

LIBRARY  
OF THE  
ASTRONOMICAL SOCIETY  
OF THE PACIFIC

ANNUAL REPORT  
OF THE  
METEOROLOGICAL  
AND THE  
SEISMOLOGICAL OBSERVATIONS  
MADE AT THE  
INTERNATIONAL LATITUDE OBSERVATORY  
OF MIZUSAWA  
FOR  
THE YEAR 1912.

---

LATITUDE  $39^{\circ} 8' N.$ , LONGITUDE  $141^{\circ} 7' E.$ ,  
HEIGHT ABOVE MEAN SEA LEVEL 63 METRES.

---

PUBLISHED BY THE INTERNATIONAL LATITUDE OBSERVATORY  
OF MIZUSAWA.

---

1913.

The present report contains the results of the meteorological and the seismological observations in the observatory during the year 1912. No alteration is done in the kinds and the methods of observations. The observations and the computations were done by Messrs. T. Oyama and K. Aoki 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
τ	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, 1905, and 1910.

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 EW component, and the other the NS component, of seismological movements. The *instrumental constants* are as follows:

	EW Component Apparatus	NS Component Apparatus
Period of free oscillation	17 seconds	20 seconds
Multiplication of the pointer	100 times	20 times
Weight of heavy cylinder	45.0 kilograms	15.0 kilograms
Horizontal distance of the centre of the cylinder from the point of support	20 centimetres	40 centimetres
Vertical distance between the points of support and of suspension	104 centimetres	87 centimetres

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

June, 1913.

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

**SEISMOLOGICAL OBSERVATIONS.**



## TABLE A.

(Earthquakes)

No.	Date		Time of Occurrence †			Duration of Total Earthquake (mean)	Maximum Range of Motion		Character of Motion	Intensity	Remarks
	1912		(E W)		(N S)		(E W)	(N S)			
51	May	28	<sup>h</sup> 6 <sup>m</sup> 41 <sup>s</sup> 19	<sup>h</sup> 6 <sup>m</sup> 41 <sup>s</sup> 19		m 5.4	mm 1.00	mm 0.80	Quick	Feeble	Felt
52		28	21 49 47	21 49 44		28.0	0.10	0.15	Slow	"	
53		31	0 31 53	0 31 53		15.9	0.39	0.50	"	"	
54		31	21 31 07	21 31 07		8.3	0.06	0.06	"	"	
55	June	1	21 27 42	— — —		3.9	0.01	—	"	"	
56		2	21 07 36	— — —		4.1	0.01	—	"	"	
57		3	18 12 46	— — —		3.1	0.01	—	"	"	
58		5	15 04 02	15 04 04		6.9	0.08	0.07	"	"	
59		8	13 41 56	13 41 56		35.5	?	8.35	Quick	Weak	Felt
60		12	2 20 26	— — —		1.8	0.01	—	Slow	Feeble	
61		12	5 28.6	— — —		4.4	0.02	—	"	"	
62		12	19 16 22	19 16 23		11.9	0.41	0.87	Quick	"	
63		12	23 43 20	23 43 22		10.7	0.03	0.04	Slow	"	
64		13	8 29 15	— — —		4.9	0.02	—	"	"	
65		13	8 56 21	8 56.6		6.5	0.03	0.04	"	"	
66	June	14	10 34 22	10 34 22		6.4	0.04	0.04	Slow	Feeble	
67		15	1 01 44	— — —		6.8	0.01	—	"	"	
68		19	12 58 33	— — —		4.3	0.02	—	"	"	
69		23	2 14 23	2 14.5		6.4	0.03	0.05	"	"	
70		24	9 47 52	9 47 53		6.3	0.05	0.07	"	"	
71		29	3 03 48	3 03 48		8.1	0.20	0.21	Quick	"	Felt
72		30	9 42 23	— — —		1.5	0.01	—	Slow	"	
73		30	13 44 35	— — —		4.7	0.02	—	"	"	
74		30	13 59 54	— — —		2.7	0.01	—	"	"	
75		30	16 33 21	— — —		0.8	0.00	—	"	"	
76		30	17 13 31	— — —		1.3	0.00	—	"	"	
77		30	17 49 49	— — —		1.0	0.00	—	"	"	
78		30	17 52 14	— — —		0.9	0.00	—	"	"	
79		30	20 28 43	20 28 44		6.8	0.12	0.24	Quick	"	
80		30	20 58 25	— — —		1.1	0.00	—	Slow	"	
81	July	1	— — —	4 22 03		5.3	—	0.06	"	"	
82		2	10 37 26	10 37 26		2.3	0.02	0.02	"	"	
83		2	11 08 09	— — —		1.2	0.01	—	"	"	
84		2	12 31 04	12 30 57		4.5	0.02	0.02	"	"	
85		5	1 54.3	— — —		1.6	0.00	—	"	"	
86		5	2 02.1	— — —		2.3	0.01	—	"	"	
87		5	3 10 14	3 10 09		2.6	0.02	0.02	"	"	
88		7	12 58 41	12 58 41		7.3	0.07	0.10	"	"	
89		7	17 06 00	17 06 04		85.9	?	?	"	"	
90		9	1 44 14	— — —		3.7	0.01	—	"	"	
91		9	7 02 39	— — —		2.7	0.01	—	"	"	
92		9	7 26 04	— — —		1.5	0.01	—	"	"	
93		9	17 31 53	17 31 53		10.6	0.04	0.05	"	"	
94		13	— — —	23 33 44		19.8	—	1.00	"	"	
95		16	7 47 21	7 47 22		16.0	0.14	0.16	"	"	

