

ANNUAL REPORT
OF THE
METEOROLOGICAL
AND THE
SEISMOLOGICAL OBSERVATIONS
MADE AT THE
INTERNATIONAL LATITUDE OBSERVATORY
OF MIZUSAWA
FOR
THE YEAR 1936.

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

PUBLISHED BY THE INTERNATIONAL LATITUDE OBSERVATORY
OF MIZUSAWA.

1937.

The present report gives the results of the meteorological and seismological observations made at this observatory during the year 1936. No alteration has been made in the nature and methods of observation. But as the observing house hitherto used became too old, a new one was built in the direction of SE, and separated 30 metres from the old position, and all the meteorological and seismological instruments in the old house were removed here. The level of the two positions are the same, and the heights of the barometer, anemometer, and the wind vane are not changed. The dates of the removal of the chief instruments are as follows:

Nasu's seismograph.....	Jan. 31, 1936.
Omori's seismograph NS	Feb. 3 ,,
Omori's seismograph EW.....	Feb. 4 ,,
Barometer	Feb. 6 ,,
Wind vane.....	Feb. 6 ,,
Robinson anemometer	Feb. 7 ,,

The observations and the calculations were made by Messrs. M. Uchida, S. Satô, and I. Kumagai, under the superintendence of Mr. T. Ikeda.

The followings are to be noted with respect to the meteorological observations:

Hours of observation—*Japanese Central Standard Time* (i.e. mean time of the meridian 9h east from Greenwich) is adopted.

Air Pressure.—The barometric readings in millimetres are reduced to the freezing point of water, the corrections to sea level and to standard gravity are given at the bottom of the page for each month.

Air and Earth Temperatures.—The degrees are given in Centigrade.

**Wind*.—The velocity is expressed in metres per second. The direction was observed relative to the sixteen points of the compass.

Cloud.—The amount is estimated by the scale 0-10, the forms are those of the *International classification*, and the direction of motion is indicated relative to the sixteen points of the compass.

Tension of Water Vapour.—is given in millimetres.

Relative Humidity.—is given in percentages.

Precipitation.—The amount is given in millimetres.

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

Duration of Sunshine.—is recorded by a Jordan sunshine-recorder.

Amount of Evaporation.—is given in millimetres, for each day,—that is from 10h of the day in question to 10h of the next day, according to the instruction of the Central Meteorological Observatory in Tôkyô.

The heights of the meteorological instruments are as follows,

Barometer.—63.1 m above sea level.

Air temperature thermometer.—1.3 m above the ground.

Anemometer.—15.4 m above the ground.

Wind vane—16.6 m above the ground.

* Note:—The wind velocity is observed by the Robinson anemometer. Since January first of the year 1925 a new factor for this instrument has been used. The ratio of the new factor to the old one is 0.7/1.0.

In recording the meteorological phenomena the following symbols are used :—

●	Rain	∇	Silver thaw	⌘	Oceanic noise
✱	Snow	~	Glazed frost	∞	Yellow dust
⌘	Thunder storm	⊞	Ice	0	Unusual visibility
⊞	Thunder without lightning	⊕	Snow drift	∞	Red sky
<	Lightning without thunder	←	Ice crystals	C	Cirrus
△	Graupel	⊙	Earthquake	CS	Cirro-stratus
▲	Hail	⊙	Solar corona	CK	Cirro-Cumulus
≡	Mist, Fog	⊕	Solar halo	KC	Alto-Cumulus
⊞	Hoar frost	∪	Lunar Corona	SC	Alto-stratus
⊞	Ice column in ground	∪	Lunar halo	SK	Strato-cumulus
△	Dew	∇	Gale	N	Nimbus
⊞	Frozen dew	∪	Rainbow	K	Cumulus
⊞	Frozen rain	∪	Aurora	KN	Cumulo-nimbus
∞	Wave cloud	∪	Zodiacal light	S	Stratus
⊞	Snow lying	∞	Haze		

The descriptions of the meteorological instruments are found in the annual reports for the years 1902, 1904, 1905, 1910, and 1916.

