東京帝國大學地震研究所

地震觀測報告

昭和八年 第一册

SEISMOMETRICAL REPORT

OF THE

EARTHQUAKE RESEARCH INSTITUTE

TOKYO IMPERIAL UNIVERSITY

1933

Part 1

(January 1.—March 31, 1933)

Published by the Institute
Tokyo 1933

Seismometrical Report.

(Earthquake Research Institute, Tôkyô, Japan.)

(Part 1, 1933.)

(January 1.—March 31, 1933.)

(1) Sensible earthquakes in Tôkyô for the period January 1.—March 31, 1933.

List I.

Time = Central standard time of Japan (Mean solar time of the meridian 135°E.)

Notation :

Prel. tr. = Preliminary tremor.
N. S. = North-South component.
E. W. = East-West component.
2A = Range of motion.
T = Period of earthquake motion.
λ = Longitude.
φ = Latitude.

Intensity ; 0 (insensible), I (slight), II (rather weak), III (weak), IV (rather strong), V (strong), VI (violent).

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
1	Tôkyô	Jan. 20	4 55 48·1	10·5	4	30	0·47	35	0·42		139·96	36·22	60	I
	Mitaka		4 55 49·8	11·0	2·5	12	0·40	16	0·40					
	Tukuba		4 55 44·0	7·2	1·8	15	0·20	15	0·20					I
	Kamakura			14·4	1·5	14	0·52	12						
	Misaki			16·1	3	12	0·49	13	0.49					
	Kiyosumi			17·1	2.5	8	0·55							
	Titibu			12·0	2	12	0·65	7	0·47					
	Tôgane			12·0	2	12	0·74	12	0·74					
	Sakura			10·5	2	16	0·54	16	0·63					
	Itô			18·2	1	20		20						

(to be continued.)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s				km	
	Koyama			16·0	2	40	0·20	32	0·25					
2	Tôkyô	Jan 25	6 10 53·0	19·5	5	52	0·65	44	0·65		141.05	36·30	50	I
	Mitaka		6 10 55·5	20.3	5	26	0·82	40	0·82					
	Tukuba		6 10 43·6	24·6	4	24	0·36	36	0·41					
	Kamakura			22·0	5	60	0·56	40	0·90					
	Misaki			25·7	5	22	0·57	21	0·57					
	Kiyosumi		6 10 56·3	24·7	5	12	0·83	8	0·85					
	Titibu			25·3	5	40	0·93	30	0·85					
	Tôgane			17·2	5	22	0·72	14	0·72					I
	Sakura			16·8	5	36	0·68	44	0·68					I
	Itô			28·6	2	28	0·45	12	0·60					
	Koyama			30·0	5	76	1·20	88	1·00					
3	Tôkyô	Feb. 2	2 04 09·9	11·0	3	26	0·25	24	0·25		139·04	35·46	30	I
	Mitaka		2 04 05·5	8·8	3	20	0·47	24	0·47					
	Tukuba													
	Kamakura			7·1	2	36	0·32	68	0·32					
	Misaki			8·9	2	24	0·40	37	0.40					
	Kiyosumi			13·9	2	2	0·74	4	0·74					
	Titibu			8·6	2	20	0·57	20	0·48					
	Tôgane			15·0	3	4	0·87	3	0·70					
	Sakura			13·8	3	8	0·80	4	0·48					
	Itô			7·0	1·5	24		40						
	Koyama			4·0	3	860	0·43	932	0·43					II
4	Tôkyô	7	9 13 00·8	8·0	5	260	0·22	330	0·24		140·00	36·10	40	II
	Mitaka		9 13 00·9	8·1	4	56	0·26	80	0·26					
	Tukuba		9 12 57·0	5·5	2·2	330		170		N45°E				III
	Kamakura			10·5	5	26	0·32	56	0·32					
	Misaki			12·7	4	36	0·40	48	0·55					
	Kiyosumi													
	Titibu			9·0	4	60	0·38	42	0·20					
	Tôgane			8·6	4	20	0·36	16	0·49					
	Sakura			7·8	4	110	0·31	80	0·31					
	Itô			15·6	2	24		28						
	Koyama			15·2	3	200	1·00	96	0·60					
5	Tôkyô		12 58 05·3	51·1	17	165	0·73	176	0·85		138·28	32·46		I
	Mitaka		12 58 02·3	52·6	10	80	0·70	76	0·70					
	Tukuba													
	Kamakura			50·5	8	94	0·49	48	0·49					
	Misaki			45·6	12	167	2·02	154	2·18					
	Kiyosumi			50·6	10	310	2·91	160	2·91					
	Titibu			55·4	10	48	2·72	75	2·72					
	Tôgane			51·5	12	156	1·61	124	2·09					
	Sakura			51·7	12	180	2·50	624	2·50					
	Koyama			50·5	10	352	0·90							
6	Tôkyô	13	15 51 16·8	13·6	12	414	0·81	404	0·81	N60°E	140·83	36·14	30	II
	Mitaka		15 51 17·5	14·4	8	710	2·01	580	2·01	N45°E, d				
	Tukuba		15 51 10·2	8·7	6	370		386						II
	Kamakura			21·0	8·5	420	2·80	430	2·80					I

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s				km	
	Misaki													
	Kiyosumi		15 51 19·1	14·3	10	406	2·83	290	2·57					I
	Titibu			21·5	9	126	1·46	124	1·46					
	Tôgane			11·6	14	320	0·62	400	0·83					III
	Sakura			11·3	12	480	0·61	530	0·61					III
	Itô			30·5	7	128		120						
	Koyama			26·9	8	432	2·00	776	3·50					
	Yosiwara			32·5	8	424		900						
7	Tôkyô	Feb. 20	20 58 32·3	8·5	4	56	0·31	132	0·31		140·11°	35·82°	50	I
	Mitaka		20 58 34·2	10·3	2·5	30	0·40	42	0·40					
	Tukuba		20 58 32·7	9·6	1·5	4	0·16	3	0·16					I
	Kamakura			11·6	1·5									I
	Misaki			11·4	4	82	0·53	50	0·40					
	Kiyosumi													
	Titibu			13·7	3	20	1·01	24	1·01					
	Tôgane			8·6	4	70	1·44	28	1·15					
	Sakura			8·5	3	16	0·72	40	0·58					
	Itô			14·9	1·5	24		32						
	Koyama			14·0	2	44	0·30	40	0·38					
	Yosiwara			16·0	2·5	32		24						
8	Tôkyô	21	11 53 38·5	12·6	10	190	2·02	374	2·02		140·54	35·88	50	I
	Mitaka													
	Tukuba		11 53 35·2	8·8	3	34	0·65	47	0·73					I
	Kamakura			14·3	5·5	68	0·30	10	0·30					
	Misaki			16·0	5	108	1·73	54	1·73					
	Kiyosumi		11 53 39·7	13·4	9	60	0·95	80	0·95					II
	Titibu			19·5	5	28	1·19	20	0·99					
	Tôgane			8·3	9	220	1·07	276	1·07					I
	Sakura													
	Itô			23·5	5	24		33						
	Koyama			24·5	4	104		152						
9	Tôkyô	25	22 18 59·5	19·0	4	42	0·55	50	0·55		140·95	36·43		I
	Mitaka													
	Tukuba		22 18 56·1	11·7	2·5	20	0·32	18	0·32					
	Kamakura													
	Misaki			25·0	4	17	0·62	21	0·55					
	Kiyosumi			24·0	3	14	2·22	14	1·23					
	Titibu			22·3	3	20	0·47	12	0·50					
	Tôgane			16·8	3	14	0·73	30	0·73					
	Sakura													
	Itô			30·0	2	24		24						
	Koyama			29·0	2·5	64		56						
10	Tôkyô	March 3	2 32 14·1	66·0	120	107000	14.00	124000	14·0	S50°Wu.	144·00	38·50		III
	Mitaka		2 32 14·7											III
	Tukuba		2 32 0·47	57·0	50									
	Kamakura		2 32 21·9	68·0	90	24500	6·60	29650	6.60	S42°Wu.				III
	Misaki									S30°Wu.				III
	Kiyosumi		2 32 19·7	68·3						S45°Wu.				III
	Titibu									S50°Wu.				III

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motio				Direction of initial motion	Epicentre			
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)	Depth	Intensity
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s				km	
	Tôgane									S41°W				III
	Sakura									S43°W				III
	Itô									S52°W				II
	Koyama									S51°W				II
11	Tôkyô	March 3	20 46 56·8	12·2	10	326	1·03	264	0·95		140·86	35·85	30	I
	Mitaka		20 46 59·4	13·5	6	220	1·80	340	2·00					
	Tukuba		20 46 55·1	8·6	3									I
	Kamakura		20 47 01·1	14·4	6	120	0·69	370	1·48					
	Misaki			14·6	10	158	1·17	125	0·88					I
	Kiyosumi			10·5	6	128	1·10	378	0·83					
	Titibu			19·7	5	94	1·50	104	2·17					
	Tôgane													
	Sakura			7·6	10	780	1·00	550	1·38					II
	Itô			20·5	5	86		60						
	Koyama			20·1	6	260	1·00	295	1·60					
12	Tôkyô	12	4 34 50·4	96·0	60	410	3·95	413	3·45					I
	Mitaka		4 34 50·2	98·9	50	540	7·53	710	6·93					
	Tukuba		4 34 54·9	104·8	11	68	0·88	3	0·48					
	Kamakura													
	Misaki			91·5	20	180	2·68	134	2·68					I
	Kiyosumi			92·0	20	410	4·20	720	5·00					I
	Titibu			104·1	12	188	4·00	190	3·75					
	Tôgane			95·0	30	540	4·80	260	4·78					
	Sakura			95·5	30	564	3·73	370	2·16					
	Itô			91·0	11	273		200						
	Koyama			95·5	72	620		680						
13	Tôkyô	12	23 26 49·1	9·8	2	30	0·40	30	0·24		140·00	36·02	60	I
	Mitaka		23 26 47·9	10·7	2	16	0·28	12	0·28					
	Tukuba		23 26 50·9	7·6	1	6	0·16	4	0·19					
	Kamakura			11·3	1	22	0·53	28	0·53					
	Misaki			12·2	1,5	10	0·48	9	0·36					
	Kiyosumi			14·9	1	3	0·74	4	0·74					
	Titibu			12·1	1	5	0·36	3	0·36					
	Tôgane			10·9	2	6	0·48	4	0·48					
	Sakura													
	Koyama			12·4	1	24		24						
14	Tôkyô	26	20 13 10·3	8·9	1·5	26	0·39	46	0·39		139·73	36·12	40	I
	Mitaka		20 13 12·5	8·5	1·5	20	0·35	10	0·23					
	Tukuba		20 13 15·8	6·4	1	10	0·16	10	0·16					I
	Kamakura		20 13 14·7	8·5	1	20	0·30	36	0·50					
	Misaki			8·8	1·5	9	0·46	12	0·61					
	Kiyosumi		very faint											
	Titibu			9·6	1	7	0·45	3	0·45					
	Togane			9·2	1	10	0·45	12	0.45					
	Sakura			8·8	1	14	0·32	10	0·49					

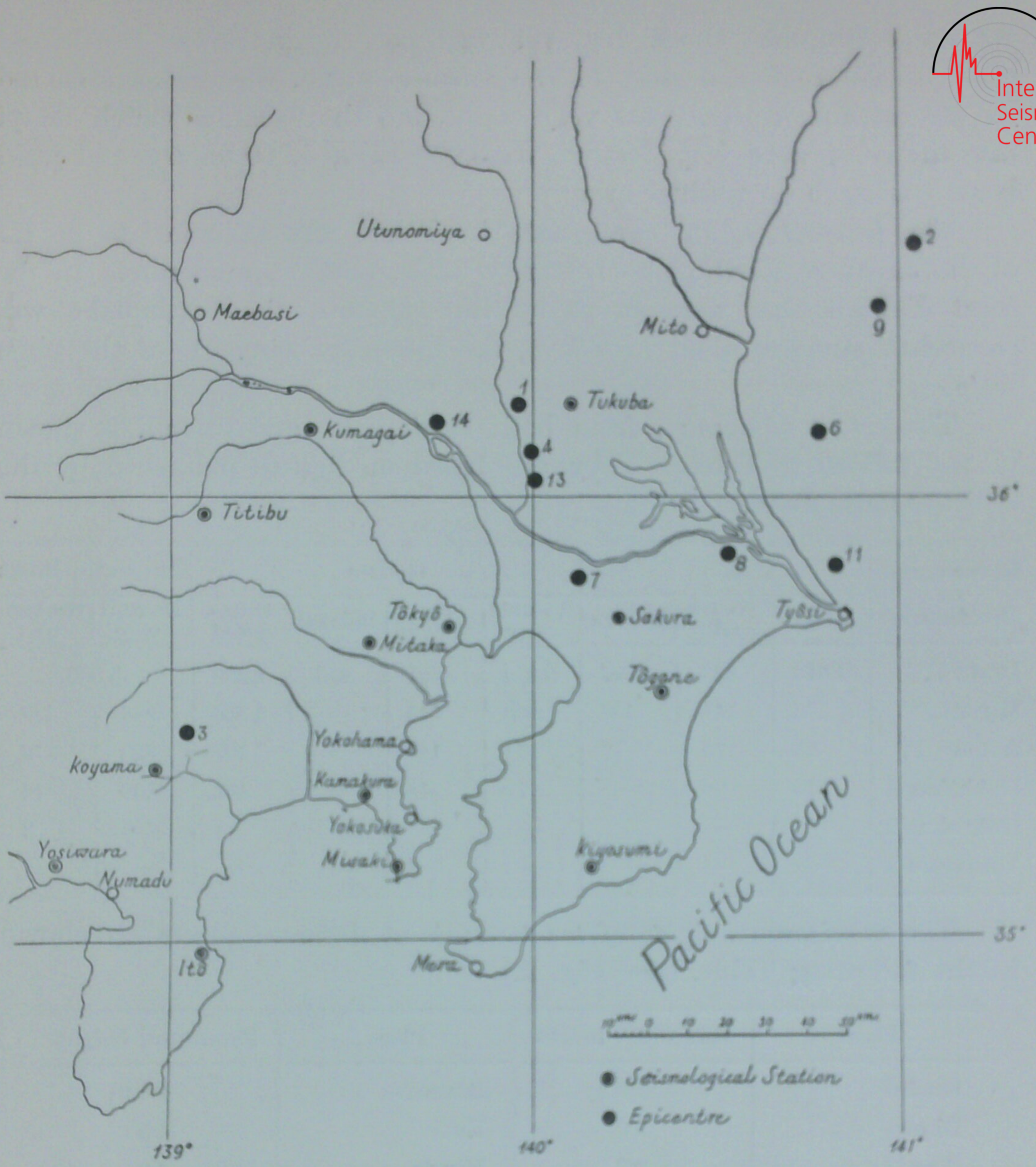


Fig. 1. Distribution of the epicentres of the Tôkyô sensible earthquakes within a distance of 160km. from Tôkyô for the period January 1—March 31, 1933.
(Figures attached to each dot correspond to the earthquake number in List I.)

