

F-264

IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 1970

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RADIO RESEARCH LABORATORIES

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CONTENTS

	Page
Site of the Radio Wave Observatories and Hiraiso branch	2
Symbols and Terminology	2
Graphs of Ionospheric Data	10
Tables of Ionospheric Data at Wakkanai	11
Tables of Ionospheric Data at Akita	23
Tables of Ionospheric Data at Kokubunji	35
Tables of Ionospheric Data at Yamagawa	49
<i>f</i> -plot of Ionospheric Data	61
Data on Solar Radio Emission	93
Radio Propagation Conditions	96

SITE OF THE RADIO WAVE OBSERVATORIES AND HIRAIISO BRANCH

Ionospheric observation is carried out at the following four observatories in Japan.

	Latitude	Longitude	Site
Wakkanai	45°23.6'N.	141°41.1'E.	Midori-cho, Wakkanai-shi, Hokkaido
Akita	39°43.5'N.	140°08.2'E.	Tegata Sumiyoshi-cho, Akita-shi, Akita-ken
Kokubunji	35°42.4'N.	139°29.3'E.	Nukui-Kitamachi, Koganei-shi, Tokyo-to
Yamagawa	31°12.1'N.	130°37.1'E.	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken

Solar radio emission and radio propagation conditions are observed at Hiraiso Branch and Inubo Radio Wave Observatory.

	Latitude	Longitude	Site
Hiraiso	36°22.0'N.	140°37.5'E.	Isozaki-machi, Nakaminato-shi, Ibaraki-ken
Inubo	35°42.2'N.	140°51.5'E.	9912 Tennodai, Choshi-shi, Chiba-ken

SYMBOLS AND TERMINOLOGY

A. IONOSPHERE

All symbols and terminology in the table of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction," 1961.

Terminology

f_oF2 f_oF1 f_oE	}	The ordinary wave critical frequency for the $F2$, $F1$ and E layers, respectively.
f_oEs		The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.
f_bEs		The lowest ordinary wave frequency at which the Es layer begins to become transparent. This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.
f -min		The frequency below which no echoes are observed.
$M(3000)F2$		The maximum usable frequency factor for a path of 3000 km for transmission by $F2$ layer.
$M(3000)F1$		The maximum usable frequency factor for a path of 3000 km for transmission by $F1$ layer.
$h'F2$		The minimum virtual height, $h'F2$, refers to the highest, most stable stratification observed in the F region and can only be scaled when such stratification is present.
$h'F$		The natural and most significant F region virtual height parameter is that for lowest F region stratification. This will be denoted by $h'F$. Thus $h'F$ is identical with the current $h'F2$ when F region stratification is absent, e.g., at night, and with the current $h'F1$ when $F1$ stratification is present.
$h'Es$		The lowest virtual height of the trace used to give the f_oEs .
h_pF2		The virtual height of the $F2$ layer measured on the ordinary

$ypF2$ wave component at a frequency equal to $0.834f_0F2$.
 The semi-thickness of the $F2$ layer deduced from a parabolic fit to the "nose" of the electron density distribution with height and based on the observed $h'f$ trace. (The difference between $hpF2$ and the virtual height at $0.969f_0F2$).

a. Descriptive Letters

The following letters are entered after or used to replace a numerical value on the monthly tabulation sheets.

- | | |
|---|--|
| A | Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example <i>Es</i> . |
| B | Measurement influenced by, or impossible because of, absorption in the vicinity of f -min. |
| 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. Used in a qualifying sense, see below. |
| E | Measurement influenced by, or impossible because of, the lower limit of the normal frequency range. Used in a qualifying sense, see below. |
| F | Measurement influenced by, or impossible because of, the presence of spread echoes. |
| G | Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately. |
| H | Measurement influenced by, or impossible because of, the presence of a stratification. |
| 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. |
| R | Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency. |
| S | Measurement influenced by, or impossible because of, interference or atmospherics. |
| T | Value determined by a sequence of observations, the actual observation being inconsistent or doubtful. |
| V | Forked trace which may influence the measurement. |
| W | Measurement influenced or impossible because the echo lies outside the height range recorded. |
| X | Measurement refers to the extraordinary component. |
| Y | Intermittent trace. |
| Z | Third magneto-ionic component present. |

b. Qualifying Letters

The following letters are entered in the first column before a numerical value on

the monthly tabulation sheets.

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.
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-ionic component.

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

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

Median (MED) of a set of numbers is the middle value when the numbers 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.

d. Description of Standard Types of *Es*

The eight standard types of *Es* are identified by corresponding capital letters: *F*, *L*, *C*, *H*, *Q*, *R*, *A*, *S*. These letters suggest the names flat, low, cusp, high, equatorial, retardation, auroral and slant, respectively. The letter 'N' is used to designate any *Es* trace that does not correspond to any of the eight types.

F An *Es* trace which shows no appreciable increase of height with frequency. The trace is usually relatively solid at most latitudes. This classification may only be used at night; apparently flat *Es* traces observed in the daytime are classified according to their virtual height: *H* or *L*.

L A flat *Es* trace at or below the normal *E* layer minimum virtual height in the day or below the night *E* layer minimum virtual height at night.

C An *Es* trace showing a relatively symmetrical cusp at or below f_oE . This is usually continuous with the normal *E* trace, although when the deviative absorption is large, part or all of the cusp may be missing. (Usually a daytime type.)

H An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above f_oE . 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. The spread is most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)

R An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation but which is nonblanketing over part or all of its frequency range. This is distinguished from the usual group retardation (as in the case of an occulting thick *E* layer) by the lack of group retardation in the *F* layer traces at corresponding frequencies and the lack of complete blanketing.

A An *Es* having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These sometimes extend over several hundred kilometers of virtual height.

S A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace. The rising trace alone is classified as 'S'; the horizontal trace is classified separately. At high latitudes the slant trace usually starts to rise from a horizontal *Es* trace such as *Es-L*, or *Es-F*, at frequencies which greatly exceed the *E* layer critical frequency, whereas at low latitudes it usually rises from *Es-Q* *Es-C* or *Es-H* at frequencies near the regular *E* critical frequency. Type *S* is never used to determine f_oEs and $h'Es$. The slant trace is sometimes observed to start at f_oE without echoes clearly identifiable as *Es* echoes being seen.

N The designation '*N*' is used to denote an *Es* trace which cannot be classified into one of the standard types. When a trace appears to be intermediate between any two classes a choice should be made whenever possible even if it is uncertain. '*N*' should be used sparingly.

e. Multiple Reflections from *Es*

When the ionogram shows the presence of multiple reflections from *Es* the number of traces seen should be recorded after the letter indicating the type.

B. SOLAR RADIO EMISSION

Solar radio observations are carried out on 200 and 500 MHz at Hiraiso Branch. Antennas are two parabolic reflectors: 10 meter for 200 MHz and 5 meter for 500 MHz, each having the total power receiver. Observations are feasible almost from sunrise to sunset.

a. Time and Unit

The time is expressed as U.T.

The unit is $10^{-22} \text{ W} \cdot \text{m}^{-2} \text{ Hz}^{-1}$ for both components of polarization.

b. Daily Data

Flux density

The three-hourly and daily mean values are given.

Variability

The three-hourly and daily mean values are given at 200 MHz only.

Variability is expressed in the following four grades:

- 0 = Quiet or no burst,
- 1 = A few bursts,
- 2 = Many bursts,
- 3 = Very many bursts.

The number of bursts exceeding the flux level is counted. Bracket means that observation time does not exceed one third of the period.

c. Distinctive Events

The phenomena are picked up on the following criteria:

1. Distinct from the prevailing kind of activity,
2. Correlated with other known solar phenomena,
3. Remarkable change-over from one situation to another.

Starting time and *Time of maximum* are given to nearest minute in general, but to nearest a tenth minute for short intense occurrences or clear commencements.

Duration is given in minutes and to nearest a tenth minute, if short or clear.

Descriptive type is denoted by the following symbols:

- S = Simple rise and fall of intensity;
- C = Complex variation of intensity,
- C+ = Prolonged broad-band enhancement of radiation, generally of spectral type IV;
- F = Group of bursts: multiple peaks probably belonging to the same event, but separated by relatively short period of quietness;
- RF = More or less irregular rise and fall of intensity, at metric or decimetric wavelengths;
- e = Sudden beginning of burst with steep rise of intensity;
- E = Steep rise of intensity of continuum background;
- p.i. = post-burst increase;
- onset storm = clear-cut beginning of a noise storm.

Peak intensity is the flux density of the highest peak reached during the occurrence, measured above the pre-burst level.

Mean intensity is the flux density averaged over the burst's duration, measured above the pre-burst level; therefore, multiplying the duration, the total energy of the occurrence can be estimated.

C. RADIO PROPAGATION CONDITIONS**a. Field Strengths of WWV and WWVH**

Field Strengths observations of WWV and WWVH transmitted from Fort Collins, Colorado and Hawaii, respectively, are carried out at Hiraio Branch. In order to avoid interferences with other standard frequency waves on the same frequency, the upper side-band of 440 Hz is picked up by the use of a narrow band pass filter with

± 40 Hz bandwidth.

The *tabulated field strength* is the average of peak value of the incident upper side-band field intensity in dB above one microvolt per meter. The *duration* of observation is two minutes for WWV and three minutes for WWVH following the time indicated in universal time on the table.

Particulars of the transmitter and receiver are summarized in the following tables:

Transmitter

	WWV	WWVH
Location	Fort Collins, Colorado Long. 105°02'W Lat. 40°41'N	Maui, Hawaii Long. 156°28'W Lat. 20°46'N
Power	3 kW for the upper side-band	0.5 kW* for the upper side-band
Antenna	$\lambda/2$ vertical	$\lambda/2$ vertical
Distance	9150 km	6270 km

* Reduced from the carrier power of 2 kW with amplitude modulation of 100%.

Receiver

Antenna	4.5 m vertical rod
Bandwidth	± 40 Hz for the upper side-band
Calibration	every half an hour

The meaning of *Descriptive symbols* is as follows:

- C : Measurement influenced by, or impossible because of, any non-propagational reasons.
- S : Measurement influenced by, or impossible because of, interferences or atmospheric.
- U : Inaccurate measurement influenced by interferences, atmospheric, or non-propagational reasons.
- E : Less than the following figure.

b. Radio Propagation Quality Figures

Radio propagation quality figures are usually expressed on the scale that ranges from one to five as follows:

- 1 = very poor (very disturbed)
- 2 = poor (disturbed)
- 3 = rather poor (unstable)
- 4 = normal
- 5 = good

The tabulated circuits contain Hamburg (commercial circuit), WWV (10, 15 and 20 MHz frequencies broadcast from Fort Collins, Colorado), Lima (commercial circuit) and WWVH (10 and 15 MHz frequencies broadcast from Hawaii), which are received at Hiraiso Branch.

Warnings of radio propagation which are broadcast from JJY station are expressed in three grades:

N = normal
 U = unstable
 W = disturbed

The letter W expresses HF propagation disturbances which are expected to occur during the following 12 hours after issue. The letter U and N also means unstable and normal conditions, respectively.

Whole day radio quality indices stand for the averages of the 6-hourly indices of the circuits of Hamburg, WWV and Lima.

Start-and end-time of principal geomagnetic storms correlated with radio propagation conditions are tabulated from observations at Kakioka Magnetic observatory.

c. Sudden Ionospheric Disturbances (S.I.D's.)

(i) SWF

The data of short wave fade-out (SWF) are prepared from the records of field intensities at Hiraiso, of the following circuits. Start-time, Duration, Type and Importance are obtained from the data of a circuit whose Drop-out Intensity is underlined. Drop-out Intensities of 10, 15 and 20 MHz are indicated by ('), (none), and ("), respectively. Characteristics of the phenomenon are classified as follows.

Circuits and Drop-out intensities

CO WWV 20, 15 and 10 MHz (Fort Collins, Colorado)
 LM Various frequencies of commercial circuit (Lima)
 HA WWVH 15 and 10 MHz (Hawaii)
 TO JJY 15 and 10 MHz (Tokyo)
 SH BPV 15 and 10 MHz (Shanghai)
 HB Various frequencies of commercial circuit (Hamburg)

Start-time and Duration

Types

S : sudden drop-out and gradual recovery
 Slow : slow drop-out taking 5 to 15 minutes and gradual recovery
 G : gradual disturbances; irregular change in both drop-out and recovery

Importances

Degrees of SWF are classified into 9 grades according to the amplitude of fade-out;

1 -	1	1 +
2 -	2	2 +
3 -	3	3 +

Besides, the time of phenomena associated with SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record), are given in this table from interchange messages of IUWDS or measurements at Hiraiso.

(ii) SPA

The data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio wave propagation received at Inubo Radio Wave Observa-

tory. Characteristics of the VLF radio wave propagation are as the following table. In the last column, a spherical earth with a radius of 6371.2 km is assumed.

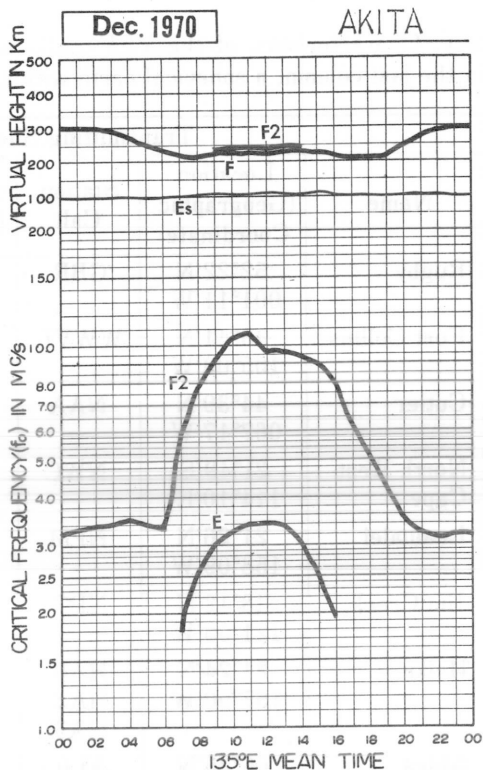
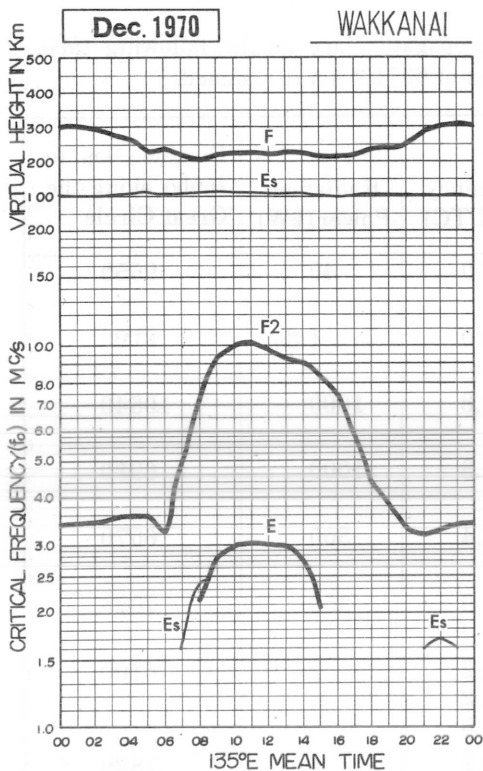
Transmitting Site					Distance (km) to Inubo along the Great Circle
Name	Location (Geographic Coordinate)	Station Call	Frequency (kHz-UTC)	Radiation Power (kW)	
Rugby	52°22'N 001°11'W	GBR	16.0	40	9550
Fort Collins	40°41'N 105°03'W	WWVL	20.0	1.8	9190
Cutler	44°39'N 067°17'W	NAA	17.8	1000	10640
North West Cape	21°49'S 114°10'E	NWC	22.3	1000	6990
Lualualei	21°26'N 158°09'W	NPM	23.4	300	6070
Jim Creek	48°12'N 121°55'W	NPG	18.6	250	7620
Haiku	21°24'N 157°50'W	HA0	10.2	2	6100
		HA2	12.2		
		HA3	13.6		
Aldra	66°25'N 013°09'E	AL0	10.2	4	7820
		AL2	12.2		
		AL3	13.6		

The phase advance is shown in its maximum stage. In the column 'Phase Advance', — means no transmission or no reception during the period, and blank means indistinguishable record.

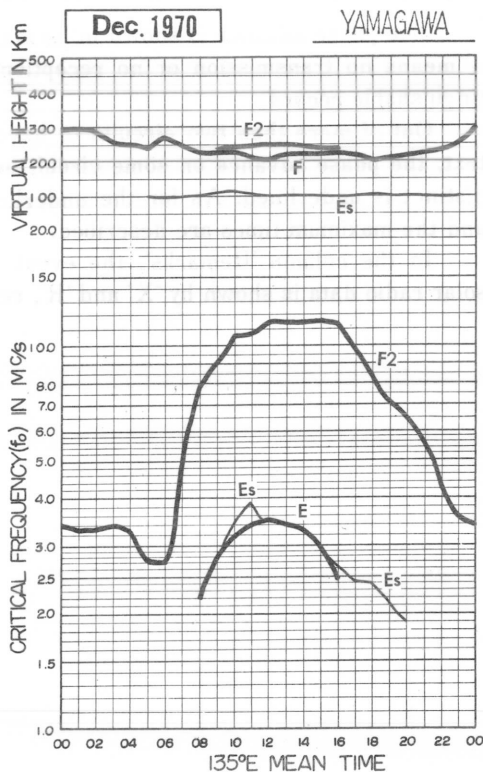
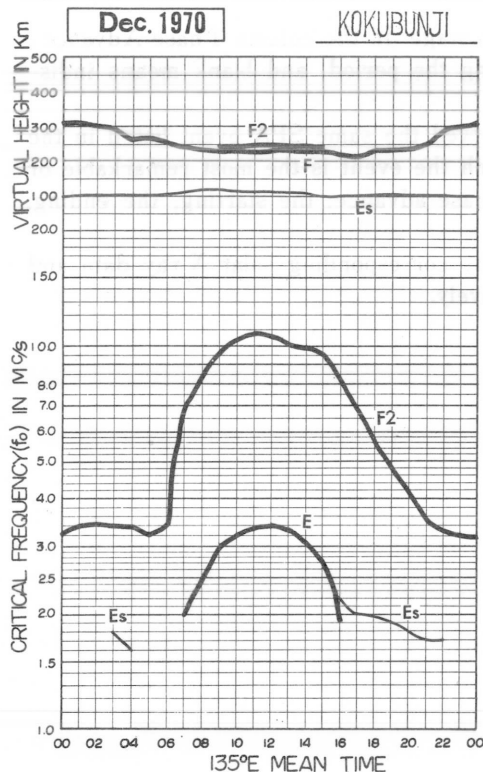
Out of more than two circuits to have observed the same SPA event listed in the text, the phase advance on some circuit on which the event is the most remarkable or distinct is underlined. As for the underlined phase advance, the starting, the ending, and the maximum times are described.

In the column 'Remarks', the event with its corresponding solar X-ray data and solar radio data is shown by 'X' and 'R', respectively.

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA

DEC. 1970

FOF2 (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45 23.6 N Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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 ₃₆	F ₃₅	F	F ₃₅	37	42	33	63	77	95	100	115	101	84	88	82	85	47	42	40	34	35	F	F ₄₃
2	F	F	F	F ₄₄	F ₄₆	43	34	58	84	87	118	108	91	94	88	86	63	43	33	41	35	31	33	36
3	37	38	37	37	38	43	33	67	73	95	94	94	101	94	87	81	76	48	38	44	37	34	34	34
4	39	40	41	41	42	43	37	61	72	90	110	103	100	92	77	85	75	47	34	40	29	28	29	29
5	30	33	33	34	33	34	23	50	81	89	105	103	103	94	92	83	85	58	53	43	40	36	40	38
6	40	39	43	43	43	43	35	63	73	89	110	105	88	99	82	84	81	50	42	38	33	31	30	33
7	32	33	33	33	35	38	43	61	88	102	106	102	97	90	93	84	68	46	42	36	33	32	33	34
8	33	33	34	34	S ₃₃	33	34	69	86	93	119	116	99	97	89	104	76	57	49	37	30	32	33	35
9	34	33	33	33	30	29	31	67	85	113	112	R	105	103	95	95	74	630	47	40	36	30	31	33
10	33	33	33	33	33	35	34	61	82	87	113	110	98	92	88	93	73	46	53	39	29	31	34	33
11	33	34	35	34	36	36	36	60	86	97	97	101	93	100	87	77	67	57	44	34	27	28	31	31
12	33	34	34	35	35	36	41	66	73	86	103	96	103	100	91	80 ^V	65	69	44 ^I	34 ^A	32	31	34	36
13	36	37	35	34	34	34	36	58	83	98	97	100	87	94	93	73	63	53	43	40	31	30	34	36
14	38	38	39	38	37	43	41	C	C	C	106	114	91	93	94	86	77	74	44	32	32	37	40	22
15	25	26	26	26	26	25	28	56	89	109	138	110	103	106	107	103	77	58	51	42	35	34	33	F ₃₅
16	F ₃₃	F ₃₀	F	F ₃₅	F ₃₅	F	F ₂₇	F ₅₀	83	97	119	106	103	94	97	87	67	61	46	40	34	33	34	F ₃₅
17	F ₂₈	F	F ₃₄	F ₃₀	F	F ₃₃	30	54	83	105	101	101	111	99	96	76	64	54	44	38	35	31	33	34
18	34	35	35	35	36	40	32	51	76	87	93	98	85	83	94	77	60	53	50	41	30	33	33	33
19	33	34	36	35	37	34	30	47	71	97	98	103	84	83	93	88	70	54	47	33	31	33	34	36
20	32	34	34	33	36	39	27	50	70	83	89	95	80	85	91	83	76	61	55	41	33	F ₃₀	33	A
21	A	35	34	34	36	36	34	50	64	91	96	102	90	96	96	95	77	58	43	38	30	29	27	30
22	33	32	33	34	36	35	30	48	68	87	96	91	94	107	96	85	80	56	50	39	26	30	33	36
23	36	33	34	34	F ₄₁	F ₄₀	26	46	68	88	89	93	86	91	95	81	70	68	54	39	33	33	37	37
24	38	F	F ₄₀	F ₄₃	43	36	F ₂₇	44	73	100	107	95	80	88	93	85	81	63	44	35	41	41	F	F ₄₃
25	F ₄₃	F	F	F	F ₅₅	F ₃₆	F ₂₆	48	81	107	87	85	85	94	90	78	61	55	36	33	33	A	F ₃₀	F ₃₀
26	F ₃₀	F	F	F ₃₃	F ₃₅	F ₃₃	F ₂₃	48	68	86	98	108	98	103	84	75	76	54	43	36	F ₂₄	F ₃₅	F ₃₆	F ₃₇
27	37	37	F ₃₃	F ₃₆	F ₃₅	F	26	44	67	95	YOB	96	103	90	80	76	72	57	43	29	28	31	34	33
28	31	33	33	37	41	41	F ₂₆	44	73	113	93	90	93	93	85	90	93	55	43	42	35	43	44	36
29	37	37	35	36	33	33	36	43	91	103	114	116	116	92	86 ^R	96	77	60	54	43	36	31	34	39
30	44	45	F	F ₄₇	47	38	35	50	75	91	90	109	113	106	88	76	83	64	43	41	F	F	F	F
31	F	F	F	F	F	F	F	F ₅₀	67	82	89	104	93	84	86	73	59	58	48	A	A	33	33	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	25	24	29	29	28	30	30	30	30	31	30	31	31	31	31	31	31	31	30	29	29	28	29
MED	34	34	34	35	36	36	32	50	76	94	100	102	97	94	91	84	75	57	44	39	33	32	33	34
UQ	37	37	36	37	41	40	35	61	83	100	110	108	103	99	94	88	77	60	50	41	35	33	34	36
LQ	32	33	33	34	34	34	27	48	71	87	95	96	89	90	87	78	67	53	43	36	30	31	33	33

The Radio Research Laboratories, Japan

DEC. 1970

FOF2 (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

FOF1 (0.01 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45 23.6 N Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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																								
2																								
3																								
4																								
5																								
6																								
7																								
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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																								
MED																								
UQ																								
LQ																								

DEC. 1970

FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1970

FOE (0.01 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45 23.6 N Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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								S	A	290	305	310	305	295	265	200	S							
2								S	230	290	300	310	300	295	270	210	S							
3								A	230	290	300	305	305	295	285	210	S							
4								S	230	290	300	310	305	300	270	205	S							
5								E	205	280	300	305	300	290	270	205	S							
6								E	215	290	300	305	310	295	255	200	S							
7								S	215	290	A	A	305	295	240	A	A							
8								S	235	295	305	305	300	300	290	200	S							
9						E		S	225	285	300	305	305	300	280	230	S							
10								A	A	A	290	305	300	300	255	205	S							
11								S	215	255	300	305	310	300	290	205	S							
12								S	230	300	320	320	325	300	260	A	A							
13								A	A	B	B	B	B	B	B	A	A							
14								C	C	C	300	310	320	300	270	205	E	E	E					
15								A	220	290	A	A	A	300	275	A	A							
16								A	225	275	300	300	300	295	265	205	S							
17								A	210	280	300	305	305	300	275	205	S							
18								A	A	265	295	300	305	300	270	205	S							
19								A	A	255	290	300	300	290	270	195	A							
20								A	A	A	300	300	I A 300	A	270	215	E							
21								S	210	280	A	A	300	I A 300	280	A	S							
22								S	205	270	295	300	300	295	260	S	S							
23								S	A	275	R	A	A	295	255	230	A							
24								E	210	270	295	300	300	300	260	205	A							
25								S	200	A	A	305	305	300	270	210	A							
26								E	A	A	A	A	300	290	275	210	S							
27								S	210	255	295	300	305	300	275	200	E							
28								S	200	A	A	295	300	300	255	210	S							
29								A	A	260	285	I A 295	300	285	260	A	A							
30								E	A	265	295	I A 300	290	290	I A 260	205	S							
31								E	A	I A 250	290	300	300	300	260	210	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							1	6	19	24	23	25	28	29	30	24	3	1	1					
MED							E	E	215	280	300	305	300	300	270	205	E	E	E					
UQ								E	228	290	300	305	305	300	275	210	E							
LQ								E	210	265	295	300	300	295	260	205	E							

DEC. 1970

FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1970

FOES (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station	WAKKANAI																							Lat.	45 23.6 N		Long.	141 41.1 E		Sweep 1 MHz to 20 MHz in 20 sec in automatic operation																						
Hour Day	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 ₁₆	E	E	E	E	E	E	E ₁₉	28	G	G ₂₇	G	G	G	G	E ₁₅	E	E	E	J ₂₅ X	J ₂₅ X	E	J ₂₅ X																													
2	28	E	E	E	E	E	E ₁₅	E ₁₆	G	G	G ₂₃	G ₂₆	G	G	G	E ₁₅	E	E ₁₇	E	E	E ₁₅	J ₂₄ X	21																													
3	E ₁₆	E ₁₆	E	E	E	31	J ₃₀ X	21	G	G	36	G	G	G	G	E ₂₀	E ₁₄	E ₁₅	E ₁₆	E ₁₆	E	E ₁₇	E																													
4	E	J ₂₃ X	J ₂₃ X	E	E	E	E	E ₁₇	G	34	G	G ₃₀	G ₂₂	G	G	E ₁₈	E ₁₅	E	E ₁₅	E	E ₁₆	E ₁₅	E ₁₅																													
5	29	E	E	E	J ₂₃ X	E ₁₅	E	G	28	G	G	G	G	G	G	E ₁₅	E	E	E	E	E	E	E ₁₆																													
6	E	E	E	E	E	E	E ₁₅	G	30	G	G	G	J ₅₈ X	G	G	E ₁₅	E	E ₁₅	E ₁₅	E ₁₇	E	E ₁₆	E ₁₅																													
7	E ₁₆	E	E	E	E	E	E ₁₅	G	G	G	J ₅₁ X	34	32	G	G	33	32	28	E	E ₁₆	29	30	18	E																												
8	E ₁₅	E	E	E	E ₁₅	E	E ₁₅	E ₁₇	G	G	35	38	37	38	G	25	E ₁₆	30	E	E	E	E ₁₅	E	E ₁₅																												
9	E ₁₇	E	E	E	E	E	E	E ₁₇	G	39	36	35	38	G	G	E ₁₅	J ₂₃ X	E ₁₄	E ₁₅	E ₁₅	E ₁₆	J ₂₁ X	E ₁₆																													
10	30	25	E	E	18	J ₃₁ X	J ₂₁ X	30	35	34	36	G	G	26	G	E ₁₃	E ₁₅	E ₁₅	E	E	E ₁₅	E ₁₅	E ₁₅																													
11	E ₁₅	E	E	E	E	E	E	E ₁₈	25	46	37	G	39	G	G	E ₁₅	E ₁₄	E	18	30	E	E	E ₁₅																													
12	E ₁₅	E	E	E	E	E	E	G	G	G	36	36	G	34	32	24	20	E ₁₅	E	J ₅₃ X	J ₂₅ X	J ₃₃ X	J ₃₁ X	E ₁₅																												
13	E ₁₄	E	E	E	E	E ₁₆	E ₁₅	31	33	E ₃₂ B	E ₃₂ B	E ₃₅ B	E ₃₇ B	E ₃₇ B	E ₃₀ B	34	39	30	29	J ₂₄ X	42	E ₁₅	J ₄₃ X	31																												
14	23	E ₁₅	30	16	E	E	E ₁₅	C	C	C	G	34	G	G	G	G	G	E	E	E ₁₅	19	32	J ₂₅ X	31																												
15	E ₁₆	E	E	17	E	E	E	28	28	G	J ₅₁ X	J ₅₀ X	31	G	G	22	31	24	J ₃₅ X	J ₃₀ X	31	J ₃₀ X	31	28																												
16	30	26	E	E	13	E	E	19	G	G	G	G	G	G	G	E ₁₈	J ₇₈ X	J ₄₃ X	E ₁₅	E ₁₆	E ₁₅	E	E																													
17	E	30	27	30	30	E	E	22	G	24	37	42	G	G	G	E ₁₆	E	E	E	E ₁₅	E ₁₆	E	28																													
18	E	E	E	E	E	E	24	29	J ₄₁ X	G ₂₅	34	G	G	G	G	E ₁₇	E ₁₅	E	18	E ₁₅	21	30	30																													
19	28	25	E	18	J ₂₃ X	E	E	20	27	31	G	G	G	G	G	33	J ₄₅ X	32	J ₂₃ X	J ₂₃ X	J ₂₄ X	J ₂₃ X	E ₁₄																													
20	30	E	E	E	E	E ₁₅	20	25	J ₄₅ X	G	G	32	35	31	G	20	J ₂₇ X	E	E	E ₁₆	J ₃₁ X	J ₂₉ X	J ₆₄ X																													
21	J ₄₃ X	J ₃₆ X	J ₂₈ X	J ₃₁ X	17	E	E	E ₁₅	G	36	42	33	29	33	G	24	E ₁₅	E ₁₄	E	21	E	E ₁₅	E ₁₅	29																												
22	J ₂₃ X	E	E	E	E	E	E	E ₁₆	G	G	G	G	G	G	G	E ₂₃	E ₁₅	E	E ₁₅	E ₁₄	E ₁₄	E	E ₁₆	E																												
23	E ₁₅	J ₆₃ X	J ₂₃ X	E	E	E	E	E ₁₅	22	G	G	37	41	G	G	17	E ₁₂	E	E	E ₁₅	E	E	J ₃₀ X																													
24	33	E	E	20	13	E	E ₁₅	19	29	G	G	G	G	G	G	17	E ₁₅	E	E ₁₅	E	22	E	E																													
25	E	E	E	17	J ₂₃ X	E	E	E ₁₅	23	50	34	G	G	25	G	G	19	32	J ₃₀ X	E	19	J ₄₅ X	J ₄₃ X	J ₃₃ X																												
26	31	26	E	E	E	J ₂₅ X	15	J ₂₈ X	J ₇₃ X	34	32	G	G	G	G	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₆	E	21																												
27	E ₁₅	E ₁₅	E	E	16	25	E	J ₆₃ X	G ₂₁	32	J ₄₁ X	G	G	G	G	38	J ₅₃ X	E	E ₁₃	24	E ₁₅	E ₁₅	E ₁₅	E ₁₅																												
28	E ₁₅	E	E	E	E	E	E	E ₁₅	G	J ₆₃ X	39	40	G	G	G	E ₁₅	E	E	E ₁₄	J ₅₅ X	J ₄₃ X	J ₂₇ X	E																													
29	E	E	16	J ₂₄ X	E	E	E	J ₄₀ X	J ₆₃ X	G	G	32	22	26	30	24	J ₃₂ X	J ₂₈ X	21	18	30	20	J ₃₁ X	J ₃₀ X																												
30	J ₃₁ X	J ₂₃ X	J ₂₃ X	E	E	E	E	23	30	35	38	J ₄₃ X	G	G	33	G	E ₁₇	E	J ₂₅ X	J ₃₇ X	J ₃₁ X	J ₃₈ X	J ₂₁ X	J ₃₃ X																												
31	25	J ₃₀ X	18	E	E	E	E	17	33	30	26	G ₂₉	G	G	G	19	E	23	J ₈₃ X	J ₆₃ X	J ₂₈ X	J ₂₄ X	J ₂₃ X																													
CNT	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31																												
MED	E ₁₆	E	E	E	E	E	E	16	24	G ₂₄	34	G ₂₈	G	G	G	G	E ₁₇	15	E ₁₃	E ₁₅	E ₁₆	16	17	16																												
UQ	28	24	16	E ₁₆	14	E	15	22	29	35	36	35	31	E ₂₅ G	G	22	20	26	19	20	27	J ₂₉ X	J ₂₆ X	30																												
LQ	E ₁₅	E	E	E	E	E	E	E ₁₅	G	G	G	G	G	G	G	E ₁₅	E	E	E	E	E ₁₄	E ₁₅	E	E ₁₅																												

The Radio Research Laboratories, Japan

DEC. 1970

FOES (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

FBES (0.1 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45 23.6 N Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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 ₁₆	E	E	E	E	E	E	E ₁₉	26	G	G ₂₀	G	G	G	G	G	E ₁₅	E	E	E	E	E	17	E	E
2	E	E	E	E	E	E	E	E ₁₅	E ₁₆	G	G	G ₂₃	G ₂₄	G	G	G	E ₁₅	E	E ₁₇	E	E	E ₁₅	E	E	
3	E ₁₆	E ₁₆	E	E	E	20	17	19	G	G	G	G	G	G	G	G	E ₂₀	E ₁₄	E ₁₅	E ₁₆	E ₁₆	E	E ₁₇	E	
4	E	16	15	E	E	E	E	E ₁₇	G	22	G	G ₂₆	G ₂₆	G	G	G	E ₁₈	E ₁₅	E	E ₁₅	E	E ₁₆	E ₁₅	E ₁₅	
5	E	E	E	E	E	E ₁₅	E	G	G	G	G	G	G	G	G	G	E ₁₅	E	E	E	E	E	E	E ₁₆	
6	E	E	E	E	E	E	E ₁₅	G	G	G	G	G	25	G	G	G	E ₁₅	E	E ₁₅	E ₁₅	E ₁₇	E	E ₁₆	E ₁₅	
7	E ₁₈	E	E	E	E	E	E ₁₅	G	G	G	46	32	25	G	G	26	16	16	E	E ₁₆	16	20	14	E	
8	E ₁₅	E	E	E	E ₁₅	E	E ₁₅	E ₁₇	G	G	G	G	G	G	G	G	E ₁₆	E	E	E	E	E ₁₅	E	E ₁₅	
9	E ₁₇	E	E	E	E	E	E	E ₁₇	G	G	G	26	24	G	G	G	E ₁₅	17	E ₁₄	E ₁₅	E ₁₅	E ₁₆	E ₁₆	E ₁₆	
10	E	E	E	E	16	18	19	17	21	29	G	G	G	G	G	G	E ₁₅	E ₁₅	E ₁₅	E	E	E ₁₅	E ₁₅	E ₁₅	
11	E ₁₅	E	E	E	E	E	E	E ₁₈	G	G	G	G	G	G	G	G	E ₁₅	E ₁₄	E	E	E	E	E	E ₁₅	
12	E ₁₅	E	E	E	E	E	E	G	G	G	26	26	G	G	G	24	17	E ₁₅	E	A	17	20	18	E ₁₅	
13	E ₁₄	E	E	E	E	E ₁₆	E ₁₅	18	26	E ₃₂	E ₃₂	E ₃₅	E ₃₇	E ₃₇	E ₃₀	26	22	19	E	18	20	E ₁₅	E	18	
14	17	E ₁₅	16	E	E	E	E ₁₅	C	C	C	C	G	G	G	G	G	G	E	E	E ₁₅	18	24	20	17	
15	E ₁₆	E	E	E	E	E	E	17	20	G	38	40	31	G	G	22	18	20	19	18	16	17	E	E	
16	15	E	E	E	E	E	E	17	G	G	G	G	G	G	G	G	E ₁₈	46	19	E ₁₅	E ₁₆	E ₁₅	E	E	
17	E	E	E	E	E	E	E	15	G	G ₂₂	25	22	G	G	G	G	E ₁₆	E	E	E	E ₁₅	E ₁₆	E	E	
18	E	E	E	E	E	E	15	16	25	G ₂₀	24	G	G	G	G	G	E ₁₇	E ₁₅	E	E	E ₁₅	E	E	17	
19	E	E	E	E	E	E	E	15	26	G	G	G	G	G	G	G	16	20	15	E	E	17	E	E ₁₄	
20	E	E	E	E	E	E	E	15	25	30	G	G	31	34	G	G	18	24	E	E	E ₁₆	18	24	A	
21	A	23	18	17	E	E	E	E ₁₅	G	G	34	32	29	33	G	24	E ₁₅	E ₁₄	E	E	E	E ₁₅	E ₁₅	E	
22	E	E	E	E	E	E	E	E ₁₆	G	G	G	G	G	G	G	G	E ₂₃	E ₁₅	E	E ₁₅	E ₁₄	E ₁₄	E	E ₁₆	E
23	E ₁₅	E	17	E	E	E	E	E ₁₅	22	G	G	37	40	G	G	G	16	E ₁₂	E	E	E ₁₅	E	E	18	
24	E	E	E	E	E	E	E ₁₅	G	G	G	G	G	G	G	G	G	16	E ₁₅	E	E ₁₅	E	15	E	E	
25	E	E	E	E	E	E	E	E ₁₅	G	27	30	G	G	G	G	G	16	18	15	E	E	A	18	21	
26	17	16	E	E	E	E	E	G	23	55	30	31	G	G	G	G	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₆	E	E	
27	E ₁₅	E ₁₅	E	E	E	17	E	E ₁₅	20	G	24	G	G	G	G	G	42	E	E ₁₃	E	E ₁₅	E ₁₅	E ₁₅	E ₁₅	
28	E ₁₅	E	E	E	E	E	E	E ₁₅	G	28	28	23	G	G	G	G	E ₁₅	E	E	E ₁₄	14	17	15	E	
29	E	E	E	17	E	E	E	20	22	G	G	30	22	G	G	23	25	23	18	E	19	18	22	20	
30	25	17	14	E	E	E	E	19	23	G	G	30	G	G	31	G	E ₁₇	E	20	23	17	16	E	20	
31	E	E	E	E	E	E	E	G	23	27	25	27	G	G	G	G	18	E	14	A	A	19	17	17	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	E ₁₃	E	E	E	E	E	E	E ₁₆	G	G	G	E ₂₂	G	G	G	G	E ₁₆	E ₁₄	E	E ₁₄	E ₁₅	16	E ₁₄	E ₁₅	
UQ	E ₁₆	E	E	E	E	E	15	16	23	22	26	27	22	G	G	G	17	16	E ₁₅	E ₁₅	16	17	15	17	
LQ	E	E	E	E	E	E	E	15	G	G	G	G	G	G	G	G	E ₁₅	E	E	E	E	15	E	E	

DEC. 1970

FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1970

F-MIN (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45 23.6 N Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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 ₁₆	E	E	E	E	E	E	E ₁₉	15	17	16	16	17	17	16	17	E ₁₅	E	E	E	E ₁₅	E	E	E	
2	E	E	E	E	E	E	E ₁₅	E ₁₆	16	17	18	18	20	17	17	14	E ₁₅	E	E ₁₇	E	E	E ₁₅	E	E	
3	E ₁₆	E ₁₆	E	E	E	E ₁₆	E	E	16	17	19	20	20	19	15	15	E ₂₀	E ₁₄	E ₁₅	E ₁₆	E ₁₆	E	E ₁₇	E	
4	E	E	E	E	E	E	E	E ₁₇	11	12	12	17	17	15	14	E	E ₁₈	E ₁₅	E	E ₁₅	E	E ₁₆	E ₁₅	E ₁₅	
5	E ₁₆	E	E	E	E	E ₁₅	E	E	12	13	16	14	17	16	11	12	E ₁₅	E	E	E	E	E	E	E ₁₆	
6	E	E	E	E	E	E	E ₁₅	E	E	11	12	16	17	19	11	11	E ₁₅	E	E ₁₅	E ₁₅	E ₁₇	E	E ₁₆	E ₁₅	
7	E ₁₈	E	E	E	E	E	E ₁₅	E ₁₇	15	17	17	19	20	19	16	E	E	E	E	E ₁₆	E	E	E	E	
8	E ₁₅	E	E	E	E ₁₅	E	E ₁₅	E ₁₇	16	16	16	17	17	17	17	13	E ₁₆	E ₁₅	E	E	E	E ₁₅	E	E ₁₅	
9	E ₁₇	E	E	E	E	E	E	E ₁₇	16	12	16	16	17	17	17	16	E ₁₅	E	E ₁₄	E ₁₅	E ₁₅	E ₁₆	E ₁₅	E ₁₆	
10	E ₁₆	E	E	E	E	E	E	E ₁₅	15	17	17	17	17	17	16	17	E ₁₅	E ₁₅	E ₁₅	E	E	E ₁₅	E ₁₅	E ₁₅	
11	E ₁₅	E	E	E	E	E	E	E ₁₈	15	17	16	16	17	19	17	16	E ₁₅	E ₁₄	E	E	E	E	E	E ₁₅	
12	E ₁₅	E	E	E	E	E	E	E ₁₅	17	20	18	20	16	20	20	17	E ₁₅	E ₁₅	E	E	E	E	E	E ₁₅	
13	E ₁₄	E	E	E	E	E ₁₆	E ₁₅	E ₁₂	20	32	32	35	37	37	30	20	11	E	E	E	E	E ₁₅	E ₁₅	E ₁₆	E ₁₅
14	E ₁₇	E ₁₅	E	E	E	E	E ₁₅	C	C	C	25	20	23	23	20	16	E	E	E	E ₁₅	E	E ₁₅	E	E	
15	E ₁₆	E	E	E	E	E	E	E	15	20	20	21	21	20	20	18	11	E	E ₁₅	E	E	E	E	E	
16	E	E	E	E	E	E	E	E	16	17	18	20	20	20	20	18	E ₁₈	E ₁₅	E ₁₅	E ₁₅	E ₁₆	E ₁₅	E	E	
17	E	E	E	E	E	E	E	E	16	17	17	20	24	20	20	18	E ₁₆	E	E	E	E ₁₅	E ₁₆	E	E	
18	E	E	E	E	E	E	E	E	14	16	18	20	20	20	19	18	E ₁₇	E ₁₅	E	E	E ₁₅	E	E ₁₅	E	
19	E ₁₆	E	E	E	E	E	E	E	16	17	19	20	20	20	20	17	E	E	E	E ₁₅	E ₁₅	E	E	E ₁₄	
20	E ₁₅	E	E	E	E	E	E ₁₅	E	20	19	20	20	20	20	20	17	E	E	E	E	E ₁₆	E	E	E	
21	E	E	E	E	E	E	E	E ₁₅	16	20	20	20	20	20	23	18	E ₁₅	E ₁₄	E	E	E	E ₁₅	E ₁₅	E	
22	E ₁₅	E	E	E	E	E	E	E ₁₆	16	18	20	23	20	19	20	E ₂₃	E ₁₅	E	E ₁₅	E ₁₄	E ₁₄	E	E ₁₆	E	
23	E ₁₅	E	E	E	E	E	E	E ₁₅	15	21	23	25	24	25	20	19	E	E ₁₂	E	E	E ₁₅	E	E	E	
24	E ₁₅	E	E	E	E	E	E ₁₅	E	17	19	20	21	23	22	20	17	11	E ₁₅	E	E ₁₅	E	E	E	E	
25	E	E	E	E	E	E	E	E ₁₅	17	18	17	20	20	20	19	15	E	E	E	E	E	E	E	E	
26	E ₁₅	E	E	E	E	E	E	E	15	17	19	18	19	19	18	17	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₆	E	E	
27	E ₁₅	E ₁₅	E	E	E	E	E	E ₁₅	17	17	17	19	20	20	18	16	E	E	E ₁₃	E ₁₆	E ₁₅	E ₁₅	E ₁₅	E ₁₅	
28	E ₁₅	E	E	E	E	E	E	E ₁₅	E	17	18	19	20	20	16	16	E ₁₅	E	E	E ₁₄	E	E ₁₅	E ₁₂	E	
29	E	E	E	E	E	E	E	E	12	16	17	17	18	17	17	17	E ₁₂	E ₁₅	E	E	E ₁₅	E	E ₁₅	E ₁₄	
30	E	E	E	E	E	E	E	E	15	17	20	19	20	20	17	18	E ₁₇	E	E	E	E	E	E	E	
31	E ₁₅	E	E	E	E	E	E	E	17	18	20	20	20	24	20	16	E	E	E	E	E	E	E	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	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	E ₁₅	E	E	E	E	E	E	E ₁₂	16	17	18	20	20	20	18	17	E ₁₅	E	E	E	E	E	E	E	
UQ	E ₁₆	E	E	E	E	E	E ₁₅	E ₁₅	16	18	20	20	20	20	20	18	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	
LQ	E	E	E	E	E	E	E	E	15	17	17	17	17	18	16	16	E ₁₁	E	E	E	E	E	E	E	