**TABLE A.**

(*Earthquakes*)



No.	Date		Time of Occurrence †				Duration of Total Earthquake (mean)	Maximum Range of Motion		Character of Motion	Intensity	Remarks		
	1912		(E W)		(N S)			(E W)	(N S)					
			h	m	s	h	m	s	m	mm				
96	July	17	19	21.7		—	—	—	5.3	0.02	—	Slow	Feeble	
97		20	10	46	30	—	—	—	1.4	0.00	—	"	"	
98		20	—	—	—	—	—	—	3.2?	0.01	—	"	"	
99		24	21	14.1		—	—	—	2.5	0.00	—	"	"	
100		24	21	18.2		—	—	—	8.0	0.00	—	"	"	
101		25	8	26	25	—	—	—	19.0	0.17	0.62	"	"	
102		26	8	15	18	8	15	25	28.7	0.04	0.15	"	"	
103		26	11	35	16	11	35	18	10.2	0.00	0.00	"	"	
104		26	16	49	05	16	49	02	22.1	0.01	0.02	"	"	
105		27	2	42	09	2	42	07	9.2	0.01	0.02	"	"	
106	August	1	0	12	44	0	12	44	6.5	0.02	0.04	"	"	
107		2	3	06	55	3	06	58	9.3	0.02	0.04	"	"	
108		7	6	20	51	6	20	51	28.1	0.03	0.15	"	"	
109		9	11	12	08	11	12	18	92.1	?	?	"	"	
110		9	17	48	17	17	48	17	11.3	?	1.37	Quik	"	
111		10	17	49	00	17	48	59	8.3	0.02	0.01	Slow	"	
112		15	15	14	09	15	14.1		3.7	0.01	0.01	"	"	
113		15	16	11	14	16	11	15	3.6	0.01	0.01	"	"	
114		15	22	47	03	22	47	03	5.1	0.01	0.00	"	"	
115		15	22	52.9		22	52.7		3.4	0.01	0.01	"	"	
116		16	5	36	54	5	36	55	2.6	0.01	0.01	"	"	
117		16	7	32.1		—	—	—	1.3	0.00	—	"	"	
118		18	4	16	46	4	17	05	51.0	?	?	"	"	
119		18	17	46	46	17	46	47	2.5	0.02	0.01	"	"	
120		18	22	27	50	22	27	50	13.3	0.07	0.06	"	"	
121		19	6	34	57	6	34	52	7.9	0.02	0.02	"	"	
122		21	13	33	49	13	33	48	4.0	0.03	0.02	"	"	
123		21	14	50	19	14	50	17	7.9	0.45	0.80	Quik	"	
124		22	22	01	34	22	01	30	7.0	0.07	0.08	Slow	"	
125		23	14	42	44	14	42	43	6.8	0.07	0.07	"	"	
126		27	21	39	00	—	—	—	3.1	0.03	—	"	"	
127		28	—	—	—	1	41	27	3.9	0.22	0.25	Quik	"	Felt
128		30	12	29	05	—	—	—	2.3	0.02	—	Slow	"	
129	September	1	1	06	07	1	06	06	3.6	0.04	0.02	"	"	
130		2	7	56	05	—	—	—	6.2	0.41	—	Quik	"	
131		3	7	08	25	—	—	—	3.4	0.07	—	Slow	"	
132		5	12	19	51	—	—	—	2.3	0.02	—	"	"	
133		12	14	33	14	14	33	14	32.9	0.12	0.21	"	"	
134		15	4	56	47	4	56.7		0.9	0.02	0.01	"	"	
135		17	18	47	08	—	—	—	2.1	0.02	—	"	"	
136		18	2	58	35	—	—	—	1.9	0.02	—	"	"	
137		18	21	51	50	—	—	—	2.8	0.01	—	"	"	
138		20	20	40	53	20	40	53	6.0	0.02	0.03	"	"	
139		24	20	11	17	—	—	—	1.7	0.02	—	"	"	
140		28	13	16	48	—	—	—	4.4	0.01	—	"	"	