The Earthquake and the Seismic Sea-wave (Tunami) of Northeast Japan, March 3, 1933.

On March 3, 1933, at 2h 32m (March 2, 18h 32m G. M. T.) northeast Japan was shaken by a strong earthquake, followed 25–40 minutes later by huge seismic sea-waves that swept the coast of the same region.

As the earthquake shock however was not so destructive to houses even in the region nearest to the seismic origin, the damages caused by the earthquake itself was very slight, but the tunamis which swept into the coast were very destructive, 3,000 lives, 4,000 houses, and 8,000 boats having been washed away.

The *intensity of the earthquake* in Tôkyô was estimated to be III of the Japanese Earthquake Intensity Scale, namely, moderate. In the coast districts that were swept by the tunamis, the earthquake was somewhat stronger than in Tôkyô, the intensity being IV of the same scale.

The *extent of damage* from both earthquake and tunami is shown in the following Table. They are based on figures published by the Police Affairs Bureau.

Government or Prefecture	Men			Houses				Ships and Boats	
	Killed	Wounded	Missing	Washed away	Destroyed	Burned	Inundated	Drifted away	Broken up
Iwate P.	1,316	823	1,397	2,914	1,121	216	2,259	5,860	
Miyagi P.	170	145	138	950	528	—	1,520	948	425
Aomori P.	23	70	7	151	113	—	107	320	312
Hokkaido G.	13	54	—	19	48	—	131	162	44
Hukusima P.	—	—	—	—	—	—	1	5	2
Yamagata P.	—	—	—	—	7	—	—	—	—

The *maximum heights of the tunamis* at different places are shown in the following Table. (See Fig. 2.)

Place	Maximum height	Place	Maximum height
Kusiro	0·6 m	Hatinohe	4·0 m
Birowo	3·0	Kuzi	4·5
Horoidumi	2·7	Miyako	4·0
Urakawa	1·8	Yamada	4·5
Tomakomai	1·0	Kamaisi	4·8
Muroran	0·6	Ryôri	8·5
Hakodate	0·7	Isatomae	3·3
		Okati	4·0

The epicentre of the earthquake. The initial earthquake motion in Tôkyô was upward, with azimuth S50°W. The duration of the preliminary tremors was 66 sec., and the focal distance deduced by Omori's

formula came out as 490km., so that the epicentre of this earthquake may be placed approximately at 144°E. 38·5°N.

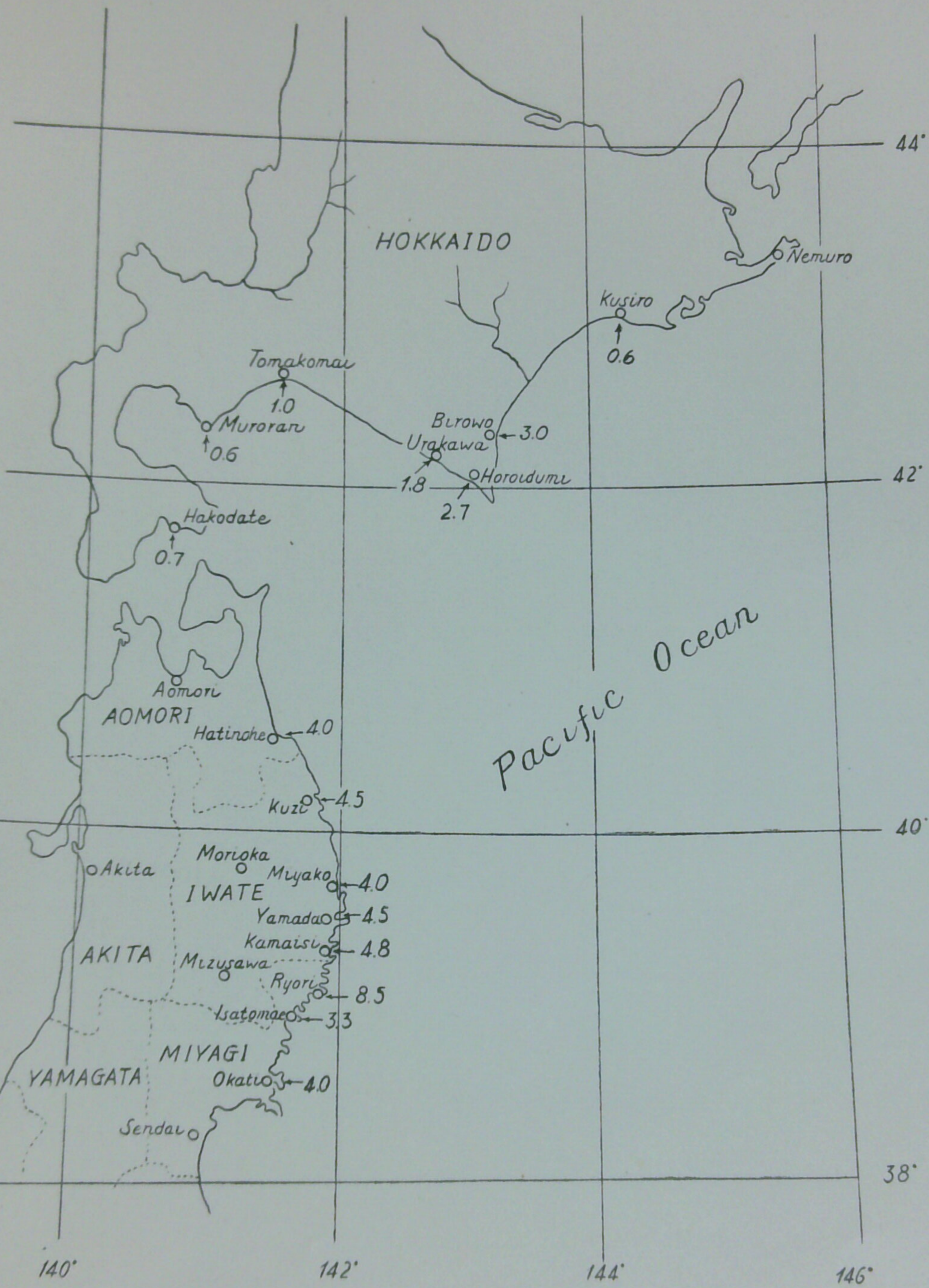
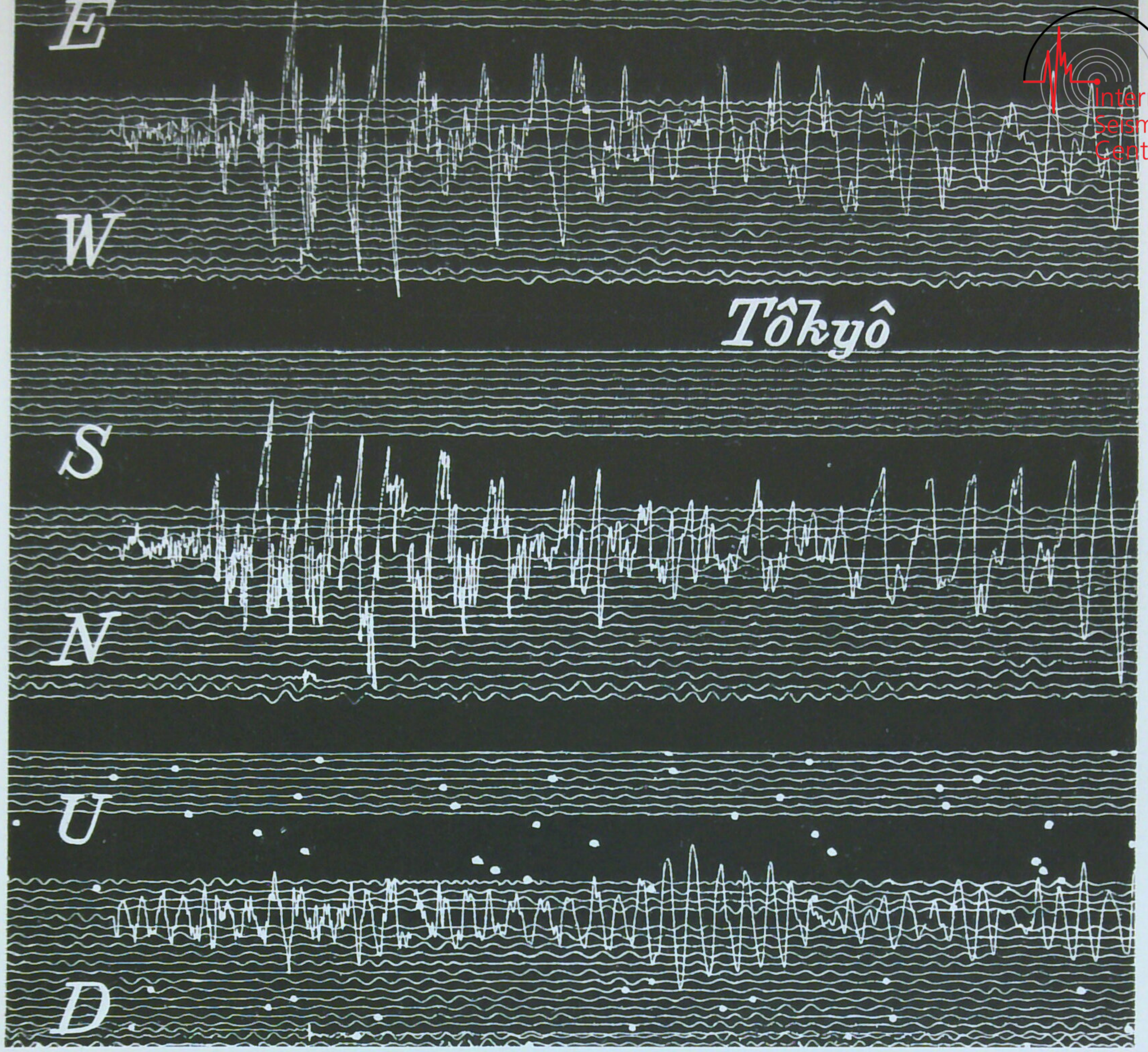
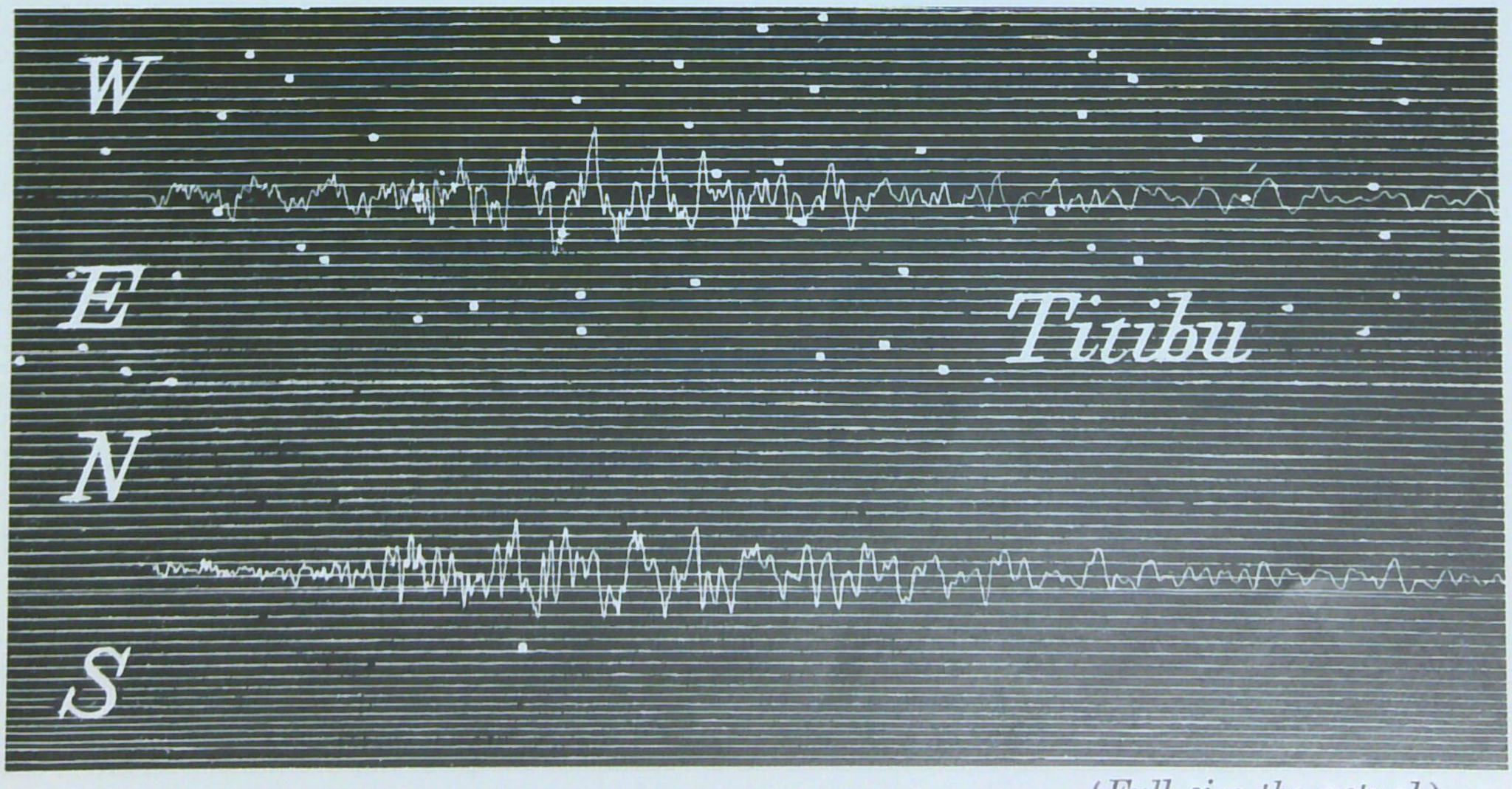


Fig. 2. Maximum heights of tunamis. (Height in m.)



