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ASTRONOMICAL SOCIETY  
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ANNUAL REPORT  
OF THE  
METEOROLOGICAL  
AND THE  
SEISMOLOGICAL OBSERVATIONS  
MADE AT THE  
INTERNATIONAL LATITUDE OBSERVATORY  
OF MIZUSAWA  
FOR  
THE YEAR 1906.

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LATITUDE  $39^{\circ} 8' N.$ , LONGITUDE  $141^{\circ} 7' E.$ ,  
HEIGHT ABOVE MEAN SEA LEVEL 61 METRES.

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PUBLISHED BY THE INTERNATIONAL LATITUDE OBSERVATORY  
OF MIZUSAWA.

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1907.

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The present report contains the results of the meteorological and the seismological observations in the observatory during the year 1906. No alteration is done in the kinds and the methods of observations. The observations and the computations were done by Messrs. T. Ito, and S. Ono (till March) and K. Awoki (from March), under the superintendence of Dr. T. Nakano.

Hitherto the meteorological results given in the report were chiefly confined to the monthly and the annual means. But from this volume, hereafter, we give, in the first part, *the direct results of the four-hourly observations for each day of each month in detail*. Thus the number of pages has considerably increased.

Next we omit, as of no significance, the data under the heading, *Direction and Intensity of the Resultant Wind Computed with the Number of Observations*, which were hitherto given in addition to those *Computed with the Velocity*.

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 bottom 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 *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.

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.

April, 1907.

H. Kimura, *Rigakuhakushi*

Director of the International Latitude Observatory  
of Mizusawa.

\* after June 1, 1906; it being 20 seconds before that date.

**SEISMOLOGICAL OBSERVATIONS.**

TABLE A.

(Earthquakes)

