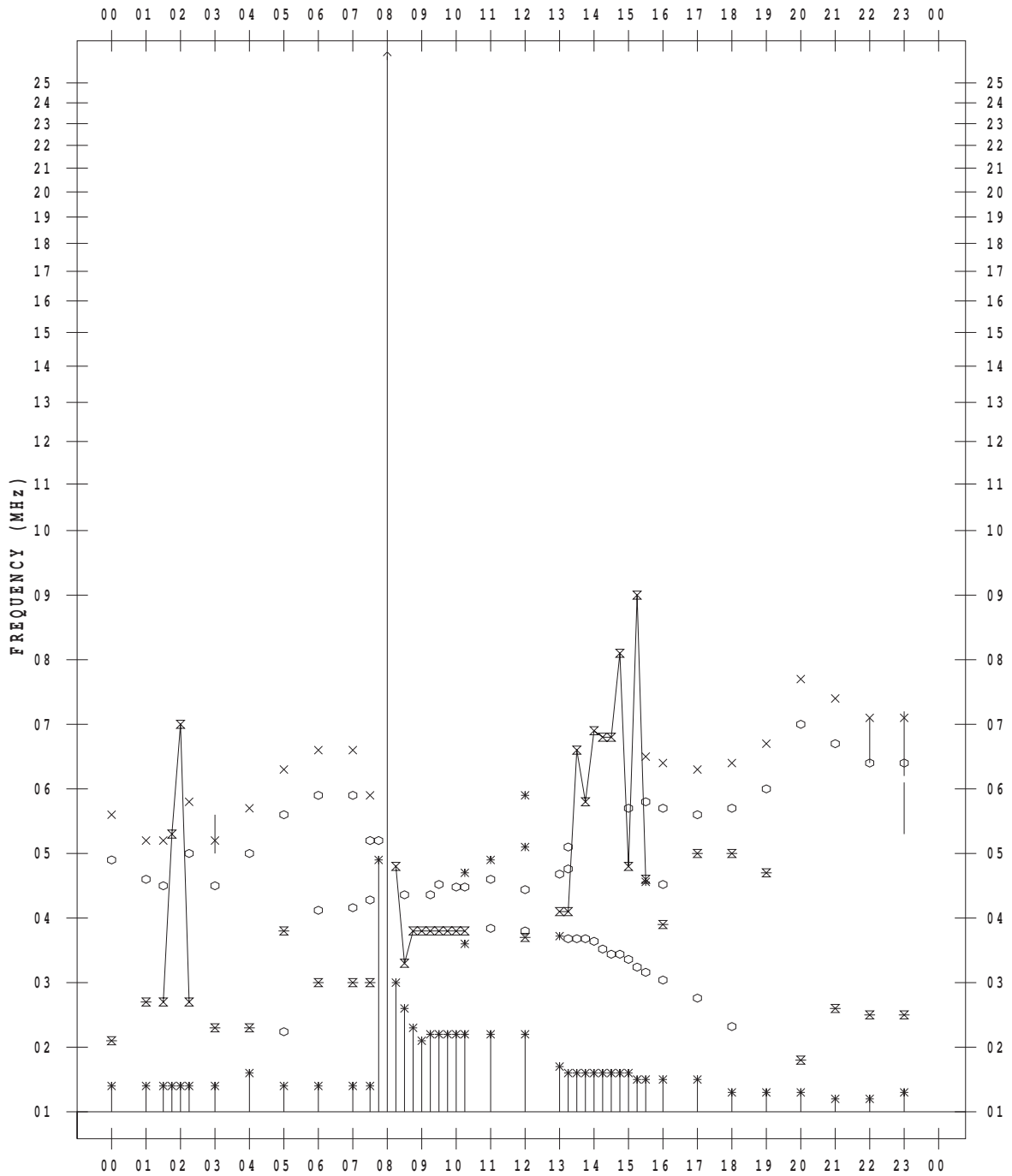
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 8

135 ° E MEAN TIME



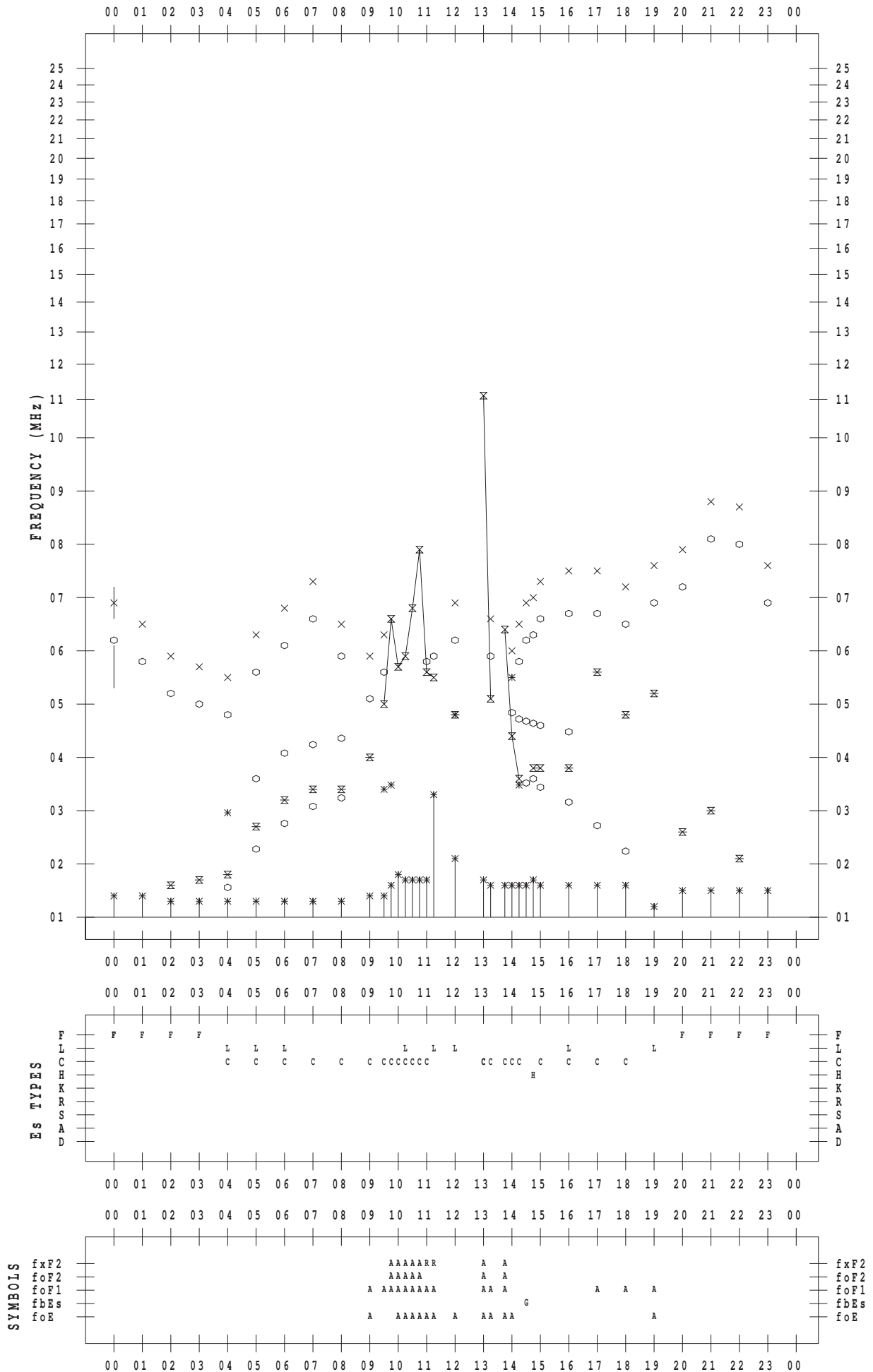
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 9

135 ° E MEAN TIME



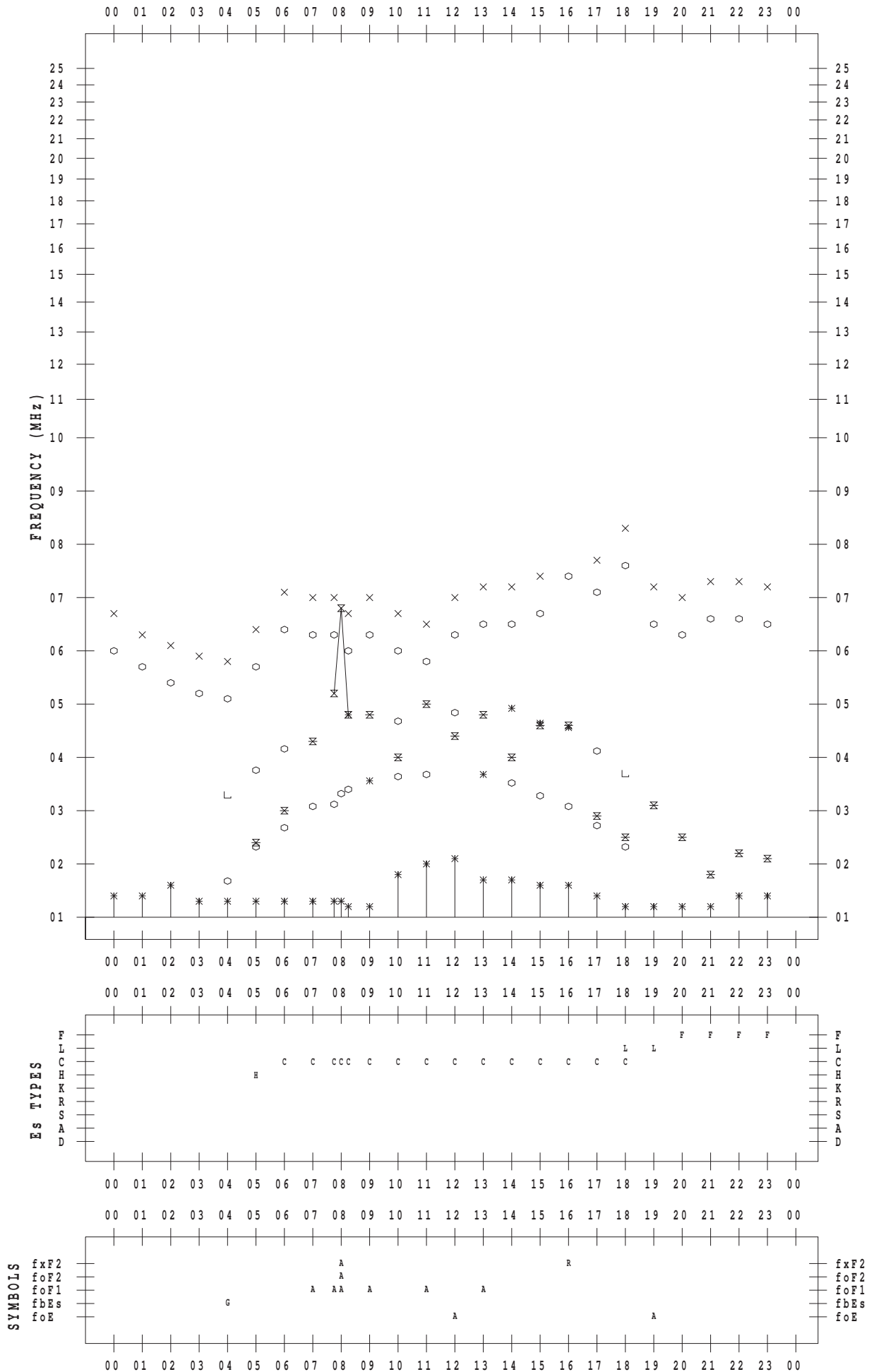
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/10

135 ° E MEAN TIME



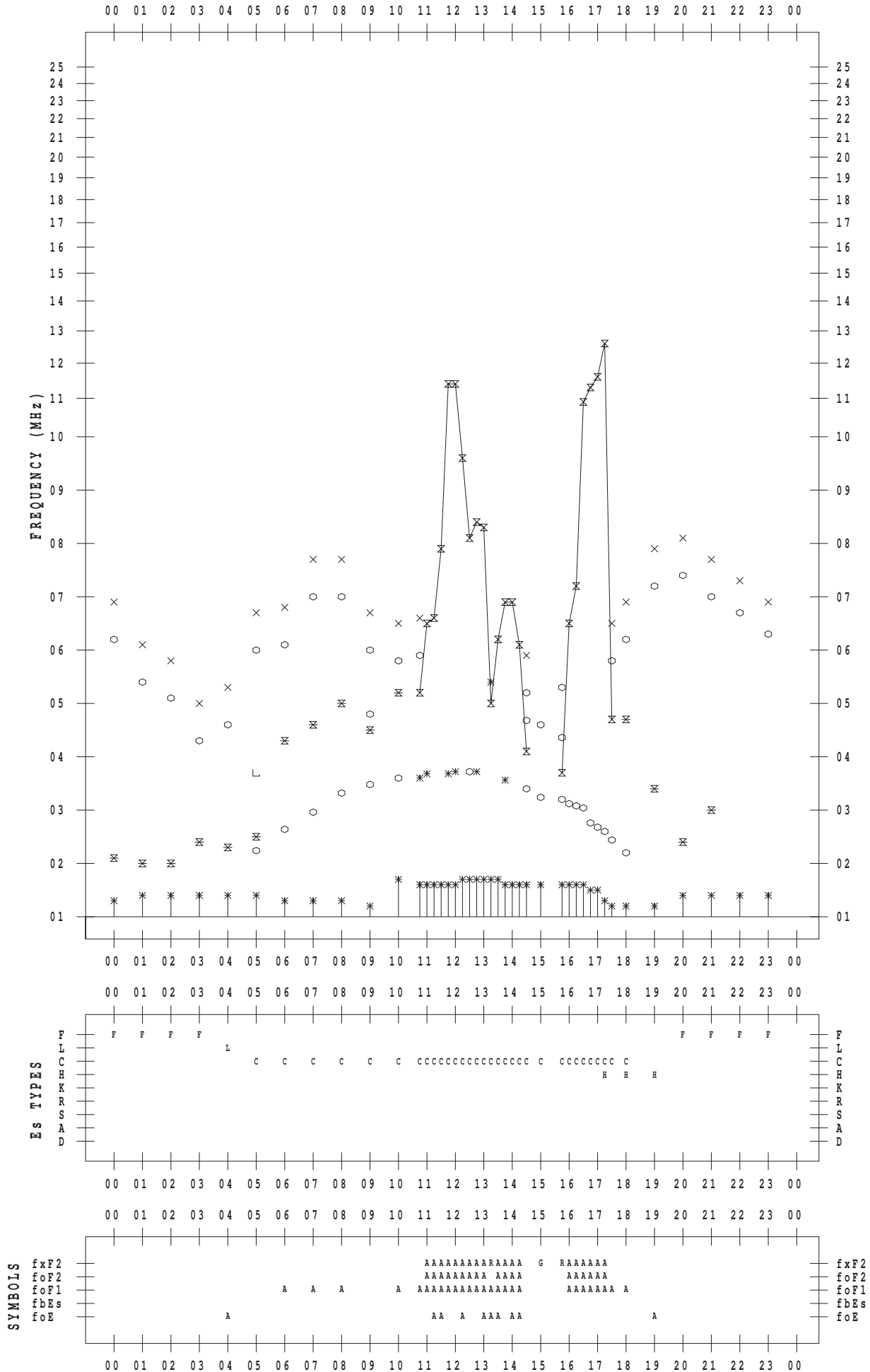
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/11

135 ° E MEAN TIME



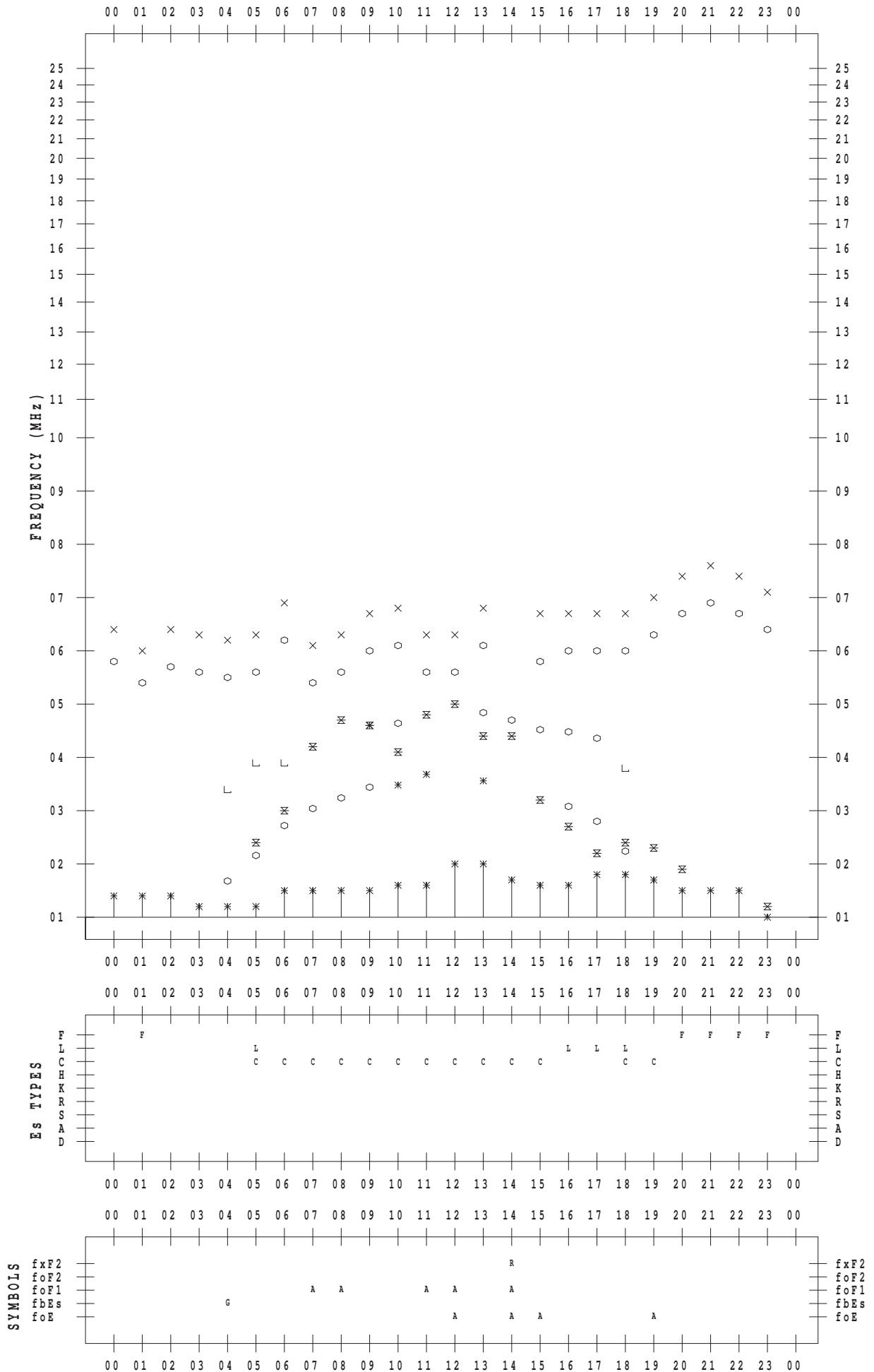
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/12

135 ° E MEAN TIME





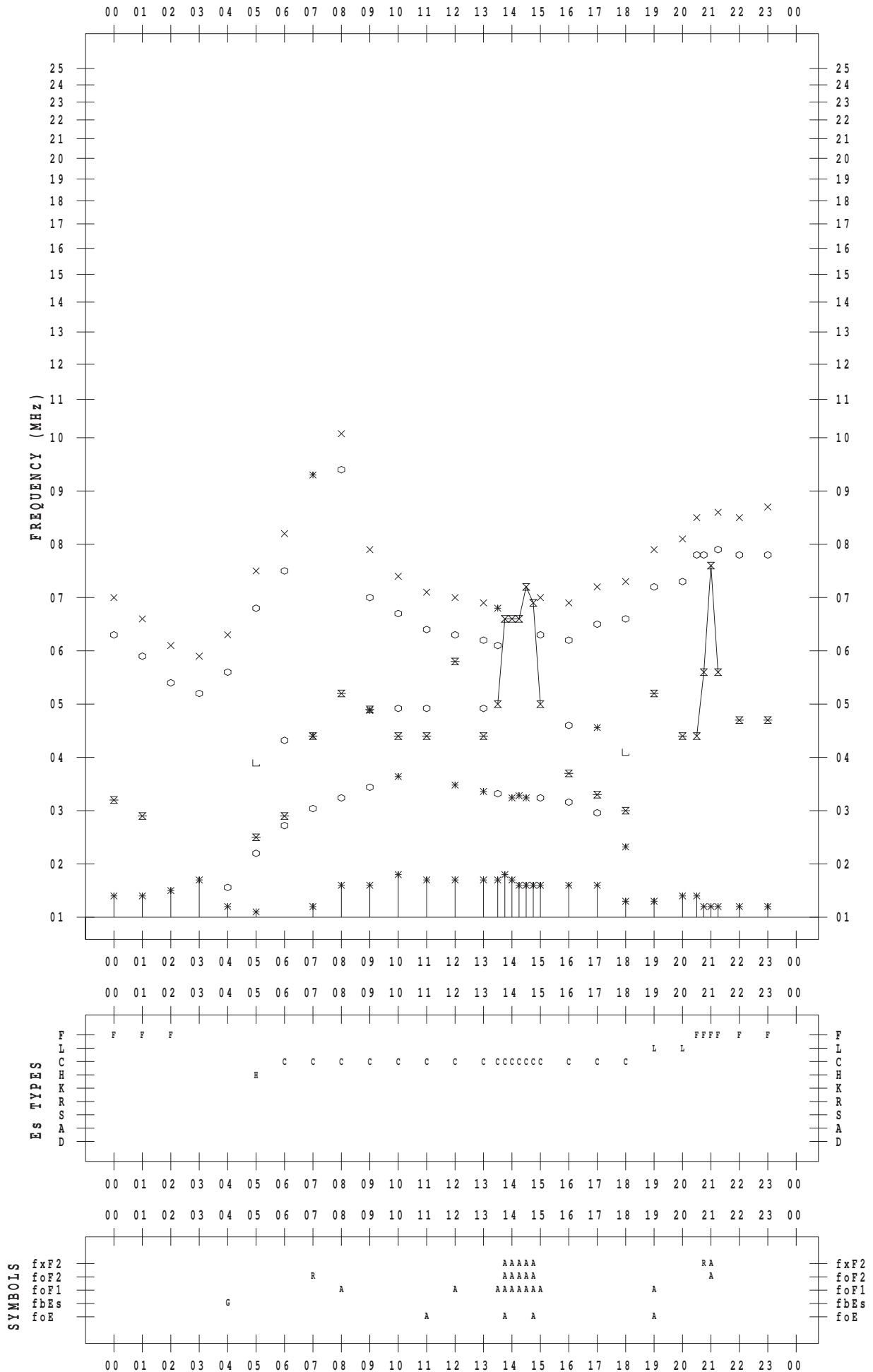
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/13

135 ° E MEAN TIME



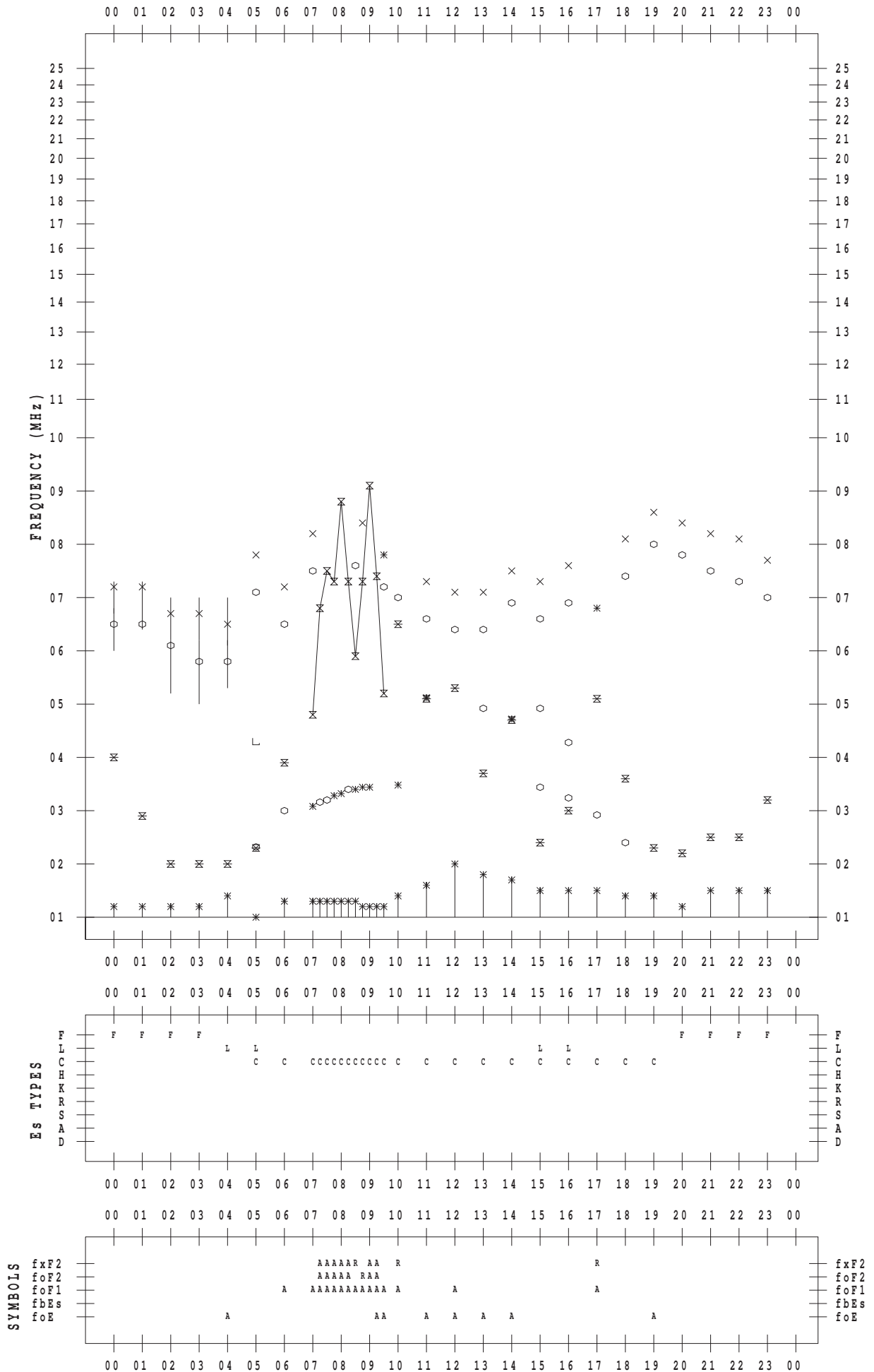
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/14

135 ° E MEAN TIME



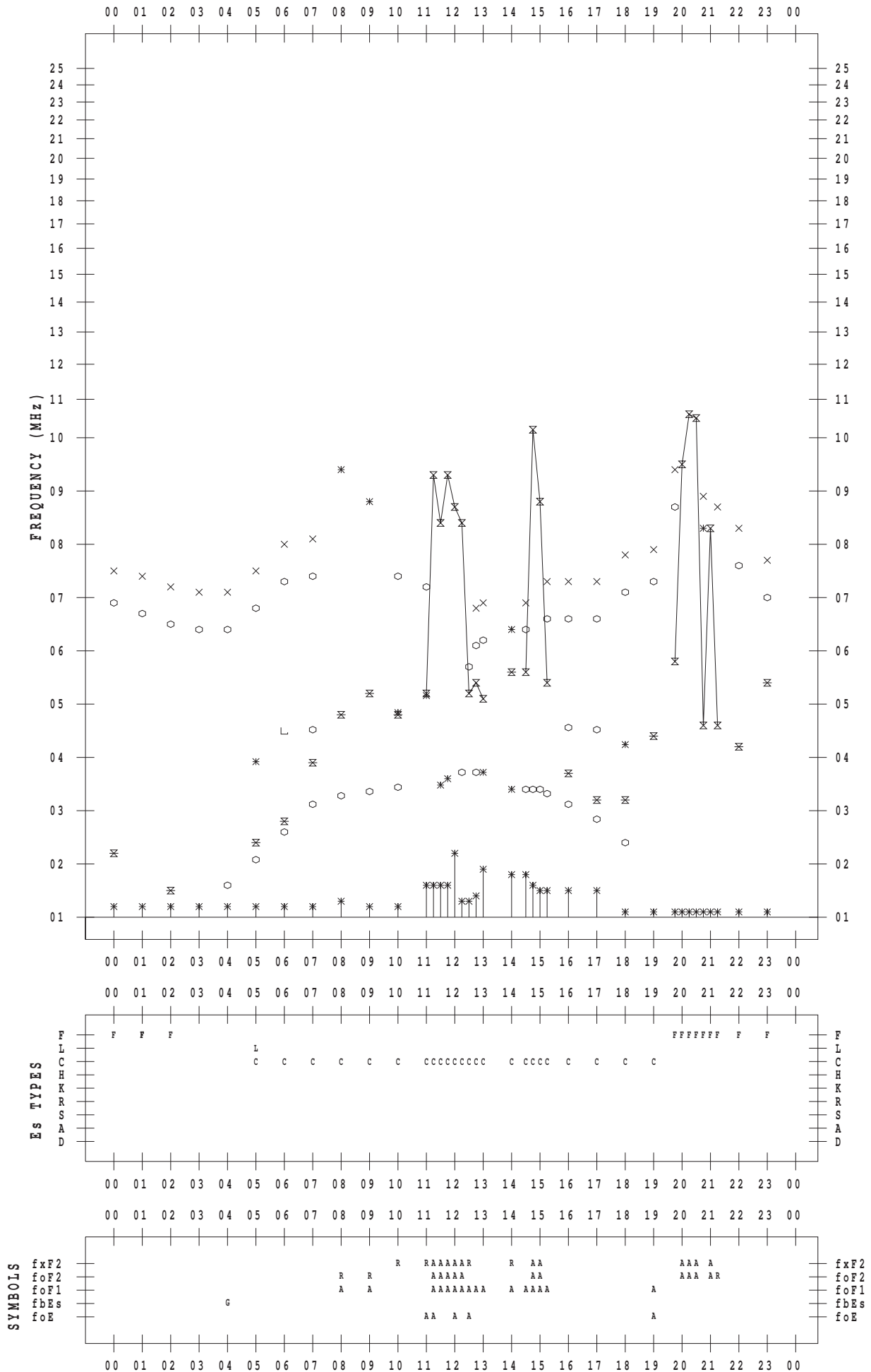
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/15

135 ° E MEAN TIME



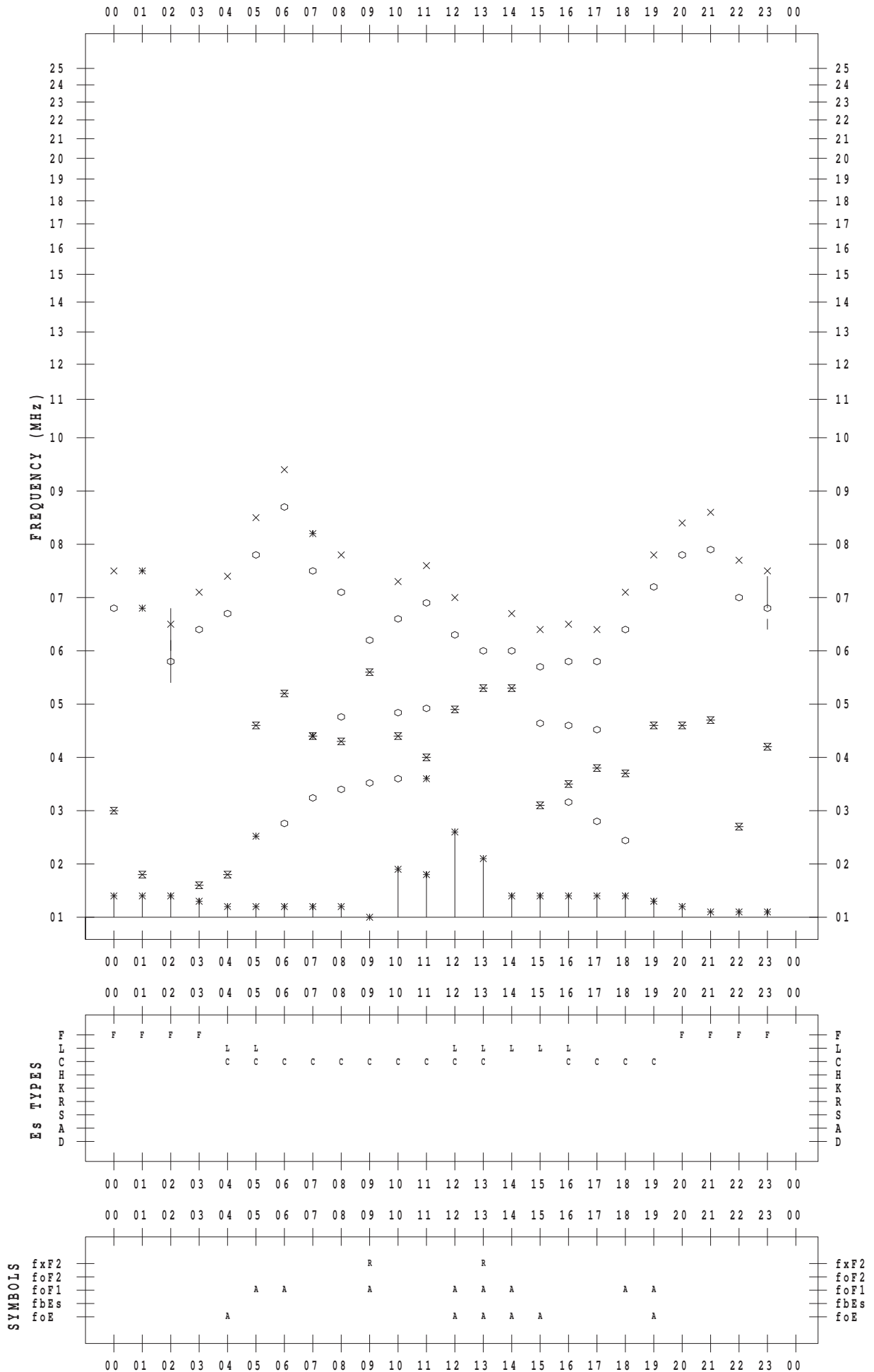
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/16

135 ° E MEAN TIME



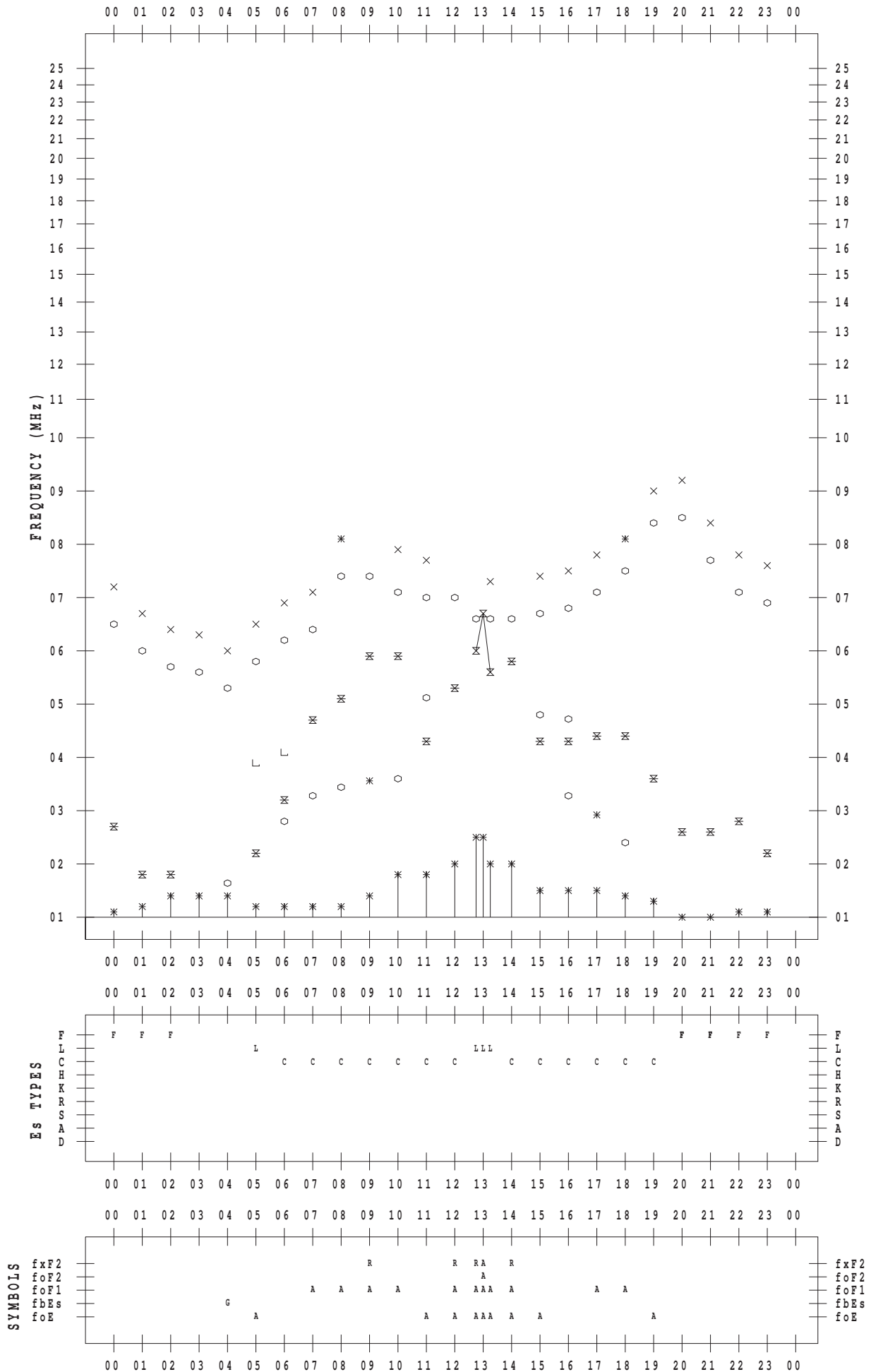
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/17

135 ° E MEAN TIME



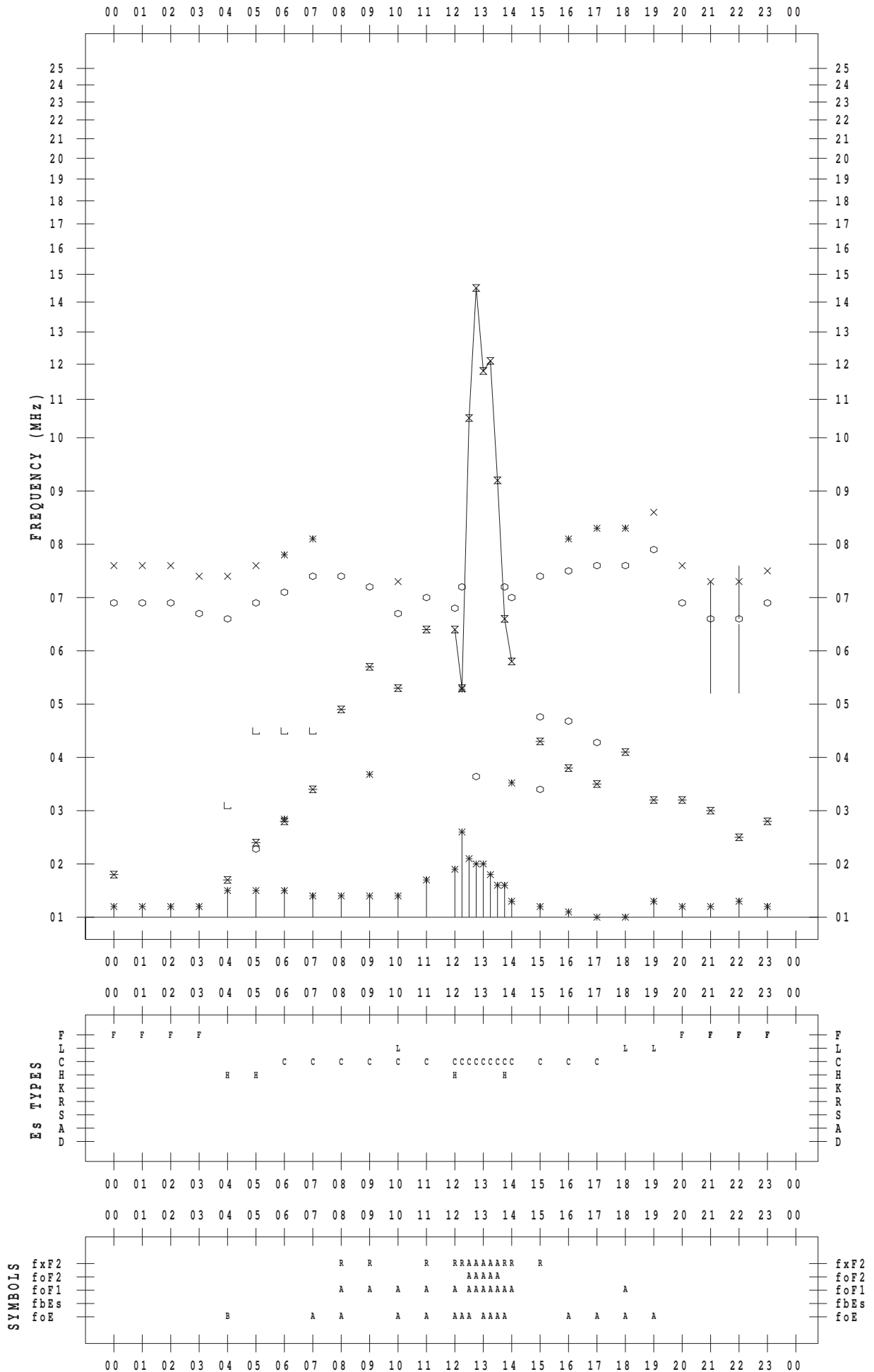
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/18

135 ° E MEAN TIME



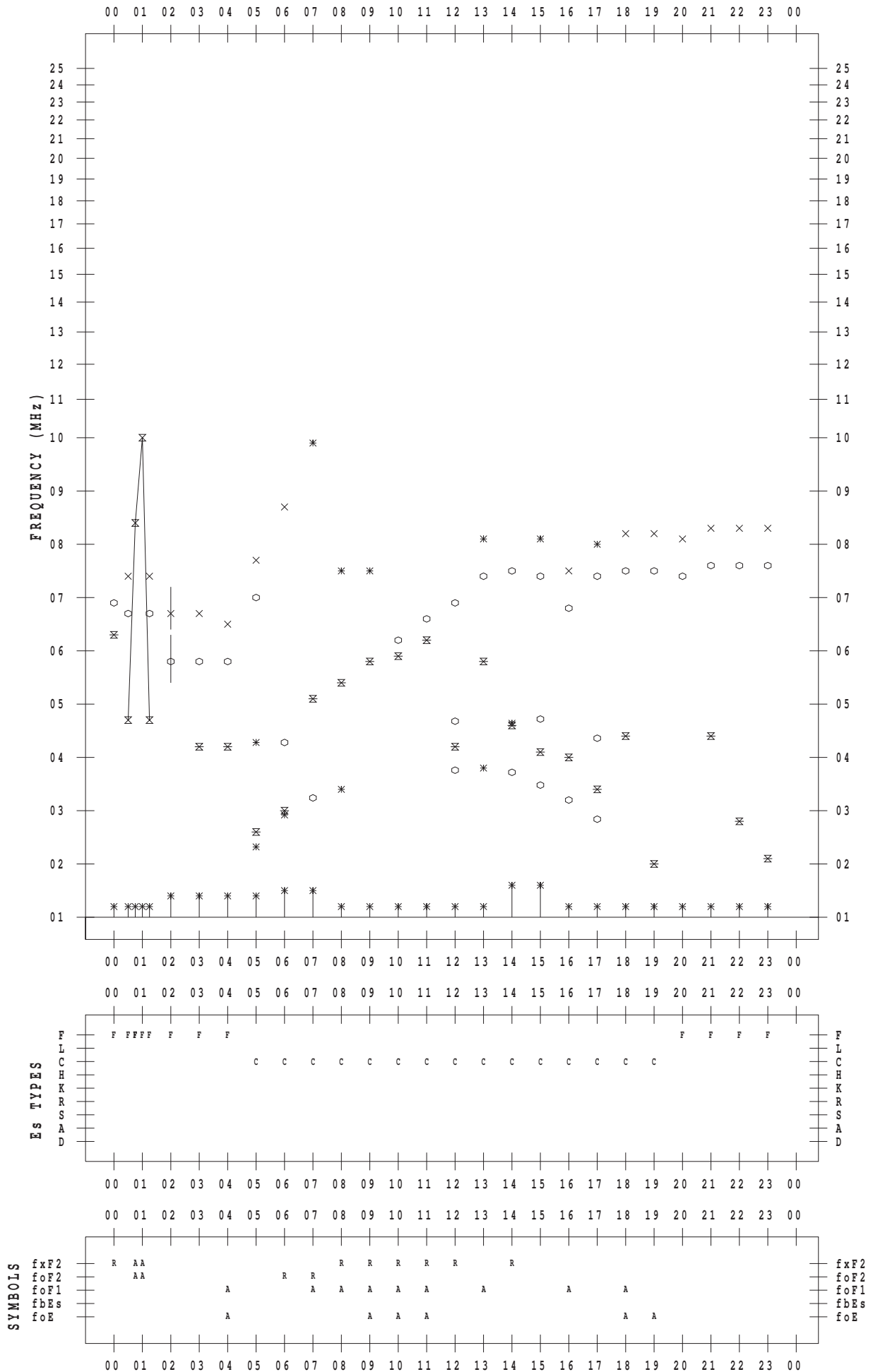
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/19

135 ° E MEAN TIME



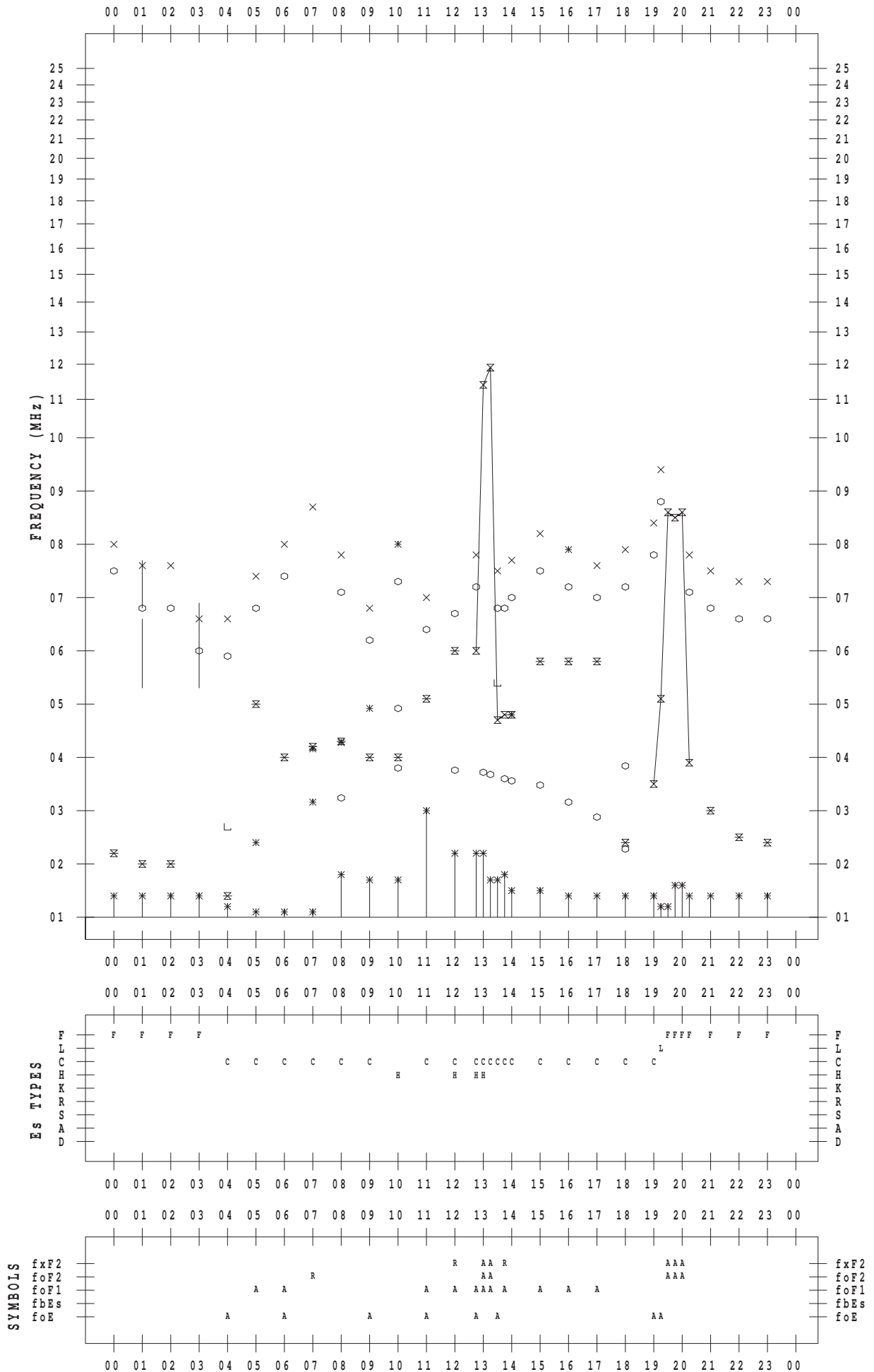
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/20

135 ° E MEAN TIME





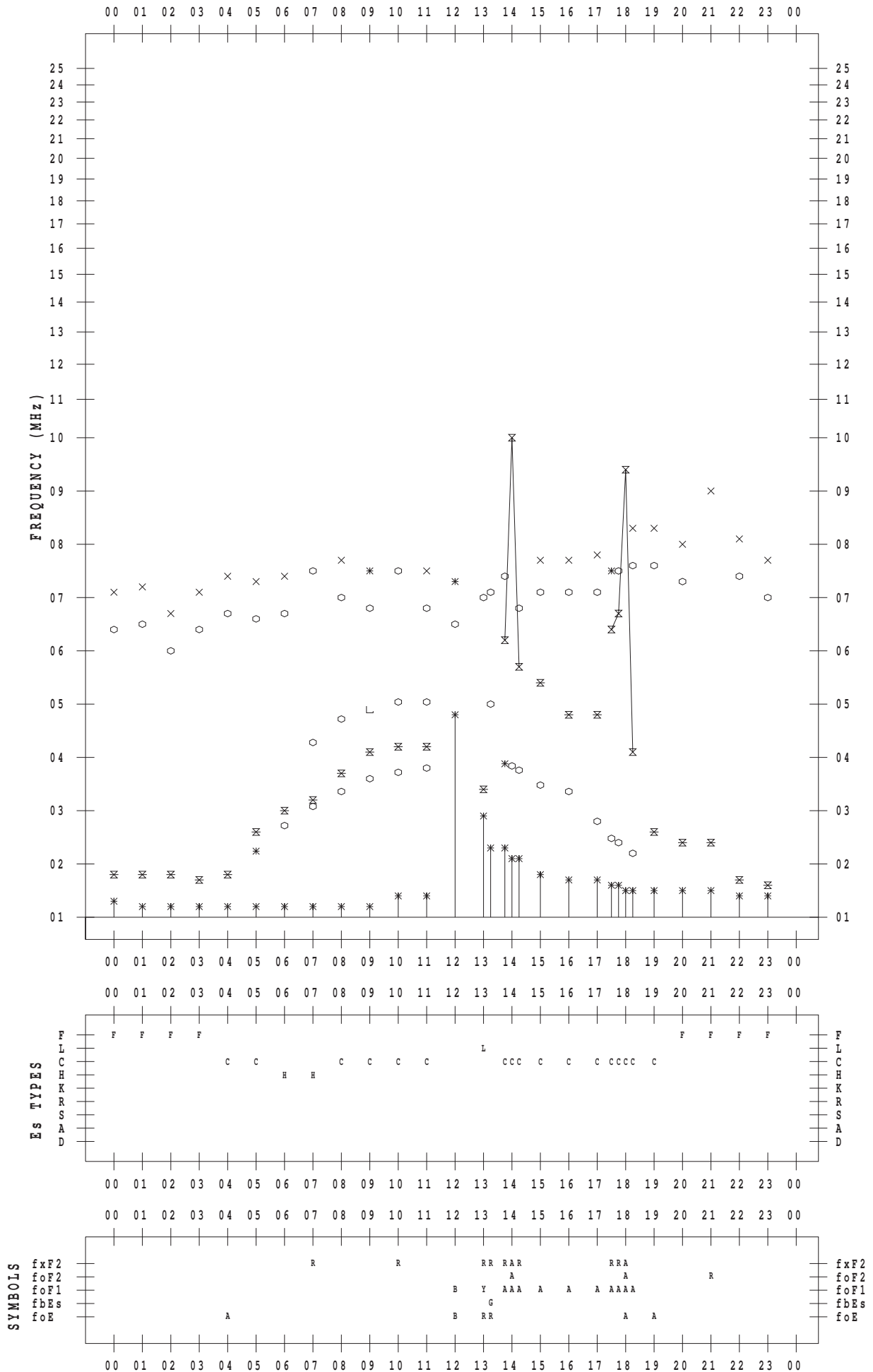
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/21

135 ° E MEAN TIME



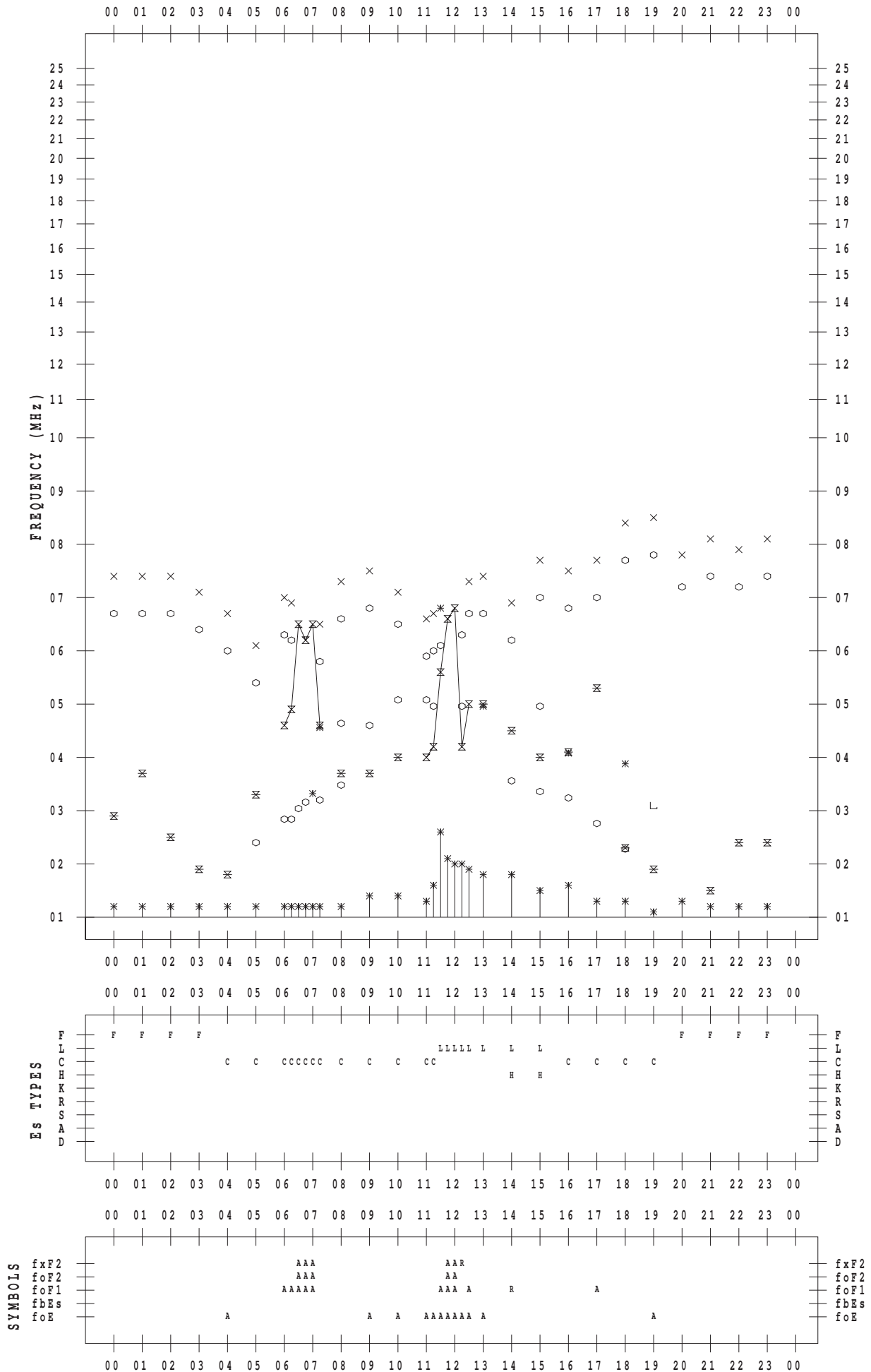
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/22

135 ° E MEAN TIME



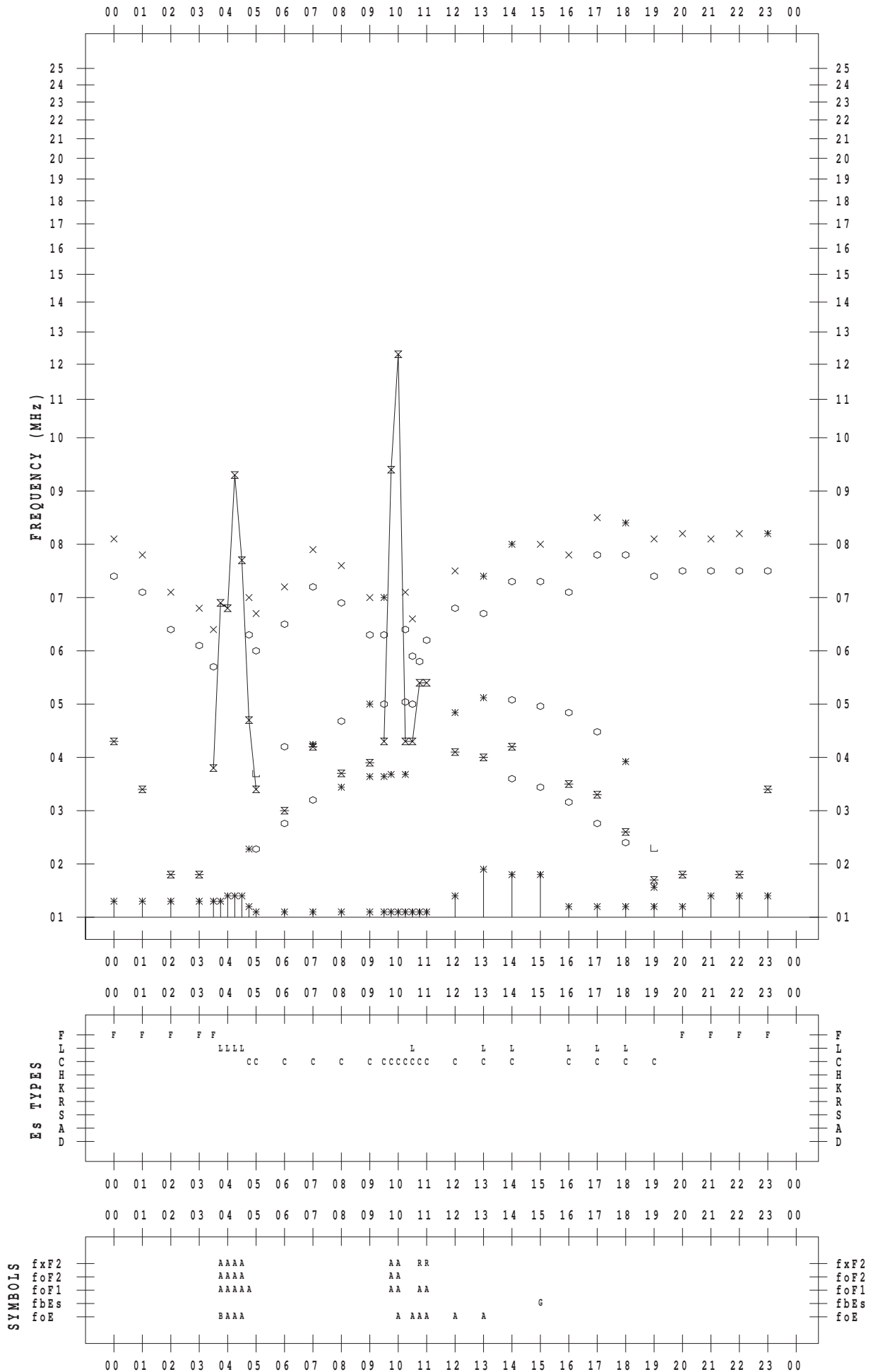
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/23