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.

	EW Component Apparatus	NS Component Apparatus
Period of free oscillation	16 seconds	36 seconds
Multiplication of the pointer	100 times	20 times
Weight of heavy cylinder	45.0 kilograms	17.6 kilograms
Horizontal distance of the centre of the cylinder from the point of support.	20 Centimetres	75 Centimetres
Vertical distance between the points of support and suspension.	104 Centimetres	104 Centimetres

July, 1937

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

SEISMOLOGICAL OBSERVATIONS

Remarks :—

1. The intensities of the earthquakes are divided into the following seven classes according to the Central Meteorological Observatory of Japan.

Not felt	0.
Felt	1. slight
	2. moderate
	3. rather strong
	4. strong
	5. very strong
	6. disastrous

2. The approximate epicentres of the chief earthquakes are given, which are extracted from the "Kisyô-Yôran" issued monthly by the Central Meteorological Observatory of Japan.
3. The time adopted in the Seismological observations is Greenwich Civil Time.
4. Symbols and notations.

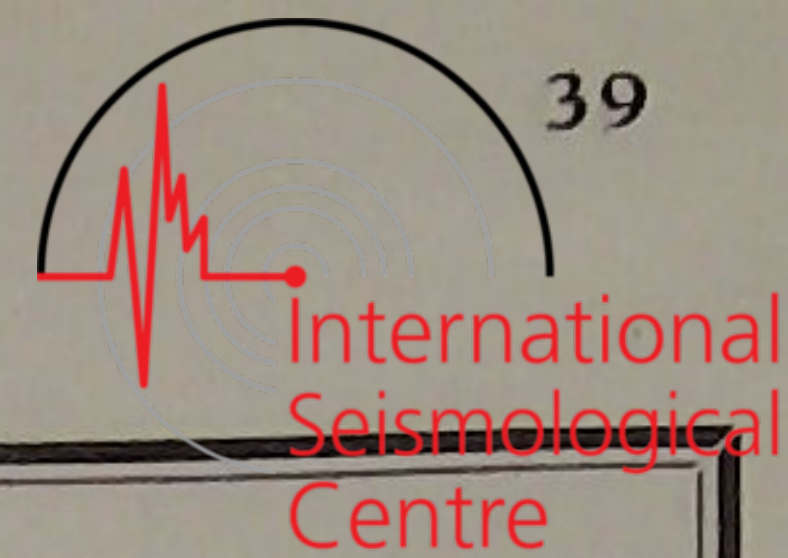
- i* Sudden beginning of the motion.
- e* Gradual beginning of the motion.
- ? Doubtful phase.
- * Out of order of the instrument.
- ⊕ Out of the range of the instrument.



EARTHQUAKES, 1936.

Table with columns for No., Date 1936, P (E, W, N, S), S (E, W, N, S), L (E, W, N, S), Maximum Range of Motion (E, W, N, S), Duration of Total Earthquake, Intensity, and Approximate Epicenter. Rows include dates from July to September 1936 with associated seismic data and location names like Kasima-Nada, Off Iwaki, Lower valley of R. Niikappu, Off Miyako, S off Daito, Neighbourhood of Sikotan Is., E off Hokkaido, NE off Etoroff Is., and SE off Hatizyo Is.

EARTHQUAKES, 1936.



