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ANNUAL REPORT

OF THE

METEOROLOGICAL

AND THE

SEISMOLOGICAL OBSERVATIONS

MADE AT THE

INTERNATIONAL LATITUDE OBSERVATORY

OF MIZUSAWA

FOR

THE YEAR 1908.

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

HEIGHT ABOVE MEAN SEA LEVEL 61 METRES.

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PUBLISHED BY THE INTERNATIONAL LATITUDE OBSERVATORY  
OF MIZUSAWA.

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1909.

The present report contains the results of the meteorological and the seismological observations in the observatory during the year 1908. No alteration is done in the kinds and the methods of observations. The observations and the computations were done by Messrs. T. Ito, 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 classified according to *Howard*, 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 *Sedau'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
K	Thunder storm	←	Ice crystals	CK	Cirro-cumulus
T	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
ƿ	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.

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	30 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.

June, 1909.

H. Kimura, *Rigaku-hakushi*  
Director of the International Latitude Observatory  
of Mizusawa.

# SEISMOLOGICAL OBSERVATIONS.

## SEISMOLOGICAL OBSERVATIONS AT MIZUSAWA.

TABLE A.

(Earthquakes)



No.	Date 1908	Time of Occurrence †				Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks
		(NS)		(EW)			(NS)	(EW)			
1	January	5	h 5	m 02	s 09	m 02	10	2.4	mm 0.02	mm 0.02	Quick
2		6	00	17	52	17	53	5.2	0.06	0.03	"
3		11	12	39	45	39	46	43.2	0.06	1.07	Slow
4		15	21	58	04	58	01	36.5	11.31	—	Quick
5		17	06	59	49	59	49	11.6	0.06	0.05	"
6		18	01	05	30	05	26	14.3	0.72	0.79	"
7		19	23	21	47	21	47	3.5	0.16	0.15	"
8		20	20	27	37	27	36	5.7	0.18	0.15	"
9		24	21	34	26	34	28	3.5	0.02	0.02	"
10		26	00	56	28	56	28	1.7	0.02	0.02	"
11		28	00	—	—	50	11	25.0	—	0.02	Slow
12		29	16	30	31	30	32	9.7	0.33	0.35	"
13		31	18	17	10	17	09	2.7	0.02	0.02	Quick
14		1	22	—	—	36	22	9.6	—	0.05	"
15		5	21	06	35	06	33	13.5	1.97	3.11	"
16	February	6	21	09	33	09	32	10.5	0.50	0.52	"
17		10	03	20	38	20	34	43.0	0.06	0.22	Slow
18		14	22	57	29	57	26	3.3	0.02	0.02	Quick
19		20	21	12	35	12	31	2.4	0.02	0.02	Slow
20		27	14	33	23	33	22	5.3	0.06	0.05	Quick
21		28	09	35	46	35	46	5.0	0.33	0.30	"
22		3	00	31	38	30	07	12.2	0.22	0.27	Slow
23		3	05	24	26	24	30	12.5	0.06	0.07	"
24		3	23	18	43	18	36	3.0	0.09	0.07	Quick
25		5	00	11	22	11	21	1.8	0.02	0.02	"
26	March	5	08	11	14	11	08	2.0	0.02	0.03	"
27		5	11	24	23	24	28	44.0	0.11	0.32	Slow
28		13	02	15	38	15	32	5.4	0.22	0.17	Quick
29		13	16	58	03	57	58	3.7	0.02	0.02	"
30		14	00	26	26	26	29	5.2	0.03	0.03	Slow
31		15	20	11	23	11	17	4.0	0.02	0.02	"
32		17	17	01	22	01	22	1.0	0.01	0.01	Quick
33		20	11	44	30	44	29	3.4	0.03	0.04	"
34		23	21	32	51	32	51	23.0	0.06	0.05	Slow
35		27	09	—	—	01	—	4.5	—	0.37	"
36		28	03	54	34	54	35	11.5	0.04	0.05	"
37		29	09	15	43	15	44	4.5	0.02	0.02	Quick
38		30	09	34	24	34	25	5.7	0.11	0.11	"
39		2	20	07	23	07	26	5.1	0.02	0.02	Slow
40		3	23	44	14	44	11	2.9	0.08	0.09	Quick
41	April	7	10	19	35	19	35	5.5	0.02	0.02	Slow
42		8	00	58	52	58	51	11.0	1.67	1.53	Quick
43		8	01	51	17	51	17	1.8	0.01	0.01	"
44		8	02	17	46	17	41	4.9	0.09	0.10	"
45		8	04	49	47	49	43	5.5	0.17	0.15	"
46		8	04	57	49	57	41	2.0	0.01	0.01	"
47		8	07	45	49	45	47	5.1	0.11	0.11	"
48		8	09	55	17	55	13	3.5	0.03	0.05	Slow
49		9	05	24	58	24	54	5.0	0.11	0.08	"
50		19	17	00	33	—	—	16.0	3.94	—	Quick
51		21	17	01	03	01	04	6.7	0.07	0.05	Slow
52		22	00	11	11	11	11	17.5	0.57	0.58	Quick
53		22	12	56	15	56	14	7.0	0.11	0.12	"
54		27	06	57	46	57	38	5.8	0.02	0.02	Slow
55		30	07	47	56	47	58	3.6	0.02	0.02	"
56	May	3	09	49	56	49	57	15.0	0.39	0.40	Quick
57		5	15	25	40	25	39	23.0	0.06	0.06	Slow
58		13	05	24	20	—	—	30.0	0.07	—	"
59		14	01	36	32	—	—	3.8	0.03	—	"
60		15	10	40	15	40	12	5.4	0.11	0.11	"
61		18	00	—	—	58	39	6.0	—	0.02	"
62		26	09	08	50	08	51	9.0	0.11	0.11	"
63		1	11	00	16	00	16	7.5	0.08	0.08	"
64		2	02	28	08	28	09	3.5	0.07	0.05	Quick
65		2	20	—	—	07	42	3.0	—	0.04	Slow
66	June	4	16	—	—	29	17	2.8	—	0.11	Quick
67		6	21	26	05	24	57	3.9	0.03	0.03	Slow
68		8	05	49	15	49	14	3.2	0.02	0.02	Quick
69		9	11	56	42	56	43	19.1	0.17	0.17	Slow
70		9	18	23	27	23	28	13.7	0.16	0.16	"