135 ° E MEAN TIME



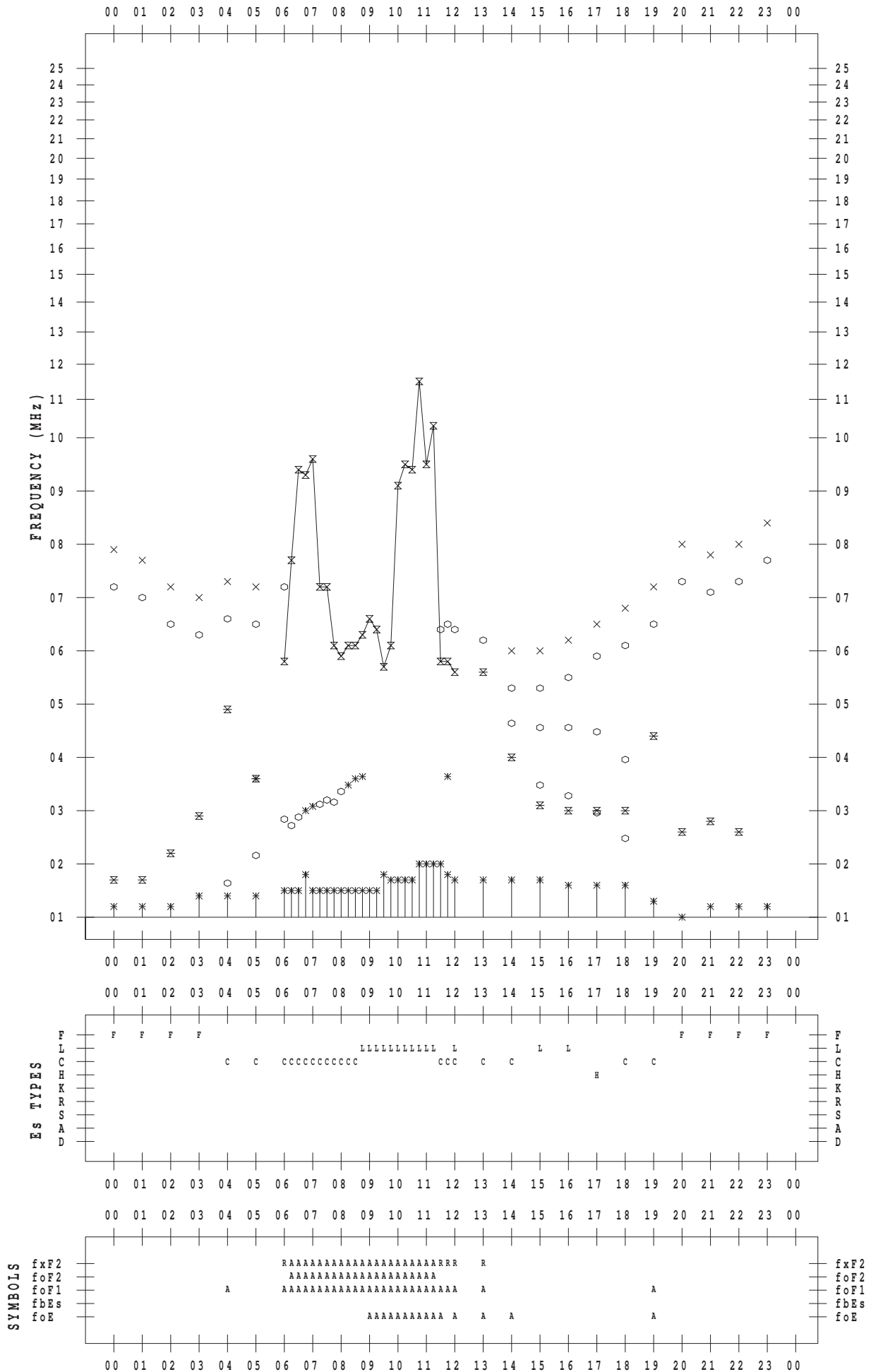
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 24

135 ° E MEAN TIME



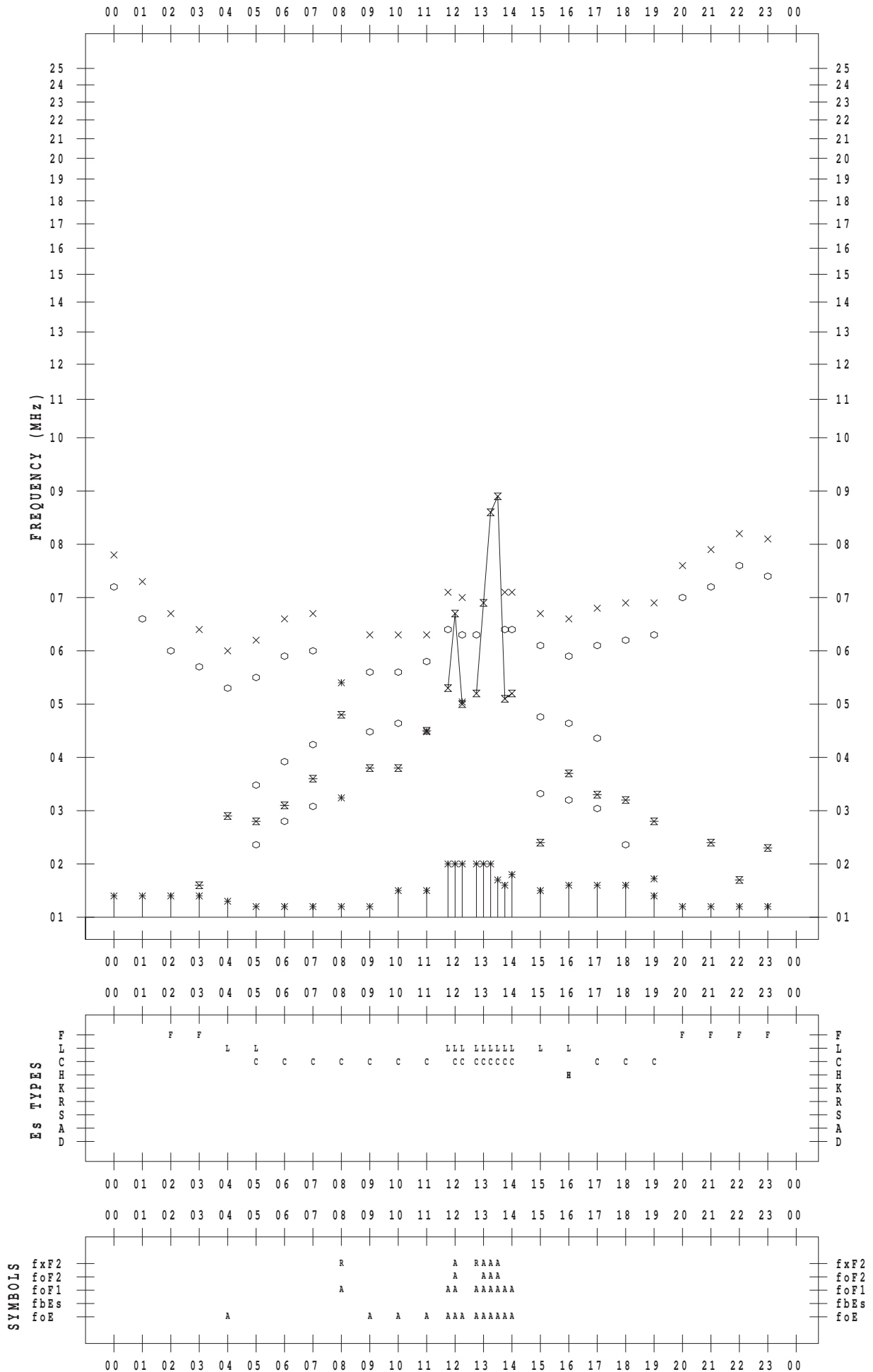
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 25

135 ° E MEAN TIME



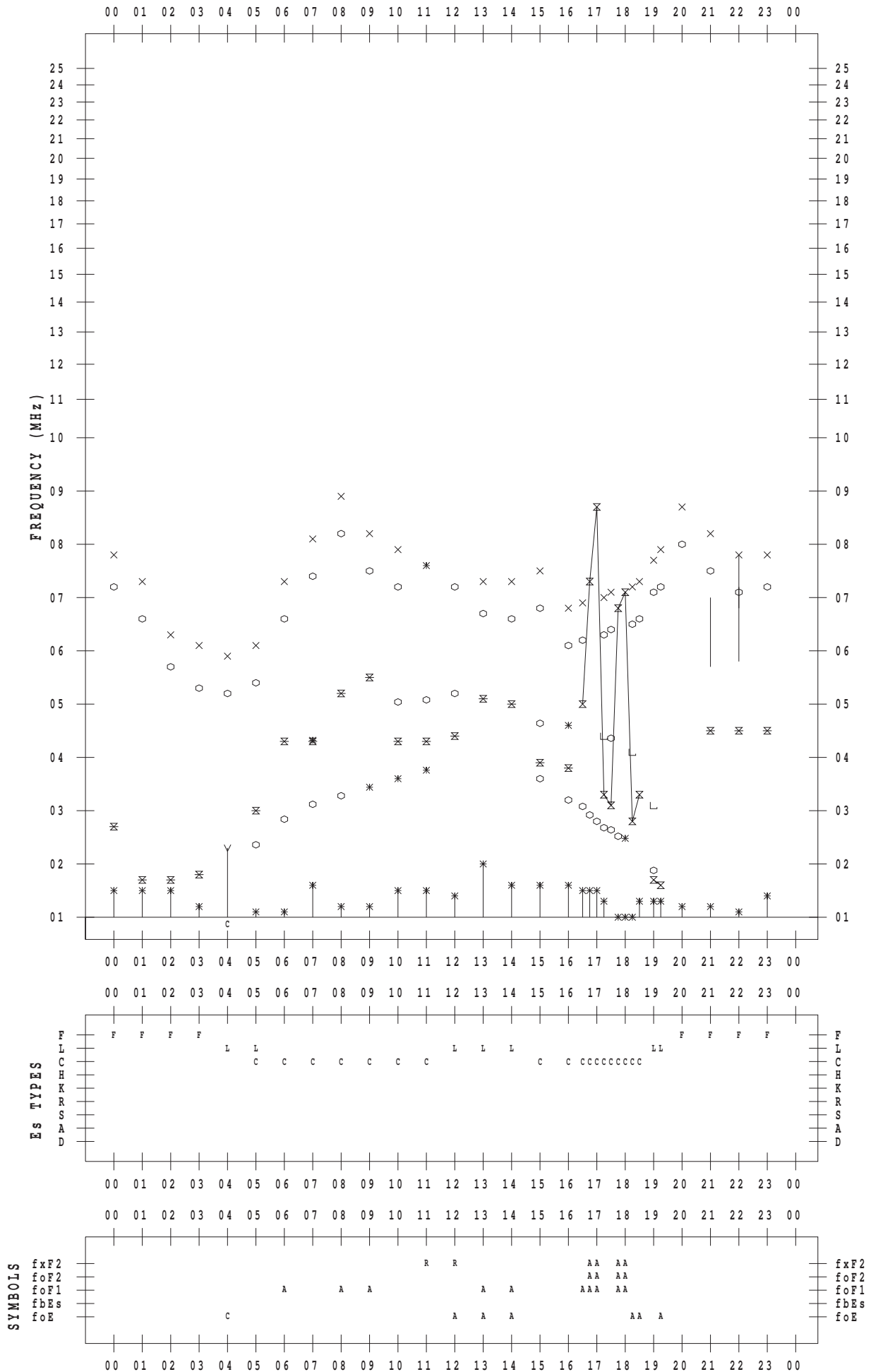
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 26

135 ° E MEAN TIME



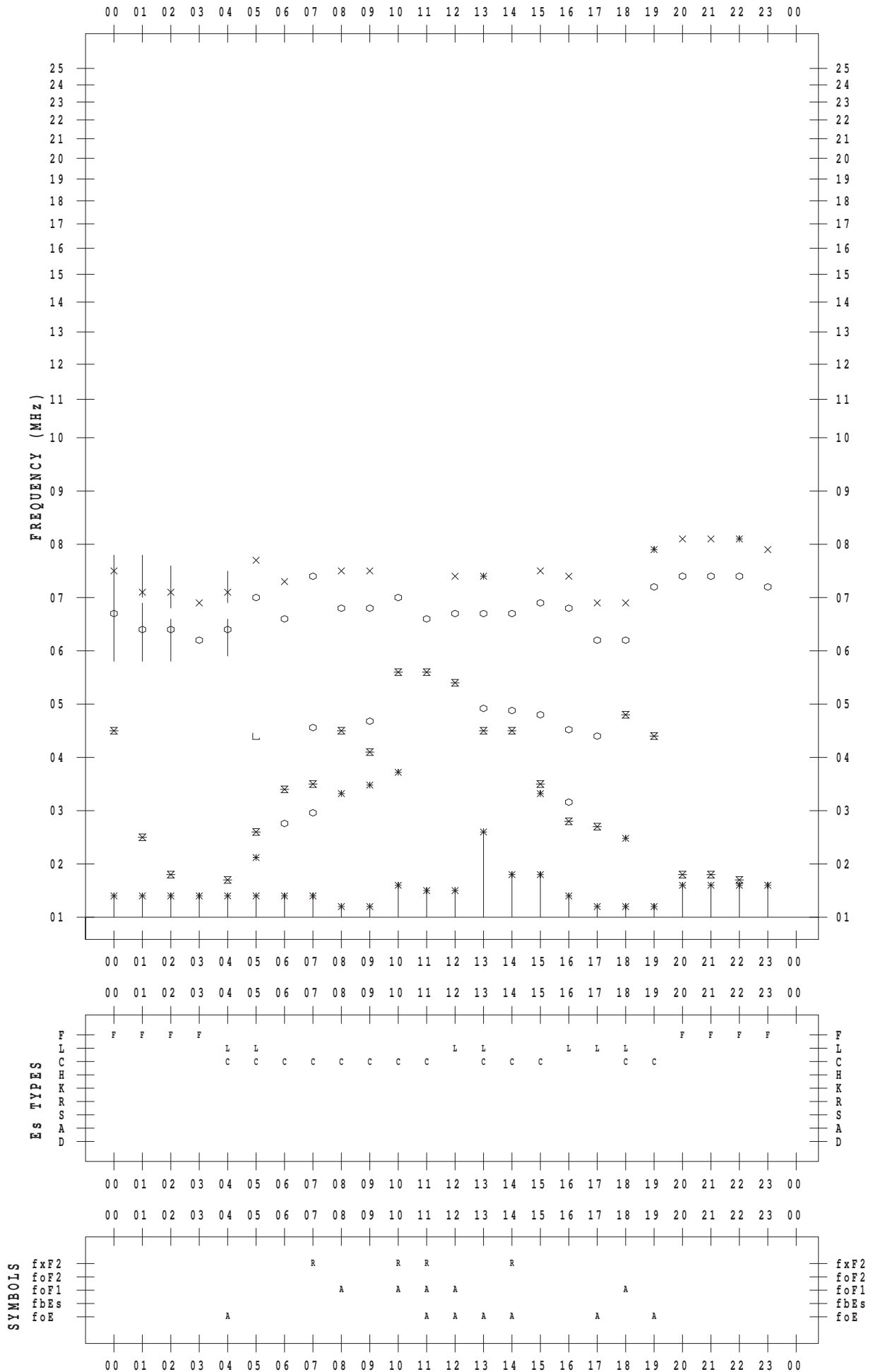
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/27

135 ° E MEAN TIME



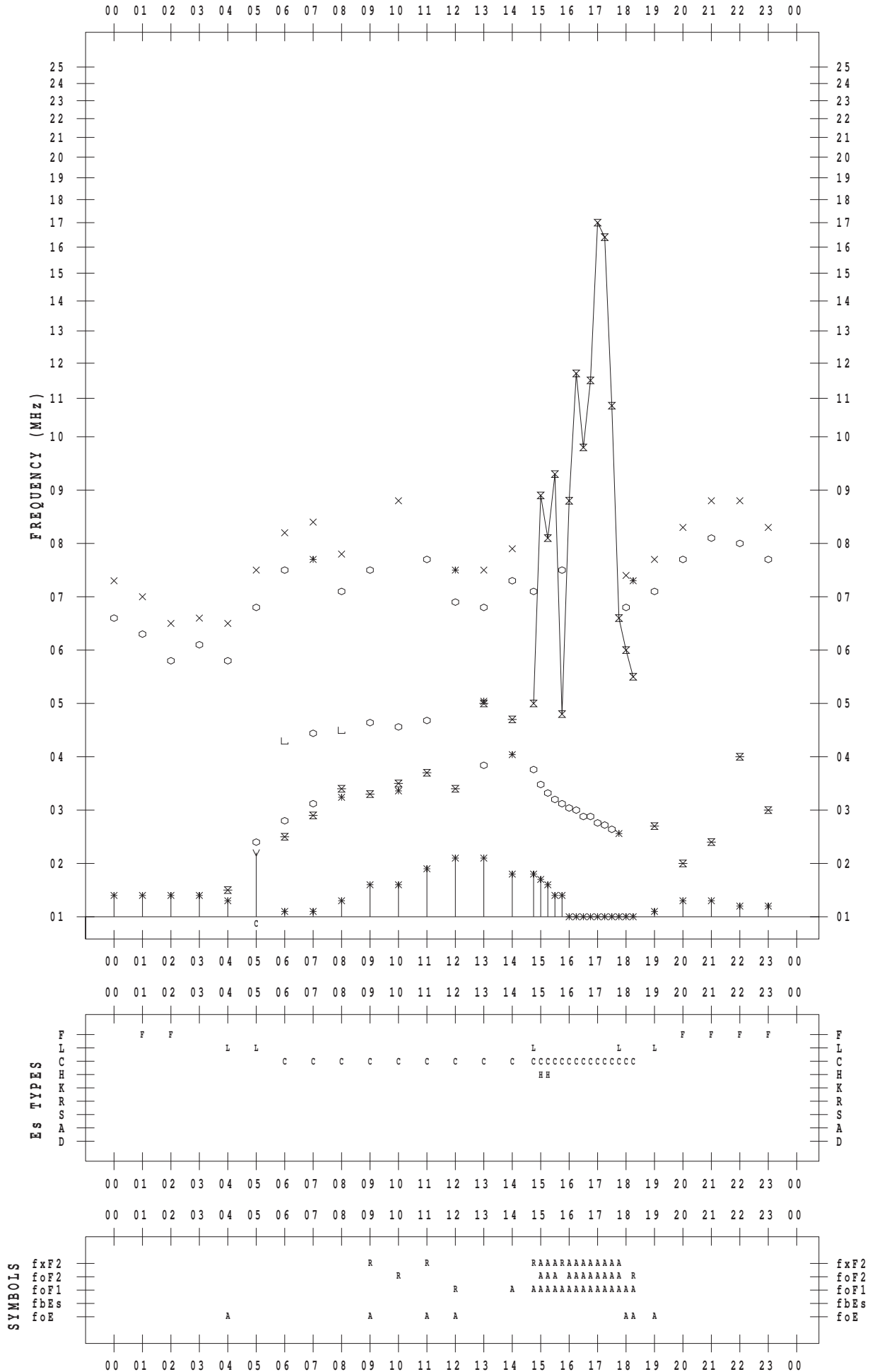
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 28

135 ° E MEAN TIME





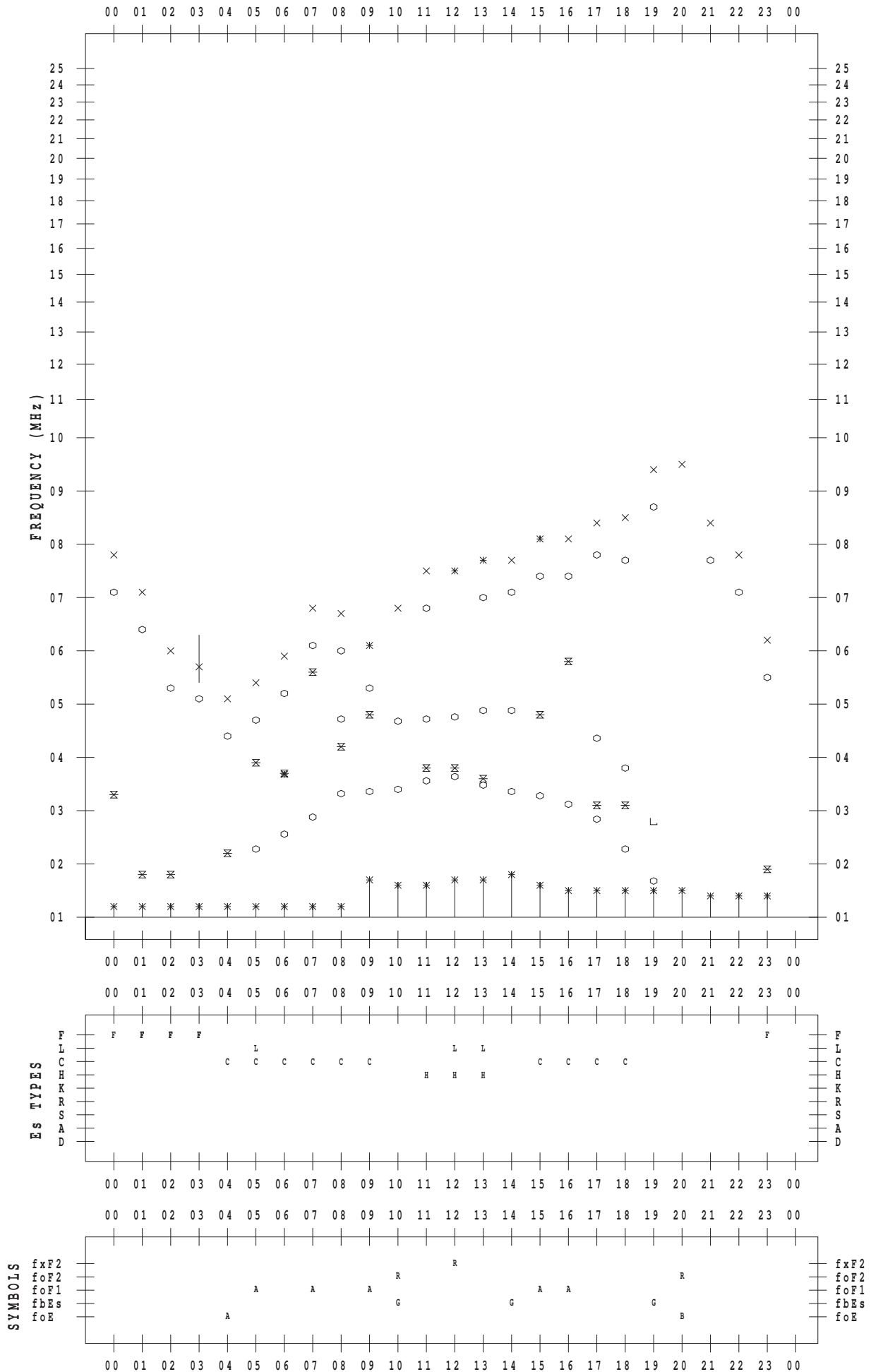
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 6/29

135 ° E MEAN TIME



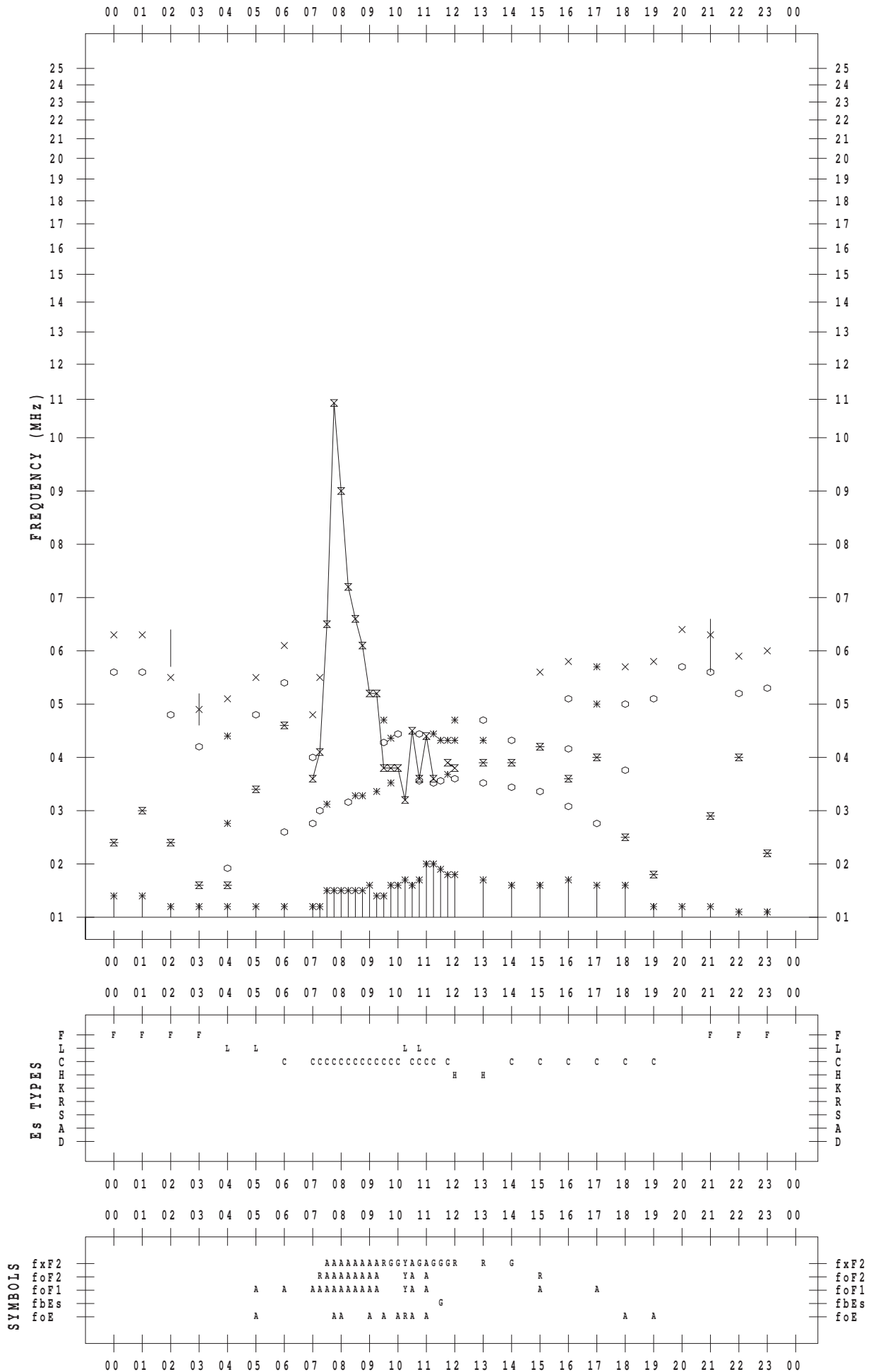
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 6 / 30

135 ° E MEAN TIME



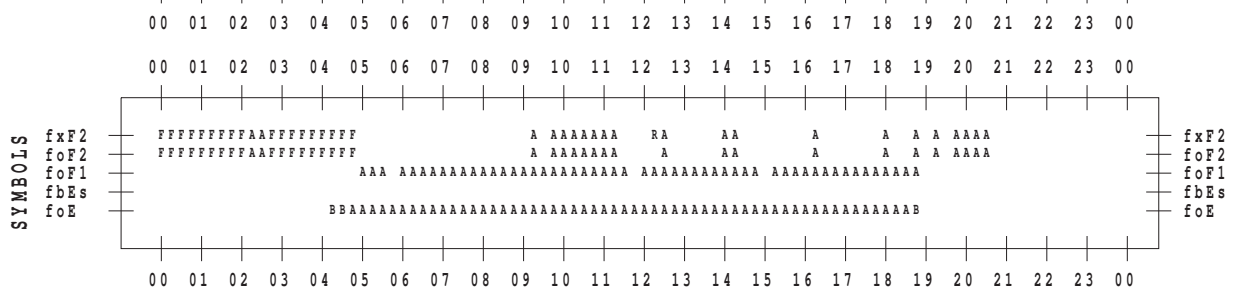
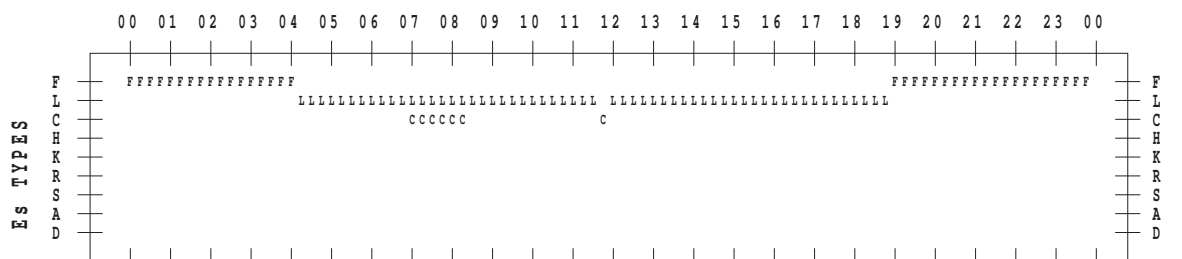
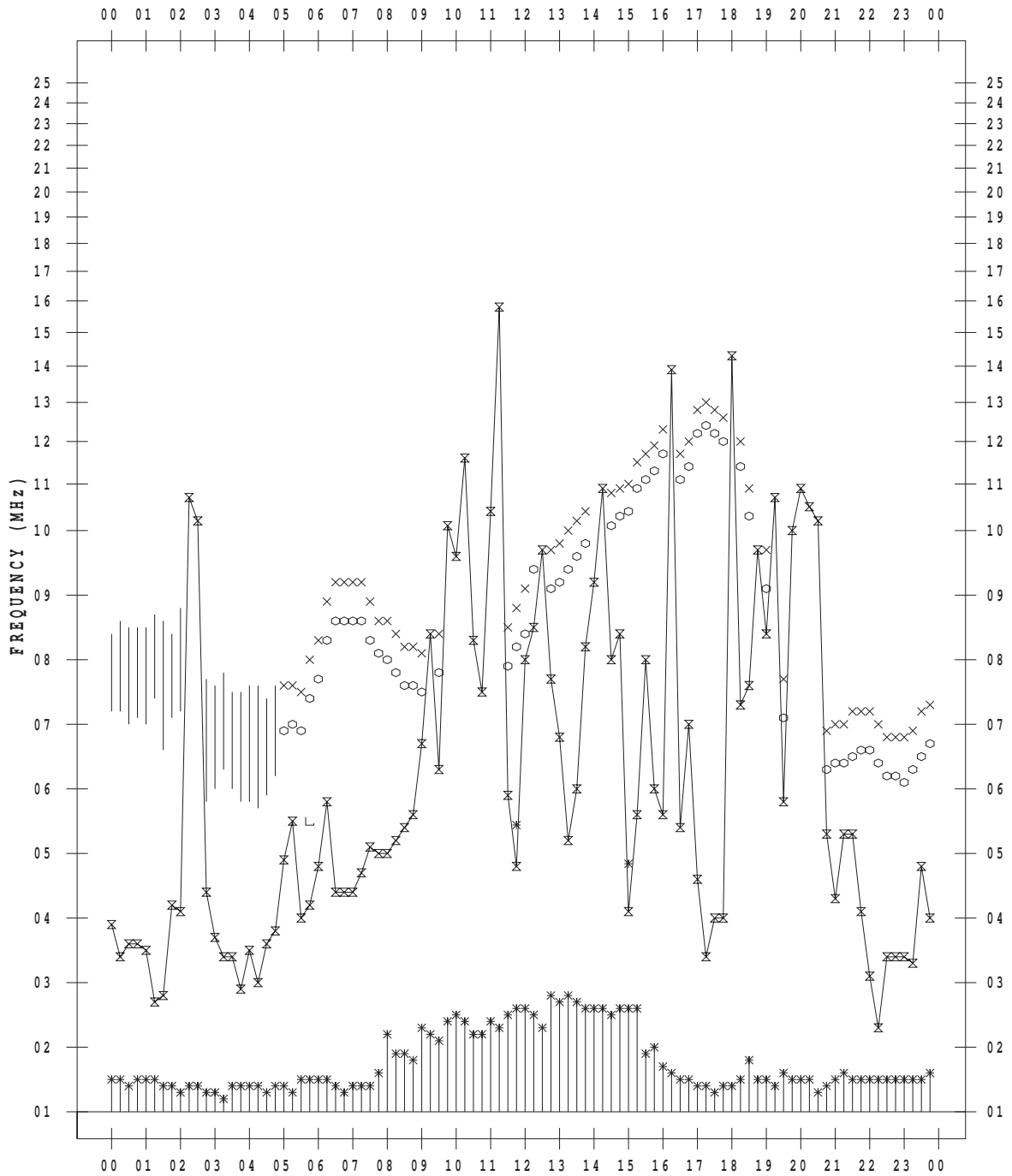
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 1

135 ° E MEAN TIME



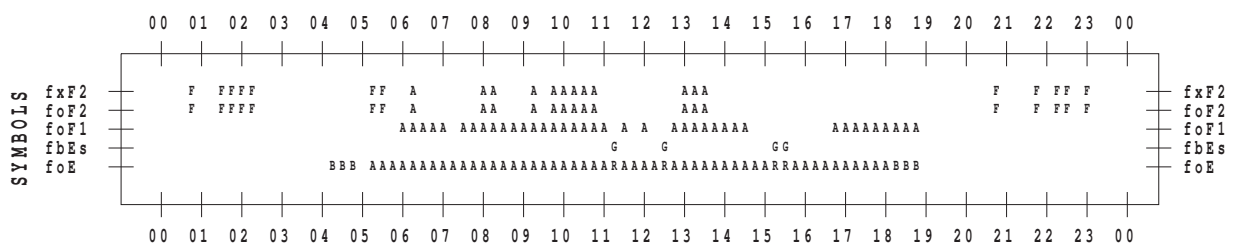
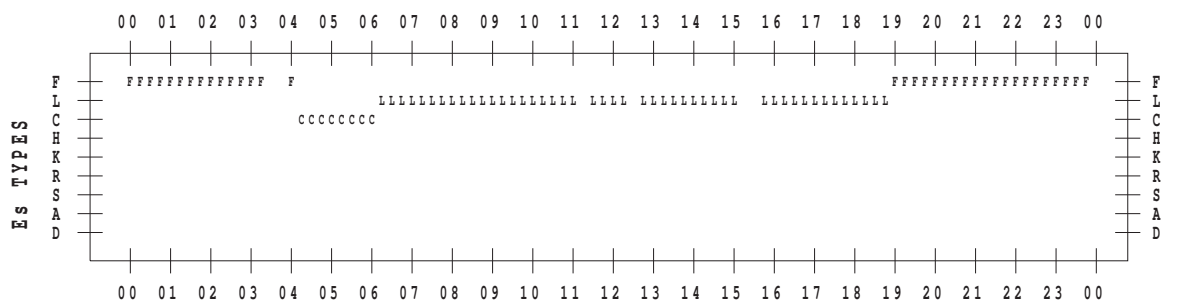
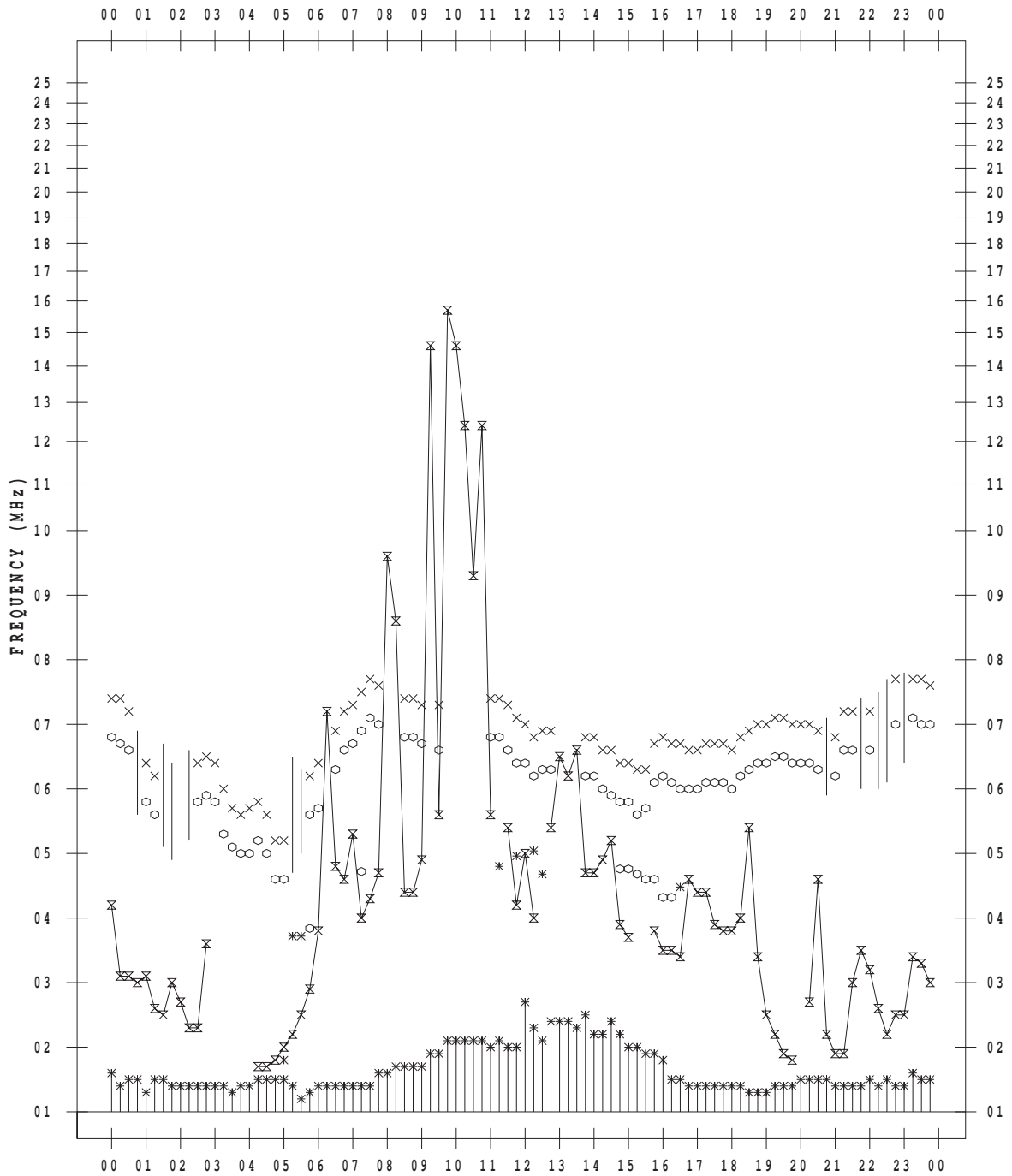
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013 / 6 / 2

135 ° E MEAN TIME



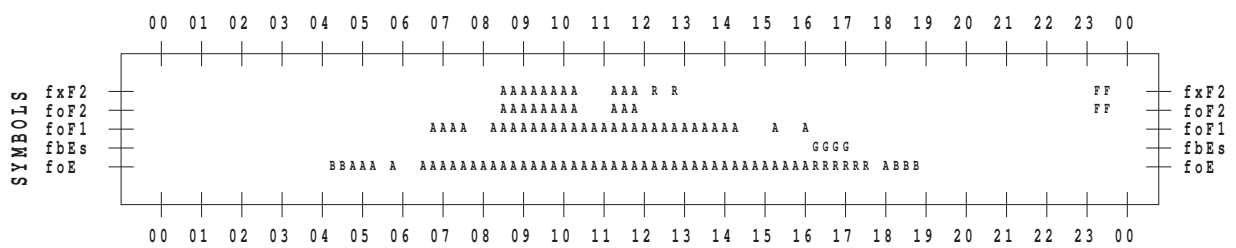
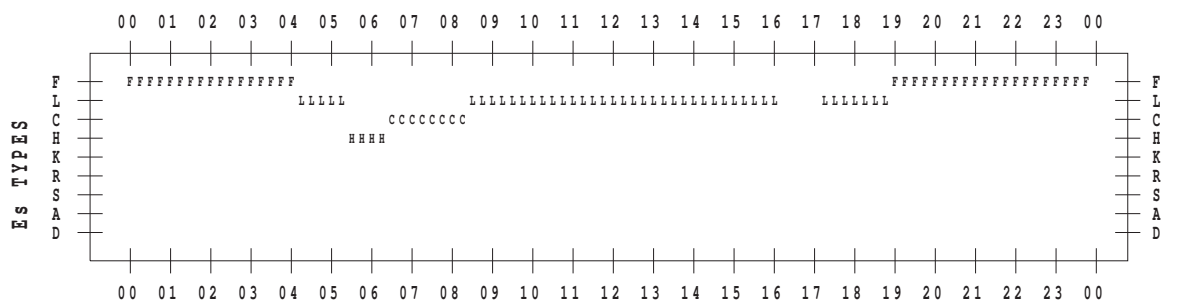
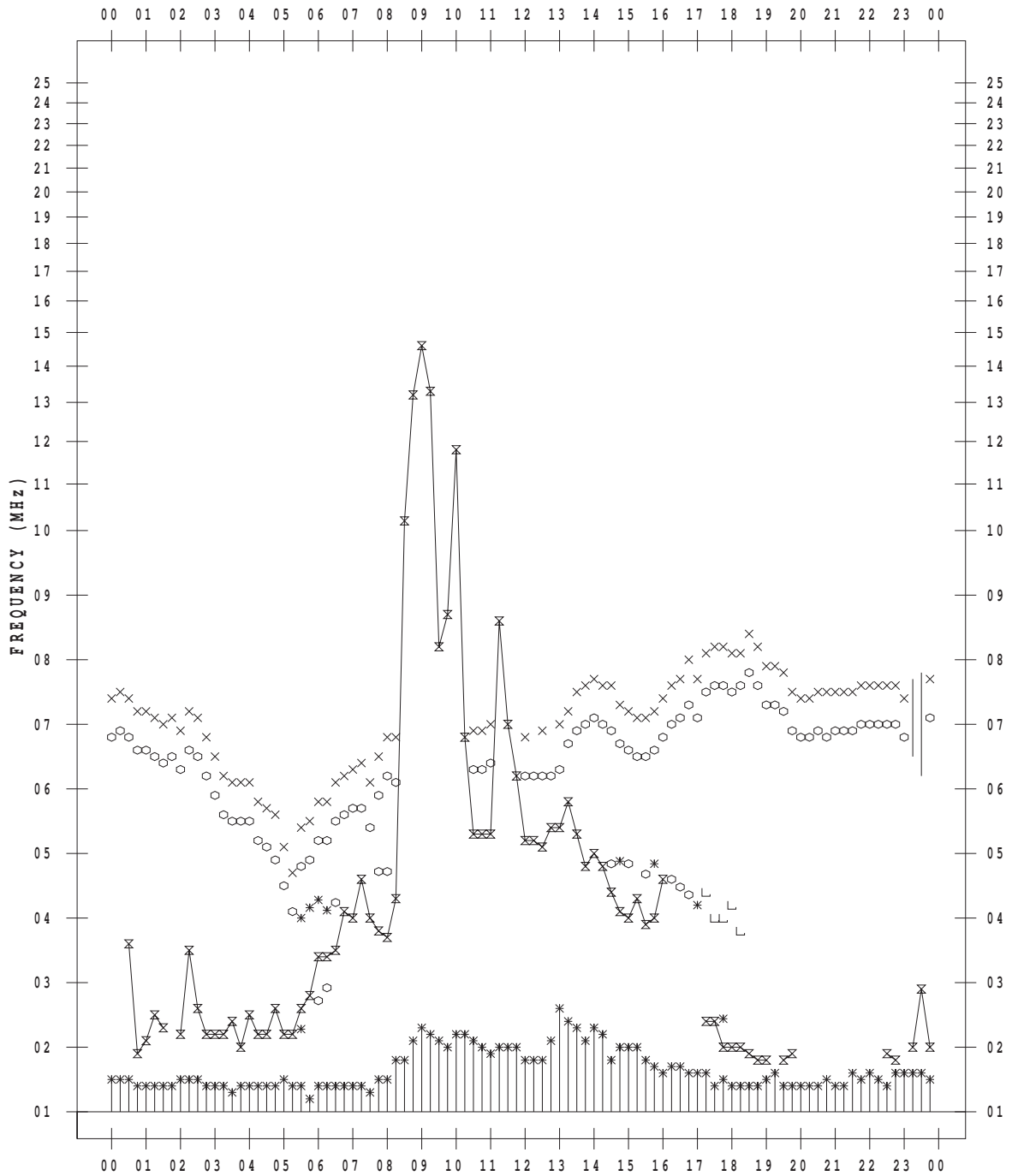
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 3

135 ° E MEAN TIME



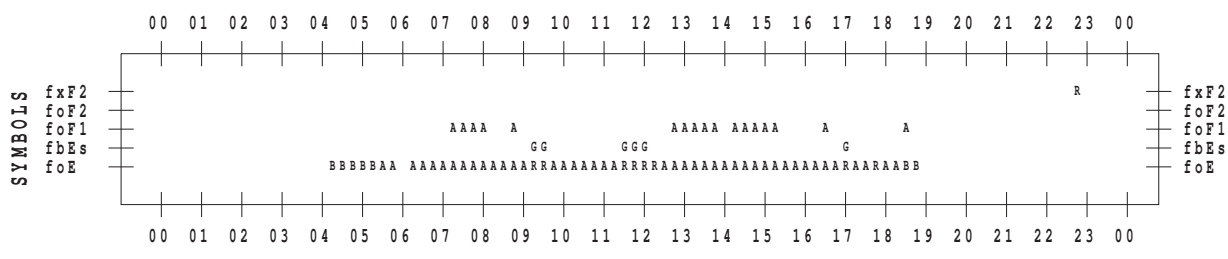
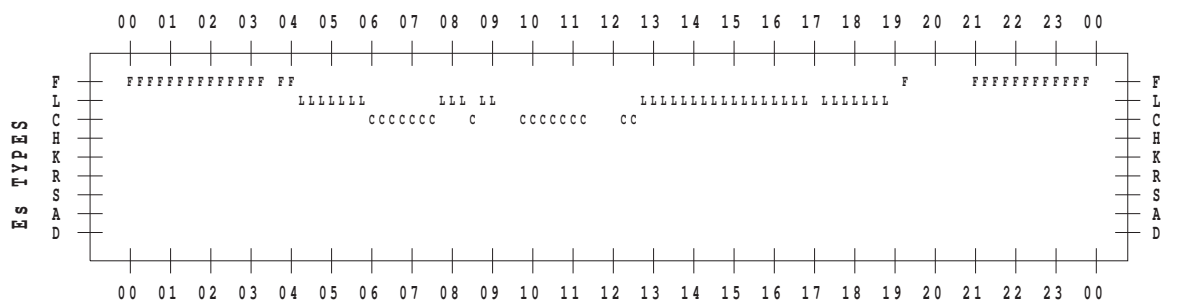
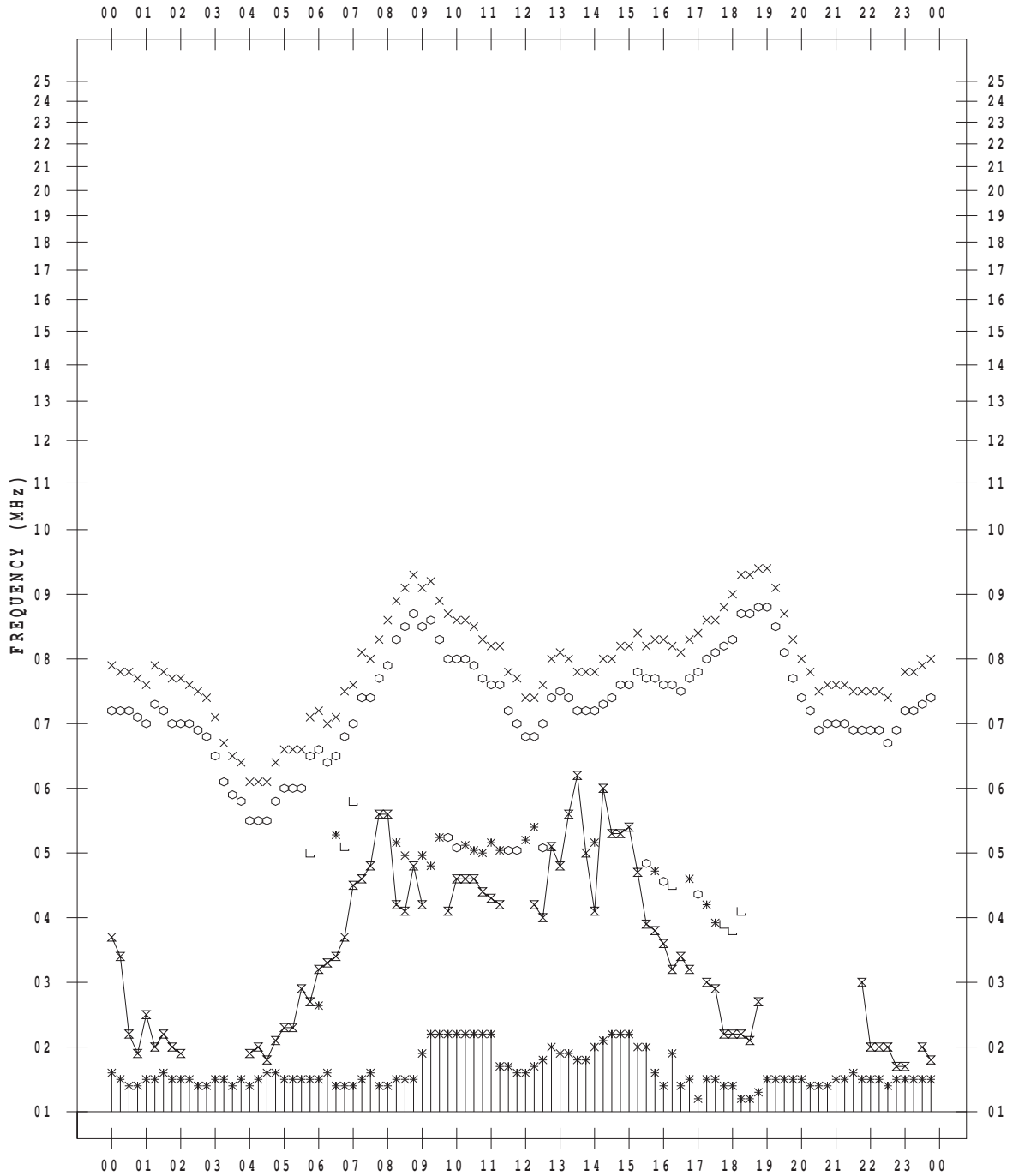
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 4

135 ° E MEAN TIME



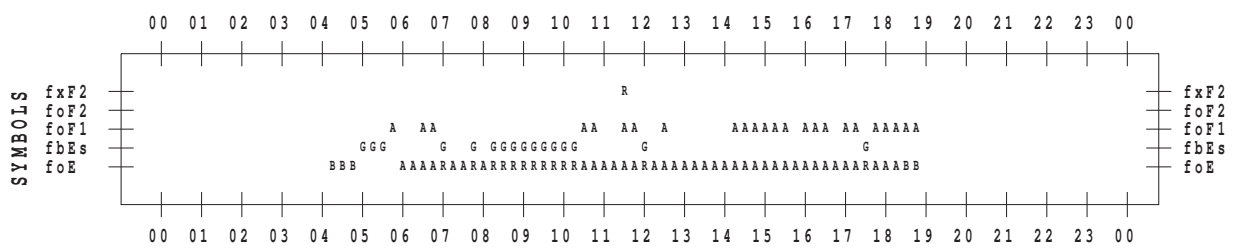
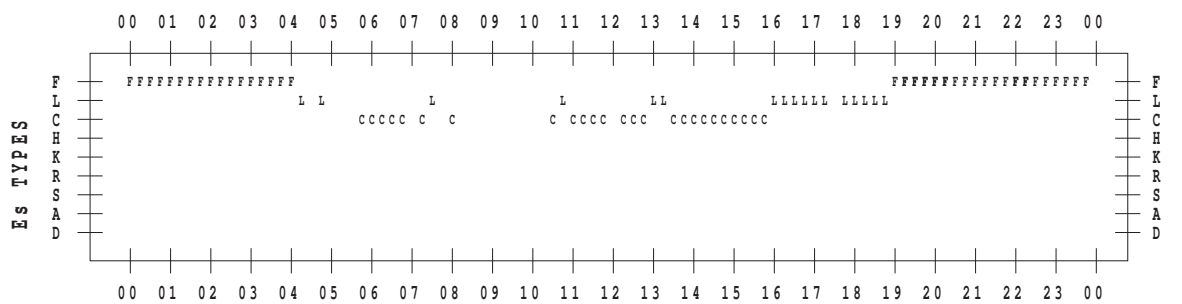
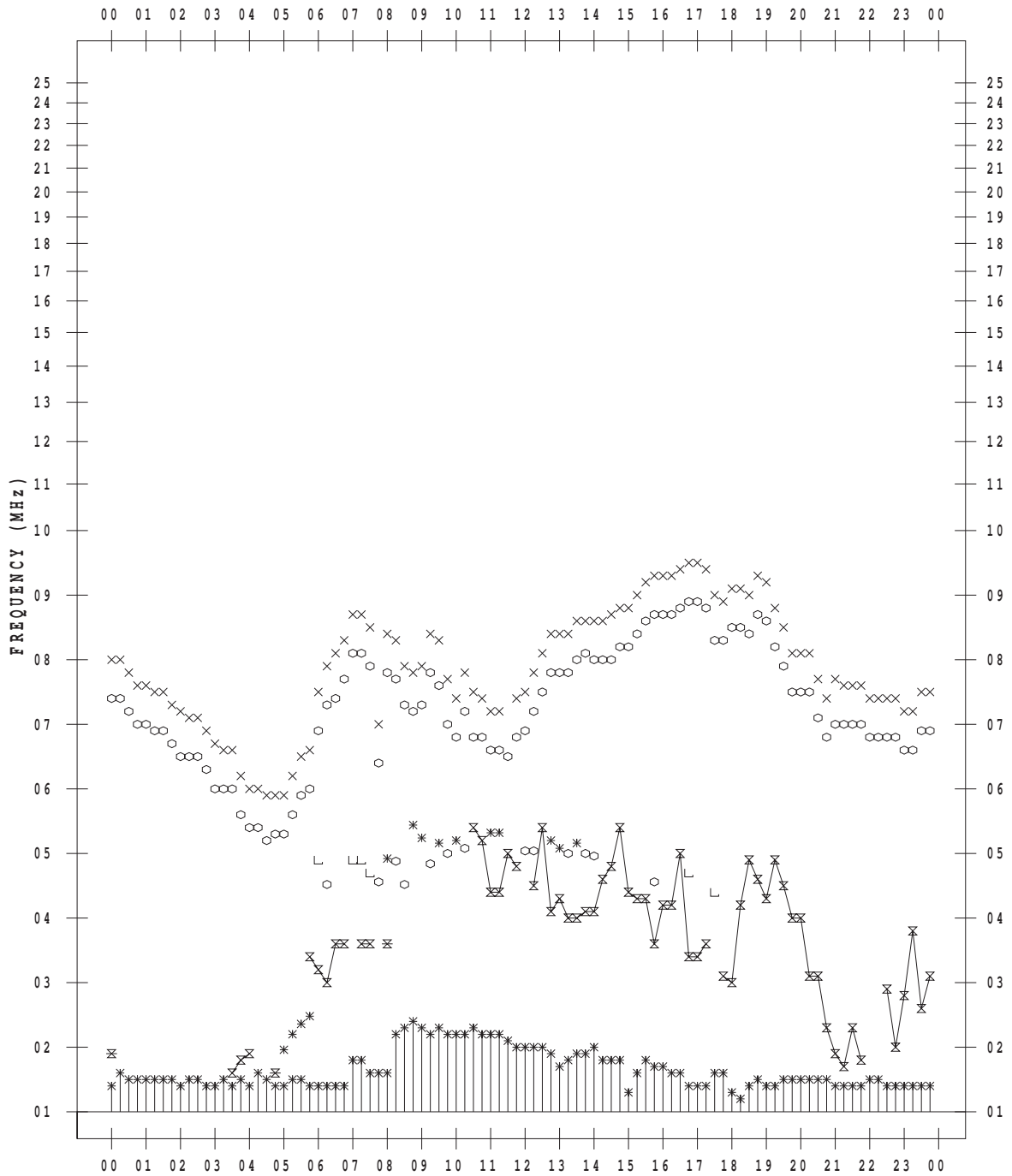
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 5

135 ° E MEAN TIME



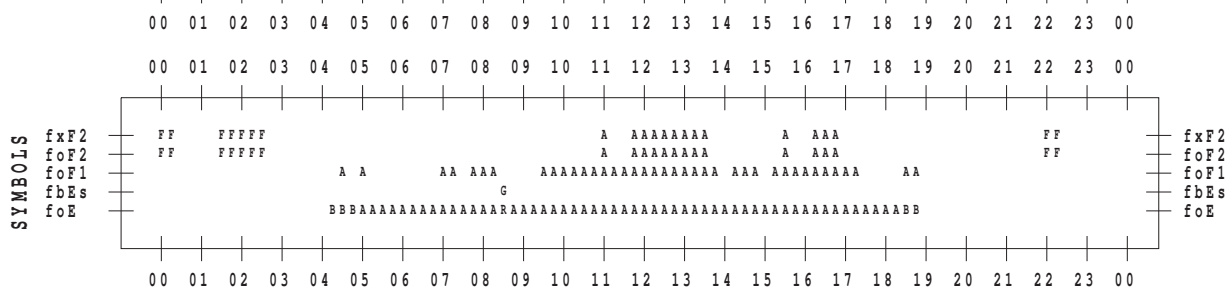
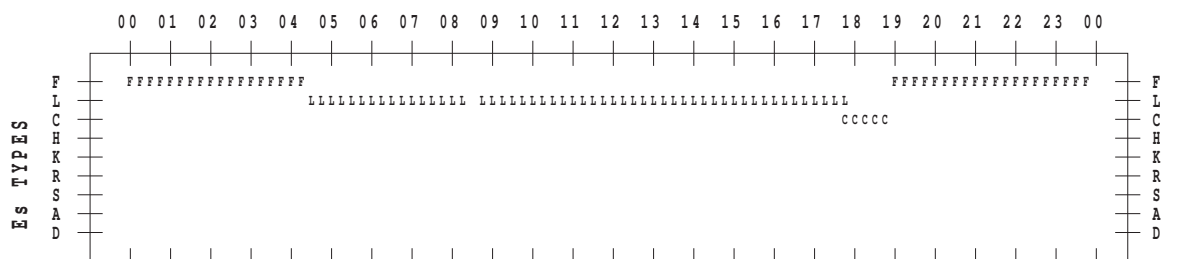
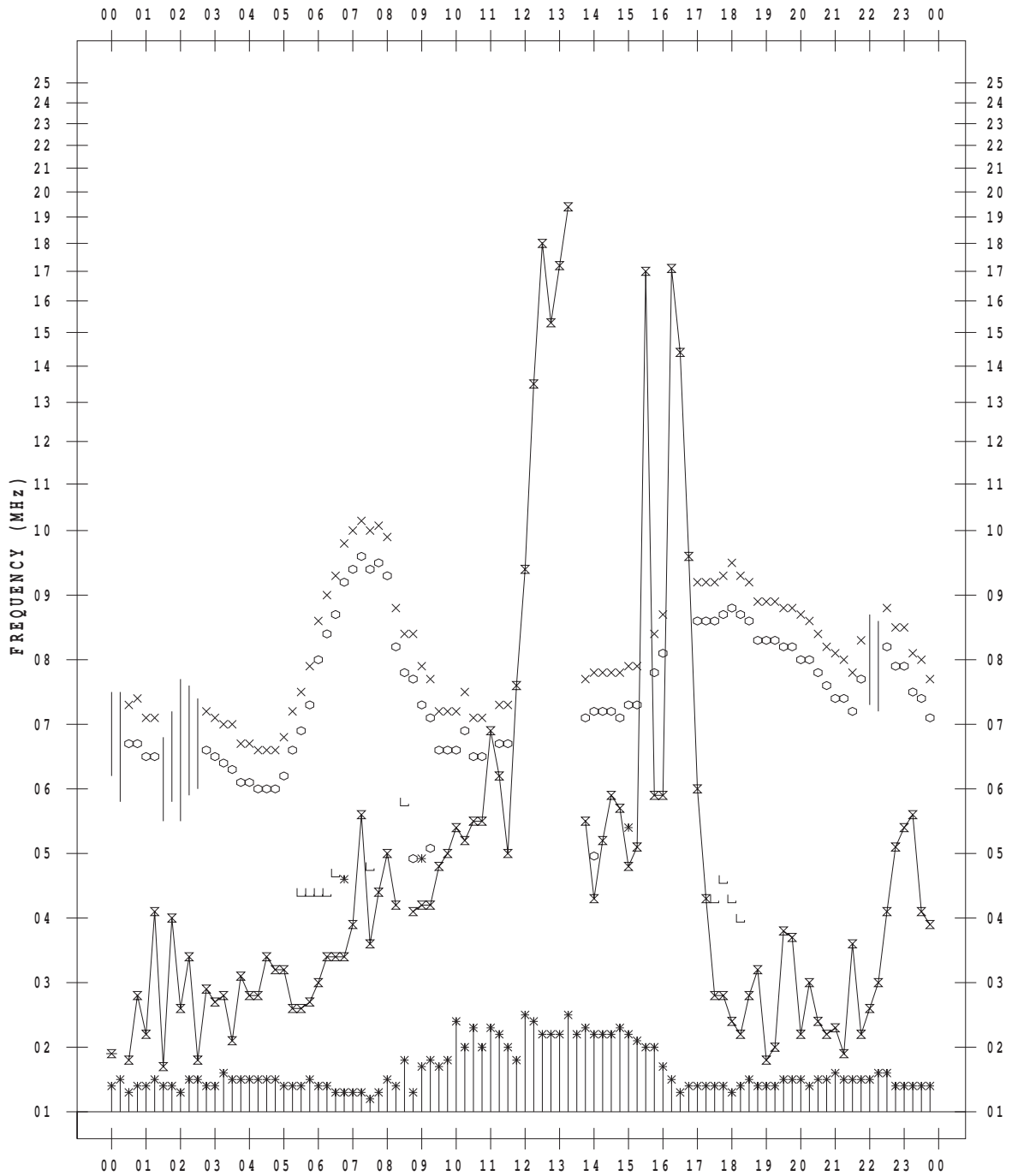
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 6