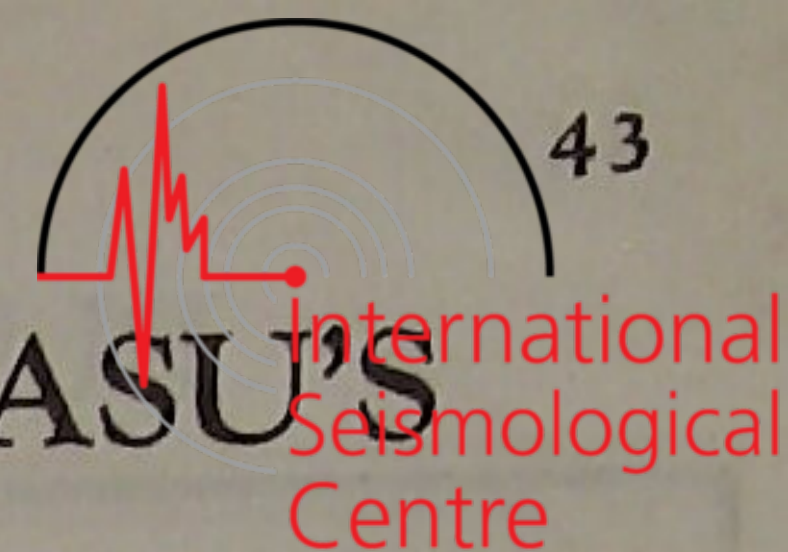
No.	Date 1936	P				S				L				Maximum Range of Motion				Duration of Total Earthquake	Intensity	Approximate Epicenter
		E	W	N	S	E	W	N	S	E	W	N	S	E	W	N	S			
		h	m	s	m	s	m	s	m	s	m	s	mm	mm	m					
276	Sept. 4	16	-	-	-	-	e 17 02	-	-	-	-	-	0.01	-	2.7	0				
277	4	e 22 14 51	-	-	-	-	i 15 31	e 15 31	-	-	-	-	0.02	-	4.6	0				
278	5	i 22 48 48	e 48 47	-	-	-	i 49 03	49 03	-	-	-	-	0.03	0.03	3.0	0	Off Mouth of R. Omoto (Iwate)			
279	7	23	-	-	-	-	-	-	-	-	-	-	-	-	-	0				
280	7	e 23 55 49	-	-	-	-	i 56 10	56 12	-	-	-	-	0.07	0.12	5.7	0	NE off Kuzi			
281	8	e 0 37 33	e 37 34	-	-	-	i 38 01	i 38 01	-	-	-	-	0.05	0.06	5.5	0	NE off Cape Siriya			
282	8	e 2 42 53	-	-	-	-	e 43 56	e 43 54	-	-	-	-	0.02	-	6.0	0				
283	12	7	-	-	-	-	e 03 28	-	-	-	-	-	0.00	-	1.9	0				
284	12	e 10 58 06	-	-	-	-	i 59 02	e 59 00	-	-	-	-	0.03	0.04	5.9	0	Kuzyukuri Coast			
285	14	e 0 23 32	e 23 30	-	-	-	i 23 51	i 23 51	-	-	-	-	0.17	0.19	6.1	0	E off the mouth of R. Ukedo			
286	14	e 1 22 12	-	-	-	-	e 22 33	-	-	-	-	-	0.01	-	2.5	0				
287	14	6 56 56	e 56 57	-	-	-	57 24	e 57 27	-	-	-	-	0.02	0.05	4.3	0	Neighbourhood of Ootose (Yamagata)			
288	14	? 9 21 56	? 21 55	-	-	-	e 22 10	e 22 09	-	-	-	-	-	-	3.1	0				
289	14	? 9 25 24	-	-	-	-	e 25 38	-	-	-	-	-	-	-	5.1	0				
290	15	3	-	-	-	-	? 58 03	-	-	-	-	-	-	-	2.2	0				
291	16	? 5 15 30	-	-	-	-	i 15 51	e 15 50	-	-	-	-	0.04	-	4.8	0				
292	16	e 10 31 29	-	-	-	-	i 31 52	e 31 49	-	-	-	-	0.01	-	4.3	0				
293	18	e 8 28 43	e 28 42	-	-	-	i 29 23	i 29 24	-	-	-	-	0.07	0.08	5.5	0	Neighbourhood of Urakawa			
394	18	e 18 40 28	e 40 29	-	-	-	i 41 52	41 52	-	-	-	-	0.06	0.15	33.2	0				
295	19	e 1 11 02	e 11 04	-	-	-	e 18 38	e 18 37	24 38	24 38	-	-	-	3.17	82.0	0				
296	20	i 6 05 12	e 05 11	-	-	-	i 05 26	i 05 25	-	-	-	-	0.21	0.23	4.8	0	Neighbourhood of Miyako			
297	22	5	-	-	-	-	? 56 42	-	-	-	-	-	-	-	2.0	0				
298	23	e 19 26 03	-	-	-	-	26 49	-	-	-	-	-	0.01	-	3.6	0				