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

## TABLE A.

(Earthquakes)

No.	Date 1908	Time of Occurrence †				Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks
		(NS)		(EW)			(NS)	(EW)			
71	June 16	h 04	m 00	s 26	— —	2.8	mm 0.03	mm —	Quick	Feeble	
72	17	10	30	08	30 10	10.0	0.11	0.10	"	"	
73	19	06	34	01	34 05	2.3	0.03	0.02	"	"	
74	23	03	39	04	— —	3.2	0.06	—	"	"	
75	25	03	36	50	36 47	7.4	0.31	0.29	Slow	"	
76	27	23	22	27	22 27	33.5	0.20	0.20	"	"	
77	28	12	30	15	30 15	9.5	0.04	0.04	"	"	
78	July 6	17	18	02	18 02	4.9	0.02	0.02	"	"	
79	10	08	19	55	19 54	3.7	0.01	0.01	"	"	
80	11	15	36	47	36 47	3.0	0.01	0.01	Quick	"	
81	August 11	15	43	07	43 03	9.5	1.67	1.22	"	"	Felt
82	14	06	08	57	08 57	40.0	0.03	0.03	Slow	"	
83	28	17	36	13	36 12	12.0	0.33	0.35	Quick	"	
84	3	16	—	—	23 13	9.0	—	0.08	"	"	
85	3	20	17	59	17 53	5.8	0.06	0.07	"	"	
86	8	02	04	58	— —	3.7	0.06	—	Slow	"	
87	9	05	56	52	56 52	4.5	0.08	0.05	Quick	"	
88	11	10	49	00	49 02	9.3	0.06	0.07	Slow	"	
89	12	03	40	11	40 11	5.8	0.11	0.09	"	"	
90	12	13	44	59	44 58	10.9	0.16	0.22	"	"	
91	16	03	23	13	— —	3.2	0.11	—	Quick	"	Felt
92	17	19	58	17	58 14	93.0	0.02	0.02	Slow	"	
93	17	21	31	34	31 37	5.2	0.08	0.09	Quick	"	Felt
94	20	19	01	48	01 46	4.0	0.03	0.52	Slow	"	
95	23	04	20	37?	21 06?	19.5	0.03	0.05	"	"	
96	September 30	10	07	52	07 49	5.3	0.06	0.05	Quick	"	
97	5	3-4	—	—	— —	9.0	0.09	0.10	"	"	
98	6	16	55	04	55 05	5.1	0.04	0.04	"	"	
99	13	13-14	—	—	— —	—	—	0.02	Slow	"	
100	16	14	11	16	11 16	10.0	0.17	0.14	Quick	"	
101	18	19	39	07	39 06	11.0	0.06	0.05	Slow	"	
102	21	15	—	—	45 34	60.0	—	0.10	"	"	
103	25	22	32	11	32 15	12.8	1.49	1.60	Quick	"	Felt
104	27	09	43	53	43 56	4.6	0.03	0.03	"	"	
105	28	03	23	27	23 30	3.0	0.02	0.02	"	"	
106	October 28	20	52	41	52 41	5.5	0.11	0.15	"	"	
107	6	02	25	12	25 12	7.4	0.61	0.62	"	"	Felt
108	17	23	17	29	17 24	6.5	0.06	0.06	"	"	
109	24	21	56	29	56 30	8.2	0.08	0.12	"	"	
110	25	06	—	—	25 40	4.0	—	0.03	Slow	"	
111	November 25	11	18	51	18 50	1.7	0.02	0.04	Quick	"	
112	2	14	—	—	24 59	90.0	—	0.20	Slow	"	
113	2	16	—	—	28 55	3.6	—	0.02	"	"	
114	5	05	00	56	00 56	1.0	0.02	0.03	Quick	"	
115	5	05	58	40	— —	4.2	0.07	—	Slow	"	
116	6	16	11	37	11 36	110.0	1.13	1.57	"	"	
117	6	22	50	02	50 07	28.0	0.07	0.15	"	"	
118	9-10	23-1	—	—	— —	2.5	—	0.03	"	"	
119	11	22	25	26	25 25	60.0	?	0.12	"	"	
120	13	04	53	40	53 42	4.7	0.06	0.10	Quick	"	
121	19	14	05	59	— —	22.0	0.06	—	Slow	"	
122	20	10	58	47	58 48	10.8	0.08	0.08	"	"	
123	22	16	15	05	15 10	18.5	1.94	1.82	Quick	"	
124	23	21	—	—	49 23	40.0	—	0.06	Slow	"	
125	24	16	16	12	16 20	6.0	0.06	0.09	Quick	"	
126	27	14	38	17	38 14	3.2	0.08	0.07	"	"	
127	27	21	—	—	55 18	2.8	—	0.05	Slow	"	
128	December 2	20	52	45	52 43	7.5	0.50	0.42	Quick	"	
129	7	22	—	—	37 13	9.0	—	0.12	Slow	"	
130	12	22	02	26	02 25	60.0	0.69	1.30	"	"	
131	13	03	59	33	59 32	40.0	0.11	0.15	"	"	
132	21	18	43	52	43 55	6.0	0.02	0.02	"	"	
133	26	21	45	12	45 08	1.2	0.02	0.02	"	"	
134	28	13	33	14	33 14	60.0	0.33	1.89	Quick	"	
135	28	17	09	25	09 28	8.2	0.17	0.17	Slow	"	
136	30	06	03	57	— —	3.0	0.10	—	Quick	"	
137	31	03	46	07	46 05	7.1	0.38	0.35	"	"	Felt