135 ° E MEAN TIME





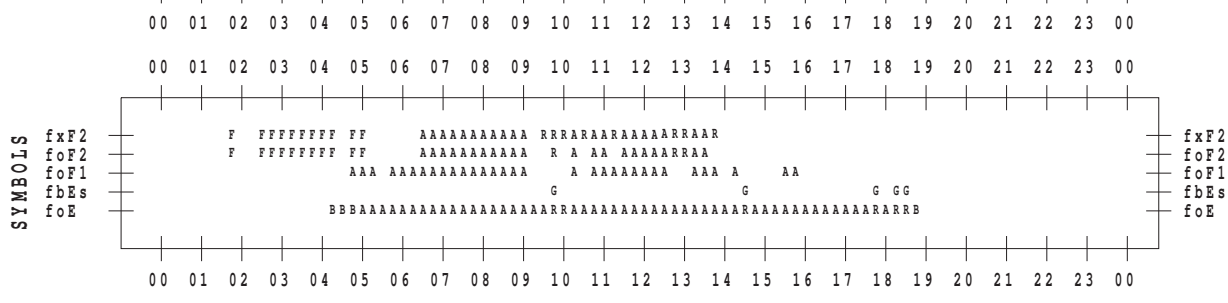
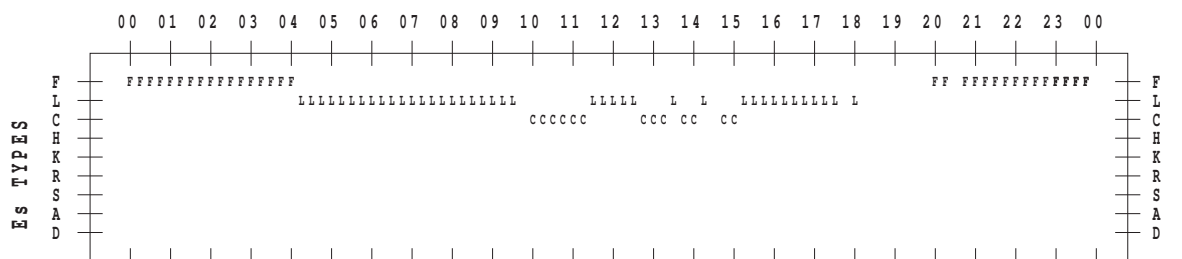
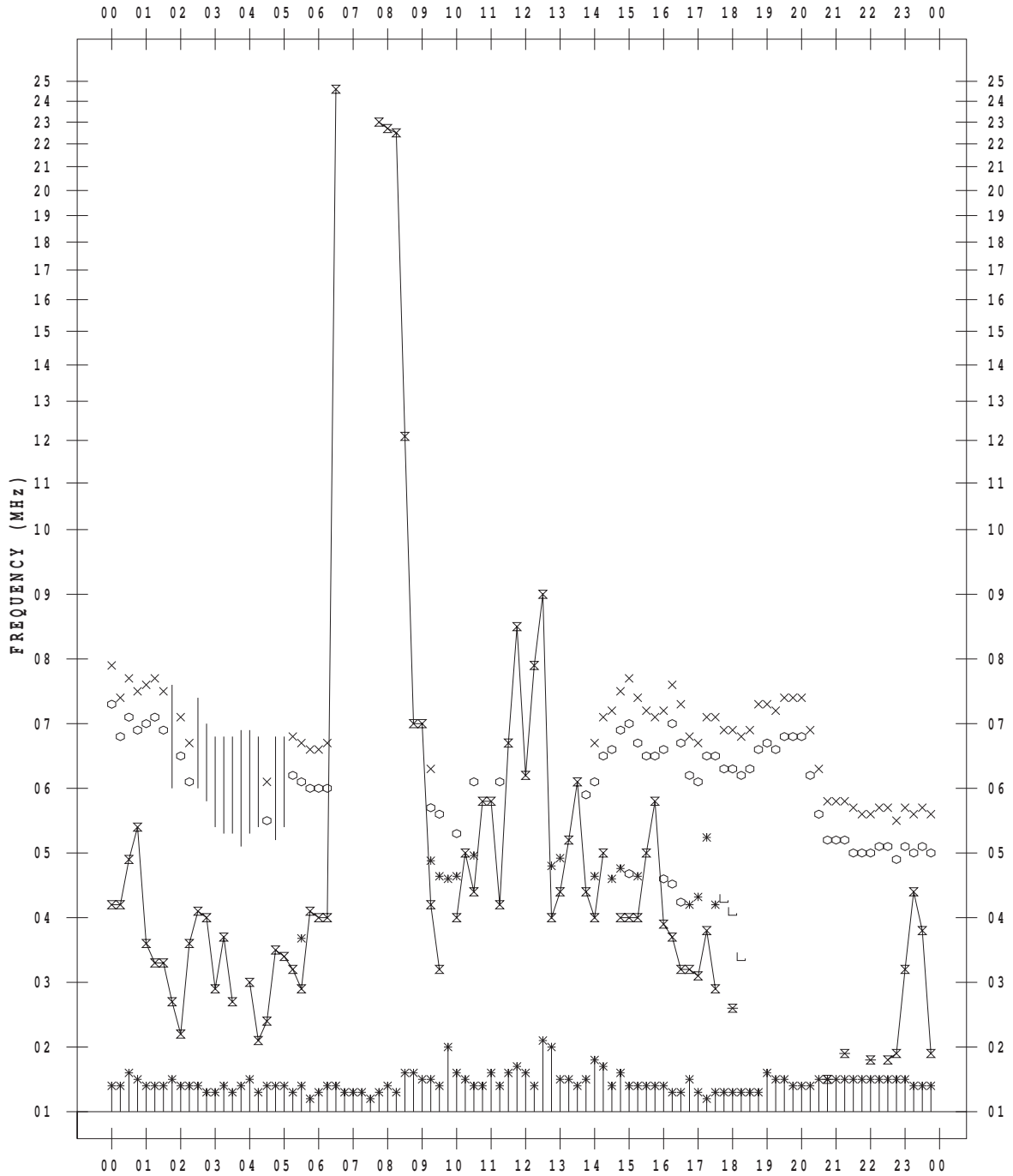
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013 / 6 / 7

135 ° E MEAN TIME



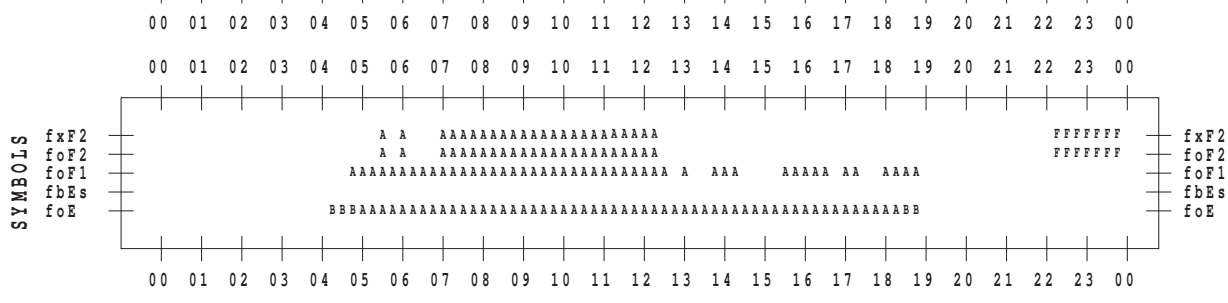
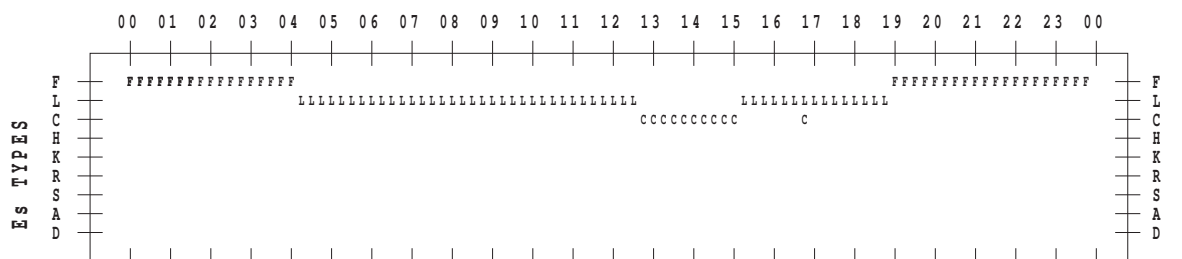
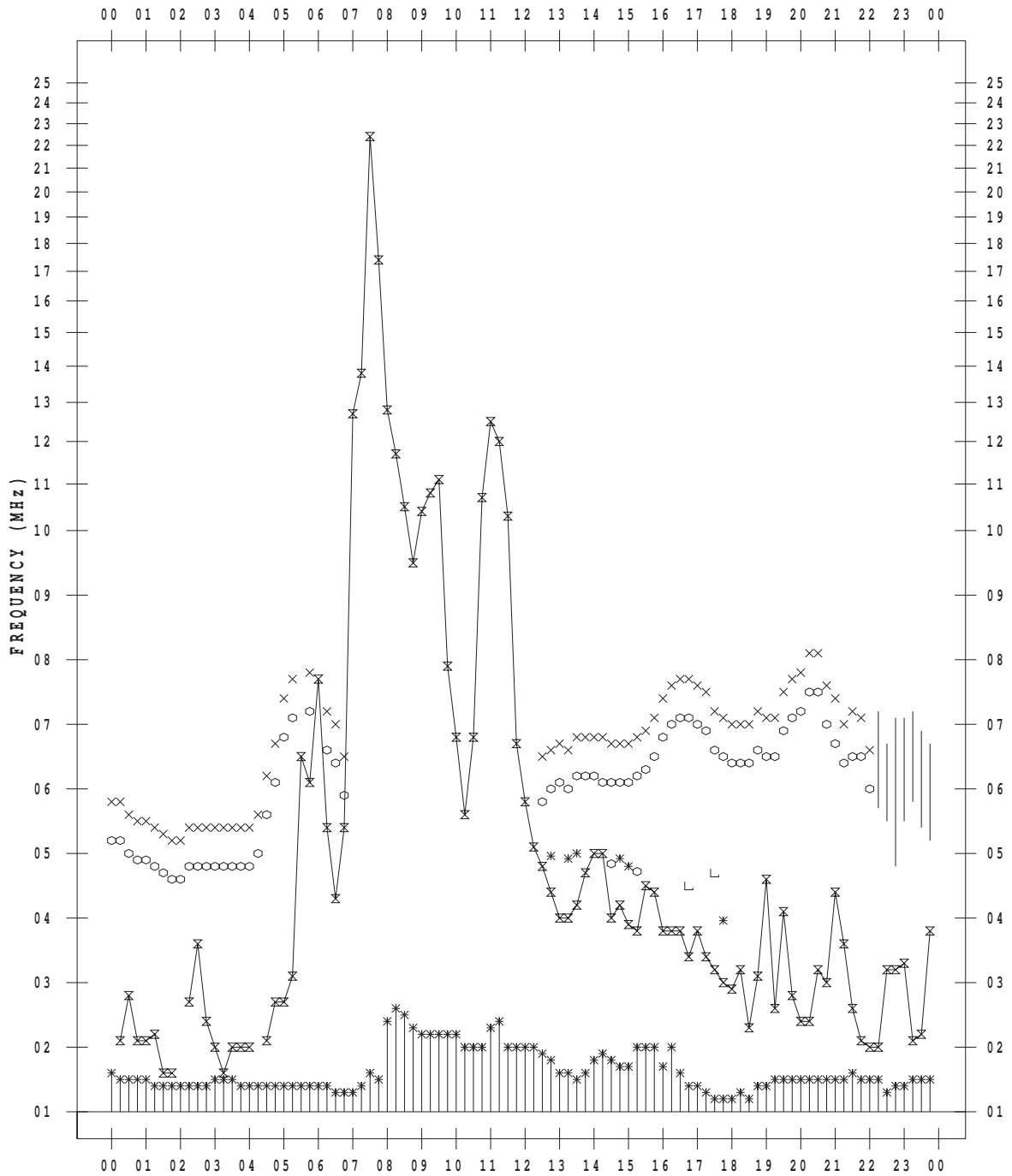
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 8

135 ° E MEAN TIME



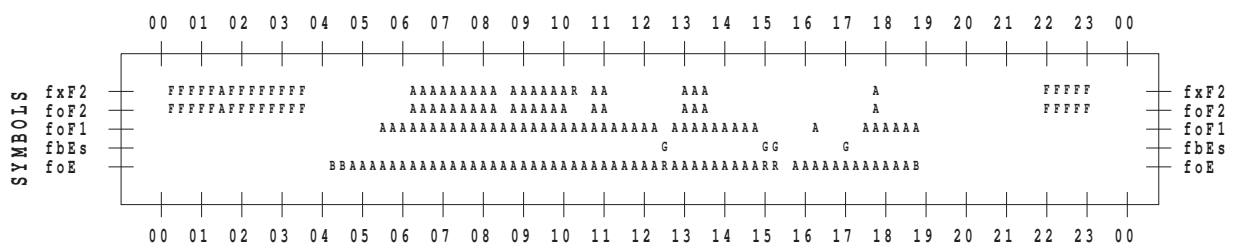
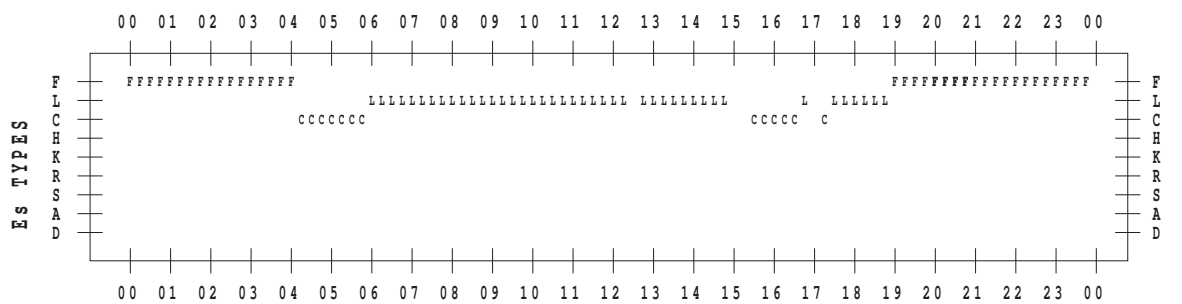
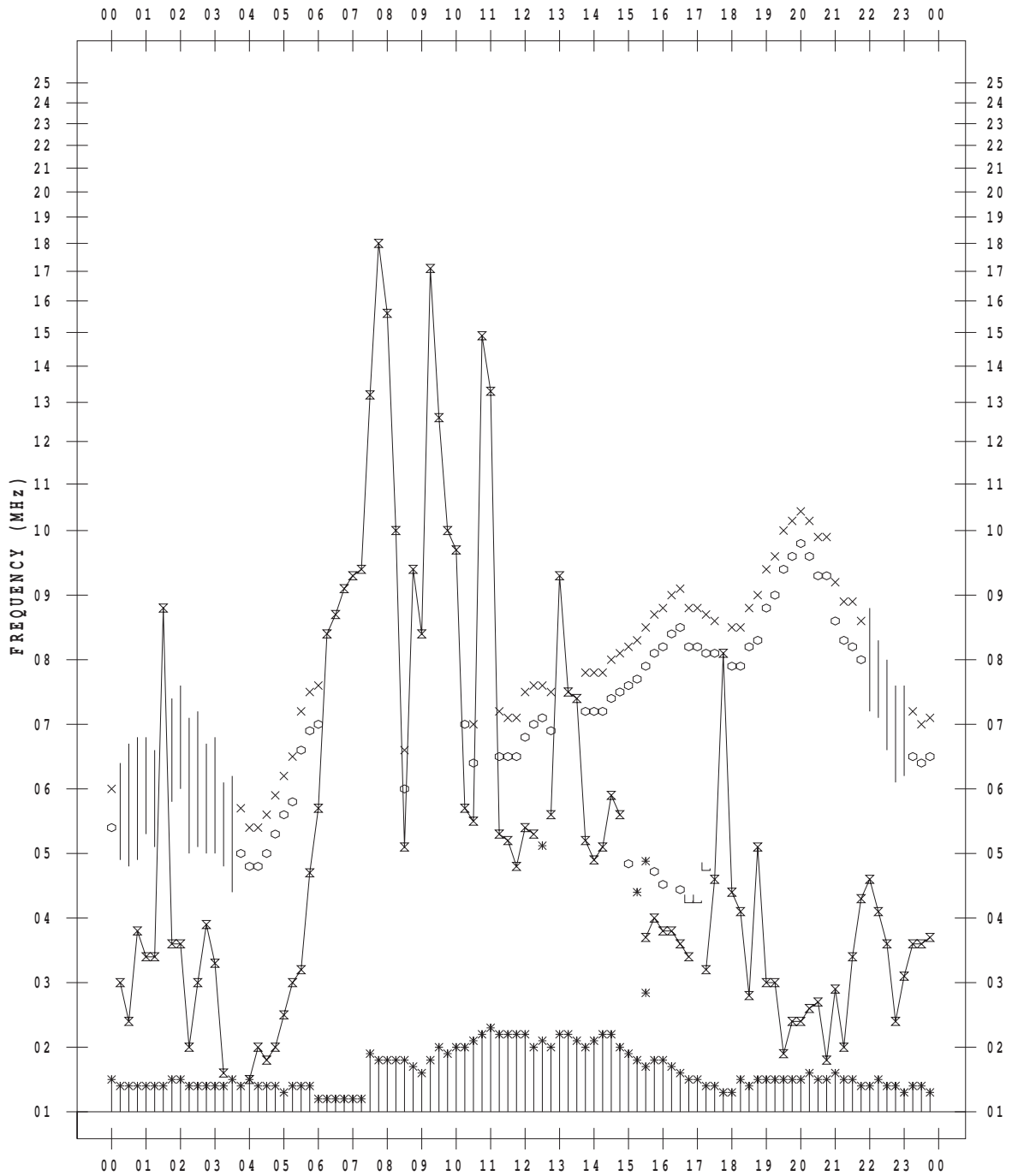
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/ 9

135 ° E MEAN TIME



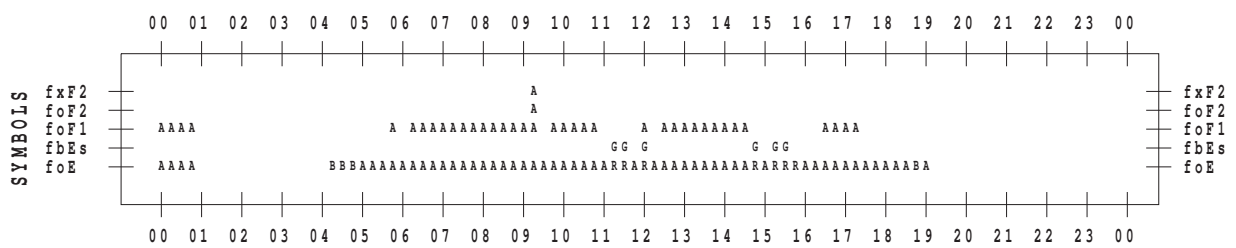
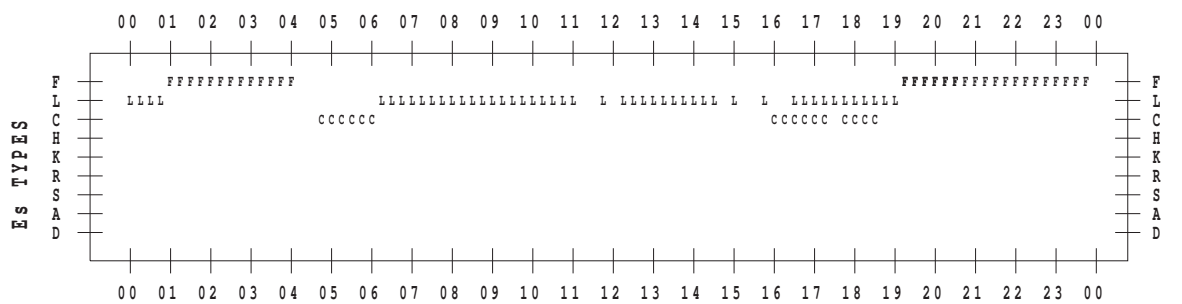
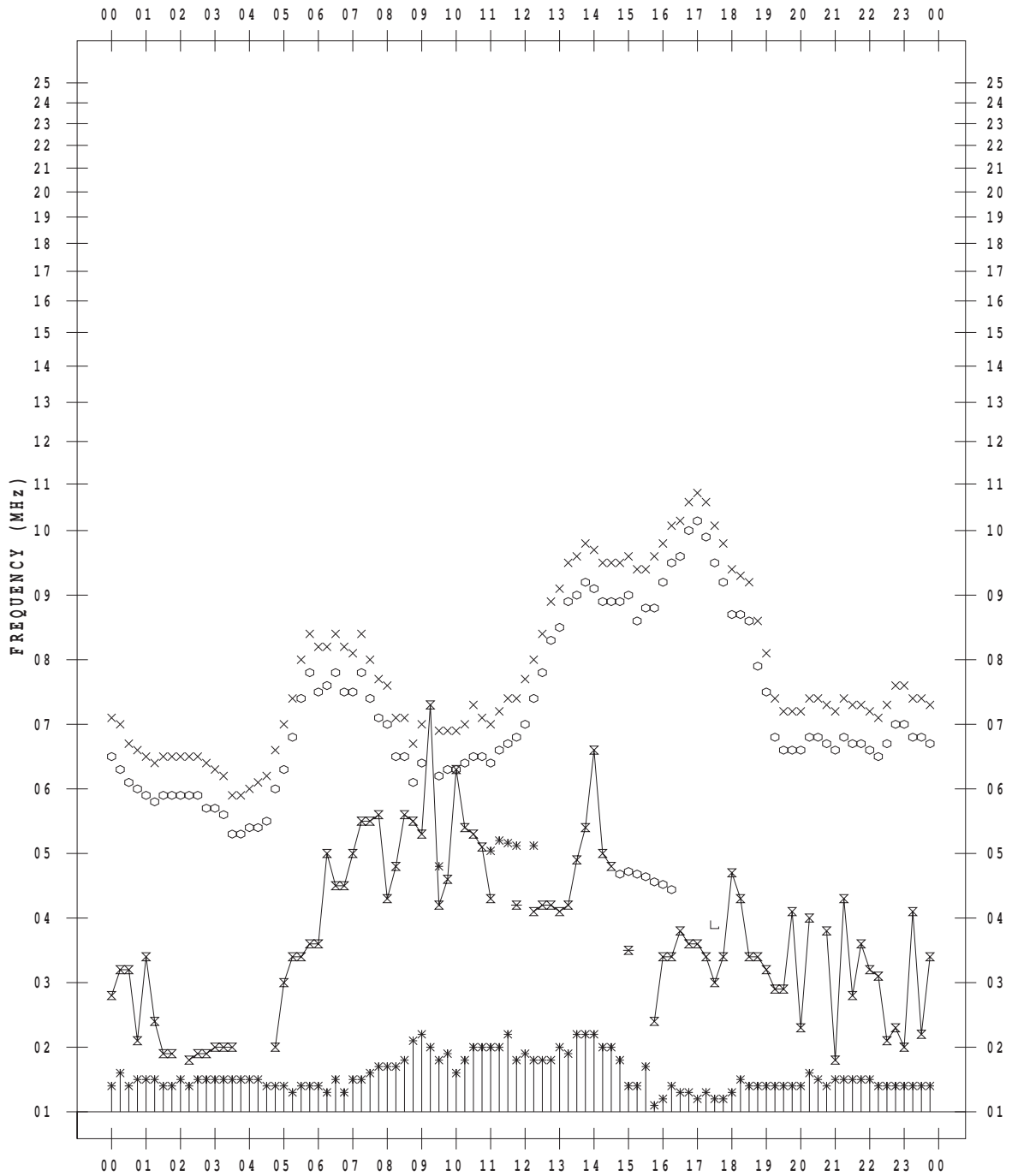
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/10

135 ° E MEAN TIME



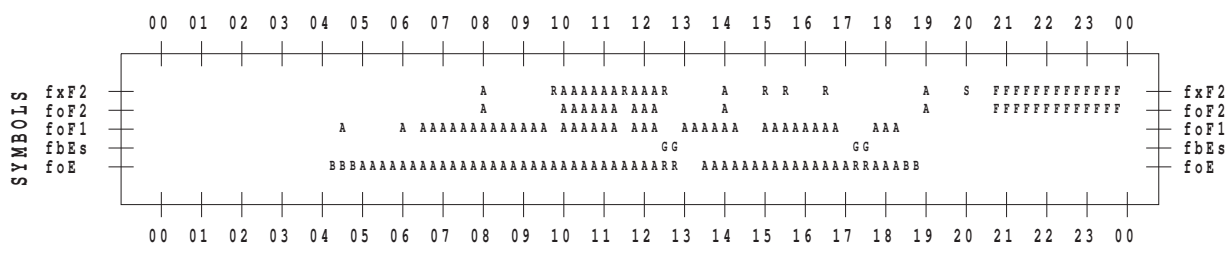
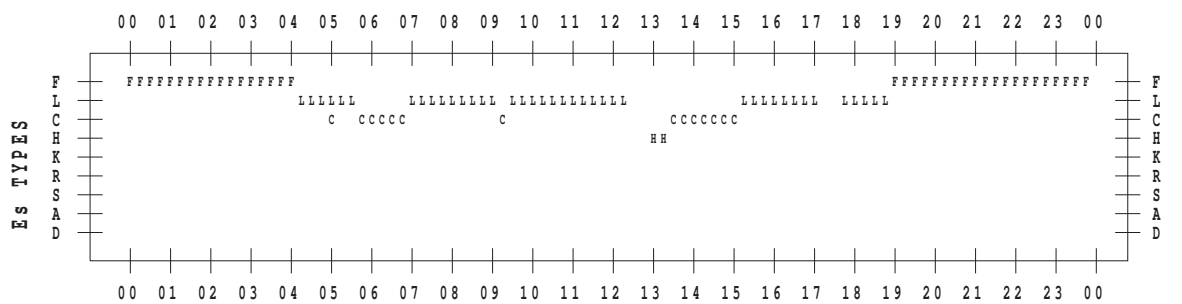
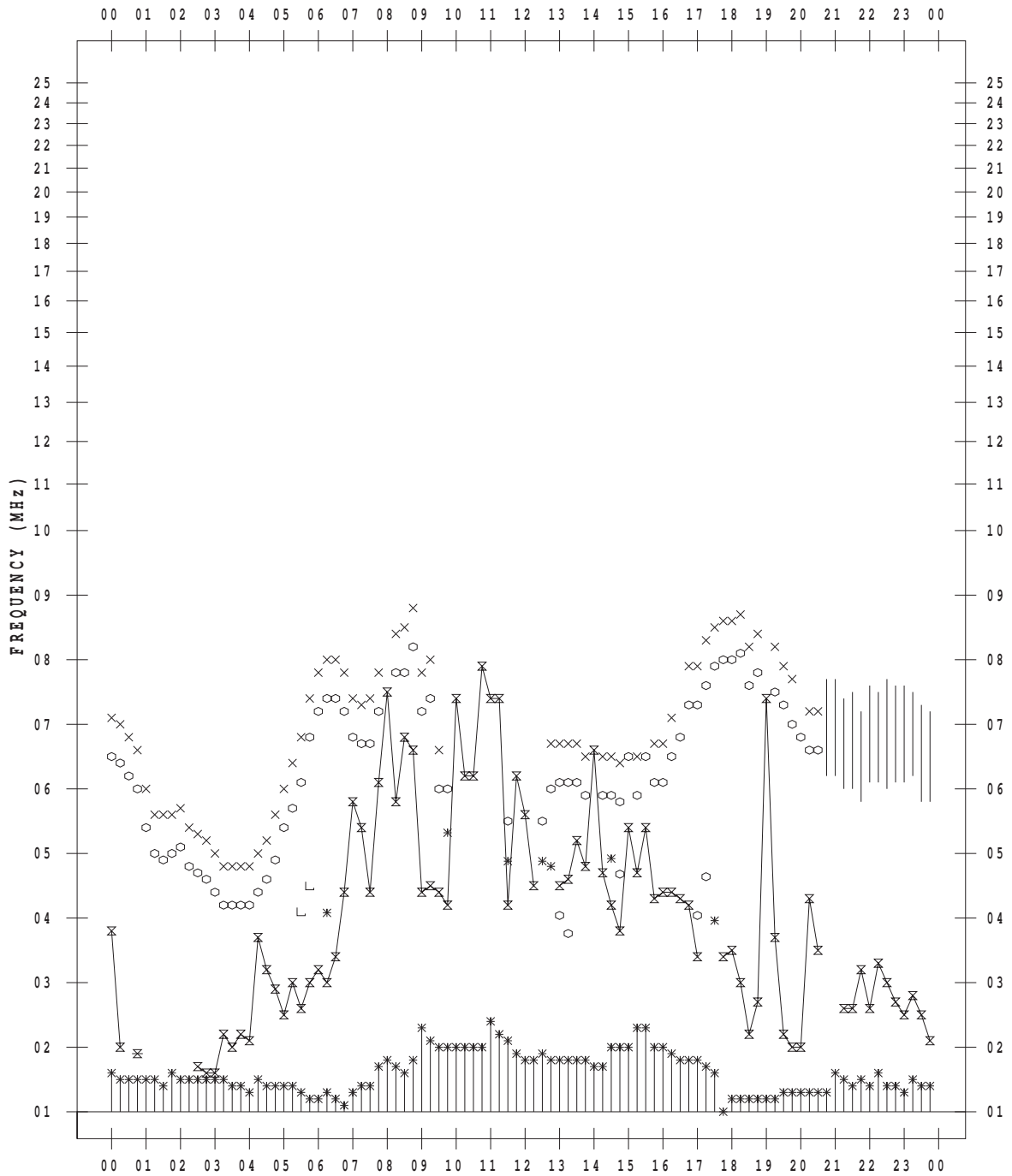
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/11

135 ° E MEAN TIME



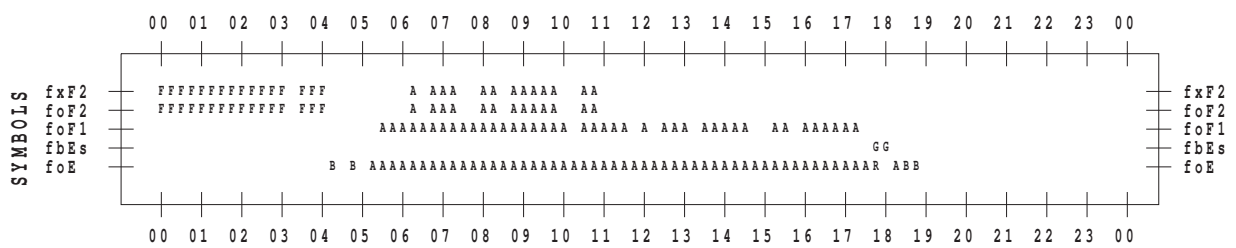
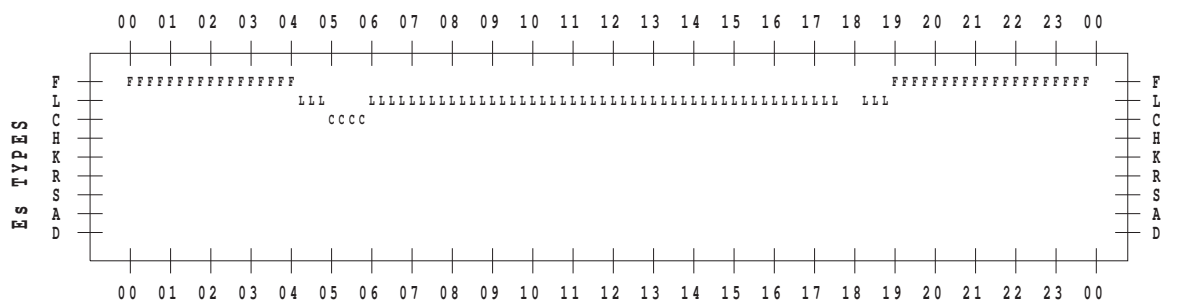
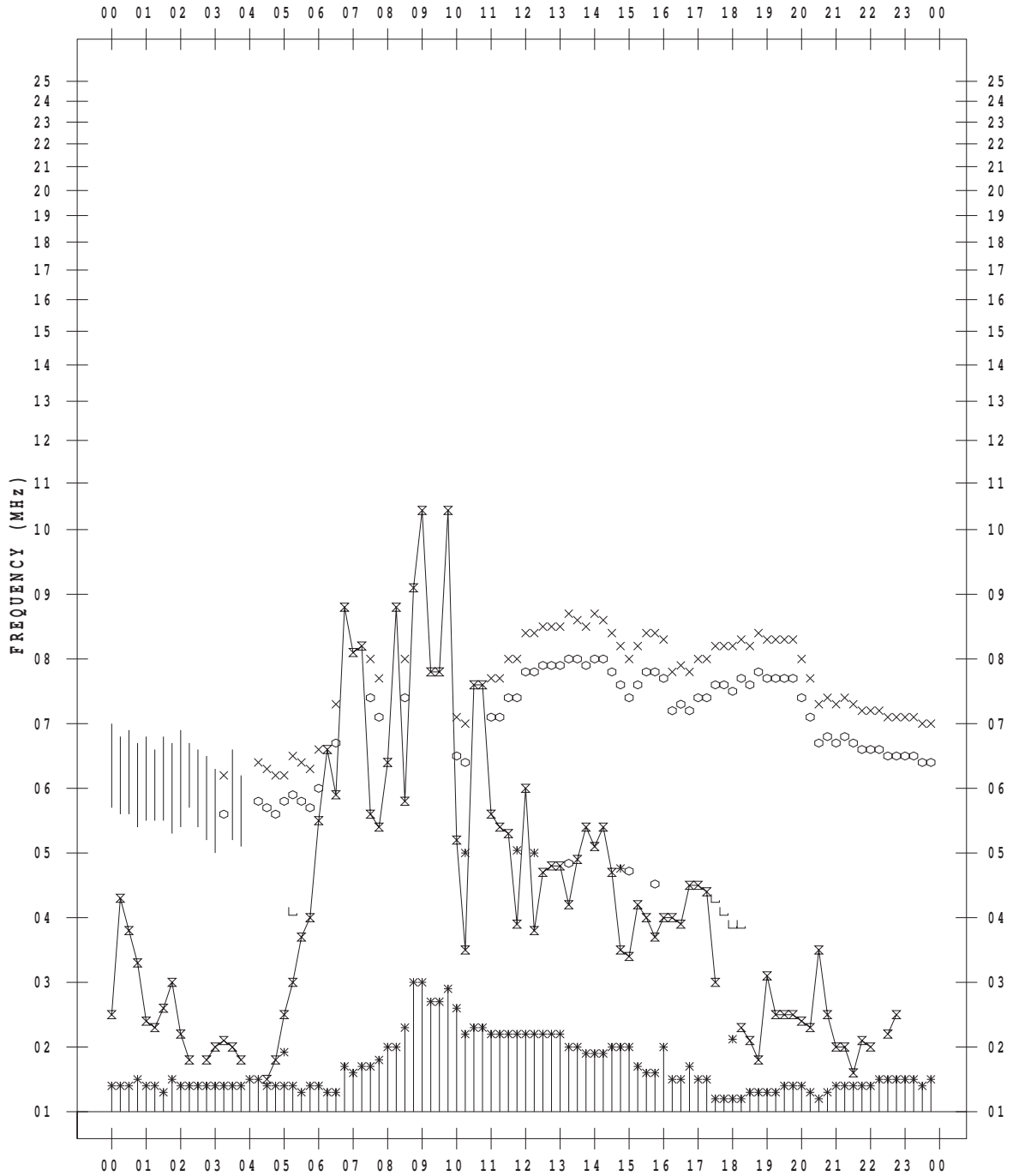
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/12

135 ° E MEAN TIME



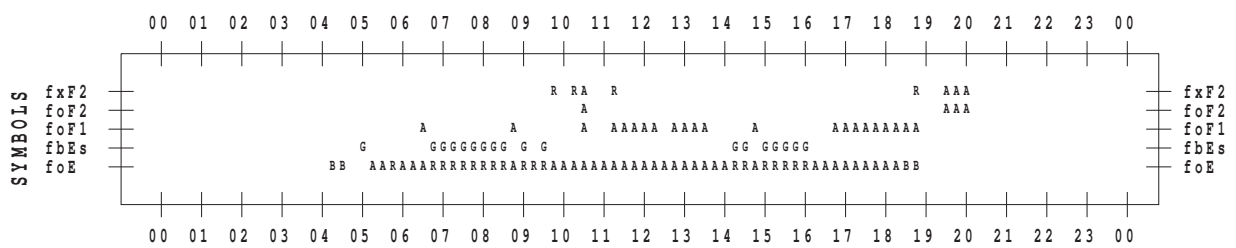
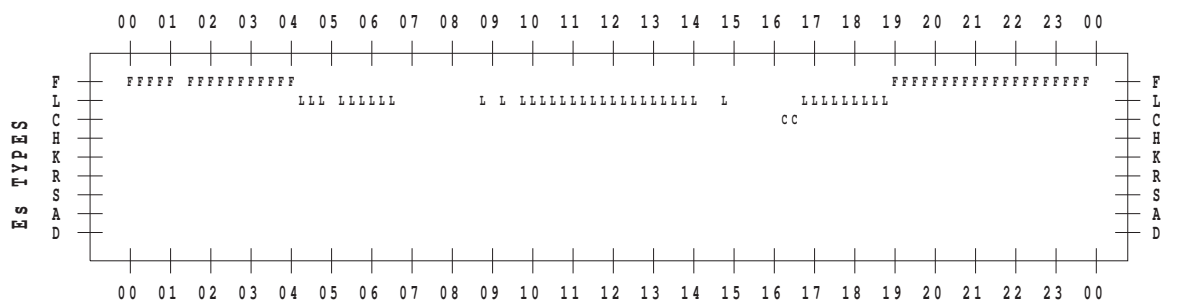
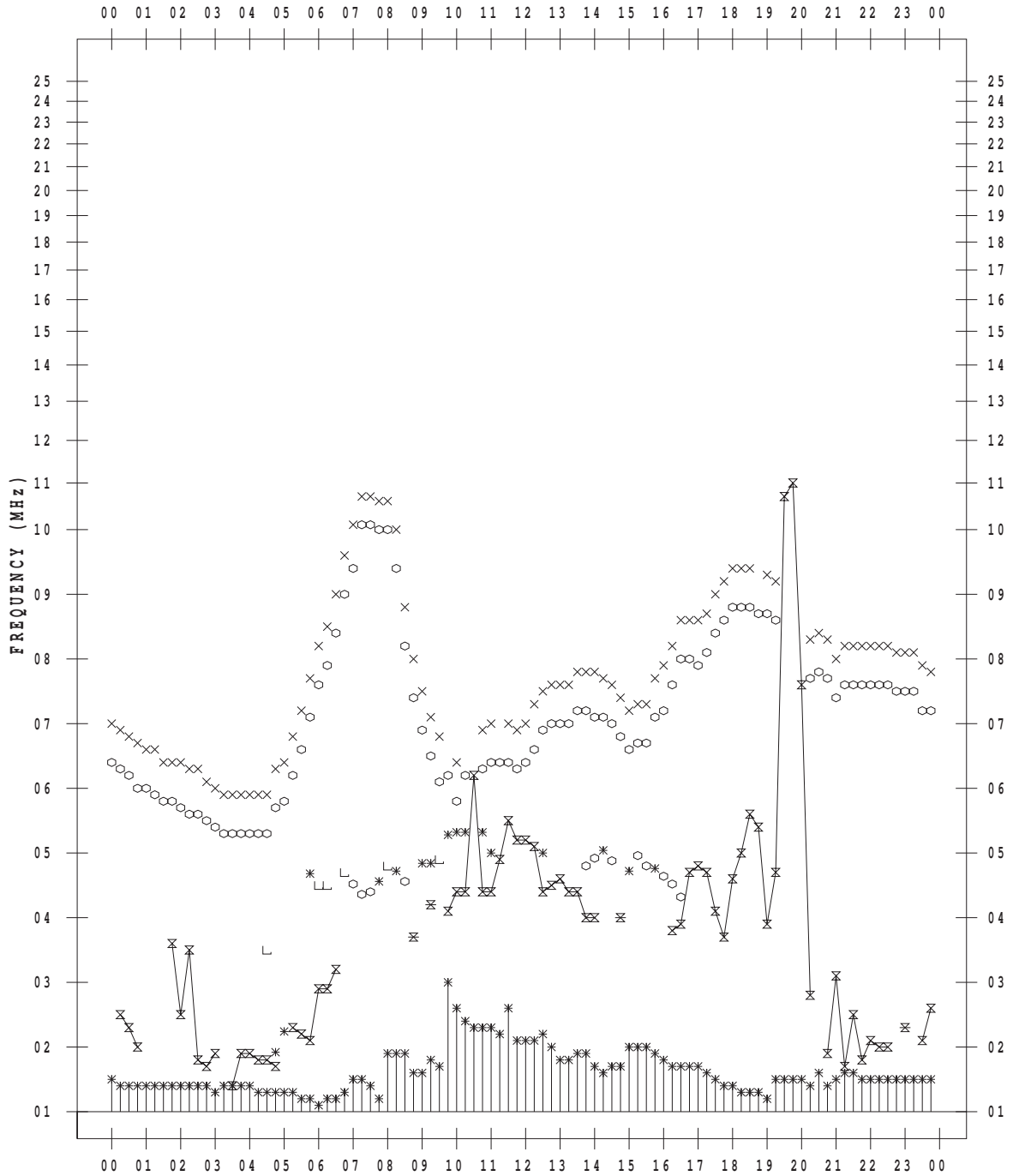
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/13

135 ° E MEAN TIME



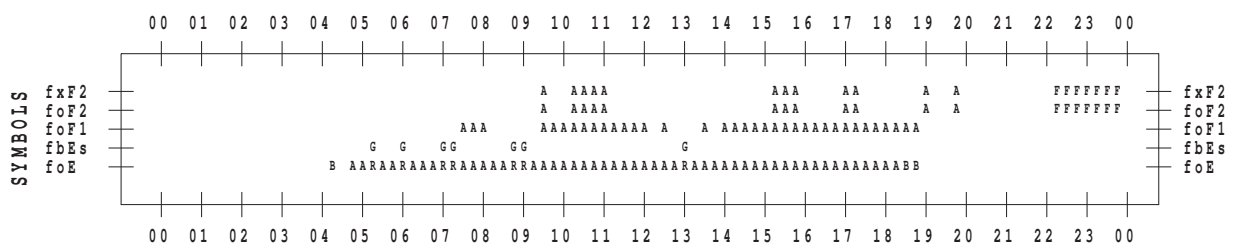
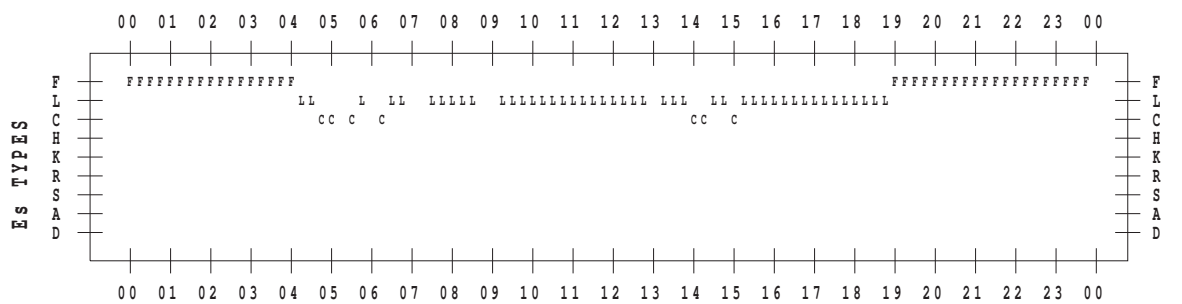
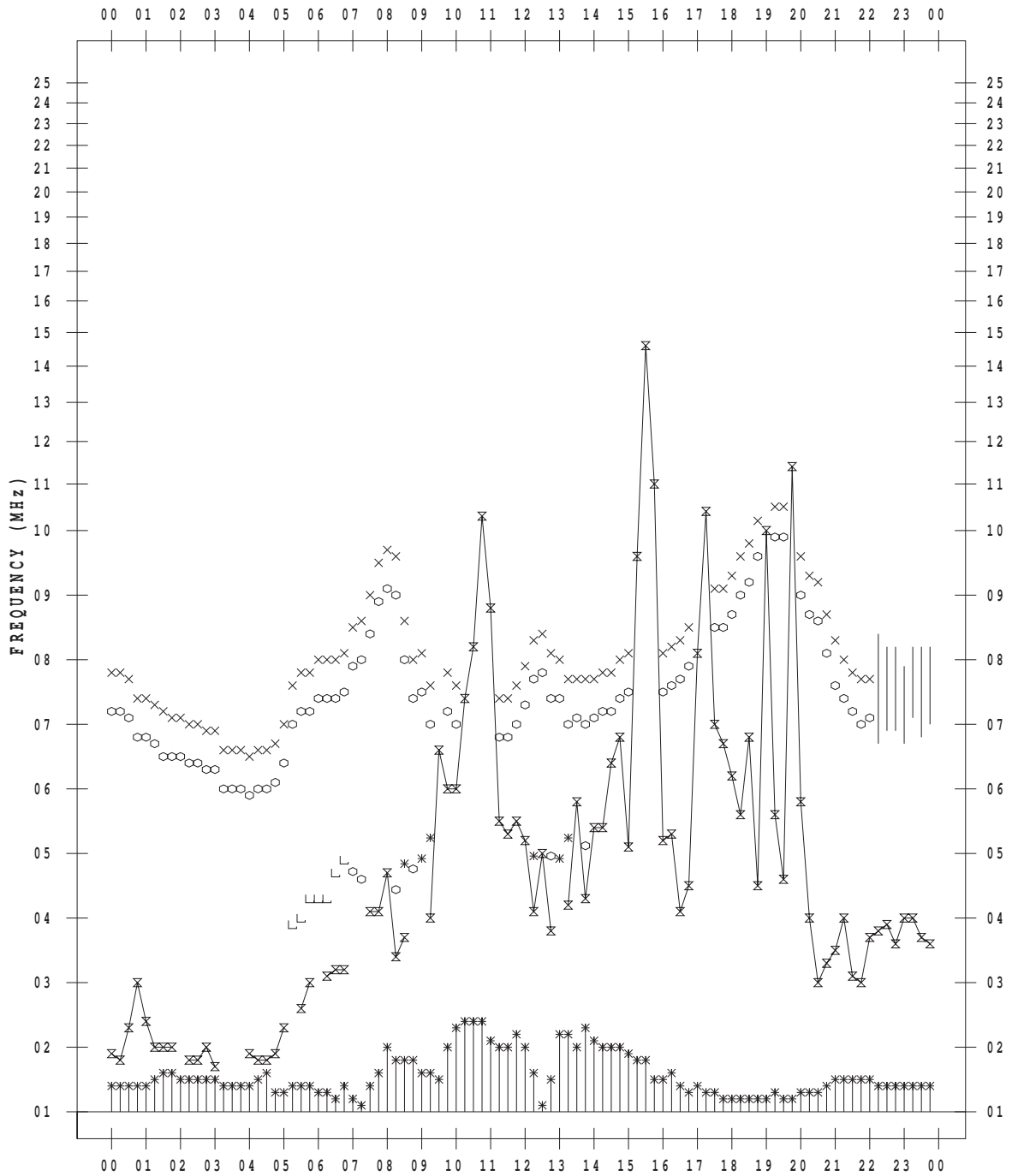
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/14

135 ° E MEAN TIME





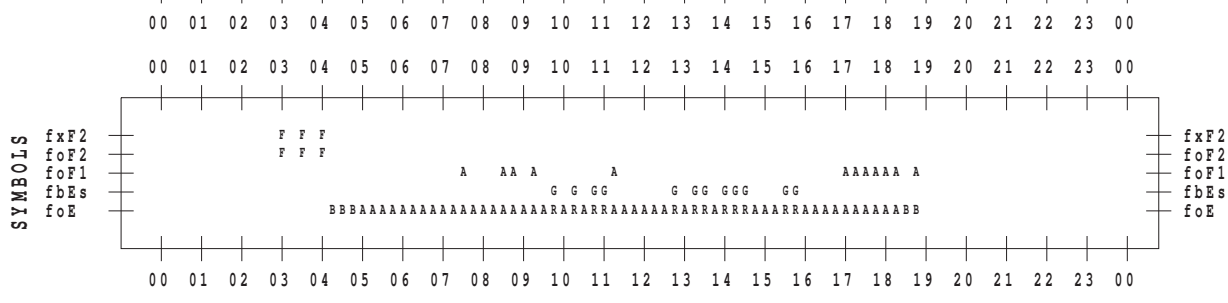
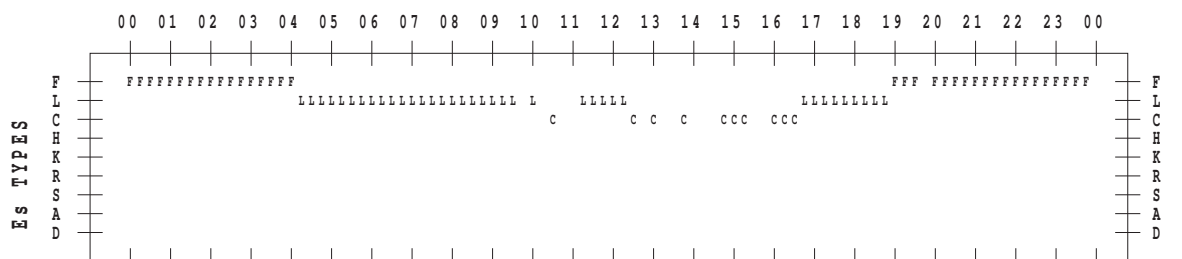
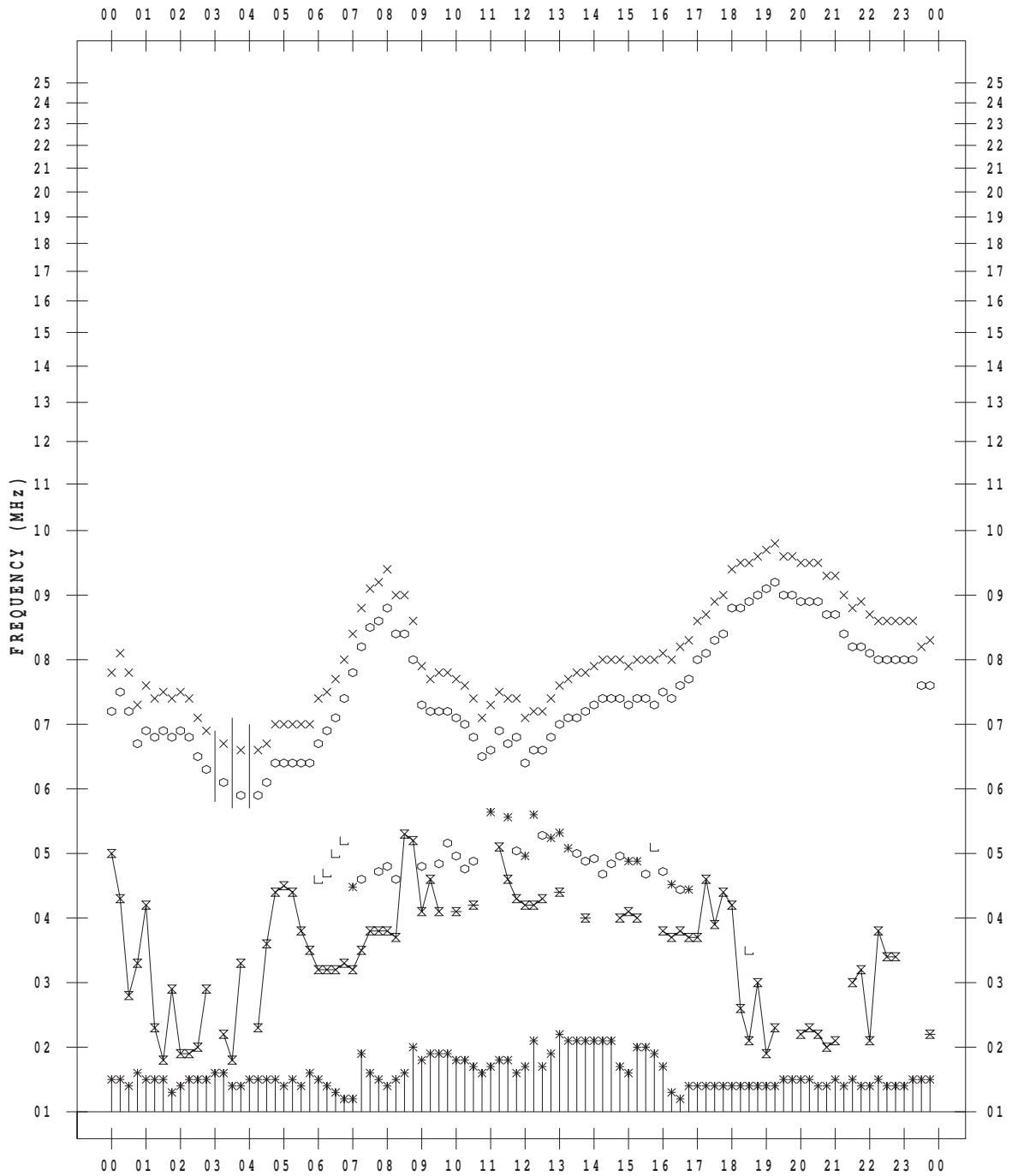
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/15

135 ° E MEAN TIME



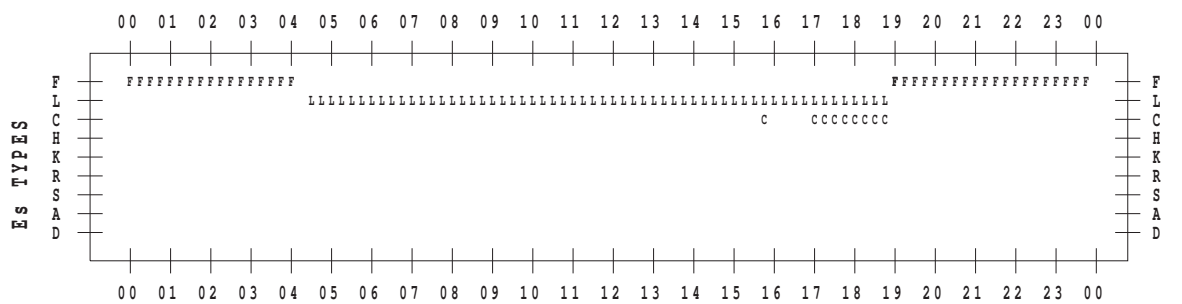
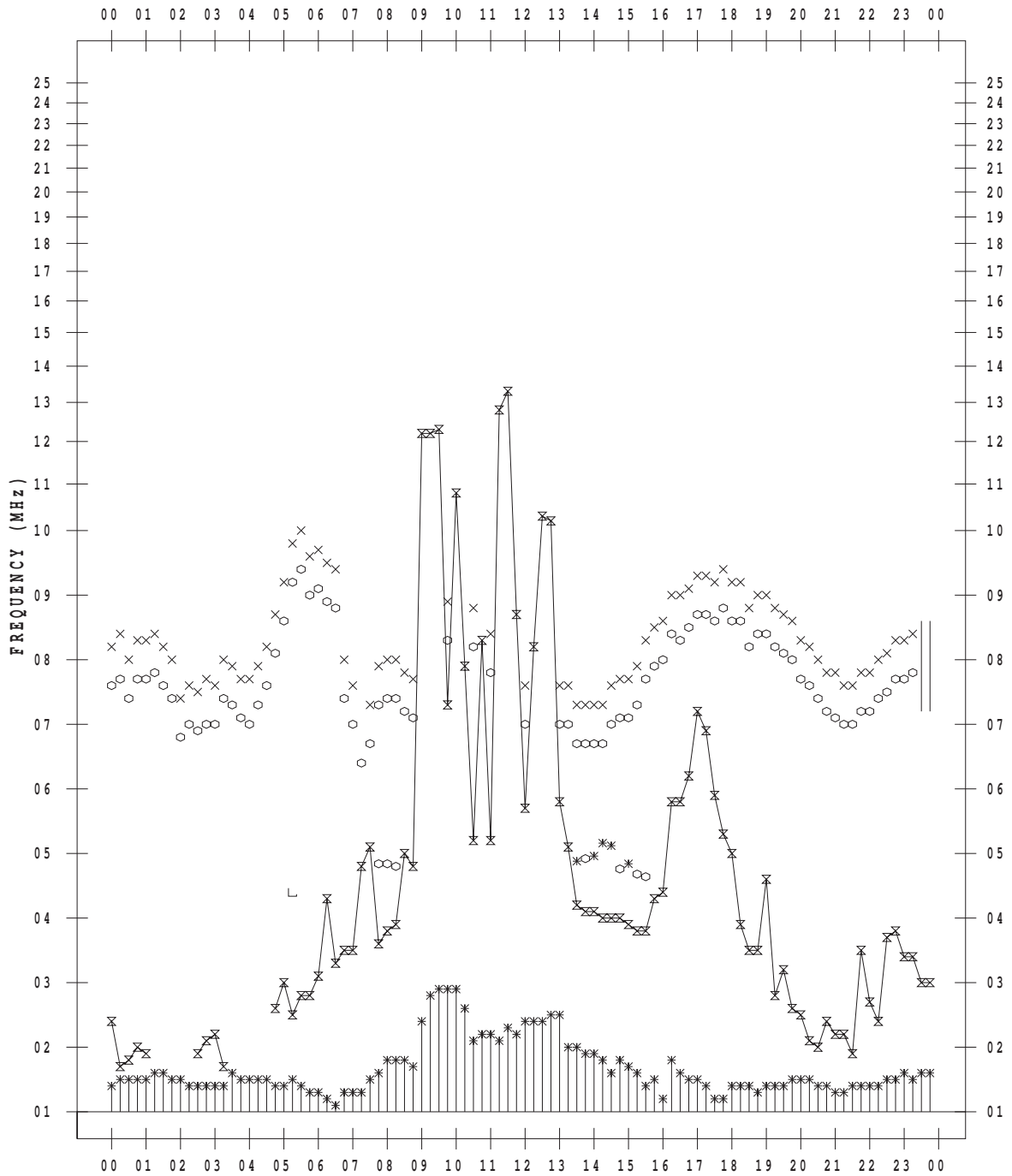
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/16