The Radio Research Laboratories, Japan

DEC. 1970

F-MIN (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

M(3000)F2 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45 23.6 N Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	265	265	F	285	300	335	340	335	340	340	340	320	340	320	340	315	355	320	335	310	305	265	F	255	
2	F	F	F	295	295	325	335	330	335	340	330	335	325	330	330	330	350	300	280	300	315	285	300	280	
3	270	275	260	285	270	310	305	335	330	360	330	340	320	340	345	325	330	335	315	300	295	320	280	280	
4	270	265	270	270	285	285	325	265	345	335	330	330	325	330	340	320	335	305	325	325	285	285	285	255	
5	265	260	275	295	280	340	340	320	335	315	335	330	335	330	320	305	330	310	320	315	305	280	265	290	
6	285	260	255	280	280	290	300	335	345	330	325	345	330	325	315	325	345	300	295	320	290	285	265	275	
7	260	260	250	265	265	285	315	310	340	335	340	325	335	325	320	325	310	320	305	315	305	280	275	270	
8	265	275	265	275	285	285	290	325	325	325	330	345	325	300	310	335	315	335	305	295	305	265	265	255	
9	295	260	275	285	300	280	275	330	330	355	330	R	320	315	345	360	325	310	315	310	305	285	260	275	
10	275	280	275	275	275	285	310	300	355	345	335	340	315	325	340	330	355	300	340	335	285	275	265	275	
11	265	275	275	275	290	295	300	320	340	350	345	330	325	300	340	340	325	315	320	305	280	280	270	270	
12	275	275	275	270	265	285	300	350	330	340	350	315	295	340	330	V	340	335	340	I A	295	260	265	265	
13	265	280	285	290	275	280	305	315	345	355	320	335	300	320	335	335	315	320	310	325	300	275	265	275	
14	265	270	280	270	260	300	315	C	C	C	340	320	310	325	340	330	295	310	280	315	250	290	335	245	
15	250	330	270	270	270	250	270	350	325	320	350	325	315	325	320	340	340	310	310	310	310	295	280	270	
16	280	260	F	255	290	F	335	320	335	350	340	340	320	320	345	345	315	330	315	315	315	270	290	290	
17	285	F	290	270	F	305	265	325	360	350	345	350	335	345	325	340	315	320	315	325	335	265	275	280	
18	265	265	265	280	280	305	305	340	320	335	345	355	340	335	320	360	310	315	335	330	310	295	290	290	
19	300	280	280	285	275	325	320	320	330	310	345	350	350	325	335	340	345	325	320	305	300	295	275	280	
20	280	270	270	275	295	335	295	350	345	335	335	340	315	320	320	325	325	290	320	340	310	265	270	A	
21	A	265	265	280	280	295	320	330	375	355	335	335	330	325	320	350	335	315	310	340	325	295	270	270	
22	290	265	275	295	315	345	315	340	340	295	355	340	340	330	355	345	325	315	325	335	305	270	260	280	
23	305	295	265	290	290	335	275	325	340	350	335	355	325	315	340	335	315	340	335	325	310	315	280	295	
24	270	F	275	300	350	340	295	295	330	340	355	360	340	310	325	330	320	345	320	295	295	300	F	260	
25	280	F	F	F	325	355	260	310	345	360	345	300	320	340	355	350	310	325	335	310	310	A	295	265	
26	30	F	F	295	315	305	305	330	355	335	350	355	325	340	345	345	335	335	325	340	250	290	280	280	
27	285	290	305	305	315	F	365	325	335	360	J R	355	340	340	340	345	330	320	335	320	270	275	295	280	
28	260	260	275	300	300	340	325	300	310	355	335	355	325	330	330	310	345	325	295	310	270	275	295	305	
29	295	270	275	285	290	275	335	300	330	350	335	330	330	330	335	335	345	305	330	330	330	305	265	270	
30	275	275	F	300	310	295	310	305	345	350	335	315	320	340	340	330	325	340	335	310	F	F	F	F	
31	F	F	F	F	F	F	F	F	340	345	335	330	335	330	335	335	355	330	340	355	A	A	280	300	295
	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	25	24	29	29	28	30	30	30	30	31	30	31	31	31	31	31	31	31	30	29	29	28	29	
MED	272	270	275	285	290	302	308	325	340	340	335	338	325	325	335	335	330	320	320	315	305	280	275	275	
UQ	285	275	275	295	300	335	325	335	345	350	345	350	335	335	340	345	340	332	335	325	310	295	290	280	
LQ	265	265	265	275	275	285	295	310	330	335	332	330	320	320	322	325	315	310	310	310	290	275	265	270	

DEC. 1970

M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1970

M(3000)F1 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station **WAKKANAI** Lat. **45 23.6 N** Long. **141 41.1 E** Sweep **1** MHz to **20** MHz in **20** sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
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30																								
31																								
CNT																								
MED																								
UQ																								
LQ																								

DEC. 1970

M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1970

H⁺F⁻2 (KM)

135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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																									
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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																									
UQ																									
LQ																									

DEC. 1970

H⁺F⁻2 (KM)

IONOSPHERIC DATA

DEC. 1970

H^oF (KM)

135° E Mean Time (G. M. T. + 9h)

Station **WAKKANAI** Lat. **45 23.6 N** Long. **141 41.1 E** Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	345	305	260	255	250	205	205	215	215	220	230	225	220	220	230	220	215	215	225	235	250	300	340	300	
2	300	285	280	265	260	220	220	210	220	215	245	230	200	215	225	220	200	200	300	245	220	300	295	315	
3	300	310	320	295	300	245	250	210	210	225	230	235	230	225	220	215	235	215	225	235	250	240	290	285	
4	305	305	305	300	260	240	230	215	215	215	240	225	230	225	220	230	225	225	230	235	250	295	310	345	
5	350	350	300	270	290	220	225	215	225	225	235	235	240	235	225	235	220	220	250	230	245	265	300	300	
6	285	310	320	275	260	220	250	230	210	225	240	240	220	220	220	230	230	200	250	245	280	250	300	300	
7	360	325	350	350	305	270	250	220	240	220	225	230	235	225	230	215	210	200	245	245	280	310	310	325	
8	325	330	310	300	300	280	260	240	210	225	250	225	220	220	220	225	205	200	255	250	245	325	320	310	
9	300	270	290	255	250	295	285	225	210	225	220	210	220	220	225	220	210	210	210	240	245	275	330	305	
10	305	270	290	290	300	295	245	220	210	210	220	205	210	215	220	230	200	235	230	200	295	305	310	305	
11	320	300	295	250	250	250	250	220	215	220	220	225	215	220	215	210	210	210	215	240	270	300	305	320	
12	300	305	305	290	300	260	225	210	200	210	220	220	225	220	220	200	205	230	205	245	260	350	350	340	
13	330	275	270	255	285	300	250	220	220	225	225	225	215	230	215	210	220	215	250	220	255	265	350	300	
14	300	295	300	275	320	270	220		C	C	C	225	215	210	230	225	240	270	245	260	235	390	325	250	370
15	360	330	315	310	305	325	310	220	215	245	240	220	215	230	225	225	205	225	250	250	250	265	300	320	
16	300	310	315	305	285	225	230	230	220	225	230	215	220	220	230	220	210	220	240	245	250	300	300	250	
17	270	305	295	270	300	245	250	225	205	225	225	220	210	230	225	215	215	225	240	205	235	280	300	300	
18	300	300	300	260	275	230	245	225	210	215	215	225	220	220	225	220	210	225	220	230	230	280	300	255	
19	310	310	300	325	300	215	205	215	210	230	230	220	205	220	240	215	215	245	240	245	260	275	295	275	
20	275	300	300	290	265	215	300	205	210	220	225	230	215	225	245	215	210	210	235	215	245	320	340	A	
21	A	350	325	310	285	240	235	205	200	210	225	225	220	225	225	225	215	220	240	225	245	270	300	350	
22	325	320	300	250	225	210	245	220	210	215	225	225	230	245	230	220	220	200	230	215	270	305	335	310	
23	260	265	325	300	270	200	185	225	205	220	220	220	225	225	245	215	215	215	215	225	230	260	300	265	
24	320	310	280	250	210	200	260	230	210	225	225	220	220	235	245	225	225	215	225	255	285	230	290	260	
25	275	300	295	250	210	200	230	245	210	220	220	220	220	240	225	210	200	230	210	245	240	A	275	310	
26	275	305	300	260	240	220	260	220	200	220	220	225	225	220	220	210	215	205	220	215	300	270	300	305	
27	295	290	275	255	225	220	200	225	200	215	215	210	225	220	225	220	220	200	220	230	300	320	275	265	
28	300	345	325	260	240	200	220	240	220	225	215	225	215	235	245	225	215	210	235	230	260	305	260	245	
29	270	300	300	275	270	275	210	250	240	220	225	225	215	210	225	230	205	225	205	210	230	245	350	325	
30	330	290	300	255	240	200	220	225	215	225	220	215	205	235	225	225	220	210	240	260	260	230	290	340	
31	245	305	300	300	285	200	240	210	210	225	220	220	230	225	240	215	215	215	215	A	A	295	265	300	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	30	30	30	31	30
MED	300	305	300	275	270	225	240	220	210	220	225	225	220	225	225	220	215	215	230	235	250	288	300	305	
UQ	325	310	312	300	300	265	250	225	215	225	230	225	225	230	230	225	220	225	242	245	270	305	315	320	
LQ	285	298	295	255	250	212	220	215	210	215	220	220	215	220	220	215	210	210	220	225	245	265	292	285	

DEC. 1970

H^oF (KM)

IONOSPHERIC DATA

DEC. 1970

H^oE5 (KM)

135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	S	E	E	E	E	E	E	S	110	G	105	G	G	G	G	G	S	E	E	E	100	110	E	110
2	110	E	E	E	E	E	S	S	G	G	105	105	G	G	G	G	S	E	S	E	E	S	100	100
3	S	S	E	E	E	110	105	110	G	G	125	G	G	G	G	G	S	S	S	S	S	E	S	E
4	E	100	100	E	E	E	E	S	G	110	G	105	105	G	G	G	S	S	E	S	E	S	S	S
5	100	E	E	E	110	S	E	G	150	G	G	G	G	G	G	G	S	E	E	E	E	E	E	S
6	E	E	E	E	E	E	S	G	125	G	G	G	110	G	G	G	S	E	S	S	S	E	S	S
7	S	E	E	E	E	E	S	G	G	G	110	105	105	G	G	100	100	100	E	S	120	115	115	E
8	S	E	E	E	S	E	S	S	G	G	125	120	115	120	G	145	S	100	E	E	E	S	E	S
9	S	E	E	E	E	E	E	S	G	125	125	125	120	G	G	G	S	100	S	S	S	S	110	S
10	100	100	E	E	100	100	100	100	110	110	115	G	G	105	G	G	S	S	S	E	E	S	S	S
11	S	E	E	E	E	E	E	S	125	115	115	G	115	G	G	G	S	S	E	100	110	E	E	S
12	S	E	E	E	E	E	E	G	G	G	105	145	G	115	115	110	110	S	E	100	100	100	100	S
13	S	E	E	E	E	S	S	100	100	B	B	B	B	B	B	100	100	100	100	100	100	S	100	100
14	100	S	100	100	E	E	S	C	C	C	G	100	G	G	G	G	G	E	E	S	160	125	110	125
15	S	E	E	100	E	E	E	110	110	G	105	100	100	G	G	100	100	105	105	105	105	105	105	105
16	100	100	E	E	100	E	E	105	G	G	G	G	G	G	G	G	S	110	105	S	S	S	E	E
17	E	100	100	100	100	E	E	105	G	105	100	100	G	G	G	G	S	E	E	E	S	S	E	100
18	E	E	E	E	E	E	110	105	100	100	100	G	G	G	G	G	S	S	E	105	S	100	100	100
19	100	100	E	100	100	E	E	110	105	155	G	G	G	G	G	G	110	105	105	110	100	100	100	S
20	100	E	E	E	E	E	S	105	100	105	G	G	100	100	115	G	110	110	E	E	S	105	105	100
21	100	100	100	100	100	E	E	S	G	105	100	100	100	100	G	100	S	S	E	105	E	S	S	100
22	100	E	E	E	E	E	E	S	G	G	G	G	G	G	G	S	S	E	S	S	S	E	S	E
23	S	105	100	E	E	E	E	S	110	G	G	110	105	G	G	G	100	S	E	E	S	E	E	105
24	105	E	E	100	125	E	S	150	145	G	G	G	G	G	G	G	100	S	E	S	E	100	E	E
25	E	E	E	105	105	E	E	S	125	115	110	G	G	110	G	G	100	100	110	E	110	105	105	100
26	100	100	E	E	E	E	100	140	110	105	110	110	G	G	G	G	S	S	S	S	S	S	E	110
27	S	S	E	E	100	110	E	105	105	105	105	G	G	G	G	115	110	E	S	100	S	S	S	S
28	S	E	E	E	E	E	E	S	G	105	105	110	G	G	G	G	S	E	E	S	105	105	100	E
29	E	E	110	105	E	E	E	110	105	G	G	105	105	100	105	100	100	100	100	100	100	100	100	100
30	100	100	100	E	E	E	E	110	105	110	105	105	G	G	105	G	S	E	105	105	105	105	110	105
31	100	100	100	E	E	E	E	160	110	110	110	110	G	G	G	G	110	E	110	110	105	100	100	100
	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	13	10	8	8	9	3	4	15	18	15	19	16	11	7	4	8	12	10	8	11	13	14	15	15
MED	100	100	100	100	100	110	102	110	110	110	105	105	105	105	110	100	100	100	105	105	105	105	100	100
UQ	100	100	100	102	105	110	108	110	125	112	112	110	112	112	115	112	110	105	108	105	110	105	108	105
LQ	100	100	100	100	100	105	100	105	105	105	105	102	102	100	105	100	100	100	102	100	100	100	100	100

DEC. 1970

H^oE5 (KM)

IONOSPHERIC DATA

DEC. 1970

TYPES OF ES

135° E Mean Time (G. M. T. + 9h)

Station **WAKKANAI** Lat. **45° 23' 6" N** Long. **141° 41' 1" E** Sweep **1** MHz to **20** MHz in **20** sec in automatic operation

Hour Day	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										F ₁	F ₂		F ₁
2	F ₁										L	L											F ₁	F ₁
3						F ₂	F ₁	L			C													
4		F ₂	F ₁							L		L	L											
5	F ₁				F ₁				H															
6									C				L											
7											L ₂	L	L			L	L	F ₁			F ₂	F ₂	F ₁	
8										C	C	C	C			H		F ₁						
9										C	C	CL	CL					F ₁						F ₂
10	F ₁	F ₁			F ₂	F ₂	F ₂	L	L	L	C			L										
11									C	C	C		C							F ₁	F ₁			
12										L	HL	L		C	C	L	L			F ₂	F ₁	F ₁	F ₁	
13							L ₂	L							L	L	F ₂	F ₁	F ₁	F ₁	F ₂	F ₁	F ₁	F ₁
14	F ₁		F ₁	F ₁							L										F ₁	F ₂	F ₂	F ₁
15			F ₁					L	L		L	L	L		L	L	F ₂	F ₂	F ₁	F ₁	F ₁	F ₂	F ₁	F ₂
16	F ₂	F ₁			F ₁			L										F ₃	F ₂					
17		F ₁	F ₁	F ₁	F ₁			L		L	L	L												F ₁
18						F ₁	L	L	L	L										F ₁		F ₁	F ₁	F ₁
19	F ₁	F ₁		F ₁	F ₁			L	L	H							L	F ₂	F ₁	F ₁	F ₁	F ₂	F ₁	
20	F ₁							L	L	L			L	L	C		L	F ₂				F ₂	F ₃	F ₃
21	F ₂	F ₃	F ₁	F ₂	F ₁				L	L	L	L	L	L		L				F ₁				F ₁
22	F ₁																							
23		F ₂	F ₂						L			L	L											F ₃
24	F ₁			F ₁	F ₁			H	H									L						
25				F ₁	F ₁				C	L	L			L			L	F ₁	F ₁		F ₁	F ₂	F ₂	F ₃
26	F ₁	F ₁				F ₁	H	L	L	L ₃	L	L												F ₁
27				F ₁	F ₁			L	L	LC	L					C	C			F ₁				
28										L	L	L										F ₂	F ₂	F ₁
29			F ₁	F ₂				L ₂	L			L	L	L	L	L	L	F ₂	F ₁	F ₁	F ₁	F ₁	F ₃	F ₃
30	F ₁	F ₁	F ₁					C	L	L	L	L			L				F ₂	F ₂	F ₃	F ₂	F ₁	F ₃
31	F ₁	F ₁	F ₁					H	L	L	L	L					L		F ₁	F ₃	F ₃	F ₂	F ₂	F ₁
	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																								
UQ																								
LQ																								

DEC. 1970

TYPES OF ES

IONOSPHERIC DATA

DEC. 1970

FOF2 (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat 39 43.5 N Long 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	33	35	37	43	39	31	32	61	78	88	96	I ₀ ^R	103	102	96	82	86	56	41	34	33	34	38	38			
2	42	41	41	F	F	48	S	36	63	90	98	105	107	113	87	92	92	78	I ₅ ^C	41	I ₃ ^C	35	33	29	30		
3	32	33	I ₃ ^C	35	35	37	32	72	S	78	81	102	R	96	94	101	89	86	81	53	44	42	41	39	31	32	
4	35	37	38	37	38	S	36	41	67	75	87	87	116	101	98	89	77	77	56	52	36	38	29	27	S	29	
5	28	31	33	33	35	31	27	59	74	84	103	101	99	93	89	98	93	66	46	51	40	36	34	36			
6	35	34	36	39	38	36	35	68	86	96	96	I ₁ ^B	92	91	98	89	84	65	47	41	32	36	31	29			
7	29	31	30	30	32	39	48	I _R	79	C	R	113	91	109	87	101	80	57	48	37	C	C	I ₃ ^C	33			
8	32	32	33	32	32	32	35	I _R	74	S	93	99	104	121	104	106	97	95	93	I _R	66	47	43	40	33	34	35
9	38	34	33	33	31	29	31	74	94	I _R	105	I _R	118	112	I ₁ ^B	108	101	84	84	62	58	47	42	36	27	31	
10	31	32	34	31	31	32	34	65	87	96	107	108	107	102	104	82	87	51	47	55	30	31	31	31			
11	31	32	33	33	33	33	34	S	68	93	105	104	105	96	96	104	96	67	61	59	38	30	25	26	29		
12	31	31	33	32	32	32	38	68	92	86	99	111	102	114	I ₀ ^C	C	C	58	58	C	C	C	C	C	C		
13	I ₃ ^C	I ₃ ^C	36	31	32	32	34	I ₅ ^C	I ₇ ^C	89	I ₀ ^C	112	92	I _R	I ₈ ^C	84	I ₇ ^C	I ₅ ^C	48	47	42	I ₃ ^C	29	32			
14	33	34	35	35	34	35	44	I _R	64	82	I _R	92	111	106	H	96	83	100	91	74	94	68	45	36	36	51	39
15	34	33	35	34	34	30	31	72	S	96	112	125	127	114	103	102	106	97	63	49	57	47	32	31	27		
16	31	32	31	33	35	33	36	64	87	98	117	116	100	107	101	98	73	59	56	46	40	29	31	34			
17	34	29	31	32	30	32	34	I _R	64	84	102	99	107	103	104	94	88	67	61	56	40	42	27	31	32		
18	31	34	36	34	37	37	39	57	77	101	103	98	95	83	87	89	63	57	58	45	34	28	29	31			
19	32	34	34	34	34	37	31	58	77	81	I ₀ ^R	94	100	88	H	95	98	74	68	51	36	27	32	30	33		
20	32	33	33	33	37	37	27	57	73	78	91	102	91	88	91	92	74	68	61	52	34	27	32	32			
21	31	33	32	33	34	35	37	58	82	76	98	107	102	94	102	98	86	69	56	40	37	27	28	28			
22	31	32	32	33	35	32	27	56	79	86	99	98	94	96	99	96	82	73	47	46	33	27	30	32			
23	33	35	32	34	36	34	31	50	78	S	93	88	96	94	83	94	91	74	64	67	53	33	31	S	35		
24	35	36	36	41	51	28	31	58	73	87	119	117	86	78	91	91	76	62	49	41	36	43	37	F	39		
25	F	F	F	F	F	39	F	27	52	74	S	102	119	86	81	81	95	85	66	54	53	34	28	34	33	33	
26	F	F	F	F	F	34	39	23	47	78	89	107	98	86	101	102	81	69	64	46	40	31	26	F	F		
27	F	36	37	35	36	42	26	47	77	94	124	103	84	95	87	77	72	68	49	29	28	33	34	32			
28	31	29	31	36	37	28	28	47	64	107	126	94	86	94	93	94	92	68	S	51	44	34	38	41	43		
29	I ₃ ^A	32	35	36	36	I ₃ ^C	34	51	82	106	116	116	115	97	87	85	87	66	I ₅ ^C	I ₅ ^C	I ₃ ^C	31	29	I ₃ ^C	I ₃ ^C		
30	I ₃ ^C	I ₃ ^C	I ₃ ^C	C	C	C	C	C	C	C	C	101	99	I ₀ ^C	I ₀ ^C	91	82	81	74	48	I ₄ ^C	36	F	F	F		
31	F	31	F	F	F	43	28	47	77	S	84	102	97	92	94	83	83	68	48	58	37	25	26	S	F		
CNT	30	29	28	28	30	30	30	30	30	29	30	31	31	31	31	30	30	31	31	30	29	28	30	27			
MED	32	33	34	34	35	34	33	60	78	93	104	106	96	96	94	90	78	62	51	42	35	32	31	32			
UQ	34	34	36	36	37	37	36	68	87	101	116	112	102	102	100	96	86	67	58	47	40	35	34	34			
LQ	31	32	32	33	33	32	28	55	77	86	99	98	92	90	89	84	72	57	47	37	32	28	29	31			

DEC. 1970

FOF2 (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

FOF1 (0.01 MHZ)

135 E Mean Time (G. M. T. + 9 h)

Station	AKITA			Lat. 39 43 .5 N			Long. 140 08 .2 E			Sweep 1 MHz to 20 MHz in 20 sec in automatic operation														
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L										
2										L	L	U 500	L											
3											L	L	L	L										
4											L	U 500	L	L										
5										L	L	L	L	L	L	L								
6										L	L	L	L											
7										C	U 450	L	L	L	480									
8											L	L	L	L										
9											L	L	L	L										
10											L	L	U 450	430	L									
11											L	L	L	L										
12											L	L	L	U 500										
13											C	L	L	L										
14											U 370	U 500	L	L		L								
15											L	L	L	L										
16											L	L	L	L										
17											L	L	L	L	L									
18											L	L	L	L	L									
19											L	L	U 500	L	U 550									
20											L	L	L	U 500										
21											L	U 500	L	L										
22											L	L	L	L	L									
23											L	L	L		L									
24											L	U 450	L	L										
25											L	A	L	L	U 360	L								
26											L	L	L	L	L									
27												L	L	L	L									
28											L	L	L	L	L	L								
29												L	L	L	L	L								
30											C	L	L	C	C									
31												L	U 440	L	L									
Hour Day	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	2	6	2	4	2									
MED										U 370	U 475	U 475	U 475	U 490	U 455									
UQ											U 500		U 500											
LQ											U 440		455											

DEC. 1970

FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1970

FOE (0.01 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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									200	265	315	335	345	350	340	305	260	A							
2									200	I ^A 265	315	335	345	345	320	295	255	190							
3									200	265	I ^A 300	I ^A 330	345	345	330	300	260	200							
4									200	275	310	325	340	345	340	310	255	195							
5									180	260	310	330	345	350	335	300	265	210							
6									200	270	315	330	I ^A 340	350	330	295	255	200							
7									200	265	I ^C 310	335	A	A	A	A	240	A							
8									B	255	315	330	345	345	330	I ^A 295	255	205							
9									195	255	305	330	345	350	I ^A 330	I ^A 280	I ^A 230	180							
10									180	260	I ^A 300	I ^A 325	I ^A 335	350	335	305	270	200							
11									175	255	305	325	345	350	340	305	A	A							
12									175	270	315	I ^A 330	I ^A 345	350	340	C	C	C							
13									C	C	B	C	B	B	B	C	A	C							
14									B	260	305	325	340	345	335	305	260	200							
15									165	255	I ^A 305	I ^A 320	340	350	345	320	270	195							
16									A	250	300	325	340	345	345	320	I ^R 265	205							
17									S	255	305	325	340	345	340	310	270	B							
18									S	I ^A 240	300	320	330	340	340	305	265	B							
19									A	245	300	320	340	345	335	305	265	200							
20									185	255	I ^A 300	325	340	345	330	300	A	A							
21									165	255	305	325	345	350	335	295	255	195							
22									A	255	305	320	340	345	340	295	245	180							
23									S	245	305	320	335	345	335	305	275	210							
24									170	250	I ^A 290	I ^A 310	335	340	340	I ^A 305	255	175							
25									A	255	305	A	A	335	325	290	255	A							
26									175	255	305	325	340	345	320	300	255	205							
27									170	250	295	315	335	340	I ^A 330	290	245	I ^A 180							
28									165	250	300	320	335	340	330	295	250	180							
29									S	I ^A 240	I ^A 300	315	335	340	320	285	240	A							
30									C	C	C	315	330	I ^C 330	I ^C 320	300	255	190							
31									155	250	300	320	335	345	330	290	I ^A 245	185							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								19	29	29	29	28	29	29	28	27	21								
MED								180	255	305	325	340	345	335	300	255	195								
UQ								200	260	310	330	345	350	340	305	265	200								
LQ								170	250	300	320	335	345	330	295	252	185								

DEC. 1970

FOE (0.01 MHZ)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

DEC. 1970

FOES (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station	AKITA																							Lat.	39 43.5 N	Long.	140 08.2 E	Sweep	1	MHz to	20	MHz in	20	sec	in automatic		operation	
Hour Day	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 ₁₄	E ₁₄	E	E	E	E	E ₁₄	G	33	G	G	J ₃₅	G	G	G	G	J ₂₃	J ₂₅	J ₂₃	E ₁₄	E ₁₃	E ₁₄	J ₂₈	E ₁₄														
2	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E	E ₁₄	G	J ₃₃	G	G	G	G	G	G	G	G	C	E ₁₉	C	E ₁₄	E ₁₄	E ₁₄	E ₁₄														
3	E ₁₄	E ₁₄	C	E ₁₄	E	E ₁₄	J ₁₈	G	J ₂₇	J ₄₁	J ₄₆	G	G	G	G	G	G	E ₁₄	E ₁₃	E ₁₄	E	E ₁₄	E ₁₄	E ₁₄														
4	E ₁₄	E ₁₄	E ₁₄	E	J ₁₉	E ₁₄	E ₁₂	G	G	G	G	J ₃₆	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₃	J ₂₅	E ₁₄														
5	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E	E ₁₄	E ₁₄	G	J ₂₈	G	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄														
6	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	J ₂₄	E ₁₂	G	G	G	G	37	G	G	G	G	G	J ₄₈	J ₂₉	J ₂₉	E ₁₃	E ₁₄	E ₁₄	E ₁₄														
7	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	G	G	C	G	37	J ₄₃	J ₄₀	J ₃₄	G	25	J ₄₂	E ₁₄	J ₂₀	C	C	C	E ₁₃														
8	E ₁₄	E ₁₄	M	E ₁₄	E ₁₄	E ₁₄	E ₁₈	G	G	G	37	J ₄₃	J ₄₆	36	54	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	J ₁₆														
9	J ₂₇	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	G	G	G	G	43	45	36	32	26	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄														
10	J ₁₇	E ₁₄	E ₁₄	E ₁₄	E ₁₄	J ₁₉	E ₁₄	G	G	34	36	36	G	G	G	G	G	J ₂₀	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄														
11	E ₁₃	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	G	G	34	36	G	37	G	G	J ₃₃	J ₂₉	E ₁₄	J ₁₉	E ₁₄	E ₁₄	E ₁₄	J ₂₄	J ₂₃														
12	E ₁₄	J ₁₉	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	G	29	G	J ₄₁	37	G	G	C	C	C	E ₁₄	E ₁₄	C	C	C	C	C														
13	C	C	J ₁₆	J ₁₆	J ₁₇	E ₁₄	E ₁₄	C	C	E ₃₆	C	E ₃₉	E ₃₆	E ₄₀	C	35	C	C	J ₂₉	J ₂₁	E ₁₄	C	E ₁₉	E ₁₈														
14	E ₁₈	E ₁₈	E ₁₈	E ₁₈	E ₁₈	E ₁₄	J ₁₈	E ₂₀	G	G	G	G	G	J ₃₀	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	J ₂₀	J ₂₉	J ₄₃														
15	J ₂₉	J ₃₉	J ₂₈	J ₂₈	E ₁₃	E ₁₄	E ₁₄	G	G	J ₃₂	J ₄₆	J ₄₃	G	G	G	J ₂₆	G	E ₁₃	J ₂₄	J ₄₄	J ₆₈	J ₂₃	E ₁₄	J ₁₈														
16	E ₁₃	E ₁₃	J ₁₉	J ₁₆	E	J ₁₈	E ₁₄	J ₂₀	G	G	G	G	G	G	G	G	J ₂₈	J ₂₆	E ₁₉	E ₁₄	J ₄₄	J ₂₆	E ₁₄	E ₁₄														
17	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	J ₂₃	G	G	G	G	G	G	G	J ₃₀	G	E ₁₉	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	J ₂₄														
18	J ₂₀	J ₂₄	J ₂₂	J ₂₀	E	J ₁₈	E ₁₃	E ₁₆	J ₃₃	G	J ₃₃	G	G	G	G	G	E ₁₉	E ₁₄	E ₁₃	J ₂₄	J ₃₄	J ₂₉	J ₃₀	J ₃₀														
19	J ₃₀	J ₂₅	J ₂₆	J ₂₃	E ₁₄	E ₁₄	E ₁₄	J ₁₉	J ₃₀	J ₂₀	J ₄₅	G	G	G	G	G	G	E ₁₄	E ₁₄	J ₂₀	J ₂₃	J ₃₃	J ₃₀	J ₂₇														
20	J ₃₃	J ₂₇	J ₂₁	J ₂₄	E ₁₄	E ₁₄	E ₁₄	J ₂₁	G	J ₃₄	G	G	G	G	G	30	J ₃₄	J ₃₀	E ₁₄	E ₁₃	E ₁₄	J ₂₇	E ₁₃	J ₂₈														
21	E ₁₄	J ₂₆	J ₂₄	E	E	J ₂₈	J ₂₁	G	G	G	G	27	G	J ₃₇	J ₃₃	G	G	E ₁₄	E ₁₄	J ₁₉	E ₁₄	E ₁₄	E ₁₄	E														
22	J ₂₄	J ₂₄	E ₁₄	E ₁₄	E	E ₁₄	E	J ₁₉	G	G	G	G	G	G	G	G	J ₂₆	J ₂₅	J ₁₉	E ₁₄	J ₁₈	J ₁₇	J ₁₈	E ₁₄														
23	E ₁₃	E ₁₃	E ₁₄	E	E	E ₁₃	E ₁₄	E ₁₆	G	G	G	G	G	G	G	G	G	J ₂₃	J ₂₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄														
24	E ₁₄	E	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	G	G	J ₃₈	J ₅₆	G	G	G	35	G	G	E ₁₄	E ₁₃	E ₁₄	J ₁₉	E ₁₄	E ₁₃	E ₁₄														
25	E ₁₄	E ₁₄	E ₁₄	E	J ₁₈	E ₁₃	J ₂₀	J ₂₃	G	J ₃₄	J ₃₈	J ₈₃	G	G	G	G	J ₃₀	J ₂₄	E ₁₄	E ₁₃	E ₁₄	J ₅₄	J ₃₄	J ₂₉														
26	E ₁₄	E ₁₄	E ₁₃	E	E	E ₁₄	E ₁₄	G	G	G	J ₃₀	40	36	35	32	27	G	J ₂₈	J ₂₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄														
27	E ₁₄	J ₂₅	J ₃₀	J ₂₃	J ₃₀	J ₁₆	E ₁₄	G	G	G	G	G	J ₂₉	J ₃₄	G	G	J ₂₀	J ₁₉	J ₁₆	E ₁₄	E ₁₄	J ₁₈	J ₁₈	J ₁₉														
28	J ₁₈	J ₁₈	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	G	G	G	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₄														
29	J ₆₄	J ₄₅	J ₂₈	J ₂₉	E	C	E ₁₄	E ₁₇	J ₄₄	J ₅₅	J ₅₄	J ₄₃	J ₃₆	G	G	G	J ₂₀	J ₂₃	C	C	C	E ₁₄	E ₁₄	C														
30	C	C	C	C	C	C	C	C	C	C	C	J ₃₀	G	C	C	G	G	J ₂₀	E ₁₄	C	E ₁₄	J ₂₀	J ₅₅	E ₁₄														
31	J ₂₁	J ₁₉	E ₁₄	E	E ₁₃	E ₁₄	E ₁₄	G	G	J ₃₈	G	G	G	J ₃₈	G	27	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	J ₇₈	J ₅₈	J ₃₆														
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23														
CNT	29	29	29	30	30	29	30	29	29	29	30	31	30	30	29	30	29	29	30	27	28	28	29	29														
MED	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	G	G	G	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄														
UQ	J ₂₀	J ₂₄	J ₁₉	J ₁₆	E ₁₄	E ₁₄	E ₁₄	E ₁₈	27	J ₃₄	J ₃₇	37	36	32	G	G	J ₂₀	J ₂₄	J ₁₉	16	E ₁₄	J ₂₂	J ₂₅	J ₂₃														
LQ	E ₁₄	E ₁₄	E ₁₄	E	E	E ₁₄	E ₁₄	G	G	G	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄														

The Radio Research Laboratories, Japan

DEC. 1970

FOES (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

FBES (0.1 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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 ₁₄	E ₁₄	E	E	E	E ₁₄	G	33	G	G	28	G	G	G	G	21	E	E	E ₁₄	E ₁₃	E ₁₄	E	E ₁₄		
2	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	G	30	G	G	G	G	G	G	G	G	C	E ₁₉	C	E ₁₄	E ₁₄	E ₁₄	E ₁₄		
3	E ₁₄	E ₁₄	C	E ₁₄	E	E ₁₄	18	G	19	35	36	G	G	G	G	G	E ₁₄	E ₁₃	E ₁₄	E	E ₁₄	E ₁₄	E ₁₄		
4	E ₁₄	E ₁₄	E ₁₄	E	E	E ₁₄	E ₁₂	G	G	G	G	28	G	G	G	G	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₃	E	E ₁₄		
5	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E	E ₁₄	E ₁₄	G	24	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄		
6	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	E	E ₁₂	G	G	G	G	36	G	G	G	G	G	26	26	18	E ₁₃	E ₁₄	E ₁₄	E ₁₄	
7	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	G	G	C	G	37	39	36	32	G	25	20	E ₁₄	E	C	C	C	
8	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₈	G	G	35	40	44	G	34	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	E	
9	24	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	G	G	G	G	42	44	36	30	25	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	
10	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	G	G	33	35	36	G	G	G	G	G	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	
11	E ₁₃	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	G	G	G	G	G	G	G	G	30	27	E ₁₄	E	E ₁₄	E ₁₄	E ₁₄	E	19	
12	E ₁₄	18	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	G	24	G	38	36	G	G	C	C	C	E ₁₄	E ₁₄	C	C	C	C	C	
13	C	C	16	15	16	E ₁₄	E ₁₄	C	C	E ₃₆	C	E ₃₉	E ₃₆	E ₄₀	C	32	C	C	22	20	E ₁₄	C	E ₁₉	E ₁₈	
14	E ₁₈	E ₁₈	E ₁₆	E ₂₅	E ₁₈	E ₁₄	E	E ₂₀	G	G	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	18	21	20	
15	19	20	19	18	E ₁₃	E ₁₄	E ₁₄	G	G	32	34	30	G	G	G	18	G	E ₁₃	E	21	19	15	E ₁₄	E	
16	E ₁₃	E ₁₃	14	15	E	E	E ₁₄	19	G	G	G	G	G	G	G	G	18	20	E ₁₉	E ₁₂	24	E	E ₁₄	E ₁₄	
17	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	18	G	G	G	G	G	G	G	26	G	E ₁₉	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	
18	E	E	18	17	E	E	E ₁₃	E ₁₆	30	G	26	G	G	G	G	G	G	E ₁₉	E ₁₄	E ₁₃	18	21	21	E	21
19	23	16	17	16	E ₁₄	E ₁₄	E ₁₄	18	19	20	26	G	G	G	G	G	G	E ₁₄	E ₁₄	E	E	29	E	E	
20	20	19	19	18	E ₁₄	E ₁₄	E ₁₄	E	G	32	G	G	G	G	G	29	26	E	E ₁₄	E ₁₃	E ₁₄	E	E ₁₃	18	
21	E ₁₄	19	19	E	E	19	18	G	G	G	26	G	28	29	G	G	G	E ₁₄	E ₁₄	E	E ₁₄	E ₁₂	E ₁₄	E	
22	20	20	E ₁₄	E ₁₄	E	E ₁₄	E	19	G	G	G	G	G	G	G	G	13	16	E	E ₁₄	E	E	E	E ₁₄	
23	E ₁₃	E ₁₃	E ₁₄	E	E	E ₁₃	E ₁₄	E ₁₆	G	G	G	G	G	G	G	G	G	18	20	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	
24	E ₁₄	E	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	G	G	32	33	G	G	G	34	G	G	E ₁₄	E ₁₃	E ₁₄	E	E ₁₄	E ₁₃	E ₁₄	
25	E ₁₄	E ₁₄	E ₁₄	E	E	E ₁₃	16	19	G	G	35	54	G	G	G	G	22	E	E ₁₄	E ₁₃	E ₁₄	19	E	19	
26	E ₁₄	E ₁₄	E ₁₃	E	E	E ₁₄	E ₁₄	G	G	G	27	G	G	G	G	27	G	19	21	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	
27	E ₁₄	E	24	20	27	E	E ₁₄	G	G	G	G	G	G	29	34	G	G	19	E	E	E ₁₄	E ₁₄	E	E	19
28	E	E	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	G	G	G	G	G	G	G	G	24	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₄
29	A	24	25	15	E	C	E ₁₄	E ₁₇	27	34	26	30	26	G	G	G	20	E	C	C	C	E ₁₄	E ₁₄	C	
30	C	C	C	C	C	C	C	C	C	C	26	G	C	C	G	G	G	E	E ₁₄	C	E ₁₄	E	18	E ₁₄	
31	16	14	E ₁₄	E	E ₁₃	E ₁₄	E ₁₄	G	G	22	G	G	G	G	27	G	27	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	16	19	19
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	30	30	29	30	29	29	29	30	31	30	30	29	30	29	29	29	30	27	28	28	29	29
MED	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₄	G	G	G	G	G	G	G	G	G	G	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
UQ	E ₁₆	E ₁₆	16	15	E ₁₄	E ₁₄	E ₁₄	E ₁₇	19	21	27	32	G	G	G	G	19	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	18
LQ	E ₁₄	E ₁₃	E ₁₄	E	E	E ₁₃	E ₁₄	G	G	G	G	G	G	G	G	G	G	E ₁₃	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄

The Radio Research Laboratories, Japan

DEC. 1970

FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1970

F-MIN (0.1 MHz)

135 E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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 ₁₄	E ₁₄	E	E	E	E	E ₁₄	14	18	15	18	16	15	17	15	16	14	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₃	E ₁₄
2	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E	E ₁₄	15	15	19	19	19	19	19	18	15	14	C	19	C	E ₁₄	E ₁₄	E ₁₄	E ₁₄
3	E ₁₄	E ₁₄	C	E ₁₄	E	E ₁₄	E ₁₃	14	15	15	16	15	17	18	18	16	14	E ₁₄	E ₁₃	E ₁₄	E	E ₁₄	E ₁₄	E ₁₄
4	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	E ₁₂	14	15	15	17	15	14	16	18	15	14	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₃	E ₁₄	E ₁₄
5	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E	E ₁₄	E ₁₄	14	16	16	16	15	16	15	16	15	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄
6	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E ₁₂	15	16	17	18	17	16	16	14	15	16	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₄
7	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	15	15	C	19	18	22	20	16	15	14	E ₁₄	E ₁₄	E ₁₄	C	C	C	E ₁₃
8	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	18	15	18	16	15	17	15	16	14	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
9	E ₁₃	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	12	15	16	14	18	19	15	14	14	13	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
10	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	13	15	15	15	16	16	15	16	14	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
11	E ₁₃	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	14	15	15	15	15	15	14	15	14	14	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₃
12	E ₁₄	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	14	17	22	20	19	18	18	C	C	C	E ₁₄	E ₁₄	C	C	C	C	C
13	C	C	E	E	E	E ₁₄	E ₁₄	C	C	C	36	C	39	36	40	C	25	C	C	E ₁₄	E ₁₄	C	19	18
14	18	18	E ₁₆	E ₂₅	18	E ₁₄	E ₁₄	20	18	17	17	20	19	15	16	18	15	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
15	E ₁₄	E	E	E	E ₁₃	E ₁₄	E ₁₄	E	13	16	18	20	19	17	15	15	15	E ₁₃	E ₁₄	E ₁₃	E	E	E ₁₄	E ₁₄
16	E ₁₃	E ₁₃	E	E	E	E ₁₃	E ₁₄	E	15	15	15	19	19	19	21	19	15	E	19	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
17	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	13	18	15	21	18	18	16	17	19	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
18	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E	E ₁₄	E ₁₃	E ₁₆	16	16	15	17	19	19	16	14	19	E ₁₄	E ₁₃	E ₁₃	E ₁₃	E ₁₃	E ₁₄	E ₁₄
19	E ₁₄	E	E	E	E ₁₄	E ₁₄	E ₁₄	14	16	16	16	18	18	17	18	19	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₃	E ₁₄
20	E ₁₄	E ₁₄	E	E	E ₁₄	E ₁₄	E ₁₄	14	15	15	19	14	15	15	15	15	14	E ₁₃	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₃	E
21	E ₁₄	E	E	E	E	E	E	13	15	15	17	19	14	15	15	14	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E
22	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E	E ₁₄	E	E ₁₄	15	18	17	18	17	18	14	14	13	E	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₄
23	E ₁₃	E ₁₃	E ₁₄	E	E	E ₁₃	E ₁₄	E ₁₆	14	18	21	18	19	16	14	15	13	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
24	E ₁₄	E	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	13	15	20	20	19	18	19	16	19	15	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄
25	E ₁₄	E ₁₄	E ₁₄	E	E	E ₁₃	E	13	15	15	17	18	16	15	16	15	14	E ₁₃	E ₁₄	E ₁₃	E ₁₄	E ₁₃	E ₁₄	E ₁₃
26	E ₁₄	E ₁₄	E ₁₃	E	E	E ₁₄	E ₁₄	14	15	14	16	15	18	16	15	15	14	E	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
27	E ₁₄	E ₁₄	E ₁₄	E	E	E ₁₄	E ₁₄	14	14	15	18	15	19	18	16	16	13	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
28	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄	13	15	15	16	14	18	17	14	16	13	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E ₁₄	E ₁₄	E ₁₄
29	E ₁₃	E	E	E	E	C	E ₁₄	E ₁₇	13	15	14	15	17	15	18	15	14	E ₁₄	C	C	C	E ₁₄	E ₁₄	C
30	C	C	C	C	C	C	C	C	C	C	C	18	19	C	C	19	14	E ₁₄	E ₁₄	C	E ₁₄	E ₁₄	E ₁₃	E ₁₄
31	E	E	E ₁₄	E	E ₁₃	E ₁₄	E ₁₄	14	14	17	18	20	20	19	19	15	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E	E ₁₄	E ₁₄
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	30	30	29	30	29	29	29	30	31	30	30	29	30	29	29	30	27	28	28	29	29
MED	E ₁₄	E ₁₄	E ₁₄	E ₁₃	E	E ₁₄	E ₁₄	14	15	16	17	18	18	17	16	15	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
UQ	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	14	15	18	18	19	19	18	18	16	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄
LQ	E ₁₄	E	E	E	E	E ₁₄	E ₁₃	13	15	15	16	15	16	15	14	14	14	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄	E ₁₄

DEC. 1970

F-MIN (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

M(3000)F2 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	280	280	285	310	315	300	310	335	340	320	335	320	320	335	340	340	325	345	320	310	290	295	280	280			
2	290	285	275	F	320	330	330	325	340	325	345	330	310	315	315	330	350	335	325	315	315	310	275	280			
3	285	280	I C	285	285	305	310	335	350	310	340	335	310	320	320	315	335	320	310	315	300	310	295	285			
4	280	280	285	280	300	300	315	330	330	335	305	360	335	330	315	330	330	340	330	305	315	285	285	265			
5	275	260	295	285	300	295	295	340	335	335	330	335	335	325	325	325	310	310	310	310	290	290	285	285			
6	285	275	280	290	300	300	305	325	340	345	320	I B	315	310	340	330	320	325	300	320	295	285	295	275			
7	275	265	250	270	275	280	315	I R	325	C	R	335	325	315	315	340	320	315	310	305	C	C	I C	270			
8	265	260	255	275	280	285	290	I R	320	340	335	330	320	315	320	310	310	325	I R	320	300	300	270	270			
9	280	295	285	295	295	275	280	315	330	I R	I R	315	I R	325	335	310	335	280	310	310	300	315	275	265			
10	285	305	295	275	280	280	325	340	345	325	340	330	330	335	325	325	340	315	305	335	285	265	285	270			
11	265	260	285	285	295	295	290	320	335	330	325	335	305	305	310	335	320	310	320	315	310	280	275	270			
12	270	290	275	280	275	280	300	330	335	340	325	335	325	325	I C	C	C	320	330	C	C	C	C	C			
13	I C	I C	300	295	290	275	280	I C	305	I C	330	I C	330	305	I R	I C	335	320	I C	310	310	300	315	I C	280	285	
14	280	265	280	280	270	280	310	I R	340	335	I R	325	320	330	295	H	325	330	320	310	310	320	305	280	260	300	290
15	275	275	275	270	270	255	280	320	335	320	315	320	325	315	320	320	330	320	300	325	325	295	290	265			
16	260	260	260	275	285	305	310	330	350	325	320	335	320	320	320	340	330	295	305	310	320	310	270	285			
17	295	275	295	285	275	280	310	I R	345	325	335	330	340	325	320	340	330	320	325	325	335	295	260	280			
18	270	270	280	275	280	300	310	335	330	340	345	340	330	330	325	335	335	315	330	345	325	295	280	280			
19	280	280	285	285	285	300	315	345	350	335	I B	340	320	295	H	315	330	325	320	315	325	305	305	275	285		
20	290	270	275	285	290	310	310	325	330	345	320	325	335	330	335	330	325	315	330	330	300	280	280	285			
21	290	275	270	270	300	295	330	330	340	335	330	325	310	315	315	330	320	315	330	300	325	295	290	270			
22	270	280	280	290	305	310	295	325	355	330	340	330	330	315	325	320	315	310	320	320	320	280	275	290			
23	295	290	285	290	300	325	300	320	340	S	335	340	335	330	315	320	335	335	315	325	320	320	270	290	F	290	
24	275	270	270	295	335	290	320	330	340	315	335	335	330	310	320	320	320	320	325	295	290	305	300	290	F	290	
25	F	F	F	325	315	330	295	320	340	S	345	355	345	335	320	325	340	325	300	320	320	335	315	295	285		
26	285	F	F	280	F	300	340	300	335	335	335	325	330	320	325	335	335	325	320	325	335	270	280	F	F		
27	F	290	300	305	305	335	315	310	340	315	335	340	325	325	335	340	320	315	330	345	280	290	295	295			
28	270	275	270	310	320	320	320	340	330	310	340	340	315	315	320	330	330	320	320	320	295	280	290	300			
29	I A	285	290	290	285	285	290	300	320	315	330	330	330	330	345	320	345	315	315	I C	I C	I C	290	280	I C	285	
30	I C	I C	I C	C	C	C	C	C	C	C	C	C	325	325	I C	I C	330	330	325	340	340	I C	335	F	305	F	
31	300	295	F	F	280	325	350	340	340	S	310	345	335	325	340	330	335	355	325	335	325	300	285	305	F	F	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	30	29	28	28	30	30	30	30	30	29	30	31	31	31	31	30	30	31	31	30	29	28	30	27			
MED	280	280	280	285	292	300	310	330	340	330	330	335	325	325	325	330	325	315	320	320	310	290	282	285			
UQ	285	285	288	292	300	310	315	335	340	335	340	335	330	330	335	335	335	320	328	325	325	305	295	285			
LQ	270	270	275	278	280	280	295	320	335	325	325	330	315	315	320	320	320	310	310	310	295	280	275	270			

