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ANNUAL REPORT

OF THE

METEOROLOGICAL

AND THE

SEISMOLOGICAL OBSERVATIONS

MADE AT THE

INTERNATIONAL LATITUDE OBSERVATORY

OF MIZUSAWA

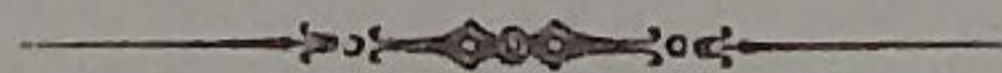
FOR

THE YEAR 1910.

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LATITUDE 39° 8' N., LONGITUDE 141° 7' E.,

HEIGHT ABOVE MEAN SEA LEVEL 63 METRES.



PUBLISHED BY THE INTERNATIONAL LATITUDE OBSERVATORY

OF MIZUSAWA.

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1911.

The present report contains the results of the meteorological and the seismological observations in the observatory during the year 1910. No alteration is done in the kinds and the methods of observations. The observations and the computations were done by Messrs. T. Ito and T. Oyama under the superintendence of Dr. M. Hashimoto.

The following are to be generally noticed with respect to the meteorological observations:

*Hours of observations.*—The *Japanese Central Standard Time* (mean time of the meridian 9<sup>h</sup> east from Greenwich) is adopted.

*Air Pressure.*—The barometric readings in millimetres are reduced only to freezing point of water; the corrections to sea level and to standard gravity are given at the bottoms of the respective pages.

*Air and Earth Temperatures.*—The degrees are given in Centigrades.

*Wind.*—The velocity is expressed in metres per second. The direction is observed according to the sixteen cardinal points.

*Cloud.*—The amount is estimated by the scale 0-10, the forms are of the International classification, and the direction of motion is observed according to the eight cardinal points.

*Tension of Water Vapour.*—It is given in millimetres.

*Relative Humidity.*—It is given in percentages.

*Precipitation.*—The amount is given in millimetres. The number of days is counted only when the amount is 0.1 mm. or more in a day; but for those days with either snow, hail, or graupel, the amount is not taken into consideration.

*Clear and Cloudy Days.*—The mean amount of cloud is less than 2 exclusive for the former, and more than 8 inclusive for the latter.

*Duration of Sunshine.*—It is recorded by a sunshine-recorder of *Jordan's* pattern.

*Amount of Ozone.*—It is observed by means of *Sedan's* ozonometer, and is given in scale of 0-10.

*Amount of Evaporation.*—It is given in millimetres, the daily amount being, according to the instruction of the Central Meteorological Observatory in Tokio, that which results from 10<sup>h</sup> a. m. of the preceding day till 10<sup>h</sup> a. m. of the day in question.

The occurrence of meteorological phenomena is recorded with the following international symbols:

●	Rain	~	Glazed frost	C	Cirrus
*	Snow	+→	Snow drift	CS	Cirro-stratus
⚡	Thunder storm	←	Ice crystals	CK	Cirro-cumulus
⊥	Thunder without lightning	⊕	Solar corona	KC	Cumulo-cirrus
<	Lightning without thunder	○	Solar halo	SC	Strato-cirrus
△	Graupel	☾	Lunar corona	SK	Strato-cumulus
▲	Hail	☽	Lunar halo	N	Nimbus
≡	Mist, fog	☙	Gales	K	Cumulus
┌	Hoar frost	☺	Rainbow	KN	Cumulo-nimbus
⌒	Dew	☾	Aurora	S	Stratus
∇	Silver thaw	∞	Dust haze		

The *descriptions* of the *meteorological instruments* are found in the annual reports for the years 1902, 1904, and 1905.

Early in this year, a selfregistrering rain gange, made by Kyôikuhin seizô Gwaisha, was prepared; the height of its receiver above ground is 1.9m.

The *seismological instruments* in use are two *Omori's horizontal pendulums*, of the same type as that described in p. 8 of No. 5, "Publication of the Earthquake Investigation Committee in Foreign Language," one serving to register the NS component, and the other the EW component, of seismological movements.