**TABLE A.**

(Earthquakes)

No.	Date 1912	Time of Occurrence †			Duration of Total Earthquake (mean)	Maximum Range of Motion		Character of Motion	Intensity	Remarks
		(E W)	(N S)			(E W)	(N S)			
141	September 30	<sup>h</sup> 5 <sup>m</sup> 57 <sup>s</sup> 51	<sup>h</sup> 5 <sup>m</sup> 57 <sup>s</sup> 51	61.8	mm 0.95	?	Slow	Feeble		
142	30	7 48 05	— — —	1.6	0.00	—	Quick	„		
143	30	21 35 04	21 35 05	6.0	0.07	0.10	Slow	„		
144	October 11	14 49 07	14 49 10	3.2	0.05	0.03	„	„		
145	11	22 21 16	— — —	5.1	0.02	—	„	„		
146	16	2 58 15	— — —	2.0	0.02	—	Quick	„		
147	18	20 03 15	20 03 15	8.7	0.38	0.49	Slow	„		
148	18	21 00 22	21 00 23	19.4	0.12	0.15	„	„		
149	18	22 17 46	— — —	1.7	0.00	—	„	„		
150	19	10 02 16	10 01.7	8.9	0.07	0.02	„	„		
151	19	19 24 09	19 24 11	4.6	0.12	0.11	„	„		
152	20	21 28 19	21 28.3	4.7	0.04	0.02	„	„		
153	26	18 06 08	18 06.0	3.7	0.06	0.10	„	„		
154	26	18 10.5	— — —	5.5	0.04	—	„	„		
155	30	17 33 43	— — —	3.1	0.00	—	„	„		
156	30	19 00 33	19 00 32	3.4	0.05	0.04	Quick	„	Felt	
157	November 7	16 48 32	16 48 35	21.4	0.23	0.15	Slow	„		
158	7	19 51.7	— — —	2.1	0.01	—	„	„		
159	8	7 25 44	7 25 45	6.3	0.27	0.31	Quick	„		
160	9	23 05 05	23 05 05	8.0	0.30	0.41	„	„	Felt	
161	22	22 43 59	— — —	3.7	0.01	—	Slow	„		
162	28	20 59 43	— — —	3.0	0.01	—	„	„		
163	December 1	17 29 49	— — —	15.7	0.04	—	„	„		
164	3	7 13 29	7 13 29	4.1	0.17	0.25	Quick	„	Felt	
165	5	2 33 36	— — —	4.7	0.02	—	Slow	„		
166	5	21 35 38	21 35 49	2.9	0.01	0.02	„	„		
167	9	8 49?	8 49?	?	?	?	Quick	„	Felt	
168	9	9 25 03	9 25 04	5.3	0.06	0.10	„	„		
169	9	9 44 30	— — —	2.7	0.00	—	Slow	„		
170	9	10 01 40	— — —	2.4	0.01	—	„	„		
171	9	10 20 13	— — —	1.3	0.00	—	„	„		
172	9	10 23 16	— — —	1.6	0.00	—	„	„		
173	9	10 31 14	— — —	2.8	0.01	—	„	„		
174	9	11 15 30	11 15 28	4.9	0.12	0.15	Quick	„		
175	9	12 04 56	12 05 05	4.3	0.05	0.11	„	„		
176	9	12 21 13	— — —	1.4	0.00	—	Slow	„		
177	10	5 41 28	— — —	2.6	0.01	—	„	„		
178	11	16 45 20	16 45 18	5.7	0.02	0.06	„	„		
179	13	13 39 34	— — —	1.4	0.01	—	Quick	„		
180	13	14 12 26	14 12 27	11.9	0.06	0.09	Slow	„		
181	24	9 03.6	9 03.9	11.6	0.03	0.03	„	„		
182	25	17 42 49	— — —	2.3	0.02	—	Quick	„		
183	30	6 44 06	6 44.0	7.9	0.10	0.10	Slow	„		
184	30	8 12 45	8 13.0	5.3	0.03	0.05	„	„		
185	31	23 30 46	23 30 46	7.5	0.38	0.66	„	„		