DEC. 1970

M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1970

M(3000)F1 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station	AKITA							Lat. 39 43.5 N · Long. 140 08.2 E							Sweep 1 MHz to 20 MHz in 20 sec in automatic operation										
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										L	L	L	L	L											
2										L	L	U ₃₆₀	L												
3											L	L	L	L											
4											L	U ₃₆₀	L	L											
5										L	L	L	L	L	L	L									
6										L	L	L	L												
7										C	U ₃₇₀	L	L	U ₃₈₀											
8											L	L	L	L											
9											L	L	L	L											
10											L	L	U ₃₆₀	U ₃₅₀	L										
11											L	L	L	L											
12											L	L	L	U ₃₆₀											
13											C	L	L	L											
14										U ₄₀₅	U ₃₈₀	L	L		L										
15										L	L	L	L	L											
16											L	L	L	L											
17										L	L	L	L	L											
18										L	L	L	L	L											
19											L	L	U ₃₆₀	L	U ₃₇₀										
20											L	L	L	U ₃₆₀											
21											L	L	U ₃₆₀	L	L										
22										L	L	L	L	L											
23											L	L	L		L										
24											L	U ₃₇₀	L	L											
25											L	A	L	L	U ₃₉₀										
26										L	L	L	L	L											
27											L	L	L	L											
28										L	L	L	L	L	L										
29											L	L	L	L	L	L									
30										C	L	L	C	C											
31											L	U ₃₆₅	L	L											
CNT											1	2	6	2	4	2									
MED											U ₄₀₅	U ₃₇₅	U ₃₆₂	U ₃₆₀	U ₃₆₀	U ₃₈₀									
UQ												U ₃₆₅		U ₃₇₀											
LQ												U ₃₆₀		U ₃₅₅											

DEC. 1970

M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1970

H^oF₂ (KM)

135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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											230	250	250	240	245										
2											245	230	260	235											
3											235	245	250	250											
4											230	255	240	250											
5											225	240	250	245	220	235	250								
6											240	235	235	215											
7											I C 240	235	235	230	280										
8											240	250	250	250											
9											230	240	235	250											
10											230	240	245	240	240										
11											235	230	250	220											
12											250	235	250	260											
13											C 250	245	235												
14											215	250	230	220		250									
15											250	245	230	240	245										
16											240	230	250	250											
17											245	225	240	235	240										
18											235	240	245	235	225										
19											250	225	250	220	280										
20											250	250	250	250											
21											250	260	255	245											
22											235	245	235	235	250										
23											230	245	245		250										
24											240	250	230	240											
25											240	225	240	235	250										
26											235	250	235	230	255										
27											240	225	225	240											
28											250	235	220	245	250	250									
29											235	245	230	225	225										
30											C 240	225	I C 235	I C 230											
31											230	240	240	245											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT											12	30	31	31	27	8	1								
MED											238	240	240	240	245	250	250								
UQ											245	245	250	248	250	250									
LQ											232	235	230	235	235	238									

The Radio Research Laboratories, Japan

DEC. 1970

H^oF₂ (KM)

IONOSPHERIC DATA

DEC. 1970

H^oF (KM)

135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	320	315	295	240	225	215	250	215	210	215	230	240	220	235	235	225	245	195	215	215	240	260	290	310
2	290	290	295	265	245	200	225	215	220	220	220	215	230	225	235	225	210	I ^C 205	220	I ^C 250	245	220	295	305
3	300	300	I ^C 320	305	300	250	235	205	210	215	235	225	230	230	220	225	215	195	215	220	245	235	255	270
4	305	315	300	285	260	265	230	210	210	225	215	210	240	230	215	215	215	210	215	240	240	240	290	340
5	345	325	290	290	255	215	250	230	220	215	220	235	245	220	215	230	235	195	215	245	245	270	290	295
6	280	305	335	270	250	255	240	225	220	230	220	235	215	220	230	225	225	225	240	240	240	265	260	300
7	340	340	360	350	300	275	240	220	210	I ^C 230	235	235	I ^A 220	230	230	240	210	210	235	240	C	C	I ^C 265	300
8	300	305	315	290	295	285	270	240	215	225	230	240	230	230	240	240	225	200	210	270	240	280	295	295
9	I ^A 320	260	280	265	265	310	290	230	220	225	225	230	235	230	235	215	220	200	225	210	245	235	250	300
10	300	280	270	275	310	295	260	215	215	230	230	230	210	205	210	215	220	220	255	210	235	300	300	300
11	315	310	290	265	255	255	260	225	220	220	225	225	220	220	215	235	215	235	220	215	220	255	310	345
12	325	330	315	305	300	300	250	220	220	215	230	235	230	230	I ^C 230	C	C	215	210	C	C	C	C	C
13	I ^C 315	I ^C 315	280	255	280	320	280	C	C	215	I ^C 225	235	225	235	I ^C 220	I ^C 235	I ^C 250	235	245	240	C	340	325	
14	295	315	305	330	330	305	245	215	210	205	220	225	215	220	230	230	240	250	225	210	270	360	285	265
15	315	345	340	330	295	340	310	230	215	235	230	230	240	230	235	235	215	195	245	240	220	240	260	305
16	340	315	330	315	275	245	225	215	210	215	220	220	220	240	230	215	210	245	240	245	250	245	305	280
17	255	305	290	280	305	300	255	220	210	220	220	235	235	220	230	230	210	215	230	215	215	210	320	310
18	295	315	305	290	290	245	230	210	215	230	235	220	215	220	235	225	205	220	220	205	240	I ^A 270	295	340
19	340	315	310	290	300	265	215	205	215	215	230	225	215	220	220	230	210	215	225	215	270	290	290	300
20	315	335	315	315	265	230	210	220	200	210	225	235	230	220	235	235	220	215	215	215	215	290	290	295
21	280	310	330	295	280	280	225	210	210	205	230	230	230	230	240	230	220	210	210	220	215	260	290	340
22	355	340	295	270	240	235	215	220	215	225	230	230	235	220	240	230	215	215	210	215	215	310	320	300
23	265	265	280	300	255	235	235	210	210	230	220	220	230	230	230	225	215	220	235	210	210	300	295	255
24	285	300	330	270	210	270	245	220	220	220	235	230	220	220	245	235	220	200	210	240	260	265	235	250
25	250	310	295	230	210	215	250	230	215	230	240	I ^A 235	235	225	210	225	220	210	215	230	205	260	245	285
26	290	295	300	300	235	215	205	215	220	225	240	230	220	235	240	215	205	215	210	215	200	320	300	315
27	315	290	300	270	290	205	245	220	220	235	240	230	215	225	235	215	215	210	205	200	315	290	290	295
28	295	320	335	255	230	210	240	215	215	240	235	210	220	240	235	235	225	205	215	230	235	295	250	245
29	I ^A 290	300	300	285	255	I ^C 260	265	210	235	240	230	210	215	215	215	225	210	205	I ^C 225	I ^C 215	I ^C 200	270	305	I ^C 305
30	I ^C 315	I ^C 305	I ^C 290	C	C	C	C	C	C	C	215	220	210	I ^C 225	I ^C 235	225	215	205	205	I ^C 230	215	260	290	360
31	285	290	295	300	280	215	200	215	220	215	225	200	220	230	230	230	205	205	210	205	240	330	255	305
CNT	31	31	31	30	30	30	30	29	29	30	31	31	31	31	31	30	30	31	31	30	29	28	30	30
MED	300	310	300	288	270	255	242	215	215	222	230	230	220	225	230	225	215	210	215	213	240	268	290	300
UQ	318	315	318	300	295	285	255	220	220	230	232	235	230	230	235	230	220	218	228	240	245	292	300	310
LQ	290	300	292	270	250	215	225	215	210	215	220	220	218	220	220	225	210	205	210	215	215	250	260	295

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DEC. 1970

H^oF (KM)

IONOSPHERIC DATA

DEC. 1970

H^oES (KM)

135 E Mean Time (G. M. T. + 9h)

Station **AKITA** Lat. **39 43.5 N** Long. **140 08.2 E** Sweep **1** MHz to **20** MHz in **20** sec in automatic operation

Hour Day	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	S	S	E	E	E	E	S	G	140	G	G	100	G	G	G	G	100	100	105	S	S	S	105	S	
2	S	S	S	E	S	E	S	G	110	G	G	G	G	G	G	G	G	C	B	C	S	S	S	S	
3	S	S	C	S	E	S	110	G	105	100	100	G	G	G	G	G	G	S	S	S	E	S	S	S	
4	S	S	S	E	100	S	S	G	G	G	G	105	G	G	G	G	G	S	S	S	S	S	100	S	
5	S	S	S	S	E	S	S	G	110	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	
6	S	S	S	S	E	105	S	G	G	G	G	140	G	G	G	G	G	100	100	100	S	S	S	S	
7	S	S	S	S	S	S	S	G	G	C	G	115	105	115	105	G	140	100	S	120	C	C	C	S	
8	S	S	100	S	S	S	S	B	G	G	125	125	115	120	105	G	G	S	S	S	S	S	S	110	
9	105	E	S	S	S	S	S	G	G	G	G	125	120	120	120	120	G	S	S	S	S	S	S	S	
10	100	S	S	S	S	100	S	G	G	120	140	110	G	G	G	G	G	100	S	S	S	S	S	S	
11	S	S	S	S	S	S	S	G	G	140	120	G	115	G	G	100	100	S	100	S	S	S	105	100	
12	S	100	S	S	S	S	S	G	115	G	105	105	G	G	C	C	C	S	S	C	C	C	C	C	
13	C	C	100	100	100	S	S	C	C	B	C	B	B	B	C	105	C	C	100	100	S	C	B	B	
14	B	B	S	C	B	S	100	B	G	G	G	G	G	100	G	G	G	S	S	S	S	150	100	105	
15	105	100	100	100	S	S	S	G	G	120	115	110	G	G	G	100	G	S	105	105	100	105	S	110	
16	S	S	100	100	E	100	S	110	G	G	G	G	G	G	G	G	100	100	B	S	105	100	S	S	
17	S	S	S	S	S	S	S	110	G	G	G	G	G	G	100	G	B	S	S	S	S	S	S	100	
18	100	100	100	100	E	100	S	S	105	G	105	G	G	G	G	G	B	S	S	105	100	100	100	100	
19	100	100	100	100	S	S	S	105	100	100	105	G	G	G	G	G	G	S	S	110	105	105	105	100	
20	100	100	100	100	S	S	S	110	G	105	G	G	G	G	G	115	110	110	S	S	S	105	S	105	
21	S	100	100	E	E	100	100	G	G	G	100	G	100	100	G	G	G	S	S	105	S	S	S	E	
22	100	100	S	S	E	S	E	100	G	G	G	G	G	G	G	G	100	100	100	S	100	100	100	S	
23	S	S	S	E	E	S	S	S	G	G	G	G	G	G	G	G	G	100	100	S	S	S	S	S	
24	S	E	S	S	E	S	S	G	G	115	110	G	G	G	105	G	G	S	S	100	S	S	S	S	
25	S	S	S	E	100	S	100	100	G	120	110	105	G	G	G	G	100	100	S	S	S	105	100	100	
26	S	S	S	E	E	S	S	G	G	G	105	135	130	140	140	140	G	100	100	S	S	S	S	S	
27	S	110	100	105	100	100	S	G	G	G	G	G	110	105	G	G	100	100	100	S	S	100	100	100	
28	100	100	S	S	E	S	S	G	G	G	G	G	G	G	110	G	G	S	S	S	S	S	S	S	
29	100	100	100	100	E	C	S	S	110	105	105	105	100	G	G	G	100	100	C	C	C	S	S	C	
30	C	C	C	C	C	C	C	C	C	C	100	G	C	C	G	G	G	105	S	C	S	105	100	S	
31	105	100	S	E	S	S	S	G	G	105	G	G	G	G	100	G	115	G	S	S	S	S	100	100	100
	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	11	10	8	4	6	4	6	8	10	14	12	8	8	7	7	9	13	9	7	6	11	11	11	
MED	100	100	100	100	100	100	108	110	110	110	105	110	112	110	105	115	100	100	100	105	100	105	100	100	
UQ	105	100	100	100	100	100	105	110	112	120	115	125	118	120	115	118	100	100	100	108	105	105	102	105	
LQ	100	100	100	100	100	100	100	100	105	105	105	105	102	100	105	102	100	100	100	102	100	100	100	100	

DEC. 1970

H^oES (KM)

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IONOSPHERIC DATA

DEC. 1970

TYPES OF ES

135 E Mean Time (G. M. T. + 9h)

Station	AKITA																								
Lat.	39 43 .5 N							Long.	140 08 .2 E																
Sweep	1 MHz to 20 MHz in 20 sec in automatic operation																								
Hour Day	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									H			L					L	F	F				F		
2									L																
3							F		L	L	L														
4					F							L												F	
5									L																
6						F						H						F	F	F					
7											S	L	C	L			L	F	F	F					
8		F								H	H	S	C	L											F
9	F									H	H	C	C	C		S									
10	F					F				C	H	L						F							
11									H	C		C			L	L			F				F	F	
12		F							L		L	L													
13			F	F	F												L		F	F					
14						F								L								F	F	F	F
15	F	F	F	F						C	C	L				L			F	F	F	F	F	F	F
16			F	F		F		L									L	F			F	F			
17								L							L										F
18	F	F	F	F		F			L		L									F	F	F	F	F	F
19	F	F	F	F				L	L	L	L									F	F	F	F	F	F
20	F	F	F	F				L		L					C	L		F				F	F	F	F
21		F	F			F	F			L		L	L							F					
22	F	F					F										L	F	F		F	F	F		
23																		F	F						
24									C	L					L							F			
25					F		F	L		C	L	L					L	F				F	F	F	F
26										L	H	H	H	H				F	F						
27		F	F	F	F	F							L	L				L	F	F		F	F	F	F
28	F	F													L										
29	F	F	F	F					L	L	L	L	L				L	F							
30										L								F					F	F	F
31	F	F								L				L		C							F	F	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
UQ																									
LQ																									

DEC. 1970

TYPES OF ES

IONOSPHERIC DATA

DEC. 1970

FOF2 (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	34	36	39	41	42	26	33	69	J ₇₈ ^R	86	98	111	117	115	106	J ₈₈ ^R	86	J ₈₁ ^R	38	36	33	36	35	36
2	36	35	36	40	46	31	33	66	J ₈₃ ^R	101	111	106	126	118	J ₁₀₃ ^R	106	86	65	51	37	40	40	30	31
3	31	33	33	33	35	35	35	71	85	83	93	96	101	104	99	93	84	66	49	48	41	40	33	30
4	31	34	35	35	37	32	34	75	J ₈₃ ^R	92	92	108	106	98	99	96	J ₈₂ ^R	66	50	46	49	41	28	28
5	29	30	32	31	31	28	30	60	81	94	95	92	99	94	87	90	87	80	53	48	47	35	35	35
6	35	34	34	37	38	32	35	70	J ₉₄ ^R	J ₁₀₆ ^R	101	96	J ₁₀₄ ^R	J ₉₀ ^R	106	97	81	90	54	44	44	44	37	30
7	31	31	31	32	33	36	45	J ₇₆ ^R	100	J ₁₁₂ ^R	108	104	100	101	103	101	90	69	52	51	50	60	46	36
8	35	35	35	36	35	35	40	J ₇₇ ^R	J ₁₀₄ ^R	J ₁₁₁ ^R	110	116	113	110	108	J ₁₀₅ ^R	101	90	51	46	56	J ₁₅₀ ^R	45	40
9	41	40	39	31	27	29	32	73	J ₁₀₂ ^R	115	121	116	107	110	J ₁₀₅ ^R	96	96	J ₇₄ ^R	J ₇₄ ^R	66	56	47	35	31
10	31	35	34	30	31	31	36	76	J ₉₁ ^R	J ₁₀₃ ^R	101	105	108	J ₁₀₂ ^R	J ₁₀₂ ^R	97	86	J ₇₈ ^R	51	61	51	33	35	35
11	34	31	33	35	31	30	34	J ₇₅ ^R	96	114	119	110	111	111	109	J ₁₀₄ ^R	J ₈₀ ^R	62	69	52	40	26	26	29
12	30	31	31	33	31	31	36	J ₇₃ ^R	95	100	98	111	111	106	111	101	95	65	68	56	38	31	32	32
13	33	34	34	34	33	32	34	77	97	97	105	107	112	96	101	101	77	57	58	56	41	29	30	31
14	33	33	35	35	35	34	41	80	88	99	103	118	111	96	96	96	79	91	80	59	52	37	50	51
15	46	42	43	44	40	J ₃₈ ^R	41	81	J ₁₀₄ ^R	106	124	125	119	J ₁₀₅ ^R	101	109	110	70	55	56	54	A	29	29
16	29	31	31	30	31	31	31	J ₈₀ ^R	91	J ₁₀₁ ^R	114	119	97	J ₁₀₂ ^R	106	101	J ₇₉ ^R	59	60	51	49	33	29	34
17	32	30	29	29	26	26	35	R	91	101	102	108	116	J ₁₀₃ ^R	100	91	75	56	51	49	37	30	28	29
18	28	30	30	30	31	32	36	71	J ₇₆ ^R	101	96	J ₁₀₃ ^R	100	91	85	92	77	52	60	51	37	24	26	28
19	30	31	32	31	31	35	29	61	J ₇₅ ^R	81	91	107	102	95	J ₉₃ ^H	99	92	63	56	50	32	37	33	35
20	34	34	32	33	35	30	26	54	88	83	90	101	99	88	94	94	78	71	67	62	43	37	43	41
21	37	35	33	34	34	36	38	J ₆₈ ^R	74	85	91	97	105	101	107	96	86	86	56	41	41	26	29	30
22	31	34	34	34	37	26	29	54	J ₈₂ ^R	77	96	C	C	C	C	106	93	J ₉₃ ^R	67	49	41	30	30	34
23	35	34	36	37	33	J ₃₃ ^R	34	53	84	81	J ₁₀₃ ^R	87	90	90	91	J ₁₀₁ ^R	81	61	71	60	34	31	31	35
24	35	35	J ₃₁ ^R	J ₃₆ ^F	J ₄₃ ^R	29	31	59	76	91	116	116	104	84	91	97	J ₇₅ ^R	66	56	41	36	36	40	36
25	31	35	37	41	31	29	26	56	J ₈₁ ^R	89	113	91	79	88	94	89	68	65	60	41	26	35	33	30
26	32	36	36	34	35	39	26	55	66	88	97	98	86	95	J ₁₀₃ ^R	93	65	65	58	36	34	28	28	31
27	J ₃₂ ^F	J ₃₅ ^F	38	34	34	34	27	52	74	94	130	109	95	89	90	77	66	72	52	31	34	36	37	35
28	32	31	31	36	32	27	34	50	62	98	J ₁₄₀ ^R	92	81	96	98	101	80	70	56	46	J ₄₁ ^R	40	39	41
29	36	30	32	32	36	36	35	66	J ₇₆ ^R	J ₉₇ ^R	121	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	86	96	110	111	110	90	91	81	71	51	39	35	30	F ₃₀ ^{J_R}	
31	F	30	F	J ₂₉ ^R	J ₃₀ ^R	35	23	51	60	90	106	91	99	101	93	88	79	51	47	46	26	26	30	I ₃₀ ^A
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	30	30	30	30	29	30	31	31	29	29	29	29	30	30	30	30	30	30	29	29	30
MED	32	34	34	34	34	32	34	69	84	97	103	107	104	101	100	96	81	68	56	48	41	35	33	32
UQ	35	35	36	36	36	35	36	75	94	101	114	111	111	105	105	101	87	74	60	56	49	40	37	35
LQ	31	31	32	31	31	29	30	56	76	87	96	97	99	94	93	92	78	63	51	41	35	30	29	30

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DEC. 1970

FOF2 (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

FOF1 (0.01 MHz)

135 E Mean Time (G. M. T. + 9h)

Station **KOKUBUNJI TOKYO** Lat. **35 42.4 N** Long. **139 29.3 E** Sweep **1** MHz to **20** MHz in **20** sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1											L	L	L	L	L										
2											L	L	L												
3											L	L	L	L	L										
4										L	L	L	L	L	L										
5										L	L		L	L	L	U 320									
6										L	L	L	L		L										
7											L		L	L											
8											L			L	L										
9										L	L		L	L	L										
10											L	L	L	L	L										
11										L	L	L	L	L											
12												L	L	L	L										
13										L	L	L	L	L	L										
14										L	L	L	L	L	L										
15										L	L	L		L	L										
16										L	L	L	L	L	L										
17										L	L	L	L	L	L										
18										L	L	L	L	L	L										
19										L	L	L	L	L	L	L									
20											L	L	L	L	L										
21									L	L	L	L	L	L	L										
22										L	C	C	C	C	C	L									
23											L	L	L	L	L	L									
24										L	L	L	L		L										
25										L	L	L	L	L	L	L									
26											L	L	L	L	L	L									
27										L	L	L	L	L	L	L									
28										L	L	L	L	L	L	L									
29										L	L	C	C	C	C	C	C								
30								C	C		L	L		L	L										
31									L	L	L	L	L	L	L	L									
CNT																	1								
MED																	U 320								
UQ																									
LQ																									

DEC. 1970

FOF1 (0.01 MHz)

IONOSPHERIC DATA

DEC. 1970

FOE (0.01 MHz)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B	A	A	A	340	I A 335	340	335	315	R	200	B							
2							B	200	R 280	A	A	I R 340	335	330	315	285	190	B							
3							B	210	R	300	325	335	A	R	310	A	210	B							
4							B	210	I R 270	310	I A 325	350	350	335	305	I R 260	A								
5							B	225	A	305	330	I A 340	355	330	300	260	200								
6							B	220	A	305	335	330	340	A	A	280	175								
7							B	220	270	310	320	350	R 345	340	I A 295	A	A								
8							B	190	R	315	335	345	345	A	A	I A 280	210								
9							B	210	R	I R 310	I R 320	325	345	340	A	A	A								
10							B	200	R	R 325	I A 335	A	A	I R 340	R 325	R 275	210								
11							B	200	250	I R 310	A	A	345	I A 335	R 325	285	R								
12							B	R	A	A	A	A	355	I R 340	315	A	R								
13							B	200	270	I B 300	340	I A 340	R 360	355	320	A	B								
14								180	255	I R 300	R 315	I R 340	I R 345	I R 335	315	B	I R 200								
15								170	R	I R 310	A	R	A	R	R	R	190								
16								R	250	I R 310	R 335	345	350	345	R 315	265	A								
17								210	R	305	315	345	345	I R 330	315	I B 280	B								
18								190	R	315	330	I R 340	345	I R 340	315	A	A								
19							B	250	300	325	340	350	330	295	260	180									
20							B	255	290	325	340	340	330	305	260	A									
21								175	R 250	290	325	I R 335	I R 345	R 325	R 300	265	175								
22							B	250	295	325	C	C	C	C	R	A									
23							B	R	A	315	I R 330	335	I R 330	305	275	R									
24							B	R	A	A	A	A	A	A	A	A									
25							B	R	285	315	I R 320	335	I R 320	315	I R 275	175									
26							A	R	285	330	330	335	325	I R 305	A	A									
27								180	250	285	320	335	I A 330	335	310	265	A								
28								175	240	A	R	335	R	R	R	R	180								
29							B	R	A	A	C	C	C	C	C	C									
30							C	C	A	315	A	A	A	I R 310	R	A									
31								195	R	285	R	R	A	R	300	R	A								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								19	14	23	23	22	22	21	23	15	13								
MED								200	250	305	325	340	345	335	310	275	190								
UQ								210	270	310	332	340	350	340	315	280	200								
LQ								185	250	292	320	335	340	330	305	262	180								

DEC. 1970

FOE (0.01 MHz)

IONOSPHERIC DATA

DEC. 1970

FOES (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat 35 42.4 N Long 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	E ₁₅	E ₁₅	E ₁₃	E ₁₅	E ₁₅	E ₁₃	25	34	35	G	J ₃₉	G	G	G	G	19	F ₁₅	J ₂₄	E ₁₆	E ₁₅	E ₁₃	E ₁₆	E ₁₅	
2	21	J ₁₈	J ₂₇	22	22	E ₁₅	E ₁₅	G	G	J ₃₅	38	31	G	37	G	G	22	E ₁₆	20	22	E ₁₃	E ₁₄	E ₁₅	E ₁₅	
3	J ₂₁	20	E ₁₅	E ₁₅	E ₁₅	E ₁₆	E ₁₅	G	G	G	38	38	J ₃₉	G	G	40	J ₂₅	J ₂₅	22	20	19	E ₁₅	E ₁₅	E ₁₅	
4	E ₁₅	E ₁₃	E ₁₅	E ₁₃	E ₁₃	E ₁₃	E ₁₃	G	G	G	J ₃₈	G	38	38	J ₂₉	31	J ₂₇	J ₂₁	E ₁₅	19	22	E ₁₄	E ₁₅	E ₁₅	
5	E ₁₆	20	22	E ₁₅	E ₁₃	E ₁₃	E ₁₃	G	30	34	36	37	G	21	G	G	G	E ₁₄	E ₁₅	M	20	E ₁₅	J ₁₈	E ₁₃	E ₁₅
6	E ₁₅	E ₁₄	M	E ₁₃	M	J ₂₆	E ₁₄	G	J ₂₈	G	36	39	37	34	30	G	G	J ₅₆	J ₂₆	E ₁₄	E ₁₅	J ₁₇	E ₁₅	J ₁₇	
7	M	E ₁₅	E ₁₄	E ₁₃	J ₁₂	J ₄₉	M	G	G	38	J ₅₁	40	39	G	J ₃₅	J ₆₁	J ₅₄	J ₂₉	24	22	J ₂₄	E ₁₅	E ₁₃	E ₁₅	
8	21	22	23	21	24	19	E ₁₃	G	G	G	J ₅₀	G	J ₄₆	J ₇₅	J ₄₁	J ₄₀	G	E ₁₃	20	E ₁₆	E ₁₅	22	21	20	
9	E ₁₃	J ₂₉	J ₂₁	E ₁₅	22	22	20	G	G	G	37	40	41	38	36	31	J ₂₉	J ₂₄	J ₂₉	J ₂₄	20	J ₄₄	J ₂₅	24	
10	E ₁₅	E ₁₅	E ₁₆	E ₁₃	E ₁₅	E ₁₂	20	J ₂₁	G	G	36	J ₄₁	42	J ₄₁	G	G	G	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₅	
11	E ₁₅	E ₁₅	E ₁₂	22	E ₁₅	20	22	19	G	20	G	41	41	J ₂₉	J ₄₄	G	G	18	22	J ₂₅	J ₂₉	J ₂₉	22	20	E ₁₅
12	E ₁₅	E ₁₅	J ₂₁	J ₁₉	20	E ₁₃	E ₁₄	G	33	J ₄₀	38	J ₇₀	J ₃₀	G	34	30	19	E ₁₅	J ₁₈	J ₁₇	J ₁₇	J ₁₈	E ₁₅	J ₁₇	
13	E ₁₅	J ₂₅	J ₂₄	J ₁₇	J ₂₄	J ₁₈	J ₁₇	G	G	E ₃₅	G	E ₃₉	G	G	G	29	31	31	20	J ₂₅	J ₁₉	E ₁₃	20	J ₁₉	E ₁₂
14	E ₁₄	22	E ₁₅	E ₁₄	E ₁₄	J ₁₈	J ₁₈	J ₂₇	G	G	G	G	32	G	G	G	E ₂₆	G	E ₁₅	20	20	22	20	20	E ₁₅
15	E ₁₅	E ₁₅	E ₁₅	22	J ₂₅	22	E ₁₅	G	G	J ₆₅	G	J ₄₁	G	G	G	G	G	E ₁₃	E ₁₅	E ₁₃	J ₂₄	J ₆₁	J ₂₉	J ₂₅	
16	E ₁₅	E ₁₅	J ₁₉	J ₁₉	J ₁₉	E ₁₅	E ₁₃	19	G	G	G	J ₂₉	G	J ₃₀	30	G	J ₂₉	E ₁₆	20	E ₁₅	20	E ₁₅	J ₂₅	J ₂₅	
17	E ₁₅	E ₁₅	20	E ₁₅	E ₁₅	E ₁₅	E ₁₃	J ₁₈	G	G	G	G	G	G	G	E ₂₆	E ₂₀	J ₂₅	E ₁₃	E ₁₅	E ₁₅	E ₁₅	E ₁₃	20	E ₁₅
18	E ₁₅	J ₂₁	22	22	19	E ₁₃	E ₁₂	G	G	G	G	G	G	30	J ₂₉	J ₂₉	J ₂₆	J ₂₈	E ₁₅	20	E ₁₅	E ₁₃	E ₁₅	J ₂₅	
19	J ₂₉	J ₂₅	J ₂₉	J ₂₄	22	20	20	21	G	G	G	G	G	21	G	23	J ₄₂	J ₂₅	22	J ₁₅	J ₁₈	19	18	M	21
20	E ₁₄	E ₁₅	J ₂₈	J ₂₅	E ₁₂	E ₁₆	E ₁₃	17	G	33	G	36	23	36	33	35	22	E ₁₃	J ₂₄	J ₂₉	J ₁₈	E ₁₅	M	E ₁₅	E ₁₅
21	J ₂₂	J ₁₇	E ₁₅	E ₁₃	E ₁₃	E ₁₃	E ₁₃	G	G	G	G	G	G	J ₂₉	J ₂₈	21	G	19	E ₁₄	E ₁₅	E ₁₅	J ₂₅	J ₂₄	E ₁₅	
22	20	22	E ₁₅	J ₂₁	23	20	E ₁₅	E ₁₅	30	G	G	C	C	C	C	20	30	J ₂₉	22	22	22	E ₁₅	E ₁₅	E ₁₅	
23	E ₁₅	22	E ₁₅	21	E ₁₅	20	E ₁₃	E ₁₈	G	33	G	G	G	G	G	G	E ₁₅	E ₁₅	E ₁₅	20	22	21	E ₁₅	E ₁₅	
24	E ₁₅	E ₁₅	E ₁₃	E ₁₅	E ₁₅	E ₁₃	E ₁₅	E ₁₅	G	32	J ₄₈	J ₇₄	J ₆₁	J ₅₅	J ₃₉	48	J ₂₉	J ₃₆	J ₂₉	E ₁₅	J ₂₄	J ₂₅	J ₂₅	J ₂₃	
25	E ₁₅	21	E ₁₃	20	23	20	E ₁₅	E ₁₅	G	G	G	G	G	G	G	G	G	E ₁₅	20	20	21	20	20	E ₁₅	E ₁₅
26	20	20	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	25	G	G	35	36	G	G	G	31	22	18	J ₁₈	J ₁₈	19	17	E ₁₅	E ₁₅	
27	E ₁₄	E ₁₃	E ₁₃	J ₁₉	24	M	J ₁₆	G	27	31	G	35	J ₄₉	35	G	G	J ₂₂	J ₂₅	J ₂₉	J ₂₅	J ₁₉	J ₁₉	E ₁₄	E ₁₅	
28	E ₁₅	E ₁₂	E ₁₄	E ₁₄	E ₁₂	E ₁₂	J ₁₆	G	G	35	G	G	G	G	G	G	G	E ₁₄	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
29	E ₁₅	E ₁₅	J ₂₆	J ₂₅	J ₂₅	20	E ₁₅	E ₁₃	G	J ₅₆	J ₄₁	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	34	29	J ₅₄	J ₆₅	J ₃₉	J ₂₈	G	J ₂₇	J ₂₉	21	21	E ₁₅	E ₁₅	E ₁₅	E ₁₅	
31	E ₁₅	E ₁₃	E ₁₅	21	20	E ₁₅	E ₁₅	G	21	38	G	31	J ₄₁	G	33	G	J ₂₅	22	E ₁₄	J ₂₂	E ₁₅	E ₁₅	J ₄₄	J ₃₉	
	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	31	31	29	29	29	29	30	30	30	30	30	30	30	30	
MED	E ₁₅	E ₁₅	E ₁₅	18	16	E ₁₆	E ₁₅	G	G	G	G	36	23	21	G	E ₂₀	22	20	20	19	18	17	17	E ₁₅	
UQ	20	21	J ₂₂	21	22	20	16	18	20	34	38	40	J ₄₁	37	30	31	J ₂₇	J ₂₅	J ₂₄	22	21	J ₂₀	21	20	
LQ	E ₁₅	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₃	E ₁₃	G	G	G	G	G	G	G	G	G	G	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	

The Radio Research Laboratories, Japan

DEC. 1970

FOES (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

F-MIN (0.1 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅	15	15	15	15	15	15	18	15	18	16	14	15	E ₁₅	E ₁₆	E ₁₅	13	E ₁₆	E ₁₅
2	E ₁₅	E ₁₅	14	E ₁₅	E ₁₅	E ₁₅	15	15	15	15	15	16	25	23	15	16	15	16	E ₁₅	E ₁₅	13	14	E ₁₅	E ₁₅
3	13	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₆	15	15	15	16	15	15	15	15	15	15	14	E ₁₅	E ₁₅	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅
4	E ₁₅	13	E ₁₅	13	13	13	13	14	15	17	15	19	22	15	15	14	14	15	E ₁₅	E ₁₅	E ₁₅	14	E ₁₅	E ₁₅
5	E ₁₆	13	E ₁₅	E ₁₅	13	13	13	16	15	16	15	16	16	16	14	15	16	14	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅	E ₁₅
6	E ₁₅	14	E ₁₅	13	13	14	14	15	15	15	16	15	15	15	15	18	15	E ₁₅	E ₁₅	13	14	E ₁₅	E ₁₅	E ₁₅
7	14	E ₁₅	14	13	13	E ₁₅	15	16	15	15	16	25	15	19	14	13	14	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	13	E ₁₅
8	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅	E ₁₅	13	15	15	17	20	19	19	19	15	15	15	13	E ₁₅	E ₁₆	E ₁₅	E ₁₅	E ₁₅	E ₁₆
9	13	E ₁₅	E ₁₅	E ₁₅	13	14	15	16	15	14	15	23	25	15	15	15	13	E ₁₅	13	14	E ₁₅	E ₁₅	E ₁₅	14
10	E ₁₅	E ₁₅	E ₁₆	13	E ₁₅	12	E ₁₅	14	15	15	15	16	20	16	15	15	16	E ₁₅	E ₁₅	E ₁₅	E ₁₅	14	E ₁₅	E ₁₅
11	E ₁₅	E ₁₅	12	E ₁₅	E ₁₅	13	14	14	15	16	19	16	20	15	19	19	15	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
12	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	13	14	15	26	28	26	26	25	26	14	15	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
13	E ₁₅	13	12	12	13	14	13	14	17	35	30	39	31	30	26	26	25	E ₁₅	14	14	13	E ₁₅	E ₁₅	14
14	14	14	E ₁₅	14	14	13	11	14	15	15	15	25	19	15	15	26	15	E ₁₅	14	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅
15	E ₁₅	E ₁₅	E ₁₅	13	13	E ₁₅	E ₁₅	15	15	16	15	25	25	22	19	16	15	13	E ₁₅	E ₁₅	13	12	E ₁₅	E ₁₅
16	E ₁₅	E ₁₅	13	12	13	E ₁₅	13	14	15	15	16	15	26	15	15	15	15	E ₁₆	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
17	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	13	14	15	24	25	26	25	25	25	26	20	E ₁₅	13	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅
18	E ₁₅	E ₁₅	E ₁₅	12	E ₁₅	13	12	16	15	24	25	26	25	15	15	15	15	14	E ₁₅	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅
19	14	14	14	14	E ₁₅	E ₁₅	12	14	14	14	15	26	24	15	21	13	13	E ₁₅	E ₁₅	14	13	E ₁₅	E ₁₅	E ₁₅
20	14	E ₁₅	14	13	12	E ₁₆	13	15	15	16	24	26	18	24	16	15	14	13	14	12	14	E ₁₅	E ₁₅	E ₁₅
21	14	13	E ₁₅	13	13	13	13	14	16	18	15	25	23	15	14	14	14	E ₁₅	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
22	E ₁₅	E ₁₅	E ₁₅	13	E ₁₅	13	E ₁₅	15	15	14	21	C	C	C	C	15	15	E ₁₇	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅	E ₁₅
23	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	14	13	18	16	16	25	25	25	26	22	16	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
24	E ₁₅	E ₁₅	13	E ₁₅	E ₁₅	13	E ₁₅	15	15	25	25	25	25	25	25	25	15	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	14
25	E ₁₅	13	13	12	E ₁₅	E ₁₅	E ₁₅	15	15	15	15	25	18	23	15	15	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
26	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	14	15	15	18	26	26	24	23	17	14	13	13	13	E ₁₅	E ₁₅	E ₁₅	E ₁₅
27	14	13	13	12	14	14	14	14	14	16	18	26	15	21	18	15	14	14	14	E ₁₅	13	E ₁₅	14	E ₁₅
28	E ₁₅	12	14	14	12	12	12	14	16	15	24	15	19	18	16	15	15	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
29	E ₁₅	E ₁₅	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	13	15	15	15	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	15	19	19	20	19	19	15	15	E ₁₅	13	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
31	E ₁₅	13	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	15	15	16	15	25	25	25	23	16	15	13	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	31	31	29	29	29	29	30	30	30	30	30	30	30	30	30
MED	E ₁₅	E ₁₅	E ₁₅	13	E ₁₅	13	14	15	15	16	16	25	22	19	15	15	15	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
UQ	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	15	15	16	22	26	25	24	19	16	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
LQ	14	13	14	13	13	13	13	14	15	15	15	16	18	15	15	15	14	14	14	13	13	E ₁₅	E ₁₅	E ₁₅

DEC. 1970

F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1970

M(3000)F2 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	260	260	280	300	340	275	305	340	34 ^B	325	315	300	315	315	315	32 ^B	350	33 ^B	340	315	280	285	270	285	
2	280	275	275	280	345	305	295	340	34 ^R	350	340	325	310	30 ^B	30 ^B	330	325	310	315	305	280	300	275	270	
3	270	275	275	275	265	280	315	320	340	350	325	320	305	310	315	325	315	335	315	310	300	285	325	275	
4	260	275	270	275	290	290	290	335	34 ^R	345	335	325	335	325	315	335	31 ^R	345	305	285	310	320	290	255	
5	250	265	290	300	325	255	275	320	335	335	335	315	330	325	310	310	315	340	310	310	320	290	270	285	
6	275	275	265	285	325	265	285	335	285	35 ^B	345	325	330	29 ^V	320	330	320	340	335	300	275	295	305	275	
7	260	260	255	250	270	275	295	32 ^R	32 ^R	350	34 ^B	325	320	310	325	310	325	325	325	310	315	300	300	320	270
8	260	260	270	270	285	265	280	31 ^R	33 ^R	33 ^R	34 ^R	310	310	310	310	300	30 ^B	305	315	300	265	290	280 ^R	265	255
9	265	285	295	330	295	270	280	320	33 ^B	330	315	320	325	310	32 ^R	325	345	31 ^R	31 ^R	320	320	320	265	270	
10	285	290	295	295	270	290	305	335	33 ^B	33 ^B	325	325	315	31 ^R	31 ^R	330	315	33 ^B	300	310	340	275	270	265	
11	265	270	275	285	295	300	270	32 ^R	325	330	330	310	320	325	275	32 ^R	31 ^R	305	320	310	310	275	270	270	
12	265	270	290	280	260	260	285	33 ^B	360	360	330	320	330	315	320	325	325	315	330	340	295	260	265	275	
13	255	265	290	295	290	255	275	335	335	350	325	325	330	315	320	32 ^V	325	305	325	325	345	270	275	270	
14	290	275	270	275	265	270	305	350	370	325	325	330	305	325	315	325	315	300	315	290	310	225	265	295	
15	290	285	280	270	275	26 ^B	275	345	34 ^B	320	325	320	305	31 ^R	305	305	330	305	305	320	355	A	270	270	
16	270	285	265	265	295	295	325	33 ^B	345	33 ^B	325	320	310	31 ^R	330	335	33 ^B	310	320	315	330	325	260	270	
17	290	270	275	280	270	270	295	R	350	345	335	290	330	33 ^B	325	340	345	305	335	345	300	305	265	270	
18	260	265	270	270	295	290	315	340	35 ^R	340	325	34 ^B	320	340	320	330	345	310	320	350	330	330	270	255	
19	260	285	285	295	270	265	320	330	35 ^R	345	330	320	325	325	31 ^H	315	365	325	320	340	285	300	275	285	
20	275	275	280	290	315	300	330	325	355	340	345	335	335	330	320	330	325	320	335	340	325	270	280	300	
21	275	285	275	270	295	305	330	34 ^R	335	355	345	330	320	315	325	330	315	335	340	325	315	345	270	265	
22	270	270	275	295	310	355	315	335	33 ^B	340	325	C	C	C	C	330	325	32 ^B	340	330	315	265	265	275	
23	275	275	285	280	305	325	325	340	325	345	35 ^B	325	310	335	320	33 ^B	335	330	325	35 ^B	275	285	285	270	
24	295	295	27 ^R	285 ^F	34 ^B	275	325	325	340	335	330	335	340	315	310	330	33 ^R	310	320	295	285	280	300	305	
25	295	260	280	345	325	275	300	320	34 ^R	310	335	325	325	320	320	335	345	335	335	345	310	270	305	280	
26	265	290	280	275	300	335	305	345	320	340	330	330	330	315	33 ^B	345	340	325	360	310	335	305	290	260	
27	265 ^F	305 ^F	315	295	295	355	295	345	340	320	335	340	345	325	345	340	335	350	365	310	280	280	280	285	
28	280	285	275	310	370	280	320	330	355	305	31 ^R	345	300	305	315	320	315	315	320	315	295 ^R	300	280	305	
29	285	295	295	280	280	290	265	33 ^R	330	320	325	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	335	335	325	315	320	310	320	335	350	355	310	290	300	F	326 ^R	
31	F	315	F	280 ^R	285 ^F	315	340	335	350	335	340	320	305	315	340	330	345	355	300	325	345	280	280	I	295 ^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	29	30	29	30	30	30	30	29	30	31	31	29	29	29	29	30	30	30	30	30	30	29	29	30	
MED	270	275	275	280	295	275	302	335	340	340	330	325	320	315	315	330	325	325	320	315	310	285	275	270	
UQ	280	285	285	295	315	300	320	340	350	345	335	330	330	325	320	330	340	335	335	330	325	300	285	285	
LQ	260	270	270	275	275	265	285	325	330	330	325	320	310	315	310	325	315	310	315	310	290	275	270	270	

DEC. 1970

M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1970

M(3000)F1 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station **KOKUBUNJI TOKYO** Lat. **35 42' 4" N** Long. **139 29' 3" E** Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	L	L	L									
2											L	L	L											
3											L	L	L	L	L									
4										L	L	L	L	L	L									
5									L	L			L	L	L	U L 560								
6									L	L	L	L	L		L									
7											L		L	L										
8											L			L	L									
9										L	L		L	L	L									
10											L	L	L	L	L									
11									L	L	L	L	L	L										
12												L	L	L	L									
13									L	L	L	L	L	L	L									
14									L	L	L	L	L	L	L									
15									L	L	L		L	L	L									
16									L	L	L	L	L	L	L									
17									L	L	L	L	L	L	L									
18									L	L	L	L	L	L	L									
19									L	L	L	L	L	L	L	L								
20											L	L	L	L	L	L								
21									L	L	L	L	L	L	L	L								
22											L	C	C	C	C	L								
23											L	L	L	L	L	L								
24									L	L	L	L	L		L									
25									L	L	L	L	L	L	L	L								
26											L	L	L	L	L	L								
27										L	L	L	L	L	L	L								
28										L	L	L	L	L	L	L								
29										L	L	C	C	C	C	C	C							
30								C	C		L	L		L	L									
31								L	L	L	L	L	L	L	L	L								
CNT																1								
MED																U L 560								
UQ																								
LQ																								

DEC. 1970

M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1970

H^oF₂ (KM)

135 E Mean Time (G. M. T. + 9h)

Station: KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											240	250	250	260	250									
2											255	250	250											
3											250	250	245	260	250									
4											250	245	260	250	250	250								
5											240	230		250	235	230	230							
6											230	230	230	240		255								
7											250		250	255										
8											260			250	255									
9											250	250		250	250	250								
10											240	250	240	240	240									
11											260	250	230	250	250									
12												260	230	245	260									
13											230	240	260	260	250	260								
14											240	240	260	250	250	250								
15											250	250	250		260	250								
16											240	250	240	235	250	250								
17											240	240	240	250	240	250								
18											245	250	250	245	245	250								
19											225	230	260	250	240	230	220							
20											230	255	250	240	260									
21										220	240	240	250	250	250	260								
22											250	C	C	C	C	250								
23											250	250	250	250	245	250								
24											260	255	250	250		270								
25											250	245	245	245	255	250	245							
26												250	240	260	245	225								
27											255	260	230	235	255	235	225							
28											280	250	240	245	250	250	250							
29											250	250	C	C	C	C	C	C						
30								C	C			250	260		250	250								
31											230	250	250	245	250	255	250							
	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	19	29	25	26	26	26	8								
MED									225	250	250	250	250	250	250	238								
UQ									250	250	255	250	255	255	250									
LQ									240	240	245	245	245	250	225									

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DEC. 1970

H^oF₂ (KM)

IONOSPHERIC DATA

DEC. 1970

H^oF (KM)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	330	340	300	260	230	260	260	210	215	240	210	220	240	230	235	220	240	215	200	240	290	260	290	290
2	300	300	340	300	240	235	245	240	240	240	230	220	210	240	245	250	230	205	240	245	250	245	250	300
3	340	305	320	330	300	275	240	240	240	240	240	220	215	240	240	245	220	240	210	245	240	240	245	290
4	340	340	300	295	270	250	255	240	235	240	230	240	240	240	240	240	210	210	215	240	240	210	260	350
5	365	340	300	290	250	250	240	210	245	230	225	230	20 ^H	230	210	210	220	210	245	230	225	230	295	280
6	305	310	340	275	230	315	270	240	230	240	230	210	205	22 ^H	225	230	220	24 ^A	220	220	230	260	250	270
7	340	350	340	345	310	290	230	220	230	215	230	230	205	240	245	250	240	230	235	240	250	245	245	300
8	305	310	300	295	300	300	290	245	240	235	240	250	240	240	240	240	240	210	200	300	240	240	255	300
9	300	300	260	245	265	310	300	240	230	240	240	240	220	245	230	240	240	215	240	230	230	240	^{E A} 340	325
10	310	290	250	290	310	300	260	240	240	240	210	240	220	210	230	230	230	205	230	240	200	290	300	310
11	330	330	300	280	250	250	290	245	240	240	220	210	240	240	240	240	210	200	240	240	255	295	330	340
12	330	310	310	300	290	325	260	215	235	230	220	230	230	230	230	220	220	200	230	220	250	220	315	300
13	310	315	290	270	260	320	300	240	220	230	225	21 ^H	230	230	220	230	210	210	230	220	210	290	310	320
14	290	310	310	310	300	320	260	220	220	200	230	240	230	240	240	240	230	280	235	240	240	30 ^A	310	290
15	260	290	300	300	300	340	290	235	240	240	240	240	240	240	220	245	230	205	240	240	205	^{A E A} 360	340	
16	350	340	345	340	250	265	240	235	230	220	240	220	200	240	240	240	215	235	245	235	230	225	330	300
17	250	250	290	260	255	340	250	240	210	230	200	220	220	220	210	240	210	210	215	215	220	250	300	310
18	300	340	310	300	290	270	245	240	220	200	240	240	210	210	240	240	210	250	240	210	210	235	300	39 ^A
19	340	340	310	310	300	290	210	240	215	220	225	205 ^H	230	220	210	230	220	220	200	225	220	240	305	290
20	300	305	315	300	245	270	225	225	230	230	210	240	240	230	220	240	210	230	220	220	210	250	275	250
21	270	280	310	315	260	260	230	220	205	210	200	240	240	240	240	240	230	220	200	215	240	240	315	340
22	340	310	290	265	250	205	250	235	250	235	210	C	C	C	C	240	240	220	205	235	220	260	340	300
23	290	300	275	250	250	250	240	210	240	240	240	220	210	240	220	240	210	215	240	215	200	300	315	290
24	290	275	350	290	210	280	250	215	225	240	250	240	240	250	250	250	225	245	240	245	250	300	290	255
25	255	310	295	215	215	260	260	240	230	240	240	205	230	200	230	235	210	245	230	205	240	290	245	250
26	310	290	290	290	260	240	290	240	215	230	235	230	230	225	230	230	215	230	205	220	215	260	260	315
27	325	295	250	260	250	205	260	230	230	230	240	220	220	220	220	220	210	210	210	260	270	290	285	280
28	305	310	305	255	205	300	255	230	210	220	240	210	210	240	240	240	215	210	215	215	260	250	290	250
29	250	290	290	290	300	305	300	230	235	240	240	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	240	210	240	260	240	240	250	235	240	225	245	220	255	290	300
31	340	260	305	300	300	240	250	240	250	240	210	230	240	250	240	240	230	205	240	215	205	300	290	30 ^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	30	30	30	30	30	30	30	30	31	31	29	29	29	29	30	30	30	30	30	30	30	29	30	30
MED	308	310	300	290	260	272	255	238	230	235	230	230	230	240	235	240	220	215	230	232	230	250	291	300
UQ	340	330	310	300	300	305	270	240	240	240	240	240	240	240	240	240	230	235	240	240	250	290	312	315
LQ	290	290	290	265	250	250	240	220	220	230	215	220	210	225	220	230	210	210	210	220	215	240	260	290