## SEISMOLOGICAL OBSERVATIONS AT MIZUSAWA.

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



Beginning			Ending		Maximum		
Date 1908	Hour	Date 1908	Hour	Date 1908	Hour	Double Amplitude	
January 1	15	January 5	14	January 3	20	mm 0.01	
7	17	10	21	9	5-7	0.03	
13	11	15	9	14	3-6	0.02	
16	5	25	10	16	14-17	0.02	
				21	10-15	0.03	
28	6	February 13	16	28	12-18	0.02	
February 15	14	19	3	February 1	5-14	0.04	
22	21	March 3	21	6-7	11-3	0.02	
March 4	19	10	11	March 2	16-17	0.01	
11	10	13	11	2	16-2	0.02	
18	1	23	2		13-23	0.02	
29	11	April 1	13			0.05	
April 2	8	3	12	April 2	11-23	0.06	
6	6	7	22	6	14-22	0.01	
9	9	13	9	10	23-6	0.03	
22	9	29	2	23-24	1-7	0.02	
				26	22-5	0.02	
				27	9-11	0.01	
					14-19	0.02	
May 4	6	May 8	16	May 5	16-21	0.03	
9	1	12	11	10	8-13	0.01	
June 6	7	20	10	19	4-17	0.03	
13	7	June 7	9	7	1-3	0.01	
23	16	16	11			0.02	
26	12	25	11			0.02	
29	2	28	1			0.01	
July 16	22	July 5	14			0.02	
		19	17			0.04	
August 3	9	August 10	15	August 5-6	8-16	0.02	
22	7	26	23	8	7-15	0.03	
September 1	11	September 17	2	24	4-12	0.02	
17	12	22	20	4-5	22-6	0.02	
October 28	20	October 3	14	14	3-22	0.02	
5	15	11	13			0.02	
19	1	22	6			0.01	
November 23	7	November 30	21	18	4-12	0.01	
3	15	5	14	20	9-19	0.04	
6	13	26	9	30	8-17	0.03	
				8-9	22-11	0.03	
				20	5-7	0.02	
						0.01	
December 11	12	December 11	0	28	13-21	0.02	
19	7	13	11	3	17-24	0.01	
27	7	21	14	6	9-20	0.03	
		26	14	16	1-7	0.02	
		—	—	23	10-16	0.01	
						0.02	
						0.05	
						0.02	
						0.02	
						0.01	
						0.01	
						0.01	
						0.02	