135 ° E MEAN TIME



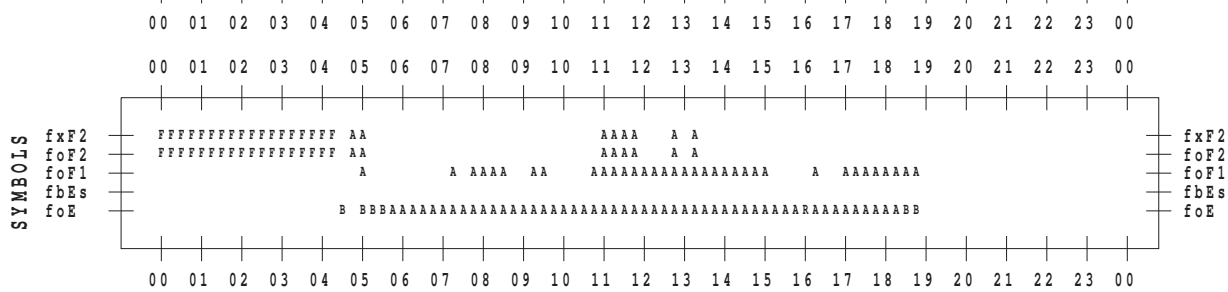
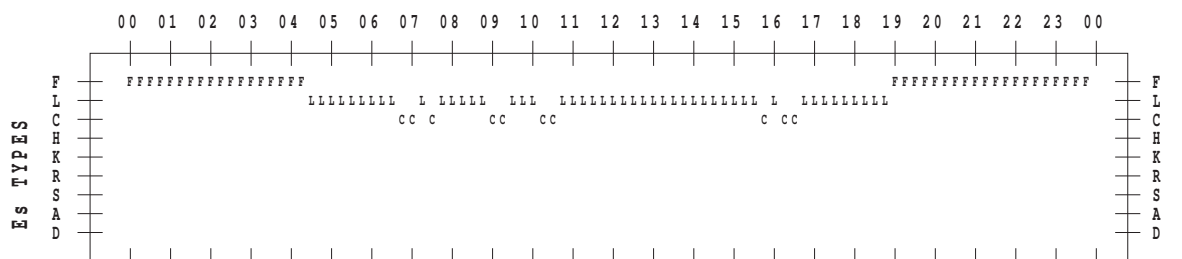
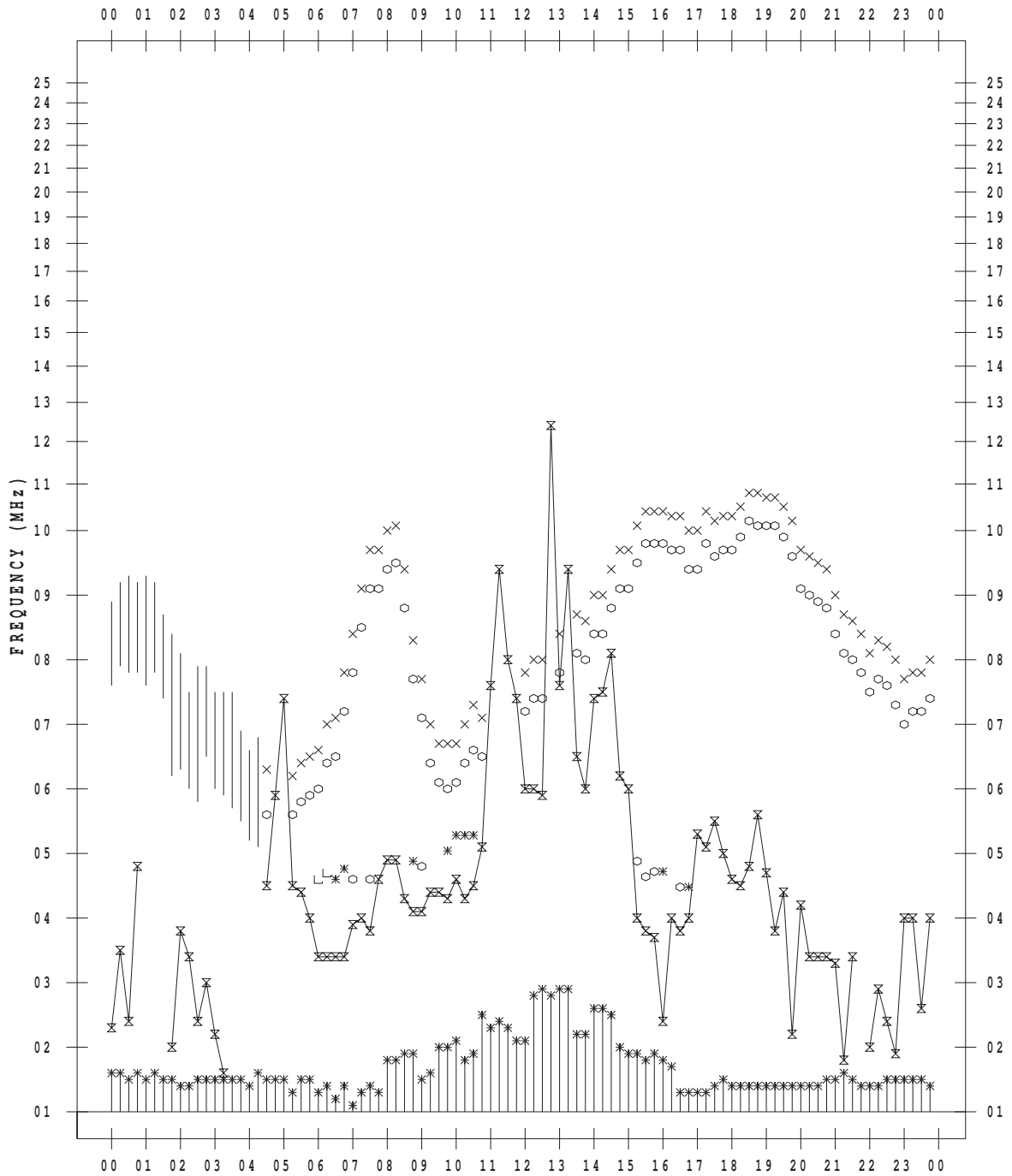
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/17

135 ° E MEAN TIME



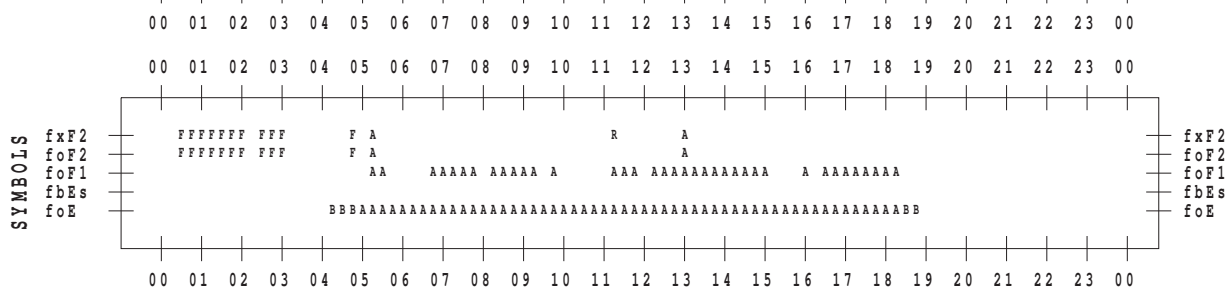
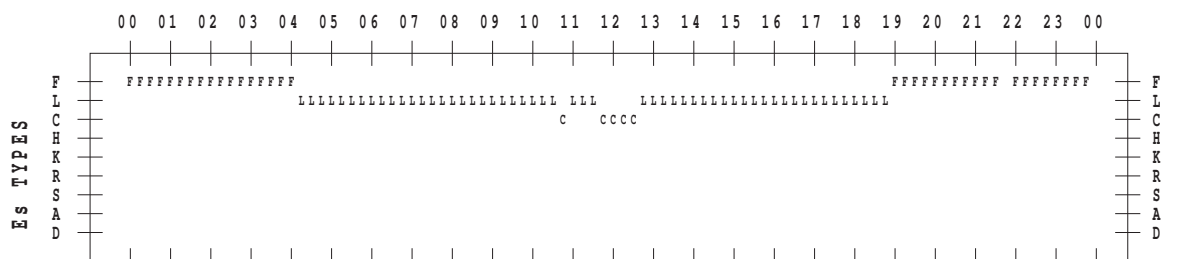
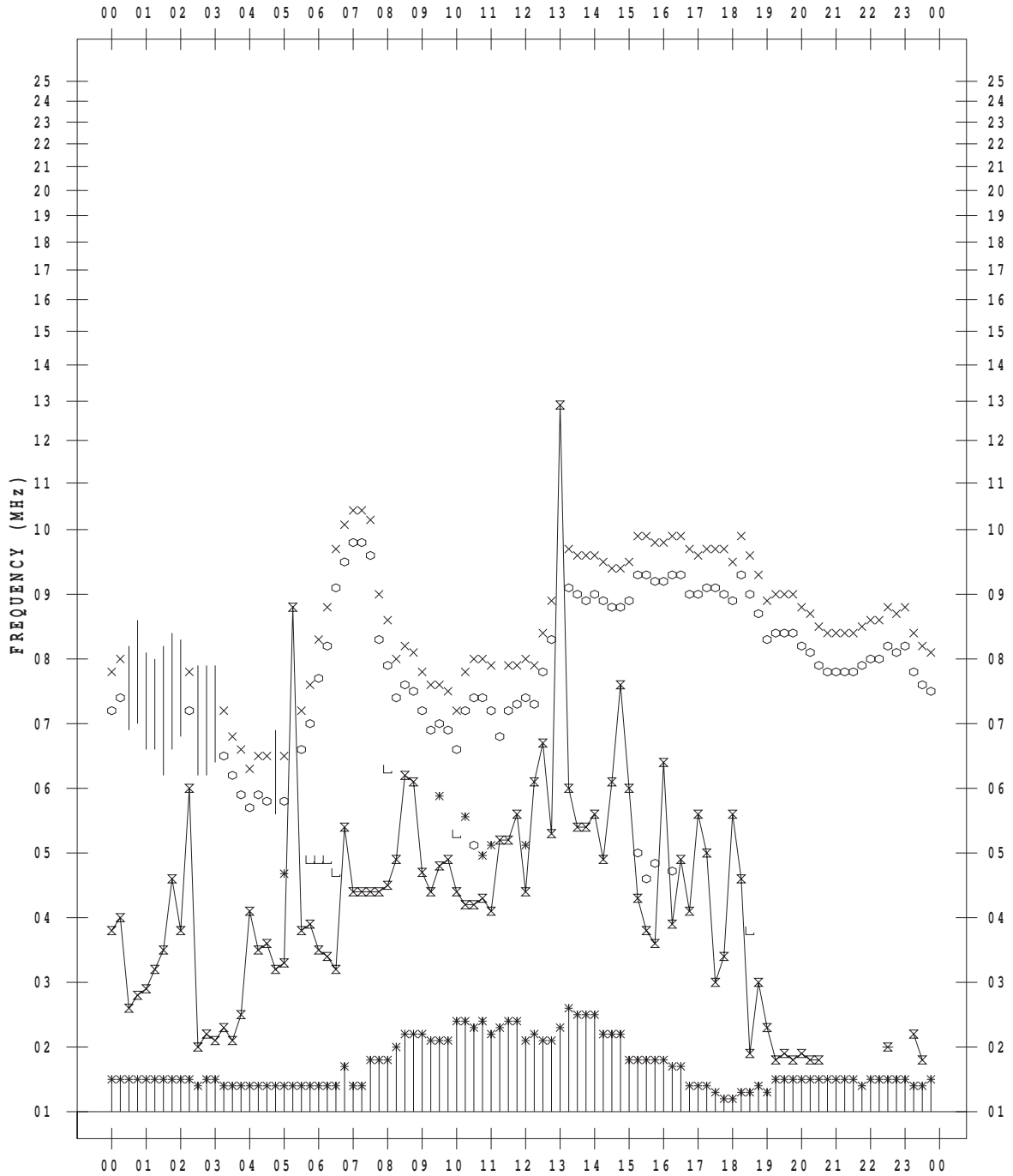
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/18

135 ° E MEAN TIME



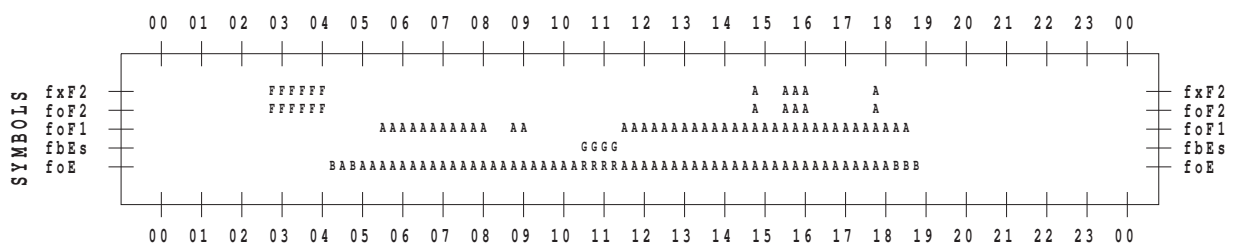
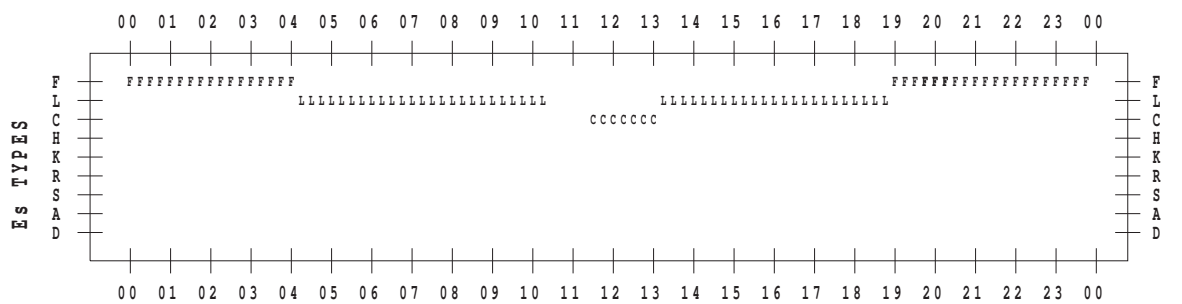
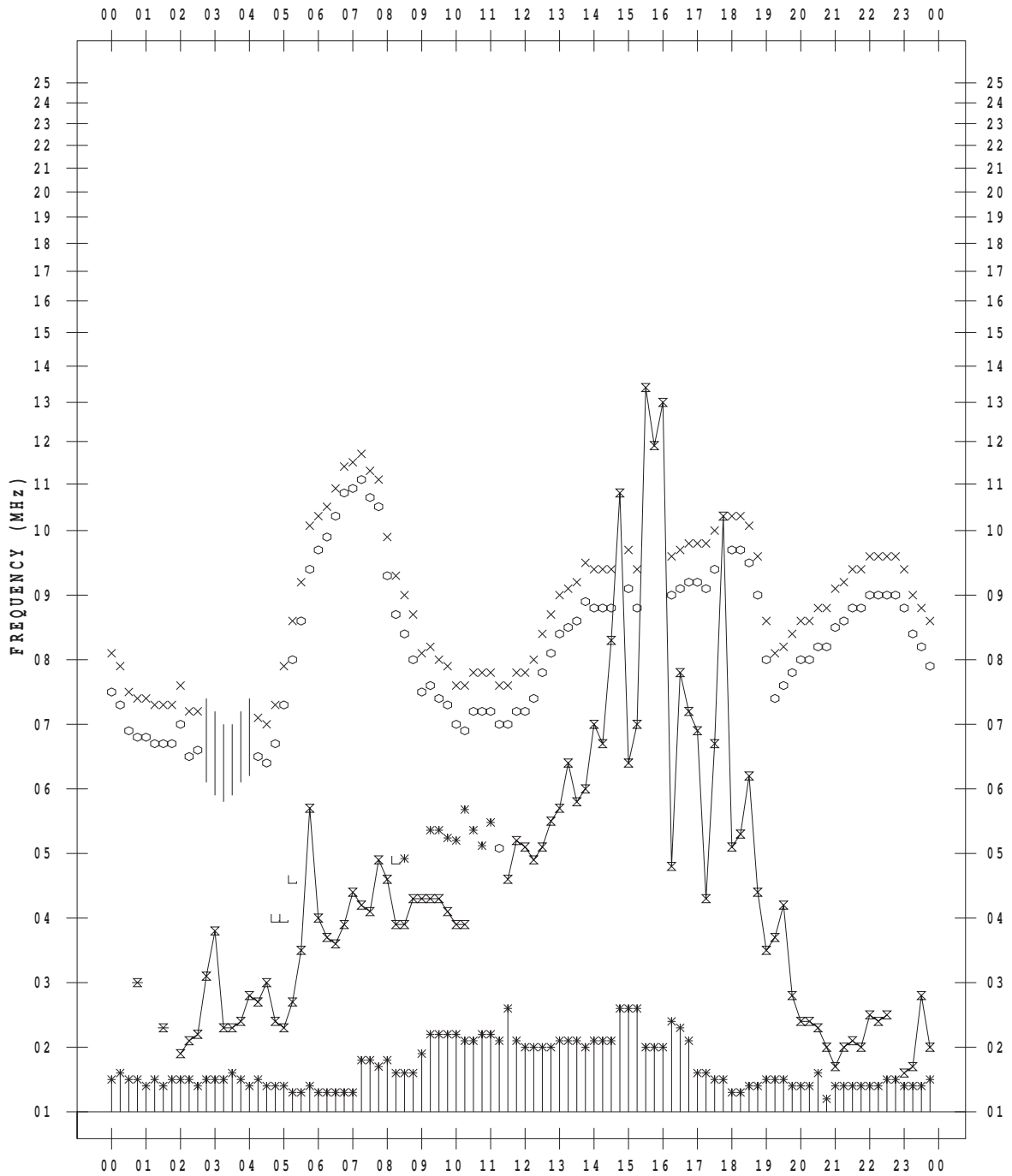
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/19

135 ° E MEAN TIME



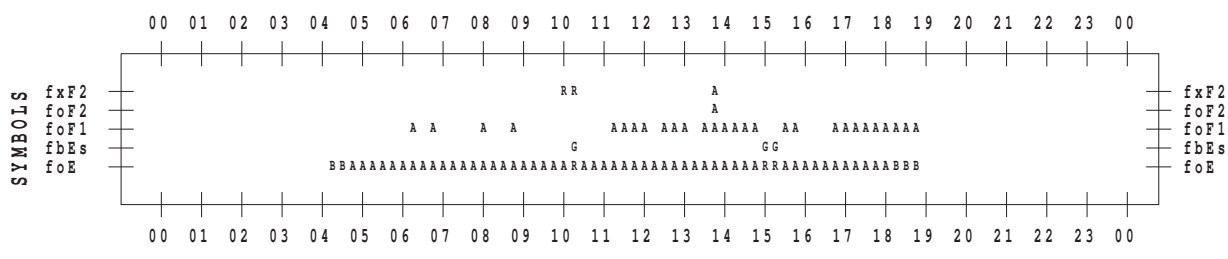
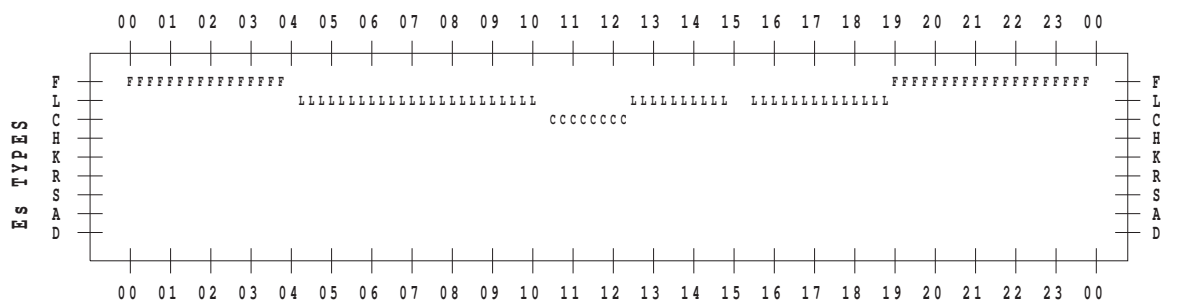
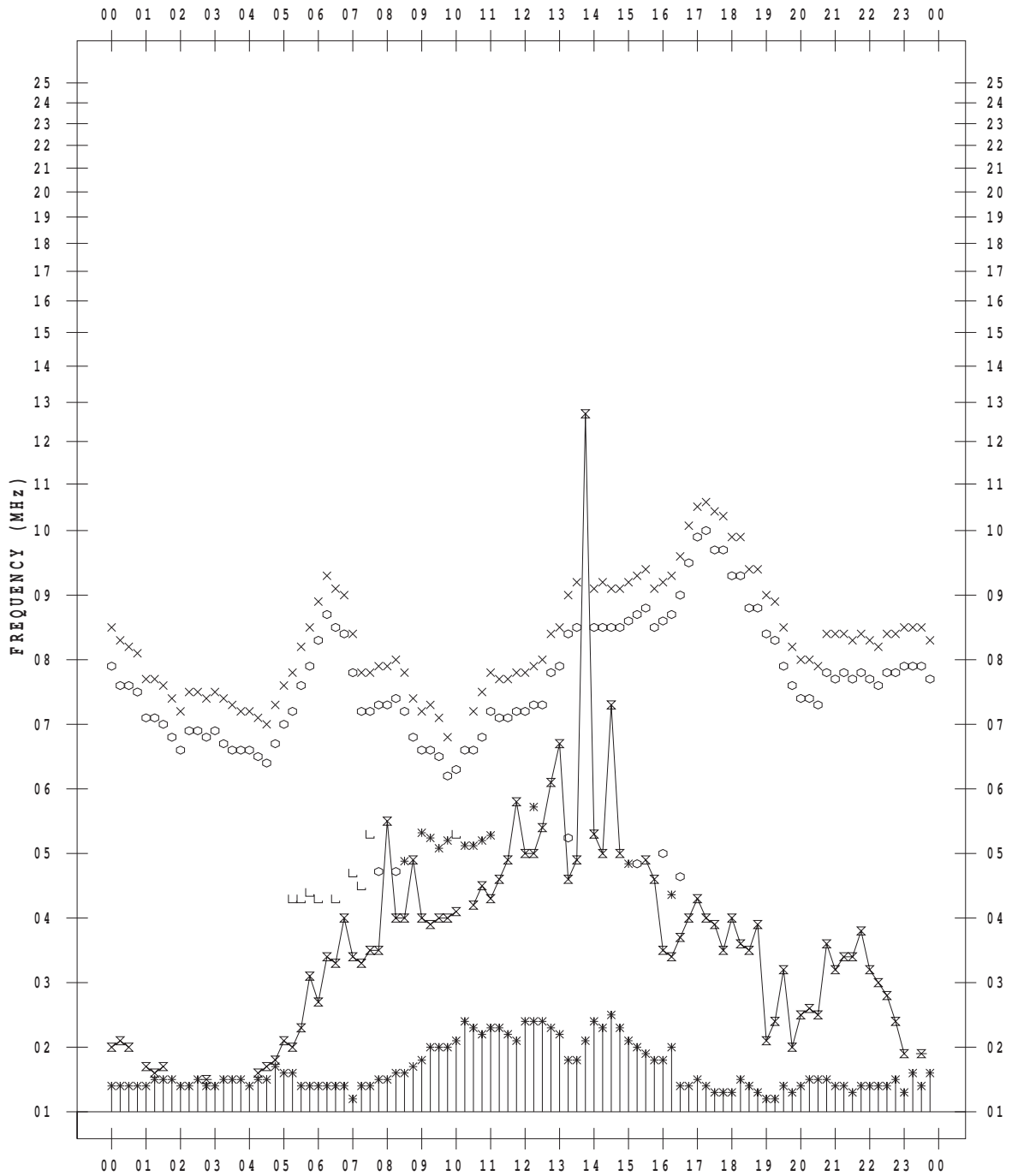
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/20

135 ° E MEAN TIME



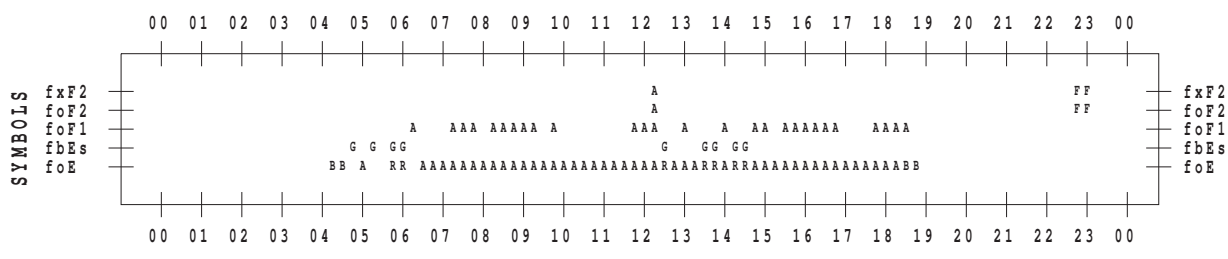
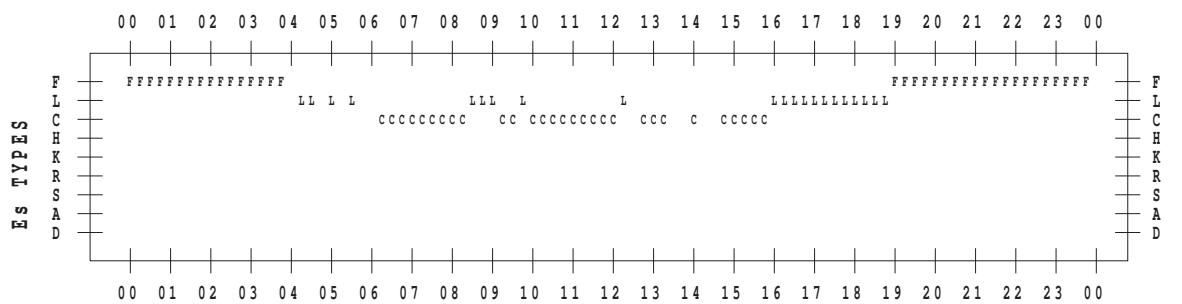
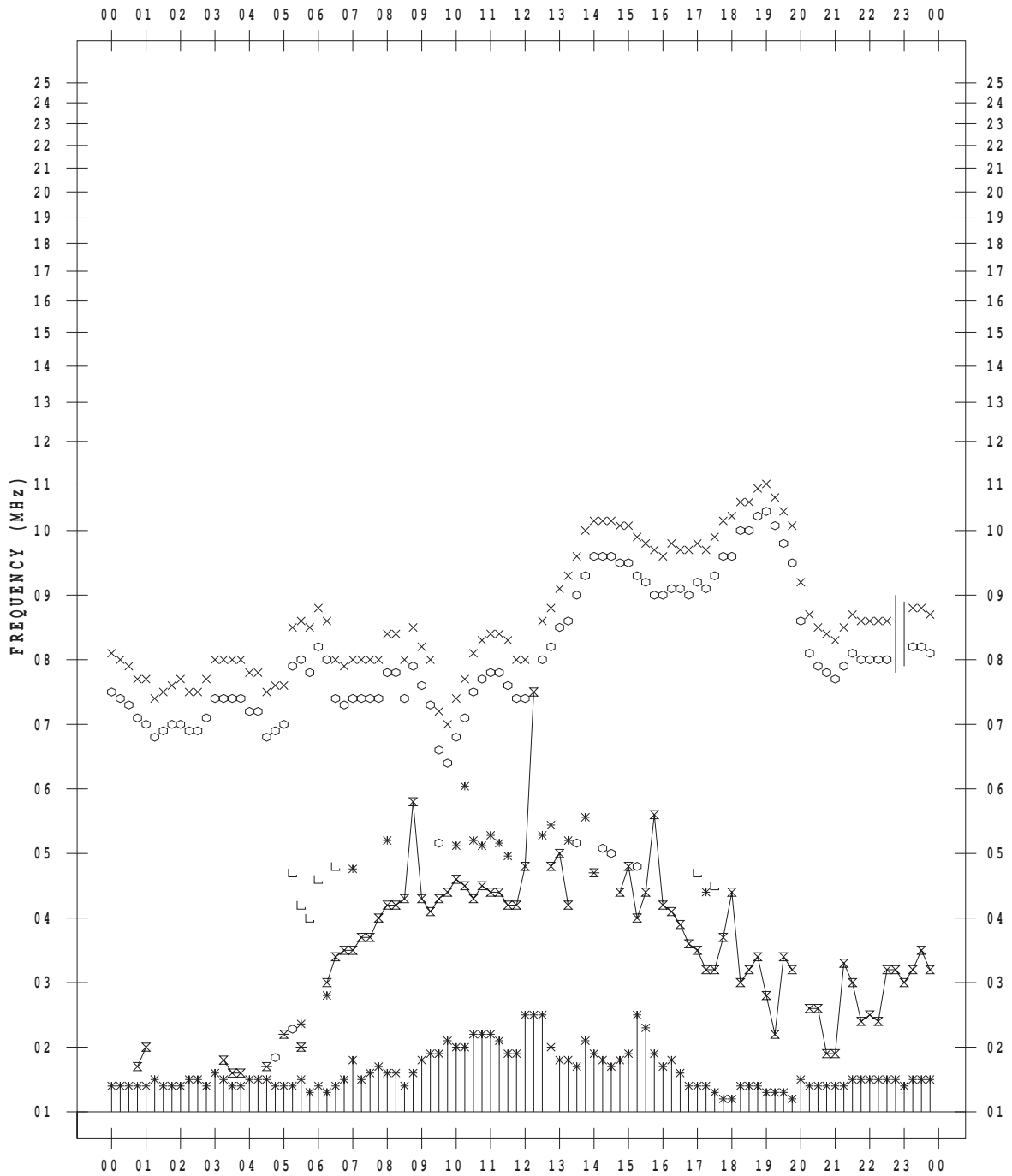
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/21

135 ° E MEAN TIME



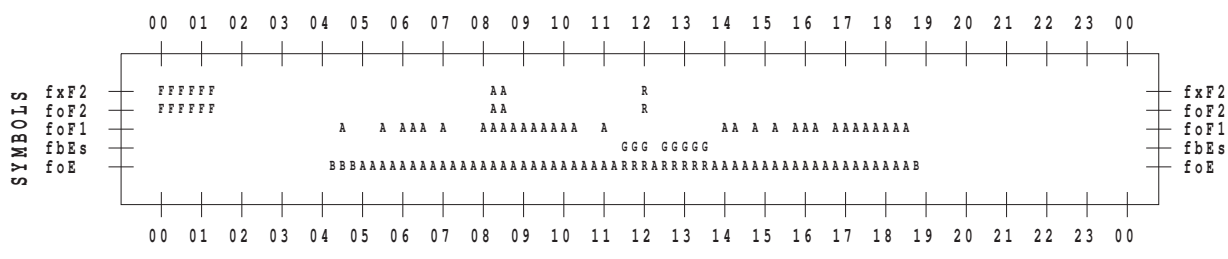
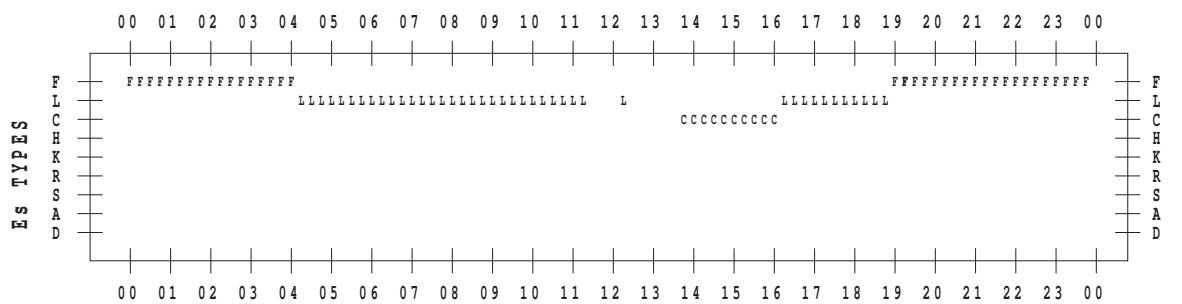
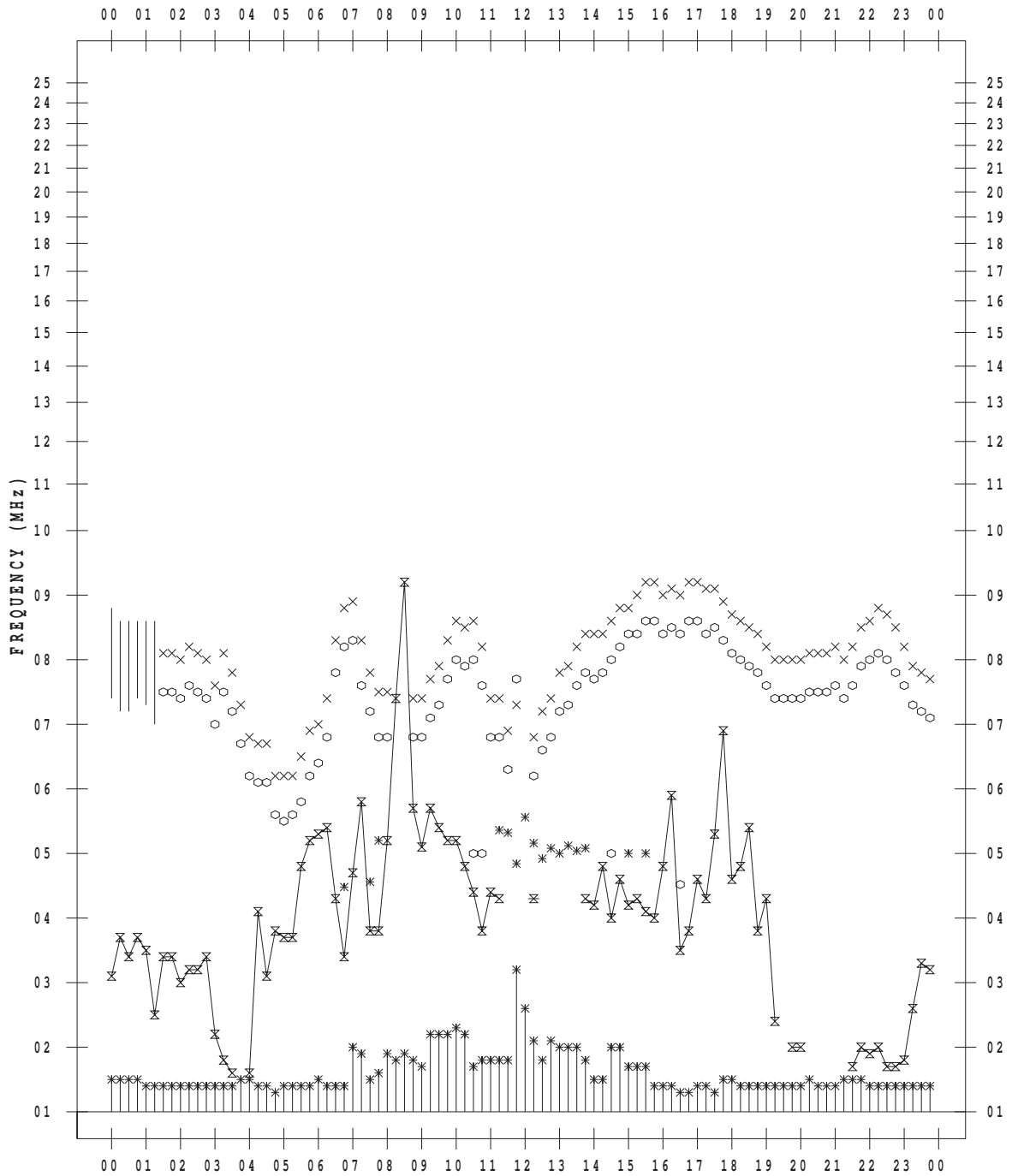
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/22

135 ° E MEAN TIME





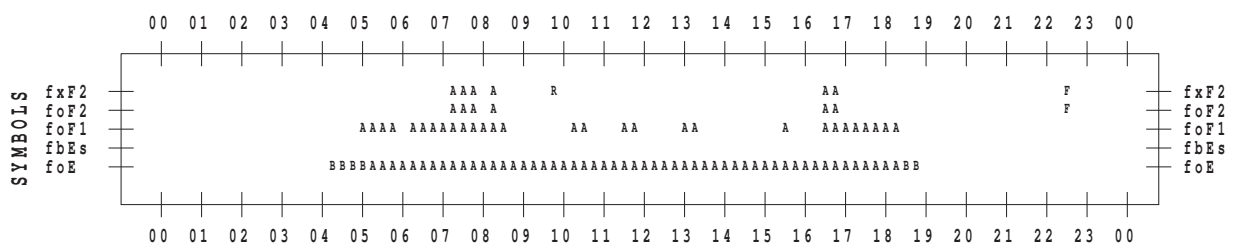
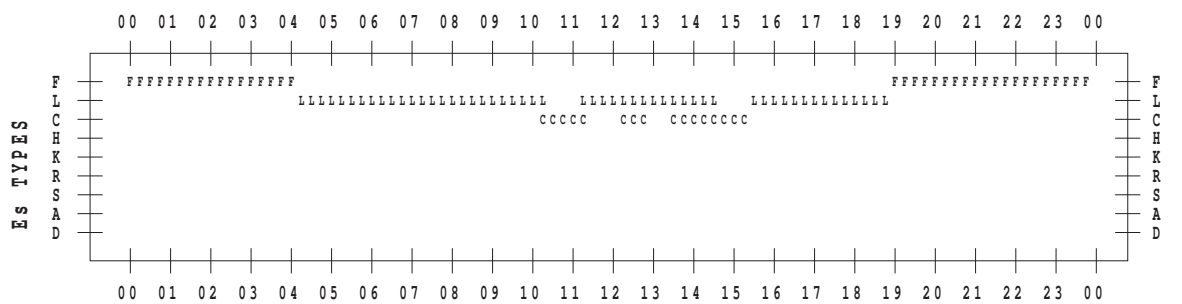
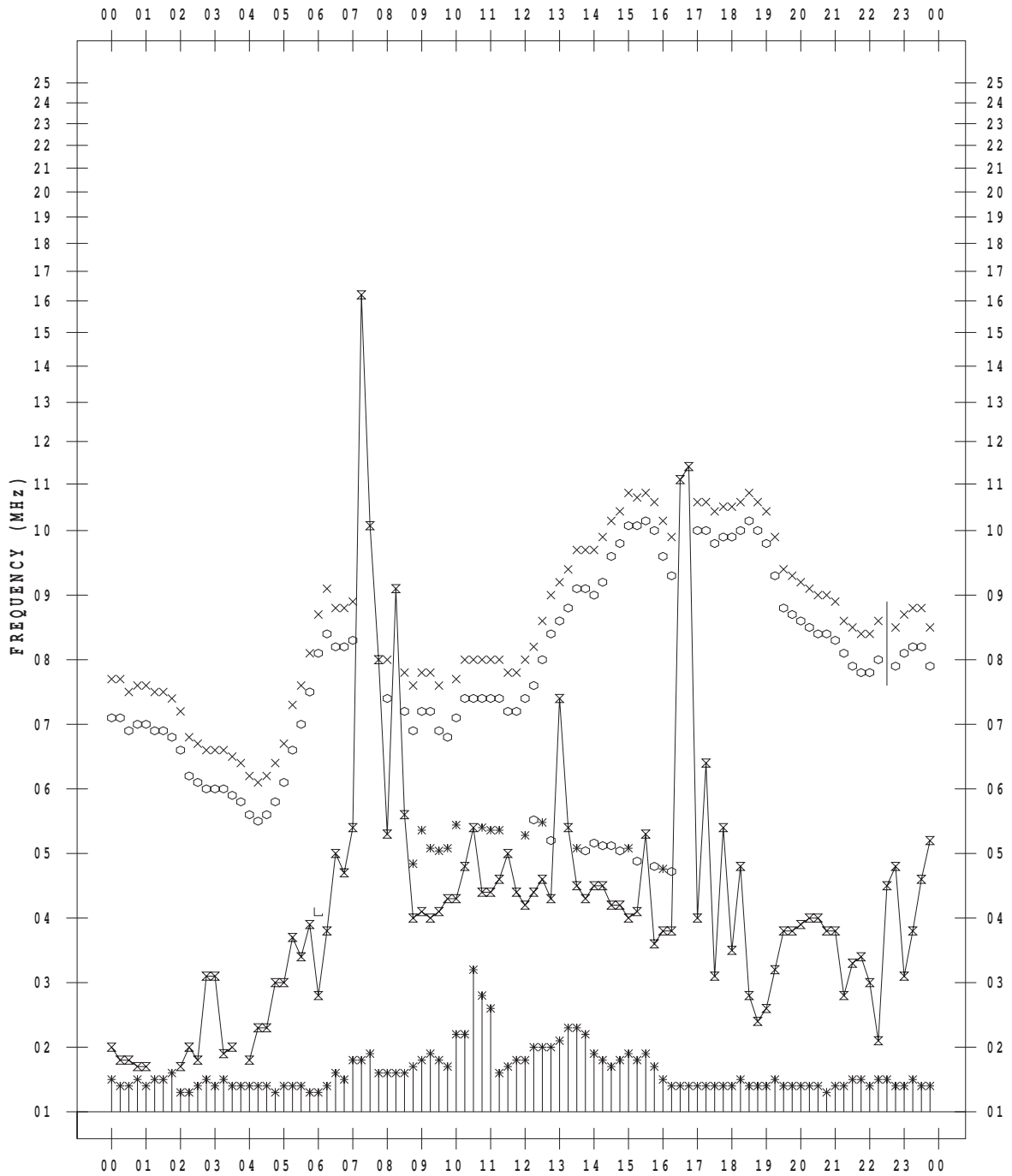
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/23

135 ° E MEAN TIME



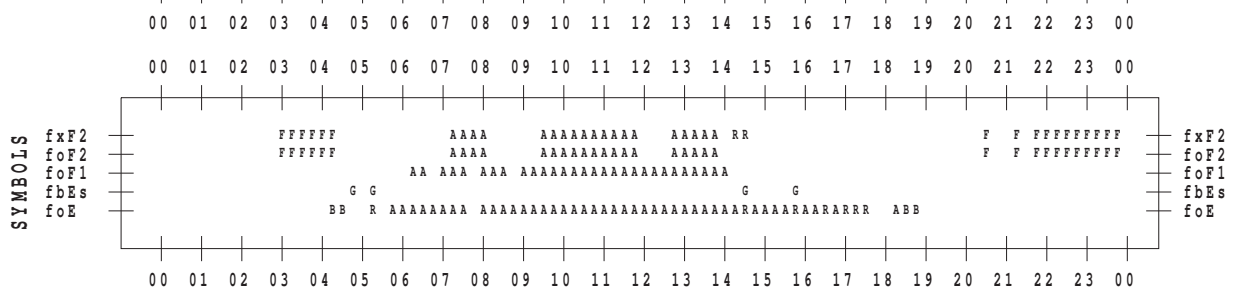
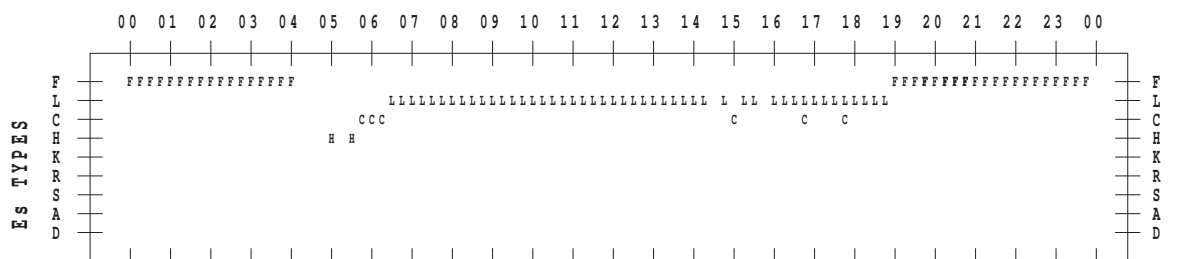
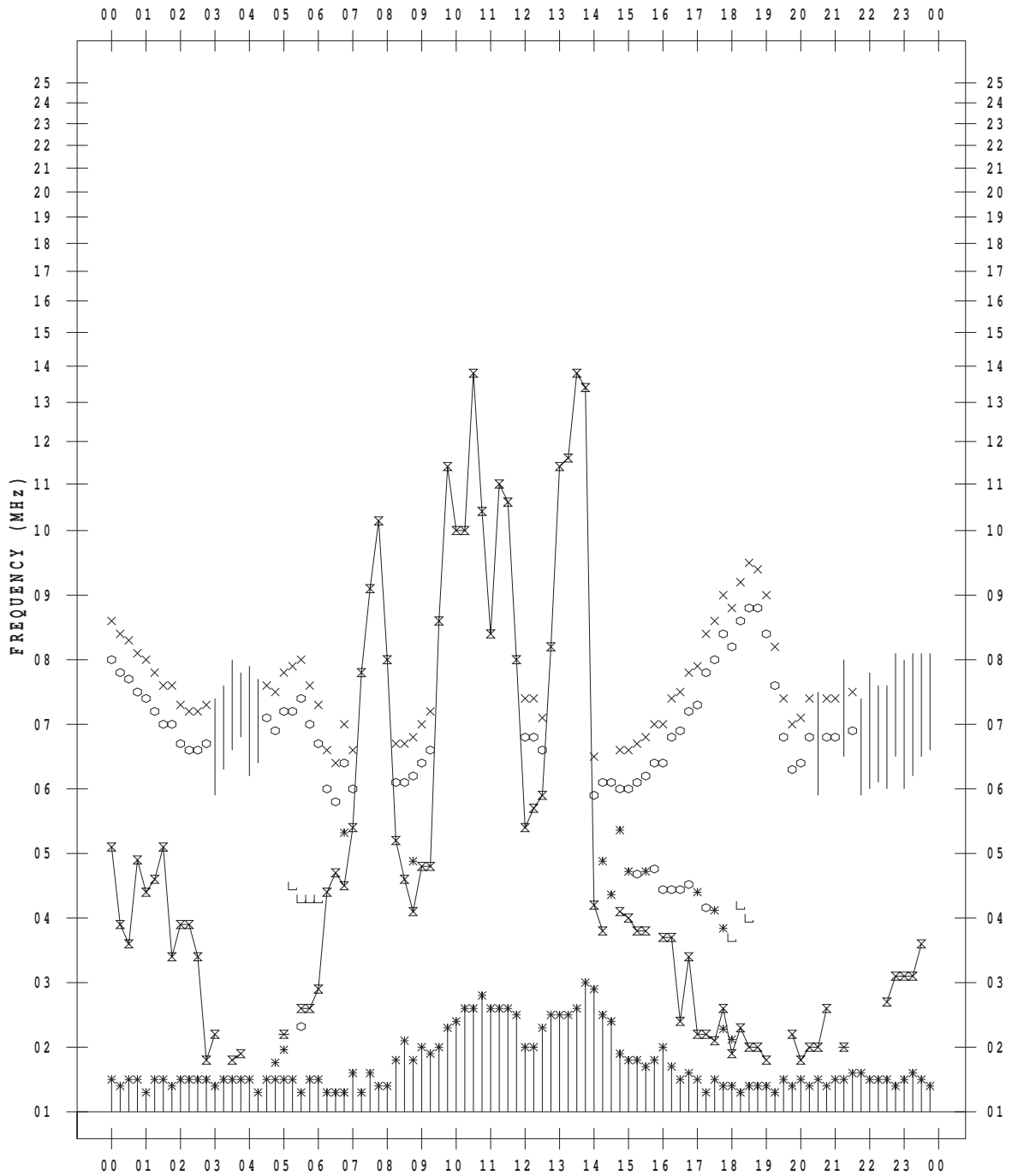
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/24

135 ° E MEAN TIME



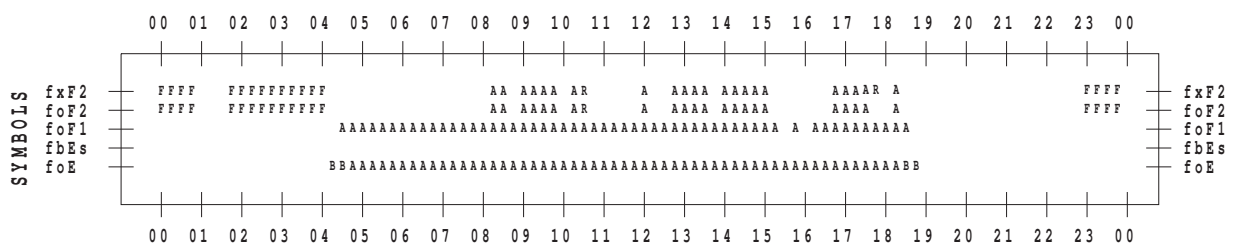
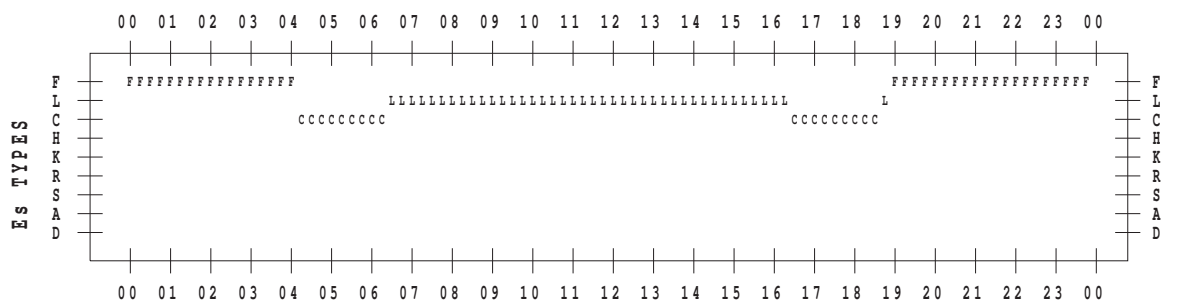
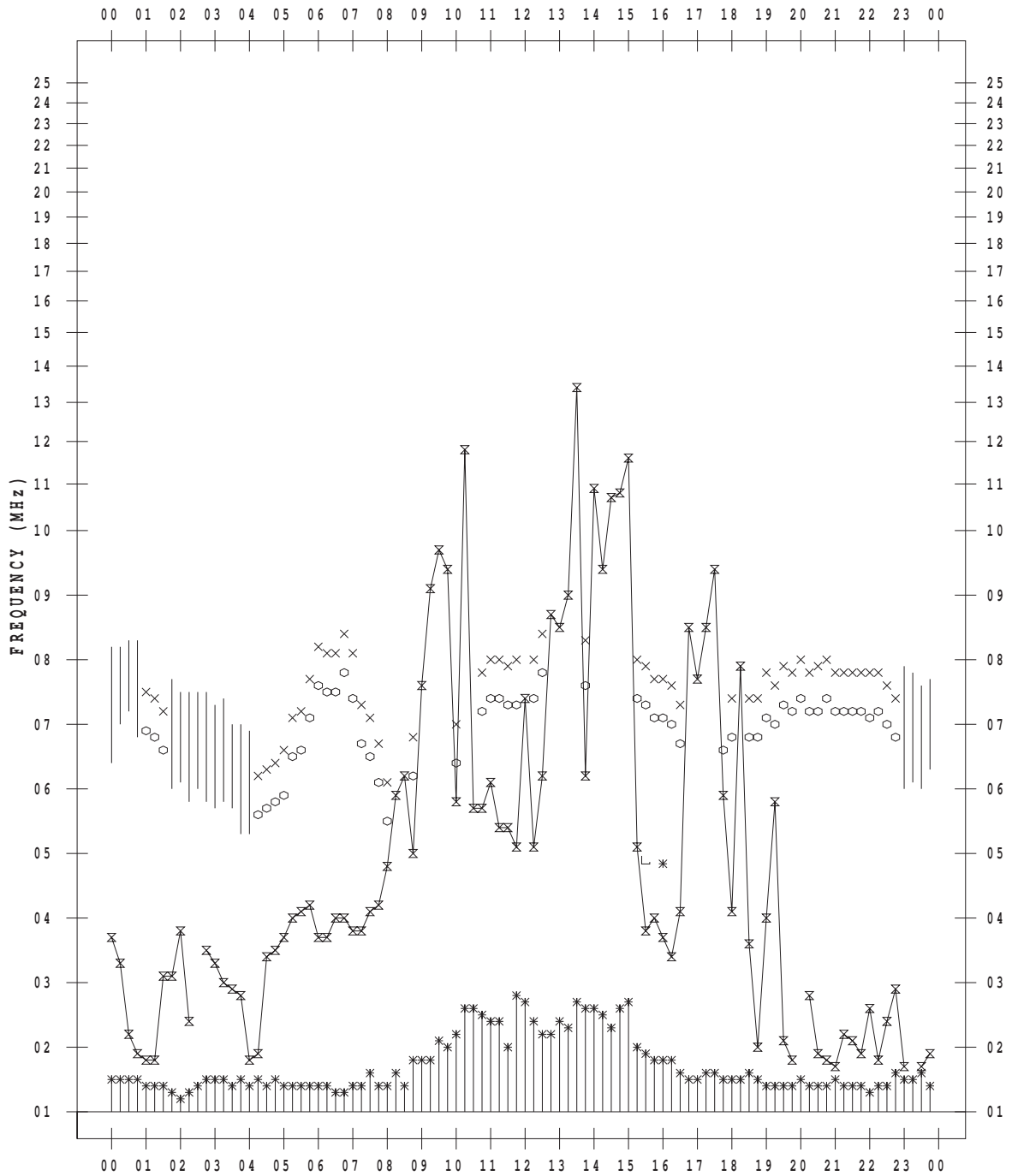
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/25

135 ° E MEAN TIME



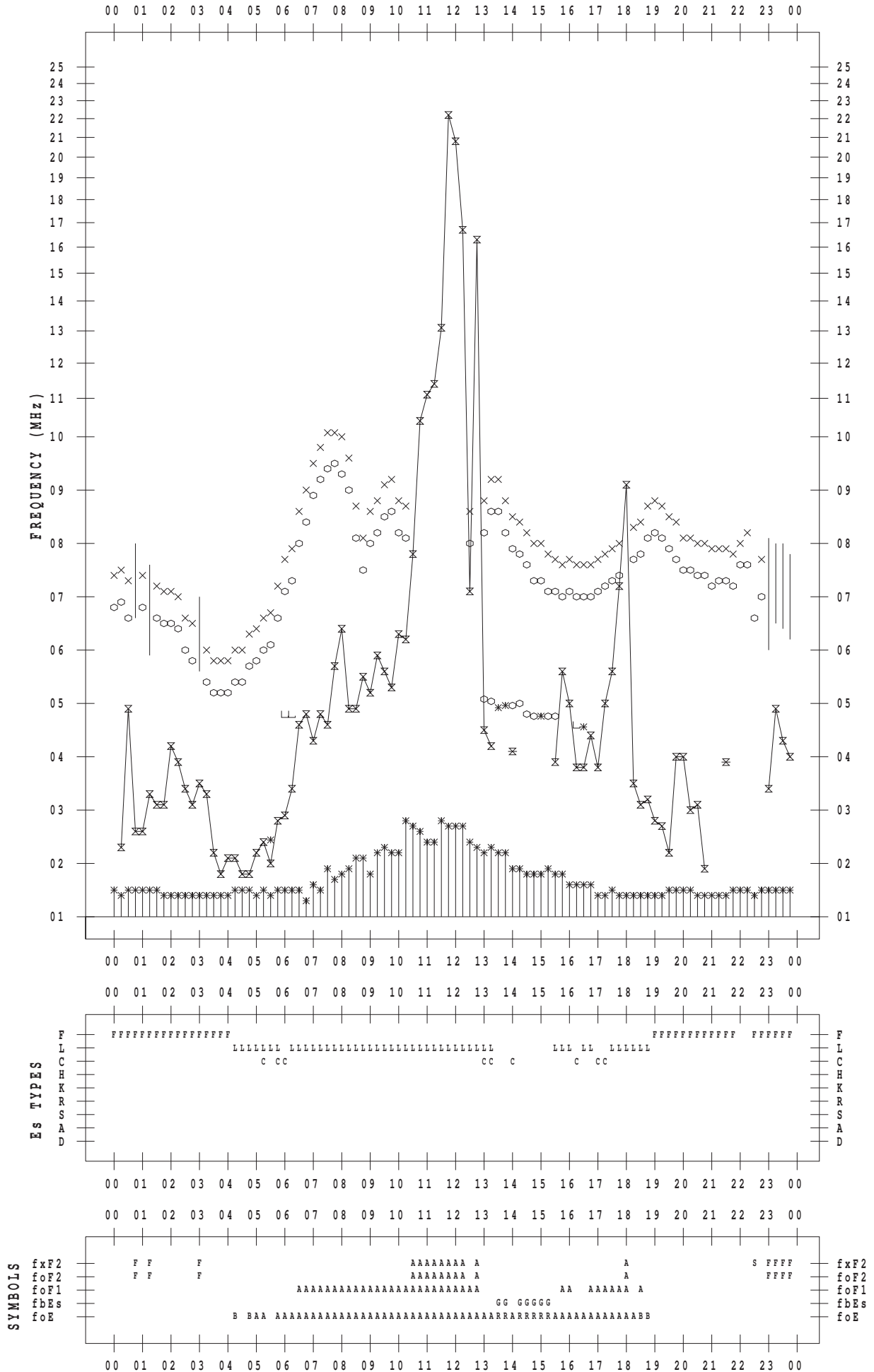
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/26

135 ° E MEAN TIME



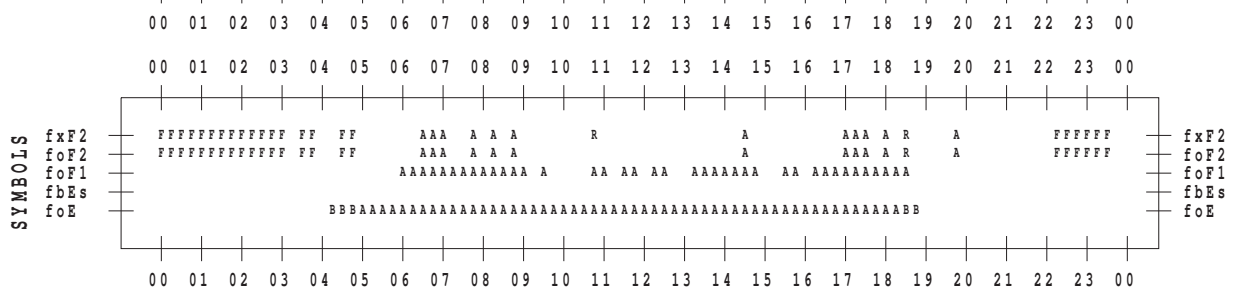
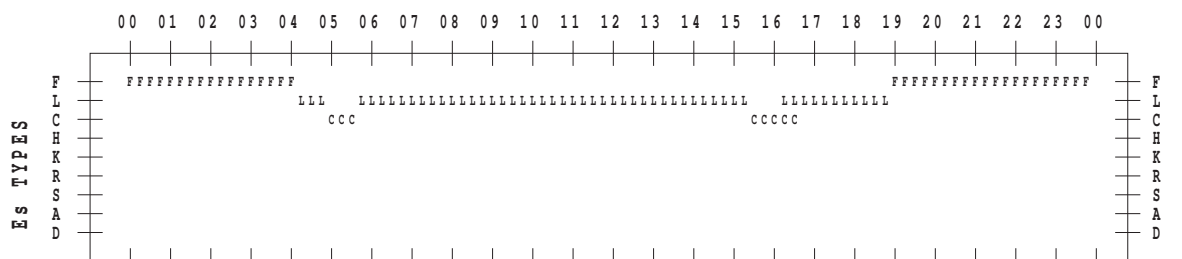
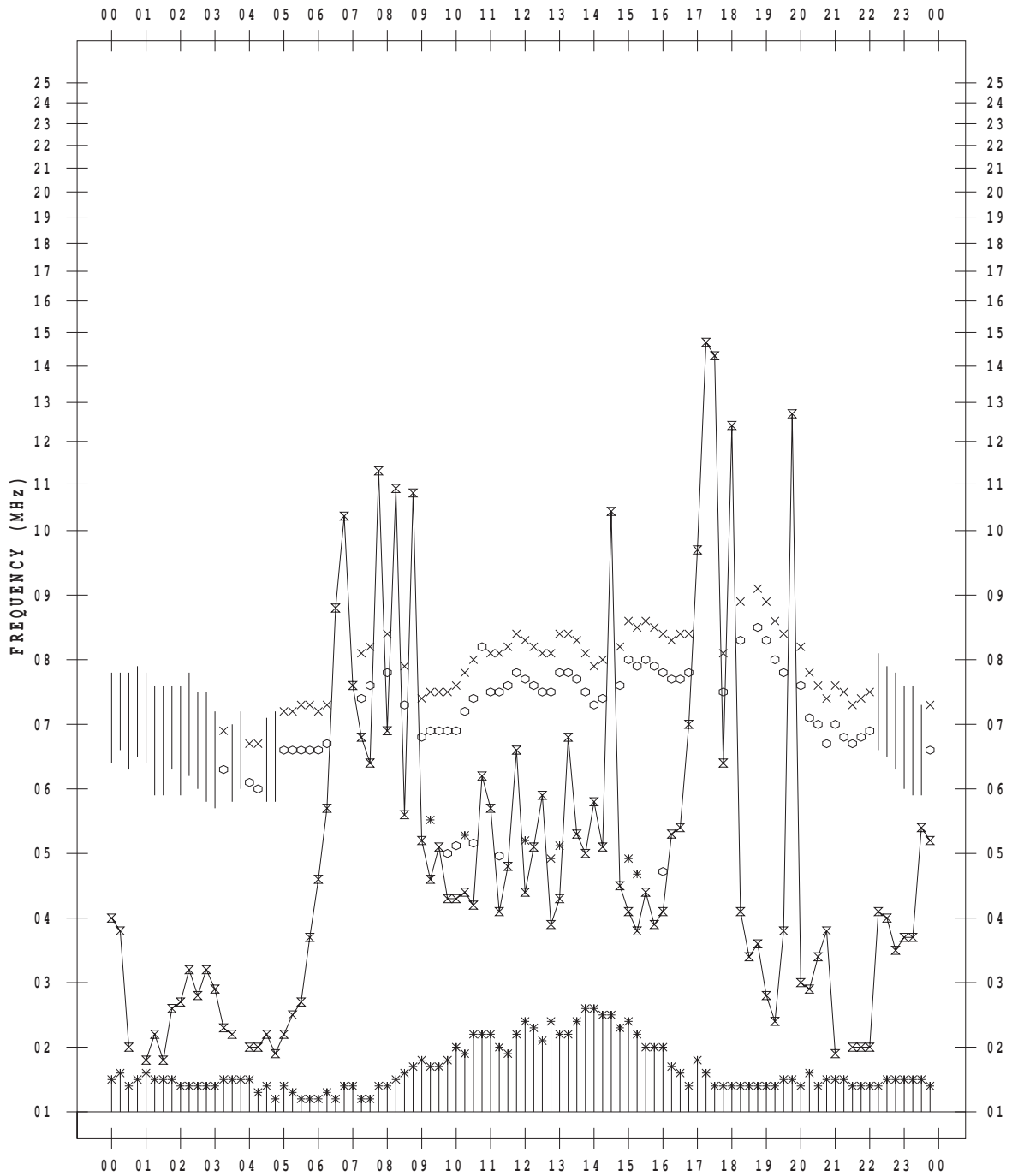
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/27