(*Full size the actual.*)



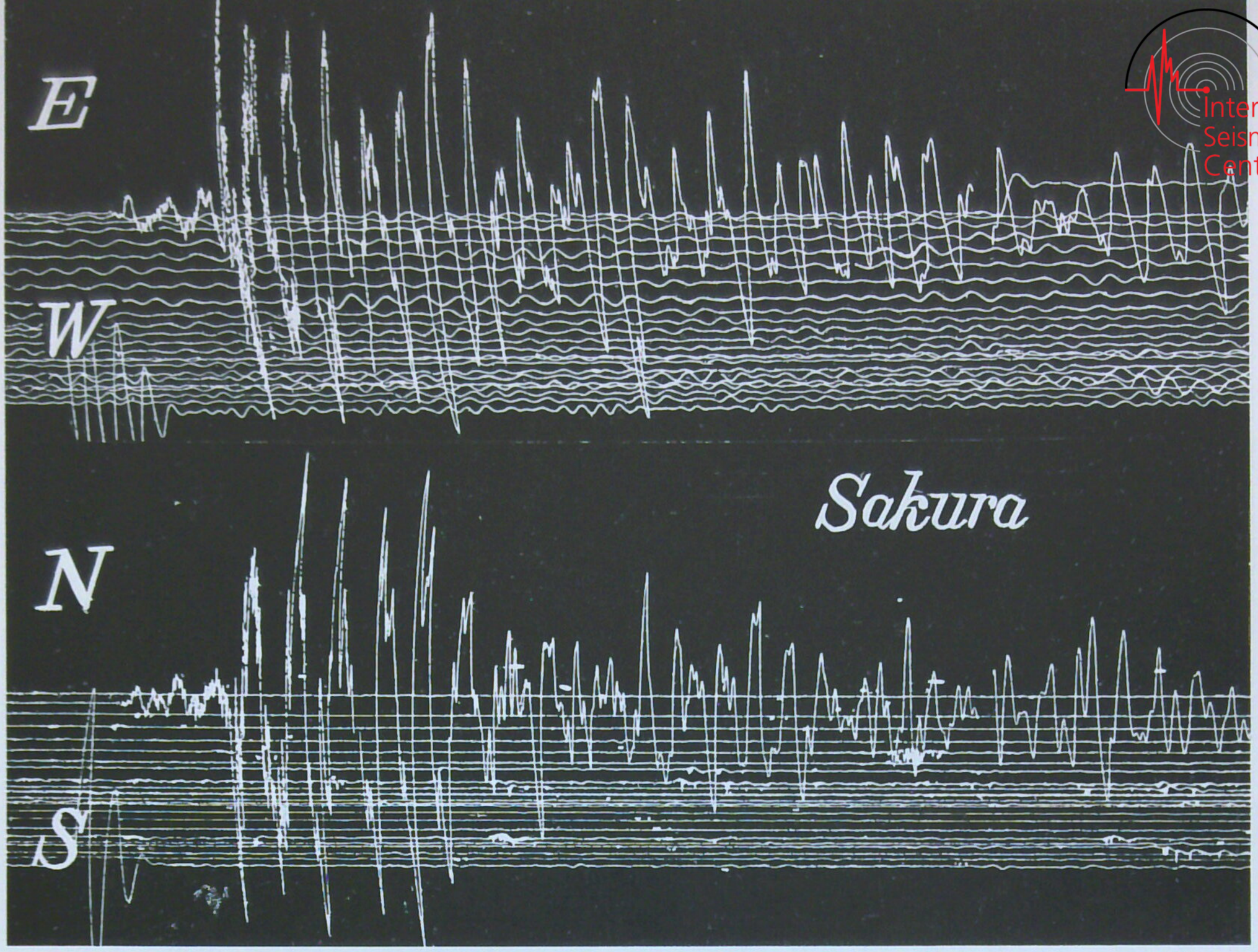
(*Full size the actual.*)

Fig. 3. Tôkyô and Titibu observations of the earthquake of Feb. 13, (Eqk. No. 6).

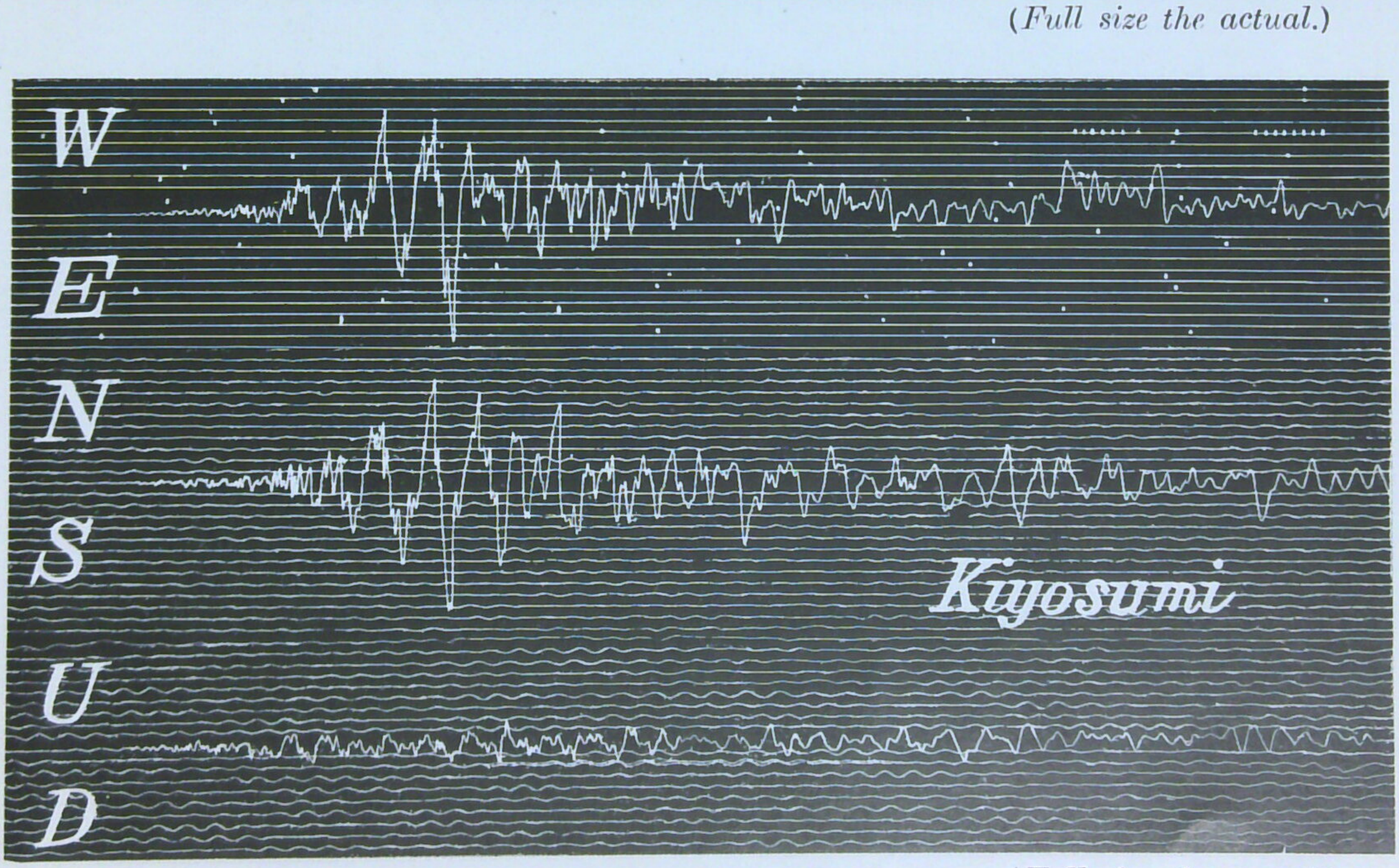
Instrumental constants:

Tôkyô	Titibu
V (N.S., E.W.)=50, V (Vert.)=28	V (N.S., E.W.)=50
T (N.S., E.W., Vert.)=7^s	T („ „)=7^s
ε („ „ „)=1·5	ε („ „)=1·3

（地震報告、一九三三、第一號、圖版）



(*Full size the actual.*)



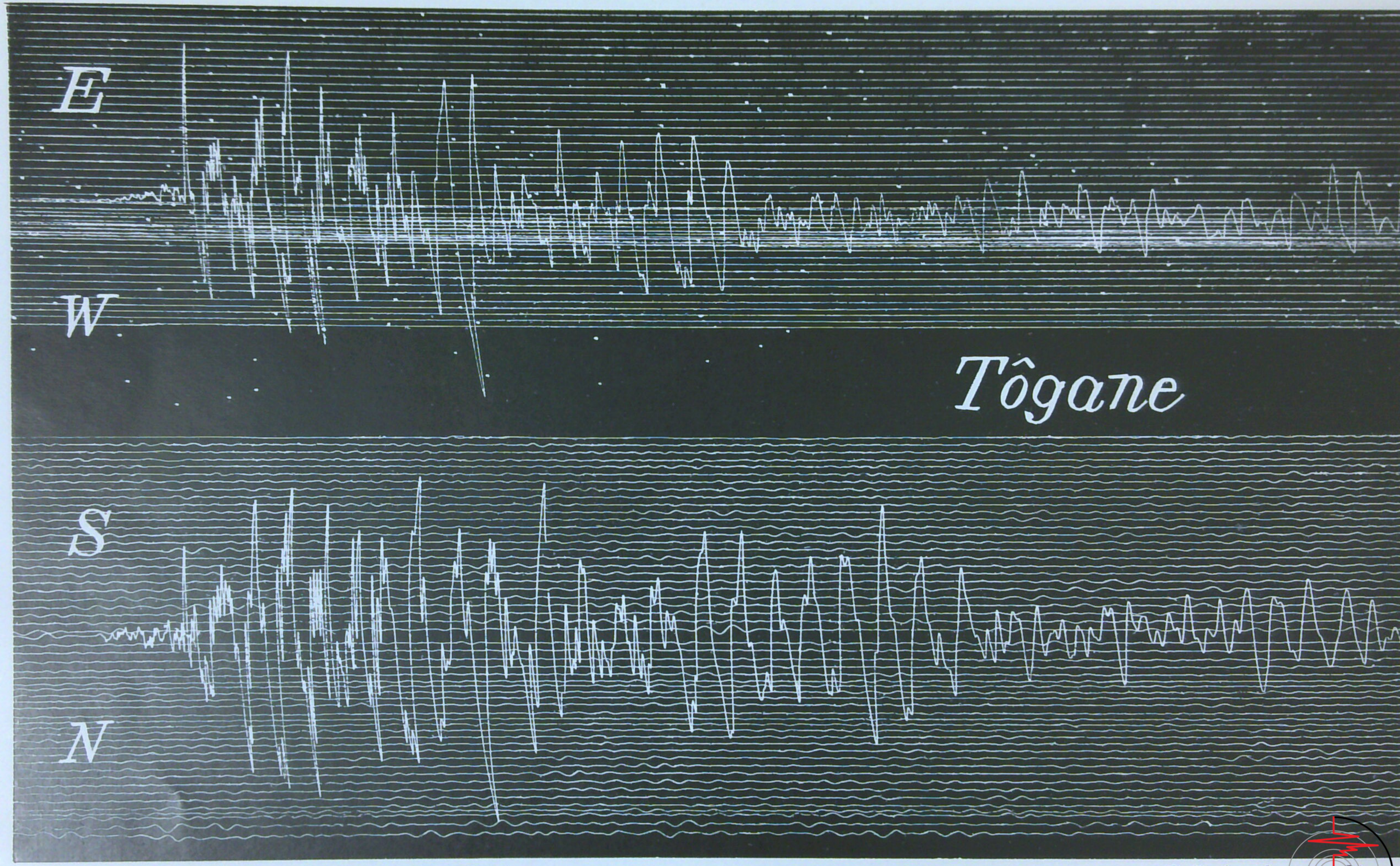
(*Full size the actual.*)

(地震報告、一九三三、第一號、圖版)

Fig. 4. Sakura and Kiyosumi observations of the earthquake of Feb. 13, 1933, (Eqk. No. 6).