299	23	e 19 37 18	-	-	-	-	37 57	-	-	-	-	-	0.01	-	4.7	0				
300	25	e 5 40 52	-	-	-	-	e 42 32	-	-	-	-	-	-	-	8.2	0				
301	25	e 6 48 30	-	-	-	-	i 49 20	-	-	-	-	-	0.02	-	7.2	0				
302	25	13	-	-	-	-	-	-	-	-	-	-	-	-	-	0				
303	26	6	-	-	-	-	e 39 45	-	-	-	-	-	0.01	-	2.6	0				
304	26	e 19 25 14	-	-	-	-	25 41	-	-	-	-	-	0.01	-	4.3	0				
305	27	e 13 03 04	e 03 06	-	-	-	i 03 38	e 03 37	-	-	-	-	0.06	0.09	7.0	0	Kasima-Nada			
306	28	e 21 07 22	-	-	-	-	07 55	-	-	-	-	-	0.01	-	3.3	0				
307	30	e 3 45 06	-	-	-	-	i 45 46	-	-	-	-	-	0.04	-	6.5	0	Neighbourhood of Torite (Ibaragi)			
308	Oct. 1	4 38 56	-	-	-	-	i 39 13	-	-	-	-	-	0.02	-	3.2	0				
309	4	16 54 01	-	-	-	-	54 12	-	-	-	-	-	0.01	-	2.2	0				
310	5	i 5 29 29	i 29 29	-	-	-	29 39	29 42	-	-	-	-	0.51	0.45	5.4	2	Oozuti Bay			
311	5	e 7 12 35	-	-	-	-	13 35	-	-	-	-	-	0.00	-	6.3	0				
312	5	i 9 51 57	i 51 56	-	-	-	i 57 57	i 57 56	-	-	-	-	0.08	0.10	35.1	0				
313	5	e 20 21 41	-	-	-	-	22 21	-	-	-	-	-	0.01	-	3.8	0				
314	7	4	-	-	-	-	e 21 46	-	-	-	-	-	-	-	3.7	0				
315	8	e 19 28 35	-	-	-	-	29 08	-	-	-	-	-	0.01	-	3.4	0				
316	8	e 20 29 03	-	-	-	-	29 55	-	-	-	-	-	0.01	-	4.6	0				
317	9	e 1 16 59	-	-	-	-	17 32	-	-	-	-	-	-	-	3.0	0				
318	9	e 17 59 23	-	-	-	-	i 59 49	-	-	-	-	-	0.02	-	3.5	0				
319	10	e 3 25 27	-	-	-	-	25 43	-	-	-	-	-	0.01	-	3.0	0				
320	10	e 17 14 14	-	-	-	-	i 14 37	-	-	-	-	-	0.01	-	1.9	0				
321	11	e 17 17 18	-	-	-	-	17 37	-	-	-	-	-	0.01	-	1.7	0				
322	12	5	-	-	-	-	? 37 56	-	-	-	-	-	-	-	1.4	0				
323	12	11	-	-	-	-	? 06 42	-	-	-	-	-	-	-	1.4	0				
324	13	e 6 38 58	-	-	-	-	e 40 01	-	-	-	-	-	0.01	-	4.7	0				
325	15	15	-	-	-	-	e 47 12	-	-	-	-	-	0.01	-	2.0	0				
326	16	e 19 48 58	-	-	-	-	i 49 34	-	-	-	-	-	0.02	-	5.9	0				
327	17	8	-	-	-	-	e 52 53	-	-	-	-	-	-	-	1.5	0				
328	17	12	-	-	-	-	e 07 19	-	-	-	-	-	0.01	-	3.2	0				
329	18	i 0 48 21	-	-	-	-	i 48 37	-	-	-	-	-	0.04	-	4.7	0	Off the mouth of R. Abukuma			
330	18	e 16 26 11	-	-	-	-	26 52	-	-	-	-	-	0.01	-	3.3	0				