The *instrumental constants* are as follows:

	NS Component Apparatus	EW Component Apparatus
Period of free oscillation	30 seconds	27 seconds
Multiplication of the pointer	9 times	20 times
Weight of the heavy cylinder	6.5 kilograms	15.0 kilograms
Length of the horizontal strut	79 centimetres	40 centimetres
Vertical distance between the points of support and of suspension	109 centimetres	87 centimetres

The *time* adopted in the seismological observations is the Japanese Central Standard Time reckoned from midnight.

April, 1911.

H. Kimura, *Rigakuhakushi*  
Director of the International Latitude Observatory  
of Mizusawa.

NUMBER OF DAYS WITH.

Month	●*	*	△	▲	⊖	≡ <sup>2</sup>	Clear	Cloudy	/	┌	Min. Temp.	Mean Temp.	Max. Temp.	Min. Temp.	Mean Temp.	Max. Temp.
	△△					<0°					<0.	<0°	>25°	>25°	>25°	
January	16	14	—	—	—	—	—	16	11	8	30	20	2	—	—	—
February	24	24	1	—	—	—	—	17	12	2	28	27	11	—	—	—
March	21	19	2	—	—	—	—	13	14	9	28	19	—	—	—	—
April	12	2	—	—	—	1	7	12	18	10	10	2	—	—	—	—
May	15	—	—	—	2	4	1	16	17	1	2	—	—	—	—	2
June	16	—	—	—	—	1	1	17	3	—	—	—	—	—	—	10
July	17	—	—	—	1	1	2	21	2	—	—	—	—	2	—	17
August	20	—	—	—	5	—	1	23	—	—	—	—	—	3	—	24
September	16	—	—	—	2	1	1	22	1	—	—	—	—	—	—	6
October	14	—	—	—	1	2	3	16	3	2	—	—	—	—	—	—
November	16	6	2	—	1	4	4	9	13	9	12	1	—	—	—	—
December	16	23	3	—	—	—	1	6	12	9	31	25	4	—	—	—
Annual	203	88	8	—	12	14	22	188	106	50	141	94	17	—	5	59

GENERAL REMARKS.

	First Day (last year)	Last Day (this year)	First Day (this year)
Min. Air Temp. below 0°:	Oct. 31	May 5	Nov. 5
Mean Air Temp. below 0°:	Dec. 5	Apr. 2	Nov. 28
Max. Air Temp. above 30°:		Aug. 29	July 21
Mean Air Temp. above 25°:		Aug. 29	July 21
Max. Air Temp. below 0°:	Dec. 9	Feb. 28	Dec. 9
Max. Air Temp. above 25°:		Sept. 18	May 7
Hoar Frost:	Oct. 20	May 1	Oct. 27
Snow:	Nov. 5	Apr. 2	Nov. 17
Snow on Ground:		Mar. 20	Jan. 16

Max. Continuance of Days with Min. Temp. below 0° is 76 Days: from Jan. 10 to Mar. 26.  
 Max. Continuance of Days with Mean Temp. below 0° is 28 Days: from Jan. 29 to Feb. 25.  
 Max. Continuance of Days with Max. Temp. above 30° is 2 Days: from July 22 to July 23.  
 Max. Continuance of Days with Precipitation is 14 Days: from Aug. 3 to Aug. 16.  
 Max. Continuance of Days without Precipitation is 9 Days: from Apr. 15 to Apr. 23.  
 Continuance of More than 5 Days with Precipitation are:

- |                                 |                                  |
|---------------------------------|----------------------------------|
| 5 Days: from Jan. 1 to Jan. 5   | 5 Days: from June 16 to June 20  |
| 9 Days: from Jan. 30 to Feb. 7  | 9 Days: from July 7 to July 15   |
| 7 Days: from Feb. 9 to Feb. 15  | 14 Days: from Aug. 3 to Aug. 16  |
| 7 Days: from Feb. 17 to Feb. 23 | 13 Days: from Aug. 27 to Sept. 8 |
| 10 Days: from Feb. 26 to Mar. 7 | 7 Days: from Oct. 8 to Oct. 14   |
| 5 Days: from Mar. 13 to Mar. 17 | 12 Days: from Nov. 10 to Nov. 21 |
| 6 Days: from Mar. 19 to Mar. 24 | 6 Days: from Nov. 24 to Nov. 29  |
| 7 Days: from Mar. 27 to Apr. 7  | 5 Days: from Dec. 1 to Dec. 5    |
| 10 Days: from May 11 to May 20  | 6 Days: from Dec. 20 to Dec. 25  |
| 11 Days: from June 1 to June 11 |                                  |

SEISMOLOGICAL OBSERVATIONS.