Instrumental constants:

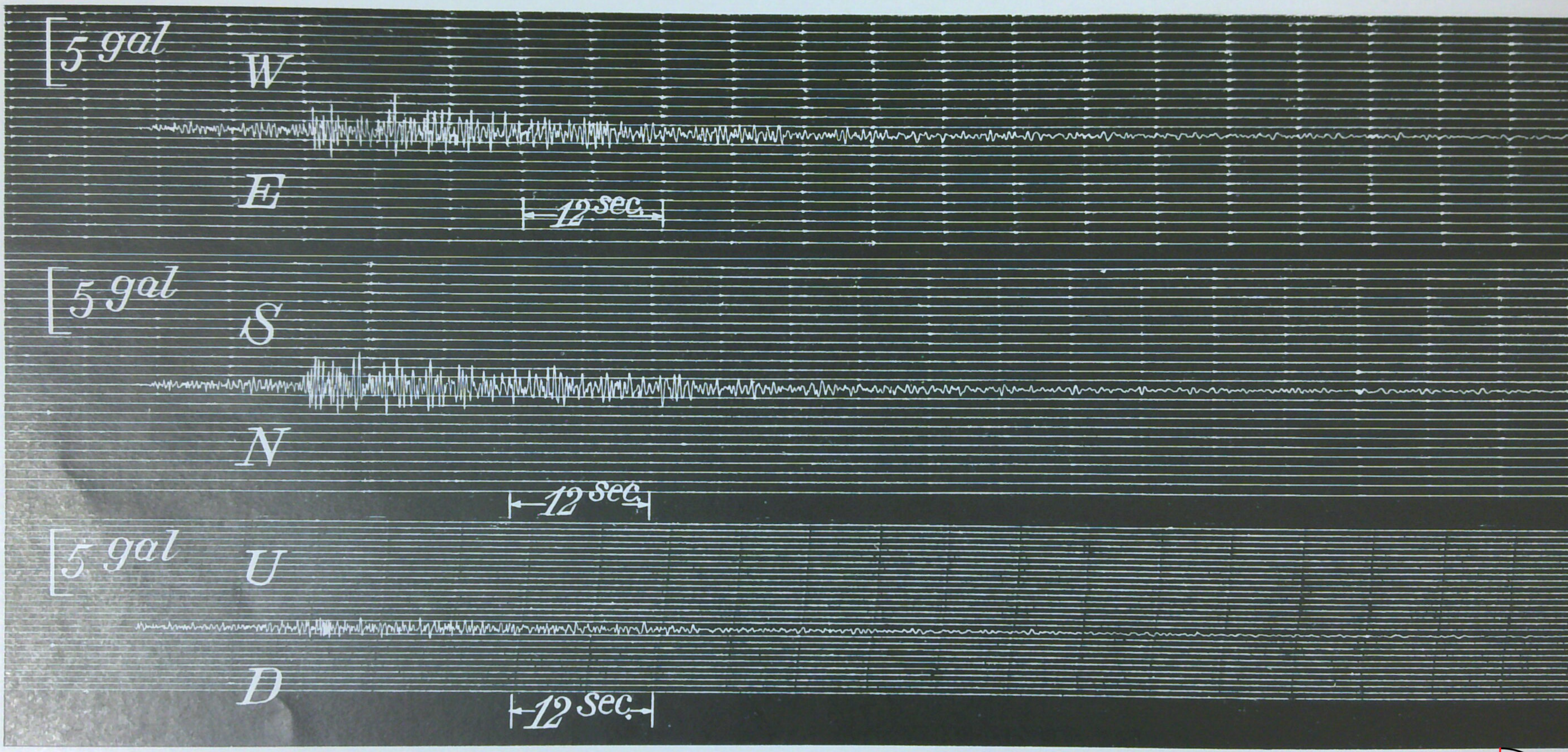
Sakura	Kiyosumi
V (N. S., E. W.)=50	V (N. S., E. W.)=50, V (Vert.)=23
T („ „)=7^s	T (N. S., E. W., Vert.)=7^s
ε (N. S.)=1·6, ε (E. W.)=1·3	ε (N. S.)=1·9, ε (E. W.)=1·6, ε (Vert.)=1·2



(*Full size the actual.*)

Fig. 5. Tôgane observation of the earthquake of Feb. 13, 1933, (Eqk. No. 6).
Instrumental constants:

V (N.S., E.W.)=50
T („ „)=7ˢ
ε („ „)=1·5



(*Full size the actual.*

Fig. 6. Ishimoto acceleration seismograph diagrams of the earthquake of Feb. 13, 1933, (Eqk. No. 6), obtained at Hongô (Tôkyô).

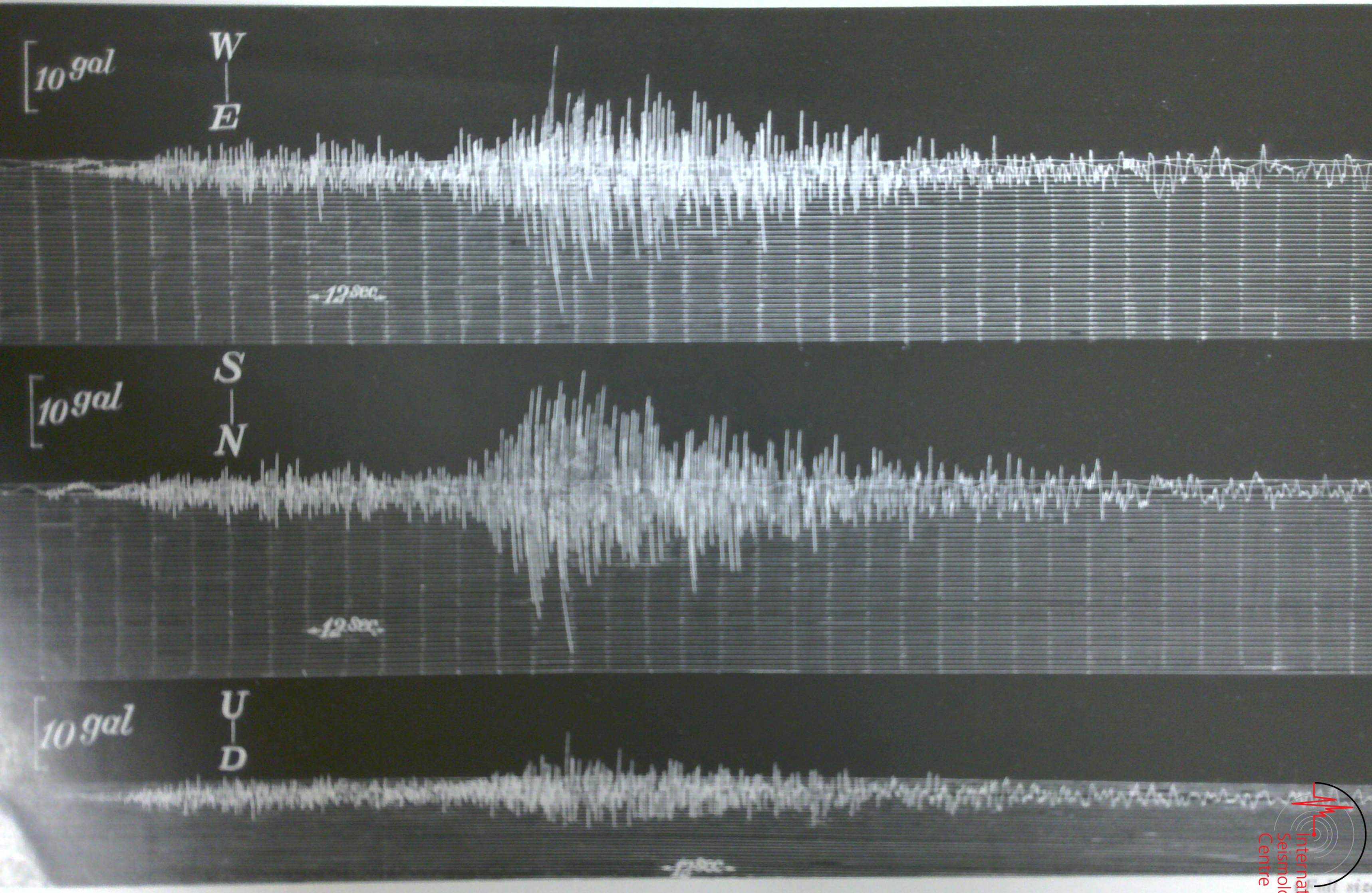


Fig. 9. Ishimoto acceleration seismograph diagrams of the strong N.-E. Japan earthquake of March 3, 1933, (Eqk. No. 10), obtained at Hongô

東京帝國大學地震研究所

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昭和八年 第二册

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(Part 2, 1933.)

(April 1.—June 30, 1933.)

(1) Sensible earthquakes in Tôkyô for the period April 1.—June 30, 1933.

List I.

Time = Central standard time of Japan. (Mean solar time of the meridian 135°E.)

Notation :

Prel. tr. = Preliminary tremor.
N. S. = North-South component.
E. W. = East-West component.
2A = Range of motion.
T = Period of earthquake motion.
λ = Longitude.
φ = Latitude

Intensity ; 0 (insensible), I (slight) II (rather weak), III (weak), IV (rather strong), V (strong), VI (violent).

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s	°	°	°	km	
15	Tôkyô	April 2	18 53 02·2	14·7	15	242	0·96	345	1·05	N 36 E, d	140·65	36·49	30	II
	Mitaka		18 53 04·7	15·9	15	326	1·86	280	1·86					
	Tukuba		18 52 54·6	7·5	3·5			780						III
	Kamakura		18 53 11·5	20·5	7	62	0·53	236	0·53					I
	Misaki			23·5	12	122	1·01	179	1·27					
	Kiyosumi			21·0	10	120	1·75	74	1·25					
	Titibu			17·3	10	176	1·30	110	0·88					
	Tôgane			13·6	10	128	0·84	250	0·84					
	Sakura			12·6	13	470	0·78	920	0·98					II
	Itô			23·0	6	120	0·90	96	0·70					II
	Koyama			24·2	6	240	0·90	200	0·92					

(to be continued.)

No.	Station	Date	Time of occurrence	Duration Prel. tr.	Duration Total	Maximum motion N. S. 2A	Maximum motion N. S. T	Maximum motion E. W. 2A	Maximum motion E. W. T	Direction of initial motion	Epicentre λ (N)	Epicentre φ (E)	Depth	Intensity
			h m s	s	m	μ	s	μ	s		°	°	km	
16	Tôkyô	April 4	4 14 47·5	8·0	4	56	0·48	80	0·48		140·35	31·84	40	I
	Mitaka		4 14 49·8	11·5	3	18	0·42	20	0·60					
	Tukuba		4 14 44·5	6·5	1			13	0·41					I
	Kamakura		4 14 53·7	10·1	2	24	0·25	10	0·25					
	Misaki			12·3	3	12	0·50	17	0·50					
	Kiyosumi		4 14 51·1	13·5	3	10	0·59	10	0·60					
	Titibu			14·8	2	12	0·87	8	0·70					
	Tôgane			6·1	2·5	26	0·44	36	0·66					
	Sakura			4·7	4	72	0·19	60	0·19	S45°W				
	Itô				1	16		16						
	Koyama				2	16		16						
17	Tôkyô	5	16 37 48·7	14·5	4	96	0·48	50	0·48		140·61	36·42	50	I
	Mitaka													
	Tukuba		16 37 41·8	7·3	2	128		84		S55°W				II
	Misaki			20·7	4	12	0·40	13	0·40					
	Kiyosumi		16 37 54·8	23·3	2	6	0·72	8	0·96					
	Titibu			15·7	2	14	0·25	12	0.31					
	Tôgane			13·5	2·5	18	0·26	8	0·18					
	Sakura			12·4	2	62	0·20	36	0·20					
	Koyama			24·0	2	24	0·30	20	0·30					
18	Tôkyô	5	21 06 16·0	8·3	4	166	0·64	146	0·64		140·02	35·59	60	II
	Mitaka		21 06 17·0	8·8	4	135	0·79	86	0·53					
	Tukuba		21 06 18·4	9·4	2·5	16	0·27	12	0·20					I
	Kamakura		21 06 17·5	9·8	3·5	90	0·46	110	0·46					I
	Misaki			9·9	3	58	0·52	77	0·52					I
	Kiyosumi		21 06 15·4	9·7	4	34	0·78	16	0·66					
	Titibu			14·2	2·5	48	0·67	36	0·76					
	Tôgane			8·7	4	110	0·75	32	0·57					
	Koyama			12·0	2·5	88	0·38	80	0·40					
19	Tôkyô	7	5 42 36·7	9·4	4	44	0·24	34	0·24		140·12	36·07	60	I
	Mitaka		5 42 37·3	11·2	3	14	0·26	16	0·38					
	Tukuba													
	Kamakura		5 42 43·9	13·2	1·4	4	0·46	12	0·46					
	Misaki			15·7	2·5	8	0·46	8	0·46					
	Kiyosumi		5 42 43·3	14·5	2	4	0·73	6	0·73					
	Titibu													
	Tôgane			10·6	2	8	0·29	6	0·39					
	Sakura			8·3	2	40	0·32	32	0·32					
	Koyama				2	16		28						
20	Tôkyô	22	5 40 26·4	24·5	15	140	0·51	142	0·51		140·95	34·00		I
	Mitaka		5 40 25·5	26·2	16	136	0·48	164	0·48					I
	Tukuba		5 40 26·9	29·4	4·5	20	0·56	21	0·59					I
	Kamakura		5 40 24·8	21·5	7	244	0·53	216	0·53					I
	Misaki			20·2	15	200	0·86	133	0·55					I
	Kiyosumi		5 40 17·0	17·4	17	140	1·66	74	1·24					II
	Titibu			30·7	10	40	0·81	94	0·89					
	Tôgane			21·8	15	100	0·95	70	0·95					II
	Itô			23·0	6	208	0·45	188	0·60					
	Koyama			27·6	6	423	0·62	298	0·50					