DEC. 1970

H^oF (KM)

IONOSPHERIC DATA

DEC. 1970

H¹ES (KM)

135° E Mean Time (G. M. T. + 9^h)

Station: KOKUBUNJI TOKYO Lat. 35° 42.4' N Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	S	S	S	B	S	S	B	150	120	120	G	110	G	G	G	G	105	B	100	S	S	B	S	S
2	100	100	100	100	100	S	B	G	G	115	110	110	G	165	G	G	200	B	100	140	B	B	S	S
3	100	100	S	S	S	S	B	G	G	G	150	140	100	G	G	100	100	100	100	100	100	S	S	S
4	S	B	S	B	B	B	B	G	G	G	110	G	150	140	105	100	100	100	S	100	110	B	S	S
5	S	100	100	S	B	B	B	G	120	150	145	130	105	G	G	G	G	B	S	105	S	105	B	S
6	S	B	105	B	100	100	B	G	125	G	150	125	115	115	110	G	G	100	100	B	S	95	S	100
7	95	S	B	B	B	105	110	G	G	140	130	140	145	G	100	100	100	100	120	115	115	S	B	S
8	100	110	100	100	100	100	B	G	G	G	G	120	110	110	110	100	100	B	100	S	S	100	100	100
9	B	110	110	S	110	110	110	G	G	G	150	140	130	130	120	100	100	100	100	100	100	100	100	100
10	S	S	S	B	S	B	100	100	G	G	115	110	110	105	G	G	G	S	S	S	S	B	S	S
11	S	S	B	100	S	100	100	105	100	G	110	110	110	105	G	G	100	100	100	100	100	100	100	S
12	S	S	100	100	100	B	B	G	130	115	115	105	105	G	145	120	115	S	100	95	95	100	S	100
13	S	105	100	100	100	100	110	G	G	B	G	B	G	G	105	100	100	100	100	100	B	100	100	B
14	B	100	S	B	B	100	100	100	G	G	G	105	G	G	G	B	G	S	110	100	100	100	100	S
15	S	S	S	105	100	100	S	G	G	G	115	G	110	G	G	G	G	B	S	B	100	100	100	100
16	S	S	100	100	100	S	B	110	G	G	G	100	G	100	100	G	100	S	100	S	100	S	100	100
17	S	S	100	S	S	S	B	100	G	G	G	G	G	G	G	B	B	100	B	S	S	B	100	S
18	S	100	100	100	100	B	B	G	G	G	G	G	G	100	100	100	100	100	S	100	S	B	S	100
19	100	100	100	100	100	100	100	110	G	G	G	G	G	100	G	100	100	100	100	100	100	100	95	95
20	B	S	100	100	B	S	B	100	G	160	G	155	100	145	130	115	115	B	110	105	100	S	95	S
21	105	105	S	B	B	B	B	G	G	G	G	G	G	100	100	100	G	100	B	S	S	100	100	S
22	100	100	S	100	100	100	S	B	160	G	G	C	C	C	C	100	100	100	100	100	100	S	S	S
23	S	100	S	100	S	100	B	B	G	125	G	G	G	G	G	G	S	S	S	S	100	100	100	S
24	S	S	B	S	S	B	S	B	G	115	110	110	110	105	100	100	100	100	100	S	100	100	100	100
25	S	100	B	100	100	100	S	B	G	G	G	G	G	G	G	G	G	S	100	100	100	100	100	S
26	100	100	S	S	S	S	S	150	G	G	180	160	G	G	G	120	120	100	100	100	100	100	S	S
27	B	B	B	100	100	100	100	G	170	130	G	150	110	145	G	G	105	100	100	100	100	100	B	S
28	S	B	B	B	B	B	100	G	G	120	G	G	G	G	G	G	G	B	S	S	S	S	S	S
29	S	S	100	100	100	100	S	B	G	120	120	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	110	105	100	100	100	100	G	100	100	100	100	S	S	S	S
31	S	B	S	100	100	S	S	G	110	160	G	105	105	G	150	G	100	105	B	100	S	S	110	100
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	14	13	16	15	14	9	9	8	13	15	19	16	15	14	14	20	17	20	19	17	16	15	10
MED	100	100	100	100	100	100	100	105	122	120	115	110	110	105	105	100	100	100	100	100	100	100	100	100
UQ	100	105	100	100	100	100	110	110	145	140	148	140	112	135	120	100	105	100	100	100	100	100	100	100
Q	100	100	100	100	100	100	100	100	115	115	110	108	105	100	100	100	100	100	100	100	100	100	100	100

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DEC. 1970

H¹ES (KM)

IONOSPHERIC DATA

DEC. 1970

TYPES OF ES

135 E Mean Time (G. M. T. + 9h)

Station **KOKUBUNJI TOKYO** Lat. **35 42.4 N** Long. **139 29.3 E** Sweep **1** MHz to **20** MHz in **20** sec in automatic operation

Hour Day	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								H	H	H		C					L		F						
2	F	F	F	F	F					C	C	L		H			H		F	F					
3	F	F									H	HL	L			L	L	F	F	F					
4											L		H	H	L	L	L	L	F	F	F				
5		F	F						H	H	H	H	L							F		F			
6			F		F	F			H		H	HL	CL	C	L			F	F		F		F		
7	F				F	F	L			H	H	H	H		L	L	L	F	F	F	F				
8	F	F	F	F	F	F					H	H	C	C	C	L			F			F	F	F	
9		F	F		F	F	L				H	H	H	H	HL	L	L	F	F	F	F	F	F	F	
10						F	L				C	C	C	L											
11				F		F	L	L	L		C	C	L	L			L	F	F	F	F	F	F	F	
12			F	F	F				H	C	C	L	L		HL	HL	L		F	F	F	F		F	
13		F	F	F	F	F	F								L	L	L	F	F	F		F	F	F	
14		F				F	F	L				L							F	F	F	F	F	F	
15				F	F	F					C	C									F	F	F	F	
16			F	F	F			L				L	L				L	F		F	F	F	F	F	
17			F					L										F					F	F	
18		F	F	F	F								L	L	L	L	L	F		F				F	
19	F	F	F	F	F	F	F	L					L	L	L	L	L	F	F	F	F	F	F	F	
20			F	F				L		H		H	L	H	HL	C	C		F	F	F	F	F	F	
21	F	F											L	L	L			F				F	F	F	
22	F	F		F	F				H								L	L	F	F	F	F			
23		F		F		F				H												F	F	F	
24										C	C	C	C	L	L	L	L	F	F		F	F	F	F	
25		F		F	F														F	F	F	F	F	F	
26	F	F						H			H	H				C	CL	F	F	F	F	F	F	F	
27				F	F	F			H	H		HL	L	H			HL	F	F	F	F	F	F	F	
28						F				H															
29			F	F	F	F				H	H														
30										HL	L	L	L	L	L	L	L	F	F	F					
31				F	F				L	HL		L	L		HL	L	L	F	F	F			F	F	
Hour Day	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																									
UQ																									
LQ																									

DEC. 1970

TYPES OF ES

IONOSPHERIC DATA

DEC. 1970

HPF2 (KM)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	400	390	370	335	260	340	340	260	250	280	300	350	300	310	300	300	250	250	250	290	350	350	360	360
2	390	380	390	380	260	290	310	280	270	260	290	300	320	300	340	290	300	290	300	310	350	300	340	390
3	390	390	390	395	390	360	300	290	280	260	300	300	340	300	300	290	300	280	270	300	340	340	280	360
4	400	390	390	350	350	350	350	290	250	260	280	290	290	300	300	290	290	260	300	320	300	290	300	400
5	400	400	350	350	300	380	350	290	290	265	265	295	280	280	305	300	290	260	305	305	280	310	370	355
6	370	385	400	350	280	390	330	265	260	250	260	285	280	315	300	280	285	260	260	300	350	320	305	355
7	395	405	405	405	380	360	310	275	250	265	290	300	310	300	300	300	300	290	300	300	350	300	290	390
8	385	395	390	360	385	390	380	300	285	280	315	310	315	300	340	350	310	300	290	380	335	350	390	390
9	400	380	350	290	350	390	380	295	290	300	300	300	300	315	290	300	280	300	300	300	300	290	390	390
10	390	350	300	350	390	370	340	290	300	290	300	300	300	300	300	290	300	290	300	300	260	390	390	390
11	400	390	390	350	310	320	390	300	300	300	300	300	300	300	395	290	290	340	300	300	300	340	380	390
12	400	395	390	390	390	400	350	290	255	250	270	300	270	300	295	270	280	290	280	255	310	370	380	360
13	395	395	330	315	320	395	360	270	265	260	290	285	295	305	290	270	280	305	290	280	250	330	370	395
14	330	375	370	375	375	385	310	250	240	300	290	290	310	300	300	300	300	350	300	340	310	510	390	350
15	350	380	390	390	390	405	360	260	265	310	300	310	315	300	340	310	300	300	300	300	250	A	395	395
16	400	400	400	400	350	340	300	250	290	290	300	300	310	300	290	270	260	290	300	300	280	280	400	385
17	350	350	355	335	350	400	300	R	250	265	290	350	300	290	300	280	260	300	290	250	300	300	355	390
18	390	400	400	390	350	350	280	280	250	290	300	260	300	260	300	290	260	330	300	250	290	290	390	400
19	400	380	380	360	400	380	300	300	250	250	270	300	285	280	315	290	240	285	280	260	300	300	380	360
20	350	370	360	340	290	310	260	280	250	260	255	275	280	280	300	280	270	295	270	275	275	360	355	315
21	355	345	375	385	310	315	280	245	260	270	265	290	300	300	300	285	300	290	280	300	300	270	390	400
22	390	390	290	350	300	260	300	260	260	280	300	C	C	C	C	290	300	300	280	280	285	390	400	380
23	390	390	350	350	340	350	290	260	280	270	275	300	300	290	300	295	280	300	300	250	340	360	390	350
24	355	350	400	350	345	350	300	290	270	290	290	285	270	300	300	290	290	300	300	300	340	340	340	300
25	345	390	355	260	280	340	350	300	250	305	290	300	300	300	300	290	250	290	280	250	300	350	300	350
26	400	350	355	350	305	280	300	250	280	255	275	280	275	305	280	255	250	285	250	295	260	300	310	400
27	F	F	300	300	305	230	310	260	260	300	280	250	250	290	260	250	260	250	240	290	340	345	350	350
28	355	370	355	300	220	350	290	275	240	350	290	260	300	300	320	300	300	300	290	290	350	310	360	300
29	300	350	340	360	360	390	360	270	290	300	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	280	290	300	315	300	300	300	290	280	280	300	350	300	F	JR
31	F	300	F	385	360	300	270	280	250	270	270	300	300	300	270	285	250	250	300	290	250	350	380	IA
CNT	29	30	29	30	30	30	30	29	30	31	31	29	29	29	29	30	30	30	30	30	30	29	29	30
MED	390	382	370	350	345	350	310	280	260	280	290	300	300	300	300	290	288	290	290	300	300	330	370	382
UQ	400	390	390	385	375	390	350	290	280	295	300	300	310	300	300	300	300	300	300	300	340	350	390	390
LQ	355	350	350	340	300	320	300	260	250	260	275	285	285	300	300	280	260	280	280	280	280	300	340	355

DEC. 1970

HPF2 (KM)

IONOSPHERIC DATA

DEC. 1970

YPF2 (KM)

135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	90	100	80	105	100	100	110	100	J ₁₀₀ ^R	100	100	90	100	100	100	J ₉₀ ^R	100	J ₉₅ ^R	90	90	100	90	90	100	
2	100	90	100	100	100	100	100	100	Y ₁₁₀ ^R	100	90	100	90	100 ^R	Y ₁₀₀ ^R	110	100	90	100	110	100	100	100	100	
3	100	100	100	95	100	100	100	100	100	100	100	100	100	100	100	100	100	100	110	100	100	100	90		
4	100	100	100	100	100	100	90	110	J ₁₁₀ ^R	110	100	90	90	100	100	100	J ₉₀ ^R	110	100	90	100	100	100	100	
5	90	90	100	90	100	100	100	110	90	55	80	100	65	65	95	75	80	60	90	85	75	100	100	90	
6	85	75	85	95	80	110	85	55	50	J ₅₀ ^R	60	80	J ₇₀ ^R	140	70	75	70	55	60	95	120	85	95	115	
7	100	100	95	95	90	90	100	J ₄₅ ^R	60	J ₉₅ ^R	90	100	90	90	100	90	90	100	100	100	100	100	100	100	
8	95	95	100	90	105	100	110	J ₁₀₀ ^R	J ₈₅ ^R	I ₉₀ ^R	85	90	85	100	100	J ₉₀ ^R	100	100	110	110	105	I ₉₅ ^R	100	100	
9	90	110	90	100	90	100	100	95	J ₉₀ ^R	90	100	100	100	85	J ₁₀₀ ^R	100	100	J ₁₀₀ ^R	J ₁₀₀ ^R	100	100	90	100	100	
10	90	100	100	100	100	90	100	90	J ₁₀₀ ^R	J ₉₀ ^R	80	100	100	Y ₁₀₀ ^R	J ₁₀₀ ^R	90	100	J ₁₀₀ ^R	J ₁₀₀ ^R	100	100	110	100	100	
11	90	100	90	100	90	100	100	J ₉₀ ^R	100	90	100	100	100	100	95	J ₉₀ ^R	J ₁₀₀ ^R	100	100	100	100	100	100	100	
12	90	95	100	100	100	90	100	100 ^R	85	50	65	60	85	75	75	125	70	70	60	60	100	135	70	95	
13	105	100	70	80	90	105	90	50	60	50	60	75	60	80	80	80	Y ₈₀ ^R	65	70	60	120	95	120	85	80
14	85	75	90	75	100	85	85	60	40	70	100	100	90	100	100	100	100	100	100	100	100	100	110	100	90
15	100	110	100	100	100	I ₉₀ ^R	90	110	J ₇₅ ^R	90	100	90	95	J ₁₀₀ ^R	100	90	100	100	100	100	110	A	95	95	
16	100	100	100	100	90	100	100	J ₁₀₀ ^R	100	J ₉₀ ^R	100	100	90	J ₁₀₀ ^R	110	100	100 ^R	100	100	100	100	100	90	105	
17	100	90	95	105	100	90	100	R	90	85	90	100	100	J ₁₀₀ ^R	100	100	90	100	100	100	100	100	95	100	
18	100	90	90	100	100	100	100	100	J ₉₅ ^R	90	100	J ₉₀ ^R	100	110	100	110	90	110	100	100	90	110	100	90	
19	90	110	100	110	90	110	90	100	J ₁₀₀ ^R	55	75	60	65	70	55 ^H	80	35	70	80	45	110	105	115	95	
20	70	85	85	75	65	105	60	75	50	60	50	50	35	120	55	60	90	75	70	75	80	110	95	85	
21	100	105	85	110	85	85	75	J ₅₅ ^R	60	110	110	110	100	100	100	95	100	110	110	100	100	110	100	100	
22	100	100	100	90	100	100	100	90	J ₉₀ ^R	100	100	C	C	C	C	110	100	J ₉₀ ^R	100	100	105	100	90	100	
23	100	100	100	90	100	J ₁₀₀ ^R	90	110	100	90	J ₈₅ ^R	100	100	110	100	J ₉₅ ^R	110	100	90	90 ^R	110	90	100	100	
24	95	100	100 ^R	100 ^F	J ₁₀₅ ^R	100	100	100	100	90	110	95	110	100	100	90	J ₁₀₀ ^R	100	100	100	100	100	100	100	
25	95	100	95	110	110	100	100	100	J ₁₀₀ ^R	95	90	90	100	100	100	90	100	90	100	90	100	100	100	100	
26	100	100	95	100	95	100	100	100	100	55	50	65	80	70	J ₇₀ ^R	50	70	60	50	100	95	95	90	95	
27	100 ^F	75 ^F	70	100	95	70	90	50	55	60	60	60	50	65	55	70	85	55	55	65	105	100	95	100	
28	90	85	90	65	55	95	65	75	60	90	J ₉₀ ^R	90	100	100	80	100	100	100	100	110	J ₉₀ ^R	90	100	100	
29	100	100	100	90	90	100	90	110 ^R	90	J ₁₀₀ ^R	100	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	100	90	100	85	100	100	100	100	100	100	100	90	100	F	J ₁₀₀ ^R	
31	F	100	F	100 ^R	90 ^F	100	90	100	90	100	100	100	100	100	100	105	100	100	100	90	100	110	100	100 ^I	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	30	29	30	30	30	30	29	30	31	31	29	29	29	29	30	30	30	30	30	30	29	29	30	
MED	100	100	95	100	100	100	100	100	90	90	90	95	90	100	100	92	100	100	100	100	100	100	100	100	
UQ	100	100	100	100	100	100	100	100	J ₁₀₀ ^R	100	100	100	100	100	100	100	100	100	100	100	105	105	100	100	
LQ	90	90	90	90	90	90	90	75	60	65	80	90	85	90	80	90	90	75	90	90	100	100	95	95	

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DEC. 1970

YPF2 (KM)

IONOSPHERIC DATA

DEC. 1970

FOF2 (0.1 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station	YAMAGAWA								Lat.	31 12.1 N				Long.	130 37.1 E				Sweep 1 MHz to 20 MHz in 20 sec in automatic operation							
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	35	34	40	38	35	28	26	55	76	90	106	105	120	134	136	124	98	95	70	55	51	50	52	43		
2	38	37	34	35	42	30	26	50	85	103	111	113	129	160	162	164	159	144	104	70	66	61	55	47		
3	41	38	32	30	33	30	31	52	86	93	88	94	97	117	121	116	106	98	87	64	57	54	52	39		
4	32	31	34	33	36	31	31	55	80	94	106	100	114	109	110	115	114	101	82	67	69	66	51	30		
5	27	28	35	37	39	27	27	47	78	106	108	97	96	101	104	104	103	107	82	77	77	63	45	41		
6	34	35	34	34	44	24	25	54	91	117	112	95	102	121	129	124	127	122	118	98	95	82	67	52		
7	J52	45	45	43	45	42	40	64	109	U20	111	101	125	111	105	115	113	C	C	C	C	C	C	C		
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	134	U30	J107	J82	79	I85	69	U49		
9	42	42	42	35	28	25	26	54	102	114	128	123	114	120	121	117	107	105	104	J96	I88	J90	55	U37		
10	U33	30	31	28	25	26	27	53	83	102	128	114	116	112	118	114	124	127	U18	J92	U80	66	U53	J48		
11	38	34	35	33	31	24	24	51	87	106	127	117	135	130	132	139	S	100	94	107	78	76	41	35		
12	33	33	36	39	31	27	29	52	81	104	113	101	113	111	131	135	131	114	S	J85	72	69	41	35		
13	37	34	32	29	31	28	28	53	99	110	115	I10	122	140	146	152	J136	110	H80	R	76	68	61	43	33	
14	33	33	32	31	32	31	32	55	85	96	105	114	128	128	111	113	109	88	U87	86	J74	J39	43	U51		
15	53	U51	50	50	44	43	48	81	85	90	106	134	U22	U23	U22	136	134	111	J92	75	64	56	35	30		
16	29	30	29	31	35	F28	28	U51	J103	94	106	123	127	U22	135	U23	U22	94	J78	63	J75	J59	39	37		
17	43	35	27	24	25	24	25	48	J96	95	106	112	126	129	U22	127	U14	86	J65	62	J61	J54	40	30		
18	30	28	27	28	29	28	26	48	J83	85	105	107	108	115	109	111	118	77	60	79	65	44	29	26		
19	28	28	29	31	32	26	27	45	79	89	80	95	110	130	U20	114	133	J32	107	95	J65	59	44	42		
20	40	U38	37	38	40	25	24	43	78	U87	96	90	103	112	105	101	104	89	70	70	68	U50	47	46		
21	45	37	33	31	31	30	29	46	J74	89	80	101	112	111	109	108	110	J99	80	J62	55	49	34	33		
22	32	31	32	35	39	24	22	42	71	83	99	92	110	105	114	124	121	129	91	65	65	58	38	33		
23	31	32	33	36	33	24	27	48	67	82	92	99	103	108	117	117	117	96	R89	74	68	54	35	32		
24	34	33	31	34	36	24	27	41	73	77	96	116	119	108	114	126	108	89	73	68	49	46	44	30		
25	30	31	33	37	31	23	24	41	70	76	108	102	91	106	110	115	108	75	66	U72	51	46	39	34		
26	30	30	32	31	33	31	26	40	64	79	106	99	102	103	109	103	92	75	59	55	56	48	32	26		
27	30	29	32	34	29	20	21	37	72	I95	120	126	111	106	114	113	102	91	H83	70	61	59	57	54		
28	S48	36	35	39	35	22	27	42	65	79	136	102	92	91	109	115	95	85	72	64	50	53	41	37		
29	34	34	33	30	30	28	30	53	70	82	117	112	125	125	107	89	87	J95	71	57	37	37	31	27		
30	30	31	34	34	35	27	23	37	68	72	J97	118	123	J28	112	129	113	94	63	50	42	32	25	20		
31	F25	F	31	34	F	F	24	36	J64	75	111	107	98	112	115	111	99	83	52	55	54	46	38	31		
CNT	30	29	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30		
MED	34	33	33	34	33	27	27	49	80	92	106	106	114	114	114	116	113	97	82	70	65	55	42	35		
UQ	40	36	35	37	36	30	29	53	86	103	113	114	124	126	122	126	124	111	92	82	74	63	52	43		
LQ	30	31	32	31	31	24	25	42	71	82	99	99	103	108	109	113	104	89	70	63	55	48	38	30		

The Radio Research Laboratories, Japan

DEC. 1970

FOF2 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1970

FOF1 (0.01 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station **YAMAGAWA** Lat. **31 12.1 N** Long. **130 37.1 E** Sweep **1** MHz to **20** MHz in **20** sec in automatic operation

Hour Day	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											410	L	L	L	L	L								
2										L	L	L	L	L	L	L	310							
3											L	L	460	L	L	L								
4											L	L	L	540	L	L								
5									L	L	450	620	L	L	L	L	L							
6									L	L	L	440	L	L	L	L								
7											L	L	400	L	C									
8									C	C	C	C	C	C	C	C								
9									L	L	L	L	L	L	L	L								
10									340			L	L	L	L	L	L							
11									360		L	L			L	L								
12									L	L	450	L	L	L										
13									L	L	C	L	C	L										
14										L	L	L	L	L	400	360	H							
15										L	L	L		L	L									
16									L	L	L	L	L	L										
17											L	L	L	L	L									
18											L	L	L	U	L	L								
19											L	L	L	L	L	L								
20											L	L	L	U	L	L	L							
21									L	L	380	L	L	L	L	L								
22										L	L	L	L	L	L	L								
23										L	L	L	L	L	L	L								
24									L	L	520	L	L	L	L	L								
25										L	L	L	L	L	L	L								
26											L	L	L	L	L	L								
27									C	L	L	L	L	L	L	L								
28									L	L	L	L	L	L	L	L								
29									L	L	L	L	L	L	L	L								
30											L	L	L	L	L	L								
31									340		L	L	L	L	L	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										3	3	2	3	3	2	1	1							
MED										340	410	450	460	480	480	360	310							
UQ										350	465		540	510										
LQ										340	395		450	440										

DEC. 1970

FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1970

FOE (0.01 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station	YAMAGAWA				Lat. 31 12.1 N				Long. 130 37.1 E				Sweep 1 MHz to 20 MHz in 20 sec in automatic operation												
Hour Day	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								S	230	300	330 ^A	340	355	350	340	300	250 ^H	S							
2								S	230	290	310	350	A	A	340	300	A	A							
3								S	230 ^H	295	320	340	350	340	325	300	230	S							
4								S	230	280	305 ^{I A}	330 ^{I A}	350	340	320	300 ^H	250 ^H	S							
5								S	230 ^H	290	325	340	350	350	330	300	260	A							
6								S	230	290	330	345	350	A	A	A	250	A							
7								S	210	300	320	340 ^{I A}	350	345	325	300 ^{I A}	A	C							
8								C	C	C	C	C	C	C	C	C	A	A							
9								S	230	295	325	340	340	340	325	290	A	A							
10								S	250	285	320	345	355 ^{I A}	355 ^{I A}	340	300	260	S							
11								S	250	300	340	350 ^{I A}	350 ^{I A}	340 ^{I R}	A	A	A	A							
12								S	A	330	345	350	340	350	330 ^{I A}	310 ^{I A}	260 ^H	A							
13								S	220	295	310	340 ^{I C}	340	350 ^{I C}	335	300	250 ^{I A}	A							
14								S	220	280	310	340 ^H	345	340	325	300	260	S							
15								S	230	290	320	A	A	A	335	300	245	A							
16								S	230	280	315	330	355	350	340	310	250	155							
17								S	235 ^{I A}	295 ^{I A}	325 ^{I A}	340	360	350	330	310	260	S							
18								S	220	280	320	340	355	350	335	310	250	S							
19								S	210	275	320	330	350	340	330	300	240	A							
20								S	230 ^H	300	325	335	350	340	330	305	250	A							
21								S	190	280 ^H	320	340	350	350	330	300	260	S							
22								S	220	290	320 ^{I A}	335	345	350	325	300	260	S							
23								S	200	270	305 ^{I A}	325 ^{I A}	340	340	320	300	250	160							
24								S	200	270	300	320 ^{I A}	340	340	330	300 ^{I A}	250	A							
25								S	200	280	310 ^{I A}	330	335	340	320 ^{I A}	290	250	A							
26								S	205 ^H	280 ^H	310 ^H	325	330	340	320 ^H	285 ^{I A}	A	A							
27								S	200 ^H	270 ^{I C}	300	320 ^{I A}	A	A	A	A	A	S							
28								S	200	270	300	330	340	330	320	300	A	A							
29								S	205	270	290	A	A	325 ^{I A}	315 ^{I A}	295	A	A							
30								S	210	280	310	330	340	330	325	300	A	A							
31								S	200	260	295 ^{I A}	325 ^{I A}	340	340	330	290 ^{I A}	250	160							
	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	28	26	26	27	27	21	3							
MED									220	282	320	340	350	340	330	300	250	160							
UQ									230	295	325	340	350	350	332	300	260	160							
LQ									205	280	310	330	340	340	325	300	250	158							

DEC. 1970

FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1970

FBES (0.1 MHz)

135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	E ₁₅	E	E ₁₂	E	E ₁₁	E ₁₅	E ₁₅	G	G ₂₈	33	39	32	41	30	20	19	19	E	E ₁₅	E ₁₅	E ₁₅	E ₁₁	E ₁₂
2	E ₁₅	E ₁₁	E ₁₁	E	E	E	E ₁₅	S	G	G	G	32	36	36	20	25	26	20	27	E	E ₁₅	E ₁₅	E ₁₂	E ₁₅
3	E ₁₃	E ₁₅	E ₁₄	E	E	E	E ₁₅	E ₁₅	G	G	G	40	G ₂₉	G ₂₅	30	G ₂₆	G	E ₁₅	E ₁₅	E ₁₅	E	E ₁₅	E ₁₅	E ₁₅
4	E ₁₄	E ₁₄	E ₁₂	E ₁₀	E	E ₁₁	E ₁₅	E ₁₅	G	G	32	41	32	31	36	G ₁₉	G	S	E ₁₄	E	15	E ₁₅	E ₁₅	E
5	E ₁₅	E ₁₄	E ₁₅	E	E	E	E ₁₅	E ₁₅	G	G ₂₃	G	G	G	G	G	G ₂₈	G ₁₆	20	E	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₄
6	E ₁₅	E ₁₄	E ₁₁	E ₁₄	E	E	E ₁₅	E ₁₁	G	G	G	39	39	36	34	31	G ₂₃	28	39	E	E	E ₁₅	E ₁₅	E ₁₅
7	E	E ₁₄	E ₁₁	E	E	E	E ₁₃	E ₁₅	G	G	G	42	G	37	G	31	25	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	28	22	19	E	E ₁₅	E ₁₄	E ₁₅	E ₁₅
9	E ₁₅	E ₁₅	E ₁₁	E	E	E ₁₃	E ₁₅	S	18	22	30	38	39	39	36	E ₃₁	26	46	25	24	20	E	E ₁₅	E ₁₄
10	E ₁₅	E ₁₅	E ₁₁	E ₁₄	E ₁₂	E ₁₄	E	E ₁₅	G	G	35	39	36	37	30	G ₂₂	20	S	E	E ₁₅	17	E ₁₅	E ₁₅	E ₁₅
11	E ₁₅	E ₁₅	E ₁₂	E ₁₂	E ₁₃	E ₁₁	E ₁₅	E ₁₅	G	G	G	36	E ₃₆	E ₃₄	35	33	26	25	34	15	15	18	15	E
12	E	E	E ₁₃	E	E	13	E	E ₁₅	25	G	G	G	G	G ₂₅	G ₂₅	35	35	16	S	E	E	E ₁₅	E ₁₄	E ₁₅
13	E	E ₁₂	E ₁₄	E ₁₂	E	E ₁₁	E ₁₅	E ₁₅	G	G	G	C	G	C	G ₂₅	G ₂₀	28	22	E	E ₁₅	19	18	E ₁₅	E ₁₄
14	E ₁₅	E ₁₄	E ₁₂	E ₁₂	E	E ₁₁	E ₁₅	E ₁₅	G	G ₂₄	G	G	G	G	G	G	G ₂₃	15	E	E	E ₁₅	E ₁₅	E ₁₃	E ₁₅
15	E ₁₆	E ₁₅	E ₁₅	E	15	20	24	S	15	G	G	36	38	37	33	29	G	21	E ₁₃	25	E ₁₅	17	18	E ₁₅
16	E ₁₄	E	15	E ₁₄	E ₁₂	E	E ₁₅	E ₁₅	20	G	31	G	G	G	G	G	G	G	E ₁₅	E	E	E ₁₅	E ₁₅	E ₁₅
17	E ₁₅	E ₁₅	E ₁₁	E	E	E	E ₁₃	S	19	30	32	G ₂₉	G	G	G	G	G	E ₁₅	E ₁₄	E ₁₃	E ₁₅	E ₁₅	E ₁₅	E ₁₅
18	E ₁₅	E ₁₅	E ₁₅	E ₁₁	E ₁₁	E ₁₅	E	S	19	G ₂₉	37	G ₃₂	G	G ₂₆	G ₂₉	23	16	17	E	E	18	E	E	E ₁₅
19	E ₁₅	E ₁₅	E ₁₅	E ₁₂	E ₁₁	E	E	S	G	25	G	29	G	G	G	G	G	16	20	E	E	17	E	E ₁₅
20	E ₁₅	E ₁₅	E ₁₅	E	E	E	E	E ₁₃	G	G	G	G	G	G	G	G	G	18	22	17	17	E	E ₁₅	E ₁₁
21	E ₁₅	E ₁₅	E	19	16	13	E	S	G	G ₂₀	G ₂₉	31	30	G ₂₉	G	G ₂₀	19	18	E	E	E	E ₁₁	E ₁₅	E
22	E	13	E ₁₁	E	E	E ₁₄	E ₁₅	E ₁₅	G	G	32	30	31	G ₃₁	G ₂₅	G ₂₀	G	S	19	14	E ₁₅	E ₁₅	E ₁₅	E ₁₅
23	E ₁₁	14	E ₁₁	E	E	E ₁₅	E ₁₅	S	G	G	32	33	30	G ₂₉	G ₂₆	G ₂₂	G	14	20	18	16	16	E	E ₁₅
24	E ₁₅	E ₁₃	E ₁₄	E	E	E ₁₁	E ₁₅	E ₁₅	G	G	34	35	31	32	30	30	G	19	20	E ₁₅	E ₁₅	15	20	E
25	E	E	E	16	E	E ₁₅	E ₁₅	E ₁₅	G	G	34	30	30	27	34	26	20	18	19	E ₁₄	E ₁₅	E ₁₅	E ₁₅	E ₁₅
26	E ₁₅	E ₁₄	E ₁₁	E ₁₁	E ₁₁	E	E ₁₅	E ₁₅	G	G ₁₉	G ₂₇	G ₂₅	G	G	G ₁₉	31	25	20	21	17	14	E	E ₁₅	E ₁₅
27	E ₁₅	E ₁₅	E ₁₅	E	E	E ₁₃	E ₁₅	E ₁₅	G	C	G	35	35	38	35	35	40	19	17	20	17	E ₁₅	E ₁₄	E ₁₅
28	E ₁₅	E ₁₅	E ₁₁	E	E	E ₁₂	E ₁₅	E ₁₅	G	G	G	G	G ₃₀	G ₂₈	G ₂₉	28	26	32	25	31	20	E ₁₅	E ₁₅	E ₁₁
29	E ₁₁	E	E ₁₂	25	E	15	E	G	G	G	38	41	36	34	32	26	34	40	26	22	15	E ₁₅	E ₁₅	19
30	E ₁₅	E ₁₅	E ₁₁	E	E	E ₁₁	E	E ₁₅	G	25	G	G ₃₁	G ₃₁	G ₃₂	G ₃₁	G ₂₈	25	27	21	26	19	E	E	E ₁₅
31	E ₁₄	E ₁₅	E	E	E	E	E ₁₅	E ₁₅	G	24	36	36	32	32	27	40	G	G	15	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	22	30	29	30	29	30	29	30	30	31	26	30	30	30	30	30	30
MED	E ₁₅	E ₁₄	E ₁₂	E	E	E ₁₁	E ₁₅	E ₁₅	G	G	G	27	32	30	G	G	20	20	15	15	15	E ₁₅	E ₁₅	E ₁₅
UQ	E ₁₅	E ₁₅	E ₁₄	E ₁₂	E ₁₁	E ₁₃	E ₁₅	E ₁₅	G	G ₂₃	32	38	34	36	33	31	26	22	21	17	16	E ₁₅	E ₁₅	E ₁₅
LQ	E ₁₃	E ₁₃	E ₁₁	E	E	E	E	E ₁₅	G	G	G	G ₂₉	G ₁₉	G ₂₅	G ₂₀	G ₂₀	G ₁₆	17	E	E	15	E ₁₃	E ₁₂	E ₁₄

DEC. 1970

FBES (0.1 MHz)

IONOSPHERIC DATA

DEC. 1970

F-MIN (0.1 MHZ)

135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat 31 12.1 N Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	E ₁₅	11	12	E	E ₁₁	E ₁₅	E ₁₅	E ₁₅	14	15	16	16	19	20	14	11	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	11	E ₁₂
2	E ₁₅	11	11	E	E	E	E ₁₅	E ₁₅	E ₁₅	15	15	19	16	15	15	15	E ₁₃	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅	E ₁₂	E ₁₅
3	E ₁₅	E ₁₅	E ₁₄	E	E	E	E ₁₅	E ₁₅	E ₁₅	14	19	19	20	19	19	16	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
4	E ₁₄	E ₁₄	E ₁₂	13	E	11	E ₁₅	E ₁₅	E ₁₄	13	15	16	16	19	15	14	11	E ₁₅	E ₁₄	E ₁₅	11	E ₁₃	E ₁₅	E ₁₄
5	E ₁₅	E ₁₄	E ₁₅	E	E	E	E ₁₅	E ₁₅	E ₁₄	13	15	16	17	16	19	15	11	E ₁₁	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₄
6	E ₁₅	E ₁₄	11	14	E	E	E ₁₅	E ₁₁	11	14	14	15	16	19	15	16	13	E ₁₄	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
7	E ₁₅	E ₁₄	11	E	E	E	E ₁₃	E ₁₅	E ₁₅	14	15	20	15	19	15	14	11	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	12	E ₁₅	E ₁₂	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₅
9	E ₁₅	E ₁₅	11	E	E	E ₁₃	E ₁₅	E ₁₅	E ₁₅	15	15	15	16	14	15	12	E ₁₅	E ₁₅	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅	E ₁₄
10	E ₁₅	E ₁₅	11	14	12	E ₁₄	E ₁₅	E ₁₅	E ₁₅	16	16	15	15	17	11	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
11	E ₁₅	E ₁₅	E ₁₂	12	13	11	E ₁₅	E ₁₅	E ₁₅	14	15	15	15	18	15	15	14	E ₁₅	E ₁₄	E ₁₁	11	E ₁₅	E	E ₁₅
12	E ₁₅	E ₁₄	E ₁₃	E	E	E	E ₁₄	E ₁₅	E ₁₅	20	20	20	20	19	16	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₅
13	E	E ₁₂	E ₁₄	E ₁₂	E	E ₁₁	E ₁₅	E ₁₅	E ₁₄	26	20	C	21	C	20	15	15	E ₁₅	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₅	E ₁₄
14	E ₁₅	E ₁₄	E ₁₂	12	E	11	E ₁₅	E ₁₅	E ₁₂	14	11	15	14	20	20	15	E ₁₅	E ₁₄	E ₁₅	E ₁₄	E ₁₅	E ₁₅	E ₁₃	E ₁₅
15	16	15	15	E	E	E	E ₁₅	E ₁₅	11	15	15	15	17	16	15	16	E ₁₅	E ₁₃	E ₁₃	E ₁₅	E ₁₅	E ₁₅	E ₁₃	E ₁₅
16	E ₁₄	E ₁₄	E ₁₄	14	12	E	E ₁₅	E ₁₅	E ₁₄	11	15	16	20	19	16	15	15	E ₁₅	E ₁₅	E ₁₃	E ₁₅	E ₁₅	E ₁₅	E ₁₅
17	E ₁₅	E ₁₅	11	E	E	E	E ₁₃	E ₁₅	E ₁₅	15	15	20	20	20	19	20	E ₁₅	E ₁₅	E ₁₄	E ₁₃	E ₁₅	E ₁₅	E ₁₅	E ₁₅
18	E ₁₅	E ₁₅	E ₁₅	11	11	E ₁₅	E ₁₅	E ₁₅	E ₁₅	15	16	16	20	19	15	15	11	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₂	E ₁₅	E ₁₅
19	E ₁₅	E ₁₅	E ₁₅	E ₁₂	11	E	E ₁₅	E ₁₅	E ₁₅	11	15	16	16	16	16	15	E ₁₅	11	E ₁₄	E ₁₅	E ₁₃	E ₁₅	E ₁₅	E ₁₅
20	E ₁₅	E ₁₅	E ₁₅	E	E	11	E ₁₅	E ₁₅	E ₁₁	11	11	12	19	16	15	16	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₁	E ₁₁
21	E ₁₅	E ₁₂	11	E	E	E	E ₁₅	E ₁₅	E ₁₁	11	14	15	15	15	15	15	11	E ₁₅	E ₁₅	E ₁₆	E ₁₅	E ₁₁	E ₁₅	E ₁₄
22	E ₁₅	E ₁₁	11	E	E	E ₁₄	E ₁₅	E ₁₅	E ₁₁	14	15	15	17	19	18	15	E ₁₅	E ₁₅	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅	E ₁₅
23	11	11	11	E	E	E ₁₅	E ₁₅	E ₁₅	E ₁₅	15	15	16	19	19	15	15	E ₁₅	E ₁₁	E ₁₁	E ₁₁	E ₁₁	E ₁₁	E ₁₁	E ₁₅
24	E ₁₅	E ₁₃	E ₁₄	E	E	E ₁₁	E ₁₅	E ₁₅	E ₁₅	15	15	15	19	19	16	15	E ₁₅	E ₁₄	E ₁₅	E ₁₅	E ₁₁	E ₁₁	E ₁₅	E ₁₅
25	E ₁₅	E ₁₅	E ₁₅	E	E	E ₁₅	E ₁₅	E ₁₅	E ₁₅	11	11	11	15	15	15	15	E ₁₅	E ₁₅	E ₁₅	E ₁₄	E ₁₅	E ₁₅	E ₁₅	E ₁₅
26	E ₁₅	E ₁₄	E ₁₁	E ₁₁	11	E	E ₁₅	E ₁₅	E ₁₃	15	15	15	19	16	16	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅
27	E ₁₅	E ₁₅	E ₁₅	E	E	E ₁₃	E ₁₅	E ₁₅	E ₁₅	C	15	17	20	16	16	15	E ₁₅	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅	E ₁₄	E ₁₅
28	E ₁₅	E ₁₃	11	E	E	12	E ₁₅	E ₁₅	E ₁₄	15	16	16	16	15	11	11	E ₁₅	E ₁₅	E ₁₅	11	E ₁₅	E ₁₅	11	E ₁₂
29	11	E	12	E	11	E	E ₁₅	E ₁₅	E ₁₅	14	15	16	20	19	19	15	14	E ₁₅	E ₁₃	11	12	E ₁₅	E ₁₅	E ₁₅
30	E ₁₅	15	11	E	E	11	E ₁₅	E ₁₅	E ₁₄	15	15	16	19	19	19	19	E ₁₅	11	11	11	E ₁₅	E ₁₅	E ₁₅	E ₁₅
31	E ₁₄	E ₁₅	E	E	E	E	E ₁₅	E ₁₅	E ₁₅	15	15	17	19	16	15	15	E ₁₅	E ₁₃	E ₁₁	E ₁₅	E ₁₁	E ₁₅	E ₁₅	E ₁₅
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	29	30	29	30	29	30	30	31	30	30	30	30	30	30	30
MED	E ₁₅	E ₁₄	E ₁₅	E	E	E ₁₁	E ₁₅	E ₁₅	E ₁₅	14	15	16	17	19	16	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
UQ	E ₁₅	E ₁₅	E ₁₄	12	E	E ₁₂	E ₁₅	E ₁₅	E ₁₅	15	15	16	20	19	19	15	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅	E ₁₅
LQ	E ₁₅	E ₁₃	11	E	E	E	E ₁₅	E ₁₅	E ₁₄	14	15	15	16	16	15	15	12	E ₁₄	E ₁₂	E ₁₃	E ₁₃	E ₁₄	E ₁₃	E ₁₄

The Radio Research Laboratories, Japan

DEC. 1970

F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1970

M(3000)F2 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	265	265	300	325	300 ^F	320	270	325	340	315	330	315	310	305	300	315	305	330	315	330	280	280	290	260	
2	250	270	275	265	310	340	345	320	320	330	325	310	300	310	285	305	305	310	315	285	285	295	295	255	
3	245	245	275	265	285	285	300	310	350	345	335	340	310	300	315	320	310	315	345	295	300	275	305	280	
4	255	265	275	275	275	320	295	310	340	340	330	310	330	320	300	305	325	315	315	315	305	325	335	240	
5	240	255	260	275	290	265	295	320	340	340	345	360	300	315	285	300	305	315	305	300	300	300	275	270	
6	260	260	260	265	315	270	265	305	330	325	340	335	305	290	300	300	305	305	320	295	275	285	285	280	
7	225	245	250	240	275	275	275	300	320	335	335	305	315	305	290	300	310	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	285	310	320	325	280	320	290	285	
9	275	270	300	320	285	270	260	295	340	335	325	325	295	315	310	320	305	315	310	315	310	325	300	260	
10	285	285	305	295	270	260	290	325	335	320	350	330	325	310	305	320	300	320	340	320	315	310	320	280	
11	265	275	285	295	310	335	275	305	345	310	330	305	295	300	295	300	310	300	300	315	310	305	315	255	
12	255	270	260	260	295	260	280	305	330	335	345	325	300	285	295	305	305	315	315	305	320	330	255	255	
13	270	285	300	280	290	250	290	335	335	335	325	305	295	295	285	285	295	290	290	305	295	300	290	280	
14	275	275	285	285	265	260	295	300	340	315	330	310	310	315	290	305	320	285	300	310	315	225	250	275	
15	285	290	270	280	315	270	270	330	350	330	310	315	305	295	290	295	310	315	305	325	320	320	310	275	
16	270	280	260	275	300	285	305	315	345	355	305	320	315	300	310	305	315	330	265	310	315	325	305	255	
17	300	330	325	285	300	275	290	305	355	340	330	330	305	315	305	310	330	340	315	325	305	335	370	275	
18	280	285	280	295	320	305	285	310	350	320	340	330	305	320	315	300	330	345	300	335	370	350	325	275	
19	265	270	285	295	330	260	295	330	355	365	360	305	305	325	310	305	320	325	320	295	330	320	270	295	
20	265	280	275	295	335	260	270	320	340	335	355	315	315	320	320	305	320	330	325	325	325	275	290	295	
21	295	295	265	280	310	310	305	315	350	350	325	305	310	305	310	305	315	335	325	320	325	335	250	275	
22	270	265	280	310	335	310	280	305	335	335	335	320	310	315	305	305	305	315	345	295	305	325	265	270	
23	290	295	285	305	335	260	280	305	350	340	325	325	315	305	305	305	315	325	320	325	355	315	255	255	
24	280	290	290	295	345	265	280	305	345	340	315	330	310	305	290	310	305	315	300	330	305	305	315	300	
25	275	270	275	325	355	255	265	320	330	340	335	330	305	295	290	315	335	335	320	345	315	285	305	285	
26	295	280	290	290	305	320	305	300	330	330	330	325	315	310	310	320	330	325	320	325	310	320	280	250	
27	265	280	285	310	345	305	290	290	320	325	325	330	335	305	305	310	335	320	310	330	330	285	290	285	
28	270	250	280	325	370	250	290	295	340	305	345	345	325	310	310	320	315	320	325	330	315	315	325	295	
29	275	275	295	295	275	270	260	330	355	310	315	320	320	315	325	305	315	325	340	350	310	295	305	265	
30	265	270	295	310	340	335	305	295	345	335	315	315	310	310	295	325	325	335	335	335	320	335	315	320	320
31	280	F	F	310	340	F	F	335	300	335	320	335	335	315	310	305	315	345	360	330	310	335	295	290	290
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	29	30	30	29	29	30	30	30	30	30	30	30	30	30	30	31	30	29	30	30	30	30	30	
MED	270	275	282	295	310	270	288	305	340	335	330	322	310	310	305	305	315	320	320	315	310	310	298	275	
UQ	280	285	295	310	335	310	295	320	350	340	340	330	315	315	310	315	322	330	325	325	325	320	315	285	
LQ	265	265	275	275	290	260	270	300	335	320	325	310	305	300	290	305	305	315	305	300	305	285	285	260	