EARTHQUAKES, 1936.



No.	Date 1936	P				S				L				Maximum Range of Motion				Duration of Total Earthquake	Intensity	Approximate Epicenter
		E	W	N	S	E	W	N	S	E	W	N	S	E	W	N	S			
441	Dec. 27	h	m	s	m	s	m	s	m	s	m	s	m	s	mm	mm	m	0	After Shock of No. 438	
442	27	e 12	33	12	-	-	e 34	17	e 34	15	-	-	-	-	-	-	5.9	0	" " " "	
443	28	e 13	45	43	e 45	42	e 47	00	e 46	56	-	-	-	-	0.01	-	9.3	0	" " " "	
444	28	e 14	02	59	e 03	02	i 04	10	i 04	10	-	-	-	-	0.07	0.07	6.8	0	Off Sikotan Is.	
445	29	e 17	21	13	e 21	14	e 22	23	e 22	22	-	-	-	-	0.04	0.07	14.3	0	After shock of No. 438	
		e 8	29	00	-	-	e 29	23	-	-	-	-	-	-	0.01	-	3.6	0	Off Cape Sioya	
446	29	e 14	25	59	-	-	? 26	27	-	-	-	-	-	-	0.01	-	3.6	0		
447	29	e 14	55	51	e 55	53	e 56	55	e 56	53	-	-	-	-	0.02	-	20.8	0		
448	30	4			-	-	e 12	00	-	-	-	-	-	-	-	-	4.0	0		

CHIEF EARTHQUAKES OBSERVED WITH NASU'S SEISMOGRAPH, 1936.



Instrument; Nasu's seismograph with three components.

Remarks:

Instrumental constants

Component	V	T ₀	γ/T_0^2	Mass
E-W	25	6.1	0.007	7.2 kgr.
N-S	25	6.0	0.013	7.2
Vertical	25	5.3	0.048	4.4

1. Direction of the earth's displacement; positive towards north, east, and upward respectively.
2. ⊕ Out of the range of the instrument.
3. × Too feeble to measure.
4. ✕ Out of order of the instrument.

No.	Date	P			S			Maximum Amplitude			First Motion			Epicenter
		mean of 3 comp.			mean of 3 comp.			E-W	N-S	Vertical	E-W	N-S	Vertical	
		h	m	s	m	s	μ	μ	μ	μ	μ	μ		
10	Jan. 8	22	20	55	21	07	- 40	- 52	✕	×	×	✕	Isinomaki Bay	
26	29	18	28	02	28	23	- 130	+ 190	+ 82	×	×	×	SE off Cape Siriya	
45	Feb. 21	1	09	41	11	23	+ 124	- 140	+ 60	×	×	×	Kawati (Yamato)	
56	Mar. 1	10	24	05	25	48	+ 130	+ 100	+ 52	×	×	×	N off Cape Siretoko (deep)	
58	2	3	20	01	20	41	>2900	+1550	- 528	- 24	- 26	+ 28	SE off Cape Erimo	
72	11	0	44	25	44	49	-1280	-2640	- 500	- 84	- 20	+ 84	E off Miyako	
73	11	1	50	41	51	06	+ 60	+ 100	+ 40	×	×	×	E off Miyako	
108	Apr. 15	19	19	23	19	50	- 140	+ 268	+ 142	×	×	×	E off Cape Siriya	
166	June 3	2	56	18	56	49	+ 900	- 708	+ 544	×	×	×	E off Cape Siriya	
172	8	6	27	01	27	12	- 214	- 160	- 74	+ 16	- 28	- 40	Sizugawa Bay	
195	27	21	14	57	16	02	- 98	- 222	- 70	×	×	×	Off Cape Otiisi	
226	July 15	1	55	38	56	10	+ 200	+ 468	- 60	×	×	×	Kasima-Nada	
230	18	15	49	06	49	27	+ 104	+ 120	- 64	×	×	×	Off Iwaki	
262	Aug. 22	6	56	49	61	04	+ 244	- 170	+ 120	- 40	- 44	- 44	Off Daito	
285	Sept. 14	0	23	32	23	50	+ 80	- 100	+ 64	×	×	×	E off the mouth R. Ukedo	
296	20	6	05	11	05	24	- 98	+ 112	+ 86	×	×	×	Neighbourhood of Miyako	
310	Oct. 5	5	29	29	29	40	- 240	- 220	- 184	+ 42	+ 32	- 48	Ozuti Bay (Iwate)	
312	5	9	51	56	57	53	- 80	+ 86	+ 48	- 20	- 41	- 48	Distance	
345	25	15	31	34	32	29	- 242	+ 204	+ 68	×	×	×	SSE off Cape Nozima	
359	Nov. 2	20	46	16	⊕		>4000	>3600	>4200	+ 280	- 320	- 308	E off Kinkwazan	
374	10	15	17	32	17	48	- 118	- 100	+ 40	×	×	×	S off Kinkwazan	
378	12	2	20	41	24	42	+ 138	- 54	+ 14	×	×	×	Mariana Is.	
379	12	20	06	43	08	10	- 122	+ 138	- 60	×	×	×	Neighbourhood of Etoroff Is.	
392	17	19	54	07	54	20	+ 132	+ 138	+ 72	+ 20	- 26	- 48	E off Kinkwazan	
398	21	21	48	25	48	42	- 870	- 774	- 218	+ 38	- 60	- 44	SE off Kinkwazan	
435	Dec. 23	22	56	17	56	42	+ 74	- 74	- 60	×	×	×	Off Cape Sioya	
438	27	0	15	59	16	58	- 470	- 452	+ 78	×	×	×	Niisima	