## TABLE A.

(Earthquakes)

No.	Date 1910	Time of Occurrence †				Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks	
		(NS)		(EW)			(NS)	(EW)				
		h	m	s	m	s	m	mm	mm			
1	January	4	21	04.2	04.2		3.4	0.08	0.05	Slow	Feeble	
2		6	21	—	40.4		3.6	—	0.02	"	"	
3		7	2	58	58	31	6.2	0.09	0.09	Quick	"	
4		7	5	—	00	09	12.0	—	0.05	Slow	"	
5		8	23	53.4	53.2		26.3	0.02	0.02	Quick	"	
6		16	3	16	16	25	7.4	0.18	0.17	"	"	Felt
7		19	17	45.7	45.5		3.2	0.09	0.08	Slow	"	
8		22	8	25.8	25.6		7.8	0.21	0.27	"	"	
9		27	5	07.0	07.0		4.2	0.09	0.05	"	"	
10		27	18	46	46	38	4.2	0.07	0.04	"	"	
11		28	21	35	35	34	5.1	0.09	0.08	Quick	"	
12		30	1	16.8	16.7		2.7	0.03	0.04	"	"	
13	February	2	19	55	55	13	23.8	0.20	0.86	Slow	"	
14		3	2	—	35	42	6.7	—	0.02	"	"	
15		4	2	37.3	37.8		5.9?	0.07	0.09	Quick	"	Felt
16		5	5	19	19	48	8.0	0.12	0.07	Slow	"	
17		5	19	20	20	48	4.7	0.04	0.04	"	"	
18		6	21	35	35	26	2.7	0.03	0.03	Quick	"	Felt
19		8	8	27	27	46	3.1	0.02	0.02	Slow	"	
20		13	3	11	11	48	8.6	2.44	1.46	Quick	"	Felt
21		25	23	—	11	14	3.2	—	0.02	Slow	"	
22	March	17	12	03	03	52	9.2	0.26	0.15	"	"	
23		21	16	19	19	40	5.3	0.05	0.10	"	"	
24		31	2	—	6	43	60.0	—	0.06	"	"	
25	April	5	16	47	47	48	6.3	0.04	0.06	"	"	
26		12	9	26	26	42	50.7	2.80	2.76	Quick	"	Felt
27		13	22	20	20	37	2.8	0.02	0.02	"	"	
28		14	15	22	22	04	4.0	0.44	0.44	"	"	Felt
29		19	23	52	52	20	4.3	0.03	0.03	"	"	
30		26	6	43	43	23	6.8	0.56	0.62	"	"	Felt
31	May	4	15	13	—	07	5.7?	0.37	—	"	"	
32		5	0	21	—	32	12.0	0.24	—	"	"	
33		9	18	48	49	59	22.2	0.14	0.15	Slow	"	
34		9	23	—	46.0		4.2	—	0.02	"	"	
35		10	0	48	48	13	12.8	0.22	0.24	"	"	
36		10	7	38	39	59	7.3	0.04	0.04	"	"	
37		10	11	—	30	39	3.8	—	0.01	"	"	
38		10	12	—	15	52	3.8	—	0.01	"	"	
39		10	18	35	35	43	21.5	0.18	0.30	"	"	
40		10	22	56	56	49	26.3	0.47	1.19	"	"	
41		11	3	—	10	51	6.7	—	0.01	"	"	
42		11	4	—	20	44	4.8	—	0.01	"	"	
43		11	5	—	01	16	3.7	—	0.01	"	"	
44		11	8	—	01	28	7.0	—	0.04	"	"	
45		11	9	05	05	57	3.6	0.02	0.02	"	"	
46		11	18	37	37	23	2.8	0.02	0.02	"	"	
47		12	12	22	22	53	11.5	0.48	0.35	"	"	
48		12	14	51	50	30	4.2	0.02	0.01	"	"	
49		16	13	—	52	51	5.0	—	0.02	"	"	
50		22	15	25	25	59	66.3	5.34	4.61	Quick	"	Felt
51		23	13	45	45	00	13.1	0.07	0.03	Slow	"	
52		24	3	49	49	29	105.0	0.03	0.02	"	"	
53		26	19	27	27	28	9.7?	0.03	0.02	"	"	
54		31	6	37	37	18	9.8?	0.89	0.54	Quick	"	Felt
55	June	1	4	33.5	33.0		4.4	0.01	0.01	Slow	"	