No.	Date 1906	Time of Occurrence †		Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks
		(NS)	(EW)		(NS)	(EW)			
1	January 4	h m s	m s	m	mm	mm	Quick	Feeble	
2	6	4 28 30	28 31	2.5	0.15	0.16	"	"	
3	6	12 49 14	49 11	1.5	0.07	0.07	"	"	
4	7	6 35 57	35 55	11.3	0.03	0.03	Slow	"	
5	16	5 24 40	—	3.5	0.08	—	Quick	"	
6	16	8 20 6	—	6.8	0.19	—	Slow	"	
7	17	7 17 58	17 57	8.7	0.04	0.03	"	"	
8	18	3 —	1 5	0.9	—	0.02	Quick	"	
9	19	6 —	59 27	6.2	—	0.01	Slow	"	
10	19	14 —	25 4	2.8	—	0.01	"	"	
11	22	22 51 46	51 43	61.8	4.93	6.35	Quick	Weak	Felt
12	23	12 —	30 28	1.0	—	0.01	"	Feeble	
13	25	10 —	37 28	2.8	—	0.03	"	"	
14	27	18 46 46	46 46	109.1	0.50	0.62	Slow	"	
15	28	23 39 40	39 42	30.6	0.05	0.05	"	"	
16	February 1	0 57 52	57 18	140.9	3.89	1.57	"	"	
17	1	11 44 19	44 22	6.2	0.08	0.08	"	"	
18	2	11 54 42	—	2.3	0.03	—	Very slow	"	
19	4	15 24 32	24 33	14.0	1.33	1.70	Quick	"	Felt
20	5	3 12 19	12 21	3.0	0.08	0.08	"	"	
21	5	5 10 13	9 56	10.8	0.76	1.05	"	"	Felt
22	6	0 6 48	6 49	2.7	0.06	0.02	"	"	
23	8	7 51 51	51 46	7.5	0.07	0.08	Slow	"	
24	13	8 45 5	45 6	22.8	0.19	0.22	"	"	
25	17	6 42 21	42 19	11.4	0.10	0.12	"	"	
26	19	11 9 40	9 40	77.7	0.02	0.02	"	"	
27	23	18 49 37	49 38	12.3	0.29	0.22	"	"	Felt
28	24	0 —	25 3	13.0	—	0.01	"	"	
29	24	9 15 31	15 26	19.5	2.46	1.76	Quick	Weak	Felt
30	27	7 51 51	52 3	9.8	0.02	0.02	Slow	Feeble	
31	27	10 27 14	27 10	5.8	0.33	0.27	Quick	"	Felt
32	28	4 —	50 42	40.0	—	0.12	Slow	"	
33	March 6	1 39 14	38 59	7.8	0.26	0.22	"	"	
34	7	11 16 4	16 12	6.9	0.49	0.41	Quick	"	Felt
35	11	6 —	28 28	3.5	—	0.02	Slow	"	
36	12	2 15 4	15 5	2.3	0.01	0.01	Quick	"	
37	12	12 —	16 33	2.0	—	0.03	"	"	
38	13	22 29 21	29 16	12.4	0.02	0.03	Slow	"	
39	14	20 23 26	23 28	4.4	0.02	0.02	"	"	
40	19	17 7 27	7 29	8.8	0.02	0.02	"	"	
41	21	23 41 10	41 10	3.2	0.14	0.14	Quick	"	Felt
42	23	5 38 33	38 36	9.6	0.58	0.50	"	"	Felt
43	30	2 20 32	20 39	7.5	0.02	0.03	Slow	"	
44	April 3	4 56 38	56 10	5.2	0.02	0.03	"	"	
45	3	5 49 7	49 8	4.2	0.02	0.03	"	"	
46	4	10 4 45	4 44	2.5	0.03	0.05	Quick	"	Felt
47	5	11 50 48	50 50	12.8	0.20	0.22	"	"	Felt
48	6	19 30 42	30 40	6.2	0.22	0.21	Slow	"	
49	8	8 38 23	38 19	10.1	0.33	0.24	"	"	
50	8	14 4 17	4 17	4.9	0.02	0.03	"	"	
51	8	14 53 37	53 39	7.0	0.03	0.05	"	"	
52	9	2 38 34	38 27	28.0	2.94	4.25	Quick	"	Felt
53	9	3 1 15	1 12	7.4	0.08	0.08	"	"	
54	9	3 52 38	52 27	12.0	0.19	0.22	"	"	
55	9	6 16 26	16 22	5.0	0.03	0.04	"	"	
56	10	7 4 7	3 59	3.0	0.02	0.02	"	"	
57	10	9 33 48	33 45	5.5	0.03	0.02	"	"	
58	10	23 42 19	42 23	2.3	0.01	0.01	Slow	"	
59	11	6 —	46 33	69.0	—	0.02	"	"	
60	11	15 —	14 51	4.8	—	0.01	"	"	
61	12	1 28 8	28 2	3.4	0.01	0.02	"	"	
62	12	7 13 22	13 21	5.5	0.01	0.01	"	"	
63	14	4 23 5	22 58	32.5	0.44	0.37	Very slow	"	
64	14	8 57 15	57 12	18.2	0.10	0.13	Slow	"	
65	14	13 8 35	8 30	19.7	0.03	0.03	"	"	
66	14	16 31 47	31 42	10.1	0.11	0.10	"	"	
67	14	17 18 21	18 16	4.2	0.02	0.02	"	"	
68	15	18 32 46	32 55	9.4	0.01	0.01	"	"	
69	16	5 16 59	—	12.0	0.04	—	"	"	
70	18	22 24 27	24 8	150.0	1.11	4.41	Very slow	"	

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

TABLE A.

(Earthquakes)