135 ° E MEAN TIME



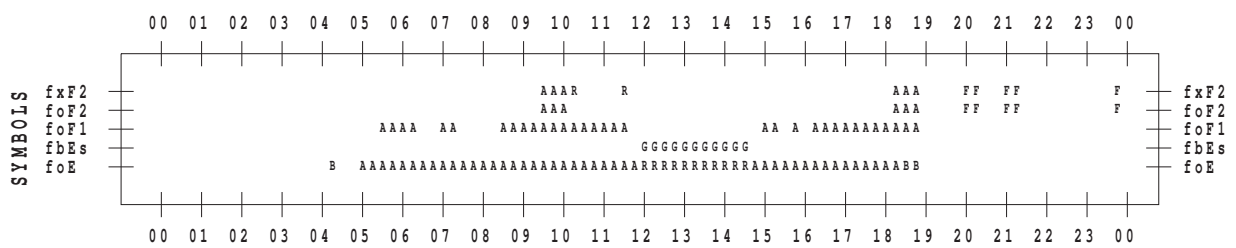
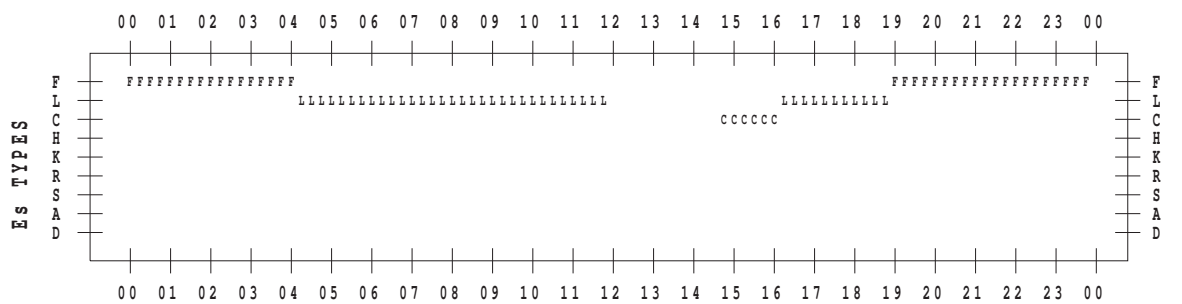
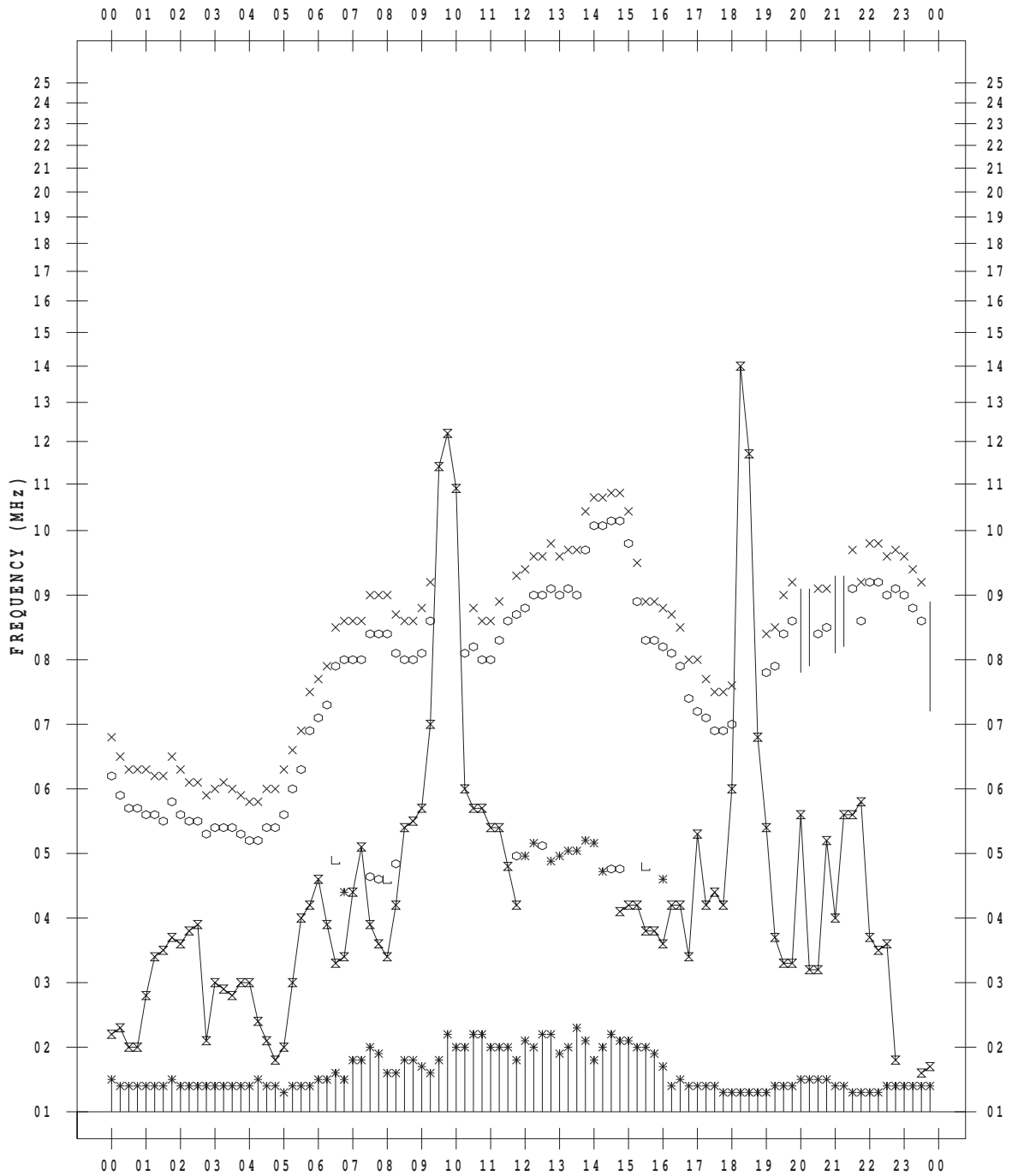
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/28

135 ° E MEAN TIME



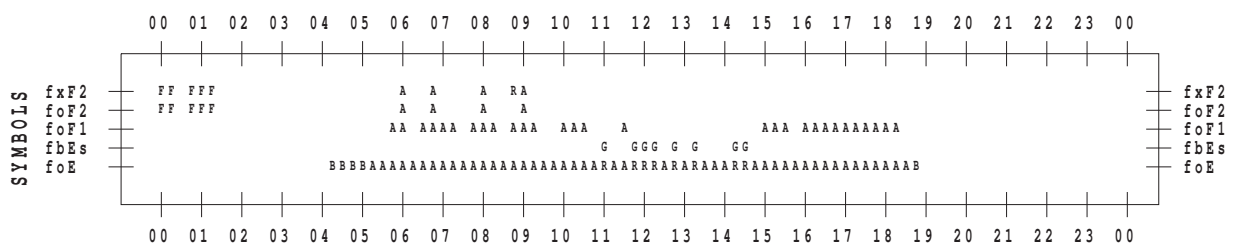
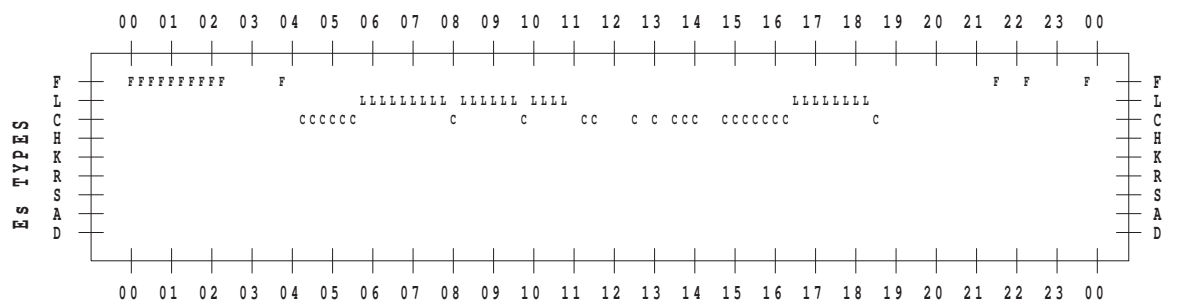
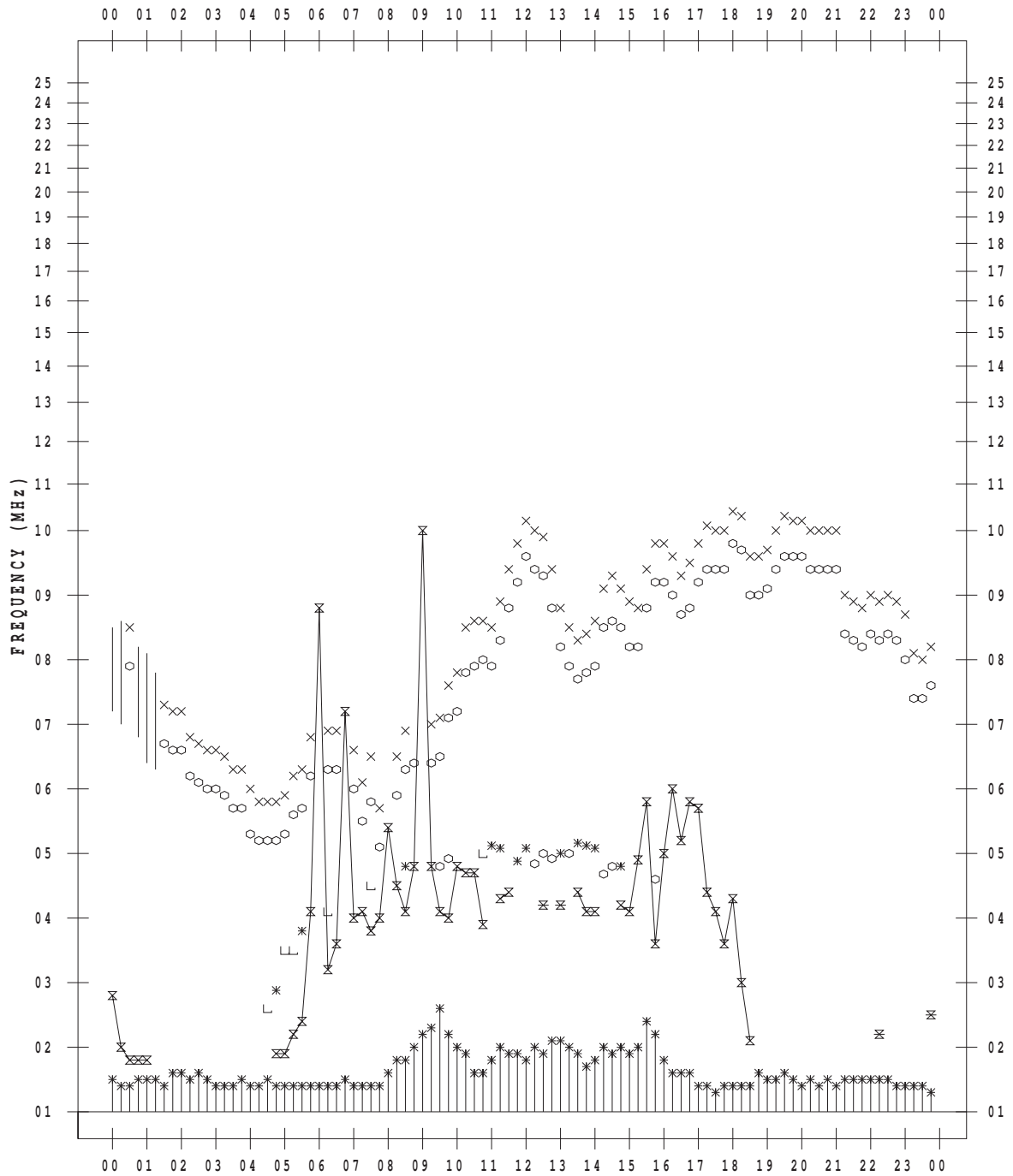
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/29

135 ° E MEAN TIME



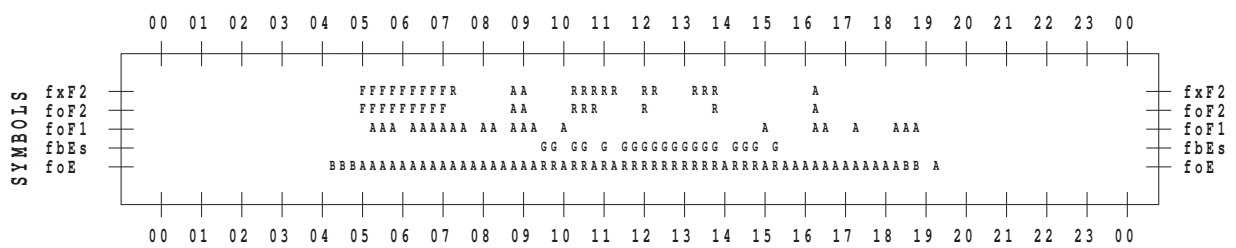
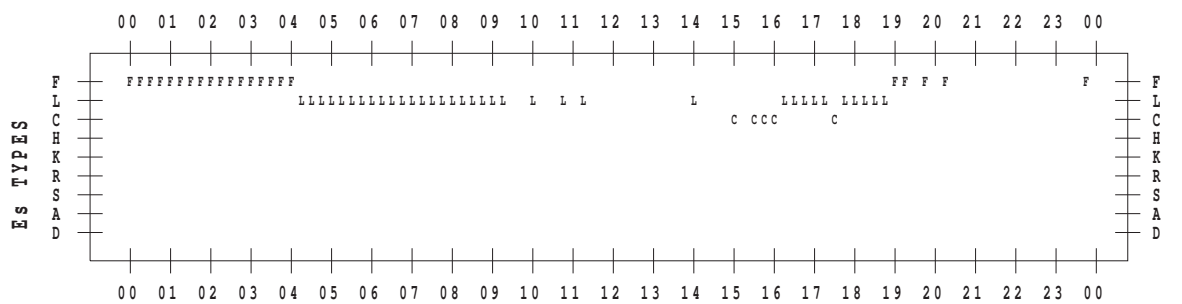
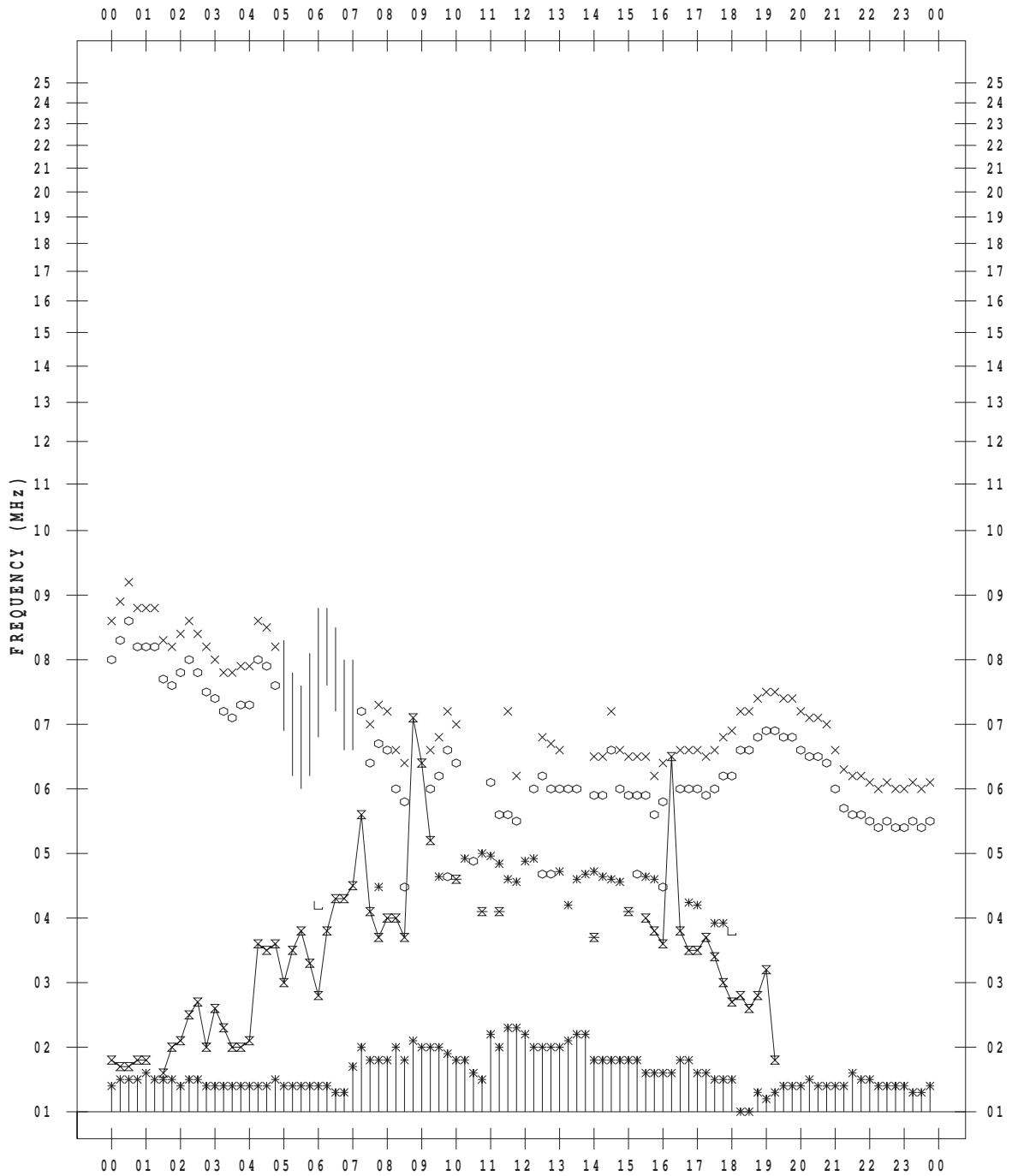
# f-PLOT DATA

SCALER : I.NISHIMUATA

STATION : Kokubunji

DATE : 2013/ 6/30

135 ° E MEAN TIME





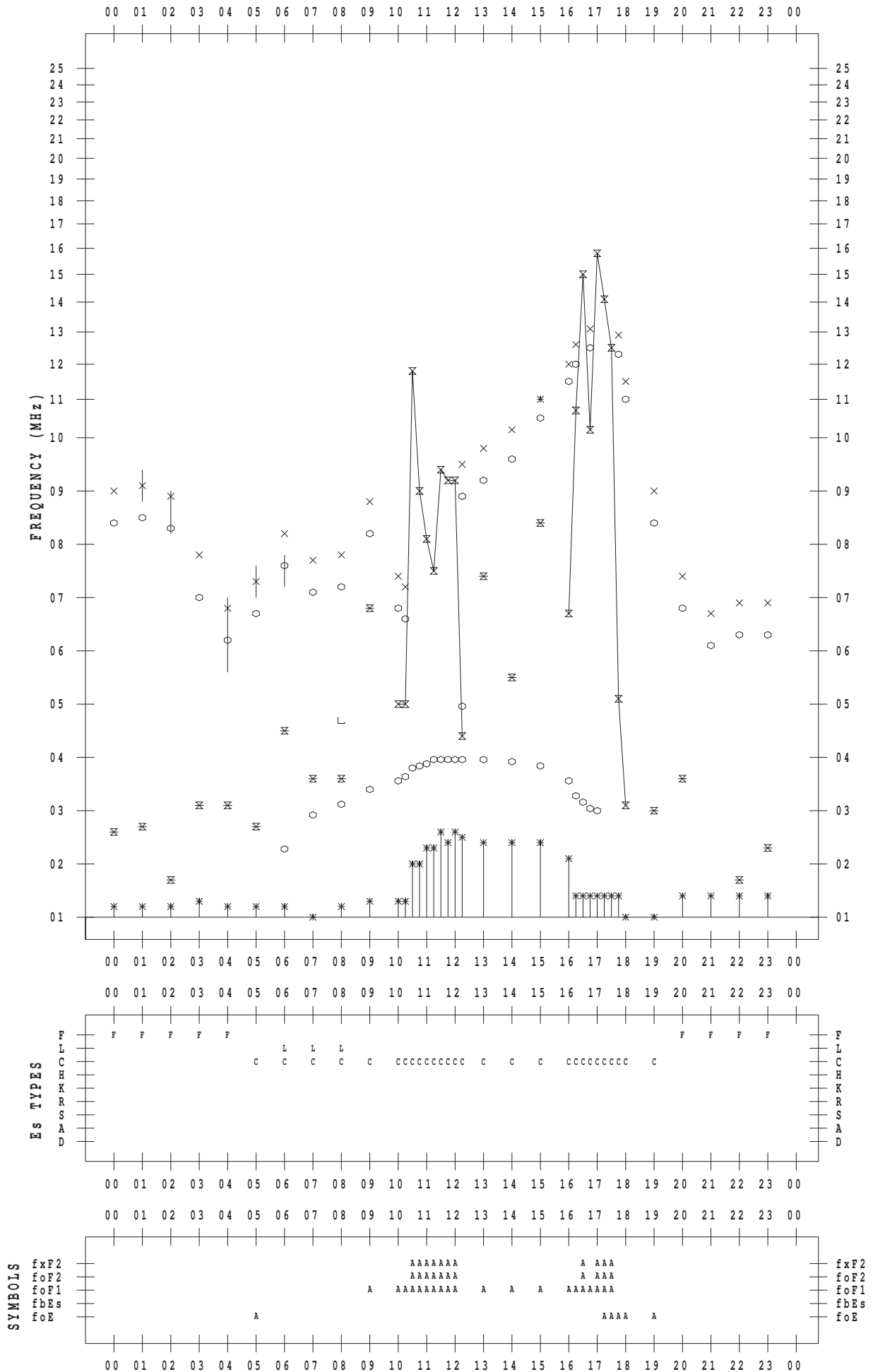
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 1

135 ° E MEAN TIME



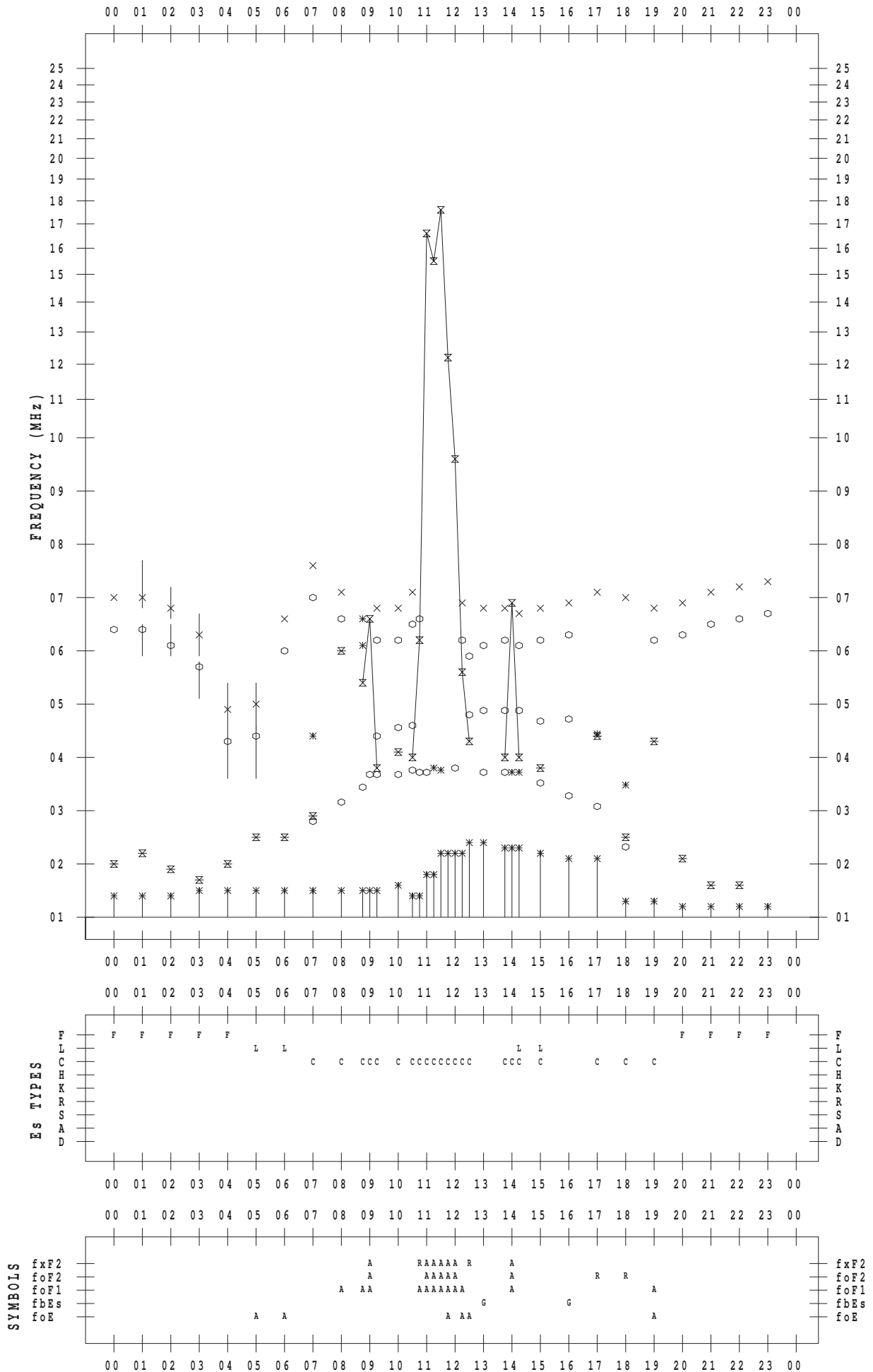
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 2

135 ° E MEAN TIME



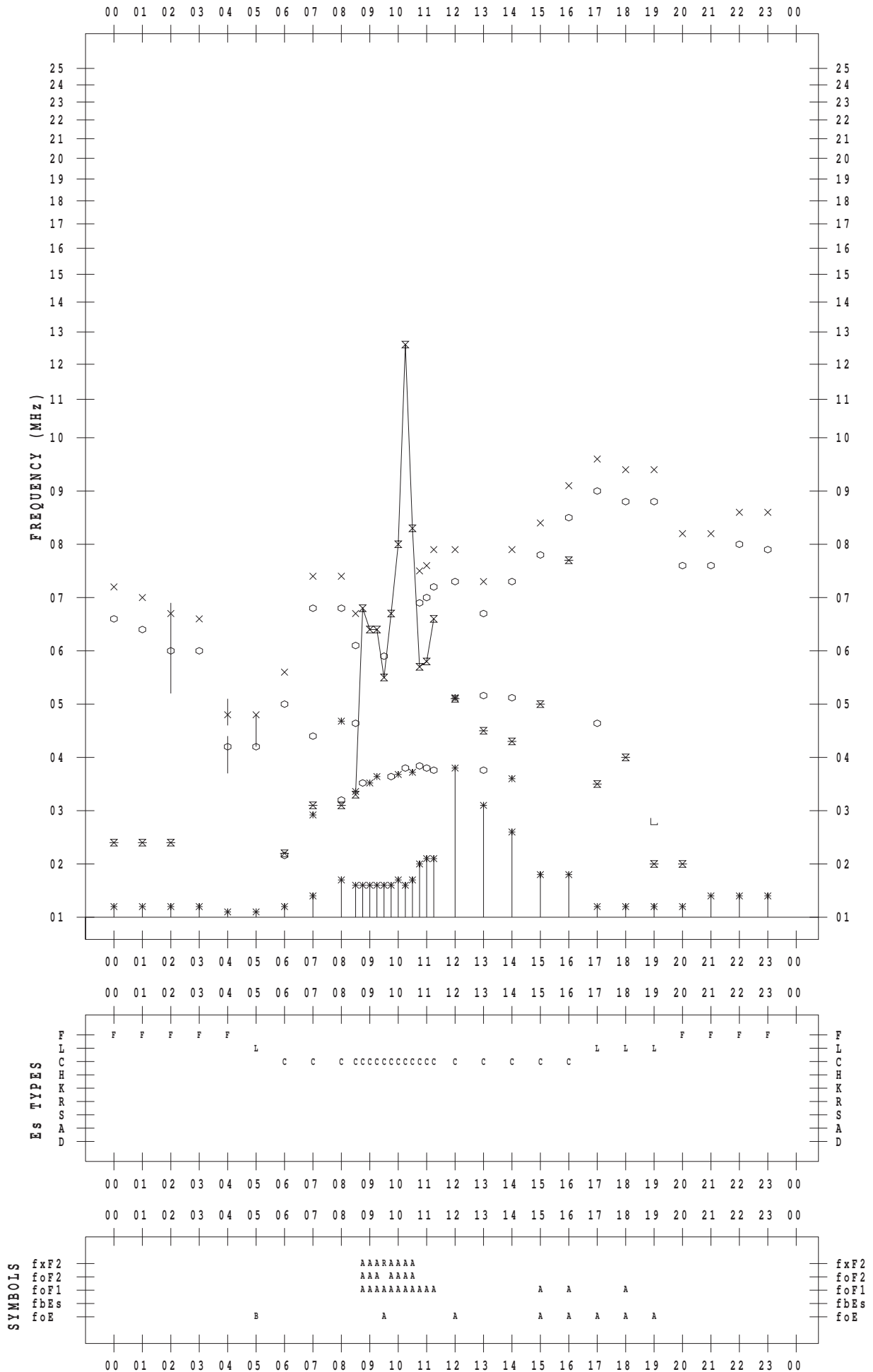
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/ 3

135 ° E MEAN TIME



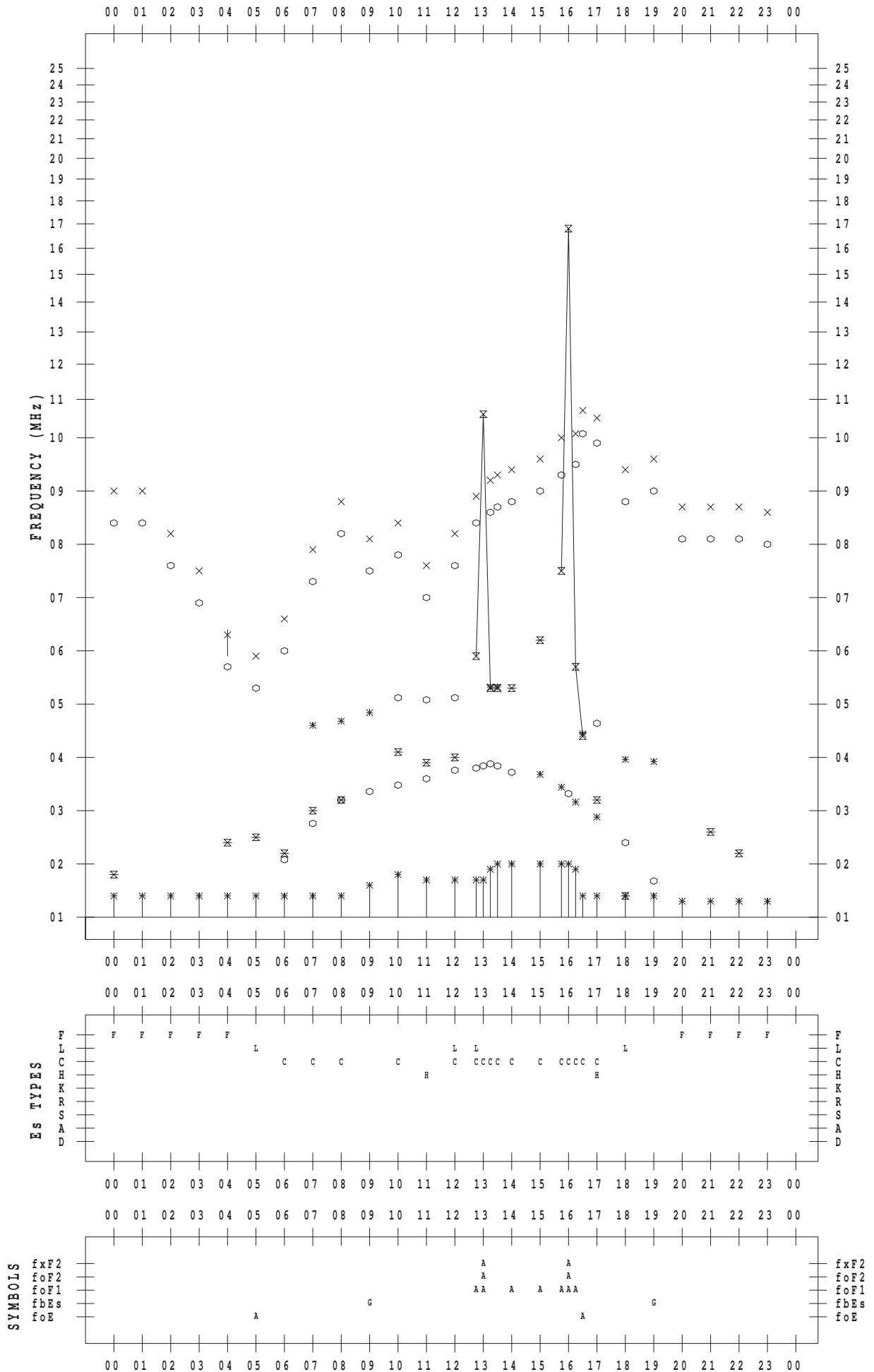
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 4

135 ° E MEAN TIME



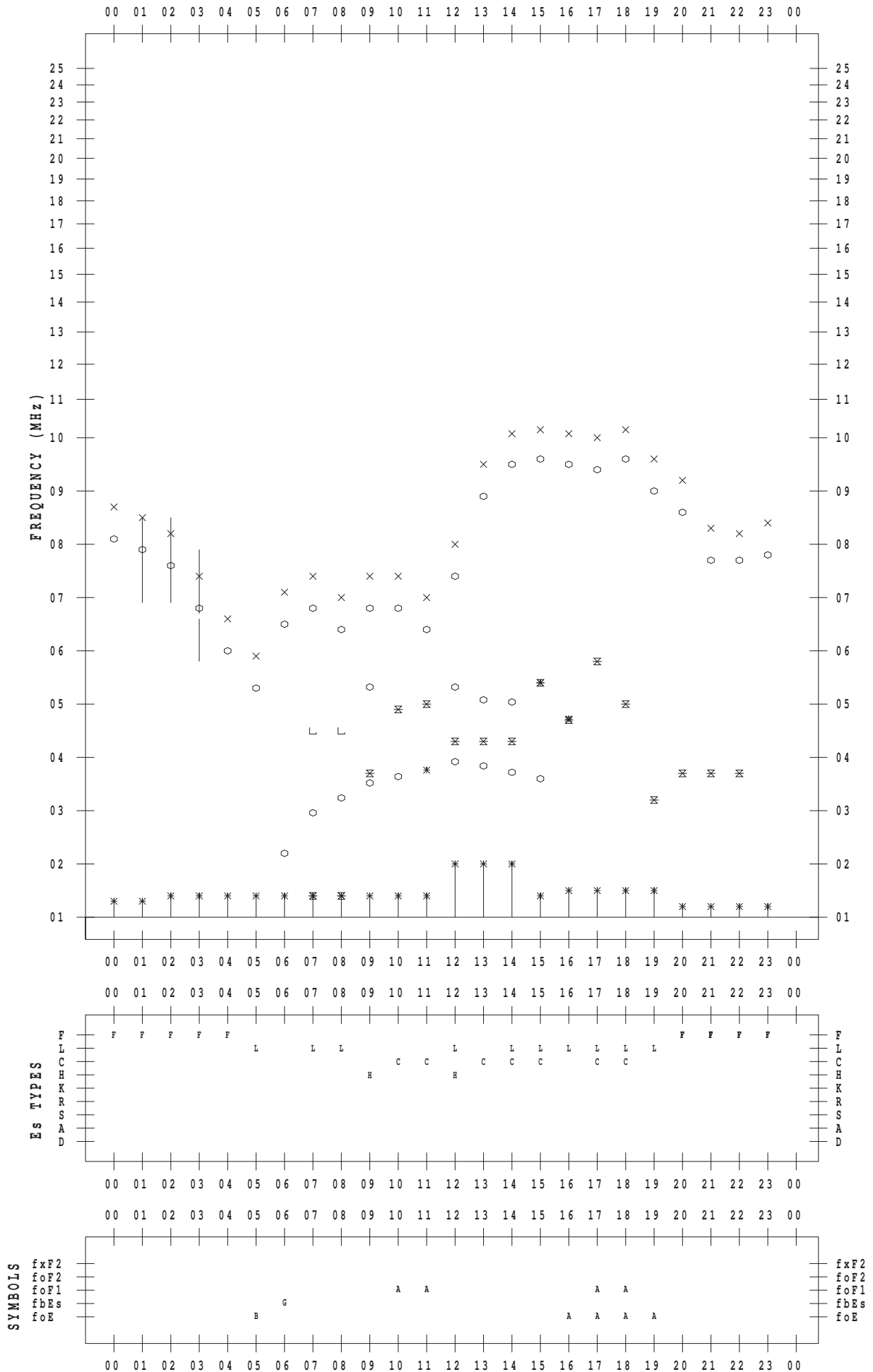
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 5

135 ° E MEAN TIME



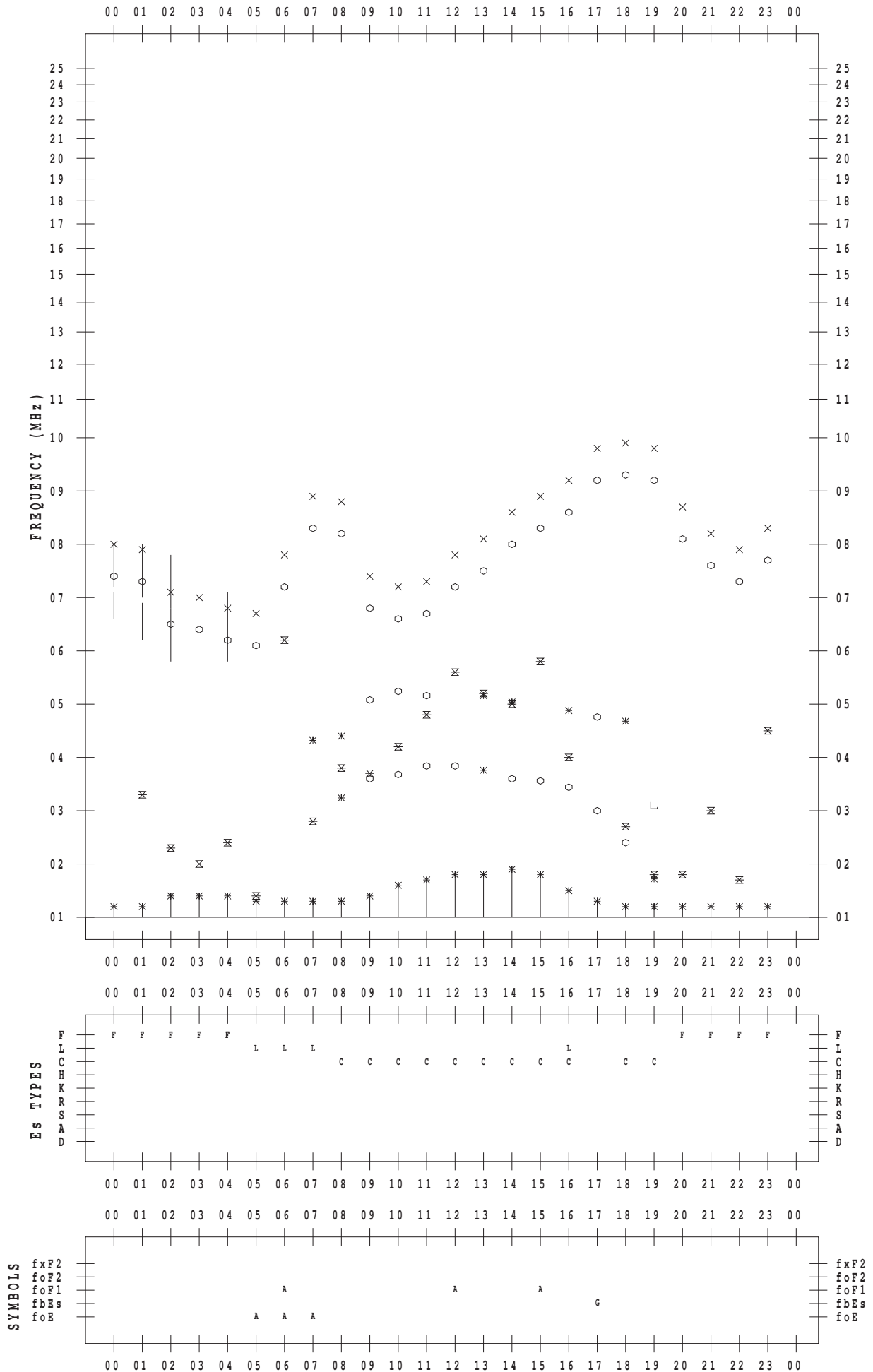
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 6

135 ° E MEAN TIME



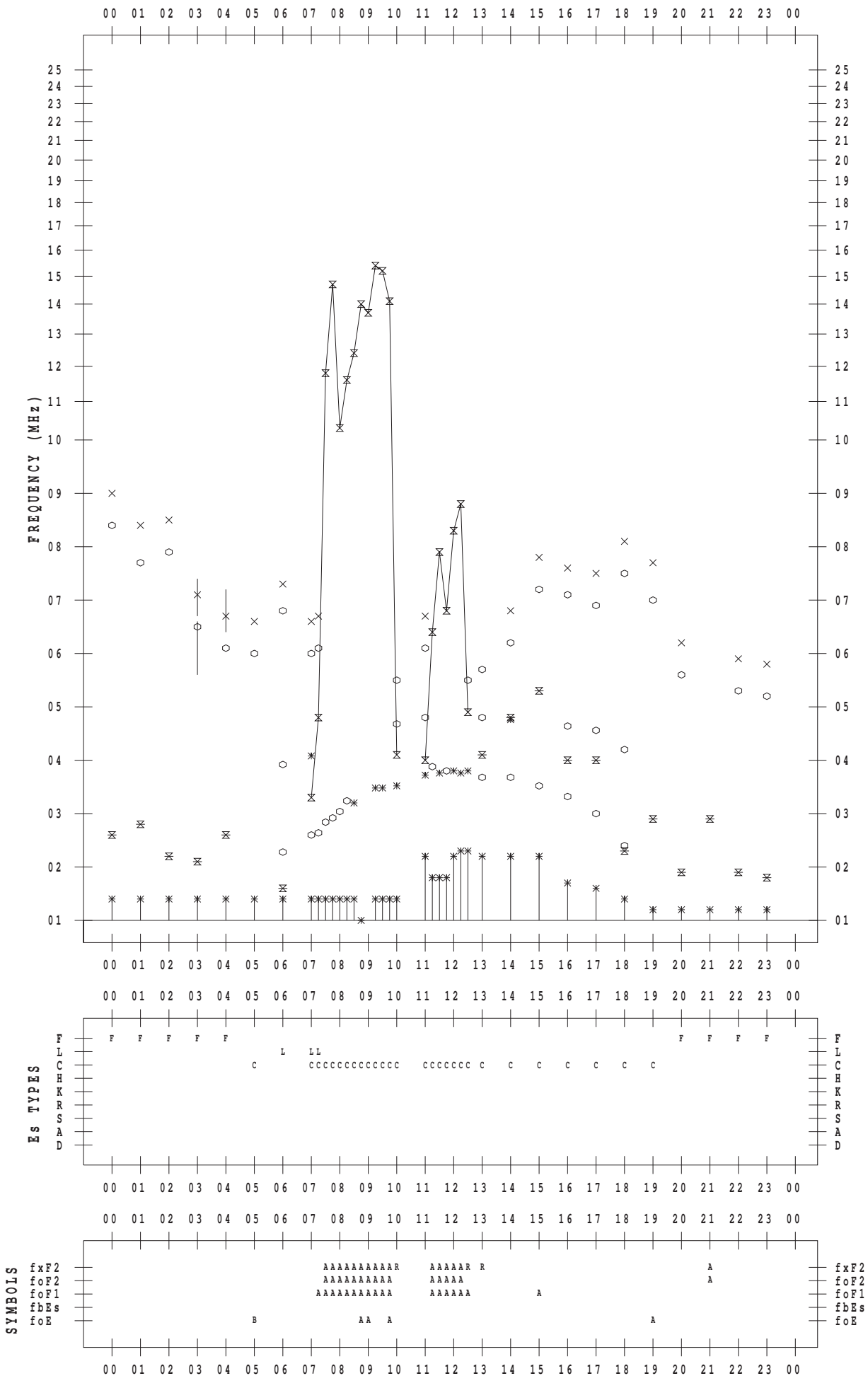
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/ 7

135 ° E MEAN TIME



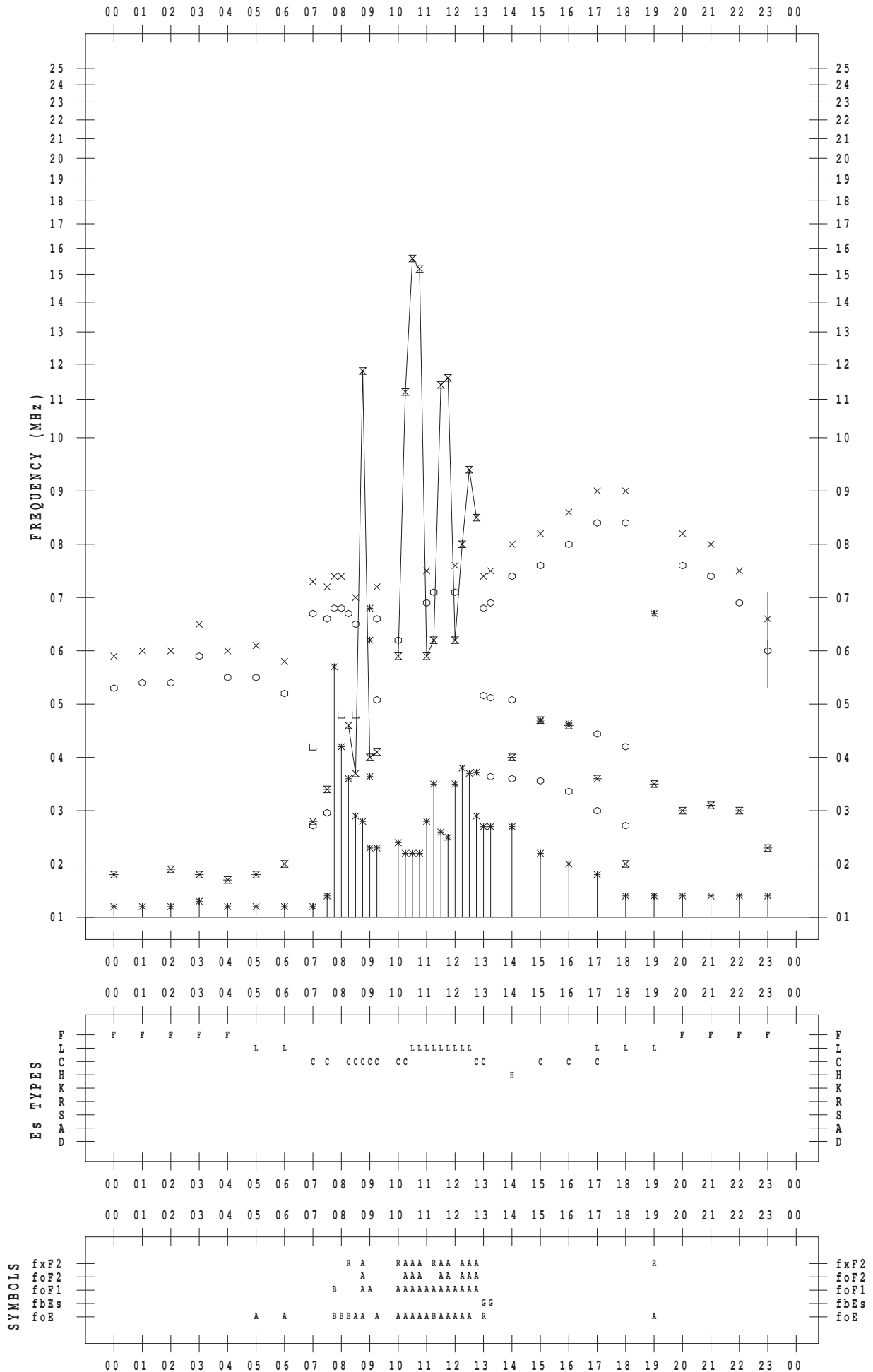
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 8

135 ° E MEAN TIME





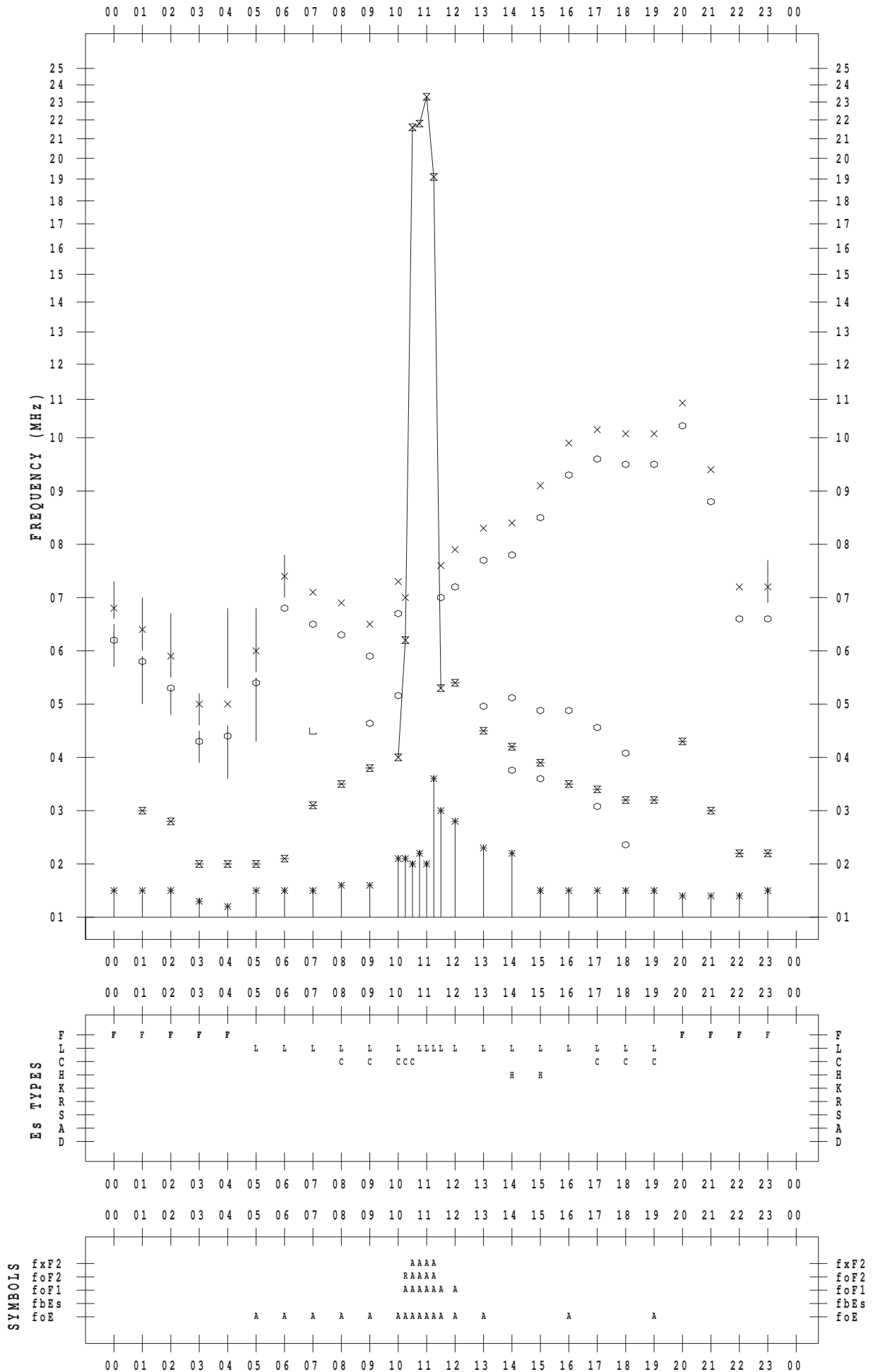
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 6 / 9

135 ° E MEAN TIME



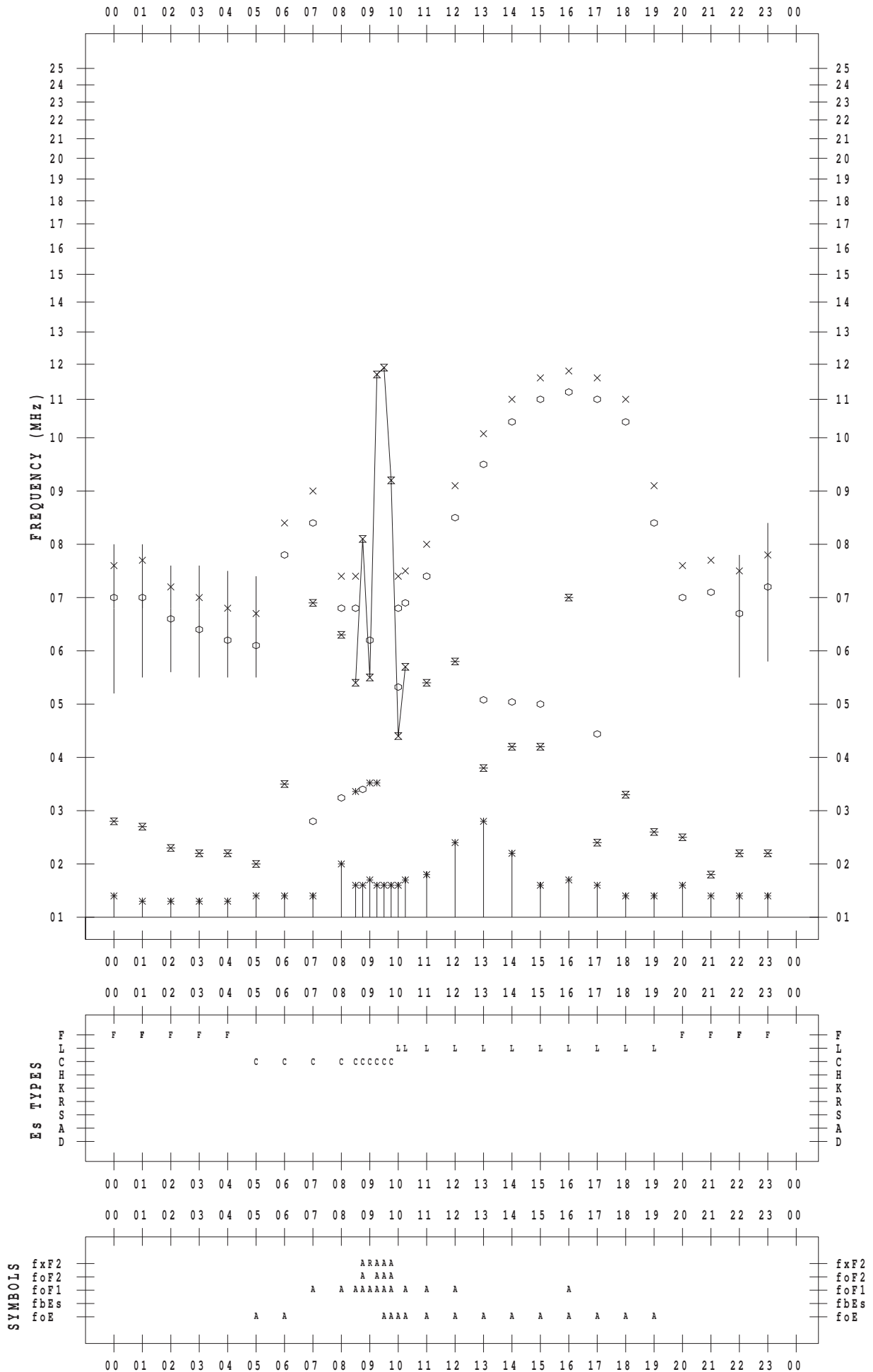
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/10

135 ° E MEAN TIME



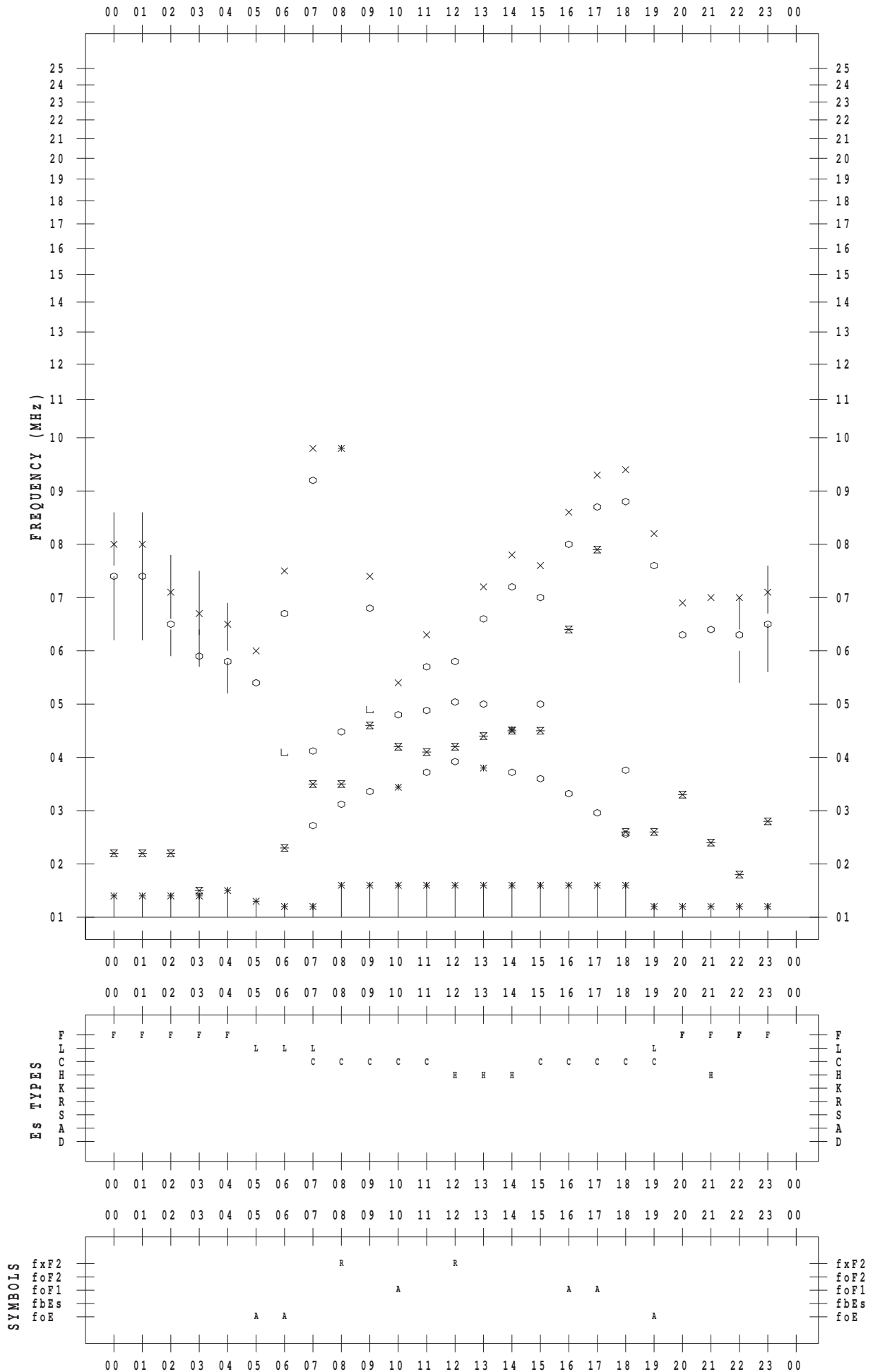
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/11