† Japanese Central Standard Time (9<sup>h</sup> east from Greenwich), reckoned from midnight.

TABLE A.

(Earthquakes)

No.	Date 1910	Time of Occurrence †		Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks
		(NS)	(EW)		(NS)	(EW)			
56	June 2	20 <sup>h</sup> 46.0 <sup>m</sup>	45.7 <sup>s</sup>	4.2	0.02	0.02	Slow	Feeble	
57	5	21 44.3	44.7	7.3	0.23	0.22	"	"	
58	9	20 50 27	50 28	35.5	0.27	0.32	"	"	
59	12	07 21 44	21 49	8.0	0.20	0.22	"	"	Felt
60	15	19 02.0	02.1	5.6	0.08	0.03	Quick	"	
61	16	15 41 07	41 10	154.8	0.91	1.66	Slow	"	
62	17	14 33 08	33 15	15.0	0.07	0.09	"	"	
63	27	01 — —	07 38	36.5	—	0.07	"	"	
64	28	03 41 15	— —	12.0	0.59	0.60	Quick	"	Felt
65	28	22 56 30	56 30	9.6	0.13	0.08	Slow	"	
66	29	19 — —	57.6	92.0	—	0.08	"	"	
67	29	23 — —	23.2	77.0	—	0.01	"	"	
68	30	03 — —	13.7	116.0	—	0.01	"	"	
69	30	12 01.0	01.4	6.2	0.02	0.02	"	"	
70	30	12 07.1	07.5	23.8	0.06	0.05	"	"	
71	July 7	17 — —	26 21	56.0?	—	0.03	"	"	
72	8	18 — —	27 00	4.1	—	0.02	Quick	"	
73	12	16 — —	44 55	3.6	—	0.02	Slow	"	
74	14	06 — —	32 06	8.6	—	0.02	Quick	"	
75	16	11 — —	35 41	3.2	—	0.02	Slow	"	
76	18	04 15 20	15 19	14.2	0.52	0.71	"	"	
77	19	02 — —	03.4?	3.6?	—	0.01	Quick	"	
78	19	11 43.6	43 42	11.0	0.11	0.10	Slow	"	
79	21	16 17.5	17 46	36.5	0.06	0.06	"	"	
80	22	09 29 31	29 29	10.6	0.07	0.05	"	"	
81	22	11 02 34	02 27	10.2	0.11	0.05	"	"	
82	23	11 18 42	18 40	4.2	0.03	0.04	"	"	
83	24	01 40.0	39 53	3.5	0.02	0.02	"	"	
84	24	13 — —	00.6	4.6	—	0.01	"	"	
85	24	14 53 36	53 23	6.4	0.02	0.03	"	"	
86	24	15 50 16	50 02	13.9	0.08	0.08	"	"	
87	24	20 54.9	54.6	6.3	0.02	0.02	"	"	
88	24	21 15.4	15 12	10.8	0.06	0.04	"	"	
89	24	22 47.8	47 42	8.3	0.03	0.02	"	"	
90	24	23 02.8	02.6	6.7	0.04	0.02	"	"	
91	24	23 19.0	18 54	6.0	0.06	0.05	"	"	
92	25	01 24.9	24.9	7.4	0.04	0.02	"	"	
93	25	02 17.6	17 06	7.3	0.03	0.03	"	"	
94	25	04 44 22	— —	9.3	0.03	—	"	"	
95	25	06 14.9	— —	4.7	0.01	—	"	"	
96	25	14 38 10	38 11	4.9	0.02	0.02	"	"	
97	25	14 56 14	56 11	4.2	0.02	0.02	"	"	
98	25	16 41 18	41 14	14.0	0.11	0.11	"	"	
99	25	18 28 03	27 49	9.0	0.04	0.03	"	"	
100	26	01 13 58	13 59	3.6	0.02	0.02	"	"	
101	26	02 29.8	29 44	5.5	0.04	0.03	"	"	
102	26	03 21.8	22 04	5.2	0.07	0.03	"	"	
103	27	12 57.9	57 16	5.4	0.01	0.01	"	"	
104	27	20 40 44	40 35	12.9	0.04	0.03	"	"	
105	29	19 34 46	34 48	54.0	0.04	0.05	"	"	
106	August 1	19 55.6	55.7	9.3	0.02	0.03	"	"	
107	10	11 58.2	58 10	3.0	0.06	0.06	"	"	
108	11	13 — —	33 01	1.0	—	0.01	"	"	
109	13	00 — —	04 17	1.8	—	0.02	"	"	
110	13	21 59 22	59 19	6.3	0.13	0.09	"	"	
111	21	14 48 40	48 46	33.7	0.16	0.25	"	"	