No.	Date 1906	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				
71	April	21	4	41	14	41	11	8.5	0.07	0.07	Slow	Feeble	
72		22	13	42	50	42	41	7.6	0.02	0.02	"	"	
73		22	18	1	42	1	33	7.0	0.06	0.04	"	"	
74		25	10	31	51	31	50	15.2	0.11	0.10	"	"	
75	May	2	10	18	14	18	1	8.4	0.01	0.01	"	"	
76		5	5	49	43	49	45	8.1	0.02	0.02	"	"	
77		5	8	10	50	10	55	11.3	0.18	0.20	"	"	
78		6	9	25	47	25	27	3.9	0.06	0.06	"	"	
79		10	23	33	42	33	38	7.5	0.11	0.10	"	"	
80		12	19	43	59	43	59	11.5	0.02	0.02	"	"	
81		16	7	37	51	37	54	4.3	0.11	0.12	Quick	"	
82		16	19	9	44	9	37	10.5	0.44	0.47	Slow	"	
83		16	22	58	6	58	6	5.7	0.11	0.10	"	"	
84		17	13	21	53	21	48	3.0	0.01	0.01	Quick	"	
85		18	0	53	4	53	3	3.6	0.03	0.04	"	"	
86		18	8	36	59	36	50	4.5	0.06	0.07	"	"	
87		18	16	4	20	4	13	3.4	0.03	0.04	"	"	
88		19	1	32	13	32	15	11.2	0.33	0.38	"	"	
89		20	20	—	—	19	27	3.2	—	0.01	Slow	"	
90		21	2	22	10	22	10	5.9	0.06	0.11	"	"	
91		21	15	56	26	56	24	6.7	0.10	0.10	"	"	
92		21	18	33	54	33	54	4.9	0.08	0.08	"	"	
93		24	6	36	37	36	31	3.1	0.01	0.01	"	"	
94		26	19	43	19	43	20	3.4	0.01	0.02	Quick	"	
95		28	4	—	—	10	53	7.0	—	0.12	Slow	"	
96		28	6	—	—	59	45	4.0	—	0.04	"	"	
97		28	8	—	—	44	15	2.5	—	0.06	Quick	"	
98		28	12	44	0	—	—	2.8	0.08	—	Slow	"	
99		29	13	—	—	57	11	5.6	—	0.15	"	"	
100		29	23	—	—	23	13	4.6	—	0.02	"	"	
101		31	7	54	7	54	7	3.3	0.02	0.02	Quick	"	
102	June	1	13	37	4	37	3	63.0	1.00	3.17	Slow	"	
103		9	5	56	45	56	32	5.5	0.02	0.03	"	"	
104		10	10	37	16	37	16	4.5	0.11	0.10	"	"	Felt
105		11	4	8	2	7	57	7.5	0.01	0.03	"	"	
106		19	5	—	—	57	3	3.6	—	0.01	Quick	"	
107		24	20	—	—	36	36	3.7	—	0.12	Slow	"	
108		27	8	45	12	45	12	4.3	0.02	0.04	"	"	
109		27	12	43	39	43	33	6.2	0.13	0.15	Quick	"	Felt
110		27	21	—	—	26	10	2.6	—	0.01	Slow	"	
111		27	23	4	43	4	40	2.1	0.01	0.01	Quick	"	
112		28	1	6	22	6	10	2.9	0.01	0.01	"	"	
113		28	1	12	9	12	0	4.0	0.02	0.02	"	"	
114		28	15	—	—	42	10	2.6	—	0.01	Slow	"	
115		28	16	—	—	34	45	3.0	—	0.01	"	"	
116		29	7	58	22	58	18	4.3	0.07	0.07	Quick	"	
117	July	5	8	13	10	13	10	3.0	0.07	0.07	Slow	"	
118		5	8	—	—	32	53	5.0	—	0.03	"	"	
119		7	19	29	25	29	26	3.7	0.26	0.27	Quick	"	Felt
120		7	20	41	23	41	16	1.0	0.10	0.10	"	"	
121		9	20	6	38	6	31	6.1	0.02	0.02	Slow	"	
122		9	20	—	—	24	35	2.4	—	0.02	"	"	
123		12	16	32	19	32	18	4.3	0.02	0.02	"	"	
124		18	0	—	—	18	53	4.0	—	0.01	"	"	
125		19	19	0	30	0	29	4.9	0.03	0.03	"	"	
126		20	15	—	—	19	31	2.8	—	0.01	"	"	
127		23	13	18	25	18	25	9.5	0.49	0.36	Quick	"	Felt
128		31	20	58	59	58	57	2.6	0.06	0.06	"	"	
129	August	1	13	30	7	30	13	1.5	0.02	0.02	"	"	
130		2	13	46	12	46	8	1.4	0.06	0.06	"	"	
131		5	4	55	2	55	1	3.9	0.02	0.02	Slow	"	
132		5	5	33	13	33	13	6.4	0.07	0.07	"	"	
133		5	21	41	55	41	43	2.0	0.01	0.01	Quick	"	
134		6	9	12	40	12	36	2.1	0.04	0.05	"	"	
135		9	8	10	53	10	53	13.0	0.17	0.17	"	"	
136		9	8	56	35	56	29	6.0	0.03	0.05	Slow	"	
137		13	11	14	7	14	2	6.2	0.26	0.27	Quick	"	
138		17	6	5	23	5	20	5.8	0.02	0.08	Slow	"	
139		17	9	16	57	16	57	9.6	1.00	—	"	"	
140		19	8	1	26	1	22	8.5	0.41	0.32	"	"	