135 ° E MEAN TIME



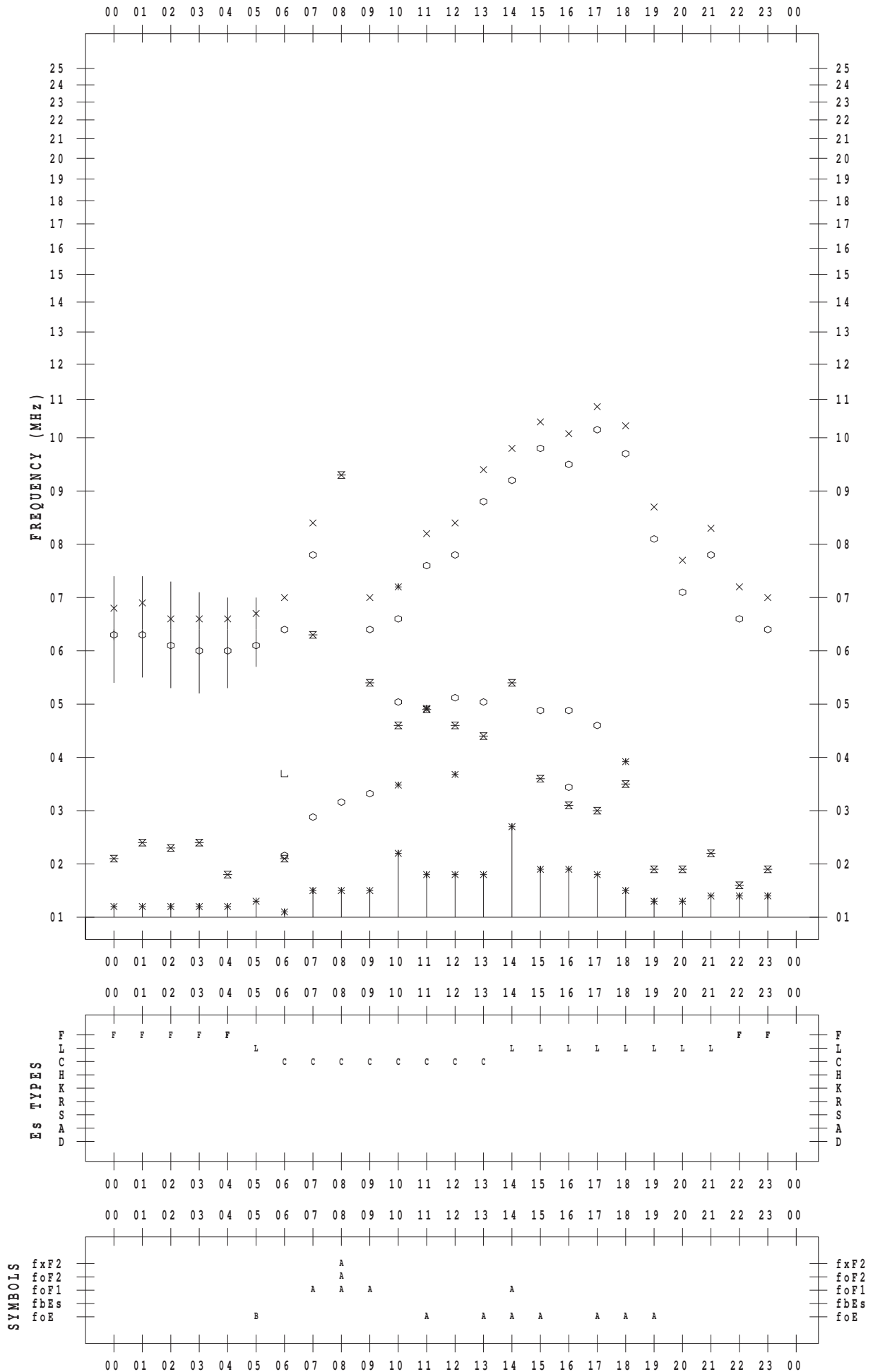
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/12

135 ° E MEAN TIME



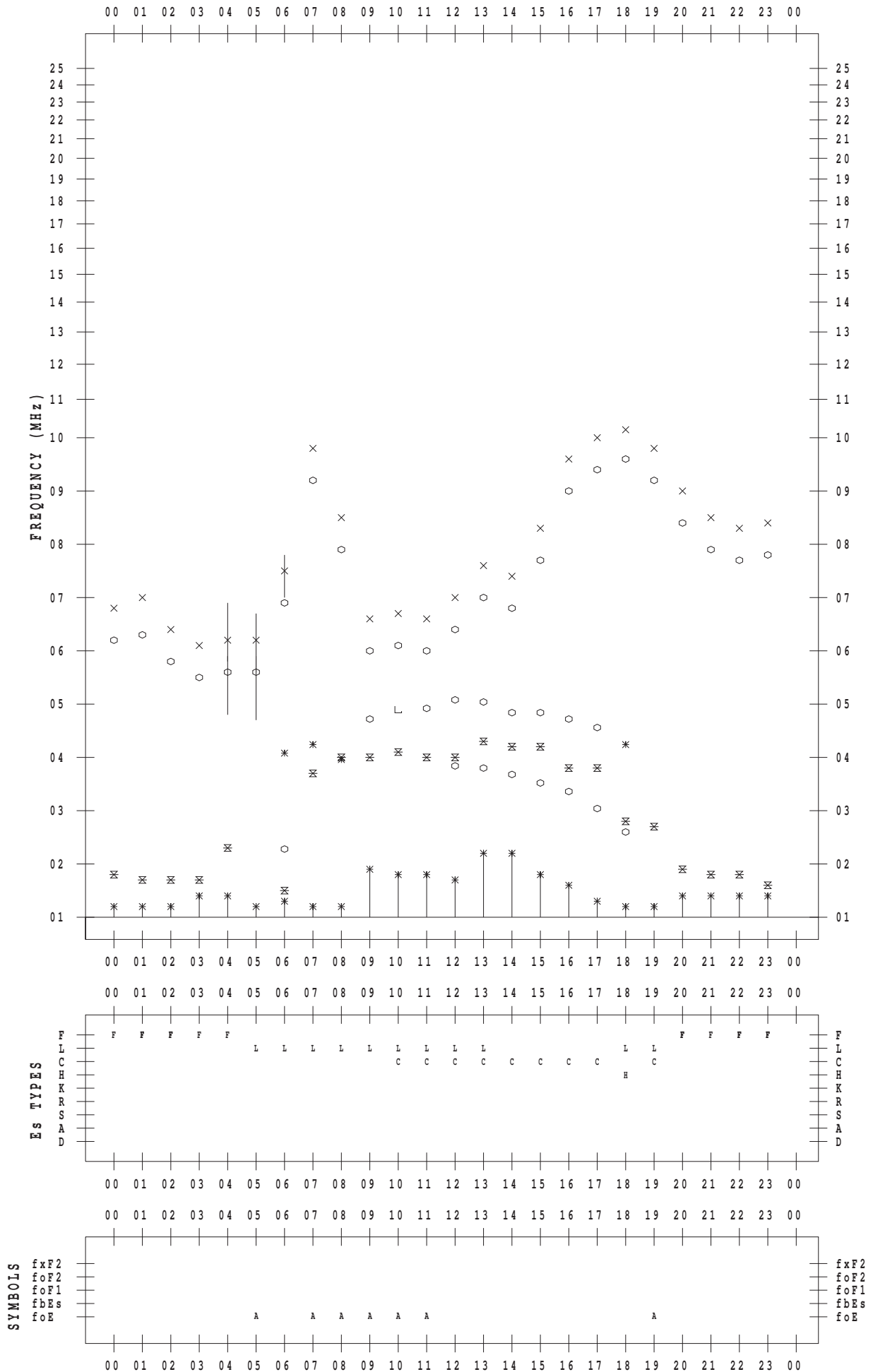
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/13

135 ° E MEAN TIME



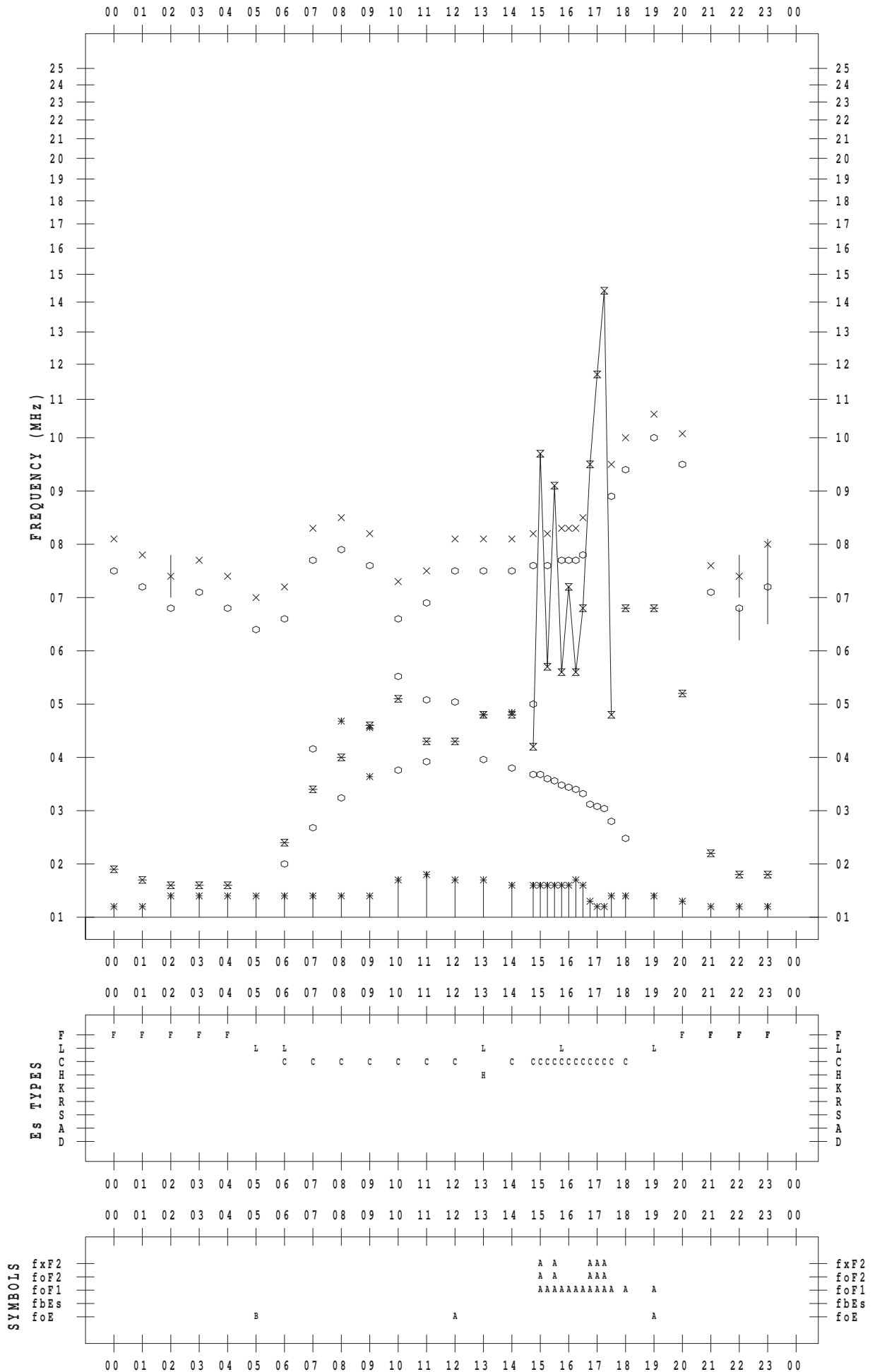
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/14

135 ° E MEAN TIME



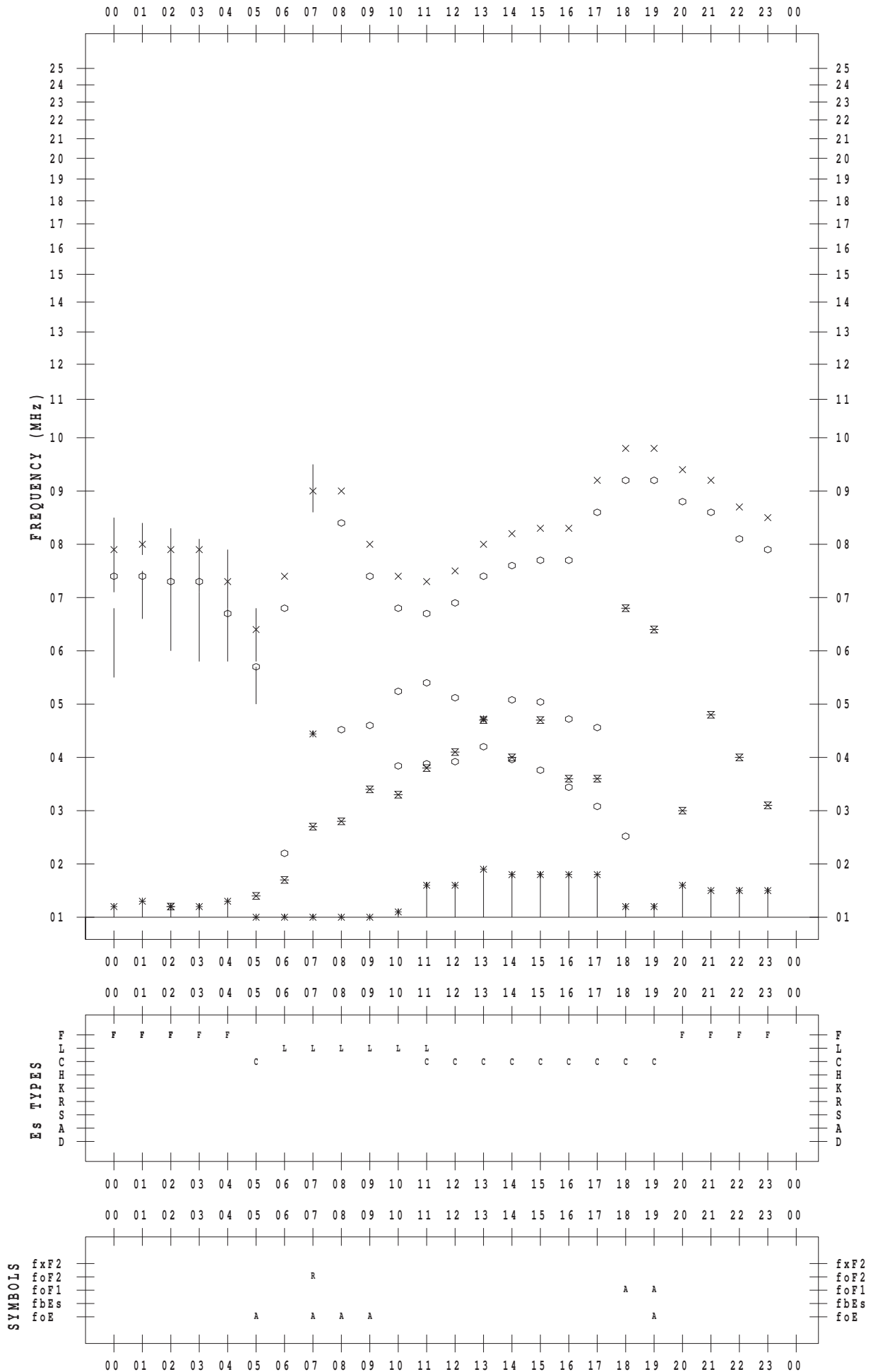
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/15

135 ° E MEAN TIME



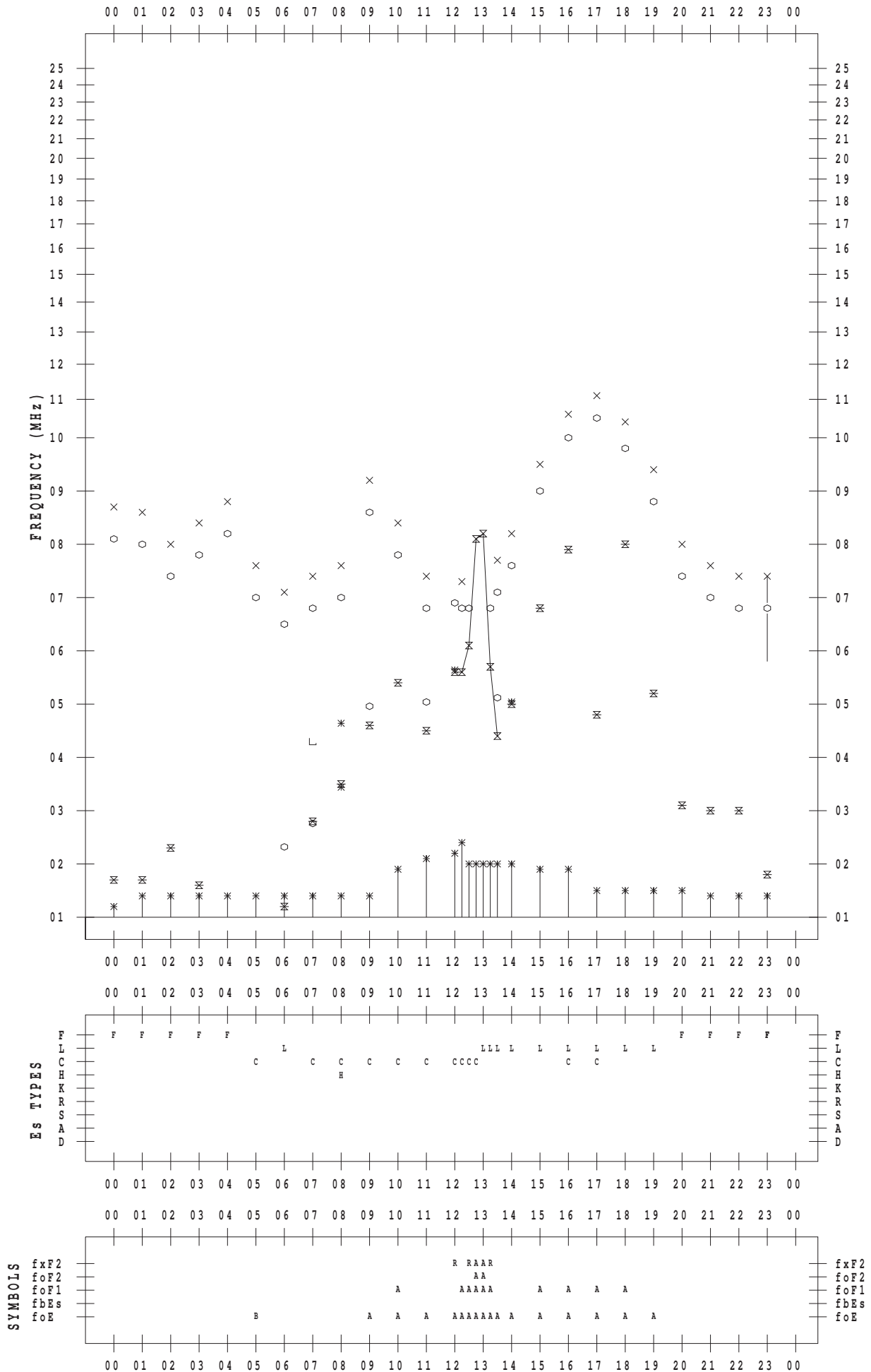
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/16

135 ° E MEAN TIME





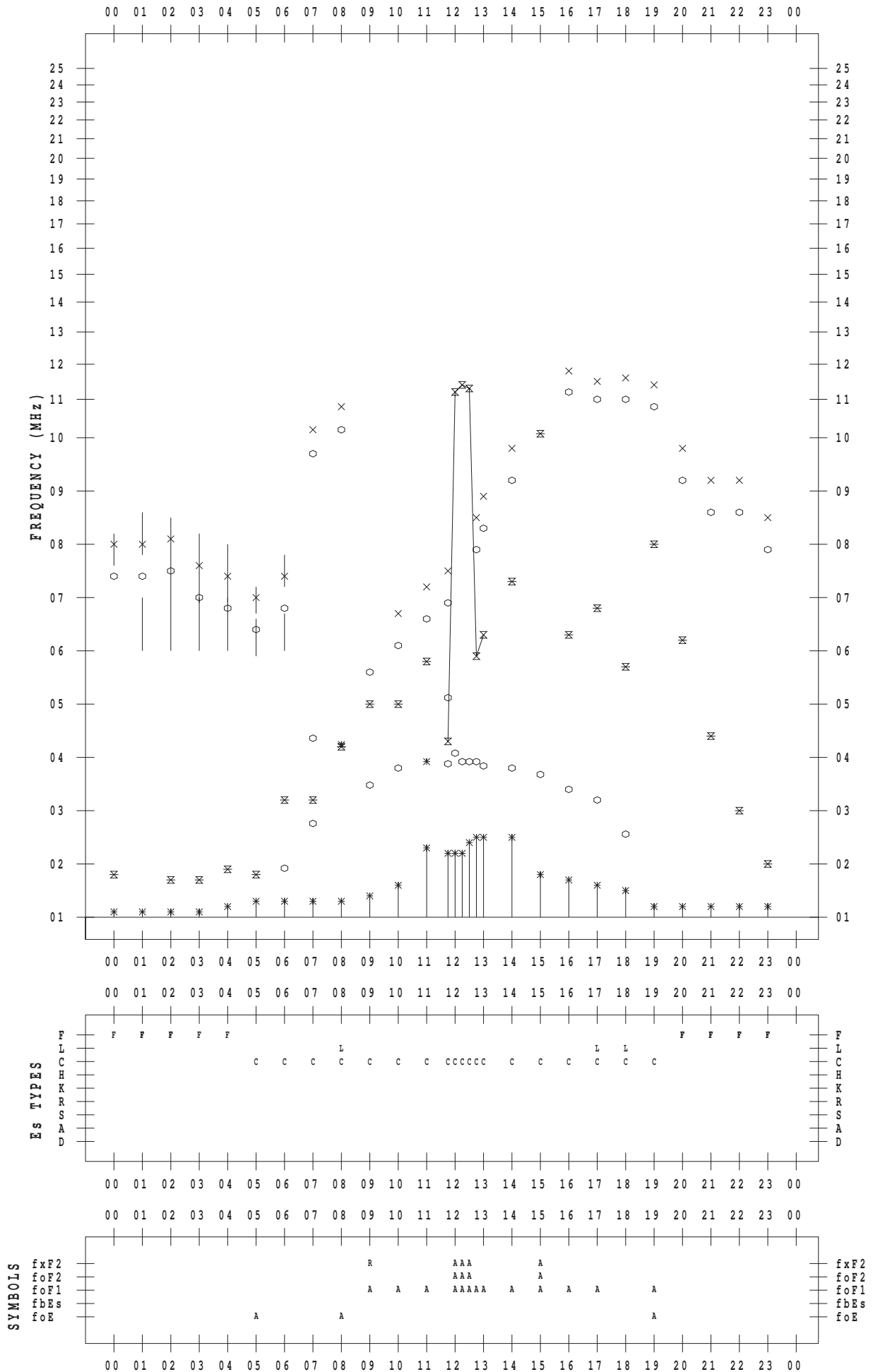
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/17

135 ° E MEAN TIME



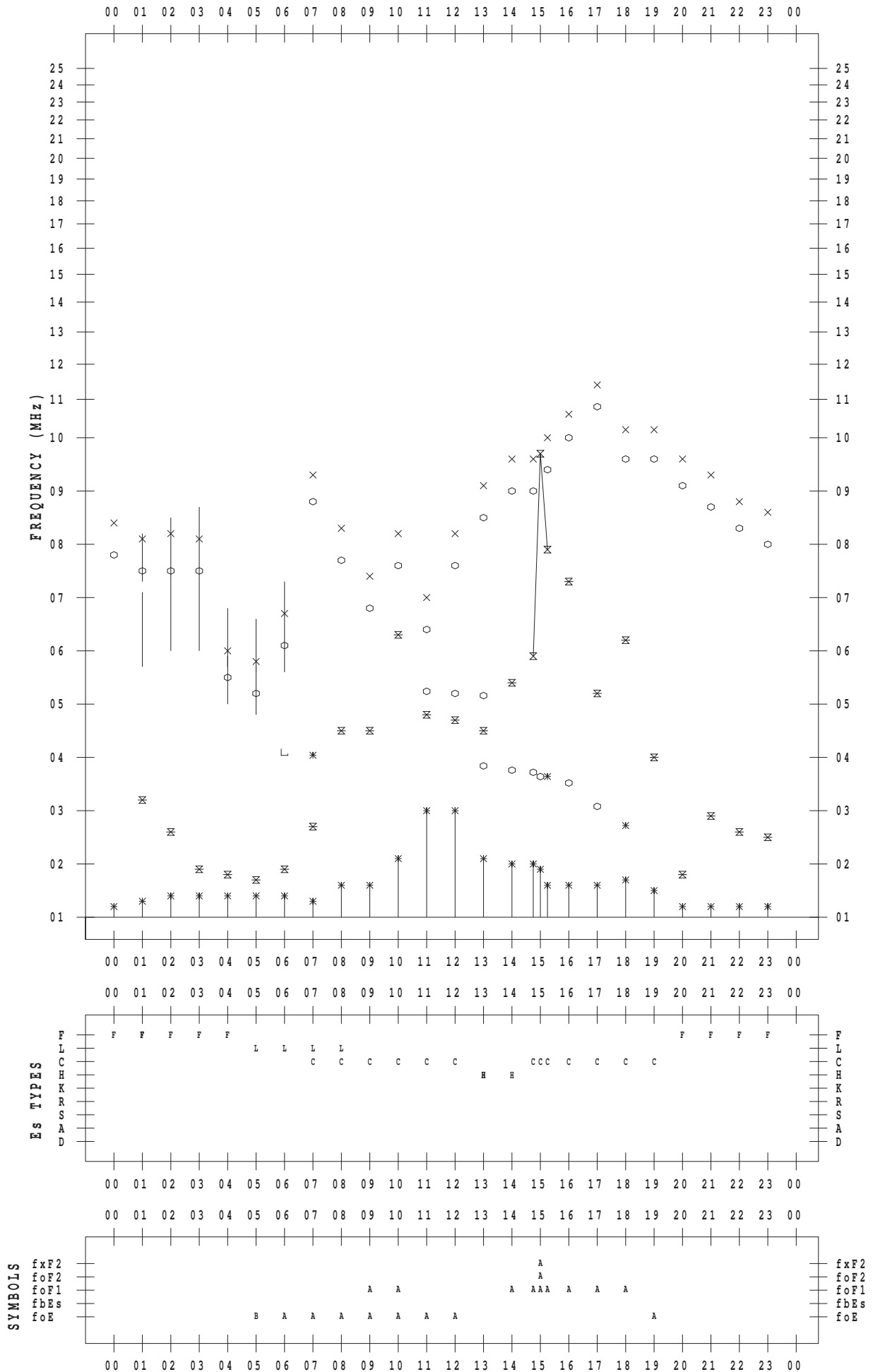
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/18

135 ° E MEAN TIME



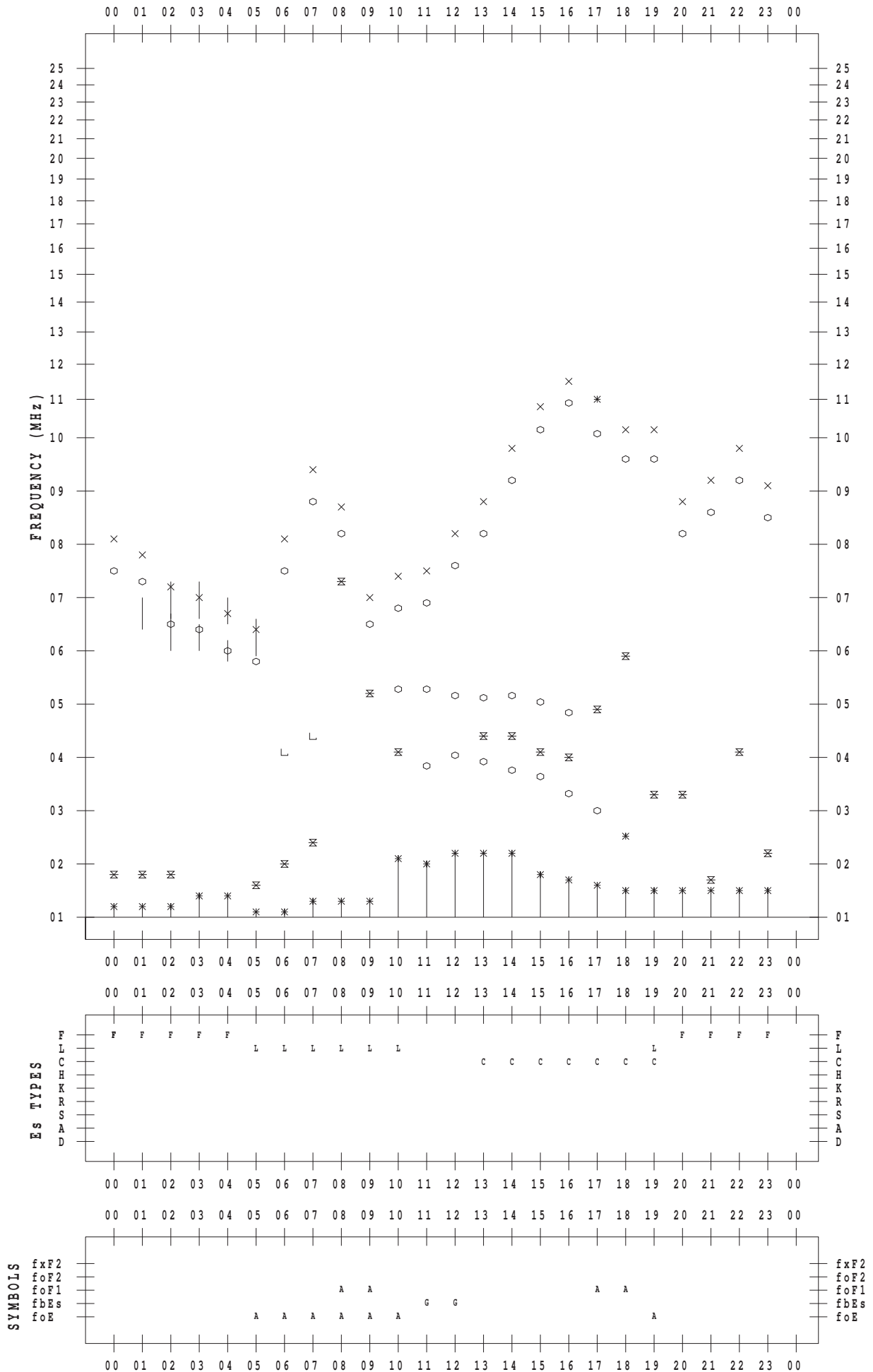
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/19

135 ° E MEAN TIME



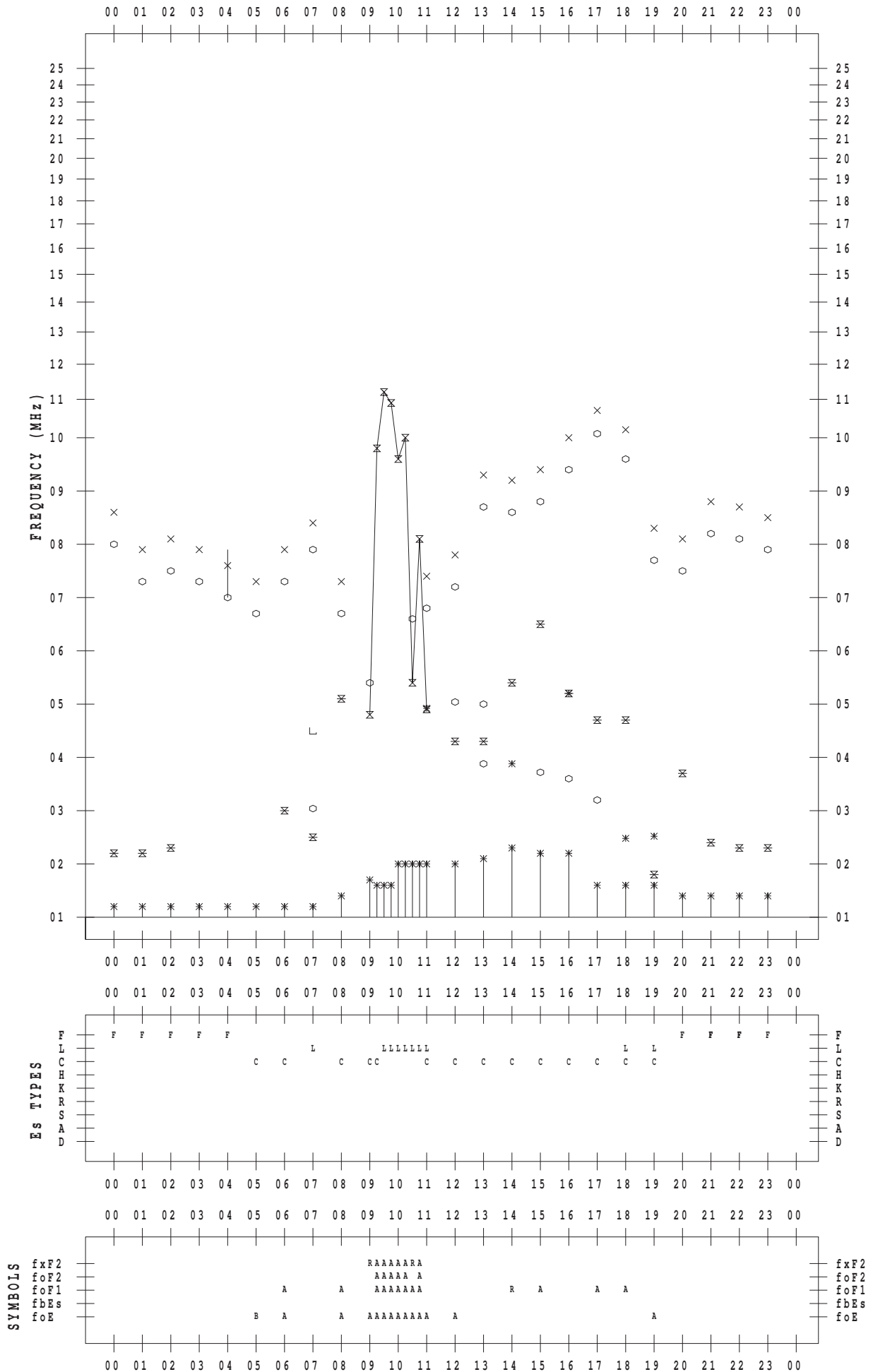
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/20

135 ° E MEAN TIME



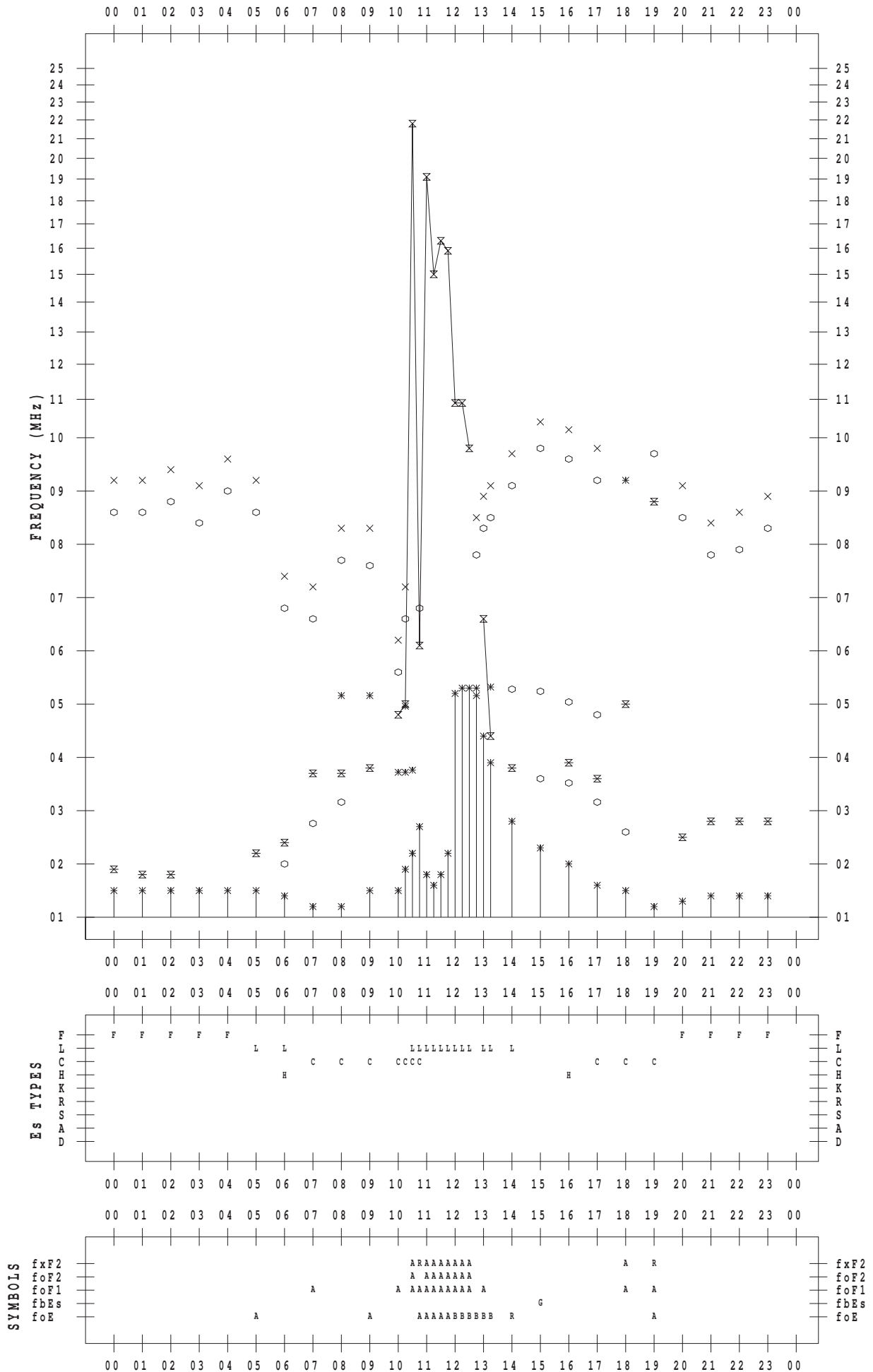
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/21

135 ° E MEAN TIME



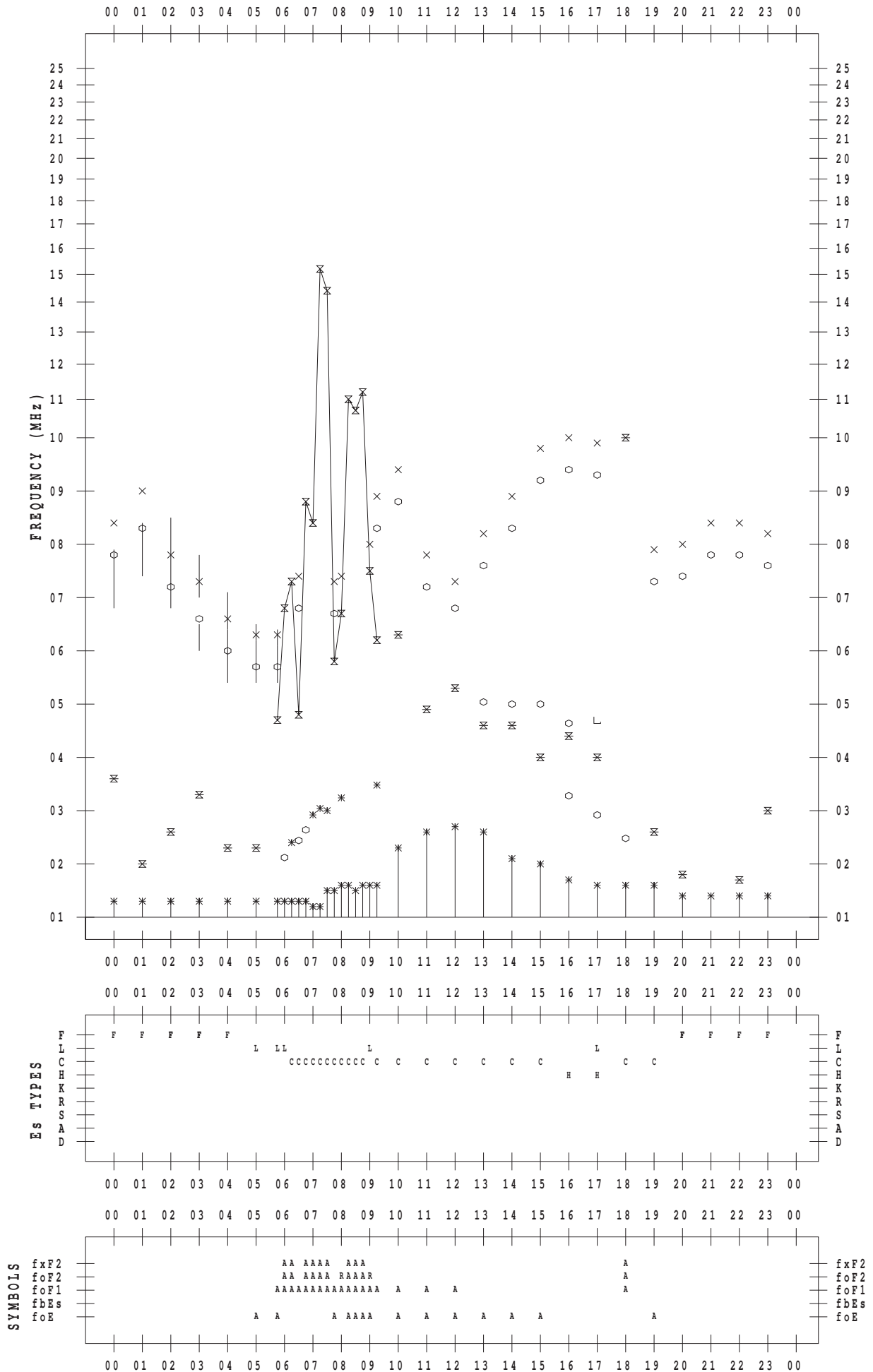
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/22

135 ° E MEAN TIME



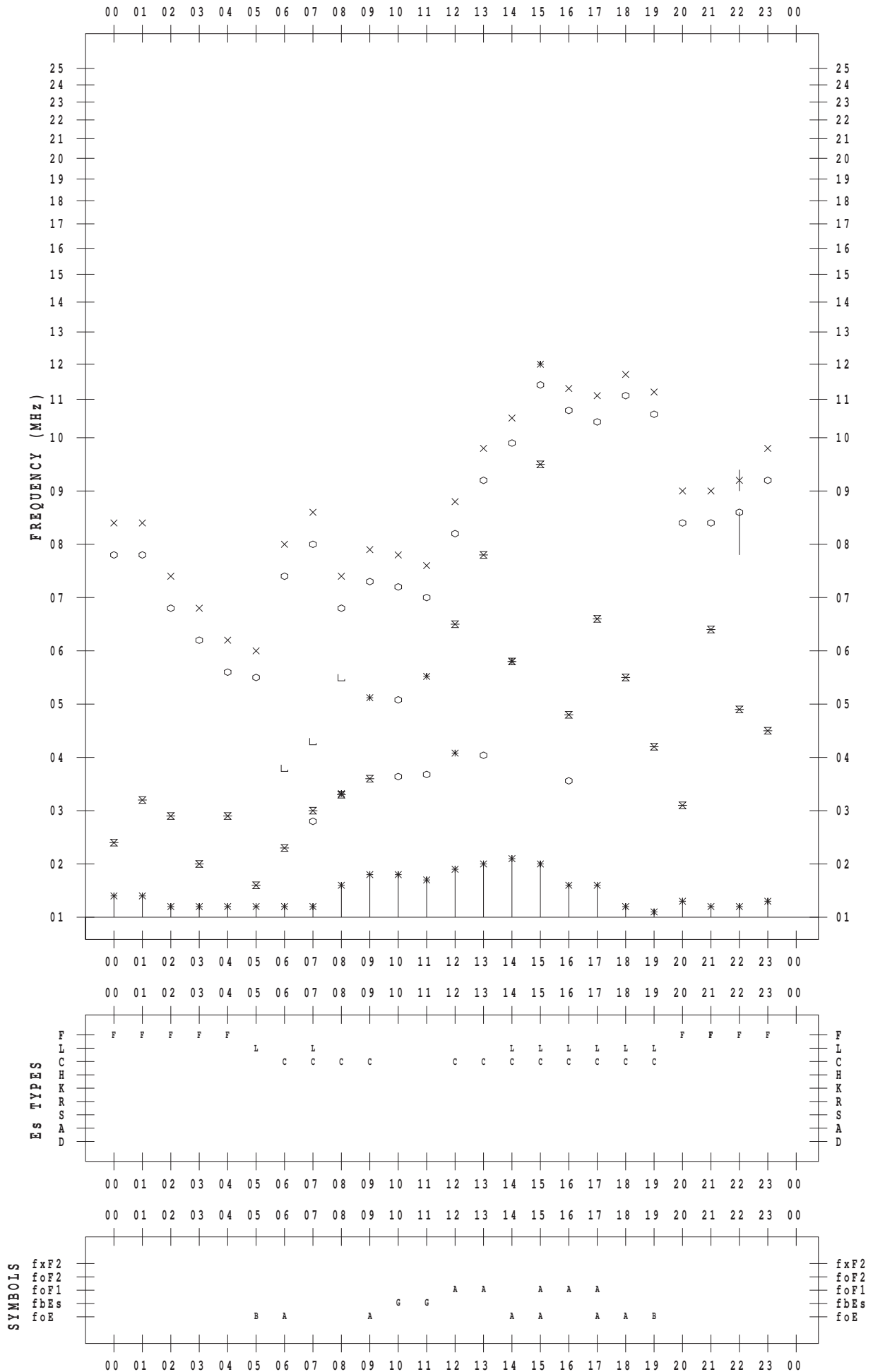
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/23

135 ° E MEAN TIME



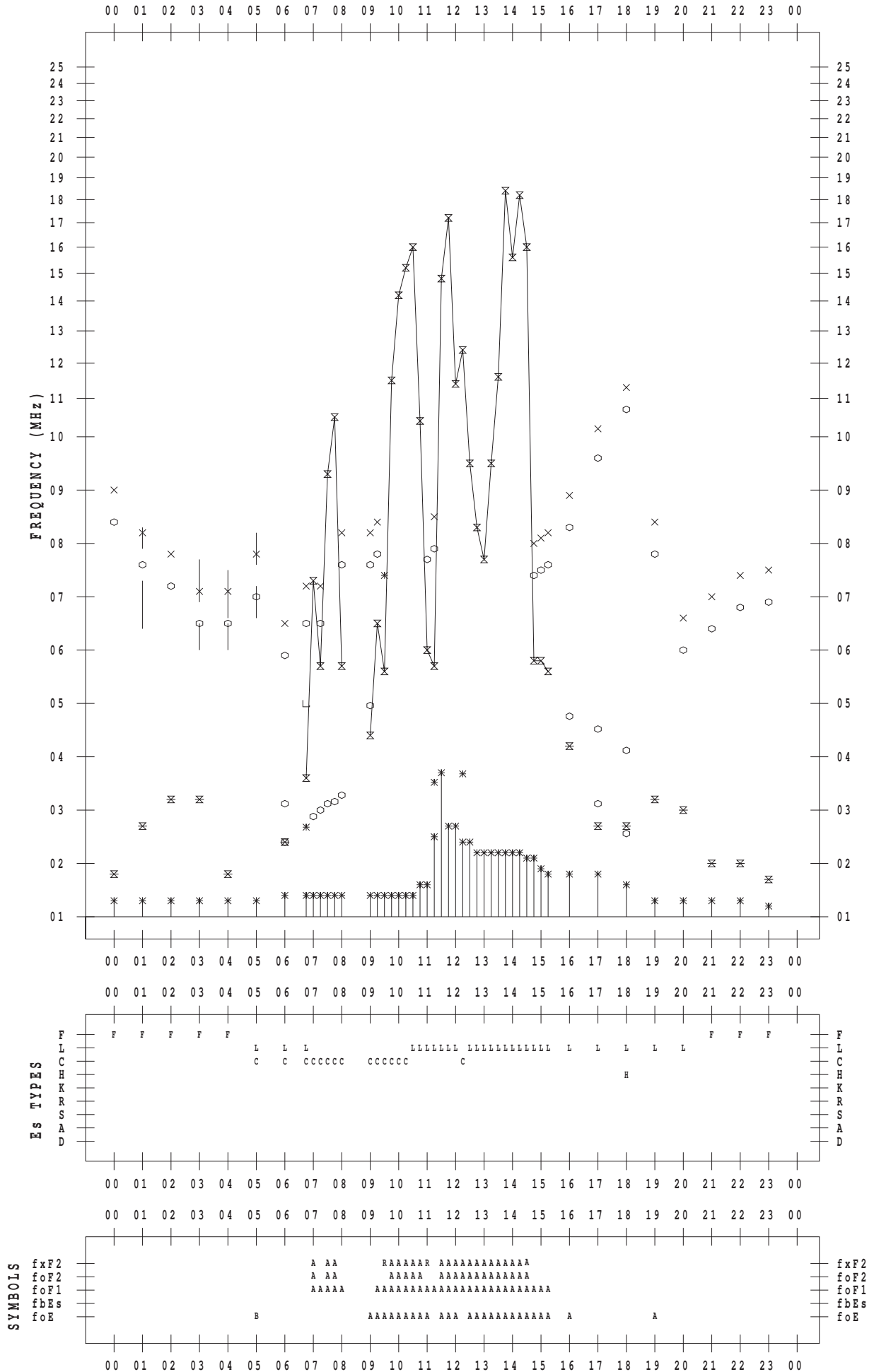
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/24

135 ° E MEAN TIME





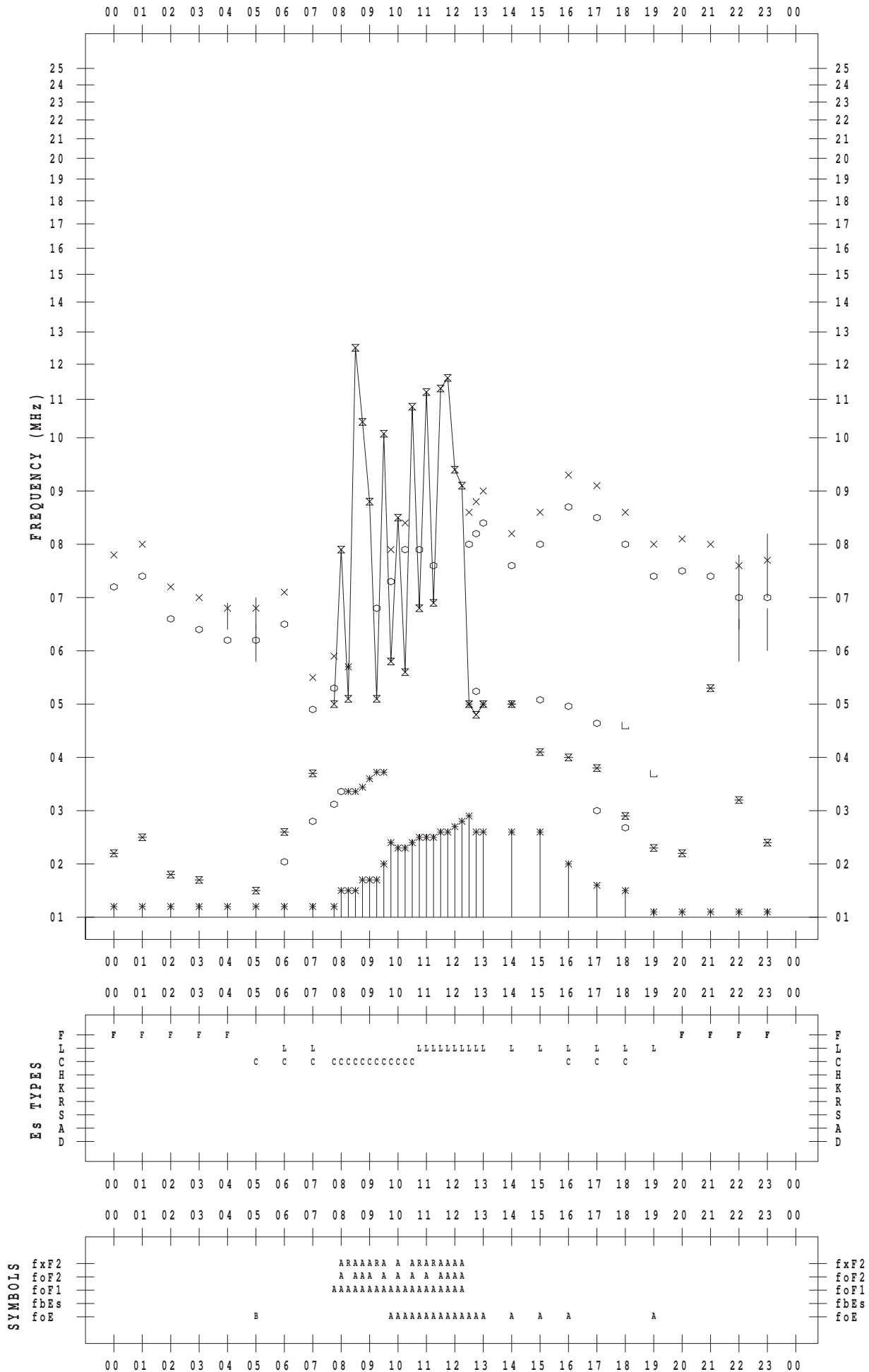
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/25

135 ° E MEAN TIME



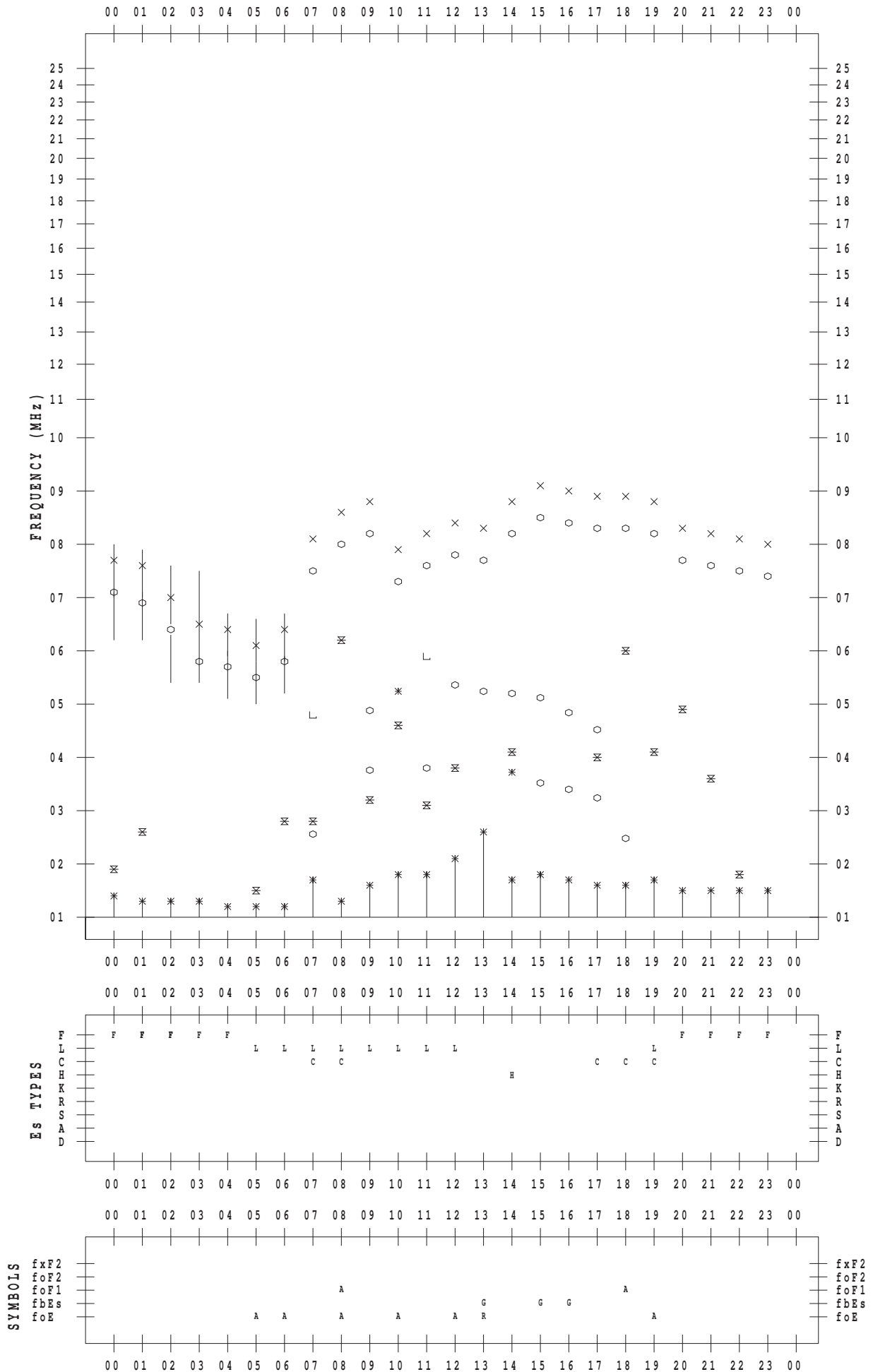
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/26

135 ° E MEAN TIME



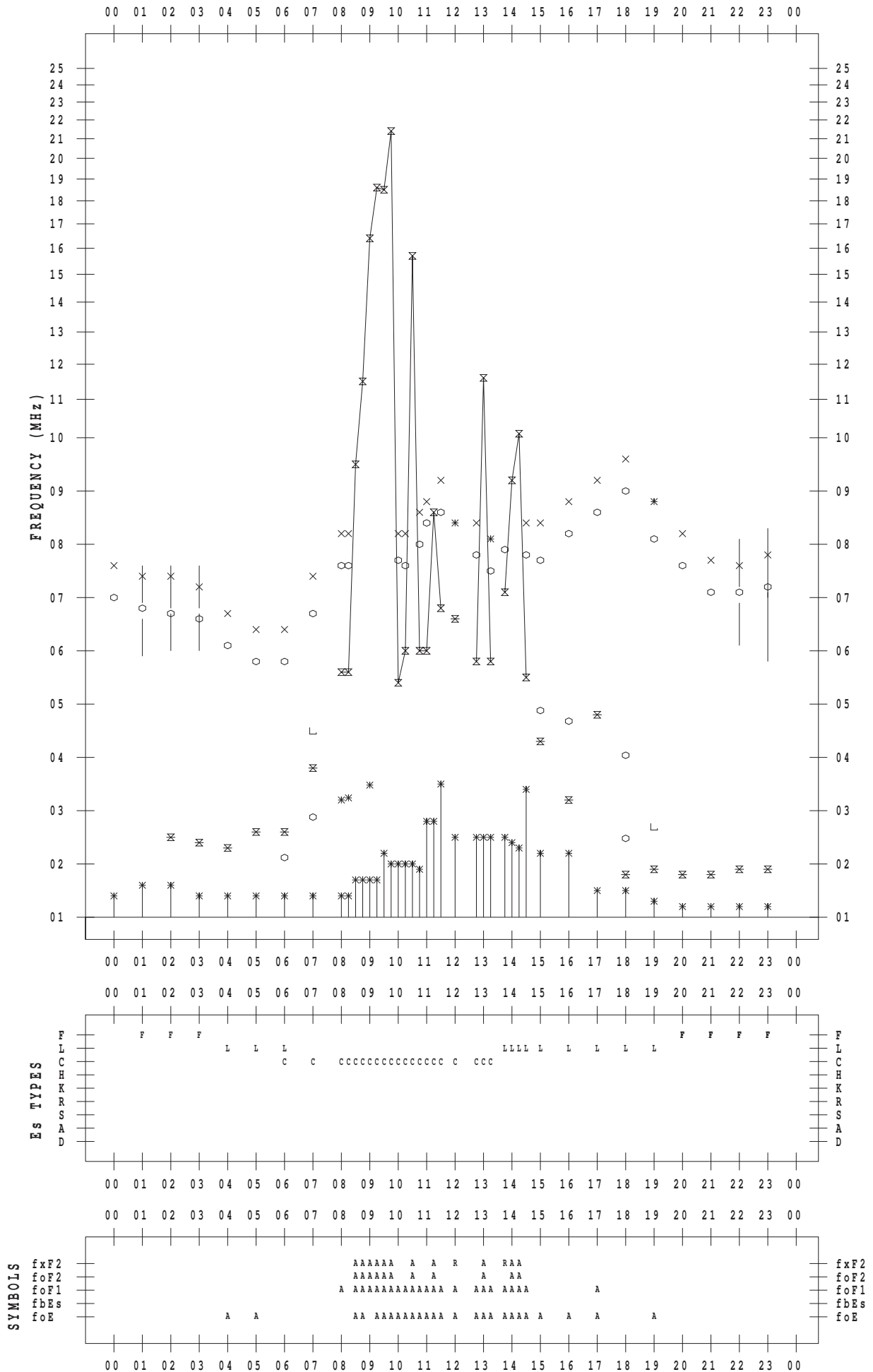
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/27