(*to be continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
21	Tôkyô	April 28	16 31 33·9	12·4	4	231	0·74	122	0·74		139·26	35·93	70	I
	Mitaka		16 31 32·5	12·0	3·5	68	0·62	85	0·75					
	Tukuba		16 31 33·7	11·5	2·8	26	0·33	14	0·33					I
	Kamakura		16 31 36·2	13·8	3	26	0·38	145	0·47					
	Misaki			15·6	3	33	0·52	26	0·52					
	Kiyosumi		16 31 37·6	16·8	3	14	1·12	28	1·40					
	Titibu			10·5	3	94	0·65	76	0·69					
	Tôgane			16·7	3	94	0·79	29	0·79					
	Itô			15·0	2	76		96						
	Koyama			12·9	2	162	0·42	188	0·50					
22	Tôkyô	May 11	20 59 24·6	16·4	3	50	0·33	68	0·33		140·36	36·63	60	I
	Mitaka		20 59 27·7	17·4	3	12	0·24	16	0·20					
	Tukuba		20 59 16·3	12·7	1·7	40	0·21	24	0·15					II
	Kamakura													
	Misaki			24·2	3	5	0·62	6	0·52					
	Kiyosumi		20 59 36·2	23·2	2	6	0·64	6	0·92					
	Titibu													
	Tôgane			16·9	3	8	0·64	16	0·64					
	Sakura			15·3	3	44	0·40	44	0·40					
	Koyama				1·5	20		24						
23	Tôkyô	15	6 45 04·6	9·1	2·5	12	0·28	18	0·56		139·94	35·42	60	I
	Mitaka		6 45 06·9	10·0	2	30	0·27	32	0·27					
	Tukuba		6 45 08·3	11·2	1	4	0·25	6	0·33					
	Kamakura			9·1	1·5	6	0·18	26	0·18					
	Misaki				2	13	0·44	20	0·44					
	Kiyosumi		6 45 06·7	9·5	2	6	0·79	4	0·79					
	Itô			7·1	1	12		8						
	Koyama			6·0	1·5	32	0·32	24	0·30					
24	Tôkyô	25	15 52 37·8	9·4	6	126	0·56	154	0·56		140·23	35·72	60	I
	Mitaka		15 52 38·5	10·9	6	36	0·61	28	0·61					
	Tukuba		15 52 37·7	8·5	1·7	5	0·20	34	0·64					
	Kamakura		15 52 39·7	11·3	4	26	0·31	30	0·31					
	Misaki			13·0	4	45	1·14	29	1·14					
	Kiyosumi		15 52 36·7	10·4	5	30	1·10	26	1·06					
	Titibu			15·1	4	10	1·23	30	1·23					
	Tôgane			9·4	6	160	1·70	156	1·70					
	Sakura			9·0	6	190	1·62	610	3·10					
	Itô			16·0	2	16		12						
	Koyama			15·5	3	24		28						
25	Tôkyô	June 3	13 26 22·6	7·4	4	116	0·62	102	0·65		140·06	35·59	50	I
	Mitaka		13 26 20·9	9·6	3	48	0·52	37	0·65					
	Tukuba		13 26 22·1	9·5	1·5	7	0·18	7	0·18					
	Kamakura		13 26 23·1	8·6	3	36	0·40	54	0·40					
	Misaki			10·6	3	48	0·78	42	0·78					
	Kiyosumi		13 26 21·0	9·5	3	8	0·53	20	0·40					
	Titibu													
	Tôgane			7·8	3	20	0·67	24	0·77					
	Sakura			7·8	3	32	0·47	20	0·42					
	Koyama			13·5		20		20						

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre			
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)	Depth	Intensity
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
26	Tôkyô	June 4	1 54 35·4	10·9	5	180	0·73	150	0·71		140·11	36·09	50	I
	Mitaka		1 54 36·8	12·2	4	84	0·92	136	1·38					
	Tukuba		1 54 31·9	6·8	2	108	0·38	156	0·38					I
	Kamakura		1 54 42·1	12·6	3·5	26	0·42	84	0·42					
	Misaki			15·6	5	26	1·00	42	0·88					
	Kiyosumi		1 54 38·2	15·1	7	11	0·69	14	0·69					
	Titibu			12·2	3	40	0·62	12	0·52					
	Tôgane			11·0	7	94	2·30	80	2·11					
	Sakura			9·6	7	80	0·42	190	0·47					
	Itô			15·5	2	60		80						
	Koyama			13·2	3	120	1·60	168	2·00					
27	Tôkyô	5	10 51 43·1	17·2	11	133	0·68	133	0·66		141·07	36·27	50	I
	Mitaka		10 51 46·1	18·5	10	46	0·62	46	0·62					
	Tukuba		10 51 35·6	9·7	3·5	48	0·21	38	0·22					II
	Kamakura		10 51 50·9	21·4	6	54	1·00	210	0·40					
	Misaki			20·7	7	71	0·60	33	0·60					
	Kiyosumi		10 51 44·4	19·8	7	21	0·90	28	0·90					
	Titibu			19·6	5	44	0·49	35	0·57					
	Tôgane													
	Sakura			13·6	10	160	0·51	90	0·51					
	Itô			29·0	5	28	0·50	28	0·55					
	Koyama			23·5	6	88	0·50	12	0·50					
28	Tôkyô	19	6 38 26·8	43·1	60	2330	3·60	2800	3·40	S32°W,u	142·40	38·11		II
	Mitaka		6 38 29·6	44·3	60	2500	3·40	4500	3·65					
	Tukuba		6 38 17·8	31·5	10									II
	Kamakura		6 38 35·6	42·4	18	1000	2·83	5300	2·84					I
	Misaki			43·0	30	1060	3·77	1090	3·50					
	Kiyosumi		6 38 32·1	44·0	25	1820	7·83	1980	5·00	SW, u				
	Titibu			44·0	25	1260	2·50	620	2·05					I
	Tôgane			41·5	30	1680	2·95	2000	3·70	SW				III
	Sakura			42·0	40	2660	3·00	2150	3·75	SW				III
	Itô			46·0	18	920		1680						I
	Koyama			47·5	25	4325	5·00	4450	6·50	S35°W				I

(2) *Important distant earthquakes as observed in Tôkyô (Hongô).*

List II.

Date	Phase	Time of occurrence (G. M. T.)	Amplitude 2A	Period	Probable epicentre
1933		h m sec			
April 27	*P*	2 45 07·4			Δ = 5500 km.
	S	2 52 10 7			
			mm	s	
	L	2 57 06·0	(E.W.) 0·400	36·3	Alaska
	M	2 59 23·0	(E.W.) 0·233	18·0	
	F	4·2			
June 24	*P*	22 06 02·0			Δ = 6200 km.
	S	22 13 05·0			
	L	22 19 22·0	(E.W.) 1·433	36·3	
			(N.S.) 1·000	33·3	
	M	22 25 12·0	(E.W.) 0·367	24·0	
			(N.S.) 0·550	23·6	
	F	24			

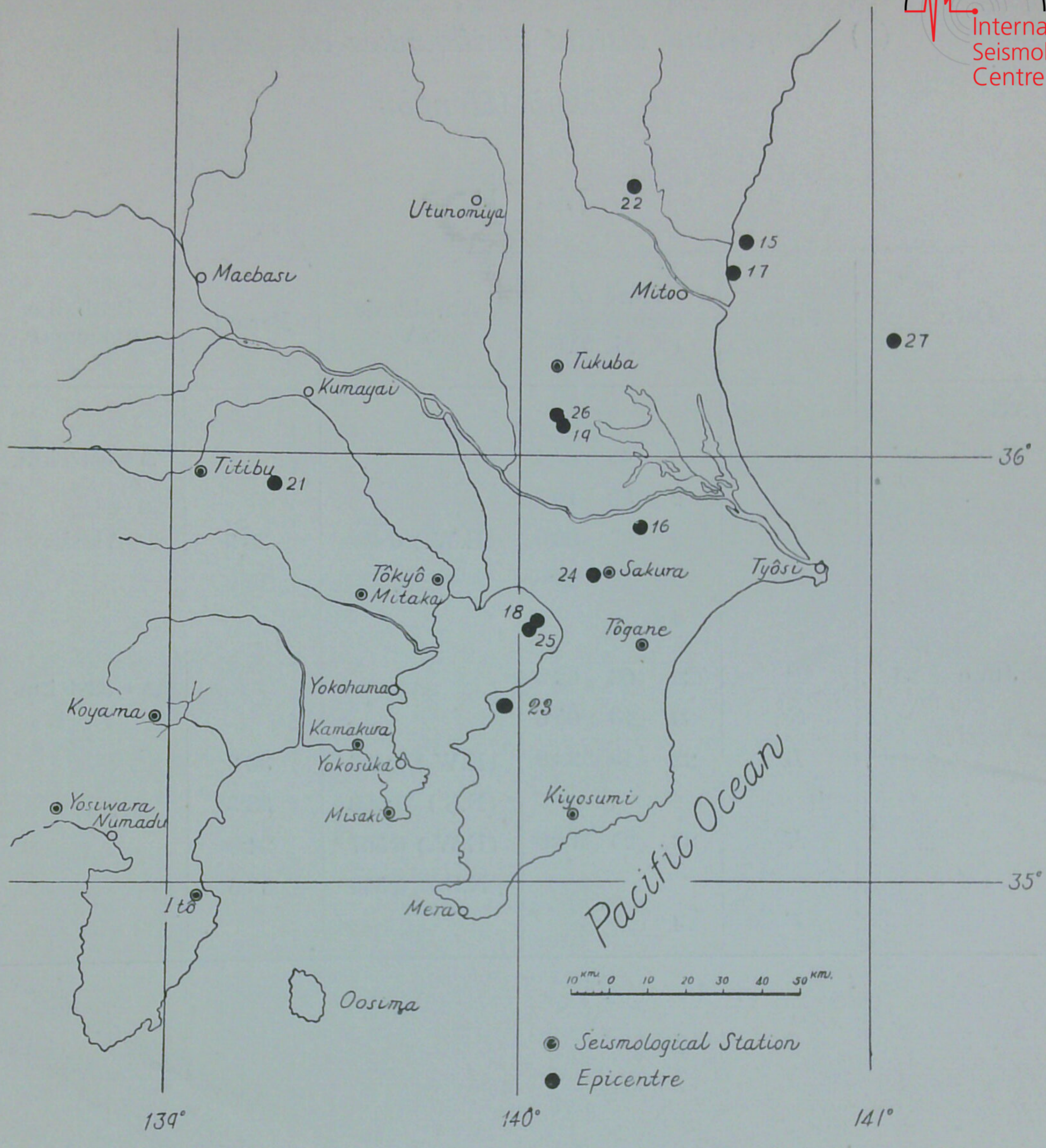
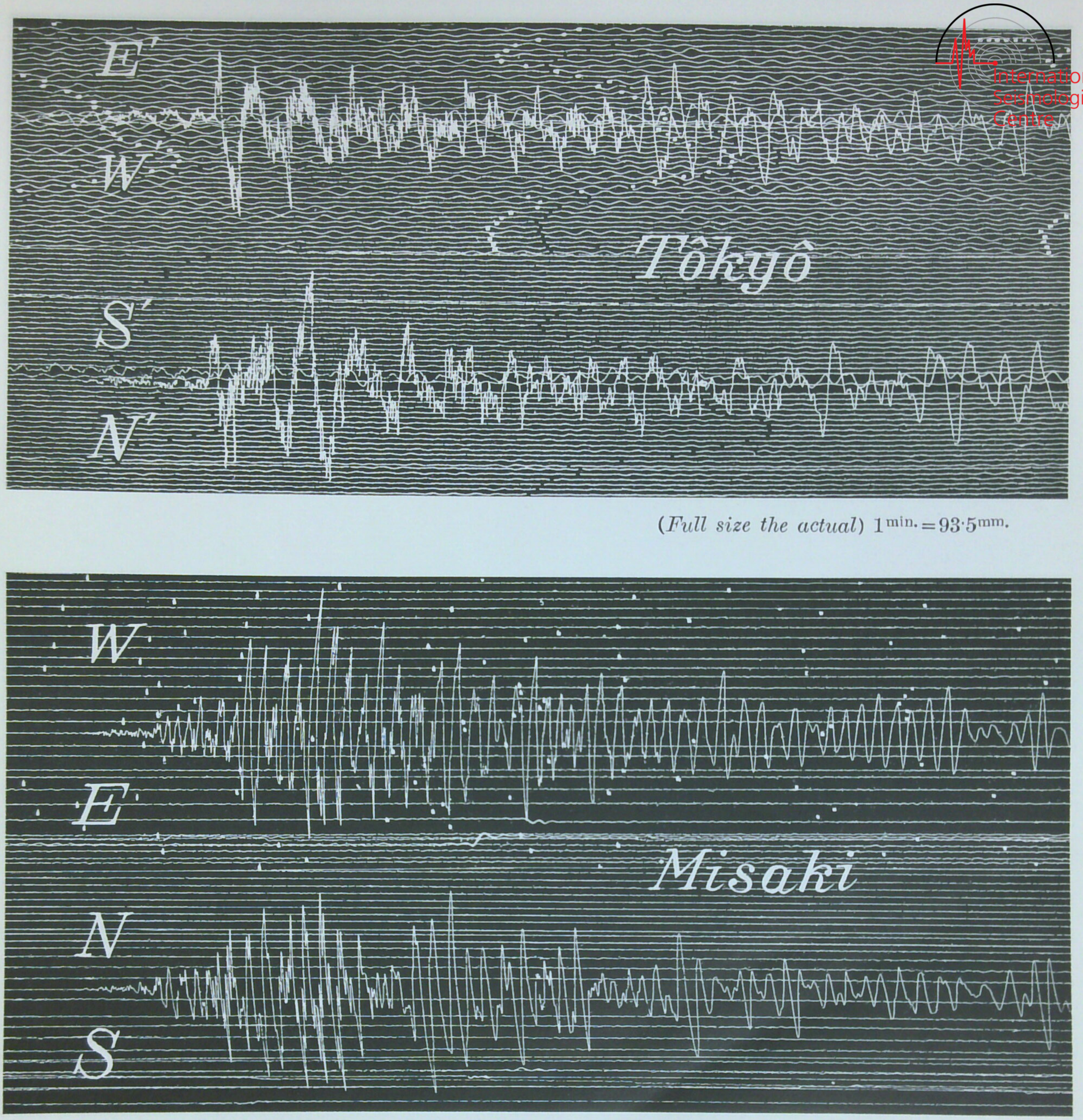


Fig. 1. Distribution of the epicentres of the Tôkyô sensible earthquakes within a distance of 160 km. from Tôkyô for the period April 1—June 30, 1933

(Figures attached to each dot correspond to the earthquake number in List I.)