## TABLE A.

(Earthquakes)

No.	Date 1906	Time of Occurrence			Duration of Total Earthquake	Maximum Range of Motion		Character of Motion	Intensity	Remarks		
		(NS)	(EW)			(NS)	(EW)					
141	August 21	h 5	m 43	s 42	m 43	s 43	3.5	0.02	0.02	Slow	Feeble	
142	22	12	19	50	19	54	5.1	0.04	0.02	"	"	
143	25	16	52	4	52	4	4.9	0.02	0.03	"	"	
144	26	15	9	20	9	15	63.5	0.06	0.40	"	"	
145	26	21	19	0	18	54	5.8	0.04	0.06	"	"	
146	30	11	—	—	58	20	10.0	—	0.01	"	"	
147	31	9	45	35	45	37	12.0	0.22	0.25	"	"	
148	September 8	3	54	7	54	6	105.0	8.44	7.03	"	"	
149	8	12	—	—	49	40	9.0	—	0.02	"	"	
150	8	18	—	—	43	24	8.8	—	0.04	"	"	
151	9	4	14	6	14	12	5.8	0.02	0.01	"	"	
152	9	21	16	46	16	46	11.0	0.02	0.03	"	"	
153	12	22	—	—	10	20	1.5	—	0.01	Quick	"	Felt
154	13	3	17	29	17	25	5.2	0.07	0.07	Slow	"	
155	15	1	13	8	13	3	122.5	0.77	6.75	"	"	
156	17	13	17	36	17	49	46.0	0.55	0.50	"	"	
157	17	17	—	—	27	46	7.0	—	0.03	Quick	"	
158	22	18	—	—	34	39	1.0	—	0.01	"	"	
159	24	16	17	58	18	0	2.4	0.03	0.95	Slow	"	
160	29	21	51	32	—	—	3.2	0.01	—	"	"	
161	October 2	11	0	4	0	2	78.5	0.08	0.85	"	"	
161	4	0	5	6	5	2	4.2	0.17	0.24	Quick	"	
163	6	0	40	37	40	32	3.8	0.01	0.01	"	"	Felt
164	6	18	37	28	37	23	2.1	0.08	0.07	"	"	Felt
165	6	20	52	36	52	22	3.5	0.11	0.10	"	"	Felt
166	8	13	—	—	58	46	9.0	—	0.17	Slow	"	
167	9	7	25	29	25	23	3.3	0.11	0.10	Quick	"	
168	10	16	—	—	27	52	15.0	—	0.01	Very slow	"	
169	10	21	52	42	52	43	60.0	0.04	0.05	Quick	"	
170	11	23	45	23	45	16	4.1	0.11	0.11	"	"	
171	12	9	55	9	55	10	10.0	1.22	0.94	"	"	Felt
172	12	10	4	29	4	29	9.0	1.00	0.80	"	"	Felt
173	12	22	56	7	56	8	3.6	0.02	0.04	Slow	"	
174	13	23	21	3	21	3	7.0	0.13	0.12	"	"	
175	16	23	50	6	50	9	3.4	0.02	0.02	"	"	
176	17	18	47	36	47	38	37.9	0.08	0.10	"	"	
177	22	20	28	10	28	7	5.4	0.01	0.01	"	"	
178	23	12	13	52	13	51	6.4	0.02	0.02	"	"	
179	24	23	54	12	54	13	7.2	0.08	0.16	"	"	
180	27	7	24	2	23	53	7.3	0.44	0.40	"	"	Felt
181	29	1	—	—	0	1	18.3	—	0.05	"	"	
182	31	10	51	22	51	15	55.0	0.06	0.12	"	"	
183	November 4	0	—	—	0	7	13.6	—	0.02	"	"	
184	7	18	—	—	21	57	6.8	—	0.01	Quick	"	
185	8	9	41	55	41	58	38.0	0.11	0.39	Slow	"	
186	9	2	—	—	53	46	2.1	—	0.01	Quick	"	
187	12	23	8	28	8	29	3.0	0.01	0.01	Slow	"	
188	14	1	5	47	5	44	5.5	0.10	0.24	"	"	
189	15	2	47	54	47	45	48.0	0.07	0.10	"	"	
190	15	14	18	22	18	18	3.7	0.01	0.02	Quick	"	
191	19	7	39	21	39	22	5.4	0.02	0.02	Slow	"	
192	19	16	29	29	29	12	52.4	0.11	0.34	"	"	
193	23	5	20	36	20	15	5.3	0.11	0.12	Quick	"	
194	23	15	—	—	34	8*	2.8	—	0.01	Slow	"	
195	23	17	—	—	43	54*	3.6	—	0.04	Quick	"	
196	24	4	—	—	34	21*	3.0	—	0.06	Slow	"	
197	24	17	45	17*	45	8*	1.5	0.03	0.02	Quick	"	Felt
198	27	18	7	3*	7	3*	3.7	0.02	0.02	Slow	"	
199	December 4	20	41	8	41	3	1.4	0.02	0.02	Quick	"	
200	6	9	34	8	34	10	1.2	0.04	0.05	"	"	
201	12	13	11	45	11	51	10.8	0.06	0.07	Slow	"	
202	17	6	40	46	40	51	1.1	0.02	0.04	Quick	"	
203	19	10	26	35	26	18	55.0	0.33	0.64	Slow	"	
204	19	14	—	—	29	36	5.5	—	0.02	Quick	"	
205	23	3	29	6	28	57	74.2	0.94	1.57	Slow	"	
206	23	16	—	—	9	9	43.0	—	0.12	"	"	
207	24	2	29	48	—	—	60.0	0.06	—	"	"	
208	26	15	13	14	13	12	4.9	0.02	0.04	"	"	
209	27	3	—	—	14	14	4.7	—	0.06	"	"	
210	29	3	12	34	12	3	1.1	0.06	0.06	"	"	