135 ° E MEAN TIME



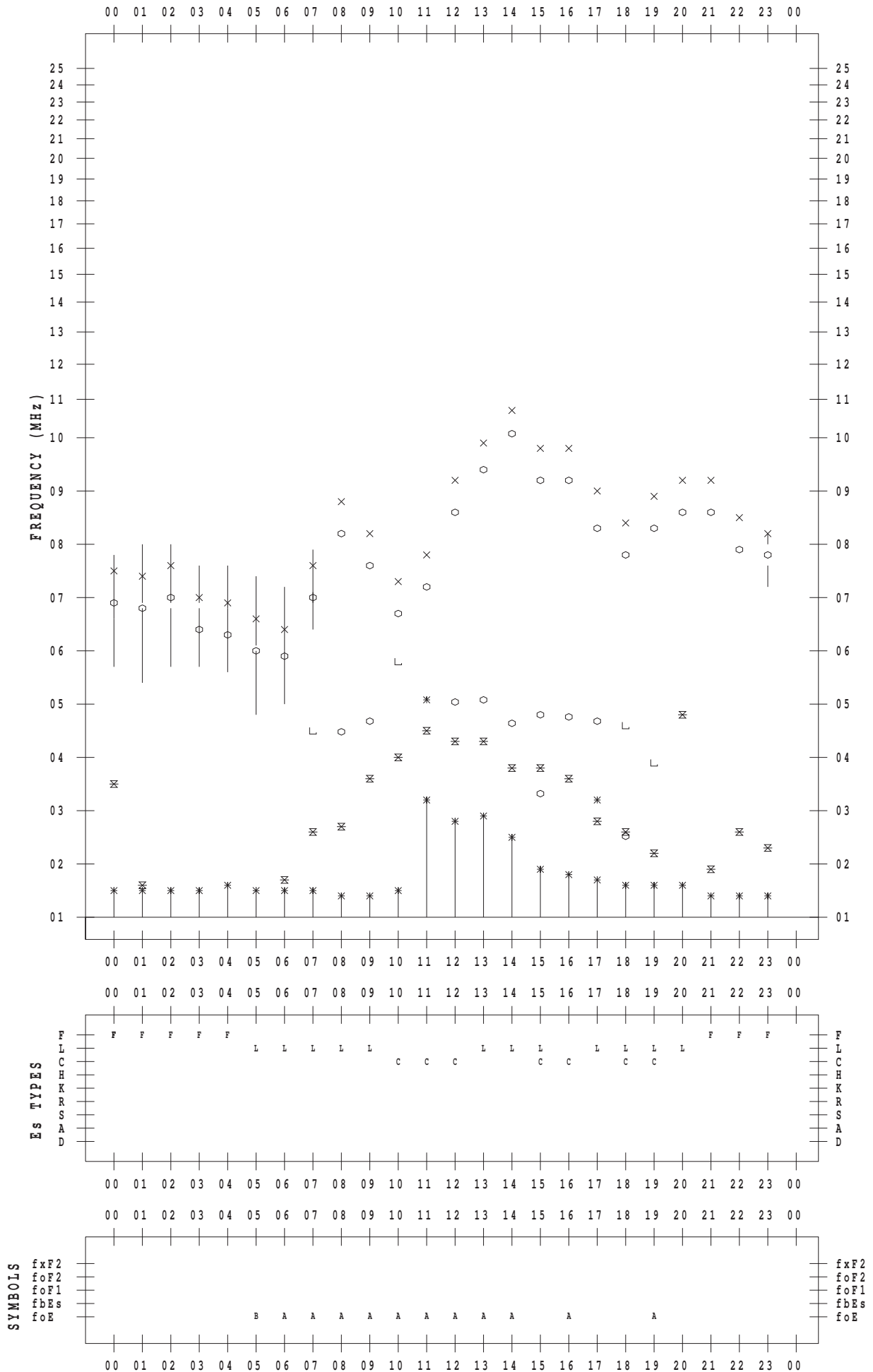
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/28

135 ° E MEAN TIME



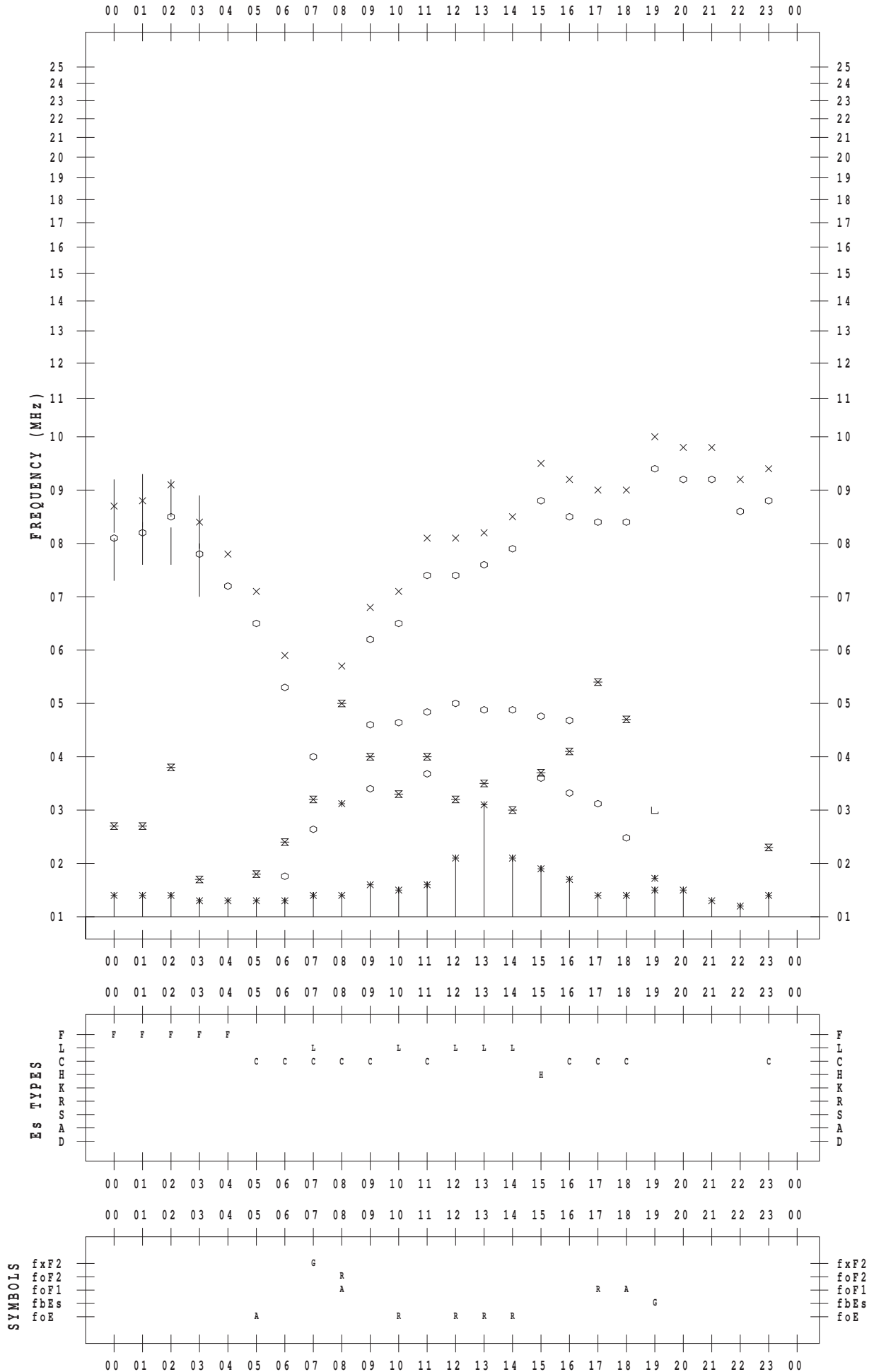
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/29

135 ° E MEAN TIME



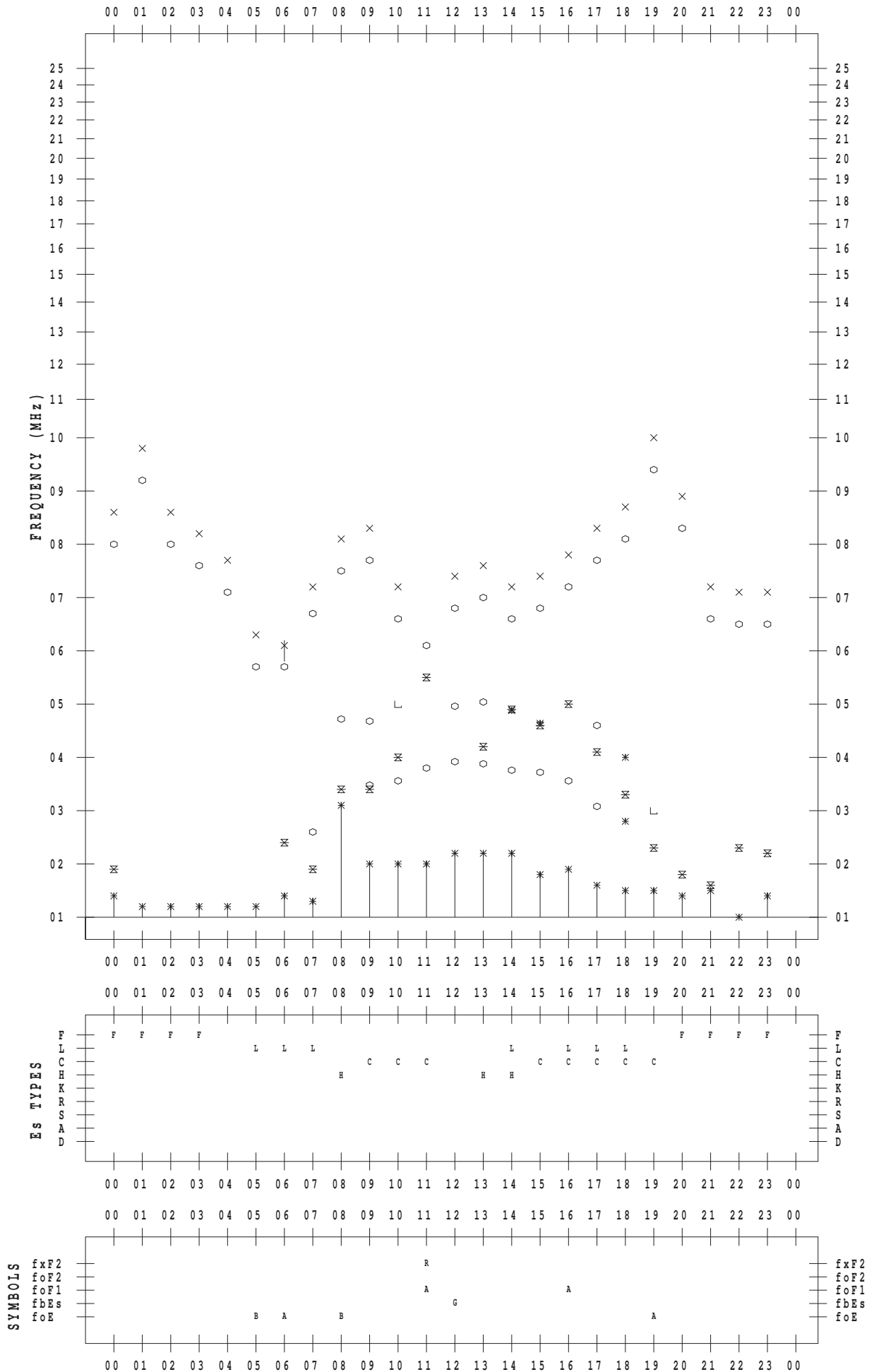
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 6/30

135 ° E MEAN TIME



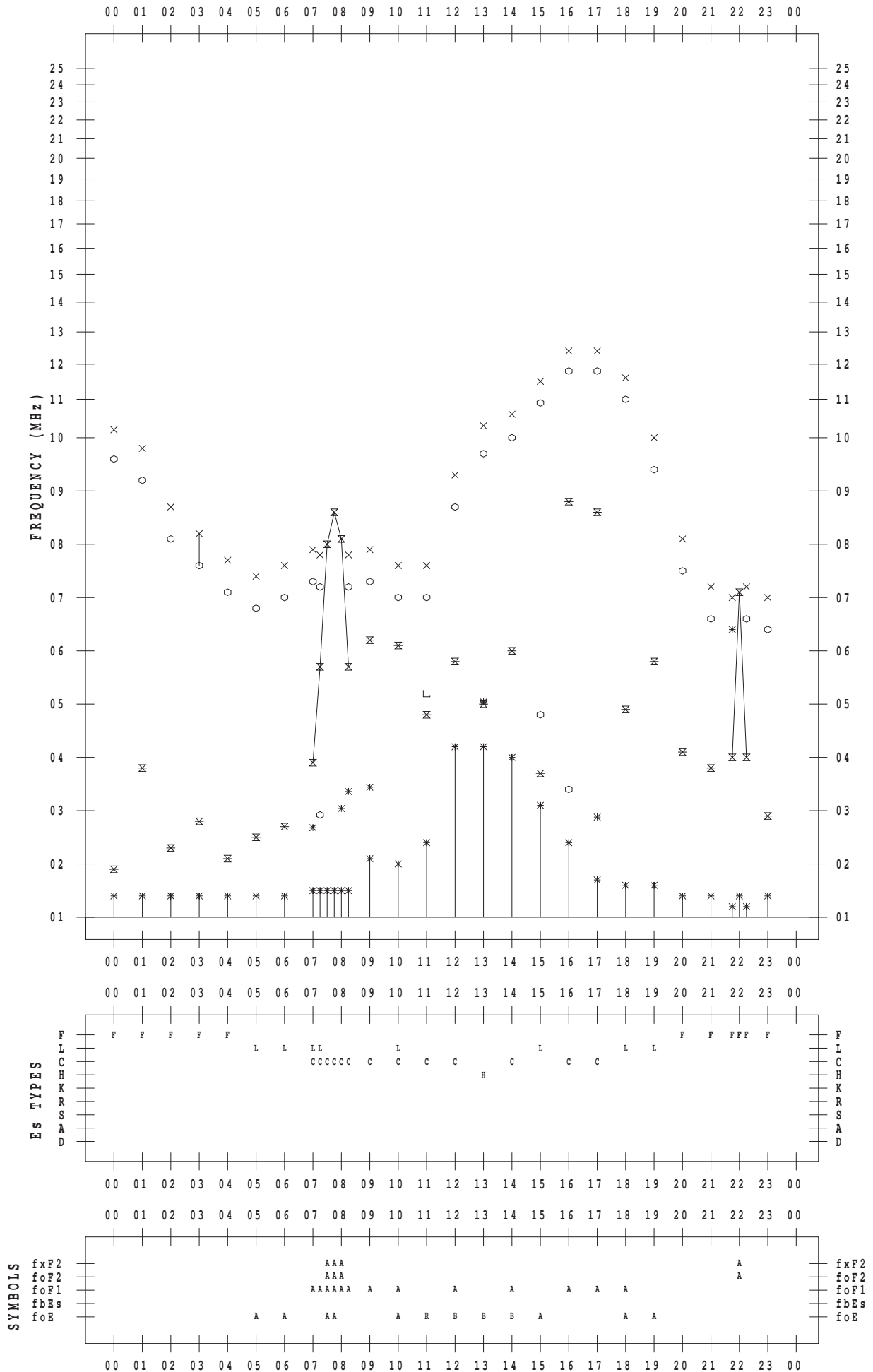
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/ 1

135 ° E MEAN TIME



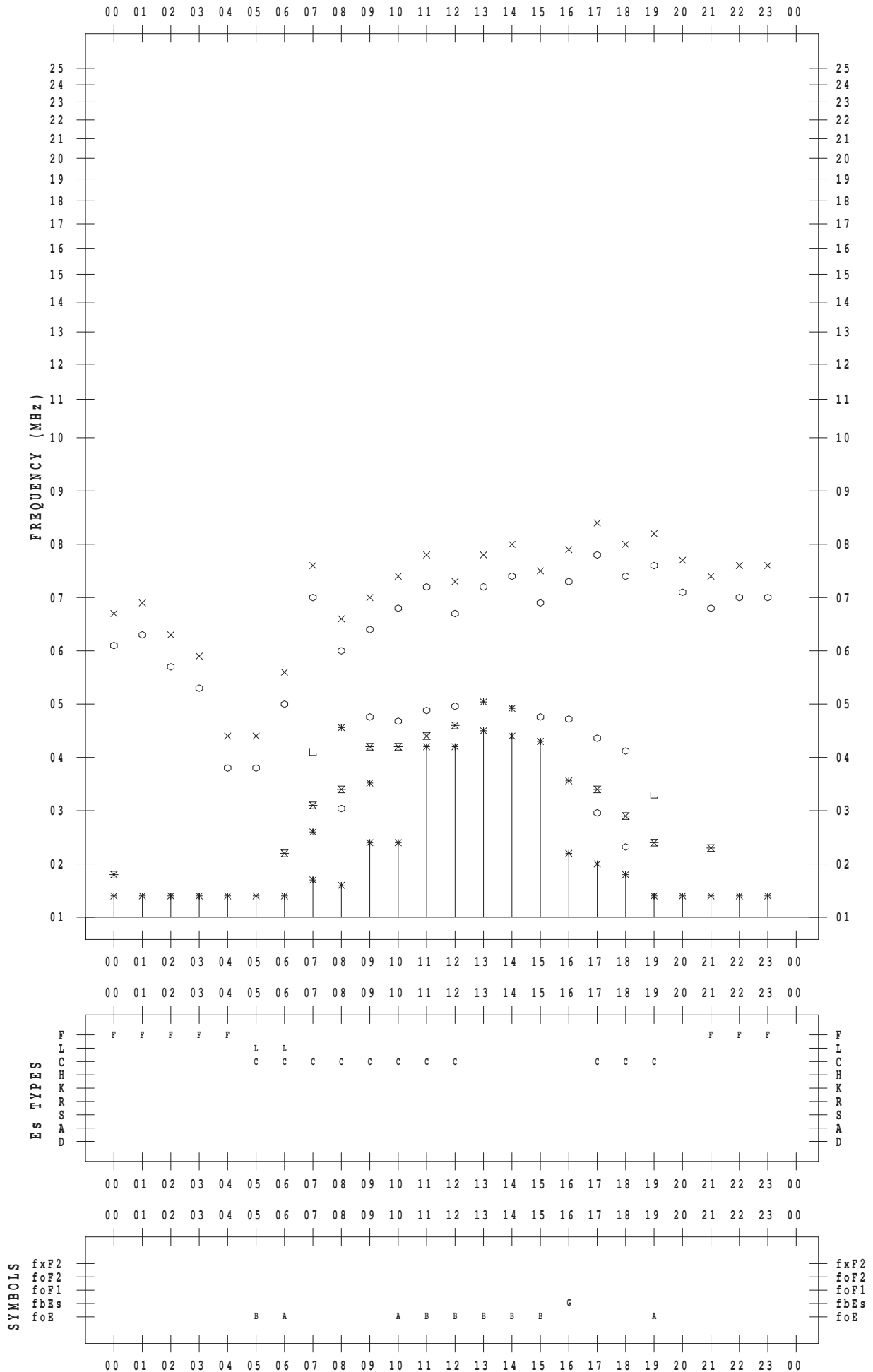
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 6 / 2

135 ° E MEAN TIME





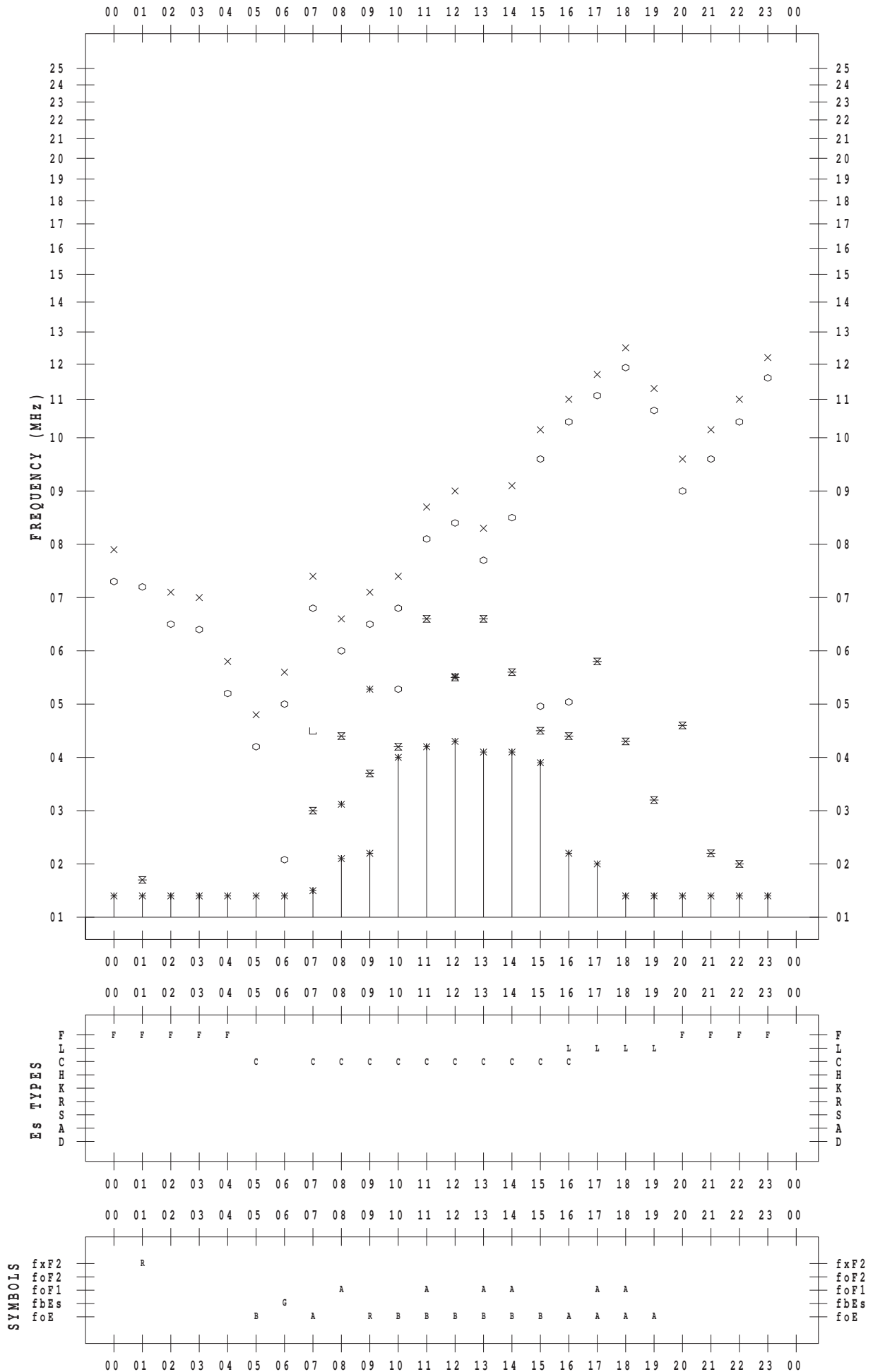
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/ 3

135 ° E MEAN TIME



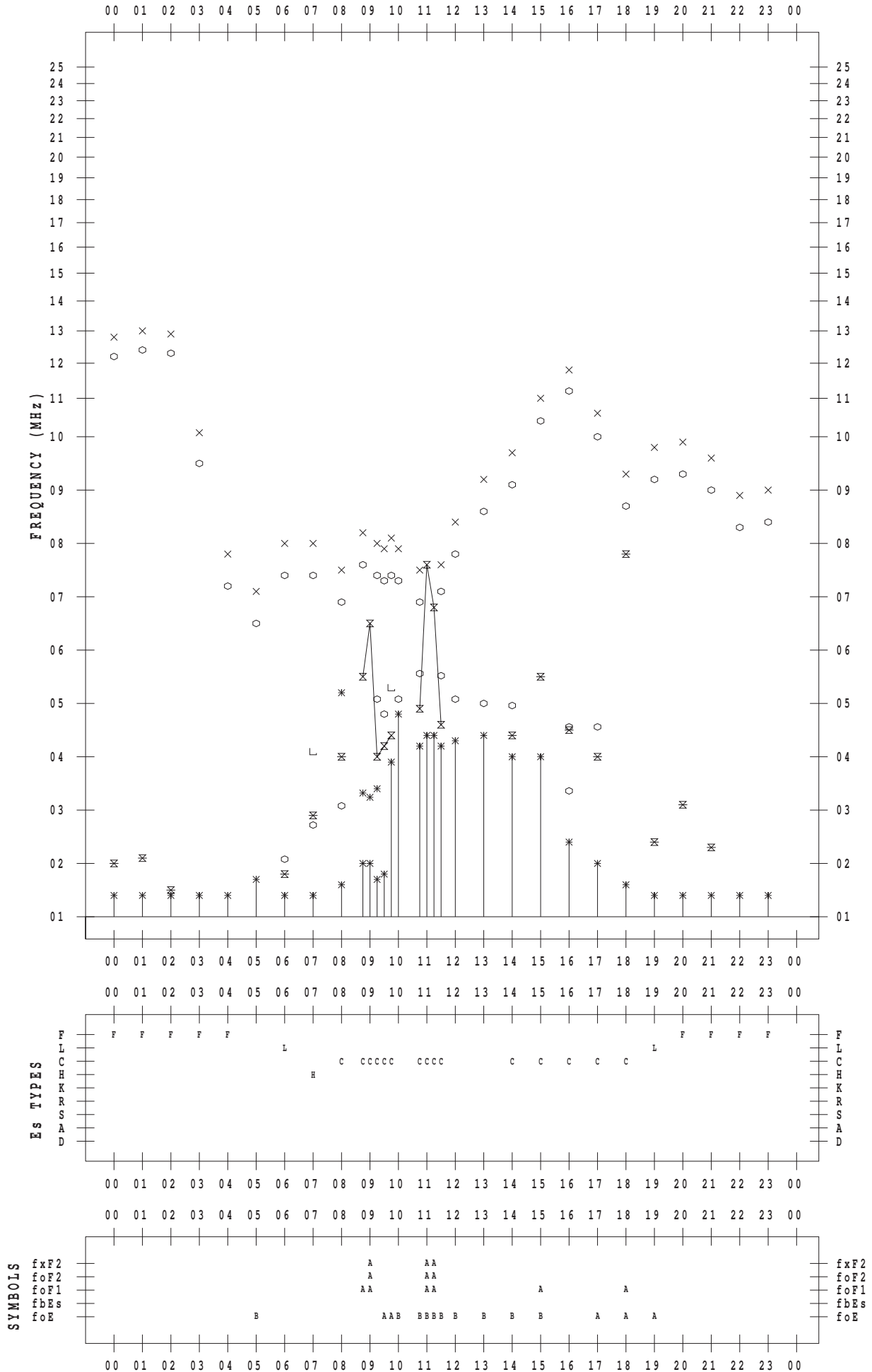
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/ 4

135 ° E MEAN TIME



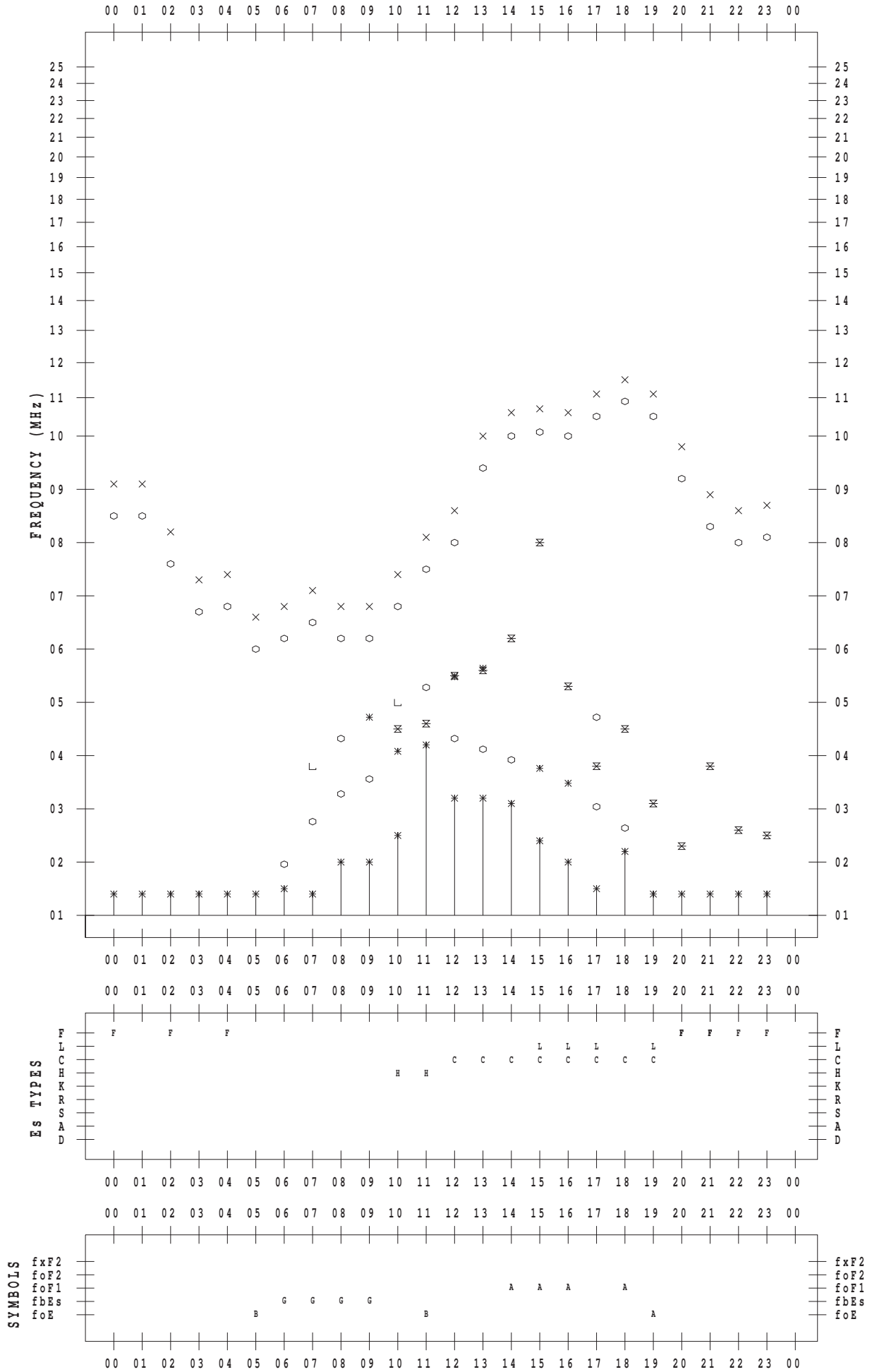
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 6 / 5

135 ° E MEAN TIME



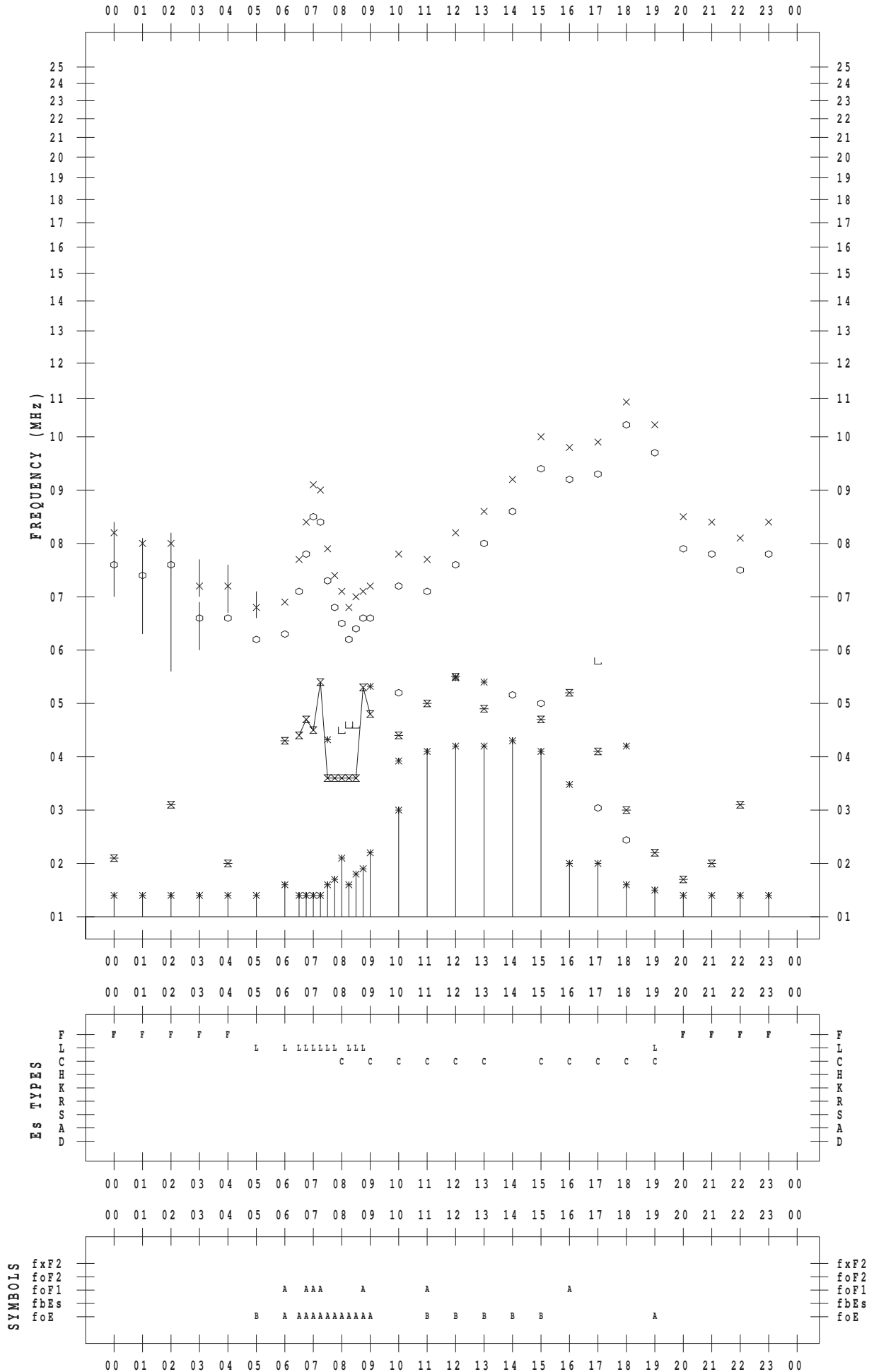
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/ 6

135 ° E MEAN TIME



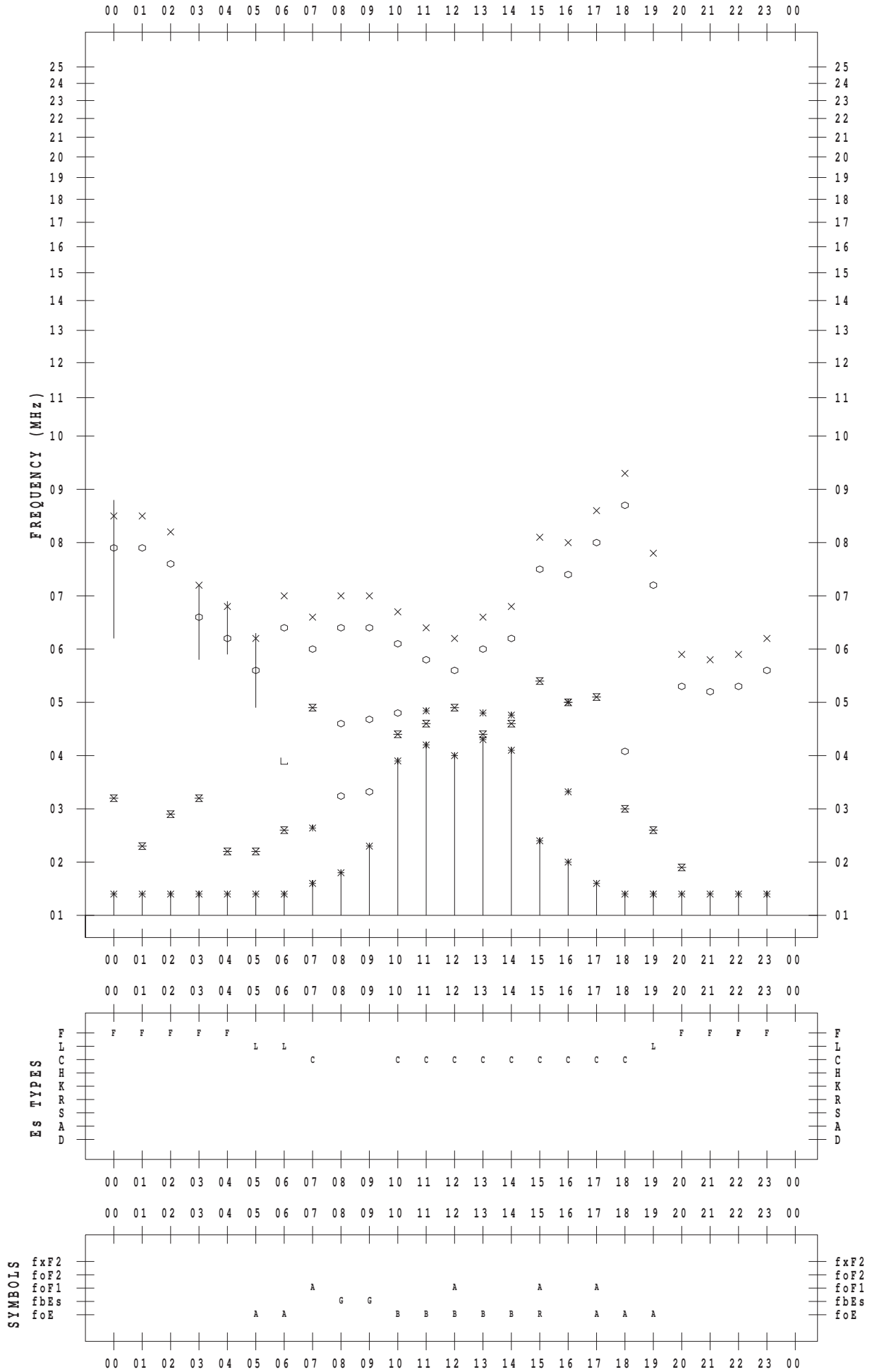
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 6 / 7

135 ° E MEAN TIME



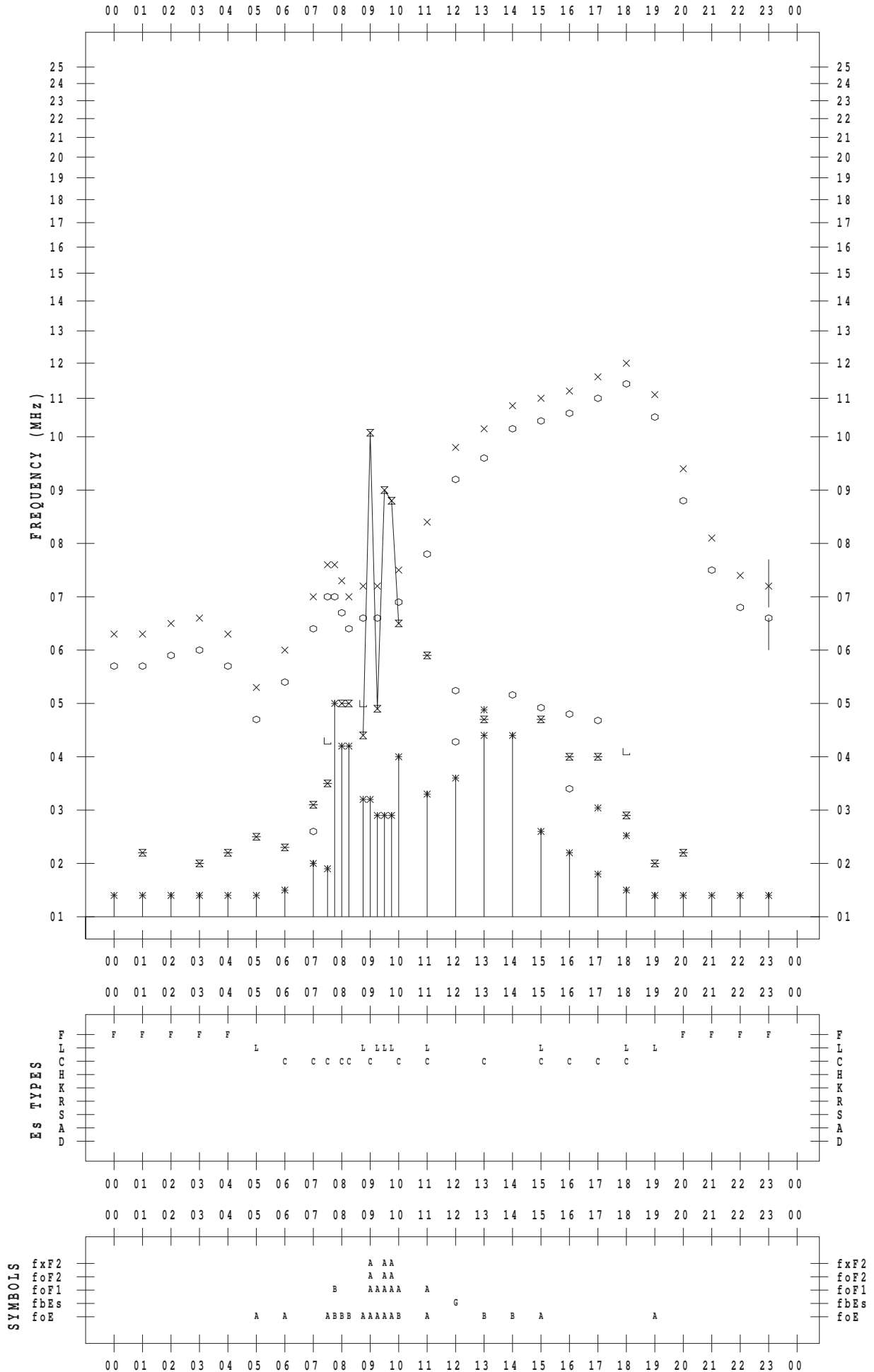
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 6 / 8

135 ° E MEAN TIME



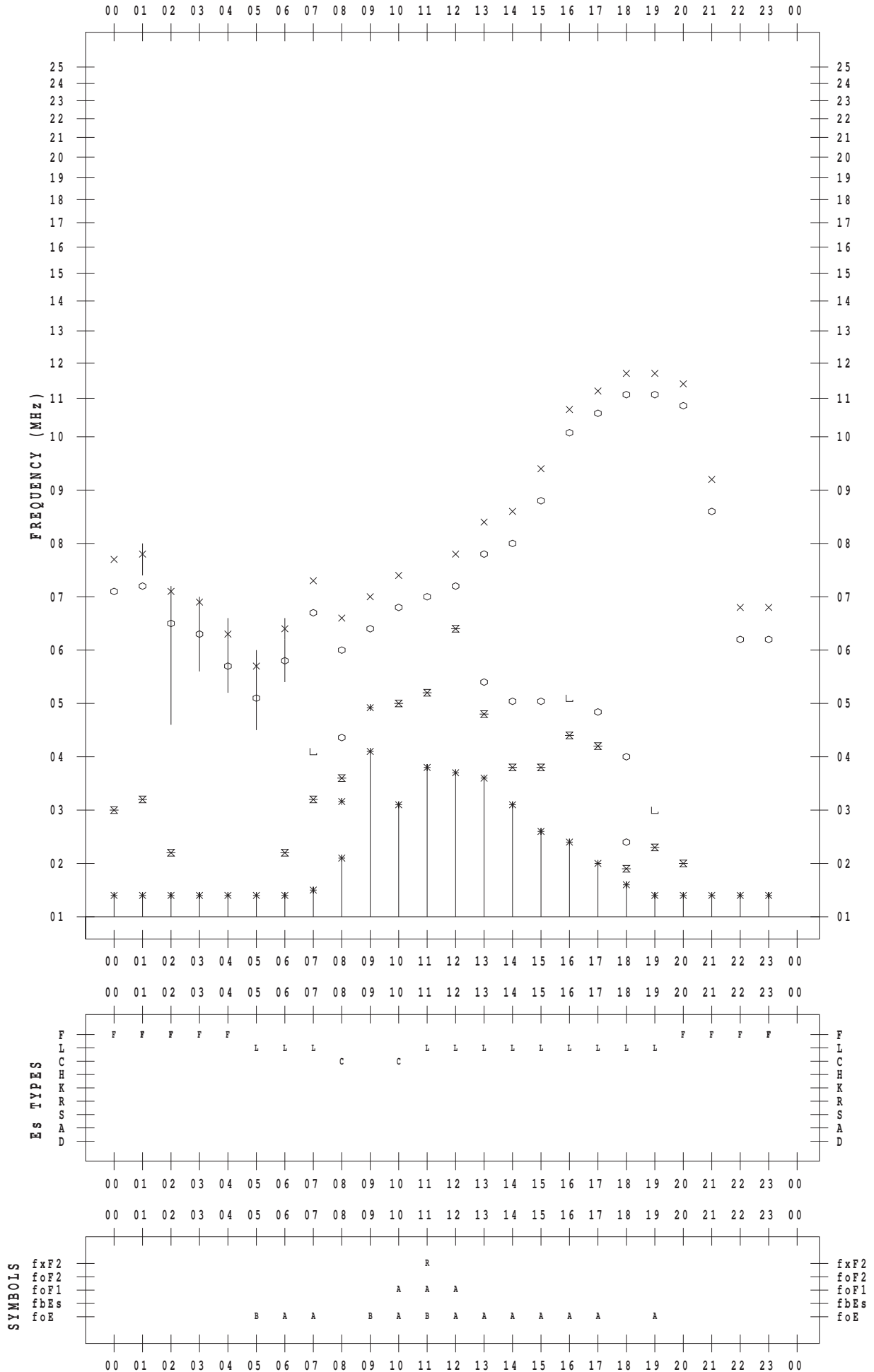
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SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 6 / 9

135 ° E MEAN TIME



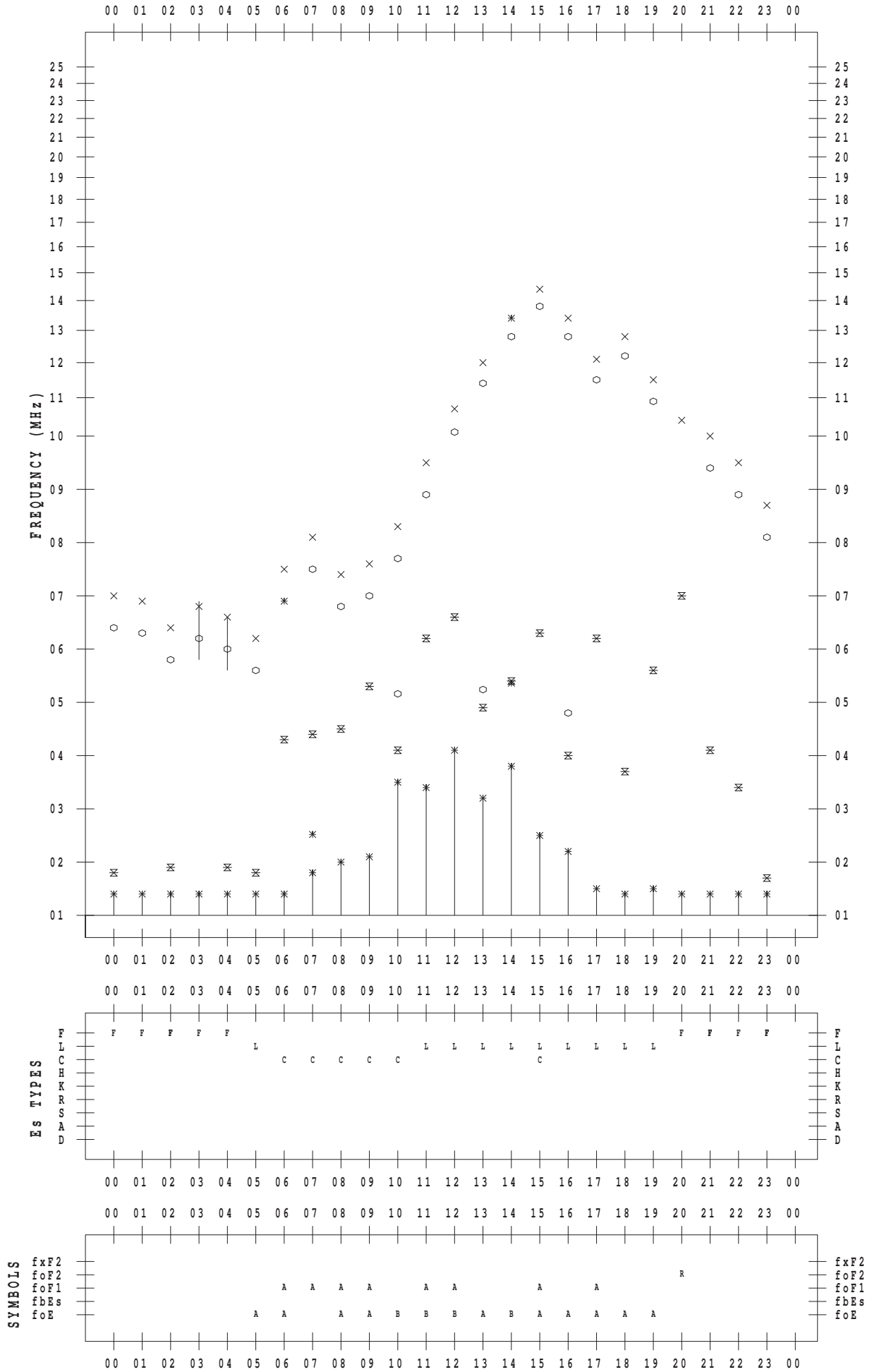
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/10

135 ° E MEAN TIME





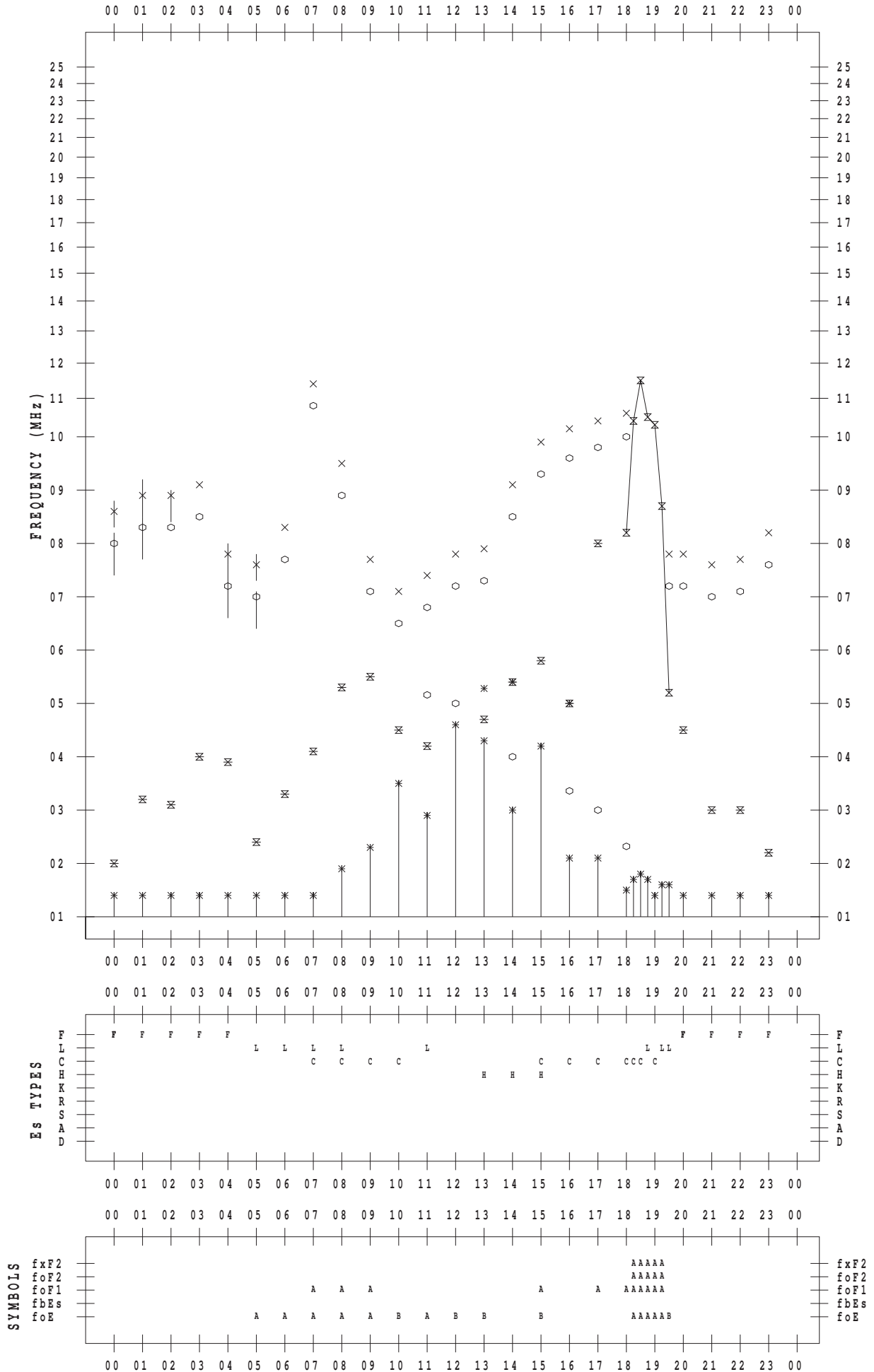
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/11

135 ° E MEAN TIME



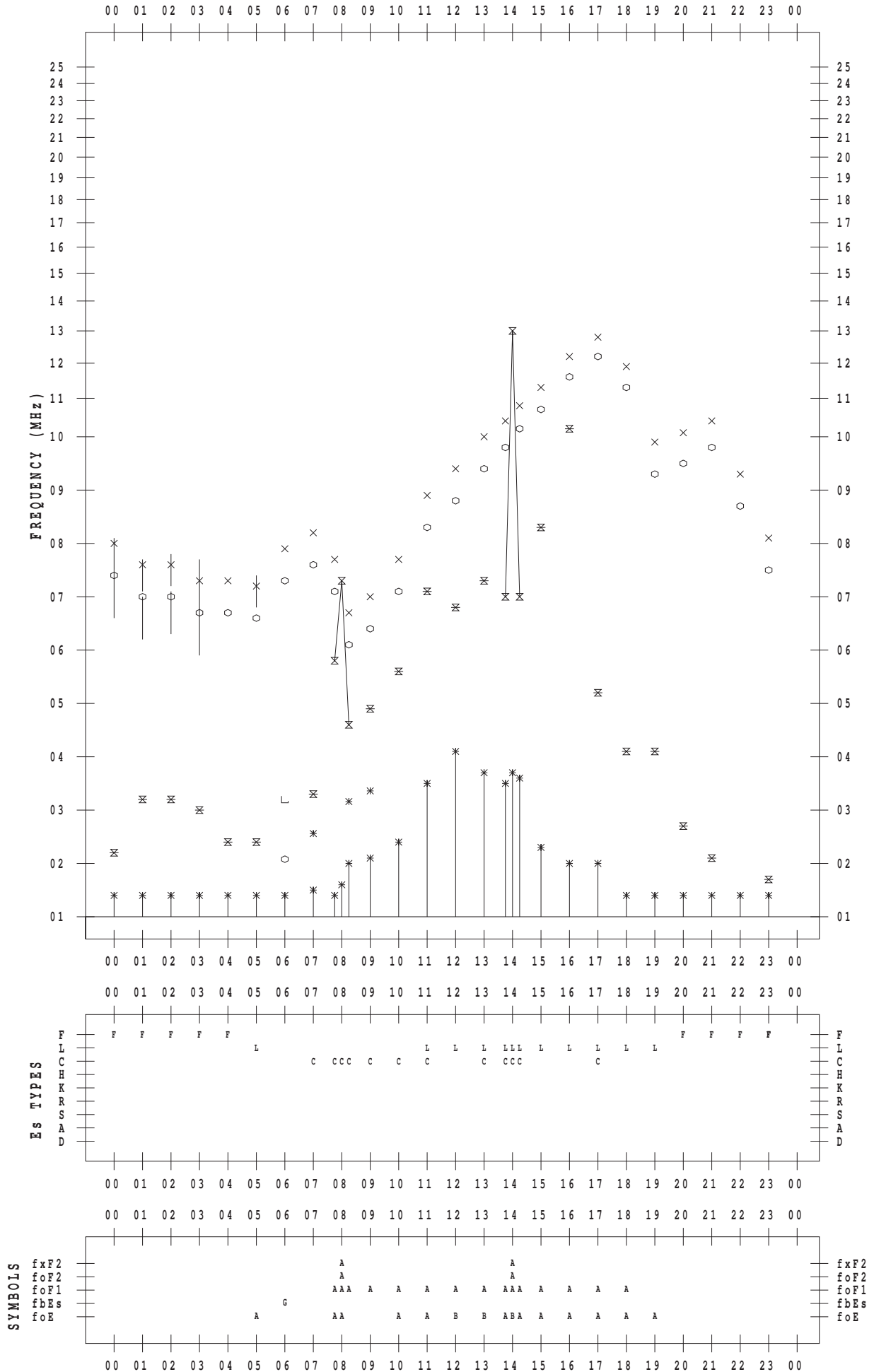
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/12

135 ° E MEAN TIME



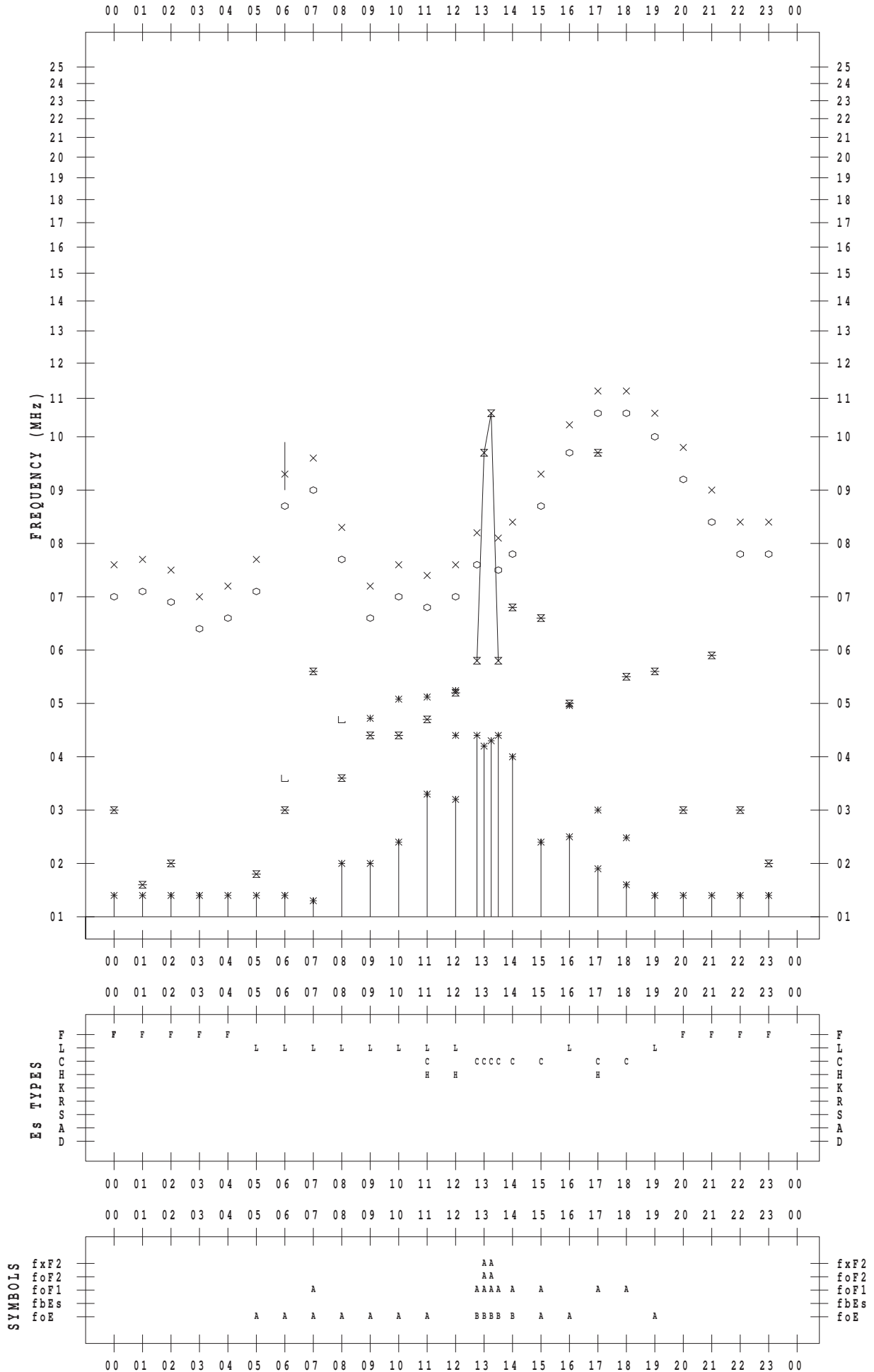
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SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/13