DEC. 1970

M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1970

M(3000)F1 (0.01)

135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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											395	L	L	L	L										
2										L	L	L	L	L	L		L	420							
3											L	L	400	L	L	L									
4											L	L	L	370	L	L									
5										L	L	400	355	L	L	L	L								
6										L	L	L	420	L	L	L									
7												L	L	425	L	C									
8										C	C	C	C	C	C	C									
9										L	L	L	L	L	L	L									
10										425			L	L	L	L	L								
11										415	L	L				L	L								
12										L	L	400	L	L	L										
13										L	L	C	L	C	L										
14											L	L	L	L	425	410									
15											L	L	L	L	L	L									
16										L	L	L	L	L	L										
17												L	L	L	L	L									
18												L	L	L	U	365	L								
19											L	L	L	L	L	L									
20											L	L	L	U	360	L	L	L							
21										L	425	L	L	L	L	L									
22											L	L	L	L	L	L									
23											L	L	L	L	L	L									
24										L	345	L	L	L	L	L									
25											L	L	L	L	L	L									
26											L	L	L	L	L	L									
27										C	L	L	L	L	L	L									
28										L	L	L	L	L	L	L									
29										L	L	L	L	L	L	L									
30											L	L	L	L	L	L									
31										415	L	L	L	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										3	3	2	3	3	2	1	1								
MED										415	395	400	400	370	395	410	420								
UQ										420	410		410	398											
LQ										415	370		378	365											

DEC. 1970

M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1970

H'F2 (KM)

135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1											240	260	295	275	240	230									
2										230	235	240	275	230	240	245	225								
3											230	240	240	260	250	240									
4											240	240	270	290	275	225									
5										250	225	240	305	250	245	230	240								
6										235	230	225	230 ^H	255	255	225									
7												265	280	235	275	240 ^C									
8										C	C	C	C	C	C	C									
9										230	250	235	220	240	255	235									
10										220	250	245	230	230	220	260									
11										230	230	240			250	250									
12										245	230	225	235	240	275										
13										230	240	255 ^I	270	250 ^I	250										
14											235	240	270	250	235	250									
15											245	250	245		245	270									
16										225	230	250	250	235	255										
17												250	290	260	250	250									
18												250	240	240	280	250									
19											215	250	275	250	250	235									
20											245	245	240	255	240	240	240								
21										225	215	260	250	260	245	255									
22											250	230	255	250	250	240									
23											240	250	255	265	250	240									
24										225	290	245	245	240	275	255									
25											245	250	250	275	250	250									
26											250	240	255	265	270	240									
27										C	245	240	240	255	250	240									
28										290	250	230	250	255	280	250									
29										280	270	240	275	250	250	235									
30											275	270	250	250	270	265									
31										225	250	245	245	265	250	245	240								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										14	26	30	29	28	30	27	5								
MED										230	240	245	250	250	250	240	240								
UQ										245	250	250	270	260	270	250	240								
LQ										225	230	240	245	240	245	235	240								

DEC. 1970

H'F2 (KM)

IONOSPHERIC DATA

DEC. 1970

H^oF (KM)

135 E Mean Time (G. M. T. + 9^h)

Station	YAMAGAWA				Lat.	31	12	·1	N	Long.	130	37	·1	E	Sweep	1	MHz to	20	MHz in	20	sec	in automatic operation			
Hour Day	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	300	310	255	245	240	205	300	235	210	225	210	230	195 ^H	250	225	215	215 ^H	220	195	200	215	240	240	255	
2	300	275	250	285	250	205	210	235	225	225	215	200	20 ^H	240	220	245	215	210	190	190	200	240	230	240	
3	295	300	295	300	270	255	240	230	225	230	225	225	200	195 ^H	240	240	225	215	200	210	240	240	230	220	
4	270 ^{E S}	320	295	280	270	230	275	240	225	230 ^H	225	225	200 ^H	190 ^H	215 ^H	225	230	220	195	210	230	210	215	330 ^{E S}	
5	370 ^{E S}	330	290	250	245	205	250	240	225	235	225	200	20 ^H	225	21 ^H	230	235	230	200	225	205	205	250	250	
6	300	325	300	295	245	215	300	265	230	235	230	220	195	200 ^H	20 ^H	225	240	225	200	205 ^H	190 ^H	240	230	225	
7	280	340	300	300	260	225 ^H	270	250	225	230	225	210 ^H	195 ^H	200	205 ^H	220 ^C	235 ^C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	230	225	200	200	240	220	220	210	
9	285	300	250	230	225	320 ^{E S}	340 ^S	265	225	220	220	225	205	200	220	230	225	230	205	215	205	205	215	255	
10	290	300	270	250	275	340 ^{E S}	300	250	220	205	230	215 ^H	215	225	200	210	210 ^H	215	200	180	215	200	255	255	
11	300	315	275	255	250	215	310	260	225	200	230	200	235	240	230	240	220	205	245	225	200	225	245	295	
12	300	315	295	255	250	305	275	240	205	240	235	210	225	200	205 ^H	245	225	205	195	220	200	240	210	300	
13	295	270	260	250	250	285 ^{E S}	350	285	245	235	230	205 ^{I C}	20 ^H	200 ^{I C}	230	235	225	220	190	220	210	235	235	250	
14	300	275	270	300	300	300	250	245	225	220	215 ^H	205	20 ^H	220	205	205 ^H	225	250	225	225	215	250 ^H	330	320	
15	280	260	300	245	240	310	320	240	210	230	230	225	235	230	220	225	225	210	200	225	205	220	240	290	
16	305	300	360	300	250	225	275	230	240	225	215	205	20 ^H	210	235	230	225	205	200	230	225	205	240	310	
17	275	225	225	260	240	290	300	240	245	220	220	215	205	220	225	220	220	205	200	220	205	210	220	320	
18	295	300	305	300	255	250	310	250	220	220	230	205	215 ^H	220	20 ^H	230	225	200	190	225	200	200	240	305	
19	340	335	315 ^{E S}	285	250	240	290	235	220	225	205	200	195 ^H	230	215	220	230	205	210	215	220	205	220	255	
20	300	300	290	260	225	225	310 ^{E S}	255	210	220	225	225	210	220	225	225	220	215	215	210	220	210	255	255	
21	245	265	300	320	270	250	250	240	220	225	200	205 ^H	230	225	215	205 ^H	230	215	215	200	230	205	250 ^{E S}	300	
22	300	315	300	250	230	195	300 ^S	250	225	225	225	205 ^H	20 ^H	225	225	230	235	220	195	205	205	210	250	300	
23	275	295	285	245	220	345 ^{E S}	275	240	215	225	210 ^H	210 ^H	210 ^H	225	225	225	225	240	220	210	205	210	220	275	340
24	280	275	290	250	200	250 ^{E S}	290 ^S	250	210	220	210	220	225	215	220 ^H	230	225	220	205	200	225	250	225	250	
25	295	300	300	240	200	365 ^{E S}	310 ^S	250	220	205	240	225 ^H	200 ^H	190 ^H	205 ^H	210	230	220	230	220	200	230	230	240	
26	270	305	280	260	240	215	270 ^{E S}	240	225	225	240	205 ^H	20 ^H	225	225	225	230	210	210	210	225	205	255	350 ^{E S}	
27	300 ^{E S}	320	280	245	205	265 ^{E S}	295 ^S	270	230	235	230	225	225	205	220	230 ^{E S}	230	225	200	205	220	200	240	240	
28	255	300	295	245	200	365 ^{E S}	280 ^S	245	225	240	245	200 ^H	210 ^H	220	210	225	230	225	245	220	235	240	225	245	
29	290	255	250	320 ^{E A}	250	335	325	230	210	230	240	220 ^{I C}	235	225	225	205	235	230	210	205	195	245	275	350 ^{E A}	
30	345	330	290	250	230	210	255	250	230	225	200 ^H	225	210	210	205 ^H	225	235	220	205	240	215	200	250	255	
31	345	355	260	245	300	240	230	270	230	185 ^H	240	230	225	200 ^H	225	235 ^{I A}	225	210 ^H	190	230	200	225	245	250	
	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	31	30	30	30	30	30	30	30	
MED	295	300	290	254	248	235	271	245	225	225	225	212	205	220	220	225	225	220	200	212	212	220	239	255	
UQ	300	320	300	290	255	278	305	250	225	230	230	225	225	225	225	230	230	225	210	225	225	240	250	302	
LQ	280	275	270	245	230	215	260	240	220	220	215	205	200 ^H	200	205 ^H	220	225	210	195	205	200	205	225	250	

DEC. 1970

H^oF (KM)

IONOSPHERIC DATA

DEC. 1970

H°ES (KM)

135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat 31 12.1 N Long 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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	S	S	100	B	E	S	S	S	G	100	100	150	100	165	100	100	100	100	100	S	S	S	B	S
2	S	B	B	E	E	E	S	100	125	125	120	105	110	120	100	110	95	95	95	95	S	S	S	S
3	S	S	S	E	E	E	S	S	G	G	155	130	100	100	100	100	G	S	S	S	100	S	S	S
4	S	S	S	B	E	B	S	S	G	G	115	140	100	100	140	100	G	100	S	95	115	S	S	100
5	S	S	S	E	E	E	S	S	105	100	125	G	100	G	100	100	100	100	100	S	S	S	S	S
6	S	S	B	B	E	E	S	S	G	G	135	120	115	120	115	105	100	100	95	95	95	S	S	S
7	100	S	B	E	E	E	S	S	G	G	135	145	150	165	140	110	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	100	95	100	100	S	S	S	S
9	S	S	B	E	E	S	S	105	105	105	100	130	125	120	120	120	105	105	105	100	100	95	S	S
10	S	S	B	B	B	S	100	S	G	140	145	115	100	105	100	100	100	100	100	S	100	S	S	S
11	S	S	S	B	B	B	S	S	G	G	G	100	100	100	100	100	100	100	100	100	100	95	95	95
12	95	95	S	E	E	100	100	S	105	125	120	115	100	100	115	105	100	100	95	95	S	S	S	S
13	E	S	S	S	E	S	S	S	155	G	115	C	105	C	100	100	100	95	95	S	95	95	S	S
14	S	S	S	B	E	B	S	S	G	105	G	G	100	G	100	100	100	100	120	S	S	S	S	
15	B	B	B	E	100	100	100	100	100	G	G	105	105	105	105	105	G	100	S	100	S	100	100	S
16	S	100	100	B	B	E	S	S	110	115	105	G	105	G	G	G	G	G	S	100	100	S	S	S
17	S	S	B	E	E	E	S	105	115	110	105	105	G	G	G	100	G	S	S	S	S	S	S	S
18	S	S	S	B	B	S	100	100	100	110	135	105	G	100	100	100	100	100	105	100	100	100	100	S
19	S	S	S	S	B	E	100	100	100	105	100	100	G	100	100	G	100	100	100	95	95	95	S	S
20	S	S	S	E	E	100	100	S	100	160	G	150	G	G	G	G	100	95	95	95	95	S	S	100
21	S	S	100	100	100	100	100	100	G	100	115	105	100	100	G	95	95	95	100	100	95	S	S	100
22	100	100	B	E	E	S	S	S	G	G	115	100	100	100	100	100	100	100	95	100	S	S	S	S
23	S	100	S	E	E	S	S	100	G	140	120	110	100	100	100	100	100	100	100	100	100	95	95	S
24	S	S	S	E	E	S	S	S	G	140	115	105	100	105	105	100	100	100	S	S	100	95	100	100
25	100	100	100	100	E	S	S	S	G	G	105	100	100	100	100	95	95	95	95	S	S	S	S	S
26	S	S	S	S	B	E	S	S	G	105	105	100	G	145	100	120	100	95	95	95	95	95	S	S
27	S	S	S	E	E	S	S	S	G	C	125	115	105	100	100	95	95	95	95	95	100	S	S	S
28	S	S	B	E	E	B	S	S	G	G	155	105	100	100	100	100	100	95	95	95	S	S	B	S
29	B	E	B	100	100	100	100	100	G	G	110	110	110	105	100	100	100	100	100	100	100	S	S	95
30	S	B	B	E	E	B	100	S	100	105	150	105	105	105	105	100	100	100	100	100	100	100	100	S
31	S	S	E	E	E	E	S	S	G	110	150	105	105	105	100	100	100	G	100	S	S	S	S	S
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	5	4	3	3	5	9	9	12	18	26	26	25	24	26	27	26	26	24	21	18	10	6	6
MED	100	100	100	100	100	100	100	100	105	110	118	105	100	102	100	100	100	100	100	100	100	95	100	100
UQ	100	100	100	100	100	100	100	100	112	125	135	120	105	112	105	102	100	100	100	100	100	100	100	100
LQ	98	100	100	100	100	100	100	100	100	105	105	105	100	100	100	100	100	95	95	95	95	95	95	95

The Radio Research Laboratories, Japan

DEC. 1970

H°ES (KM)

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135 E Mean Time (G. M. T. + 9h)

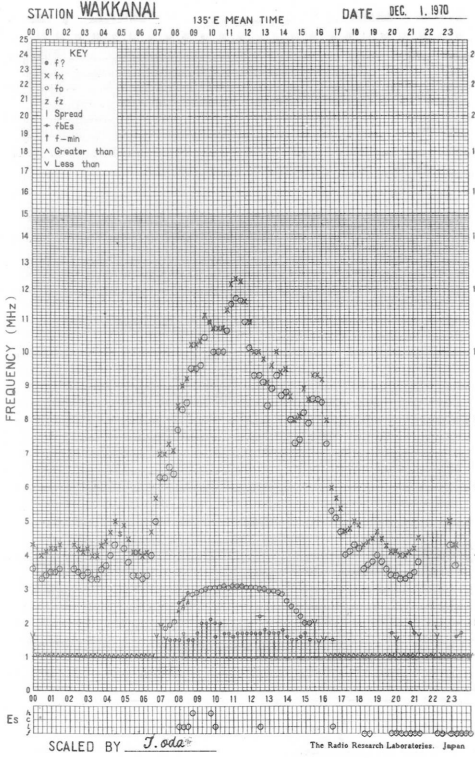
Station YAMAGAWA Lat. 31 12.1 N Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	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 ₁						L ₂	L ₂	HL ₁₁	L ₁	HL ₁₁	L ₁	L ₁	L ₁	L ₁	HL ₁₁	F ₁						
2								L ₁	H ₃	H ₂	S ₂	L ₂	CL ₁₁	CL ₁₁	L ₁	HL ₁₁	L ₄	L ₁	F ₄	F ₁					
3											HL ₁₂	HL ₁₁	L ₁	L ₁	L ₃	L ₃					F ₁				
4											C ₁	HL ₂₂	L ₁	L ₁	HL ₁₁	L ₁		L ₁		F ₁	F ₁			F ₁	
5								L ₁	L ₂	HL ₂₁		L ₁		L ₂	L ₂	L ₁	L ₁	F ₁							
6										H ₁	H ₂	C ₁	S ₂	C ₁	L ₂	L ₂	L ₃	F ₆	F ₁	F ₁					
7	F ₁									H ₂	HC ₁₁	HL ₁₁	HL ₁₁	HL ₁₁	C ₁	L ₅									
8																	L ₃	L ₃	F ₂	F ₁					
9								L ₂	L ₂	HL ₂₁	L ₂	H ₁	L ₁	CL ₁₁	CL ₁₂	L ₃	L ₄	F ₄	F ₄	F ₃	F ₂				
10						F ₁			H ₁	H ₁	C ₂	L ₁	L ₁	L ₂	L ₂	L ₂	L ₁	F ₁		F ₁					
11												L ₁	L ₁	L ₂	L ₂	L ₃	L ₄	F ₃	F ₂	F ₁	F ₄	F ₁	F ₁		
12	F ₂	F ₁			F ₁	F ₁			L ₂	H ₁	C ₁	C ₁	L ₁	L ₁	CL ₁₁	CL ₂₁	L ₁	L ₁	F ₁	F ₂					
13									H ₁		CL ₁₁		L ₁		L ₁	L ₁	HL ₃₁	L ₄	F ₁		F ₃	F ₃			
14										L ₂			L ₁		L ₁	L ₁	L ₂	L ₂	F ₁	F ₁					
15					F ₂	F ₃	F ₃	L ₁	L ₁			L ₁	L ₂	L ₂	L ₁	L ₂			F ₃			F ₂	F ₂		
16		F ₁	F ₁						L ₂	C ₁	L ₁		L ₁						F ₁		F ₁				
17								L ₁	L ₁	L ₁	L ₁	L ₁			L ₁										
18						F ₁	L ₁	HL ₂	L ₂	HL ₂₁	L ₁		L ₁	L ₂	L ₂	L ₁	L ₂	F ₁	F ₁	F ₂	F ₁	F ₁	F ₁		
19						F ₁	L ₁	L ₁	L ₂	L ₁	L ₂		L ₁	L ₁			L ₁	L ₂	F ₂	F ₁	F ₂	F ₂			
20					F ₁	F ₁		L ₁	H ₁	H ₁							L ₂	L ₃	F ₂	F ₂	F ₂			F ₁	
21			F ₁	F ₃	F ₂	F ₁	F ₁	L ₁	L ₁	HL ₂	L ₂	L ₂	L ₁		L ₂	L ₂	L ₂	F ₁	F ₁	F ₁			F ₁		
22	F ₁	F ₁								C ₁	L ₂	L ₂	L ₂	L ₂	L ₁	L ₁	L ₁	F ₅	F ₁						
23		F ₁						L ₁		H ₂	S ₂	C ₁	L ₁	L ₁	L ₂	L ₂	L ₁	L ₂	F ₃	F ₃	F ₁	F ₁	F ₁		
24									H ₂	S ₂	C ₂	L ₁	L ₁	L ₂	L ₂	L ₂	L ₂				F ₁	F ₄	F ₁	F ₁	
25	F ₁	F ₁	F ₁	F ₂						C ₂	L ₂	L ₂	L ₂	L ₂	L ₂	L ₂	HL ₃₁	L ₄	L ₄	F ₂					
26									L ₂	L ₁	L ₂		HL ₁₁	L ₁	CL ₁₁	L ₂	L ₂	F ₃	F ₂	F ₂	F ₁			F ₁	
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28									H ₁	L ₁	L ₁	L ₁	L ₁	L ₂	L ₂	L ₄	L ₅	F ₅	F ₂						
29			F ₃	F ₁	F ₁	F ₁	L ₁			C ₃	L ₂	L ₂	L ₂	L ₂	L ₂	L ₄	L ₃	F ₄	F ₂	F ₁				F ₁	
30						F ₁			L ₁	L ₂	HL ₁₂	L ₁	L ₁	L ₁	L ₁	L ₂	L ₄	L ₂	F ₂	F ₅	F ₂	F ₁	F ₁		
31									L ₁	HL ₂₁	HL ₂₂	L ₁	L ₂	L ₂	L ₄	L ₁			F ₁						
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																									
UQ																									
LQ																									

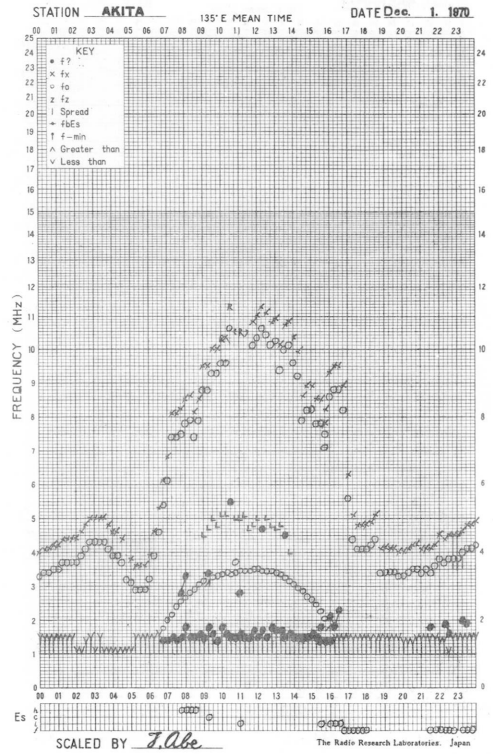
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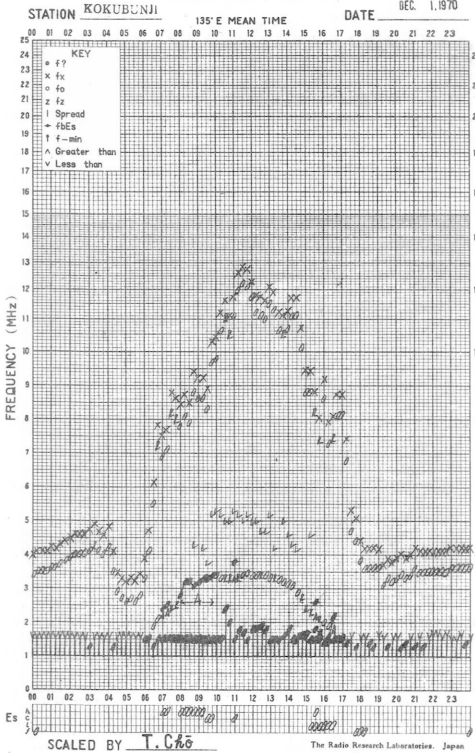
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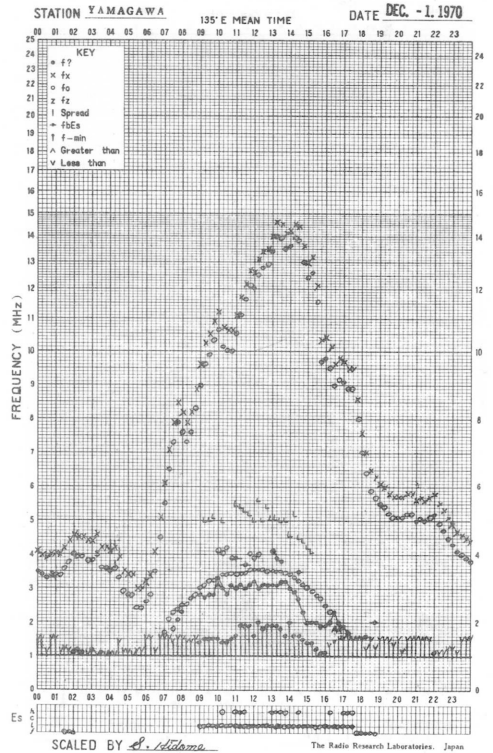
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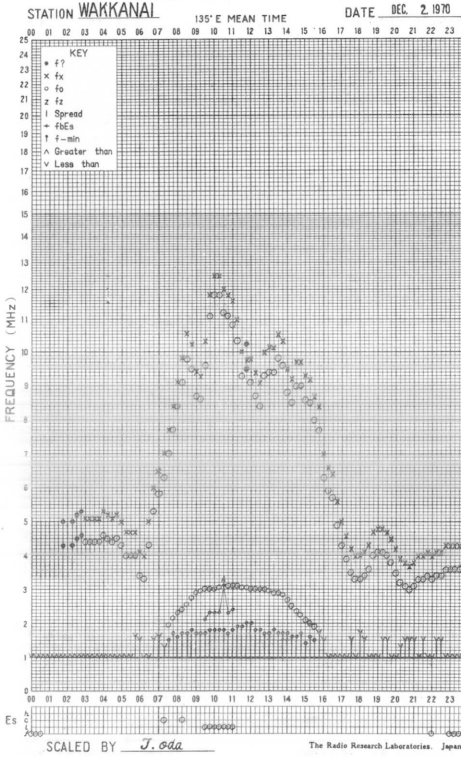
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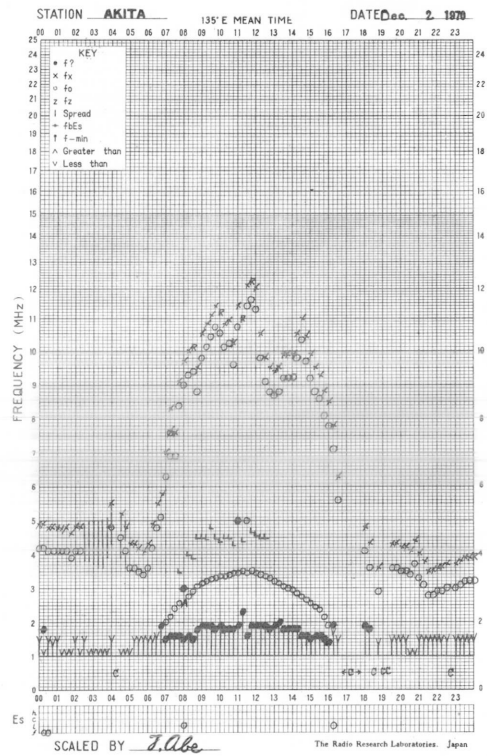
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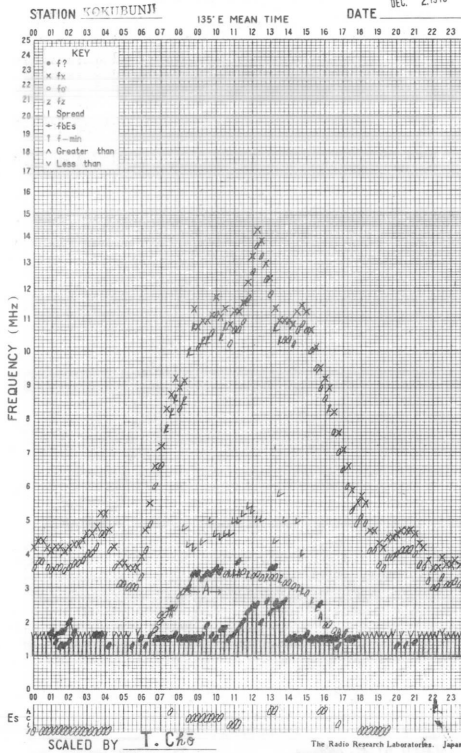
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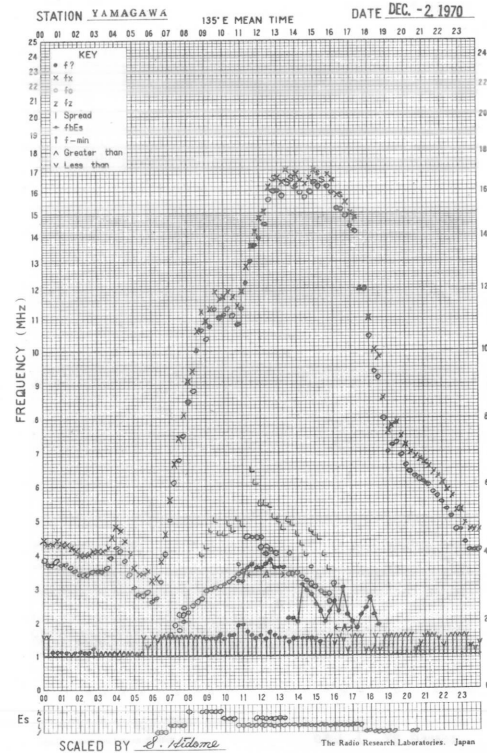
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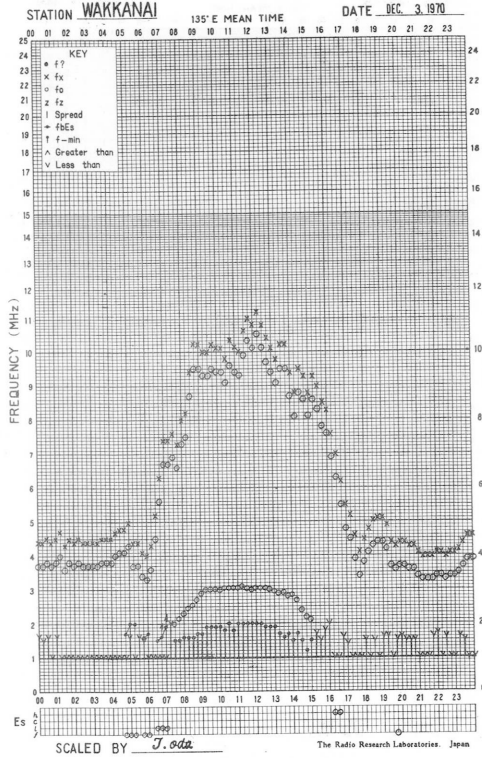
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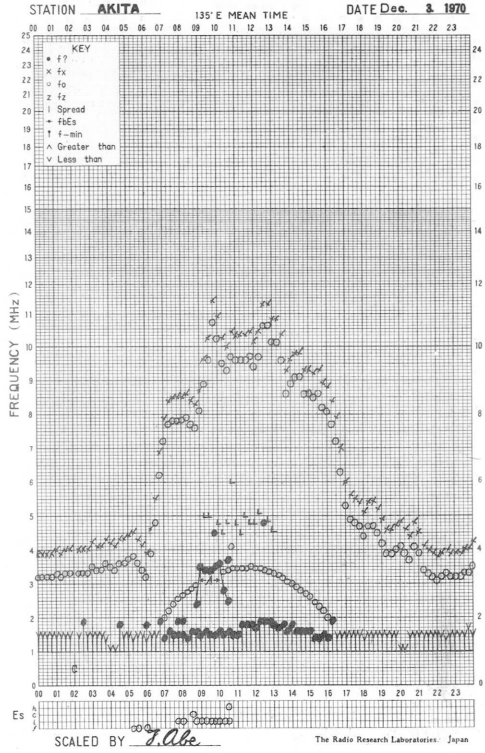
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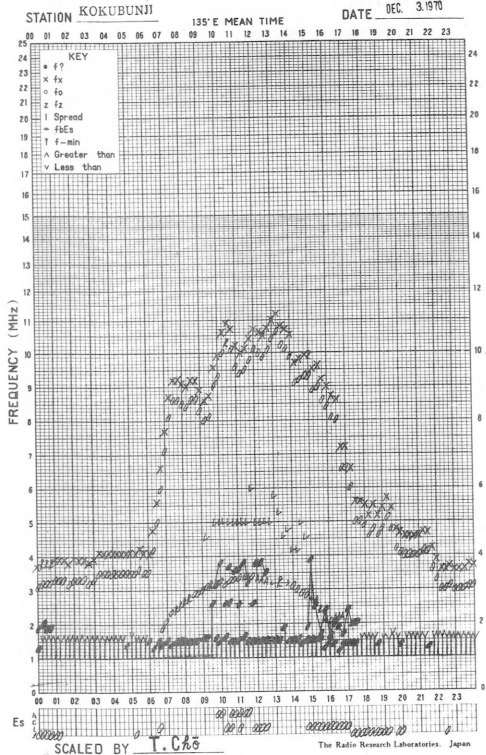
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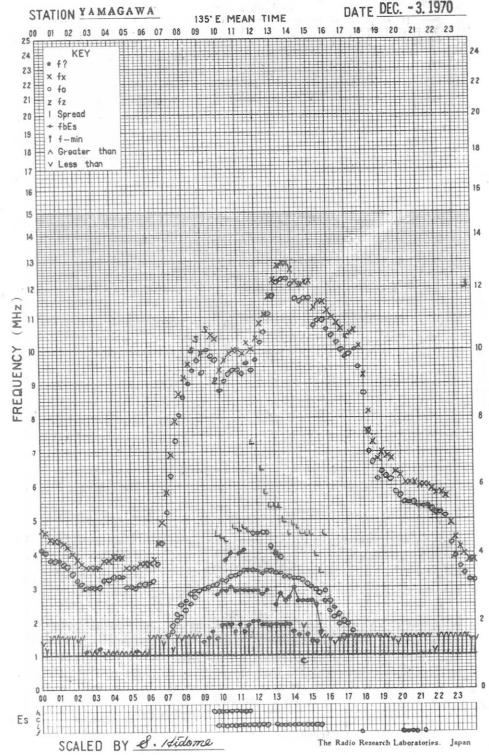
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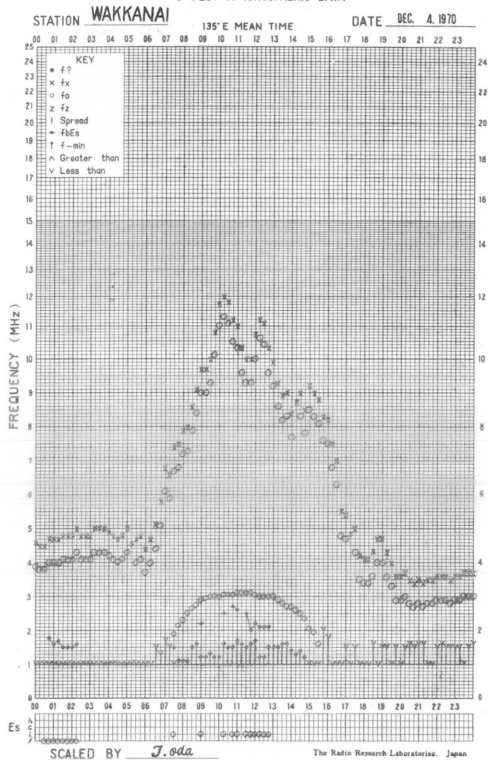
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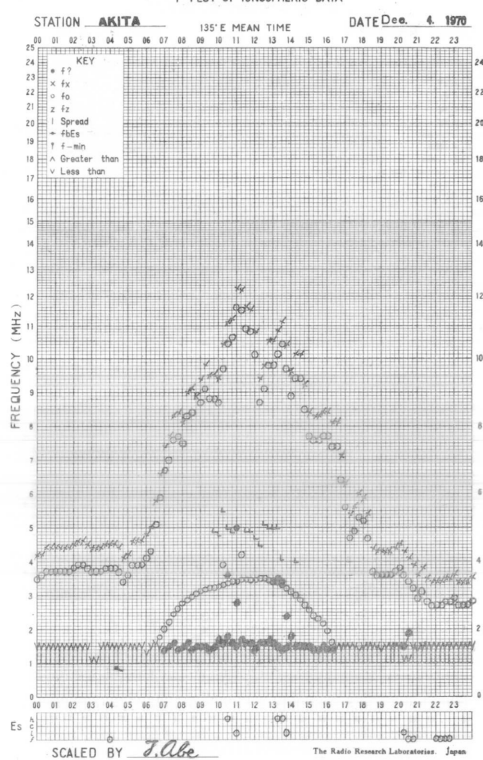
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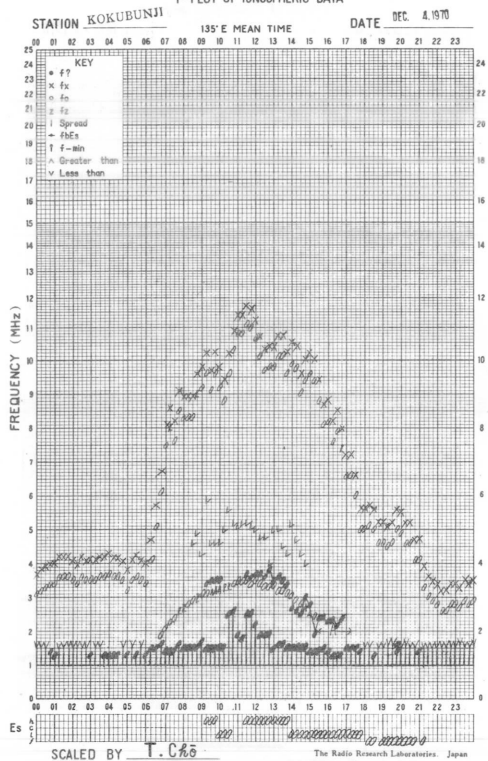
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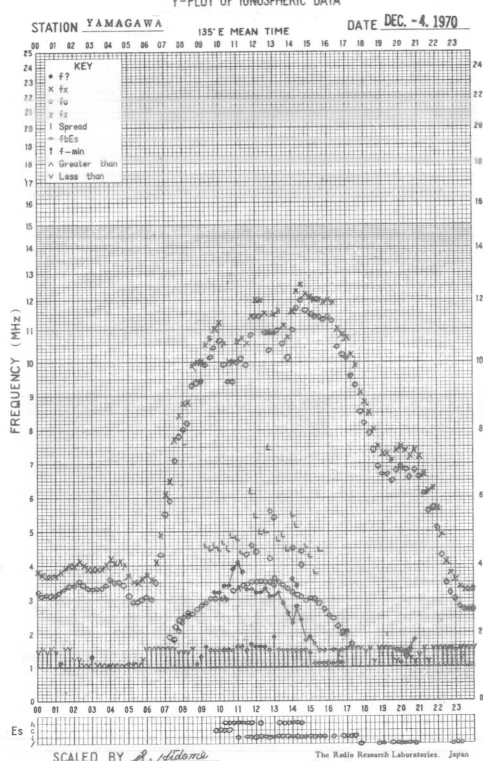
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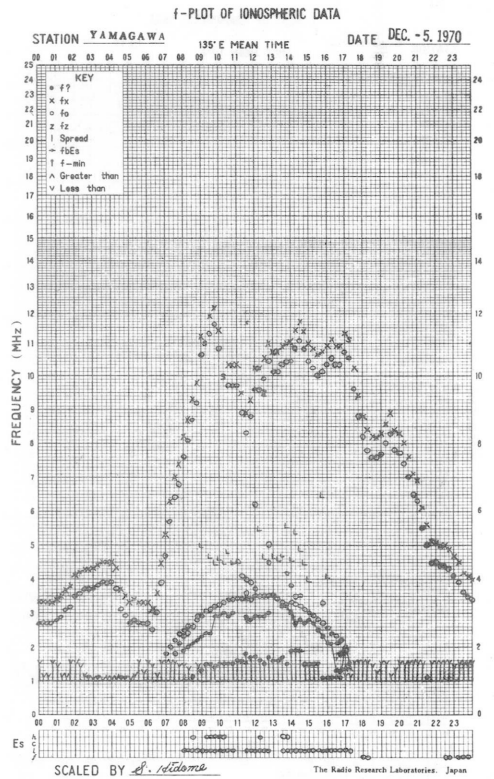
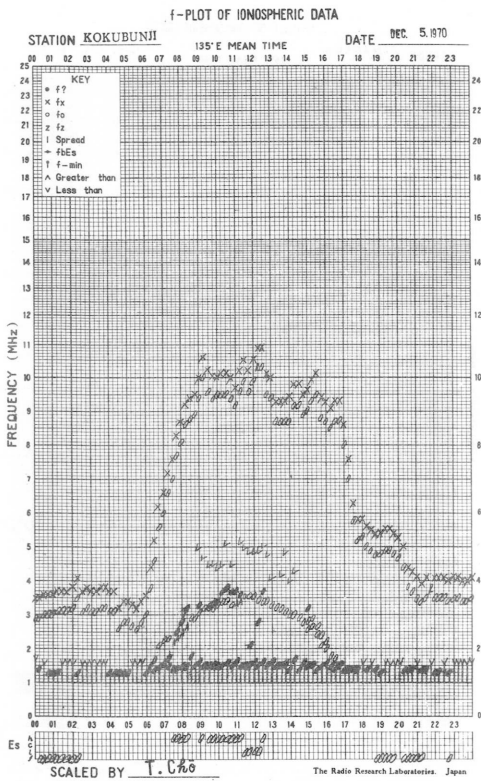
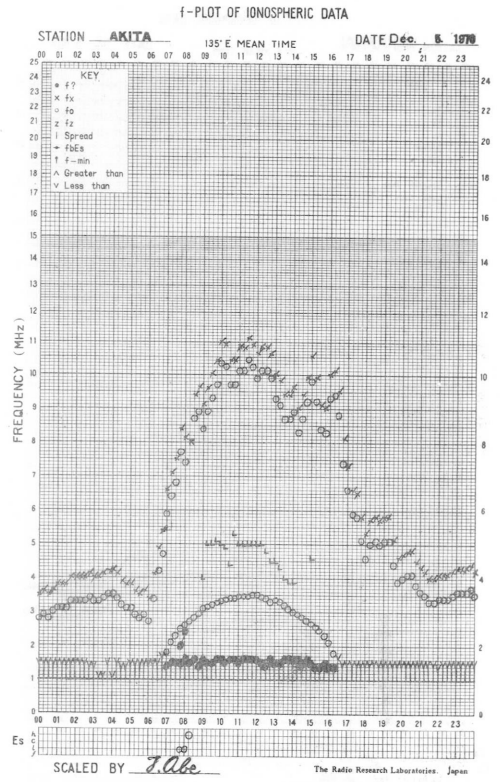
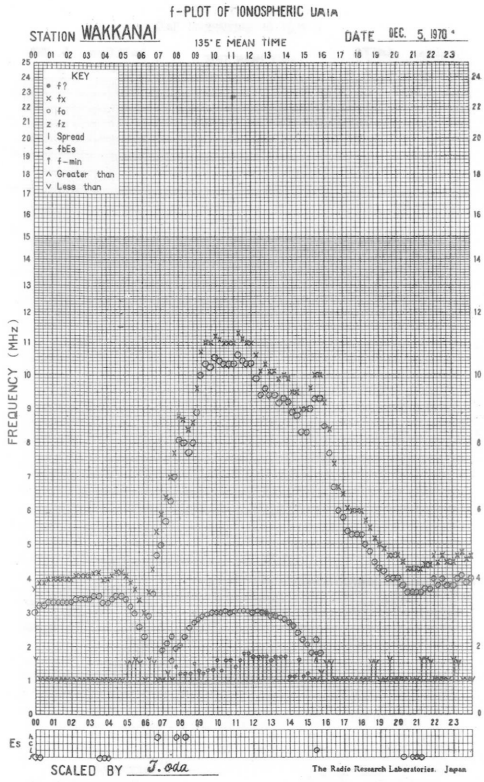


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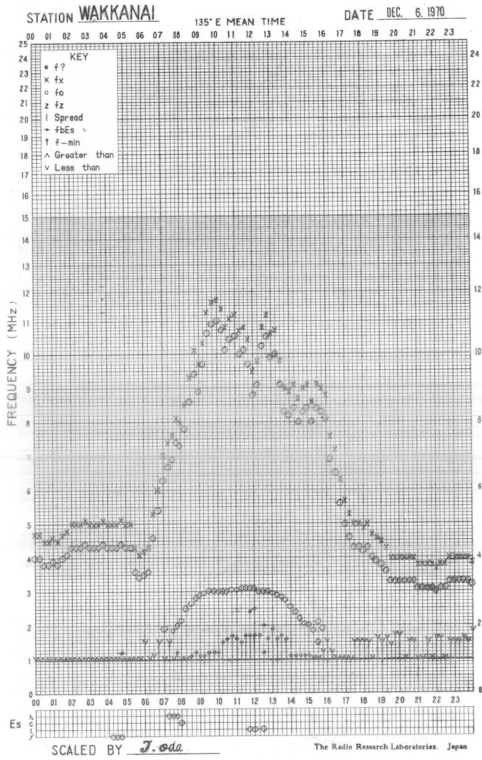


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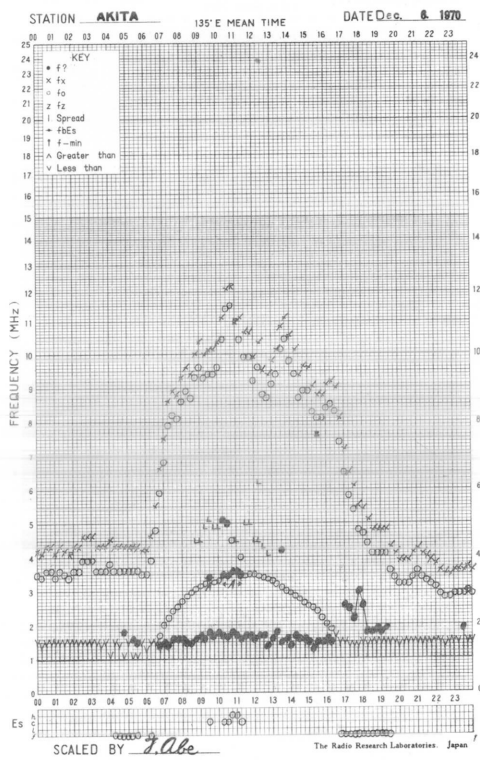