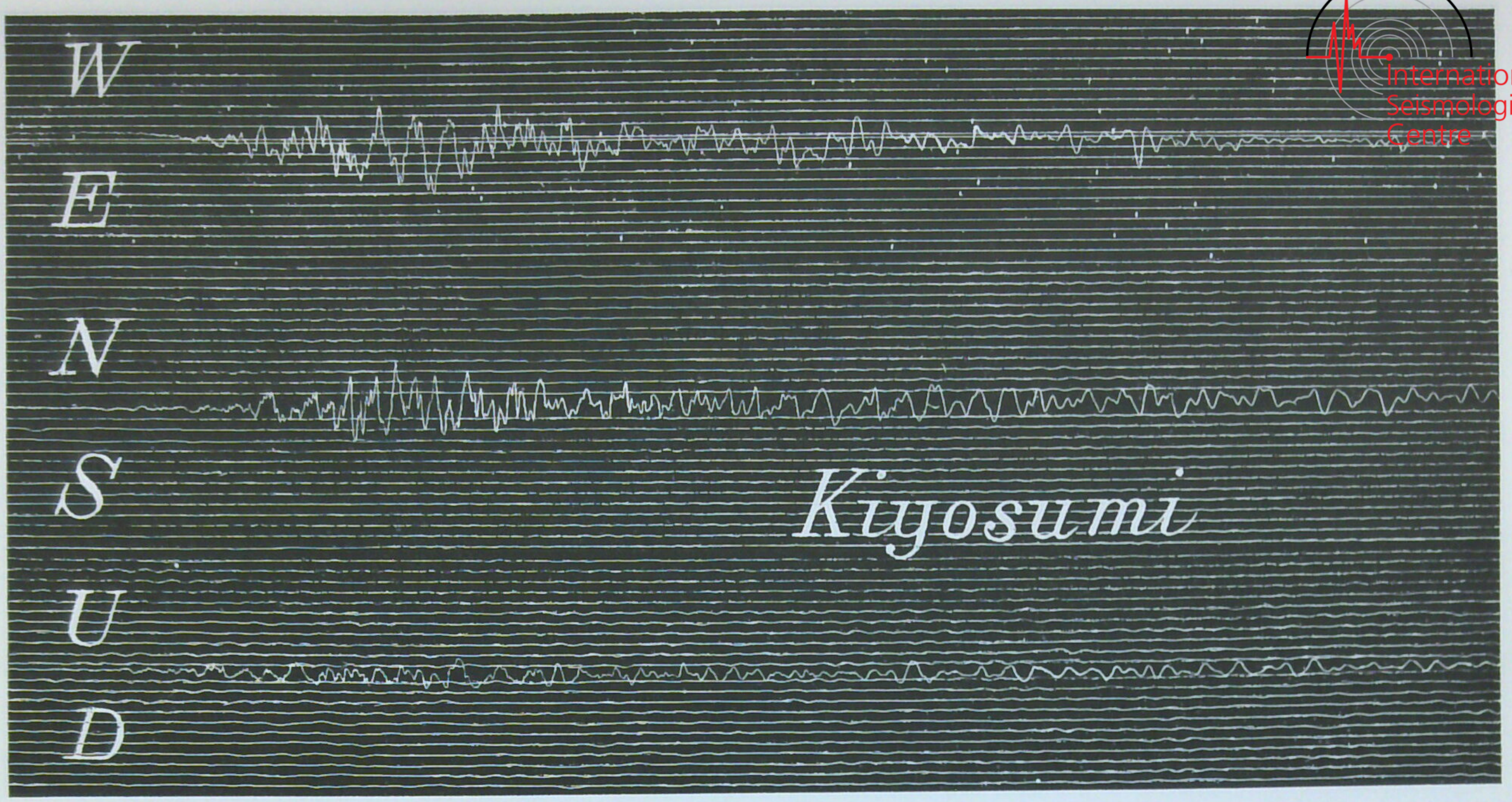
(*Full size the actual*) $1^{\text{min.}}=93{\cdot}5^{\text{mm.}}$

(*Full size the actual*) $1^{\text{min.}}=48{\cdot}3^{\text{mm.}}$

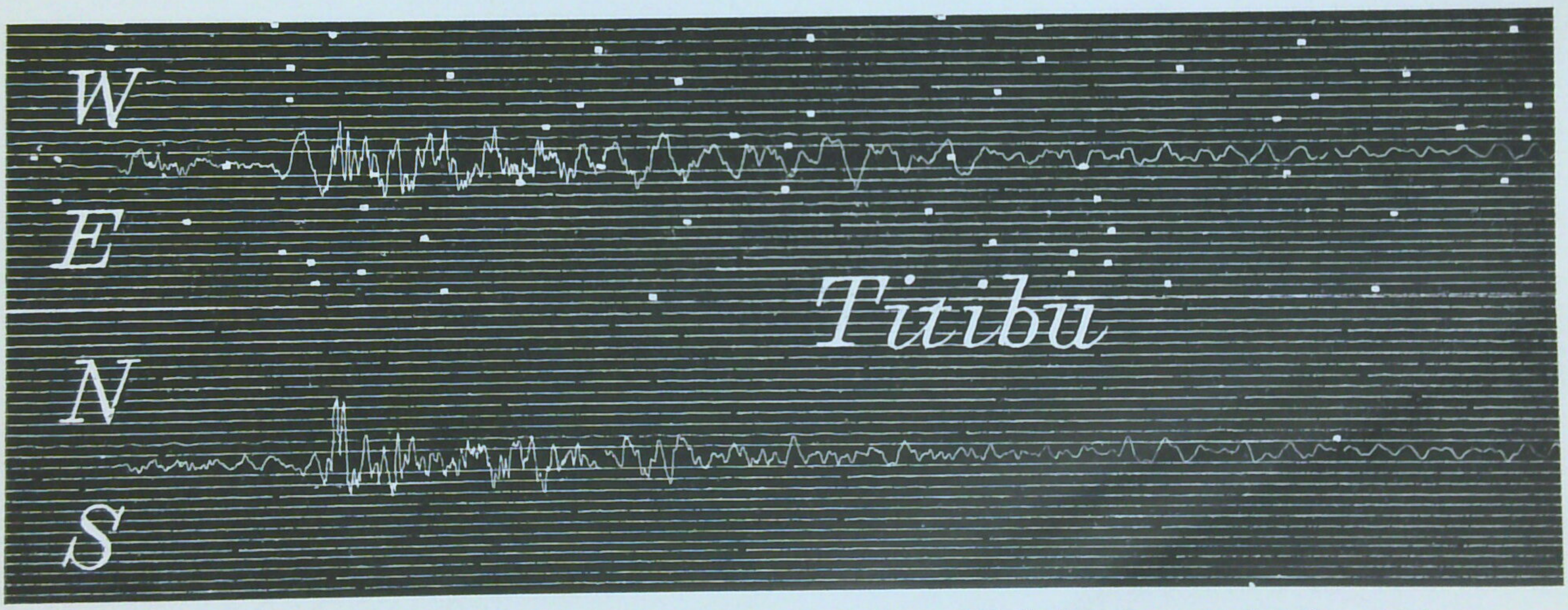
Fig. 2. Seismograms of the earthquake of April 2, 1933. (Eqk. No. 15.)

Instrumental constants :

Tôkyô (Hongô)	Misaki
N′=N 13° W, E′=N 77° E	V (N. S., E. W.)=120
V (N.′S.′, E.′W.′)=50	T („ „)=4s.
T („ „)=7s.	ε („ „)=1·5
ε („ „)=1·5	