TABLE A.

(Earthquakes)

No	Date 1910		Time of Occurrence †				Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks	
			(NS)			(EW)		(NS)	(EW)				
112	September	1	09	50	02	50	02	36.5	0.06	0.50	Slow	Feeble	
113		1	12	—	—	28.0?		3.4?	—	0.01	"	"	
114		1	23	—	—	26.1?		30.0?	—	0.17	"	"	
115		5	16	36	19	36	28	3.2	0.09	0.06	"	"	
116		8	11	50.4?		50	02	12.0?	0.07	0.07	"	"	
117		9	10	19	47	19	44	57.0?	0.07	0.15?	"	"	
118		10	21	—	—	36.0?		22.0?	—	0.01	"	"	
119		11	03	27	56	28	03	5.6	0.10	0.06	Quick	"	
120		11	23	—	—	15.3?		2.3?	—	0.01	"	"	
121		14	03	—	—	35	44	6.1?	—	0.01	Slow	"	
122		14	22	—	—	13	00	6.0	—	0.01	"	"	
123		15	5	26	47	26	47	12.3	0.21	0.23	"	"	
124		15	5	—	—	37.3		10.0	—	0.01	"	"	
125		15	10	57	07	57	03	8.6	0.07	0.09	"	"	
126		15	13	18	58	18	49	8.6	0.11	0.11	"	"	
127		15	13	—	—	53	58	7.0	—	0.04	"	"	
128		16	19	—	—	50.3		3.0	—	0.01	Quick	"	
129		17	03	—	—	59.3		3.2	—	0.01	"	"	
130		17	08	—	—	14.1?		6.0?	—	0.05	Slow	"	
131		19	16	—	—	38.3		3.3	—	0.02	"	"	
132		26	09	20.9		19.7		10.0	0.11	0.10	"	"	
133		26	19	26	58	26	52	16.0	0.39	0.20	"	"	
134		27	17	04	56	04	51	9.6	0.14	0.20	"	"	
135		29	08	05	15	05	14	7.3	0.11	0.08	"	"	
136	October	5	08	19	50	19	43	6.4	0.03	0.03	"	"	
137		6	05	15	18	15	16	6.3	0.56	0.35	Quick	"	Felt
138		13	23	57	37	57	37	16.0	1.11	0.85	Slow	"	
139		15	20	—	—	01.6		3.3	—	0.03	Quick	"	
140		18	00	28	15	28	11	6.0	0.06	0.09	Slow	"	
141		20	17	50.3		50.4		8.3	0.03	0.09	"	"	
142		25	03	22	37	—	—	6.0	0.40	—	Quick	"	
143		26	10	14.8		15.1		8.0	0.06	0.05	Slow	"	
144	Novemebr	1	11	—	—	59.5		2.7	—	0.05	Quick	"	
145		3	20	—	—	21	20	3.3	—	0.09	"	"	
146		8	16	05	42	05	41	7.1	0.13	0.15	Slow	"	
147		9	15	11.8		12	04	62.9	0.03	0.45	"	"	
148		14	16	—	—	39	49	4.9	0.28	0.40	"	"	
149		16	07	46.1		45	31	3.2	?	0.02	Quick	"	
150		17	21	—	—	28.4?		3.0?	—	0.05	"	"	
151		19	06	—	—	41	32	?	—	0.02	"	"	
152		26	13	52.0?		50	52	?	?	?	Slow	"	
153		27	21	22	22	22	24	4.9	0.22	0.14	"	"	
154		29	11	—	—	31	51	?	—	?	"	"	
155		29	11	—	—	55	03	10.9	—	0.15	"	"	
156	December	1	20	26.3		26.5		5.3	0.03	0.05	"	"	
157		2	00	08.7		08	58	5.0	0.11	0.07	"	"	
158		2	00	—	—	50.9		26.4	—	0.06?	"	"	
159		6	01	29	30	29.2		41.0	0.11	0.31?	"	"	
160		7	18	37.1		36	40	5.5	?	0.04	"	"	
161		9	20	02	38	02	39	6.7	0.11	0.11	Quick	"	Felt
162		10	18	36	02	36	10	71.7	0.82?	4.61?	Slow	"	
163		11	22	—	—	50	41	1.9	—	0.04	Quick	"	
164		13	03	—	—	04.8?		3.3?	—	0.02	Slow	"	
165		14	23	56.4?		56.4?		2.0?	0.04	0.04	Quick	"	
166		15	05	—	—	56	25	17.0	—	0.06	Slow	"	
167		16	11	—	—	36	25	4.0	—	0.02	"	"	
168		16	23	52	01	52	01	92.5	?	0.77	"	"	
169		25	15	30	42	30	43	13.0	0.29	0.32	Quick	"	Felt
170		30	09	—	—	54.0?		53.5	—	0.02	Slow	"	
171		31	10	—	—	14	22	12.0	—	0.14	Quick	"	