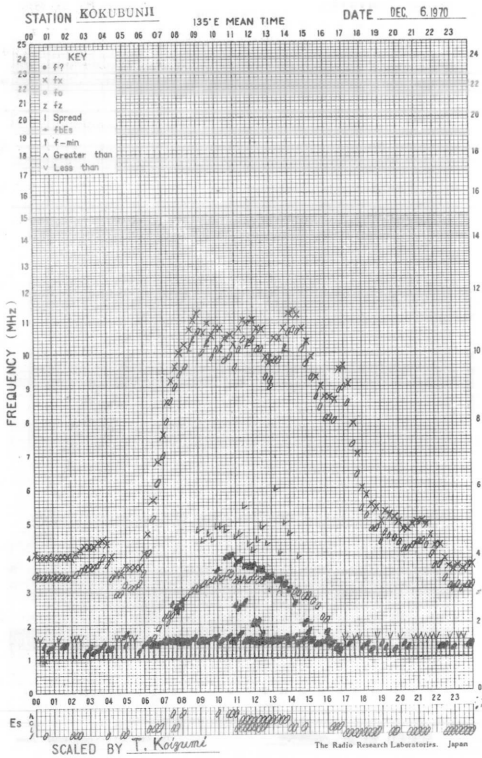
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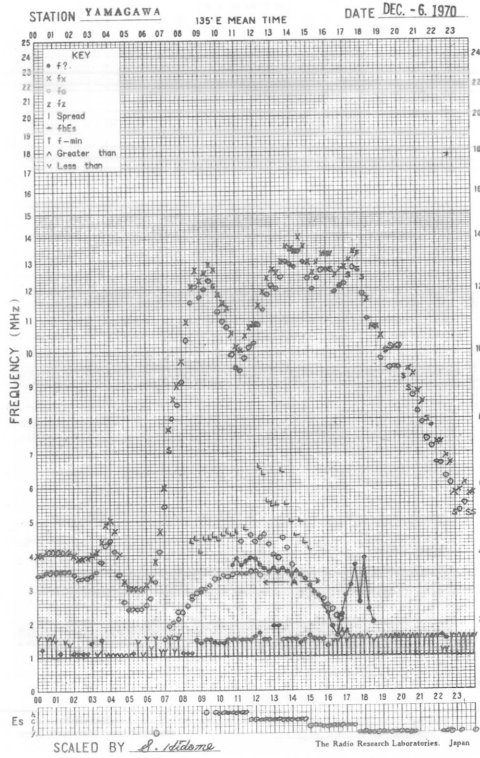
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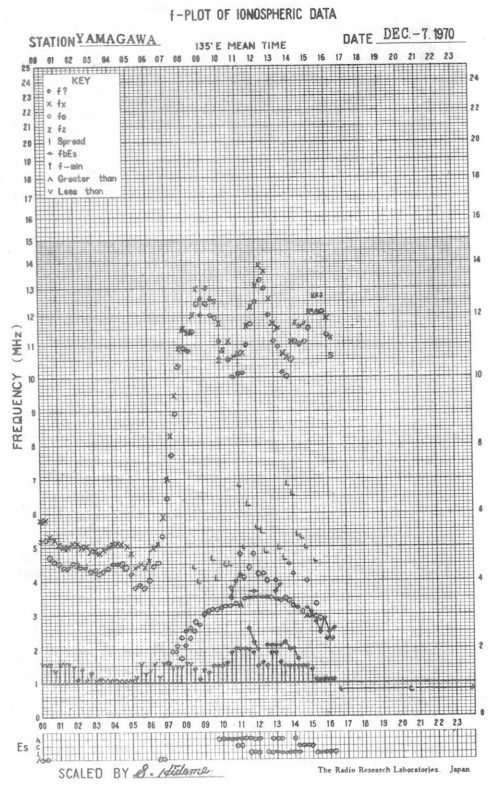
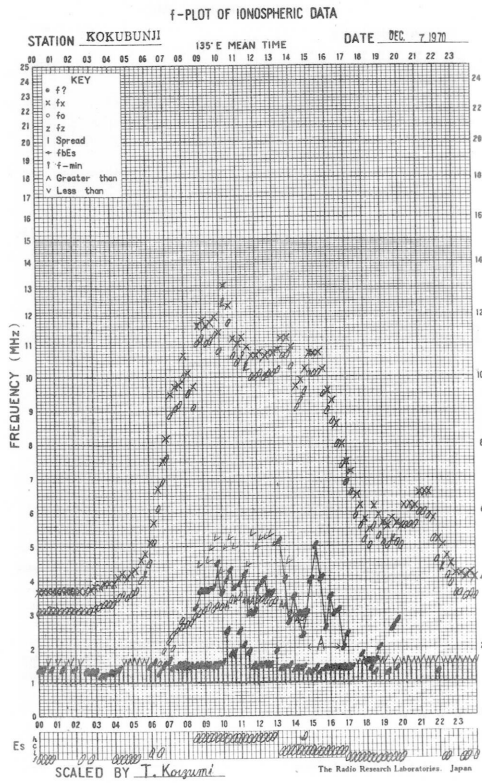
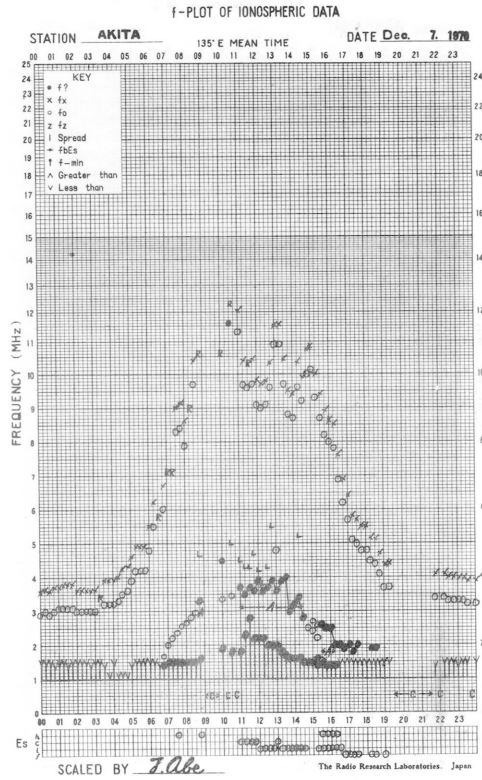
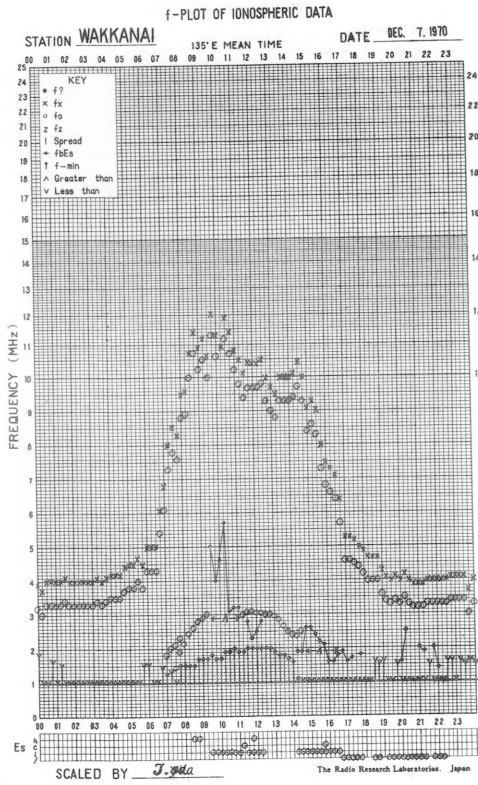


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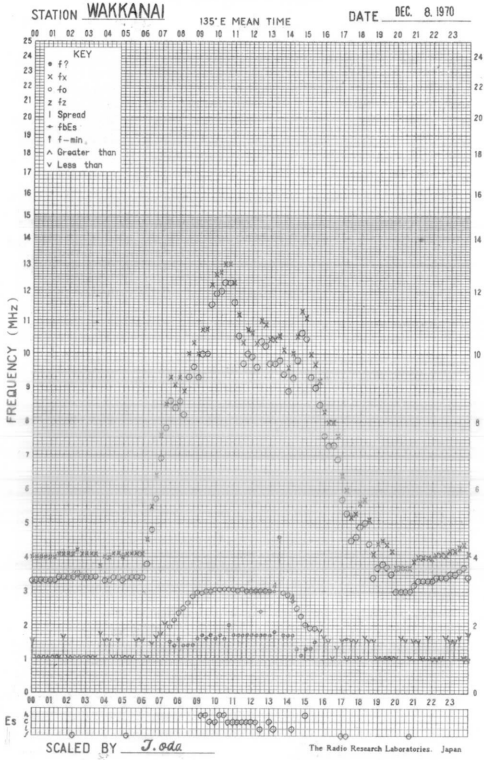


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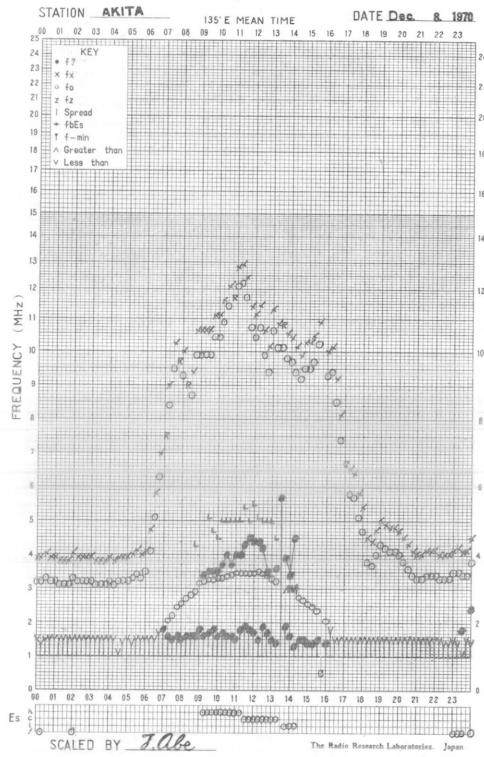




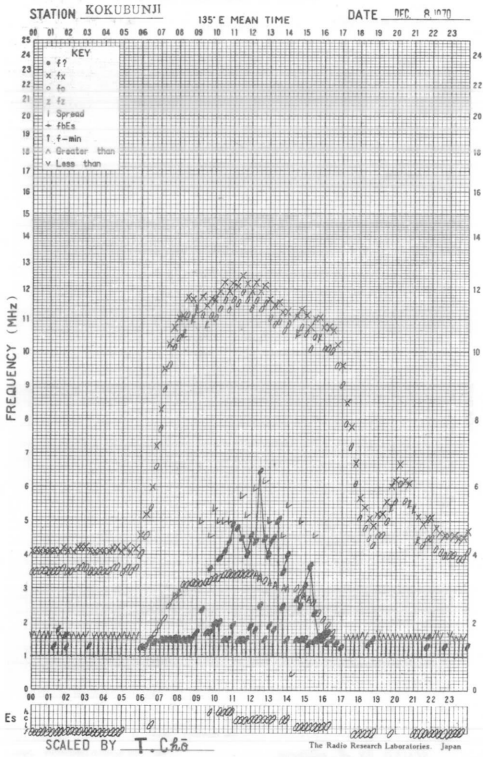
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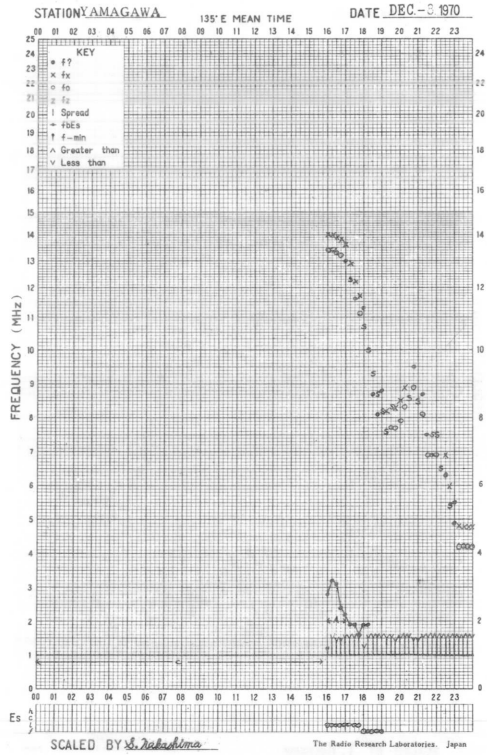
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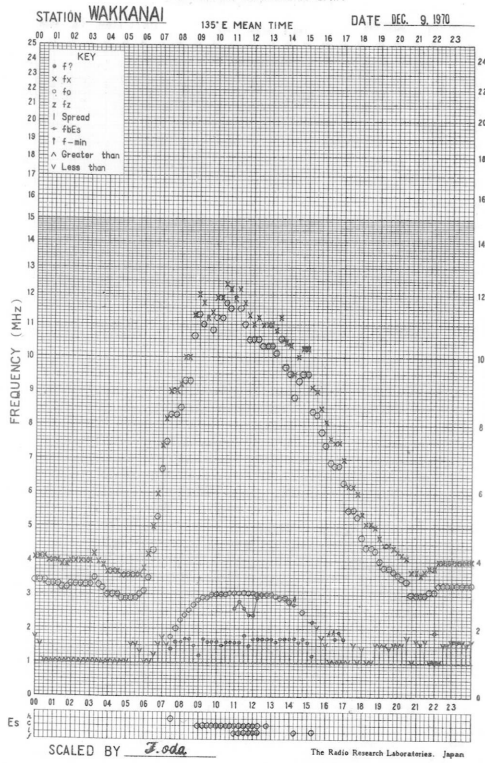
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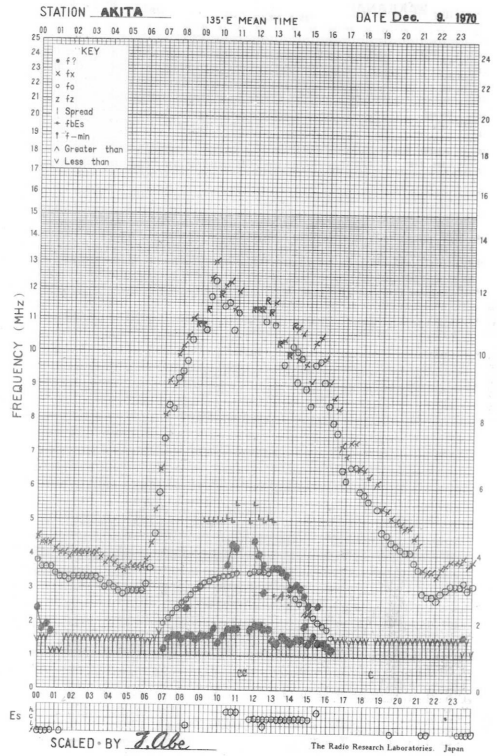
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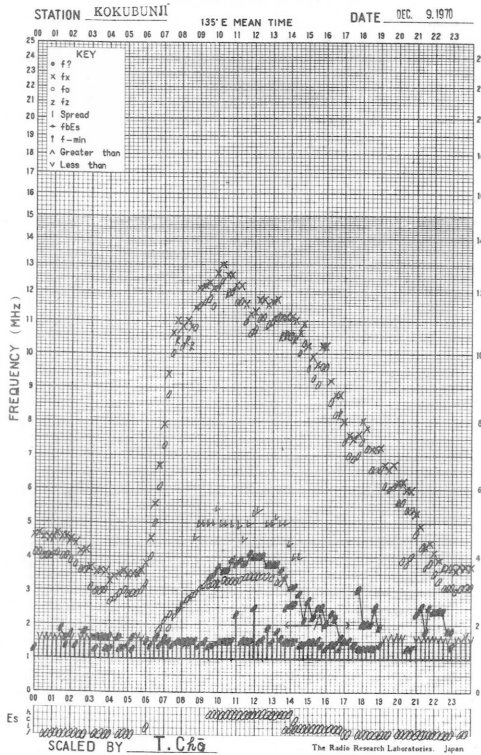
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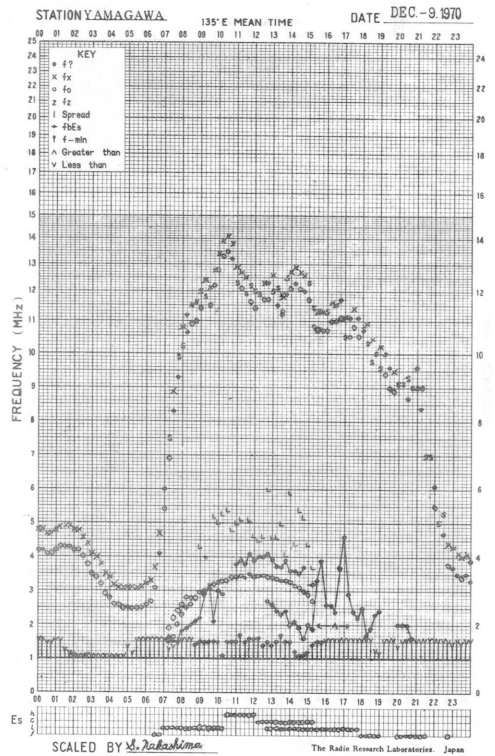
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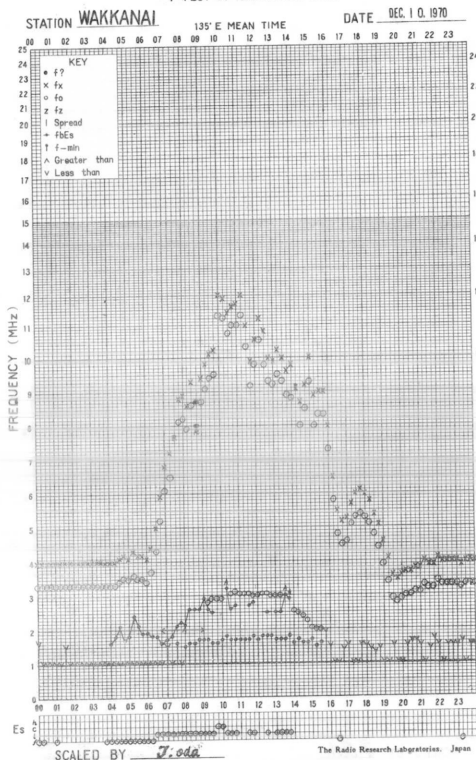
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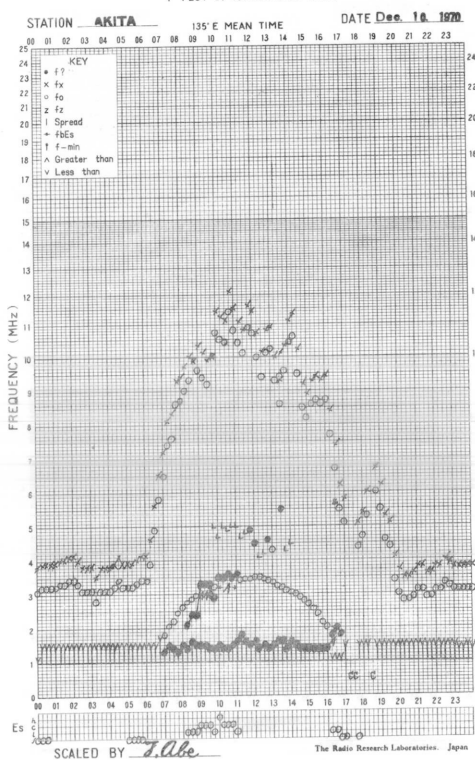
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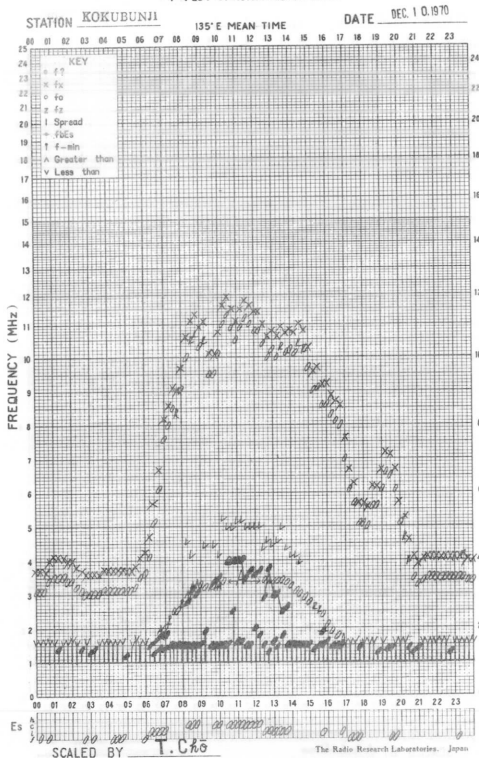
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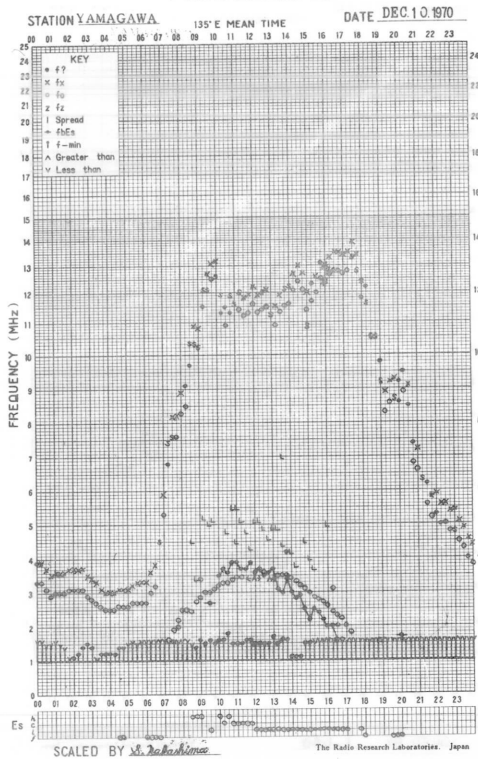
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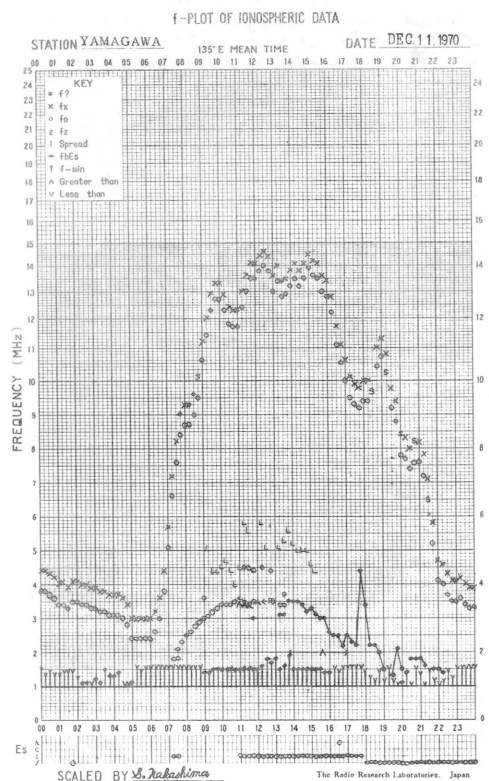
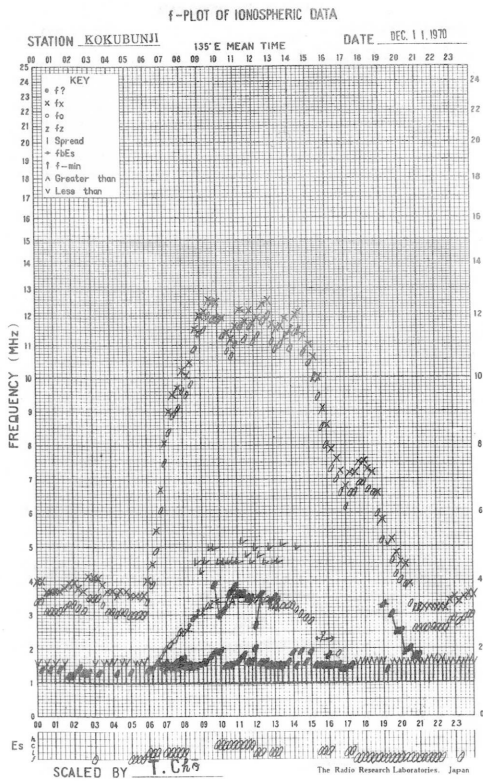
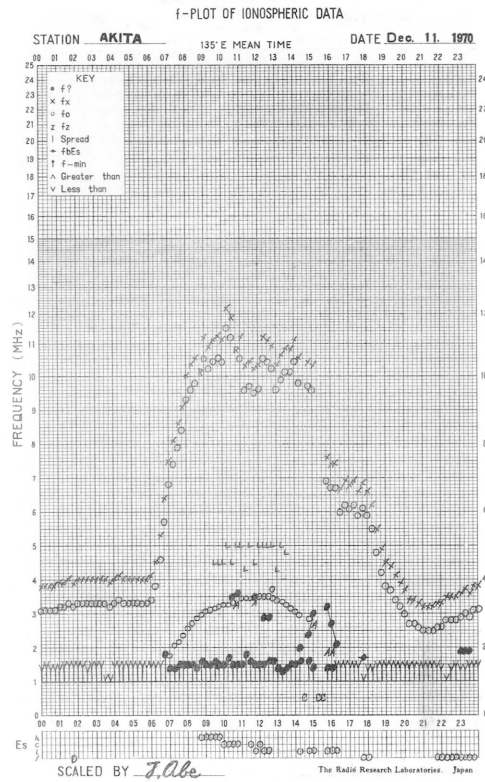
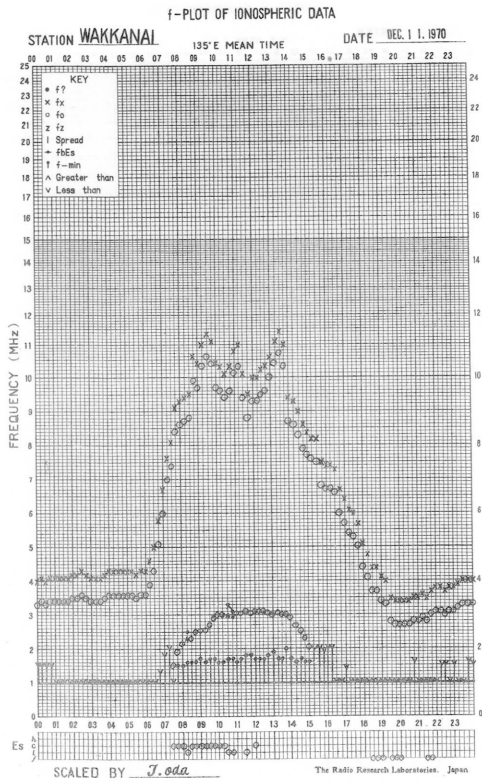


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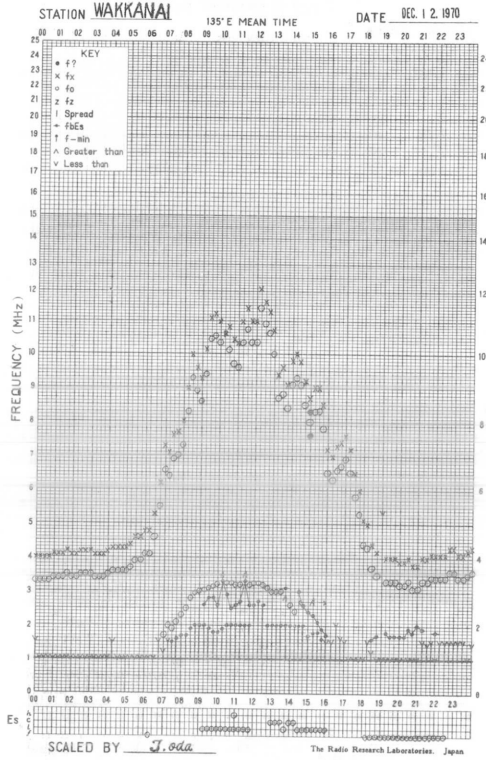


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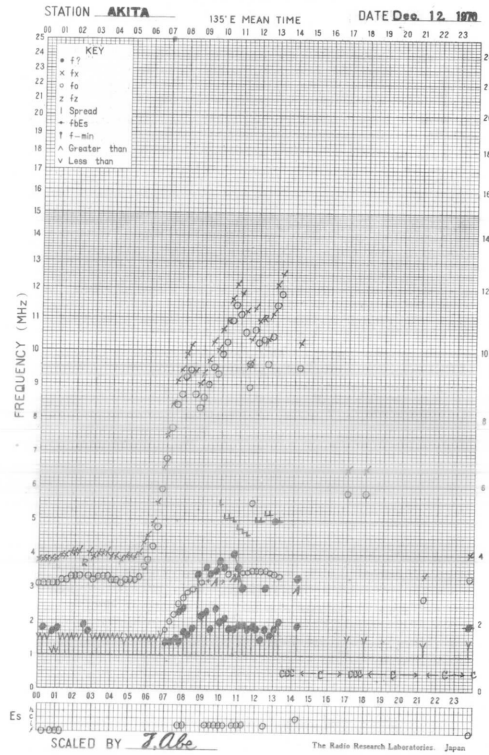




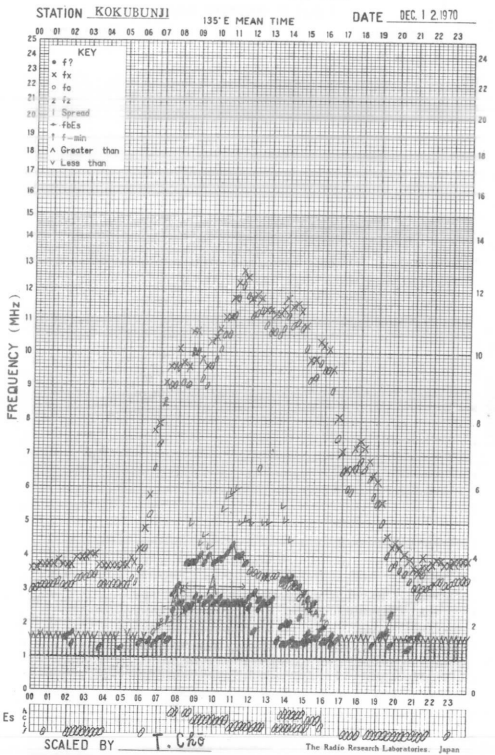
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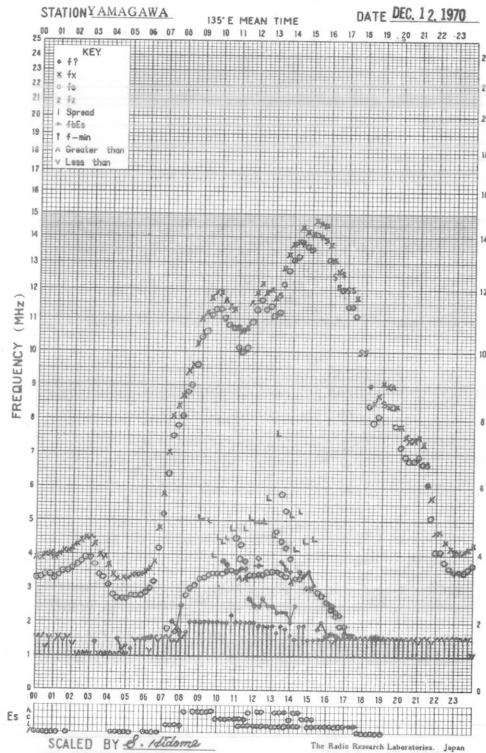
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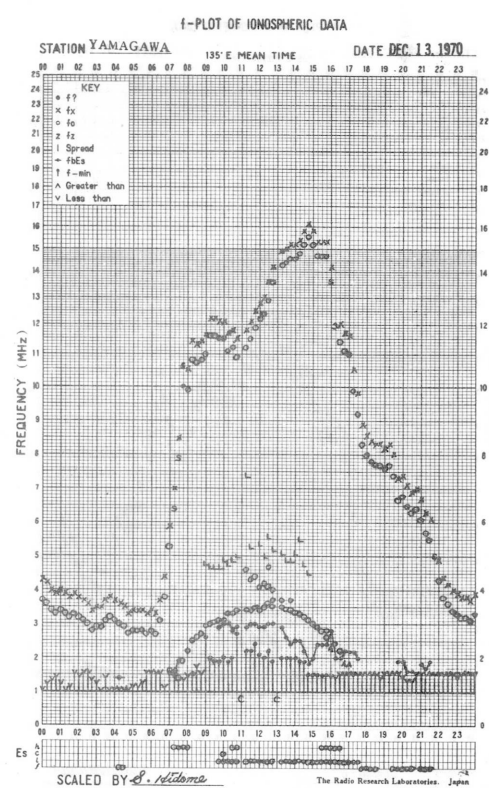
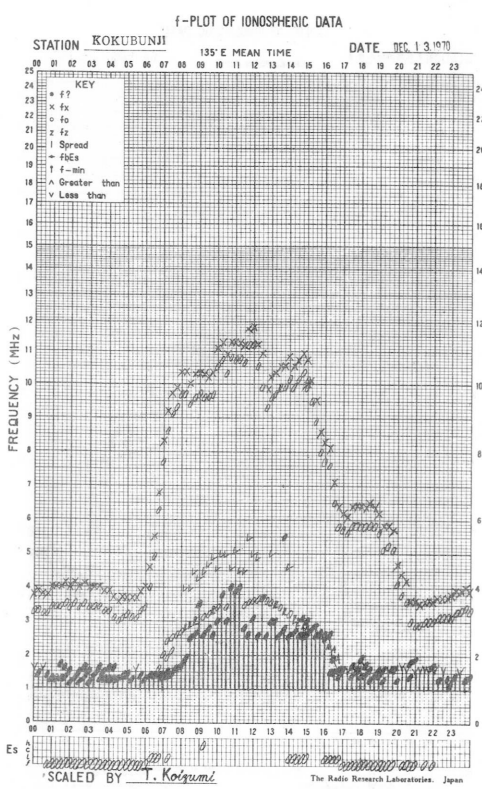
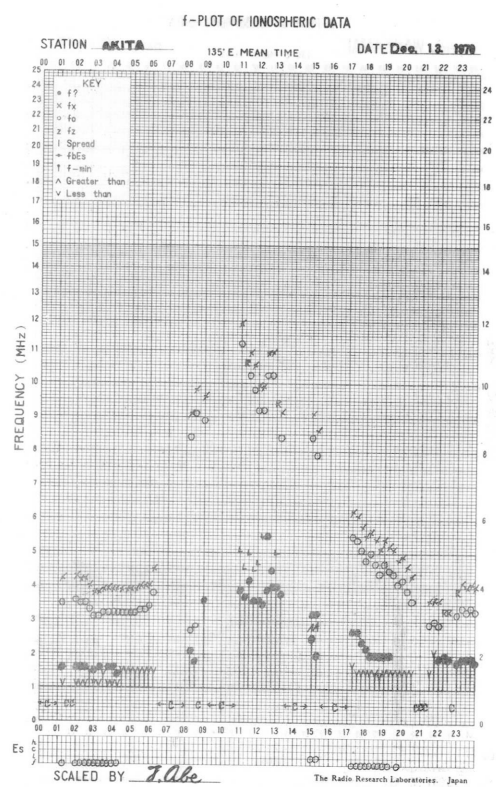
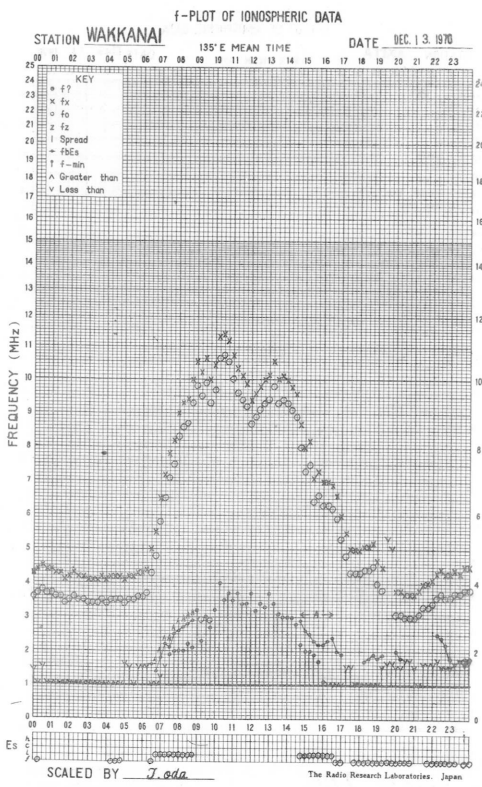


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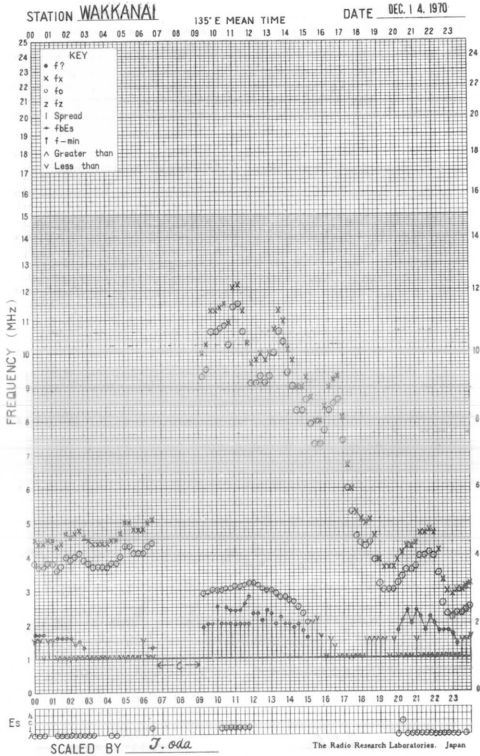


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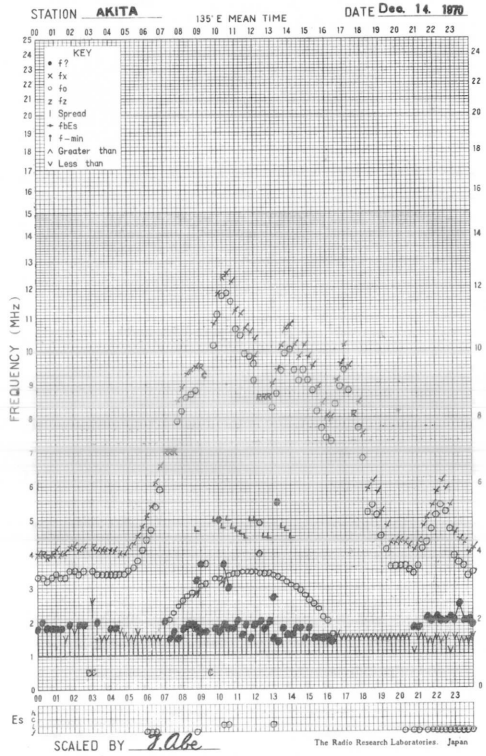




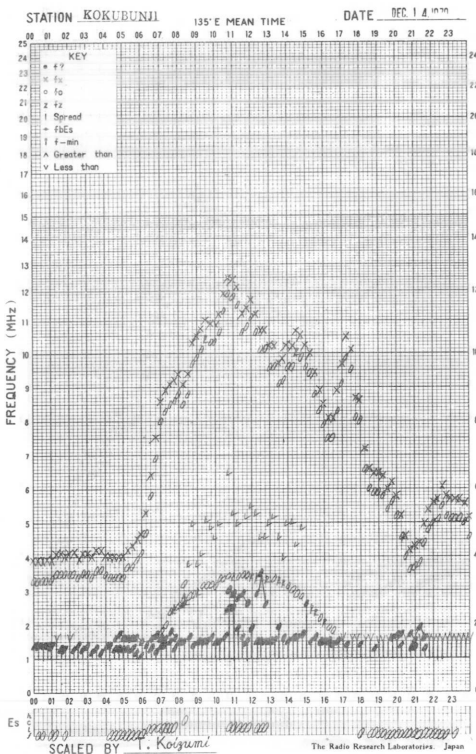
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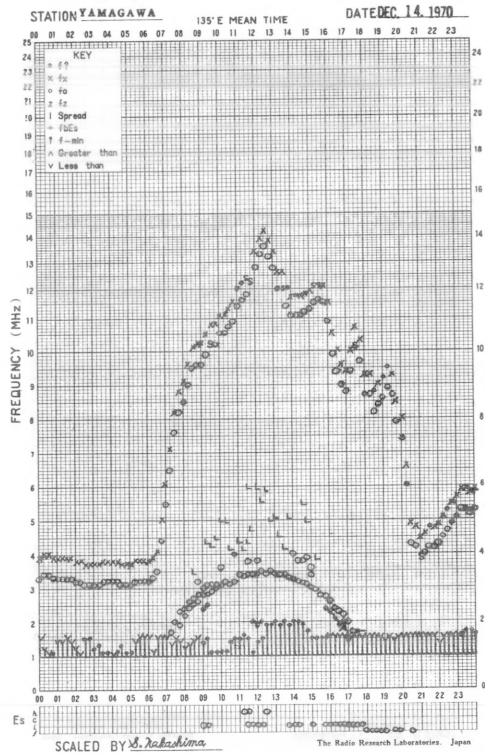
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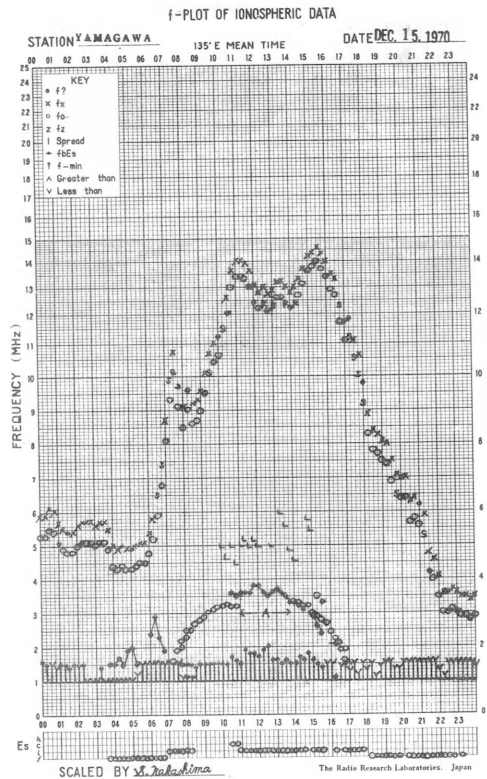
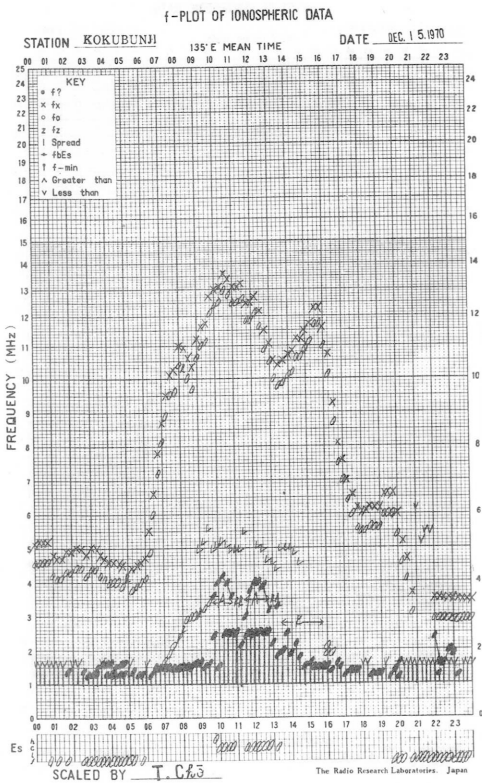
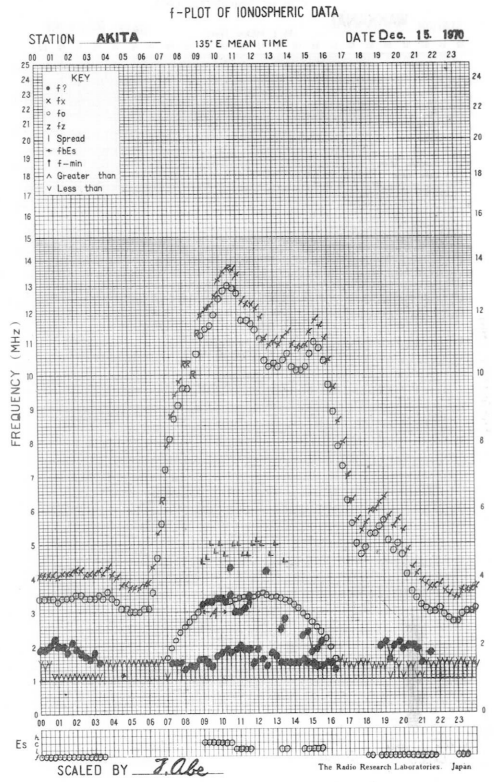
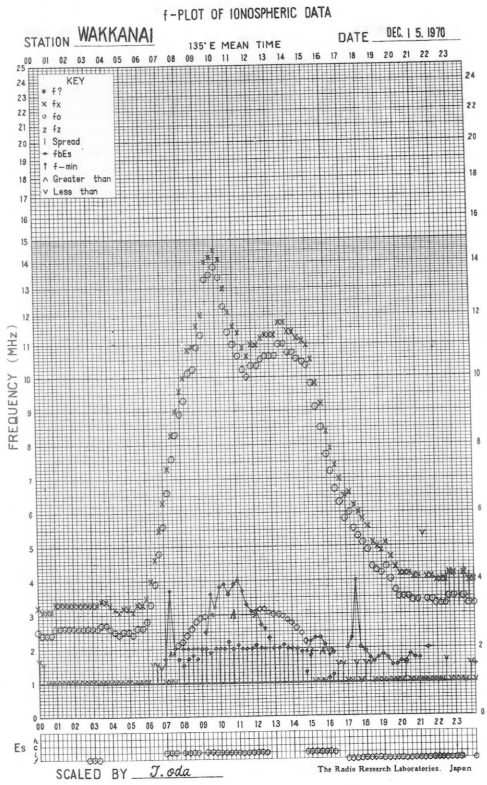