\* The clock was then taken away for repair; the times are measured from the speeds of the rotations of the drums, and are therefore very inaccurate.

SEISMOLOGICAL OBSERVATIONS AT MIZUSAWA.

**TABLE B.**

(Pulsatory Oscillations)  
EW Component.

Beginning		Ending		Maximum		
Date 1905-06	Hour	Date 1906-07	Hour	Date 1905-06	Hour	Double Amplitude
December	30	January	1	December	30	
January	1		5	January	2	
	5		7		6	
	7		12		11	
	13		14		14	
	16		24		20	
	25		31		26	
February	1	February	3	February	2	
	5		8		5	
	9		13		10	
	14		16		14	
	17		18		18	
	18		21		19	
	21		27		25	
	27	March	5		28	
March	5		10	March	7	
	11		14		12	
	15		17		15	
	19		22		22	
	24		27		25	
	28		30		29	
	30	April	1	April	31	
April	3		8		5	
	8		12		10	
	16		20		17	
	22		25		24	
May	3	May	10	May	7	
	10		12		11	
	13		15		14	
	18		20		18	
	26		31		29	
June	4	June	6	June	6	
	7		8		7	
	10		12		10	
	14		16		15	
	19		27		20	
July	1	July	7	July	3	
	11		13		11	
	14		16		14	
	25		29		26	
August	3	August	5	August	4	
	7		11		9	
	17		18		18	
	24		27		25	
	29		31	September	1	
September	13	September	18		14	
	22		24		23	
	25		27		26	
October	1	October	5	October	4	
	6		10		6	
	11		14		12	
	24		28		26	
November	30	November	8	November	3	
	13		16		15	
	16		19		17	
	20		24		20	
December	27	December	1	December	30	
	1		4		3	
	5		8		7	
	8		12		10	
	14		15		15	
	17		19		19	
	19		25		20	
	25		29		26	
	29	January	1		31	