SEISMOLOGICAL OBSERVATIONS AT MIZUSAWA.

**TABLE B.**  
(Pulsatory Oscillations)  
EW Component.



Beginning		Ending		Maximum		
Date 1910	Hour	Date 1910	Hour	Date 1910	Hour	Double Amplitude
January	1	January	5	January	2-3	0.02
	5		8		6	0.01
	8		11		9-10	0.02
	11		21		12	0.01
					17	0.06
	22		24		22	0.01
	26		30		28	0.01
February	30	February	5	February	31-1	0.01
	9		13		10-11	0.02
	17		23		18	0.02
	26	March	3		27	0.01
March	5		22	March	13	0.02
	22		25		16	0.03
	26		29		23-24	0.02
					27	0.02
	30	April	1		30	0.02
April	1		6	April	2-3	0.02
	8		15		5	0.01
	17		19		11	0.01
					18	0.01
					19	0.01
	20		27		22	0.01
	28		30		25-26	0.02
May	1	May	8	May	30	0.01
					2	0.01
					6	0.01
	11		18		12	0.02
	18		21		14-15	0.02
June	29	June	1		19-20	0.01
	2		9	June	29-30	0.02
					6	0.02
	13		15		14	0.01
	16		22		17	0.01
July	3	July	12	July	20	0.01
					3-4	0.02
					9	0.01
	14		18		15	0.01
August	5	August	8	August	6	0.01
	9		22		11	0.01
					14	0.01
					21	0.01
	29		31		30	0.01
September	2	September	13	September	5	0.02
	20		22		6	0.01
	25		27		20-21	0.01
					25	0.02
October	1	October	6	October	2	0.01
	8		20		3	0.01
					9	0.02
					12	0.01
					16	0.02
	21		21		21	0.01
	22		26		23	0.01
	28	November	4		29	0.01
November	10		12	November	30	0.01
	17		18		3	0.03
	24		25		10-11	0.03
	28		28		17	0.02
December	1	December	3	December	25	0.01
					28	0.01
					1	0.01
					2	0.01
	17		18		17	0.02
	26		27		15-19	0.02
	28		29		27	0.02
					28	0.02