f-PLOT OF IONOSPHERIC DATA

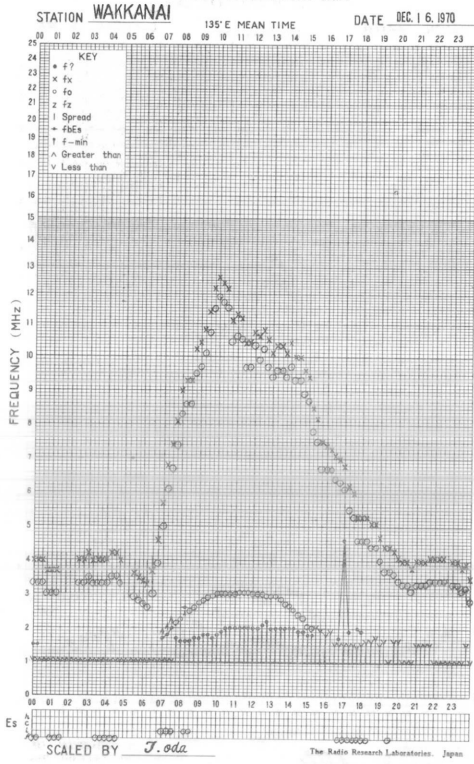


f-PLOT OF IONOSPHERIC DATA

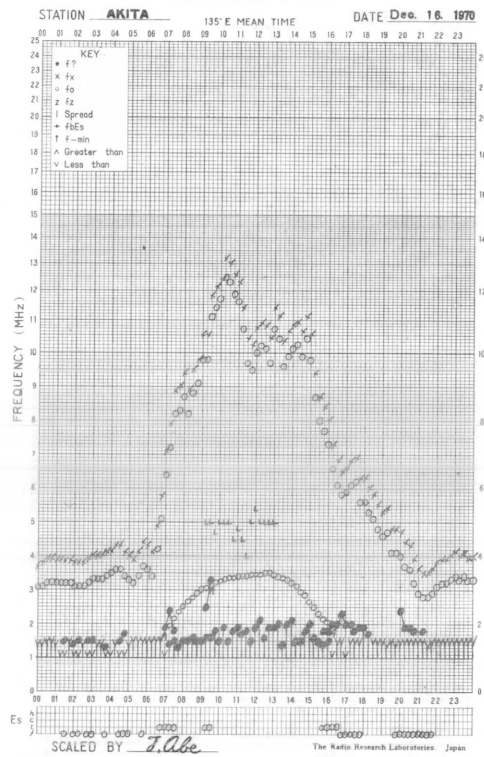




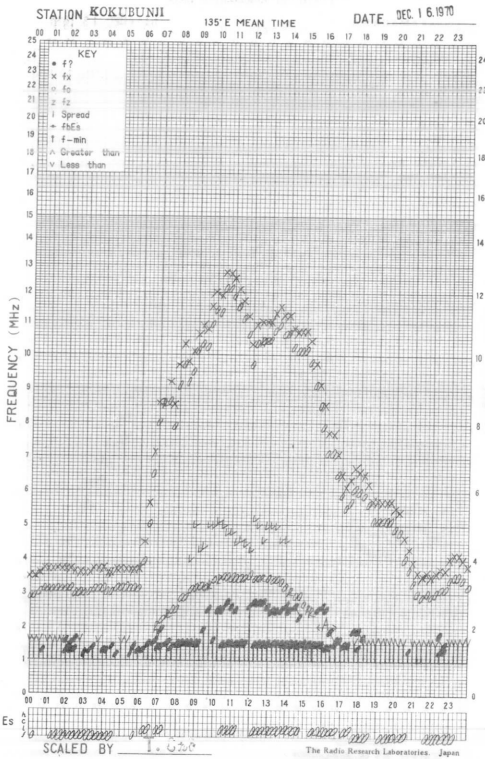
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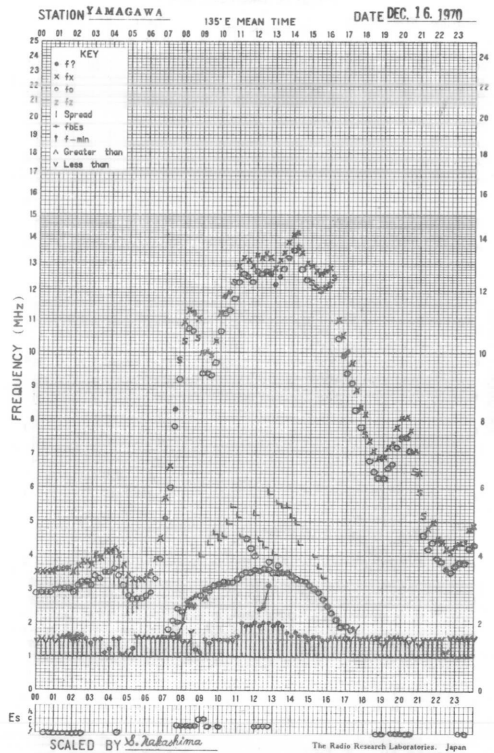
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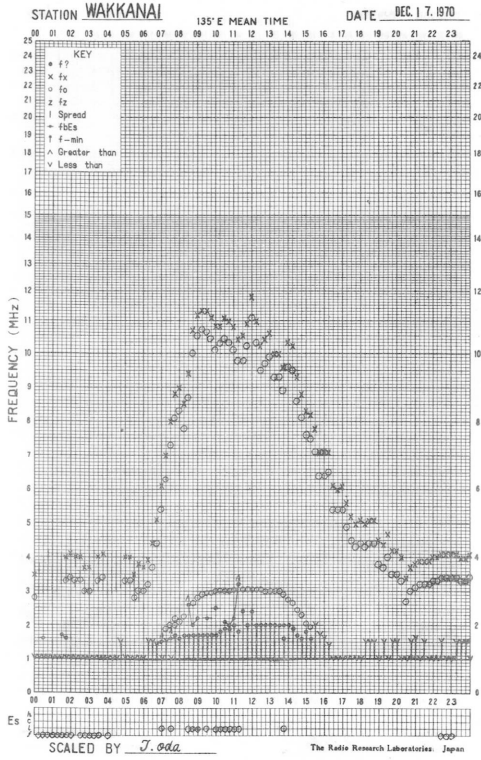
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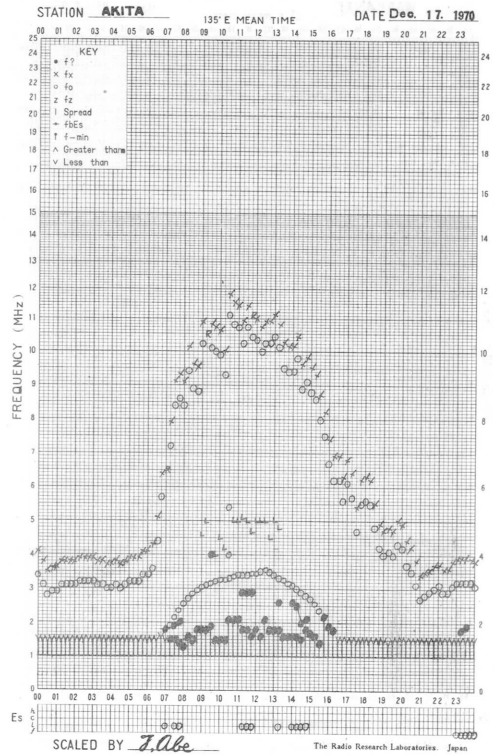
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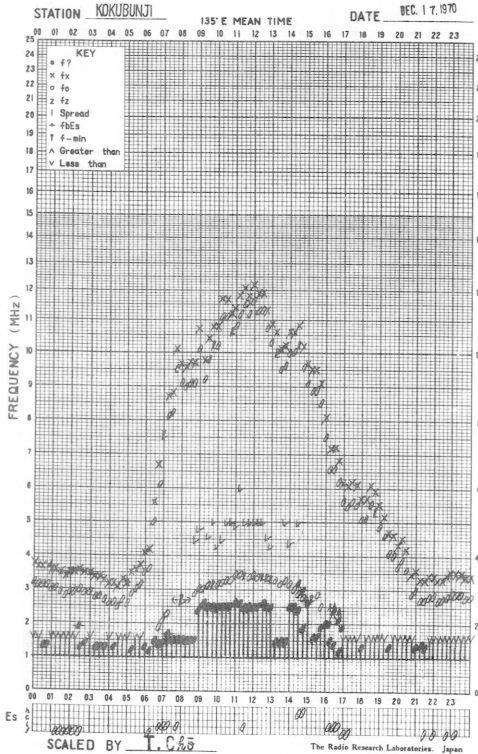
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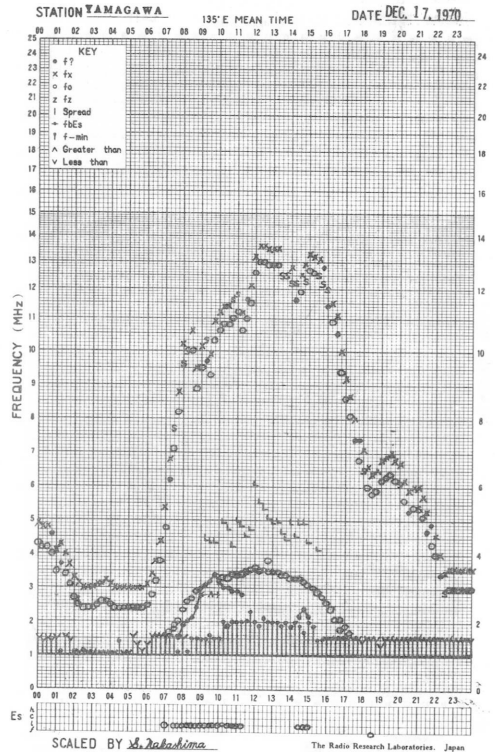
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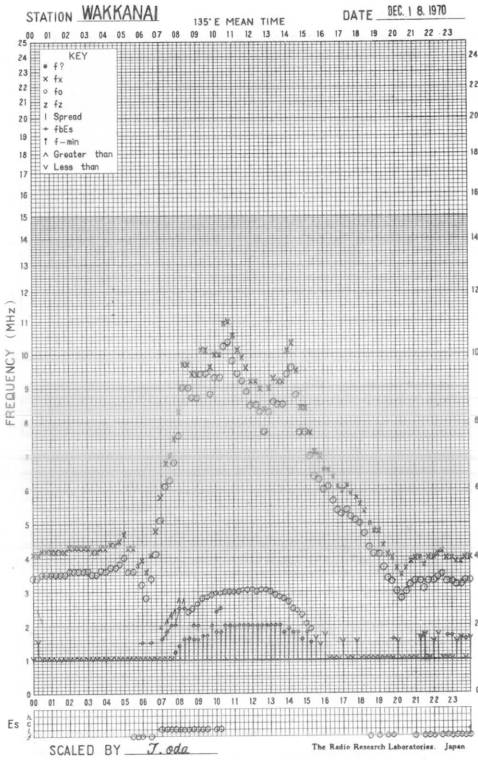
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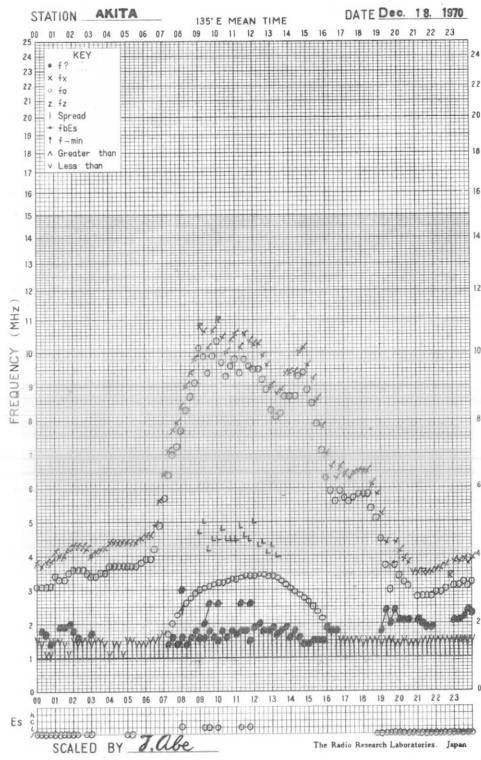
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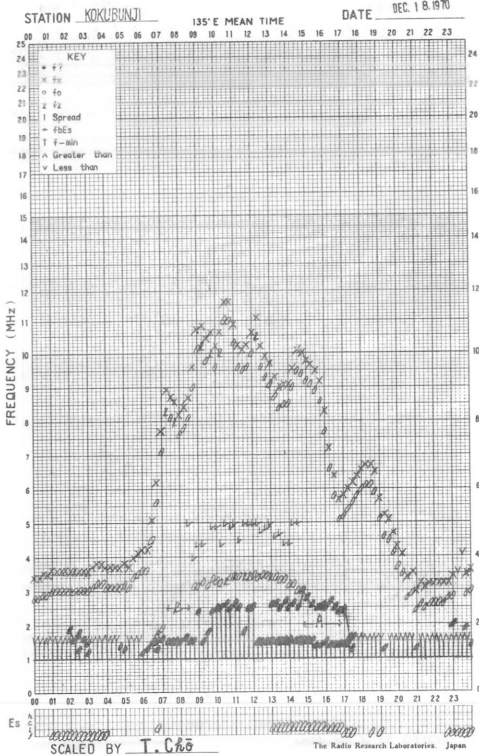
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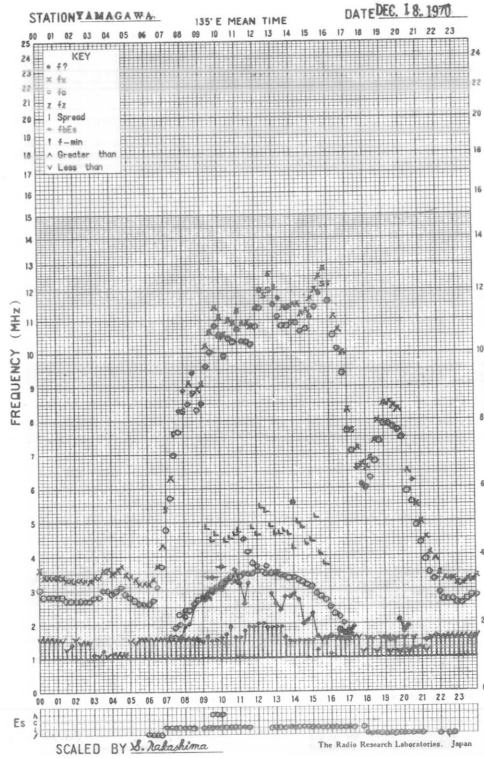
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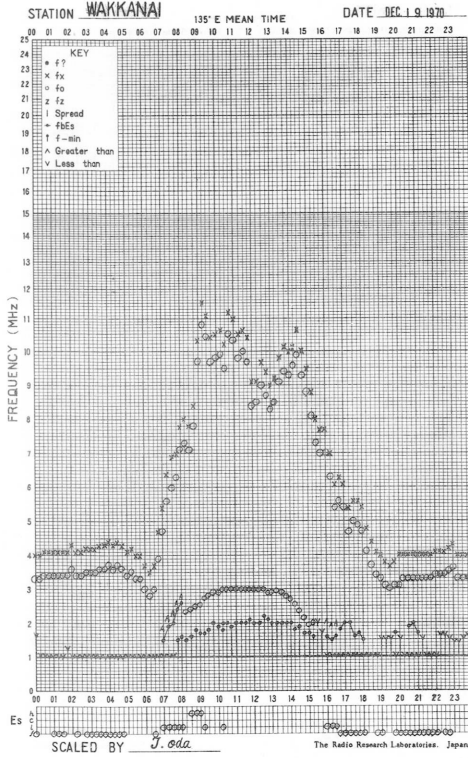
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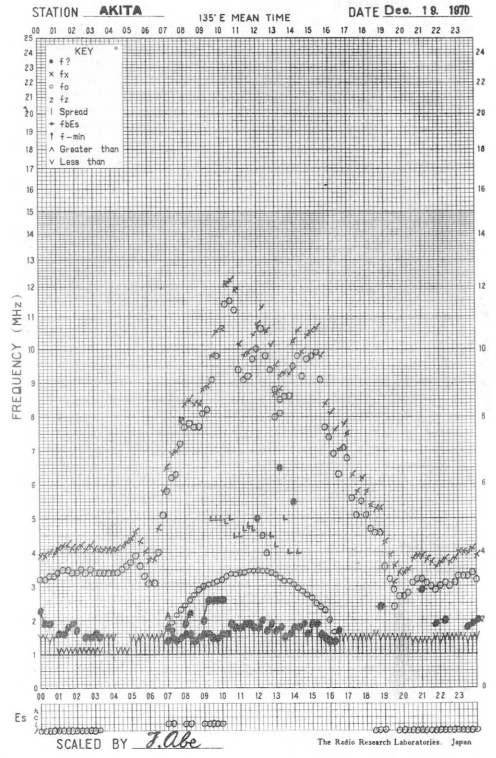
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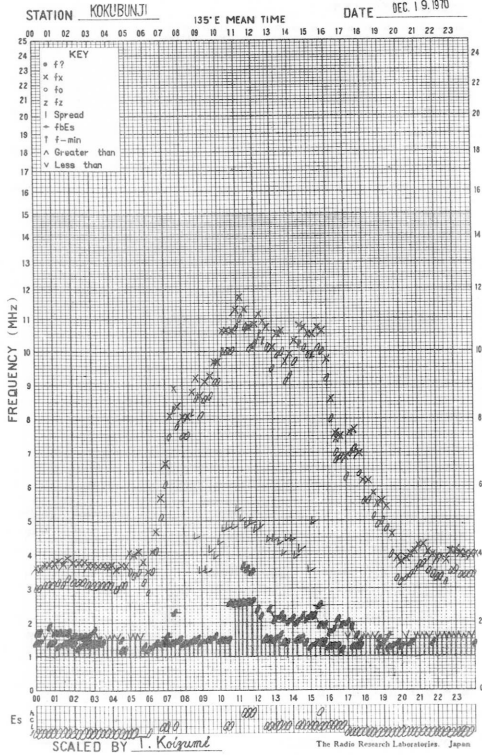
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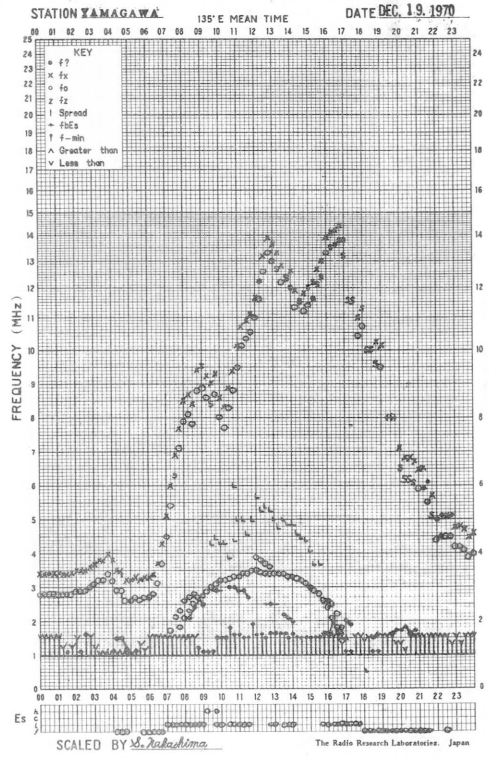
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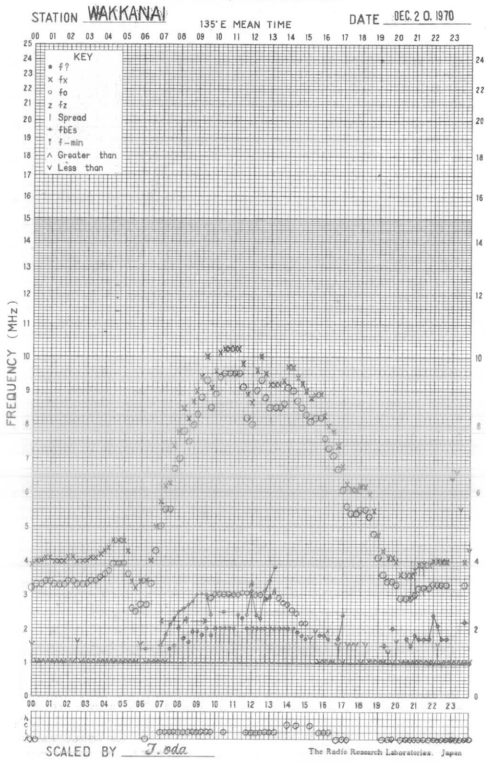
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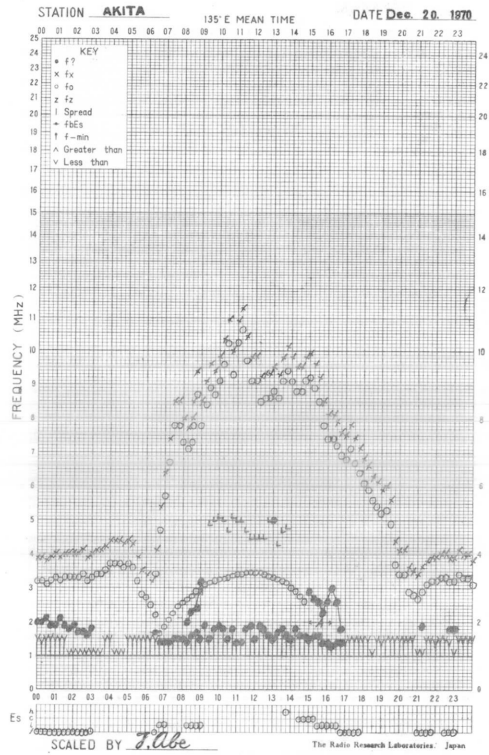
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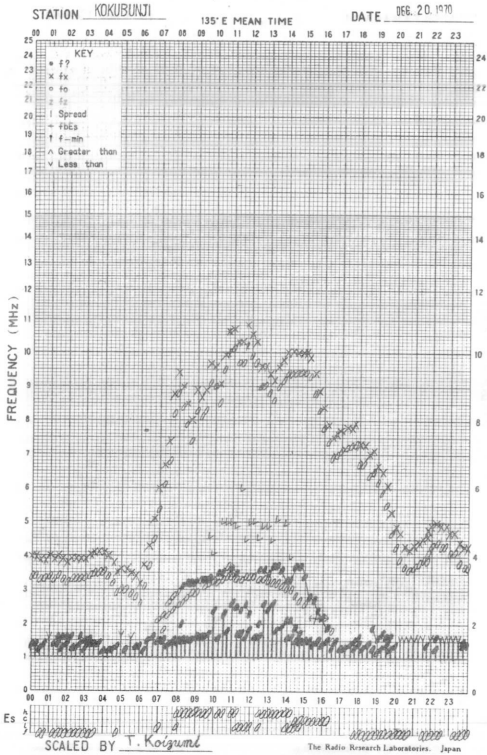
f-PLOT OF IONOSPHERIC DATA



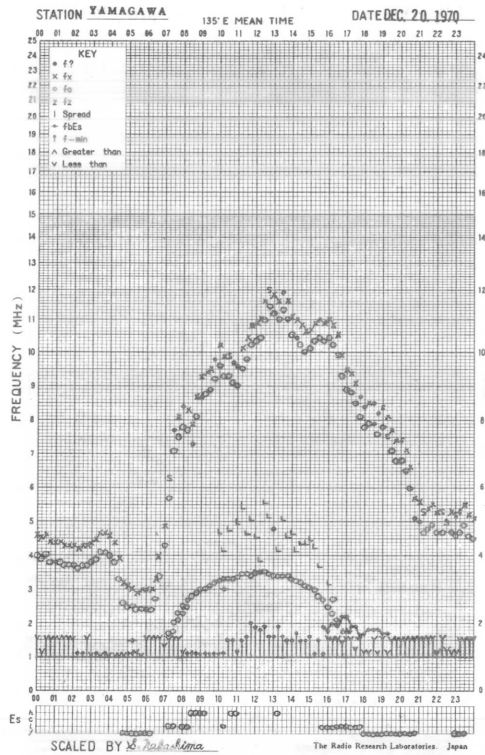
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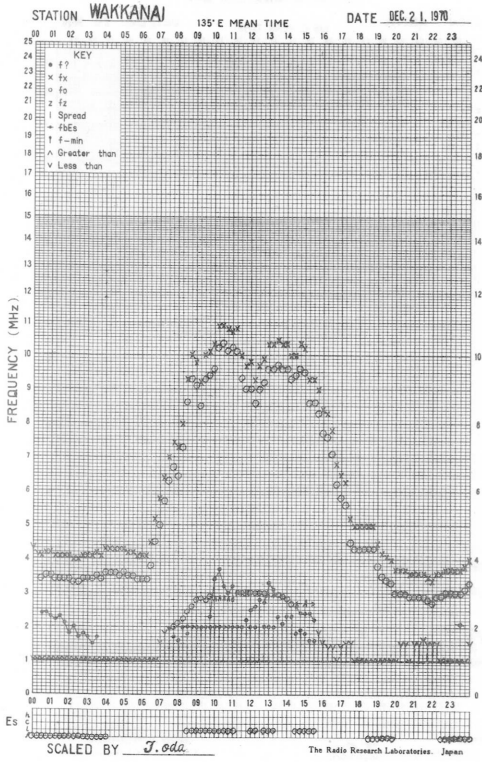
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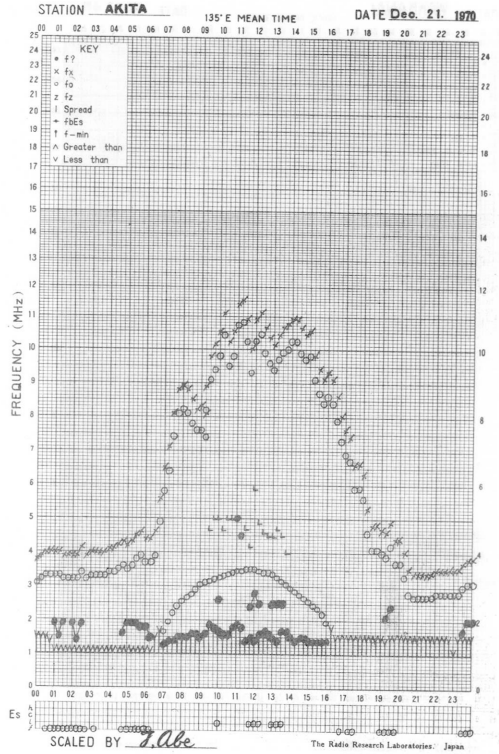
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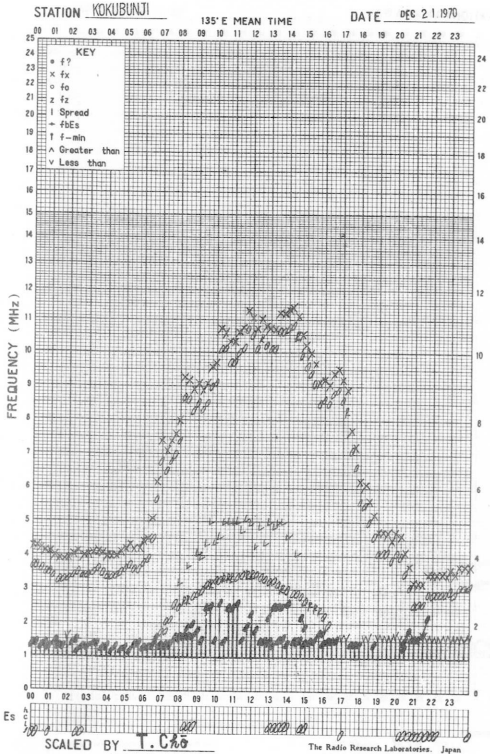
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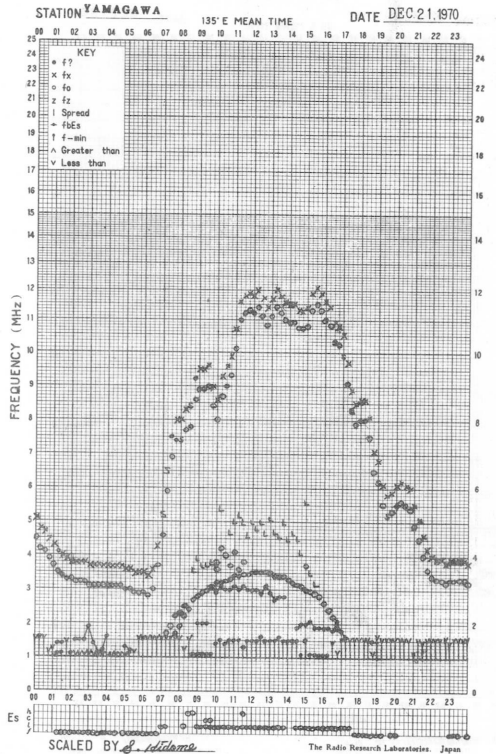
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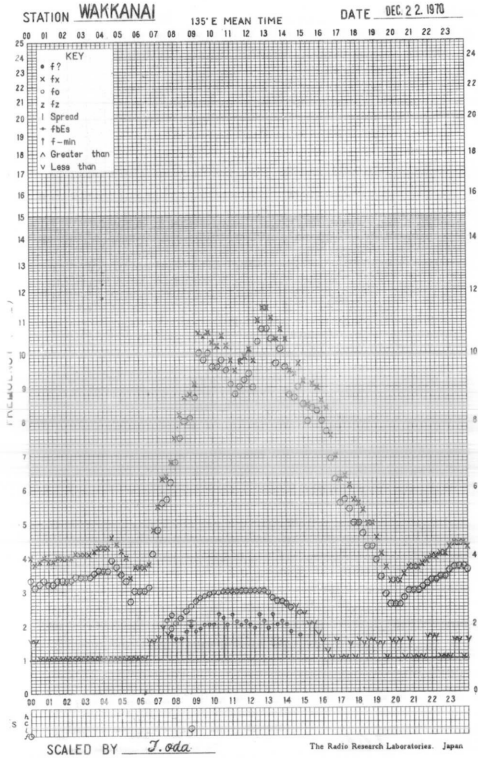
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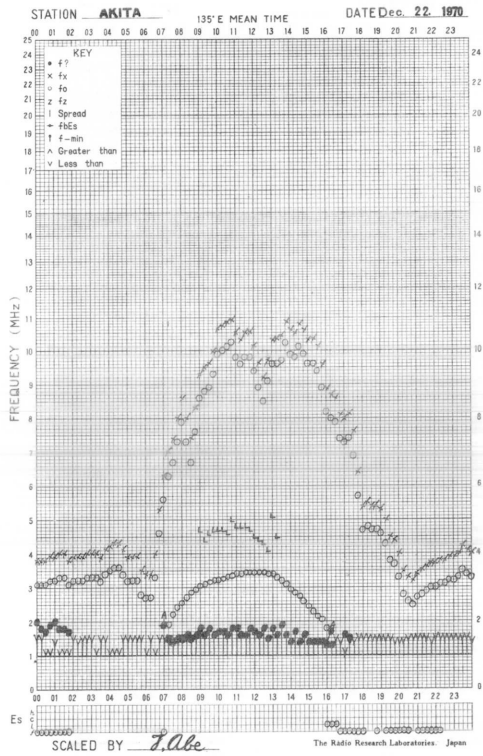
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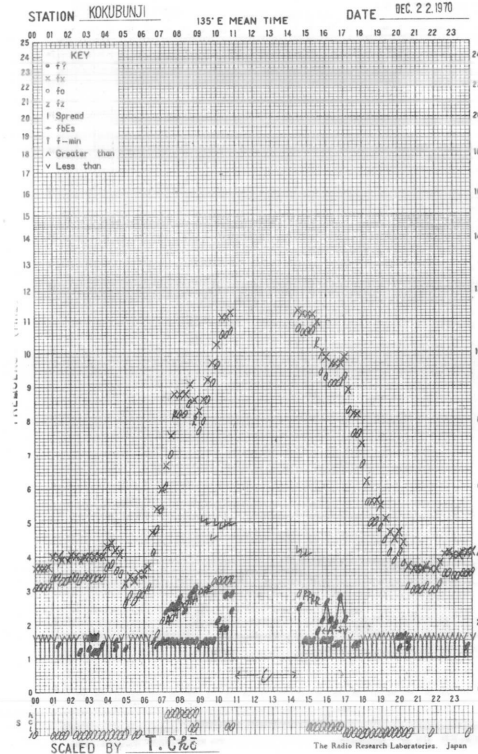
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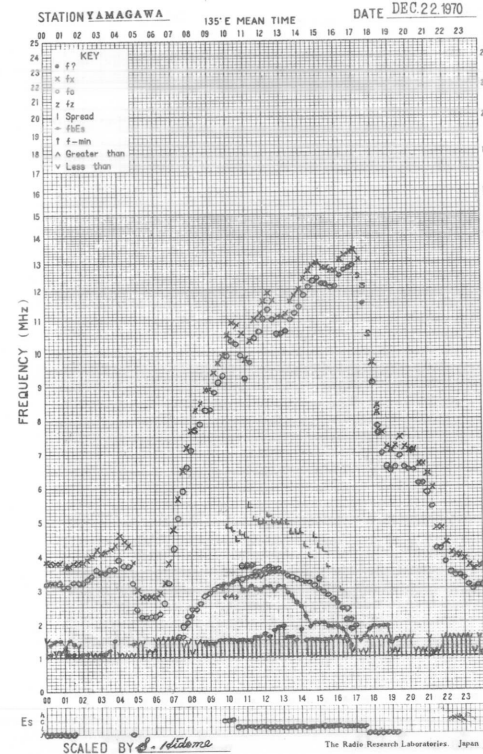
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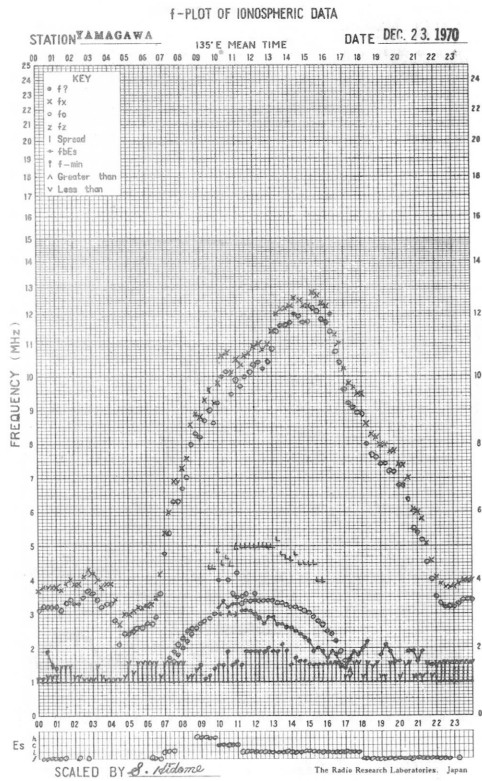
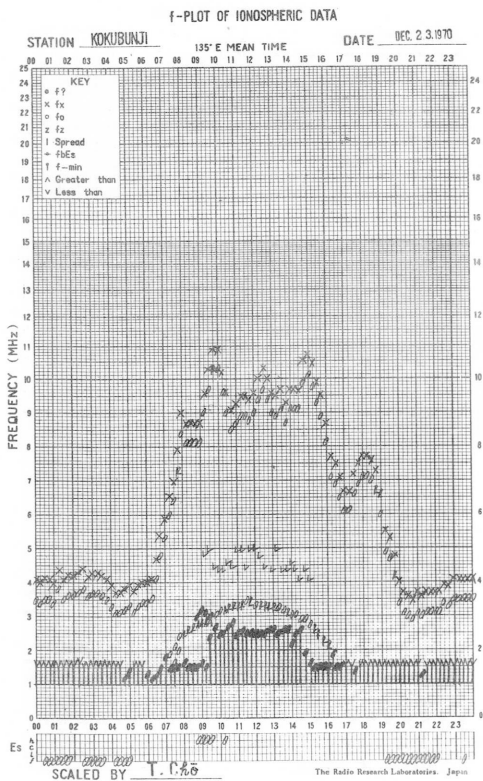
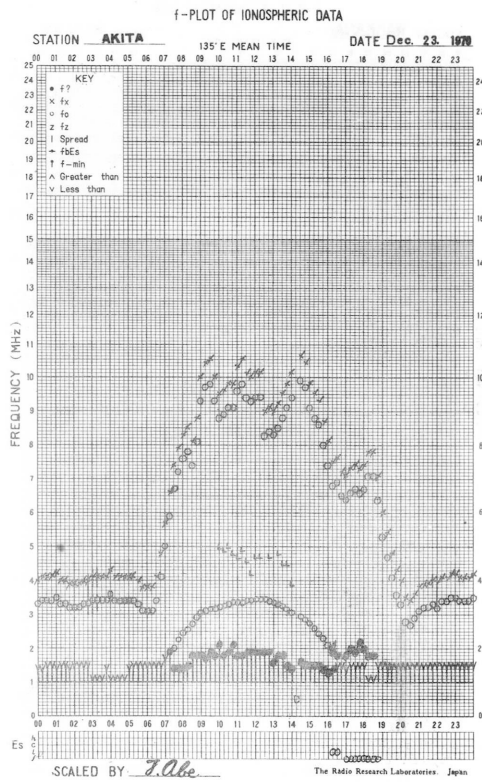
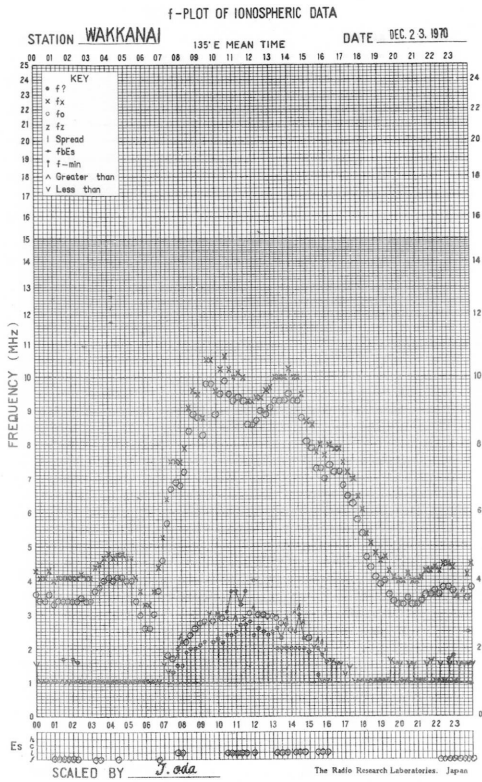


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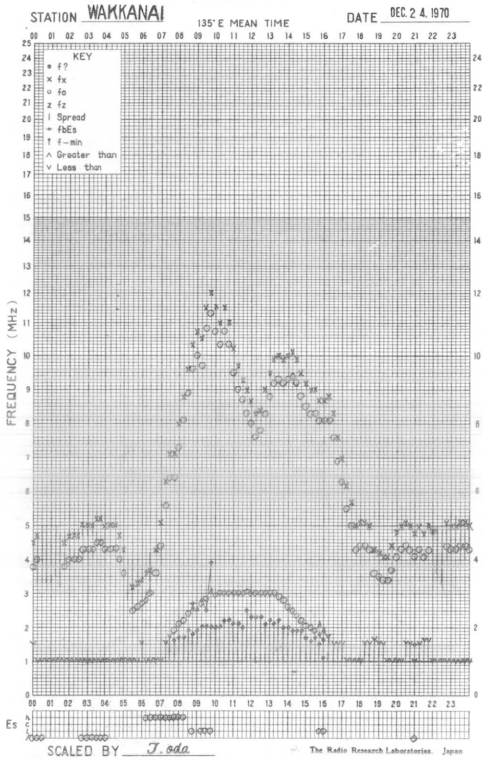


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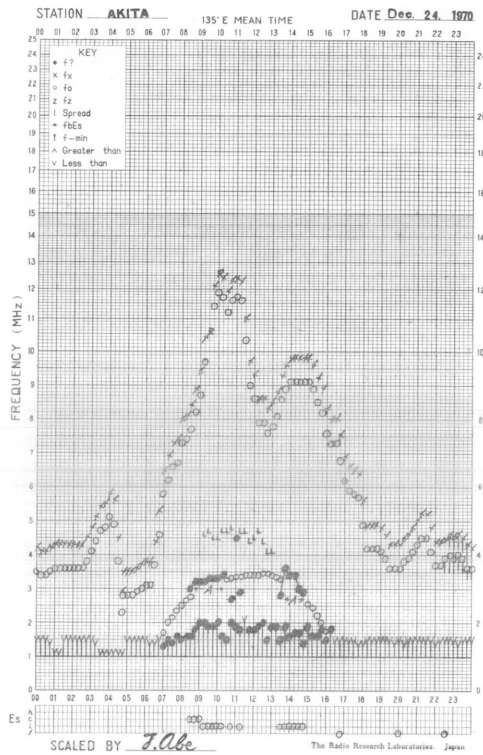




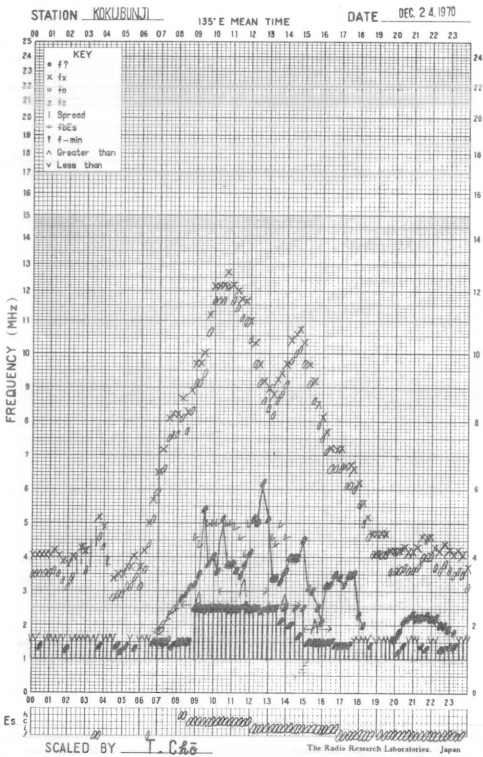
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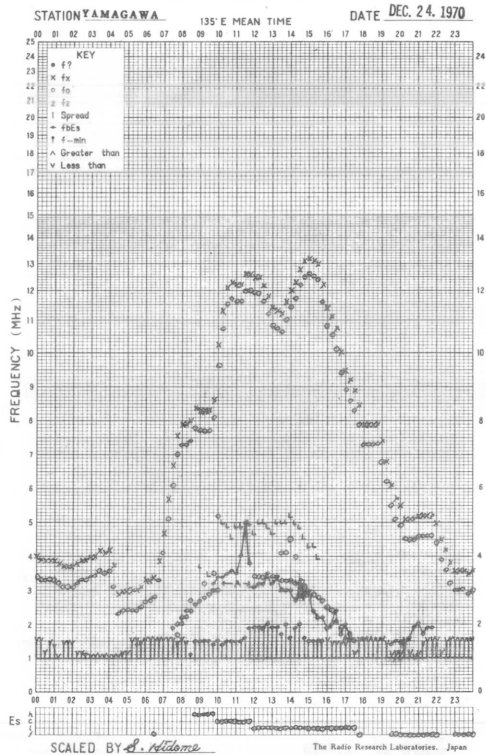
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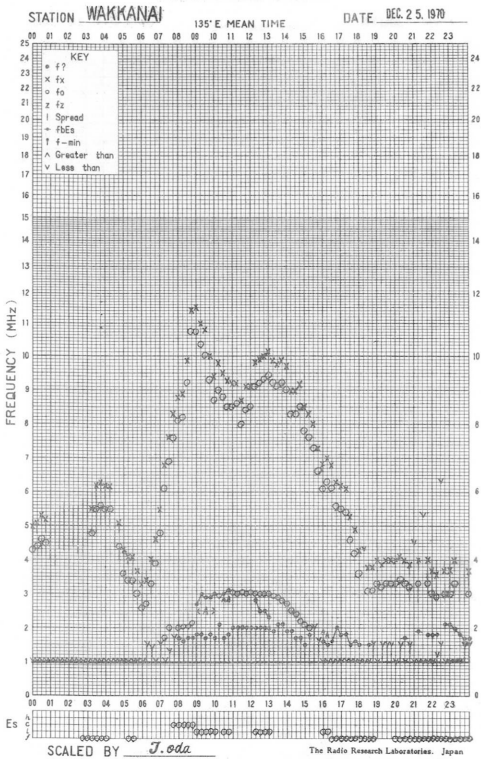
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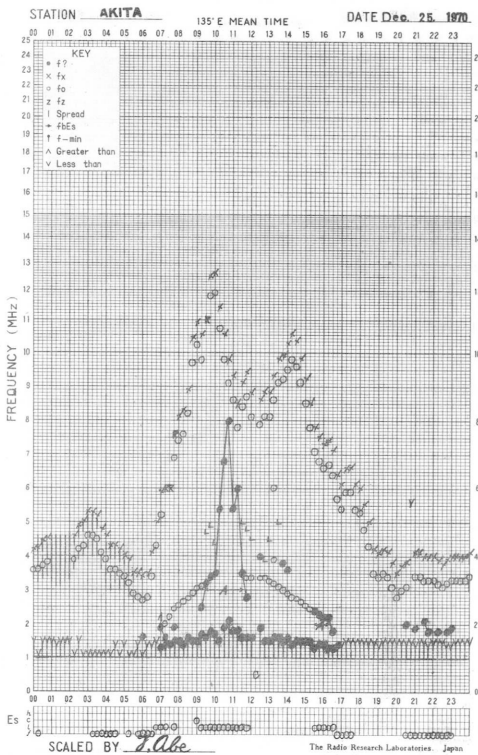
f-PLOT OF IONOSPHERIC DATA