(*Full size the actual*) $1^{min.}=45{\cdot}5^{mm.}$

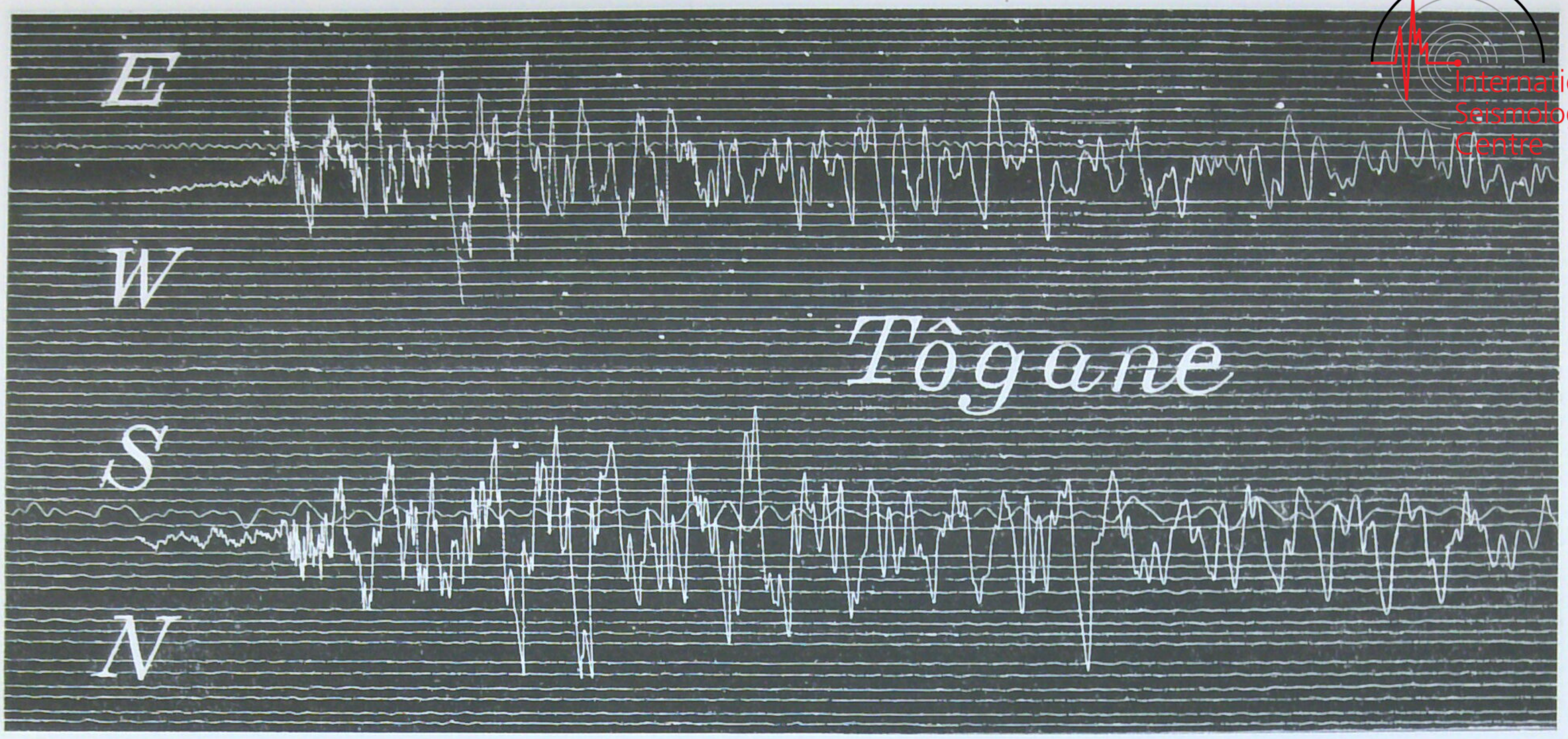


(*Full size the actual*) $1^{min.}=69{\cdot}3^{mm.}$

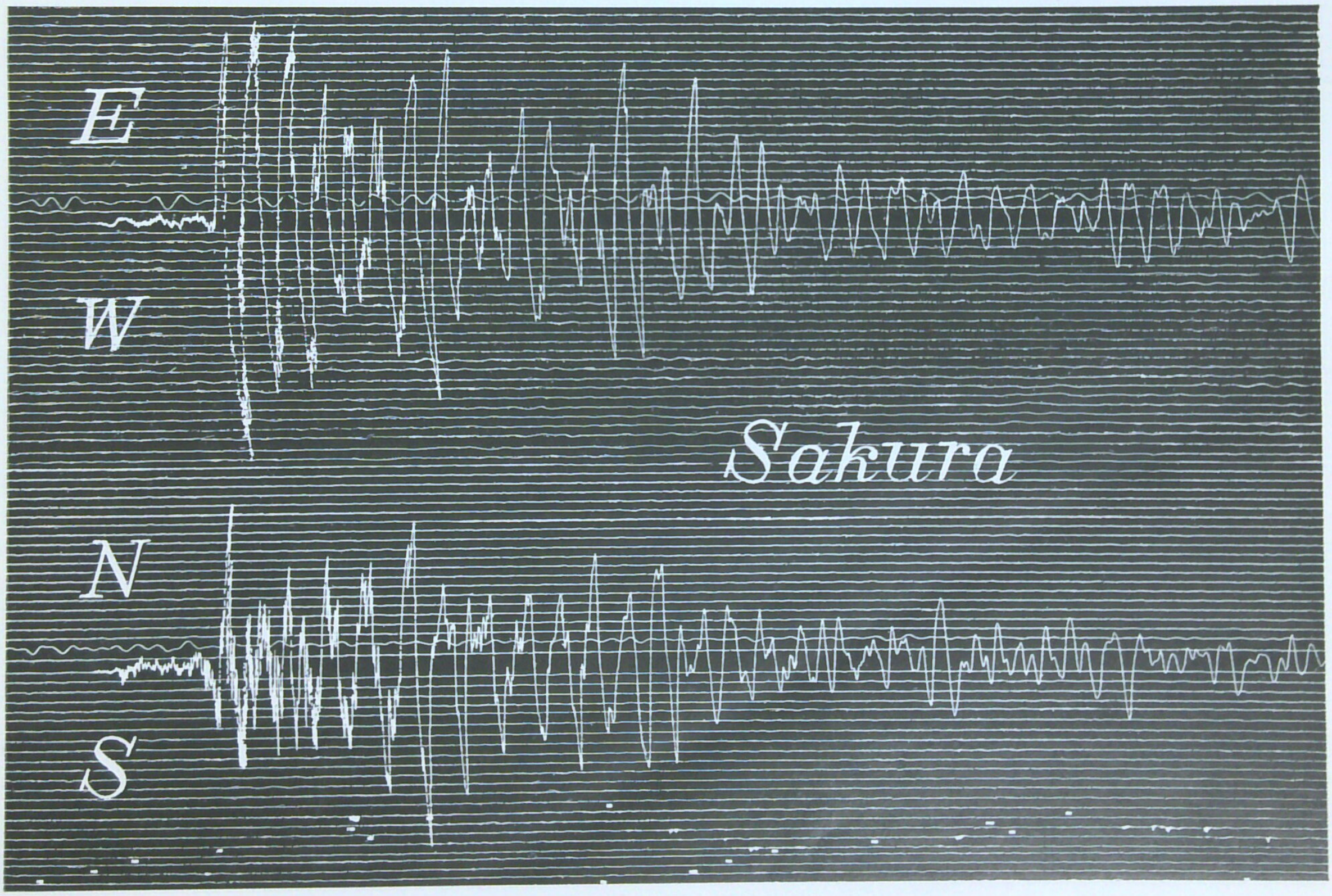
Fig. 3. Seismograms of the earthquake of April 2, 1933. (Eqk. No. 15.)

Instrumental constants :

Kiyosumi	Titibu
V (N.S., E.W.)=50, V (Vert.)=28	V (N.S., E.W.)=50
T („ „)=7s.	T („ „)=7s.
ε (N.S.)=1·9., ε (E.W.)=1·6	ε („ „)=1·3
ε (Vert.)=1·2	



(*Full size the actual*) $1^{min.}=73{\cdot}2^{mm.}$

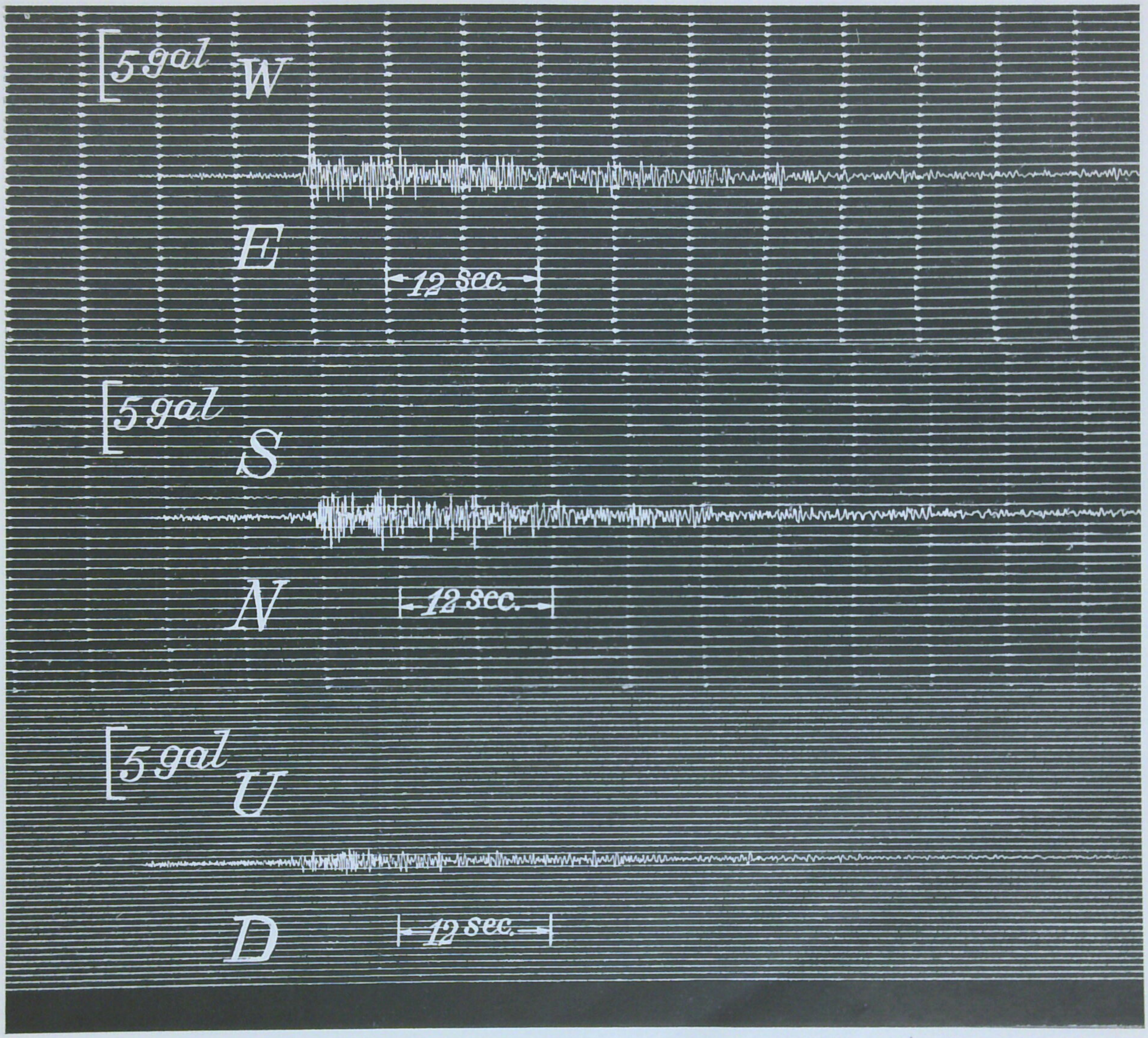


(*Full size the actual*) $1^{min.}=64{\cdot}0^{mm.}$

Fig. 4. Seismograms of the earthquake of April 2, 1933. (Eqk. No. 15.)

Instrumental constants :

Tôgane	Sakura
V (N.S., E.W.)=50	V (N.S., E.W.)=50
T („ „)=7s.	T („ „)=7s.
ε („ „)=1·5	ε (N.S.)=1·6, ε (E.W.)=1·3



(*1.6 × the actual.*)

Fig. 5. Ishimoto acceleration seismograph diagrams of the earthquake of April 2, 1933. (Eqk. No. 15.)

Tôkyô (Hongô) observation.

List II.

Date	Phase	Time of Occurrence (G.M.T.)	Amplitude 2A	Period	Probable Epicentre.
		h m s			km
1932 Dec. 4	P	8 15 45			$\Delta = 4150$
	S	8 24 32			
	L	8 27 17·4	mm (E.W.) 1·300	s 39·0	
	M				
	F				
Dec. 25	P	2 11 17·5			
	S	2 16 43·6			km $\Delta = 3830$
	L	2 19 20·0	mm (E.W.) 6 000	62·0	$\lambda = 98°$ E
			(N.S.) 17·000	63·0	
	M	2 22 13·0	(indistinct)		$\varphi = 39·5°$ N
	F				

Daily frequency of the earthquake felt in Tôkyô during 1932.

List III.

Date \ Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Sum
1								1			1		2
2			2									1	3
3			1			1			1				3
4		2											2
5			1	1			1			1		1	5
6													0
7								1	1				2
8			1										1
9													0
10			1										1
11													0
12		1		1									2
13						1	1				1		3
14			1	1			1	2		2			7
15													0
16		1	1			1				1		1	5
17													0
18													0
19		1							2				3
20					1								1
21		1	1										2
22						1							1
23					1				1	1	1		4
24			2						1				3
25							1			1			2
26		2		1									3
27													0
28				1									1
29													0
30							1			2			3
31													0
Sum		8	11	5	2	4	5	4	6	8	3	3	59

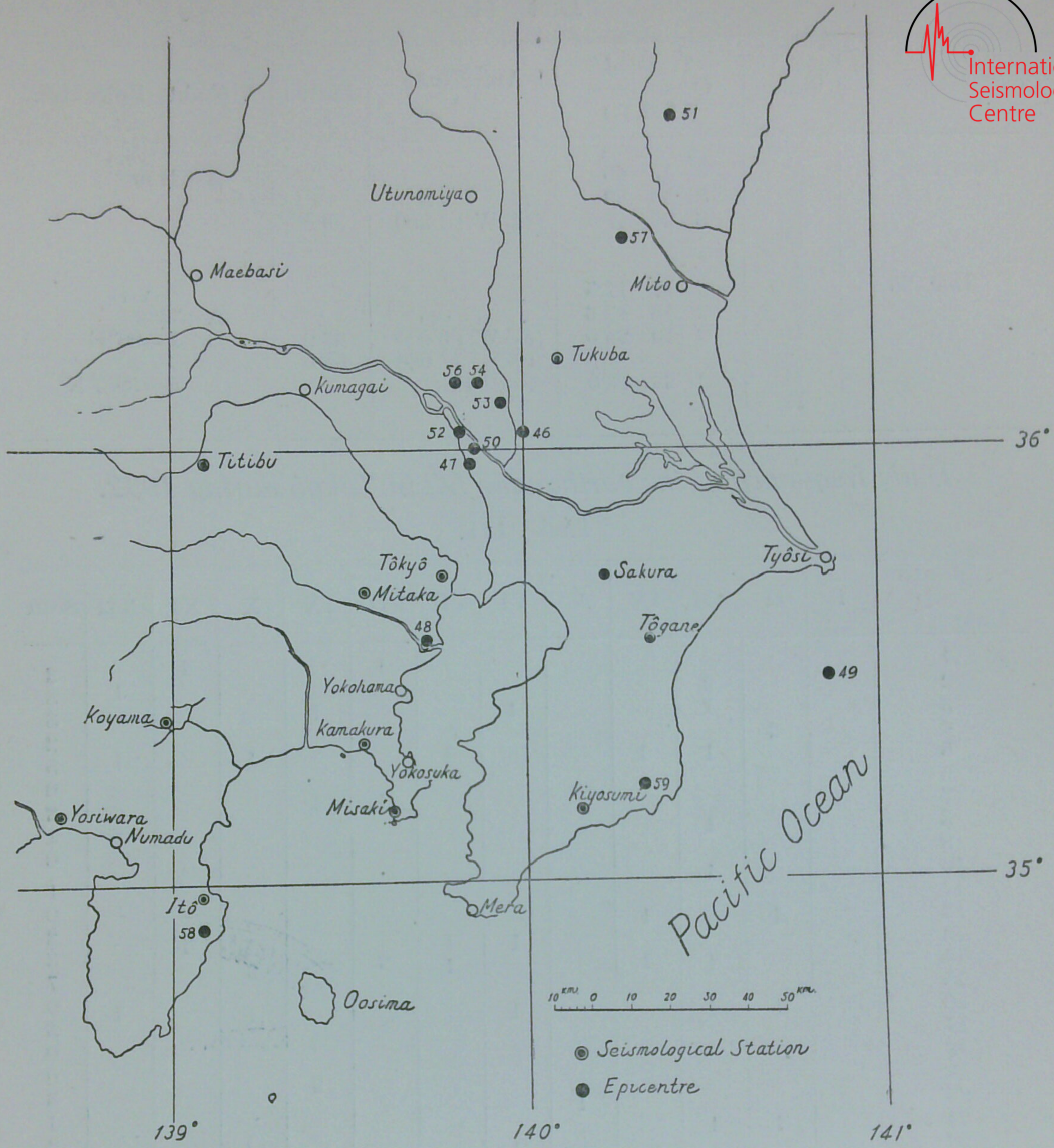


Fig. 1. Distribution of the epicentres of the Tôkyô sensible earthquakes within a distance of 160 km. from Tôkyô for the period October 1—December 31, 1932.

(Figures attached to each dot correspond to the earthquake number in List I.)

東京帝國大學地震研究所

地震觀測報告

昭和八年 第三册

SEISMOMETRICAL REPORT

OF THE

EARTHQUAKE RESEARCH INSTITUTE

TOKYO IMPERIAL UNIVERSITY

1933

Part 3

(July 1.—September 30, 1933)

Published by the Institute
Tôkyô 1934

Seismometrical Report.

(Earthquake Research Institute, Tôkyô, Japan.)

(Part 3, 1933.)

(July 1.—September 30, 1933.)