135 ° E MEAN TIME



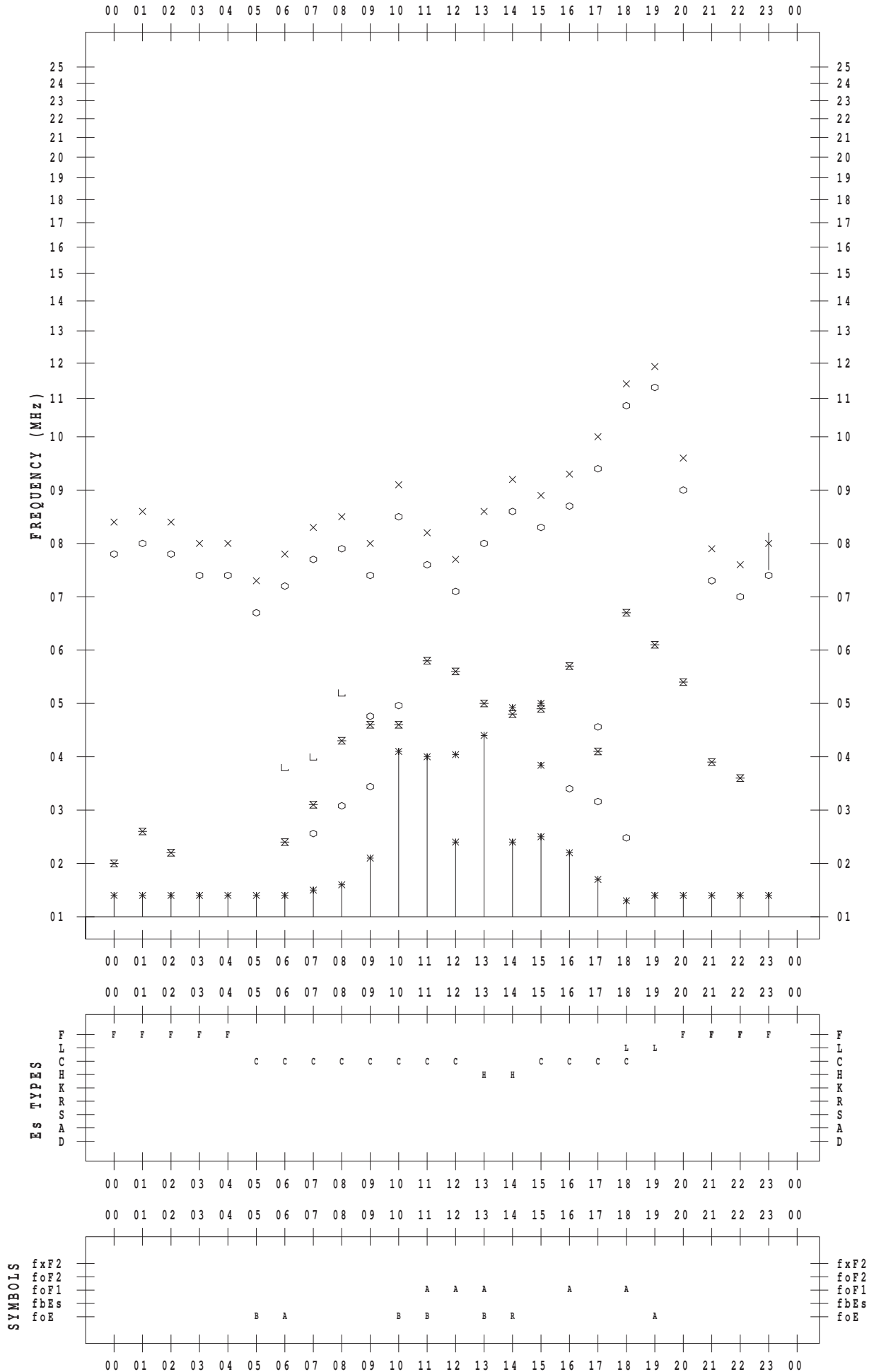
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/14

135 ° E MEAN TIME



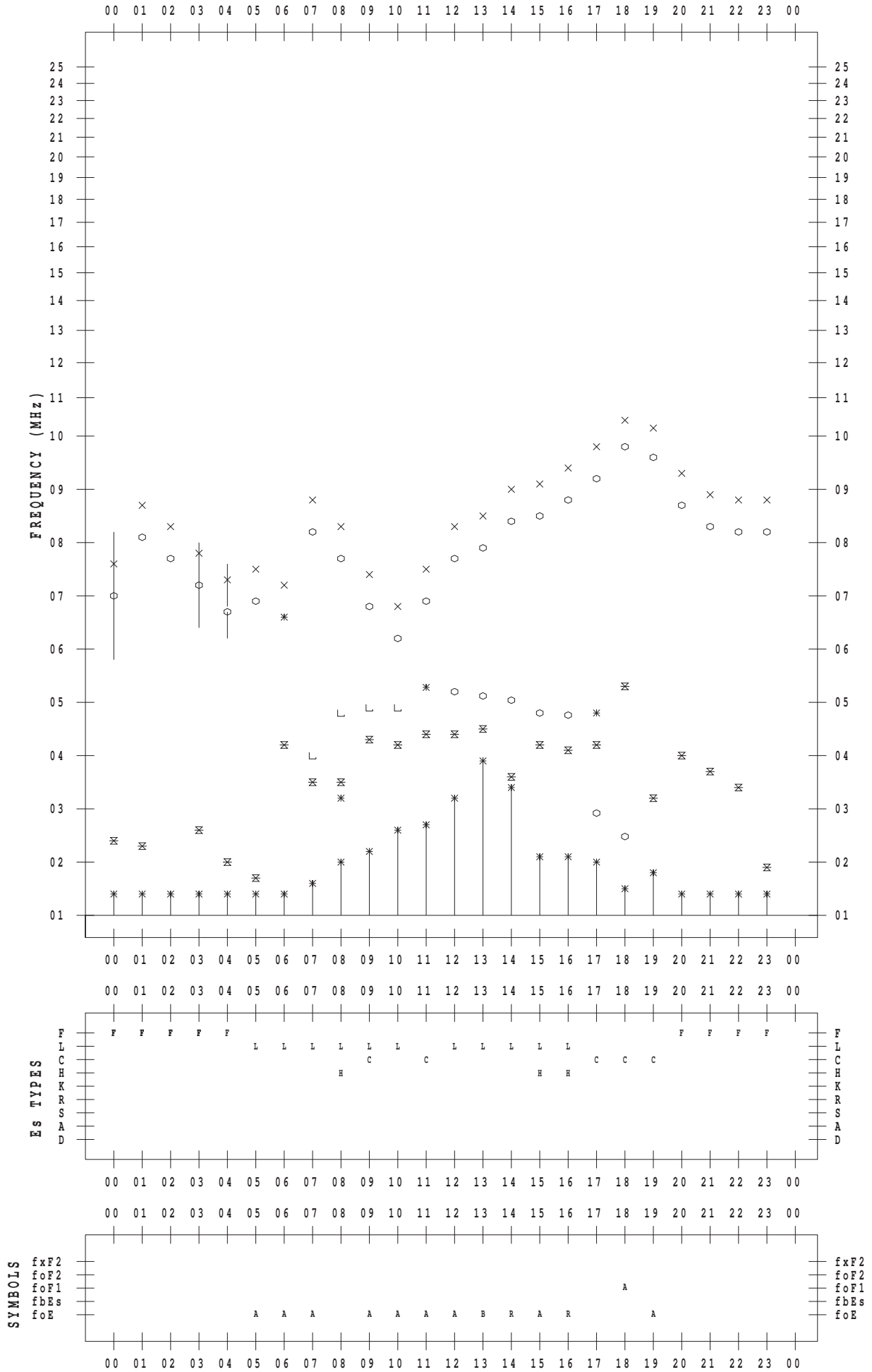
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SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/15

135 ° E MEAN TIME



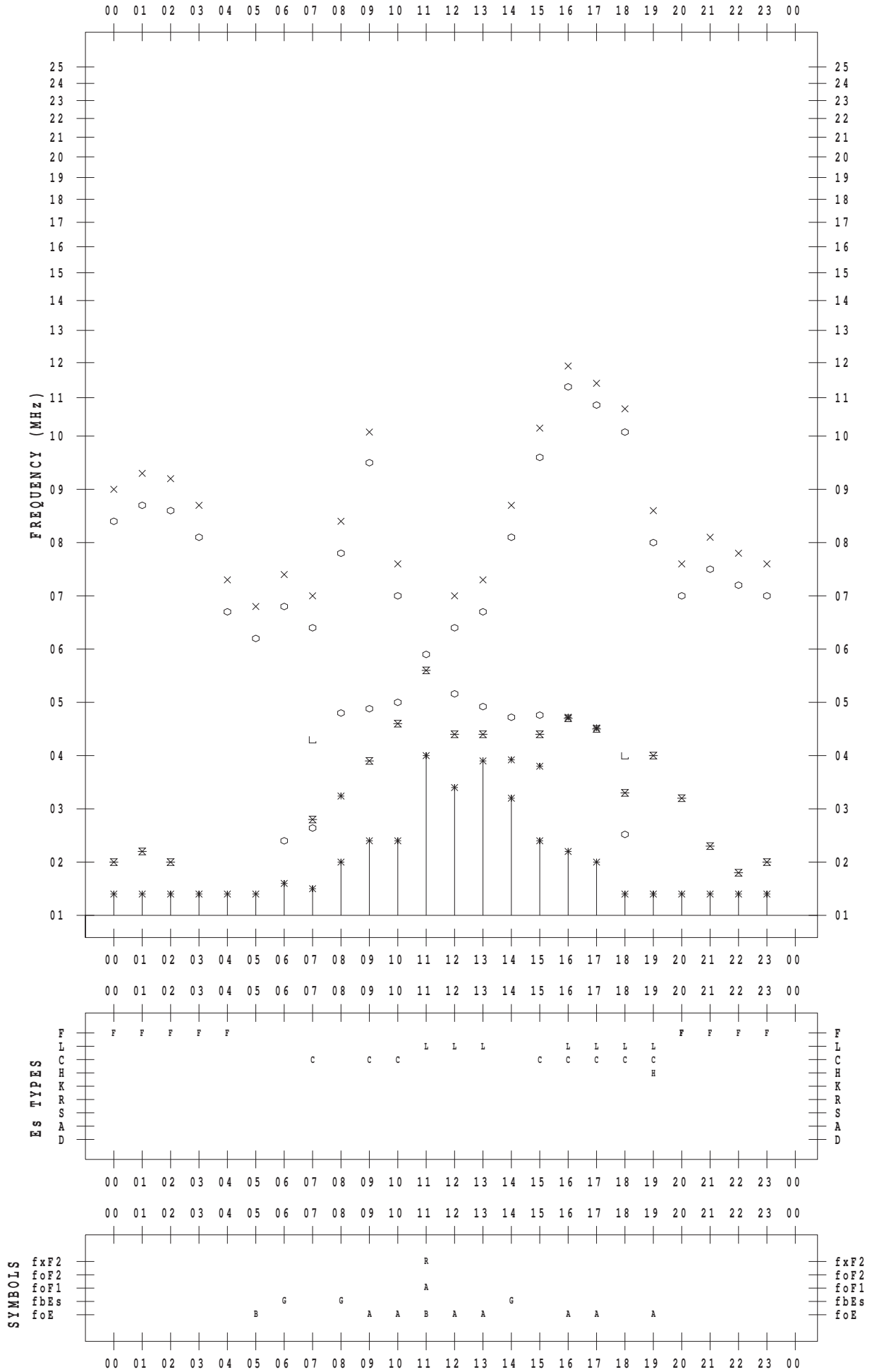
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/16

135 ° E MEAN TIME



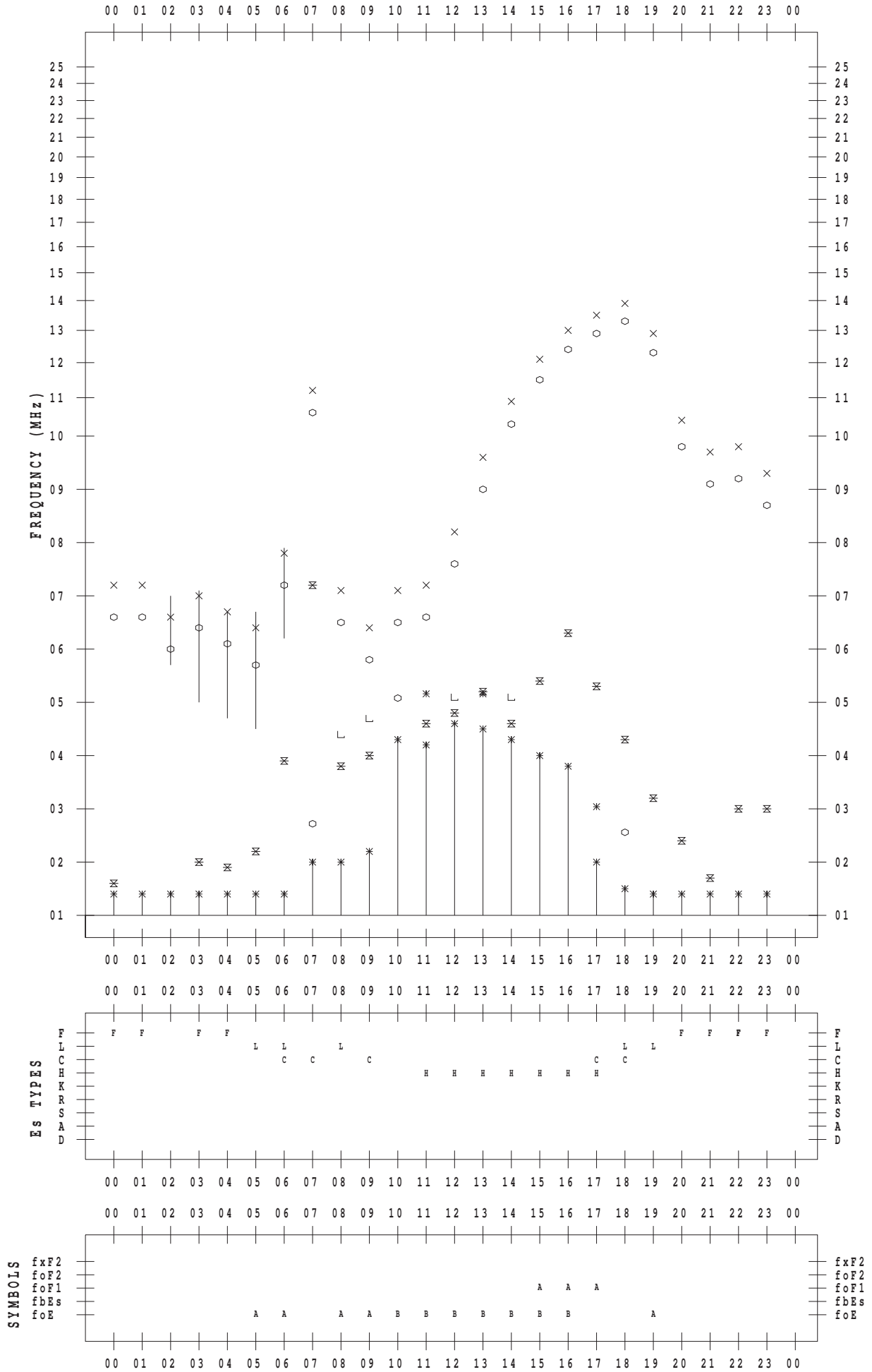
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/17

135 ° E MEAN TIME



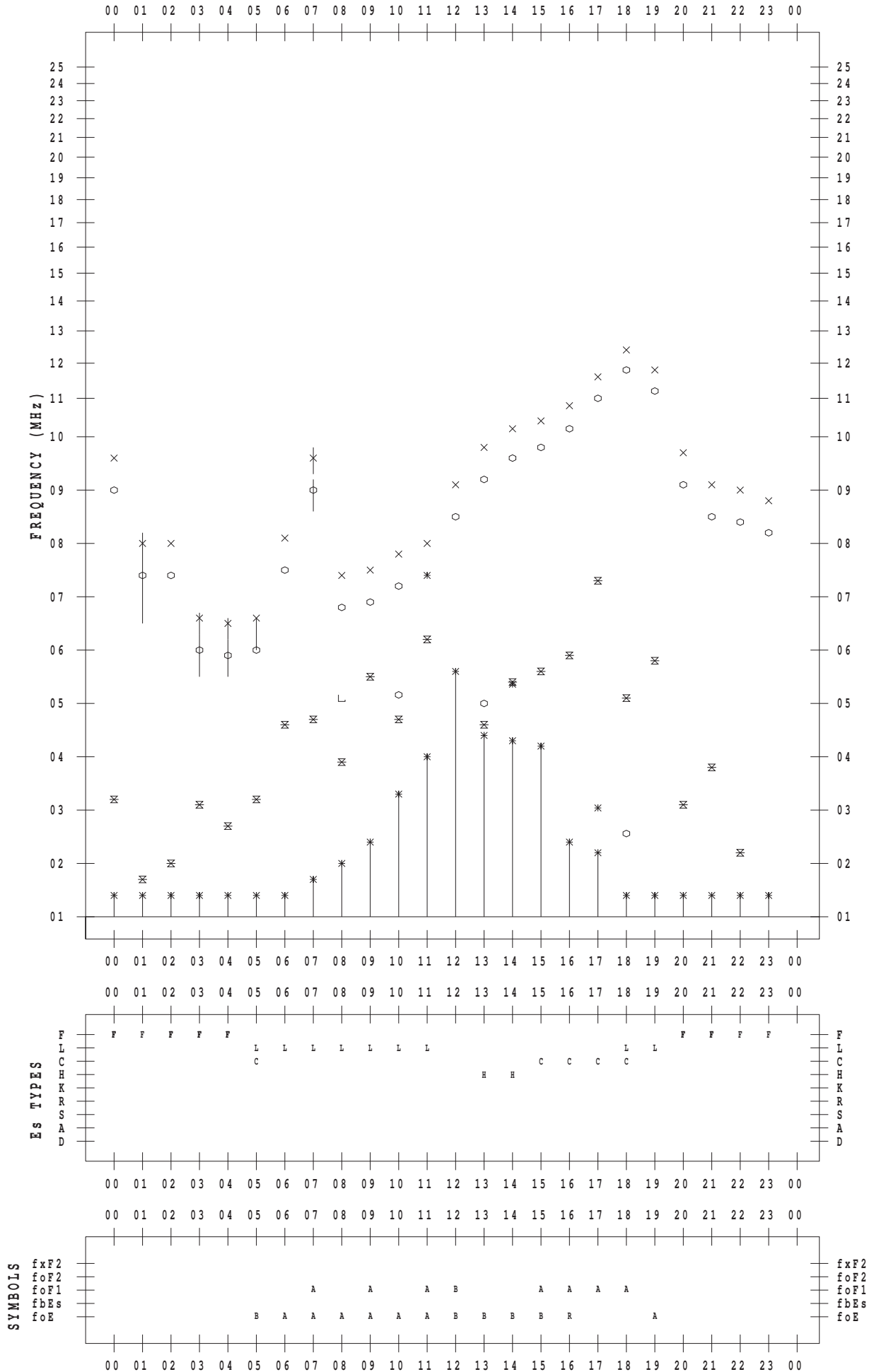
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/18

135 ° E MEAN TIME





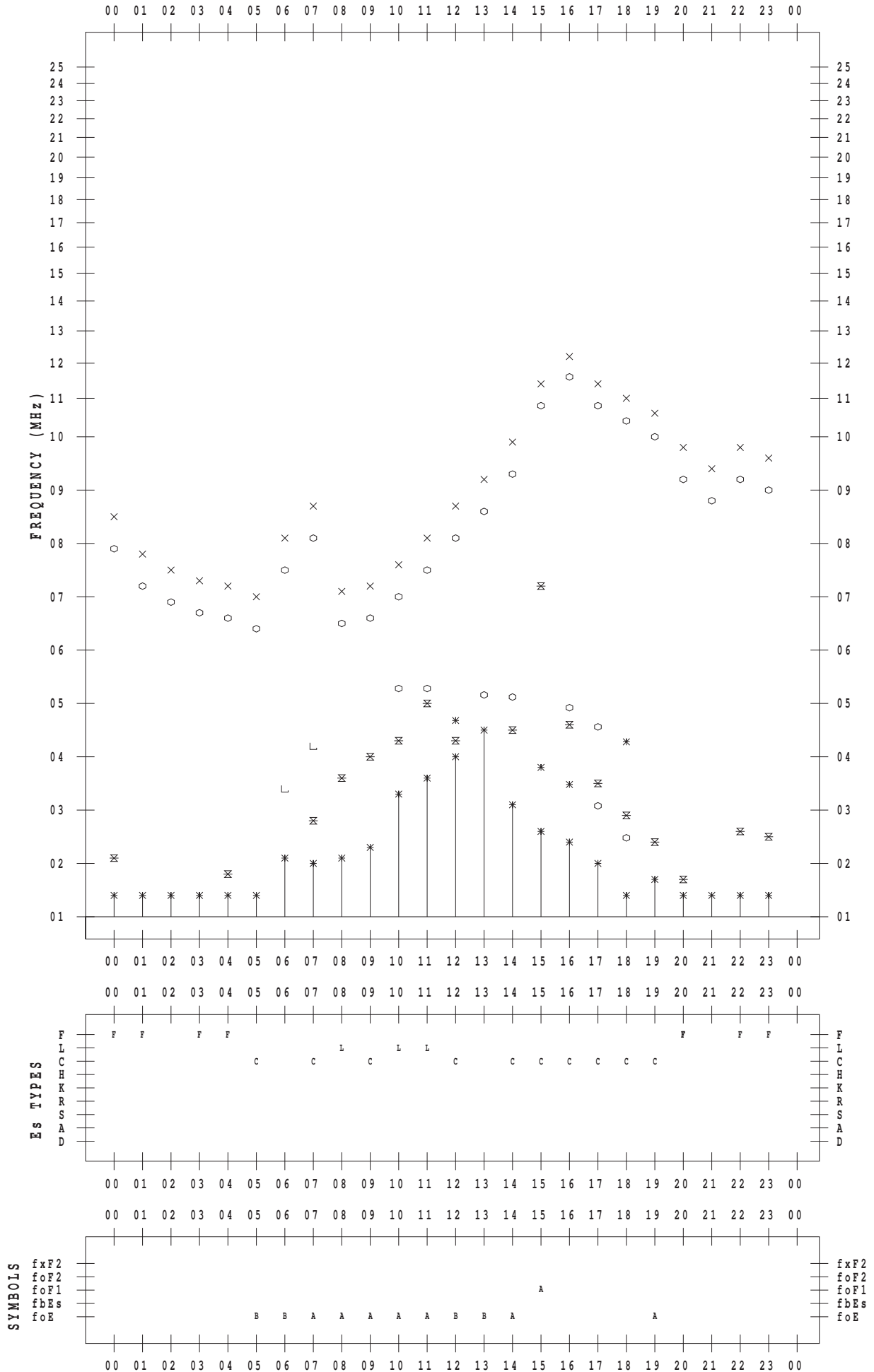
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/19

135 ° E MEAN TIME



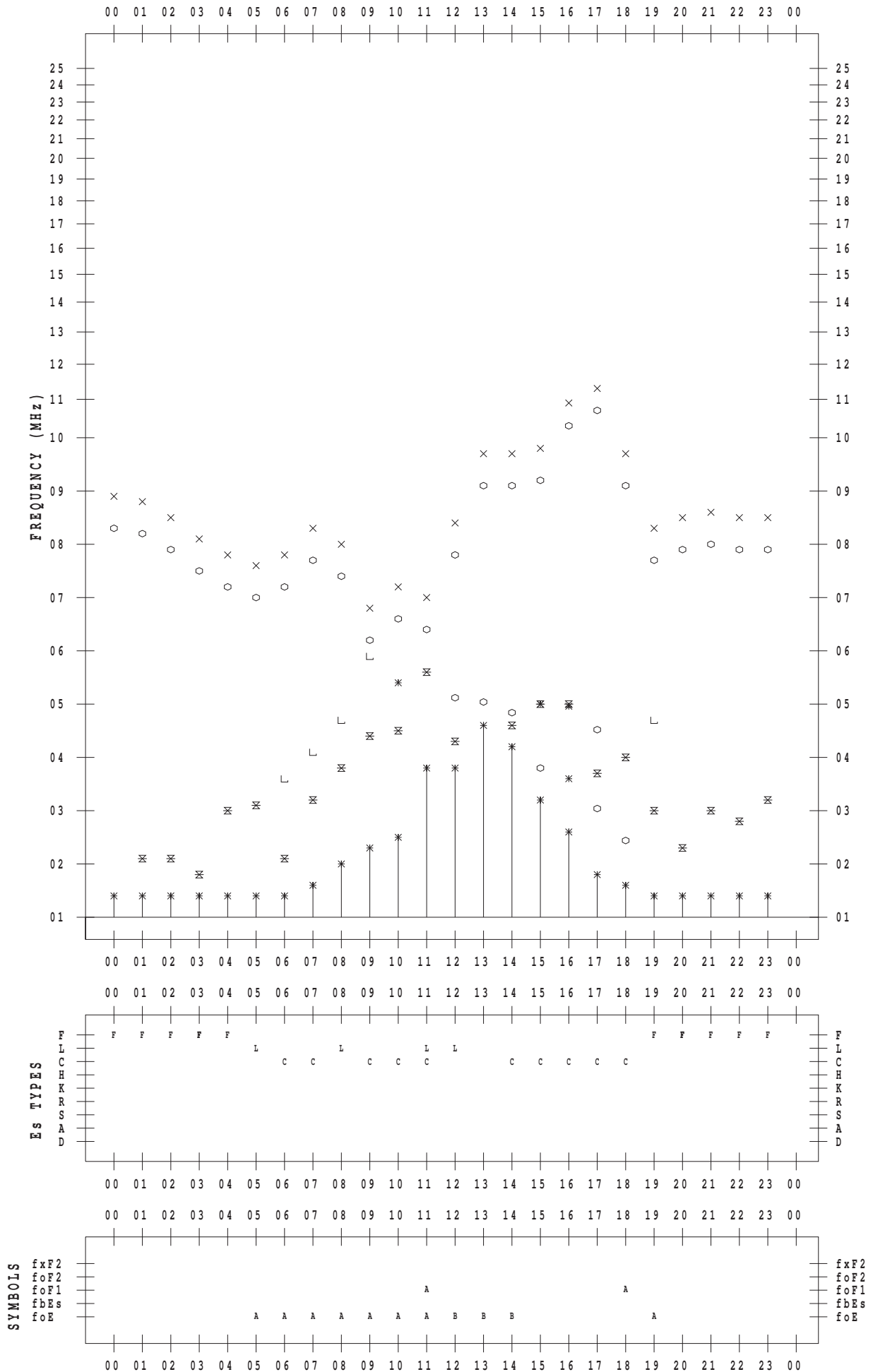
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/20

135 ° E MEAN TIME



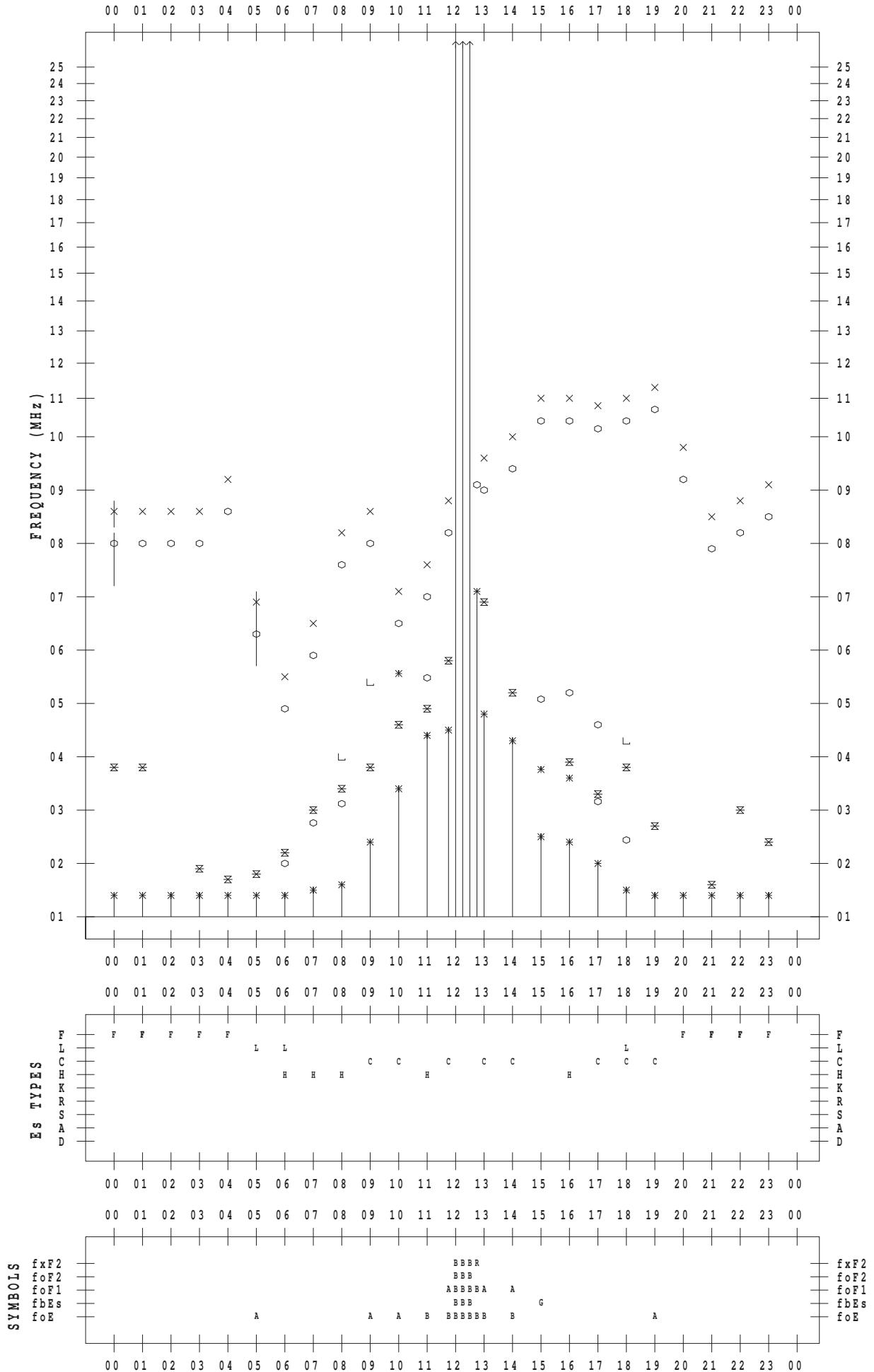
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/21

135 ° E MEAN TIME



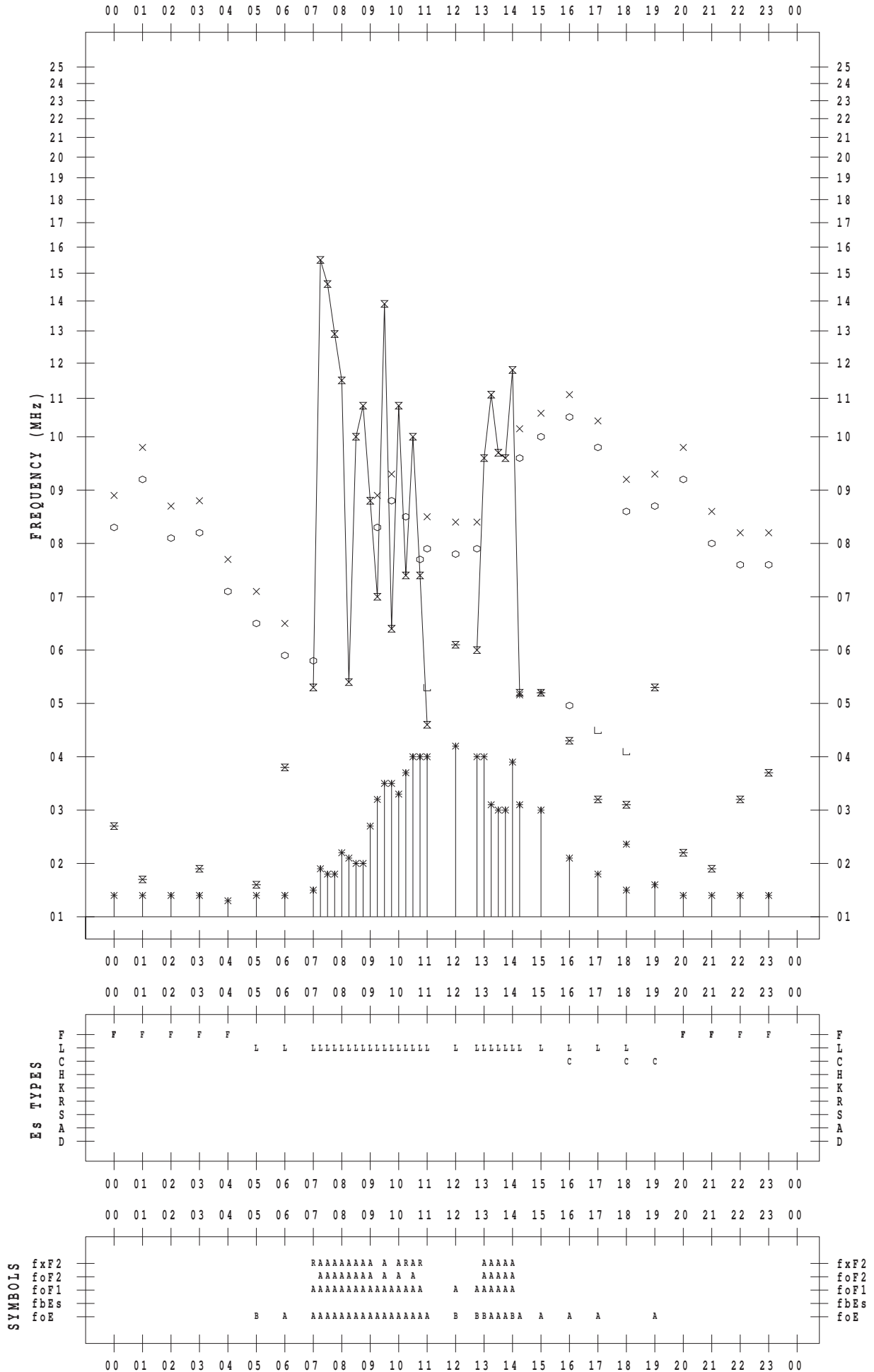
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/22

135 ° E MEAN TIME



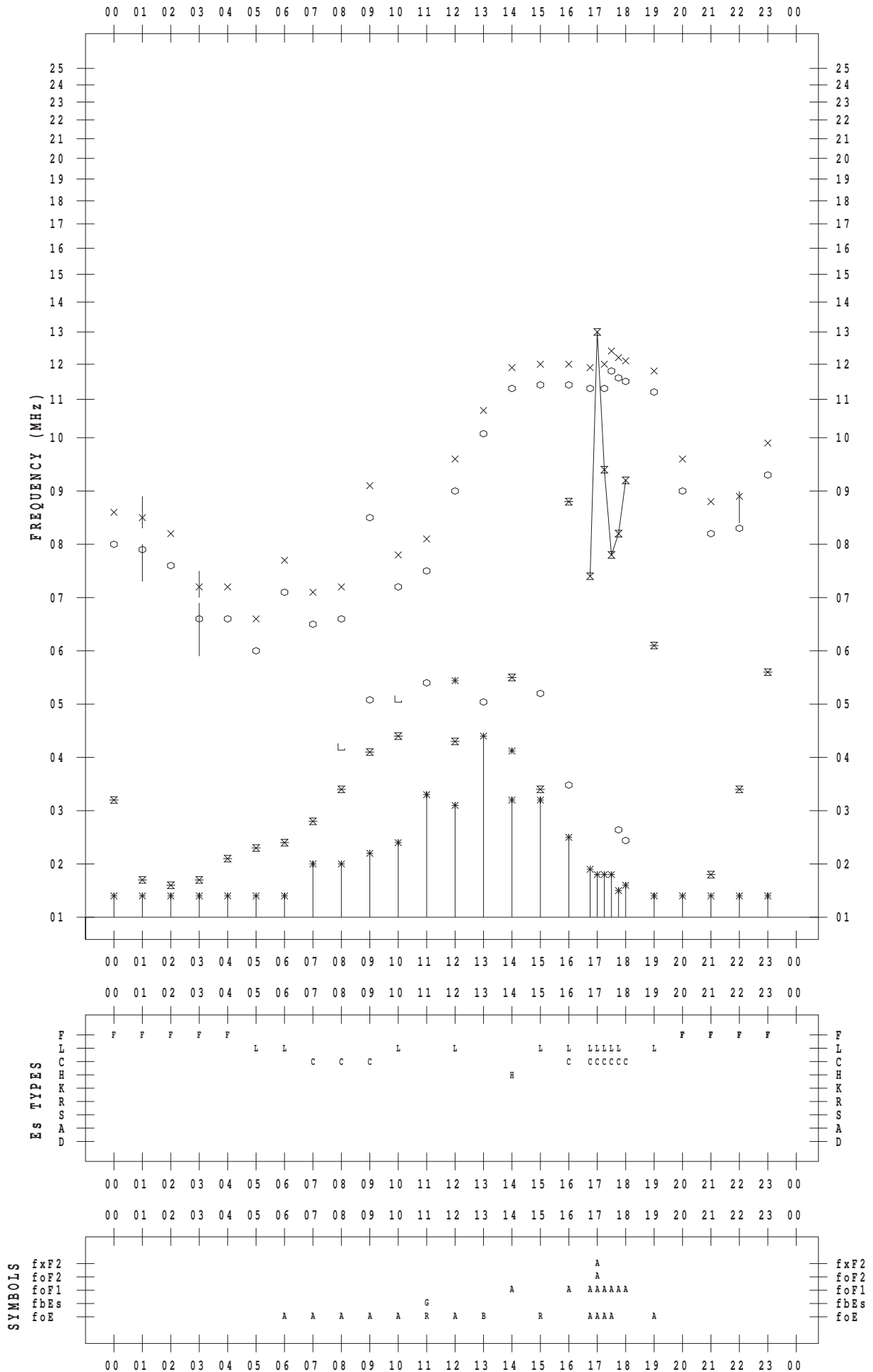
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/23

135 ° E MEAN TIME



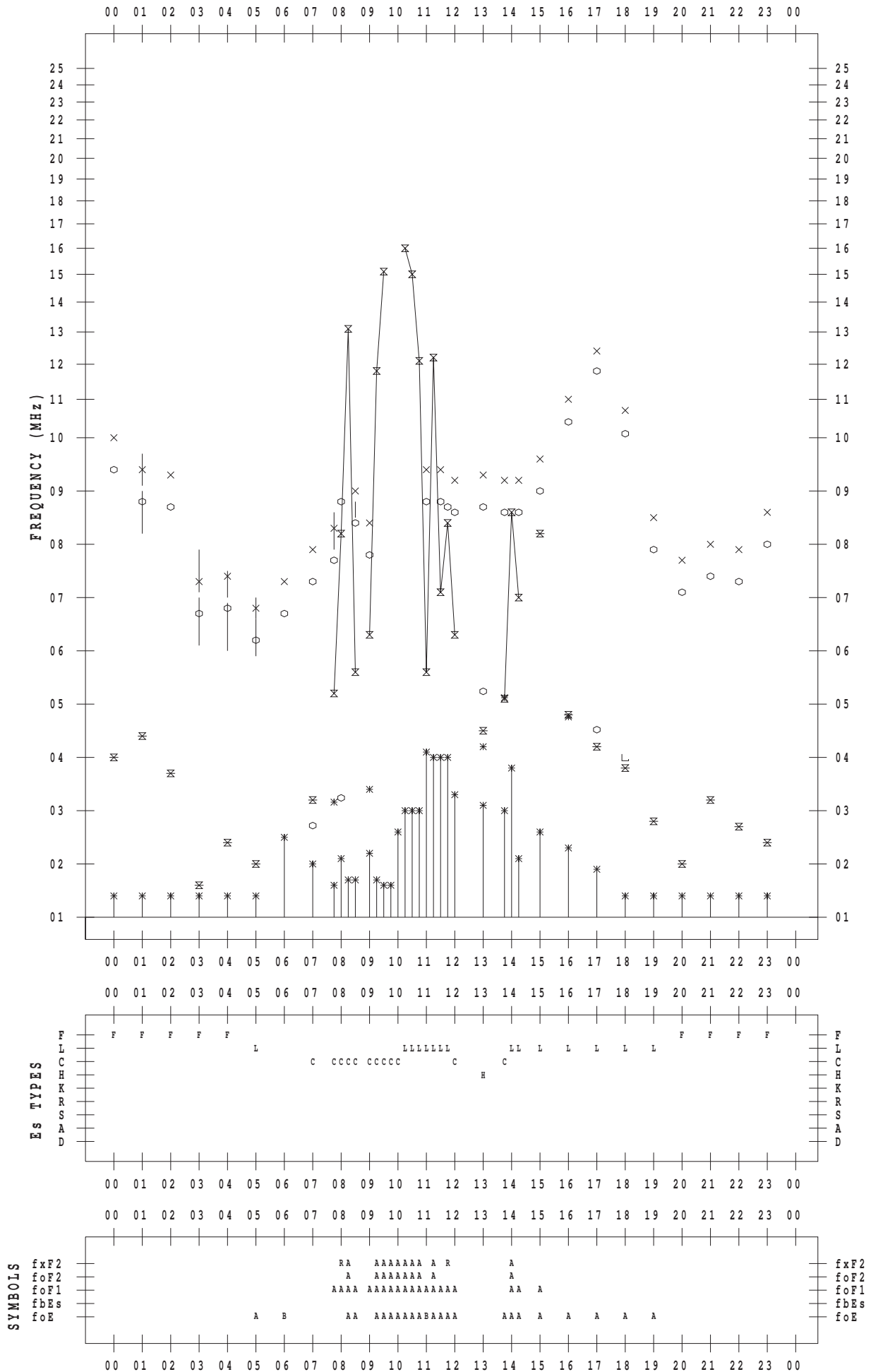
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/24

135 ° E MEAN TIME



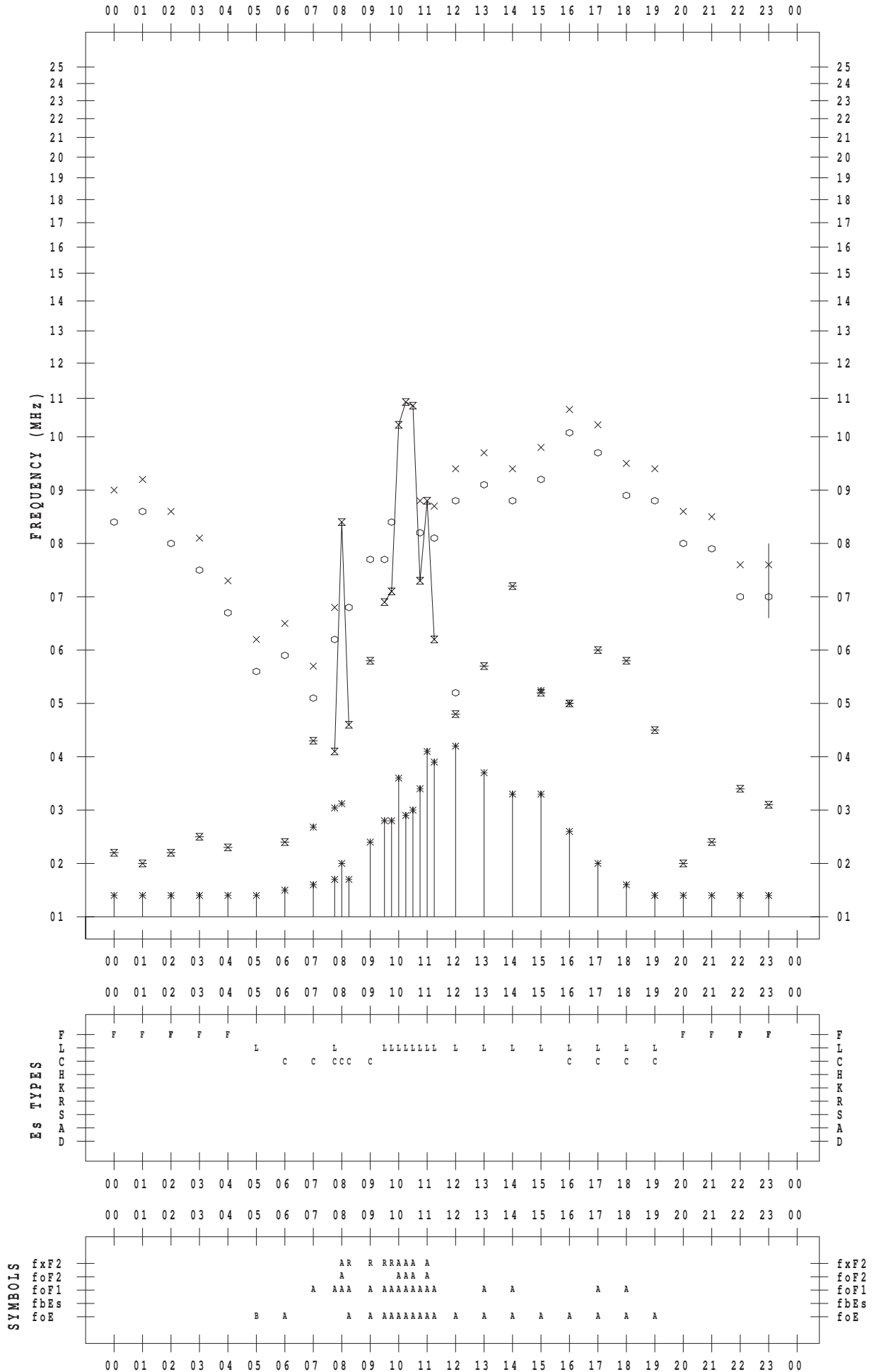
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/25

135 ° E MEAN TIME



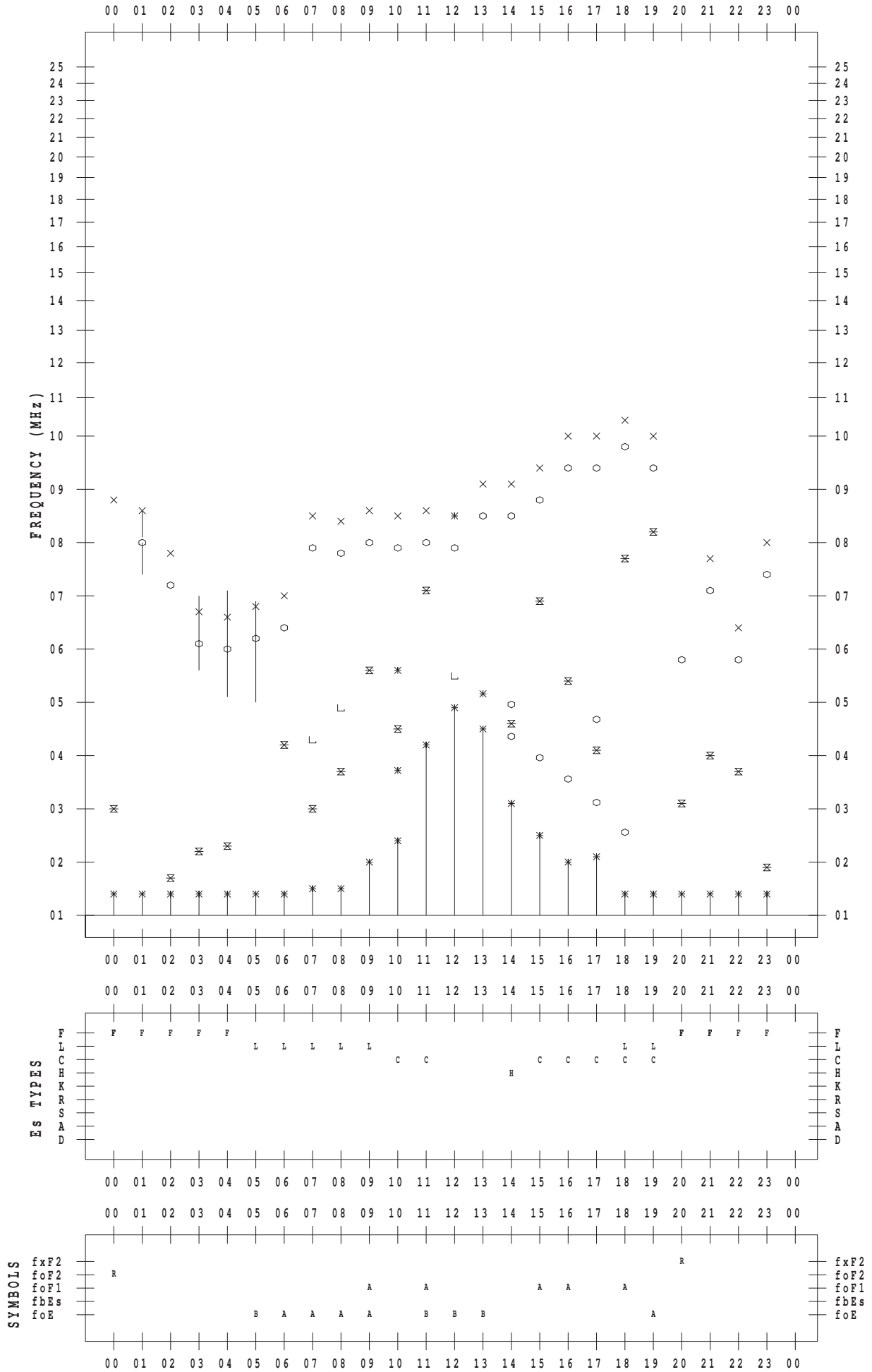
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/26

135 ° E MEAN TIME





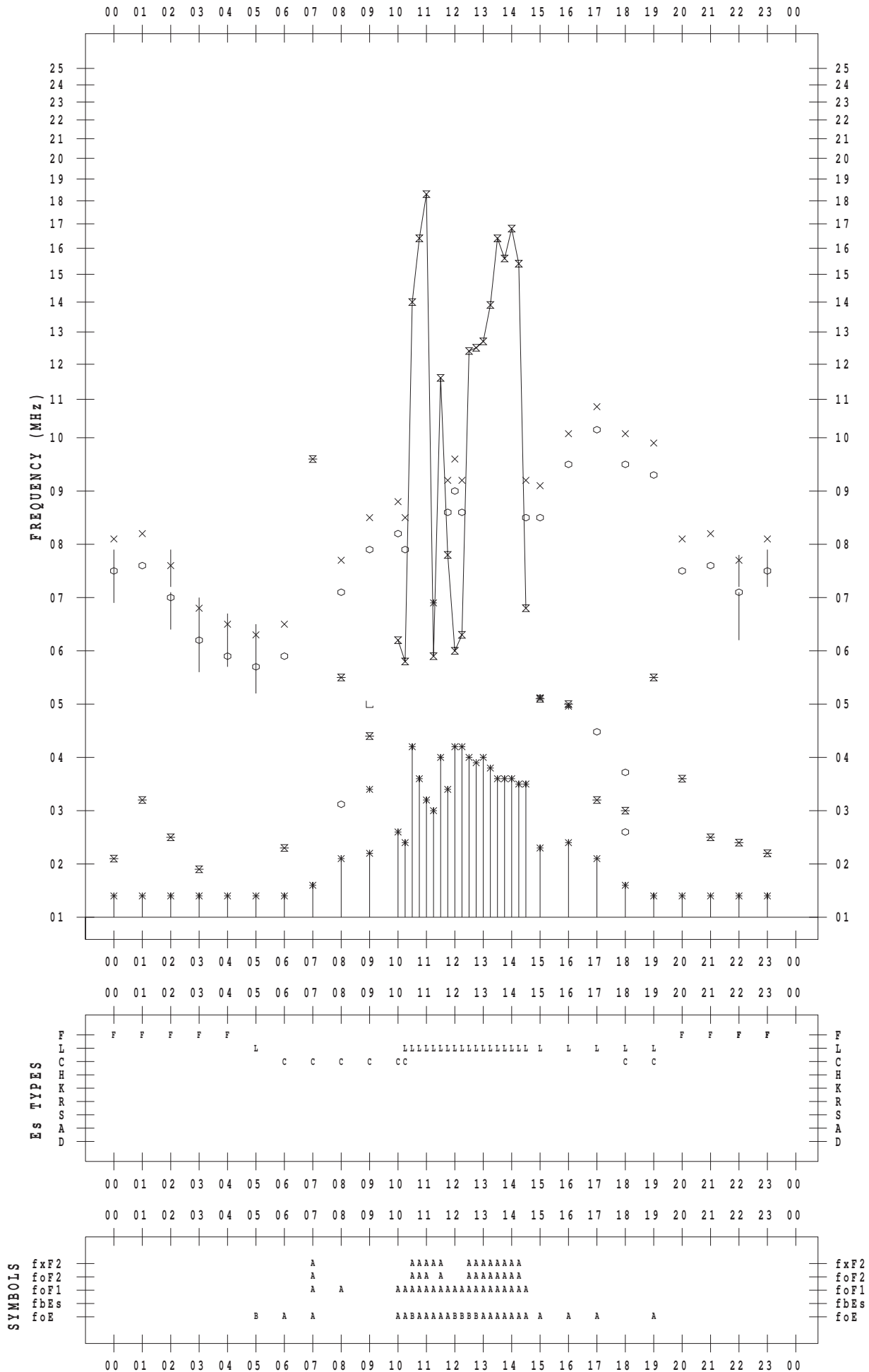
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/27

135 ° E MEAN TIME



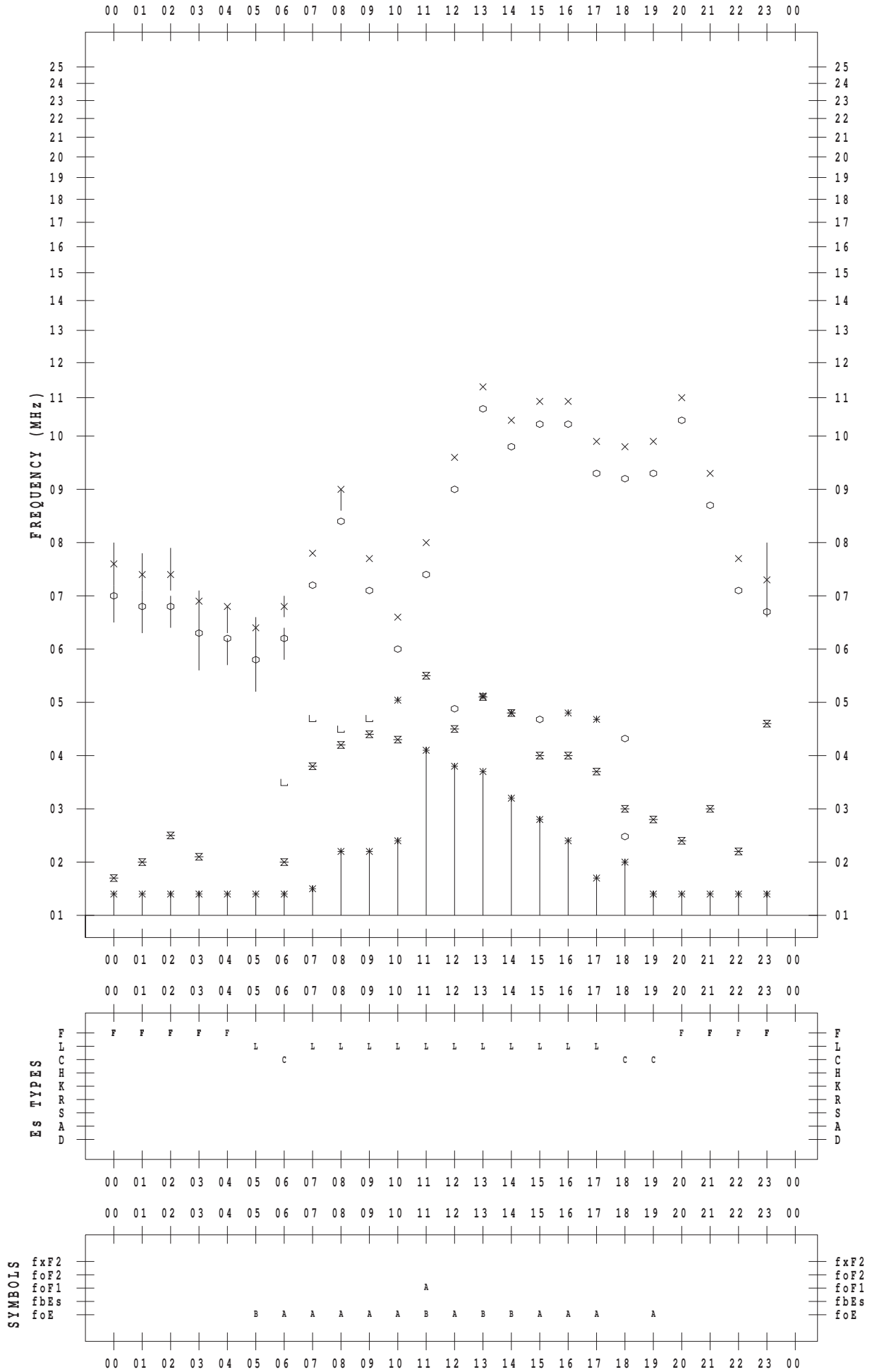
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SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/28

135 ° E MEAN TIME



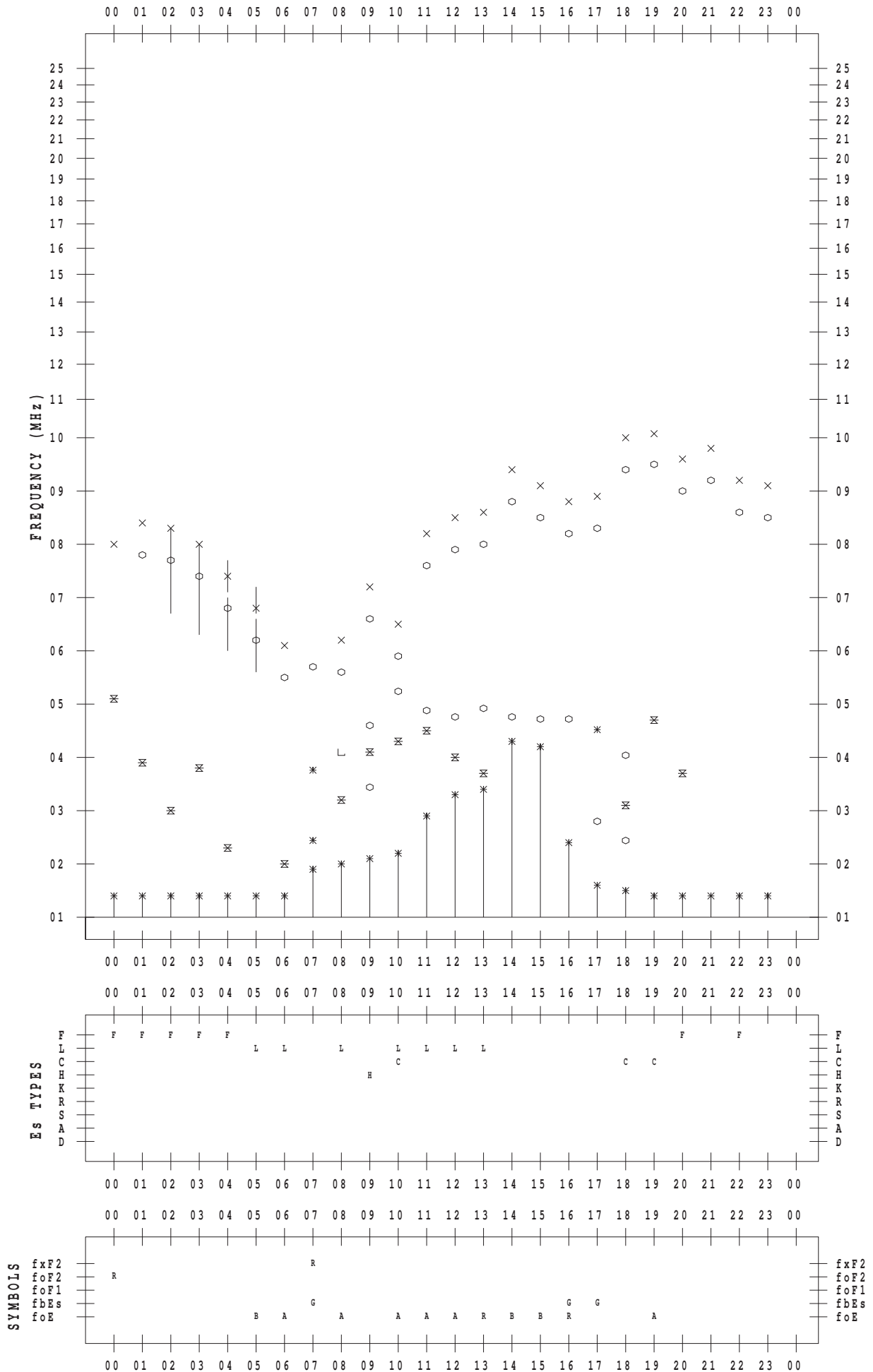
# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 6 / 29

135 ° E MEAN TIME



# f-PLOT DATA

SCALER : Y.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 6/30

135 ° E MEAN TIME