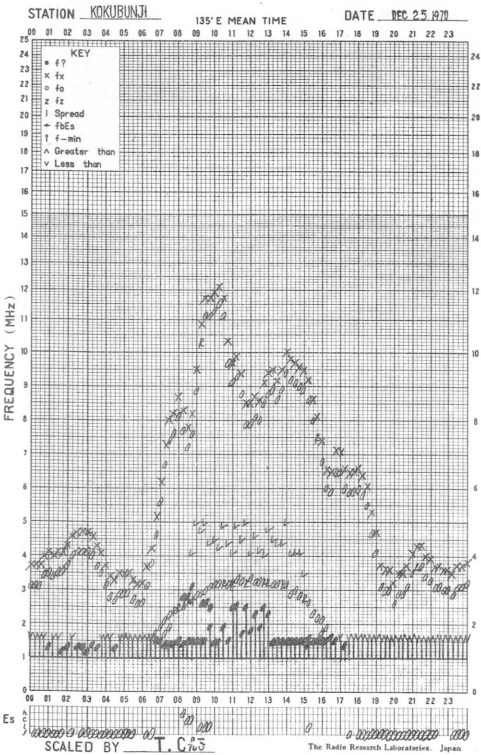
f-plot of IONOSPHERIC DATA



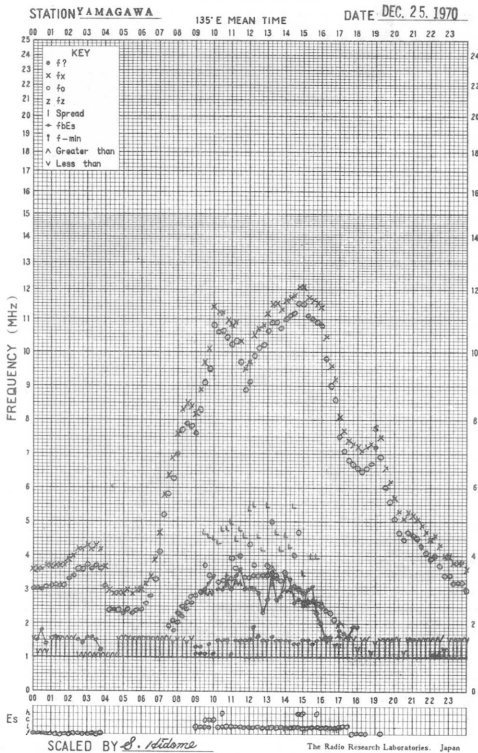
f-plot of IONOSPHERIC DATA



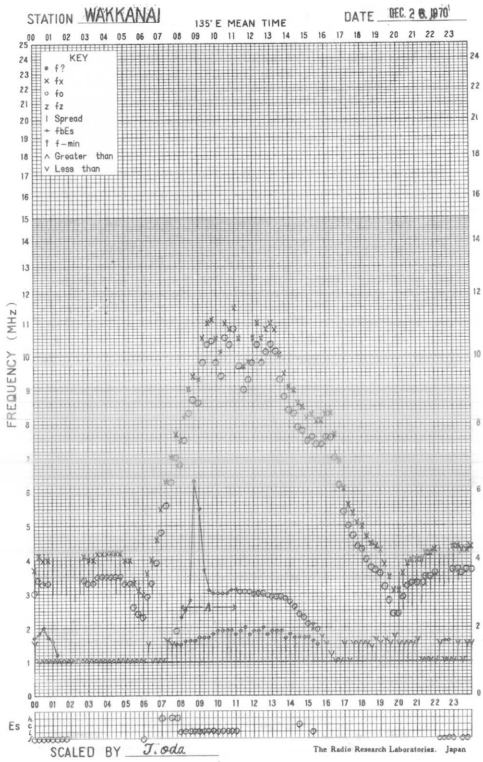
f-plot of IONOSPHERIC DATA



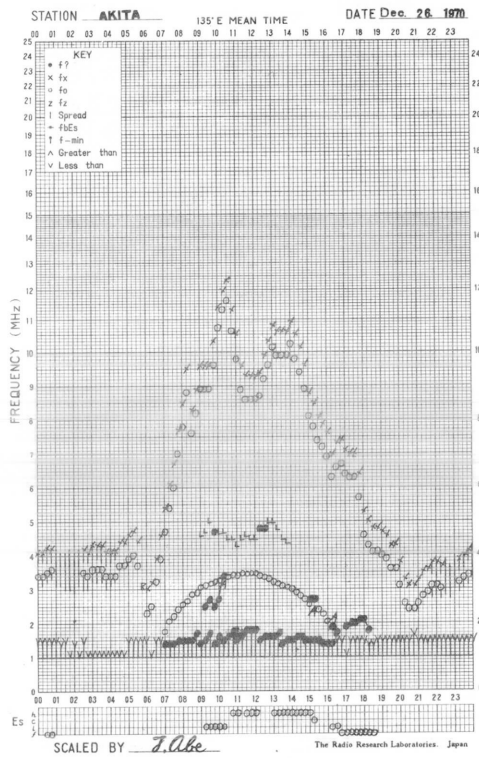
f-plot of IONOSPHERIC DATA



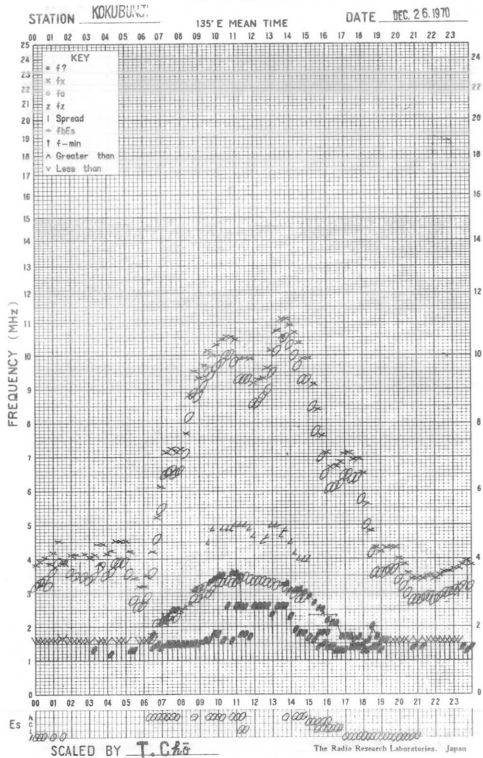
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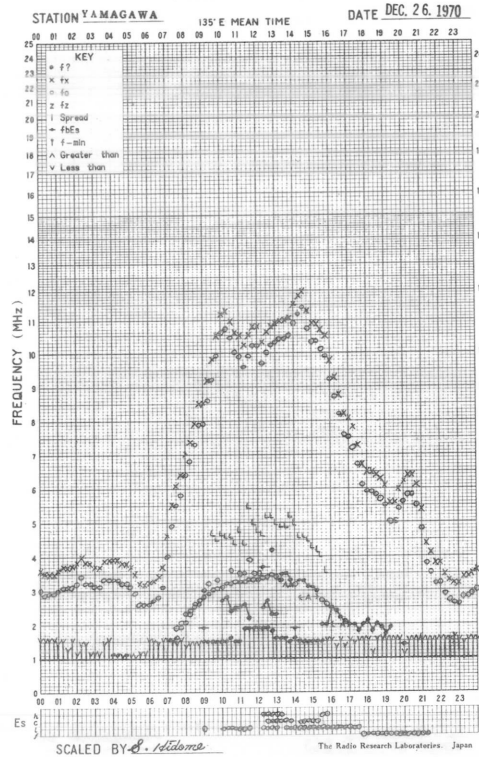
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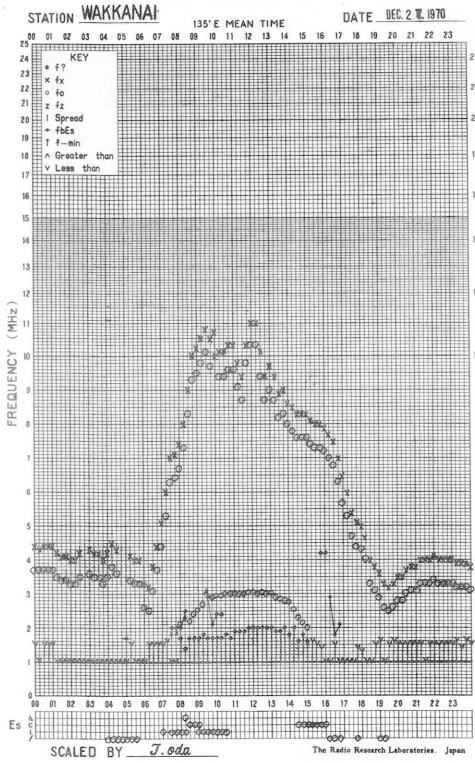
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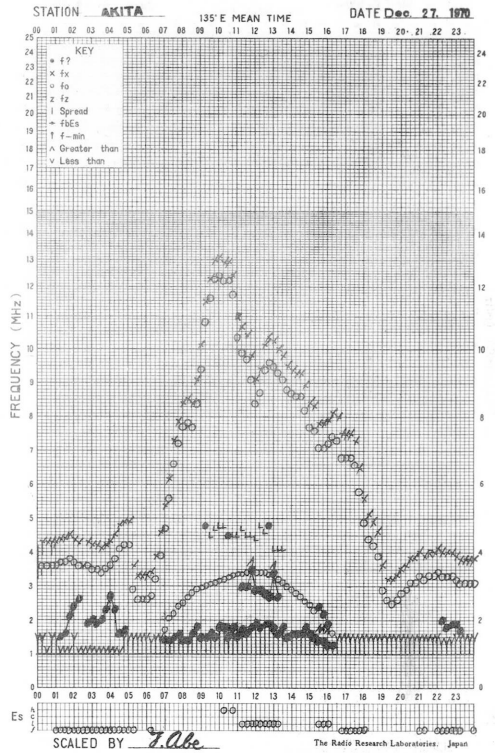
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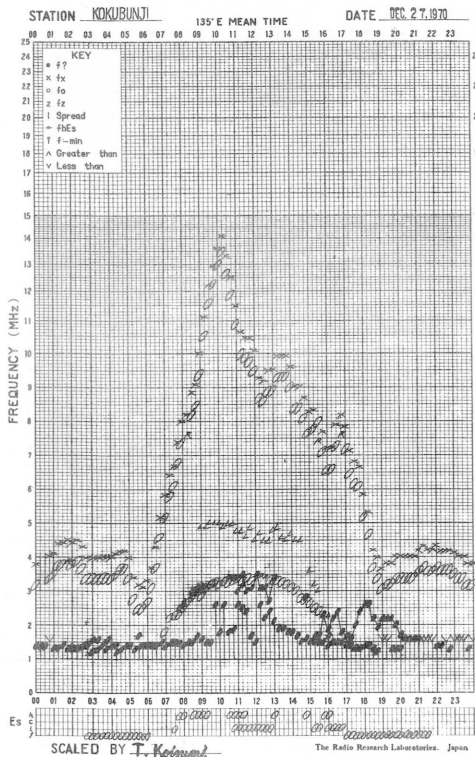
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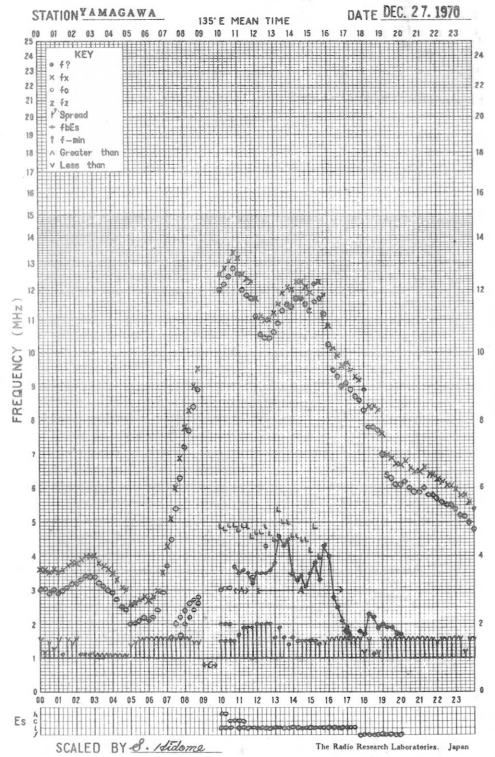
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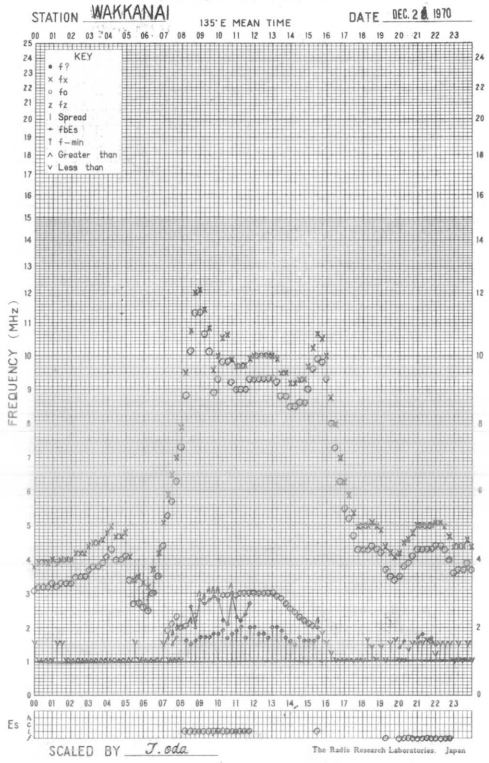
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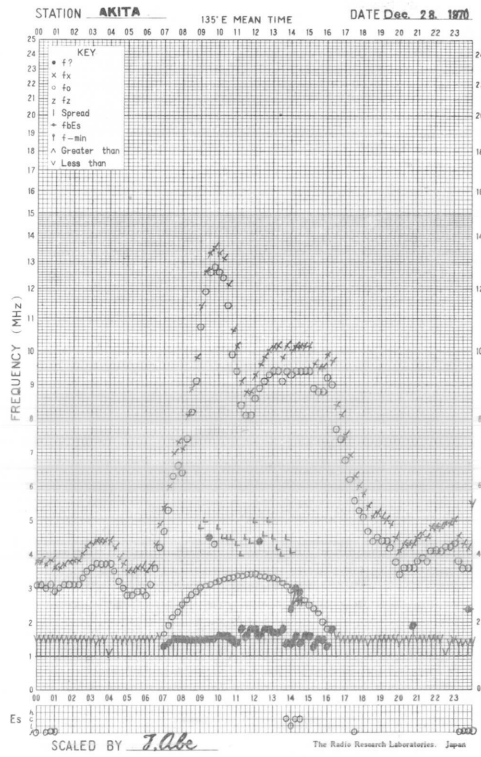
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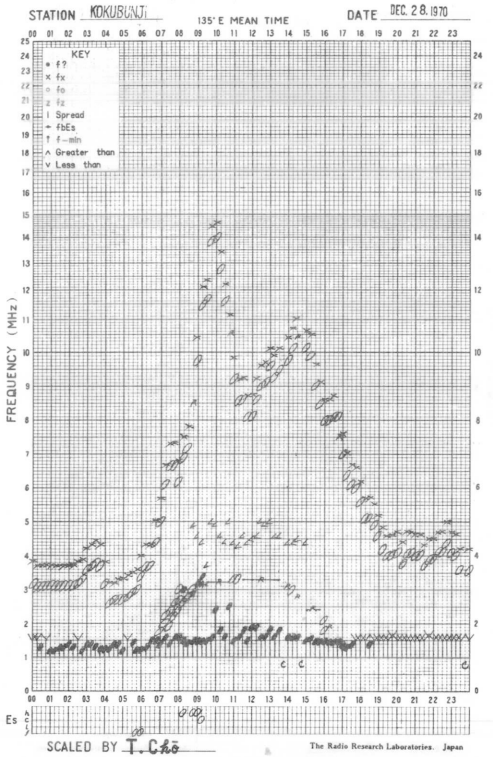
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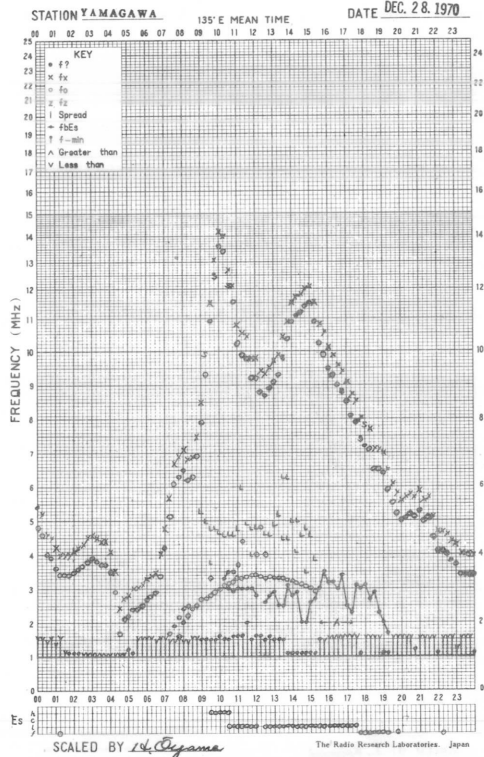
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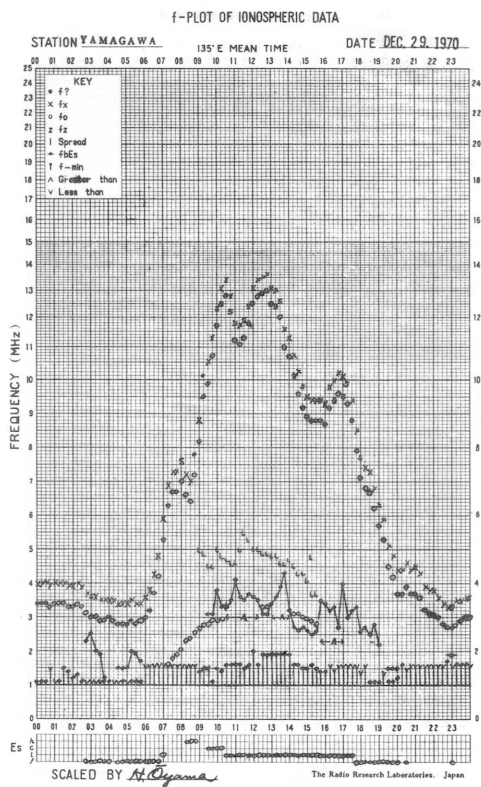
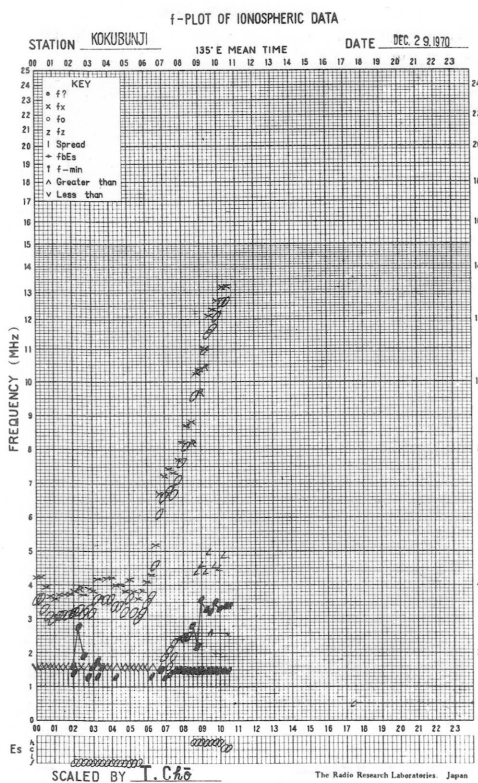
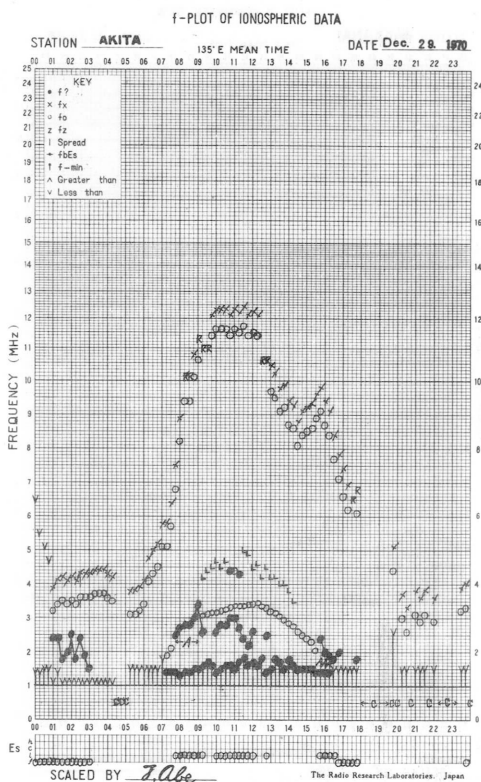
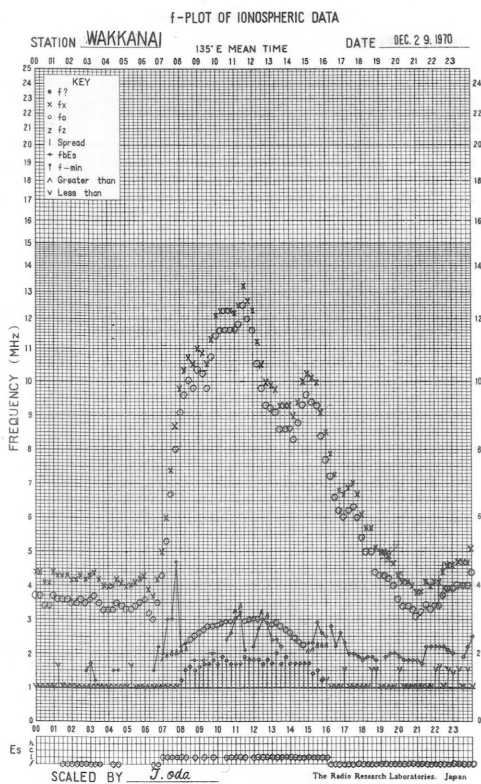


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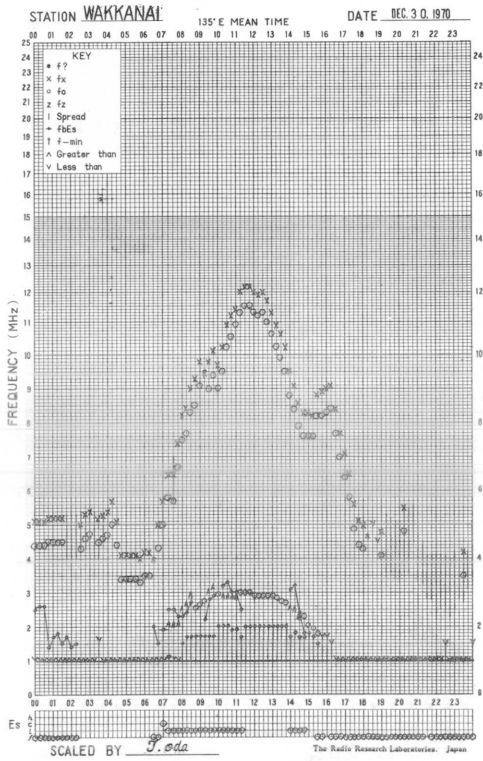


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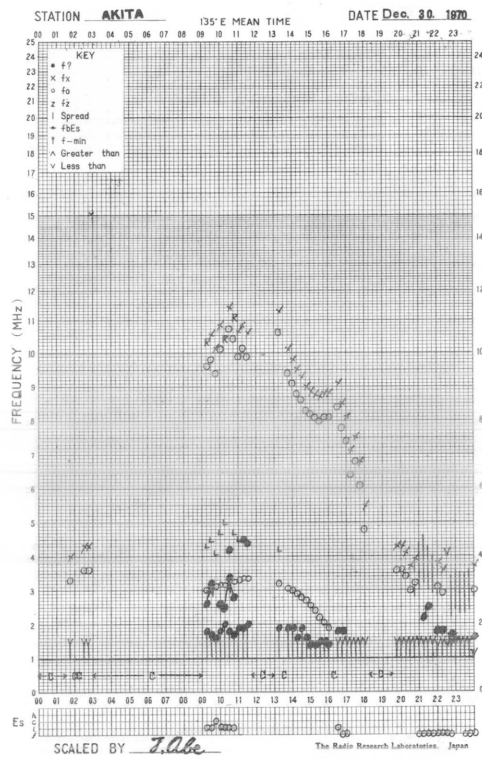




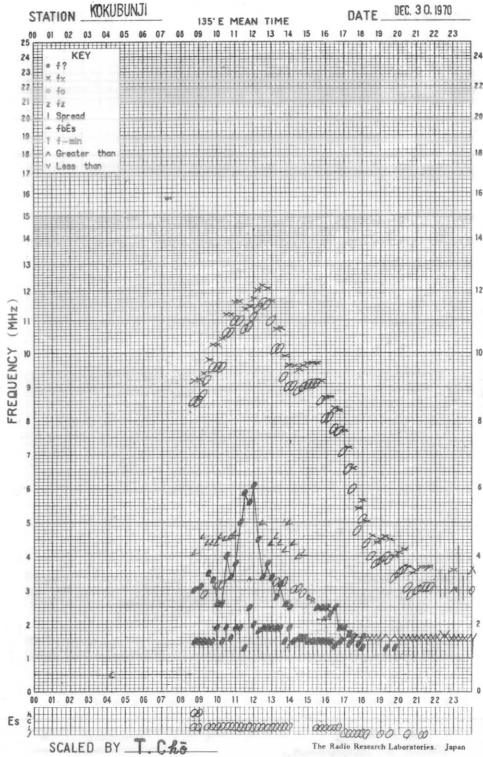
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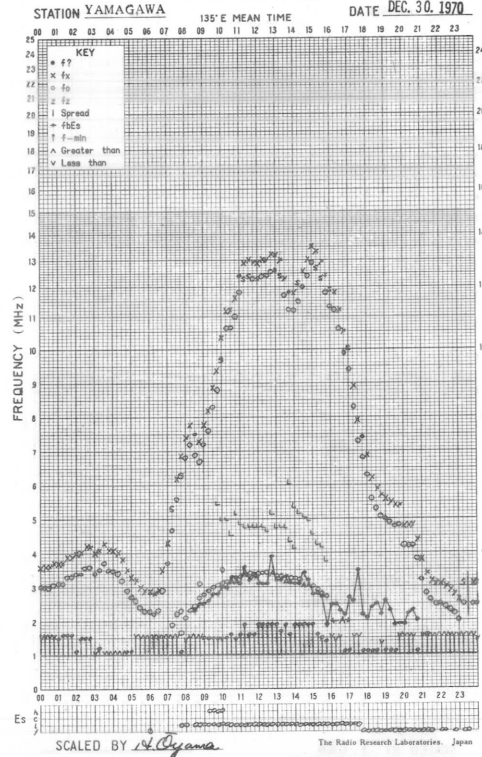
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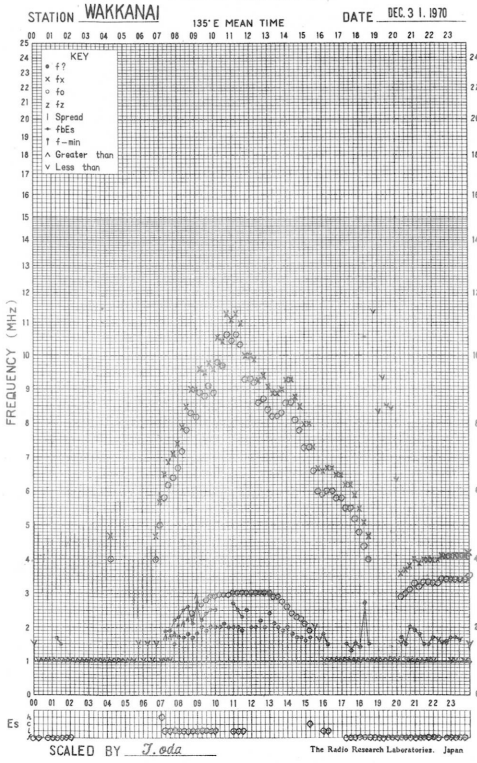
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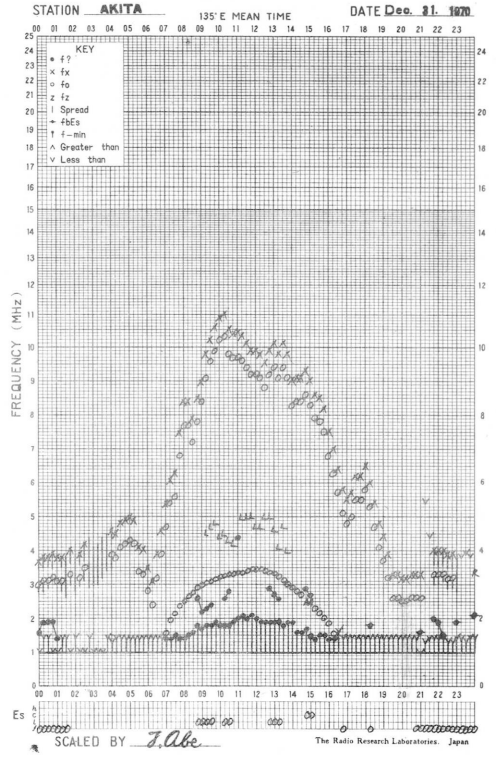
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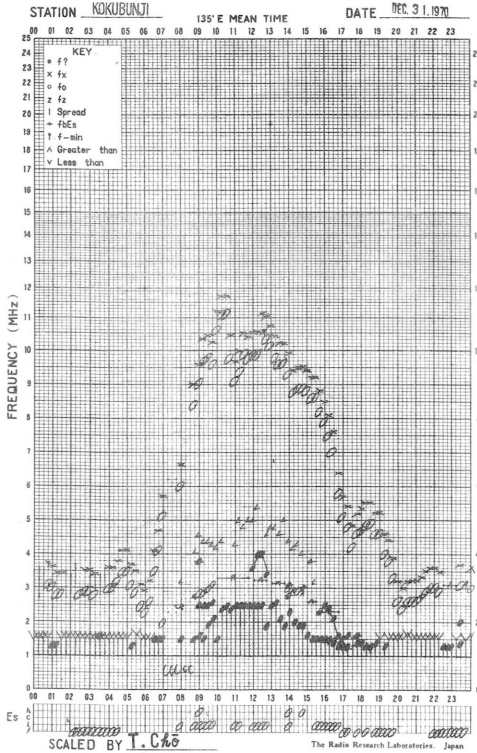
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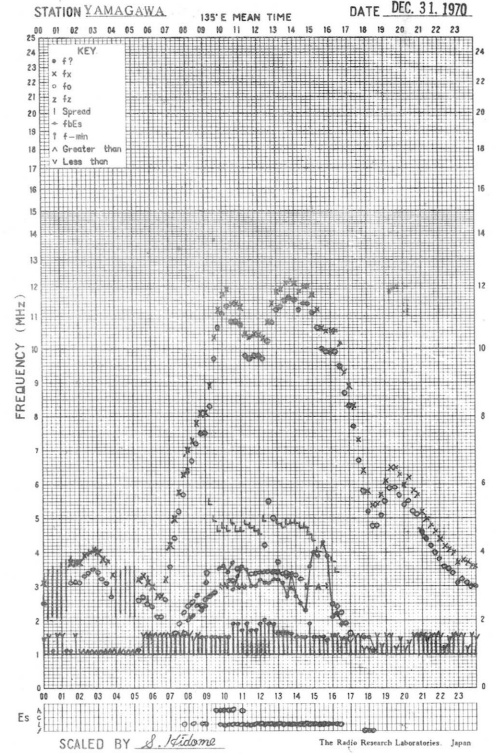
f-PLOT OF IONOSPHERIC DATA



f-PLOT OF IONOSPHERIC DATA



f-PLOT OF IONOSPHERIC DATA



SOLAR RADIO EMISSION

Flux Density and Variability										
Month: December 1970						Frequency: 200 MHz				
Observing station: Hiraiso										
Flux density $10^{-22} W_m^{-2} (Hz)^{-1}$						Variability 0 to 3				
UT	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
Date										
1	11	10	(10)	q	10	1	0	(0)	0	0
2	q	10	(8)	9	10	0	0	(0)	0	0
3	12	10	(8)	10	11	0	1	(0)	0	0
4	9	8	-	8	9	0	0	-	0	0
5	9	6	(7)	9	8	0	0	(0)	0	0
6	9	8	(8)	8	9	0	0	(0)	1	0
7	9	8	(7)	9	8	0	0	(0)	0	0
8	8	9	(10)	10	9	1	0	(1)	0	0
9	8	8	(7)	8	8	0	0	(0)	0	0
10	7	7	(7)	8	7	0	0	(0)	0	0
11	6	7	(8)	13	7	1	0	(0)	1	0
12	16	26	(26)	6	20	1	0	(0)	1	1
13	7	7	(7)	9	7	0	0	(1)	1	1
14	8	9	(8)	7	9	1	0	(0)	0	0
15	9	9	(6)	7	8	0	0	(0)	0	0
16	8	8	(q)	8	8	0	0	(0)	0	0
17	8	9	(8)	8	8	0	0	(1)	1	0
18	9	10	(9)	17	9	0	1	(0)	1	1
19	17	16	(14)	86	16	1	0	(1)	1	1
20	65	57	(65)	-	67	1	0	(0)	-	0
21	27	24	(21)	20	25	0	1	(0)	0	0
22	15	15	(14)	20	16	0	1	(0)	1	0
23	18	22	(12)	9	19	1	1	(0)	0	1
24	10	9	(8)	7	9	0	0	(0)	0	0
25	6	6	(7)	7	6	0	0	(0)	0	0
26	6	6	(7)	7	6	0	0	(0)	0	0
27	7	6	(7)	8	7	0	0	(0)	0	0
28	7	7	(7)	6	7	0	0	(0)	0	0
29	6	7	(7)	7	6	0	0	(0)	0	0
30	6	7	(9)	q	7	0	0	(0)	0	0
31	q	q	(q)	8	q	0	0	(0)	0	0

Note No observations during the following periods:

4th 0535- 0730
20th 2140- 21st 0020

q: quiet level, when radiometer is unstable.

SOLAR RADIO EMISSION

<u>Flux Density</u>					
Month: December 1970					
Observing station: Hiraiso			Frequency: 500 MHz		
Flux density $10^{-22} W_m^{-2} (Hz)^{-1}$					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	31	32	(q)	30	31
2	30	29	(28)	31	29
3	31	32	(31)	33	31
4	31	-	-	29	(32)
5	30	28	(26)	29	28
6	29	28	(28)	29	28
7	30	32	(31)	29	30
8	30	30	(28)	30	29
9	30	30	(30)	31	30
10	31	31	(31)	32	31
11	32	32	(32)	32	32
12	31	30	(29)	31	31
13	32	31	(31)	30	31
14	32	32	(30)	32	31
15	32	32	(32)	-	32
16	29	30	(29)	29	29
17	29	29	(29)	28	29
18	29	29	(29)	32	29
19	31	31	(31)	29	31
20	29	29	(28)	28	29
21	29	28	(28)	29	28
22	29	29	(29)	25	29
23	26	26	(26)	27	26
24	28	28	(28)	25	28
25	27	27	(27)	25	27
26	26	25	(25)	24	25
27	25	25	(24)	23	25
28	24	24	(24)	25	24
29	25	24	(24)	26	25
30	26	26	(26)	-	26
31	26	26	(25)	25	26

Note No observations during the following periods:

4th 0155-	0730	15th 2140-	16th 0020
7th 0330-	0400	30th 2140-	31st 0030
15th 0000-	0020		

q: quiet level, when radiometer is unstable.

<u>Distinctive Events</u>								
(single-frequency observations)								
Month: December 1970								
Observing station: Hiraiso								
Normal observing period: 2140 - 0730 (sunrise to sunset)								
Date	Frequency	Starting time	Time of maximum	Duration	Type	Flux density		Remarks
	MHz	UT	UT	minutes		$10^{-22} W_m^{-2} (Hz)^{-1}$	peak	
3	500	0210.0	0233.0	110	RF	30	10	
		0415.0	0418.2	5.0	C	15	10	
	200	0414.0	0416.0	4.0	C	>1800	>170	
5	200	0146.8	0146.8	1.5	C	560	70	
8	200	0625.5	0625.5	1.0	C	420	200	
11	500	0435.8	0436.2	9.2	C	25	5	
	200	0440.0	0440.0	1.0	C	140	40	
	500	2212.0	2313.5	151	C	210	40	
	200	2209.0	2314.0	146	C	430	30	
12	200	2213.0	2213.5	1.0	C	2000	550	
		2325.0	2325.0	0.5	C	640	220	
	500	2347.5	2348.0	4.5	C	180	30	
	200	2347.5	2347.8	2.5	C	1400	370	
13	500	0136.5	0138.0	9.5	C	50	5	* 0700-01
	200	0137.0	0141.0	8.0	F	570	-	
		0658.0	0659.8	4.0	C	810	90	
14	200	0114.5	0114.5	0.7	C	210	20	
	500	0224.0	0224.4	1.0	C	40	15	
	200	0224.0	0224.0	1.0	C	1100	270	
17	500	0621.0	0621.3	1.0	C	500	100	
	200	0622.0	0622.5	1.0	C	170	20	
18	500	0035.0	0035.5	1.0	C	110	70	
20	500	2234.5	2235.0	1.0	C	370	100	
22	200	0508.0	0509.0	2.5	C	2100	370	
31	500	0244.0	0244.5	2.0	C	660	30	

*: Interrupted by calibration.

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

DEC 1970 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAI SO

UT DAY	00H	01H	02H	03H	04H	05H	06H	07H	08H	09H	10H	11H	12H	13H	14H	15H	16H	17H	18H	19H	20H	21H	22H	23H		
1	16	17	18	-3	-10	ES	ES	ES	-19	ES	-19	-19	ES	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28		
2	12	7	14	1	ES	-15	-16	-10	-15	ES	-20	-24	-12	-22	-28	-28	-28	-28	-28	-28	-28	-19	14	17	16	
3	17	21	17	ES	-4	ES	-16	-13	-10	-13	ES	-25	-14	-28	-28	-28	-28	-28	-28	-28	-28	-22	13	17	20	
4	23	22	22	14	ES	ES	-12	-19	-15	-12	-28	ES	-25	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28		
5	21	24	25	19	-3	-13	ES	ES	-4	-12	ES	ES	-28	-28	-28	-28	-28	-28	-28	-28	-28	-19	14	22	24	
6	20	27	24	ES	ES	ES	-13	ES	-13	-15	-12	ES	-25	-25	-19	-28	-28	-28	-28	-28	-19	-14	18	20	22	
7	21	8	16	3	-8	-8	-10	-9	-11	-9	-13	ES	ES	ES	-25	-17	ES	-28	-28	-28	-28	-3	17	20	19	
8	19	21	26	2	-14	-7	ES	ES	ES	ES	-19	-28	-28	-14	-28	-28	-28	-28	-28	-28	-28	-28	13	16	18	
9	18	22	25	18	-8	-14	-11	-14	-17	-18	-12	-20	-28	-28	-28	-28	-28	-28	-28	-28	-13	-25	14	20	17	
10	18	21	18	16	-9	-5	ES	3	ES	-18	ES	ES	-14	-14	-16	-28	-28	-28	-28	-28	-28	-28	9	21	19	
11	16	23	17	8	-18	ES	-25	-25	-13	-15	ES	ES	-13	-28	-28	-28	-28	-28	-28	-28	-28	-17	3	10	ES	
12	0	8	11	-6	-13	-12	-12	-13	-19	-13	-11	-7	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	3	8	5	
13	2	6	7	-17	-13	-18	-15	-19	-15	-14	-28	-10	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-3	8	1	
14	-3	2	7	-10	-15	-21	-4	ES	-3	-9	-13	ES	-4	-28	-28	-17	-19	-28	-28	-28	-28	-28	-8	-4	-7	
15	-3	-1	2	ES	-21	-23	-20	-10	-20	-20	-28	ES	-15	-28	-28	-28	-28	-28	-28	-28	-28	-28	-19	2	-4	
16	ES	1	7	ES	-11	-15	-14	-19	-25	-11	-25	ES	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-12	3	-1	
17	-2	2	14	-8	-25	-19	-11	-25	-8	-19	-13	-12	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	2	6	5	
18	2	6	12	-14	-14	-14	-19	-19	ES	ES	-11	-20	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	4	12	7	
19	6	2	18	ES	-19	-19	-13	-11	ES	-19	-18	ES	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	7	16	7	
20	3	8	4	-15	-25	-19	-19	-19	-20	-25	-19	-25	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	1	13	7	
21	1	2	-1	-15	-19	-19	-14	-7	-11	-17	-28	-22	-18	-11	-28	-28	-28	-28	-28	-28	-28	-28	5	3	9	
22	2	7	4	6	-8	-19	-11	-12	-13	-11	-22	ES	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-3	-1	7	2
23	2	2	-1	-12	-25	-22	-19	-15	-19	ES	-4	-28	ES	-11	-34	-34	-34	-34	-34	-34	-34	-34	-1	3	3	
24	6	2	13	-25	-25	ES	ES	-19	ES	-14	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	2	4	-6	4	2	
25	7	11	11	-19	-25	-15	-28	-19	C	ES	-19	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-1	10	6	
26	9	11	13	-4	-8	-13	-19	-25	-19	-13	-28	-13	-28	-28	-28	-28	-28	-28	-28	-28	4	-28	6	7	8	
27	12	10	14	-16	-14	-13	-12	-10	-16	-16	-25	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	3	7	8	
28	9	11	4	-3	-10	ES	ES	-19	-17	-13	-13	ES	-7	-21	-28	-28	-28	-28	-28	-28	-12	-28	-28	5	9	12
29	7	11	3	-12	-18	-22	-28	-16	ES	ES	-12	-28	-28	-28	-28	-28	-28	-28	-28	-28	-19	-25	-28	6	9	15
30	9	2	-11	-19	-19	-10	-18	-12	-11	-25	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	1	7	8	
31	12	14	11	ES	-11	-16	-11	-7	-13	-13	-25	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	1	2	2	
CNT	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	9	8	13	ES	-13	ES	-14	-13	-13	-13	-13	-20	-13	-28	-28	-28	-28	-28	-28	-28	-28	-28	4	9	8	
UD	21	23	25	16	ES	ES	-4	ES	ES	-4	ES	ES	ES	-2	-12	-14	-19	-28	-28	-28	-19	-13	-13	14	21	21
LD	-3	2	-1	-19	-25	-23	-25	-25	-20	-20	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-8	2	ES	

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

DEC 1970	FREQUENCY 15 MHZ																			BANDWIDTH 80 HZ				RECEIVING ANTENNA ROD 4.5 M												MEASURED AT HIRAI SO			
UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M															
1	11	7	11	22	22	17	20	22	0	-7	-8	ES -9	-19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	6	12	8	8													
2	0	2	12	17	22	18	6	26	-3	-4	-9	ES 9	-12	-22	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	9	12	6	6														
3	7	9	14	16	22	18	14	29	4	-6	-2	ES 8	3	-21	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	13	7	7	1														
4	13	11	18	16	27	20	16	14	ES 3	9	-4	ES -1	-12	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	2	16	7	11														
5	7	12	11	24	25	22	11	21	7	-7	ES 3	ES 3	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-10	-13	6	8	12	7													
6	2	9	17	20	24	22	24	14	ES 7	ES 2	ES 7	ES 3	-7	-13	-16	ES 28	ES 28	-15	-16	-16	9	11	5	11															
7	2	6	14	20	25	20	8	26	-2	-2	-6	ES 11	-11	-11	ES 28	ES 28	ES 28	-4	ES 28	4	11	17	16	9															
8	9	13	18	20	20	31	26	21	ES 2	ES 4	ES 8	ES 7	ES 4	-8	ES 28	ES 28	ES 28	-19	ES 28	ES 28	1	8	6	2															
9	7	10	18	18	24	26	26	28	23	8	ES 3	ES 9	-9	-13	-20	ES 28	ES 28	ES 28	ES 28	ES 28	4	8	7	11															
10	6	11	15	19	22	22	24	16	10	ES 3	ES 3	ES 1	-11	ES 28	ES 28	ES 28	ES 28	-19	ES 28	ES 28	-5	13	8	10															
11	4	5	7	12	14	12	15	10	12	-8	ES 9	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-8	2	ES 28	ES 2															
12	-6	-3	3	8	15	6	11	13	7	2	-8	ES 11	-13	-16	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-3	0	-3	-2															
13	-8	-19	2	9	10	0	9	-1	7	-1	ES 7	ES 14	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-6	1	-2	-1															
14	-4	-2	3	13	18	21	15	21	14	16	16	7	5	1	-4	-19	ES 28	-9	-13	ES 28	-3	6	0	7															
15	-3	-1	6	13	12	17	16	15	7	0	6	ES 10	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	3	6	0	1															
16	2	6	6	16	20	12	10	9	12	7	ES 10	ES 18	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	6	3	5	1															
17	2	-1	7	13	19	15	-1	0	20	ES 6	ES 3	ES 3	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-1	4	1	2															
18	3	3	10	12	16	13	14	16	5	ES 2	ES 4	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	5	11	-3	4															
19	-1	1	11	9	20	18	11	6	15	ES 10	ES 9	ES 3	ES 3	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	2	1	-1	0															
20	0	1	7	16	20	18	11	14	11	11	ES 3	ES 20	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-19	1	5	2	6														
21	1	2	10	19	20	7	8	15	7	-13	-22	ES 14	ES 13	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-1	4	3	-1															
22	2	5	13	18	16	17	20	21	5	ES 11	-19	ES 17	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-4	6	-1	2															
23	-2	4	12	8	9	14	19	18	2	ES 10	ES 28	ES 4	ES 34	ES 34	ES 34	ES 34	ES 34	ES 34	ES 34	ES 34	-2	6	-1	0															
24	2	0	6	11	18	19	20	2	ES 4	-11	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-3	2	-2	-2															
25	-2	0	6	9	11	12	2	17	5	ES 13	-19	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	2	-1	7	1															
26	-2	3	7	16	18	19	19	20	ES 6	ES 22	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	2	11	5	5															
27	0	4	11	14	13	11	18	0	ES 4	ES 10	ES 14	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	3	6	6	2															
28	7	7	11	13	16	22	18	19	ES 2	ES 8	-19	ES 21	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-3	16	12	6															
29	4	7	14	11	16	5	20	6	ES 1	ES 2	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	4	9	12	7															
30	10	7	12	15	17	22	17	7	ES 2	ES 3	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-7	6	10	1															
31	3	7	7	11	11	16	0	-11	ES 3	ES 8	ES 7	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	5	8	7	5															
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31														
MED	2	5	11	15	18	18	15	15	US 9	ES 7	ES 8	ES 14	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	2	6	5	2															
UD	10	11	18	20	25	22	24	26	15	9	-2	ES 1	ES 3	-11	-20	ES 28	ES 28	-15	-16	-16	9	16	12	11															
LD	-4	-2	3	9	11	6	2	0	ES 2	ES 3	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	ES 28	-6	1	-3	-2															

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Dec. 1970	Whole Day Index													Warning				Principal magnetic storms		
		W W V				L M				W W V H				00	06	12	18	Start	End	H
		00	06	12	18	00	06	12	18	06	12	18	24	06	12	18	24			
1	4+	(5)	-	-	5	3	4	-	(4)	4	4	(4)	4	N	N	N	N			
2	4+	(4)	-	-	5	4	4	-	5	4	4	(4)	4	N	N	N	N			
3	4+	(5)	-	-	5	3	4	-	4	4	4	(5)	4	N	N	N	N			
4	5-	(5)	-	-	5	5	4	-	4	5	4	(4)	4	N	N	N	N			
5	5-	(5)	-	-	5	4	4	-	-	5	4	(4)	5	N	N	N	N			
6	4+	(5)	-	-	5	3	-	-	-	4	(5)	(5)	5	N	N	N	N			
7*	5-	(5)	-	-	5	5	4	-	5	4	4	(5)	5	N	N	N	N	19.0	---	84 ^Y
8*	4+	5	-	-	5	4	4	-	4	5	(5)	(5)	4	N	N	N	N	---	16xx	
9'	5-	(5)	-	-	5	4	4	-	5	4	5	(5)	4	N	N	N	N			
10	4+	5	-	-	5	4	4	-	4	5	(5)	(5)	4	N	N	N	N			
11	4+	(5)	-	-	5	4	4	-	3	4	4	(4)	(3)	N	N	N	N			
12	4-	(4)	-	-	4	3	4	-	-	3	4	(4)	4	N	N	N	N			
13	4°	(4)	-	-	4	4	-	-	-	3	4	(4)	4	N	N	N	N			
14*	4+	(4)	-	-	3	5	5	-	4	4	5	(5)	4	N	U	W	W	01.54	---	258 ^Y
[15*]	4°	(4)	-	-	(3)	5	4	-	4	4	4	4	4	U	U	U	U	---	19xx	
[16]	4-	(3)	-	-	4	4	4	-	4	4	4	4	4	N	N	N	N			
[17]	4°	(4)	-	-	4	4	4	-	4	4	(4)	(4)	4	N	N	N	N			
18	4-	(3)	-	-	4	4	4	-	4	4	(4)	(4)	4	N	N	N	N	21.43	---	71 ^Y
19	4°	(4)	-	-	4	4	4	-	-	4	(4)	(4)	4	N	N	N	N	---	---	
20	4-	(4)	-	-	4	3	-	-	-	4	4	4	4	N	N	N	N	---	16xx	
21	4-	(3)	-	-	4	4	4	-	4	4	3	4	4	N	N	N	N			
22	4-	(4)	-	-	4	4	4	-	3	4	4	4	4	N	N	N	N			
23	4-	(3)	-	-	4	4	4	-	3	4	(4)	(4)	4	N	N	N	N			
24	4-	(4)	-	-	4	4	4	-	3	4	(3)	(4)	4	N	N	N	N			
25	4-	(3)	-	-	4	4	4	-	3	3	(3)	(4)	4	N	N	N	N			
26	4-	3	-	-	4	4	4	-	-	4	(3)	(4)	4	N	N	N	N			
27	4-	(3)	-	-	4	4	-	-	-	4	(3)	(4)	4	N	N	N	N			
28	4+	(5)	-	-	4	4	4	-	4	4	(4)	(4)	4	N	N	N	N			
29	4-	(3)	-	-	4	5	4	-	3	4	(3)	(4)	4	N	N	N	N			
30	4-	(4)	-	-	4	4	4	-	3	4	(3)	(4)	4	N	N	N	N			
31	3+	(3)	-	-	4	3	3	-	4	4	(3)	(4)	4	N	N	N	N			

GEOALERT

- " = PROTON FLARE
- * = MAGSTORM
- ° = MAGCALME
- ' = COSMIC EVENT

- [] = Regular World Day
- = impossible to evaluate
- () = inaccurate

- C = artificial accident
- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES

(S.I.D.)

HIRAISO

Time in U.T.

Dec. 1970	Drop-out Intensities (db)					S W F		Correspondence				
	CO	LM	HA	TO	SH	Start-time	Dura-tion	Type	Imp.	Flare	Solar Noise	Mag.
8	x		x			04.27	43	S	2+	x	x	x
	x'		x'									
	20''											
12		17				23.49	23	S	1+		x	

I N U B O

1970	S P A							Remarks
Dec.	Phase Advance (degrees)				Time (U.T.)			
DATE	GBR	WWVL	NAA	NWC	Start	End	Maximum	
1			5	<u>32</u>	0456	0542	0503	
3			6	<u>24</u>	0416	0501	0425	
5		<u>42</u>		8	0112	0130	0117	
5	—		13	<u>16</u>	0252	0320	0258	X
5			10		0420	0448	0424	
5				8	0511	0544	0525	
7			19	—	0200	0238	0206	X
8		<u>47</u>	26*	72	0311	0358	0332	X
8	<u>97</u>	72	77	153	0427	0534	0430	X
8				24	0625	0710	0636	X
8			26	<u>28</u>	2246	2335	2257	X
9				8	0143	0203	0146	
9				16	0344	0433	0353	X
9			10		0439	0506	0443	
9			37		0532	0632	0547	
9				24	0800	0828	0805	
9			15	<u>52</u>	2354	0043	0007	
10				16	0419	0513	0440	
11			9	<u>22</u>	0211	0252	0216	
11	25			<u>60</u>	0437	0557	0442	X
12	25			<u>72</u>	0902	0943	0907	
12		19		<u>16</u>	2304	2333	2313	X
12	23	54	<u>42</u>	128	2347	0049	0000	
13			<u>10</u>	64	0049	0111	0057	X
13			<u>21</u>	86	0141	0230	0149	

1970	S P A							Remarks
Dec.	Phase Advance (degrees)				Time (U.T.)			
DATE	GBR	WWVL	NAA	NWC	Start	End	Maximum	
18			6	<u>40</u>	0114	0158	0120	X
18			13		0418	0436	0426	
21			6	<u>12</u>	2322	2338	2327	
25				4	2309	2322	2312	
26				32	0316	0414	0318	
26				28	0839	0920	0843	
27			6	<u>16</u>	0320	0420	0332	
31				8	0243	0304	0245	

NOTES (1) : The letter E or D attached to a time shows that the pertinent time is earlier or more delayed than the given time, respectively.

(2) : The mark * Shows a multi-peak event.

(3) : The mark ** shows a time on the day before the pertinent day.

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