**TABLE B.**  
(Pulsatory Oscillations)  
EWComponent.



Beginning		Ending		Maximum		
Date 1912	Hour	Date 1912	Hour	Date 1912	Hour	Double Amplitude
	h		h		h h	m m
January	1	January	4	January	2-3	0.02
	7		9		7-9	0.01
	15		20		16-17	0.01
	22		25		22-23	0.02
	27		29		27	0.01
February	3	February	6	February	3-5	0.03
	6		8		7	0.02
	9		11		10	0.01
	15		20		15-16	0.02
	22		24		22-23	0.03
	24		26		25	0.01
	28	March	3		28-29	0.02
March	4		10	March	4-5	0.01
	11		12		7-8	0.02
	17		20		8-9	0.02
	21		24		11-12	0.01
	28		30		17-20	0.03
	31	April	2		21-22	0.01
April	3		6	April	28	0.02
	7		8		1-12	0.01
	9		13		17-20	0.03
	19		20		21-22	0.01
	23		26		22-20	0.02
	30	May	1		23-9	0.01
May	4		6		17-1	0.03
	13		15		22-20	0.01
	19		22		13-23	0.02
June	8	June	11		14-17	0.01
	17		21		3-4	0.02
	29		30		4-5	0.02
July	11		12		7	0.01
August	27	July	12		10	0.01
September	10	September	3		19-20	0.02
	16		11		25-26	0.01
	22		17		30-1	0.01
	30	October	8	May	4-5	0.02
October	16		17		13-14	0.01
	28		29		21-22	0.01
	31	November	1	June	9-10	0.01
November	14		16		18-19	0.02
	17		18		29	0.01
	19		21	July	12	0.01
	23		26	September	2-3	0.05
December	1	December	2		10-11	0.01
	7		9		16	0.01
	9		11		23-24	0.04
	12		13	October	1-3	0.01
	15		17		7	0.02
	18		20		16	0.01
	22		25		20-23	0.01
	28	January(1913)	1		6-13	0.01
					2-17	0.02
					4-11	0.01
					9-22	0.01
					12-9	0.02
					12-15	0.02
					9-15	0.01
					7-18	0.01
					9-22	0.01
					12-13	0.01
					15-16	0.03
					19	0.02
					23-24	0.02
					28	0.01