PULSATORY OSCILLATIONS, 1936 (EW Component.)



No.	Beginning			Ending			Maximum				Double Amplitude
	Date			Date			Date				
	Month	Day	Hour	Month	Day	Hour	Day	Hour	Day	Hour	
1	Dec. (1935)	31	17	January	1	15	1	0	1	2	3
2	January	2	11		3	5	2	23	3	1	10
3		3	10		8	1	4	1	4	4	6
4		12	7		16	2	13	21	13	23	4
5		16	9		19	11	17	23	18	1	6
6		25	2		28	10	25	17	25	20	20
7		29	13		30	17	30	6	30	8	4
8	February	30	20	February	3	24	1	2	1	5	6
9		4	11		6	8	4	18	4	20	11
10		18	0		19	2	18	4	18	6	5
11		24	9		25	15	24	17	24	20	3
12		28	5		29	23	29	1	29	3	8
13	March	3	21	March	5	6	4	2	4	4	3
14		8	16		11	3	10	2	10	4	5
15		17	18		19	13	18	0	18	2	13
16	April	3	3	April	6	10	3	14	3	16	21
17		9	2		10	10	9	15	9	17	10
18		12	23		14	14	13	14	13	17	10
19		18	5		20	22	18	20	18	21	4
20		22	9		23	11	22	22	22	24	5
21		24	21		27	13	25	14	25	16	11
22	May	23	5	May	25	11	23	22	23	24	3
23	June	29	0	June	30	7	29	8	29	11	4
24	July	9	11	July	12	9	10	0	10	2	6
25	September	21	1	September	22	12	21	20	21	22	4
26		26	18		30	20	27	23	28	2	9
27	October	3	0	October	5	10	3	9	3	11	17
28		12	21		15	12	14	4	14	6	6
29		17	17		18	19	18	5	18	7	4
30		19	16		24	4	20	5	20	8	3
31		26	10		28	9	27	2	27	4	10
32	November	1	1	November	2	10	2	0	2	2	6
33		4	5		5	11	5	0	5	2	9
34		10	20		13	15	12	5	12	7	7
35		22	0		23	7	22	15	22	18	10
36		23	18		25	13	24	4	24	7	5
37	December	27	0	December	29	12	28	7	28	9	6
38		2	0		3	11	2	9	2	11	4
39		17	22		19	4	18	15	18	17	11