(1) Sensible earthquakes in Tôkyô for the period July 1.—September 30, 1933.

List I.

Time = Central standard time of Japan. (Mean solar time of the meridian 135°E.)

Notation :

Prel. tr. = Preliminary tremor.
N. S. = North-South component.
E. W. = East-West component.
2A = Range of motion.
T = Period of earthquake motion.
λ = Longitude.
φ = Latitude

Intensity ; 0 (insensible), I (slight), II (rather weak), III (weak), IV (rather strong), V (strong), VI (violent).

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
29	Tôkyô	July 6	10 59 45·1	7·7	15	714	0·61	824	0·61	S 38°E, d	139·87	35·59	30	II
	Komaba		10 59 47·0	7·9	8	700	0·82	820	0·82	S 53°E, d				II
	Mitaka		10 59 45·3	8·5	11	540	0·64	614	0·64					II
	Tukuba		10 59 48·5	8·9	3	28	0·18	30	0·24					II
	Kamakura		10 59 48·2	7·5	6	164	0·27	404	0·80	N45°E, d				II
	Misaki			8·9	8	508	0·82			N39·5°E				II
	Kiyosumi		10 59 46·1	8·8	6	340	0·98	532	0·98	S 16°E, u				
	Titibu			11·9	4	266	0·87	264	0·87	N64°W				
	Tôgane			7·5	10	850	0·73	266	0·73	S 64°E				
	Sakura			7·8	10	1000	1·00	610	1·00	S 69°W				
	Itô													I

(to be continued.)

No.	Station	Date	Time of occurrence	Duration Prel. tr.	Duration Total.	Maximum motion N. S. 2A	Maximum motion N. S. T	Maximum motion E. W. 2A	Maximum motion E. W. T	Direction of initial motion	Epicentre λ (E)	Epicentre φ (N)	Depth	Intensity
			h m s	s	m	μ	s	μ	s				km	
	Koyama			11·8	6	420	0·82	348	0·82	N67°E				I
	Yosiwara													
	Susaki		10 59 57·0	15·3	4	72	0·40	72	0·40	N45°E				I
30	Tôkyô	July 8	16 57 50·4	20·0	20	125	0·50	100	0·53		140.00°	34.38°	100	I
	Komaba		16 57 49·3	19·7	9	130	0·50	92	0·40					I
	Mitaka		16 57 49·5	20·5	11	110	0·79	60	0·49					
	Tukuba		16 57 56·6	24·5	3	8	0·35	4	0·39					
	Kamakura		16 57 46·1	17·0	6	20	0·27	112	0·55					I
	Misaki			15·3	7	90	1·98	150	1·98					
	Kiyosumi		16 57 40·0	15·6	6			80	1·08					II
	Titibu			25·1	6	26	1·64	35	1·64					
	Tôgane			18·5	9	70	1·73	66	1·72					
	Sakura			21.0	10	40	1·21	80	1·33					
	Itô													
	Koyama			20·4	7	108	0.36	152	0·50					
	Yosiwara													
31	Tôkyô	15	12 55 43·5	8·1	7	130	0·24	122	0·24		139·94	36·00	40	I
	Komaba		12 55 43·0	8·5	8	160	0·40	160	0·60	S40°W,u				
	Mitaka		12 55 44·2	9·4	8	180	0·77	150	0·72					
	Tukuba		12 55 41·3	5·7	2	114		62						II
	Kamakura		12 55 49·1	12·9	5	56	0·60	36	0·40					
	Misaki			13·5	6	121	1·15	78	1·15					
	Kiyosumi		12 55 51·5	14·5	8	80	1·55	52	1·55					
	Titibu			9·8	4	55	0·20	50	0·20					
	Tôgane			13·8	7	66	0·80	32	0·80					
	Sakura			8·3	8	100	0·65	100	0·65					
	Itô													
	Koyama			13·9	5	110	0·64	288	0·64					
	Yosiwara													
32	Tôkyô	25	3 00 42·1	14·9	3	47	0·49	42	0·49		140·56	35·12	70	I
	Komaba		3 00 41·7	14·6	2	30	0·40	50	0·60					
	Mitaka		3 00 41·2	16·5	2·5	20	0·35	36	0·35					
	Tukuba													
	Kamakura		3 00 42·3	12·7	2	24	0·54	44	0·54					
	Misaki			13·0	2·5	33	0·50	15	0·37					
	Kiyosumi		3 00 37·2	10·6	3	17	0·57	10	0·57					
	Titibu			24·0	2	6	0·60	4	0·60					
	Tôgane			11·1	2			12	0·58					
	Sakura													
	Itô													
	Koyama			17·2	2	36	0·25	44	0·25					
	Yosiwara													
33	Tôkyô	26	15 41 28·3	6·9	2	55	0·32	56	0·31		139·84	36·00	40	I
	Komaba		15 41 27·7	7·6	3	40	0·32	50	0·40					
	Mitaka		15 41 27·2	7.6	2·5	14	0·43	32	0·43					
	Tukuba		15 41 23·0	6·4	1	23		32						
	Kamakura		15 41 32·9	11·8	1·5	14	0·41	14	0·41					
	Misaki			13·0	2·5	8	0·43	7	0·43					
	Kiyosumi		15 41 31·2	14·0	2	4	0·57	4	0·57					

(*to be continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s				km	
	Titibu			8·8	2	8	0·70	8	0·70					
	Tôgane			9·6	2	44	0·49	36	0·49					
	Sakura													
	Itô													
	Koyama			15·1	1·5	28	0·36	56	0·48					
	Yosiwara													
34	Tôkyô	July 31	18 03 06·5	13·8	6	46	0·42	52	0·42		139°91	34°75	50	I
	Komaba		18 03 04·0	15·6	6	51	0·25	36	0·25					
	Mitaka		18 03 04·2	14·2	8	46	0·31	42	0·31					
	Tukuba		18 03 13·2	21·2	2	5	0·41	7	0·45					
	Kamakura		18 03 01·6	12·1	5	480	0·42	332	0·42	S8°E				II
	Misaki			10·7	6	83	0·73	79	0·73					I
	Kiyosumi		18 02 58·7	10·6	6	56	1·06	48	1·06	S45°W,d				
	Titibu			21·2	4	16	0·94							
	Tôgane			13·3	6	32	0·92	20	0·46					
	Sakura													
	Itô			10·3	6	280	0·53	400	0·53	S45°E				II
	Koyama			13·9	6	168	0·47	172	0·47					
	Yosiwara													
35	Tôkyô	Aug. 7	2 43 36·7	5·0	2	150	0·35	184	0·35		139·59	35·73	30	I
	Komaba		2 43 36·0	4·6	2	130	0·40	154	0·30					I
	Mitaka		2 43 37·2	4·2	1·3	54	0·28	80	0·28					
	Tukuba													
	Kamakura		2 43 20·9	6·8	1·5	26	0·28	6	0·28					
	Misaki			10·0	1	12	0·52	12	0·52					
	Kiyosumi													
	Titibu			7·9	1	6	0·46	4	0·46					
	Tôgane			9.7	1	4	0·33	4	0·33					
	Sakura													
	Itô													
	Koyama													
	Yosiwara													
36	Tôkyô	14	3 14 58·3	8·7	2	36	0·32	28	0·32		140·13	35·72	60	I
	Komaba		3 14 57·5	9·0	2	30	0·32	44	0·32					
	Mitaka													
	Tukuba		3 14 58·6	9·2	1	7	0·17	5	0·17					
	Kamakura													
	Misaki			11·8	2	8	0·72	8	0·72					
	Kiyosumi		3 15 00·9	8·8	1·5	4	0·88							
	Titibu			15·0	1·5	3	0·61	2	0·61					
	Tôgane			8·2	2	10	0·37	8	0·49					
	Sakura													
	Itô													
	Koyama													
	Yosiwara													
37	Tôkyô	29	21 32 05·4	28·5	15	350	2·90	160	2·07		141·82	37·45		I
	Komaba		21 32 07·0	28·7	14	135	3·20	215	2·64					
	Mitaka		21 32 07·8	2·94	15	232	2·28	184	2·20					
	Tukuba		21 31 55·6	23·5	4	66	0·56	68	0·48					

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration Prel. tr.	Duration Total.	Maximum motion N.S. 2A	Maximum motion N.S. T	Maximum motion E. W. 2A	Maximum motion E. W. T	Direction of initial motion	Epicentre λ (E)	Epicentre φ (N)	Depth	Intensity
			h m s	s	m	μ	s	μ	s				km	
	Kamakura		21 32 13·0	36·9	7·5	332	0·95	180	0·95					
	Misaki			43·8	9	183	2·23	247	2·63					
	Kiyosumi		21 32 9·62	42·3	15	234	3·12	116	2·37					
	Titibu			35·0	7	160	1·64	162	1·64					
	Tôgane			14·6	16	510	3·90	480	3·89					
	Sakura													
	Itô				7	88	1·40							
	Koyama				9	336	1·65	230	0.97					
	Yosiwara													
											°	°		
38	Tôkyô	Sept 3	1 42 43·8	69·3	50	2420	4·10	1800	4·10		139·26	30·83		II
	Komaba		1 42 43·0	68·5	25	1500	4·40	1100	3·20					II
	Mitaka		1 42 43·0	70·5	40	1540	5·00	1800	4·75					II
	Tukuba		1 42 48·2	70·0	8									
	Kamakura		1 42 40·9	64·5	12	1950	2.84	298	2·84					I
	Misaki			64·1	30									II
	Kiyosumi		1 42 38·6	64·5	35	2820	3·18	2150	3·18					
	Titibu			71·4	15	650	1·27	760	1·08					
	Tôgane			69·0	40	2140	3·90	1740	3·41					II
	Sakura			69·6	40	1350	3·40	2050	3.40					
	Itô			64·9	35	1740	4·87	1720	4·87					
	Koyama			66·7	25	3640	4·97	3620	6·10					
	Yosiwara			71·1	27	2640	3·73	2440	3·63					
39	Tôkyô	9	20 57 29·2	4·9	1	18	0·52	25	0·49		139·68	35·55	30	I
	Komaba		20 57 31·0	3·6	2	32	0·32							
	Mitaka		20 57 28·3	4·7	1	8	0·33	6	0·33					
	Tukuba													
	Kamakura				1	6	0·40	18	0·40					
	Misaki			7·0	1	6	0·30	6	0·30					
	Kiyosumi													
	Titibu			10·1	1	2	0·97	2	0·97					
	Tôgane			9·8	1	5	0·80	4	0·80					
	Sakura													
	Itô													
	Koyama													
	Yosiwara													
40	Tôkyô	14	15 26 37·7	13·7	10	116	0·37	91	0·30		140·97	58·72	40	I
	Komaba		15 26 40·0	14·2	6	50	0·60	52	0·60					
	Mitaka		15 26 40·2	16·5	8	30	0·55	30	0·55					
	Tukuba		15 26 33·0	10·2	2·6	24	0·32	28	0·30					
	Kamakura		15 26 45·0	16·6	4	19	0·43	34	0·51					
	Misaki			18·5	10	26	1·00	38	1·00					
	Kiyosumi			14·4	8	40	1·75	20	1·35					
	Titibu			21·8	4	15	1·22	15	1·47					
	Tôgane			8·9	6	260	0·75	140	0·75	S45°W				
	Sakura													
	Itô													
	Koyama			20.2	5	56	1·70	48	1·36					
	Yosiwara													

(*to be continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N.S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
41	Tôkyô	Sept. 17	2 29 19·3	7·3	3	52	0·53	51	0·45		139·95	36·03	40	I
	Komaba		2 29 21·0	8·1	3	60	0·40	70	0·40					
	Mitaka		2 29 22·5	8·3	3	38	0·71	54	0·71					
	Tukuba		2 29 18·8	5·3	1·3	56	0·07	36	0·07					II
	Kamakura		2 29 26·3	11·6	2	32	0·74	7	0·42					
	Misaki			13·1	4	17	0·90	25	0·90					
	Kiyosumi		2 29 23·4	13·3	2·5			8	0·67					
	Titibu			10·3	3	12	0·37	10	0·37					
	Tôgane			8·8	3	12	0·94	16	0·94					
	Sakura													
	Itô			15·6	2	22	0·50	14	0·62					
	Koyama			15·3	2	42	0·93	60	0·93					
	Yosiwara													
42	Tôkyô	19	10 39 09·8	4·9	2	40	0·24	60	0·24	N78°W,u	139·85	35·64	30	I
	Komaba		10 39 08·8	4·4	2	50	0·24	56	0·32					
	Mitaka		10 39 08·7	6·0	1·5	28	0·41	20	0·41					
	Tukuba		10 39 15·4	8·4	0·4									
	Kamakura					8	0·21	6	0·21					
	Misaki			9·8	2	5	0·94	6	0·94					
	Kiyosumi													
	Titibu			10·5	1	4	0·37	4	0·37					
	Tôgane			7·5	1	2	0·34	2	0·34					
	Sakura			7·2	1	8	0·29	4	0·20					
	Itô													
	Koyama													
	Yosiwara													

(2) *Important distant earthquakes as observed in Tôkyô (Hongô.)*

List II.

Date	Phase	Time of occurrence (G. M. T.)			Amplitude 2A		Period	Probable epicentre
		h	m	s		mm.	s	
1933								
Aug. 25	*P*	7	56	42				
	S	8	01	41	(E.W.)	2·63	24·0	$\Delta = 3200$km.
					(N.S.)	0·70	25·5	
								Destructive near
	L	8	04	53	(E.W.)	2·88	42·5	Chengtu, China.
					(N.S.)	3·03	37·0	
	M	8	07	46	(E.W.)	2·33	23·4	
					(N.S.)	1·25	11·5	
	F	9·5						

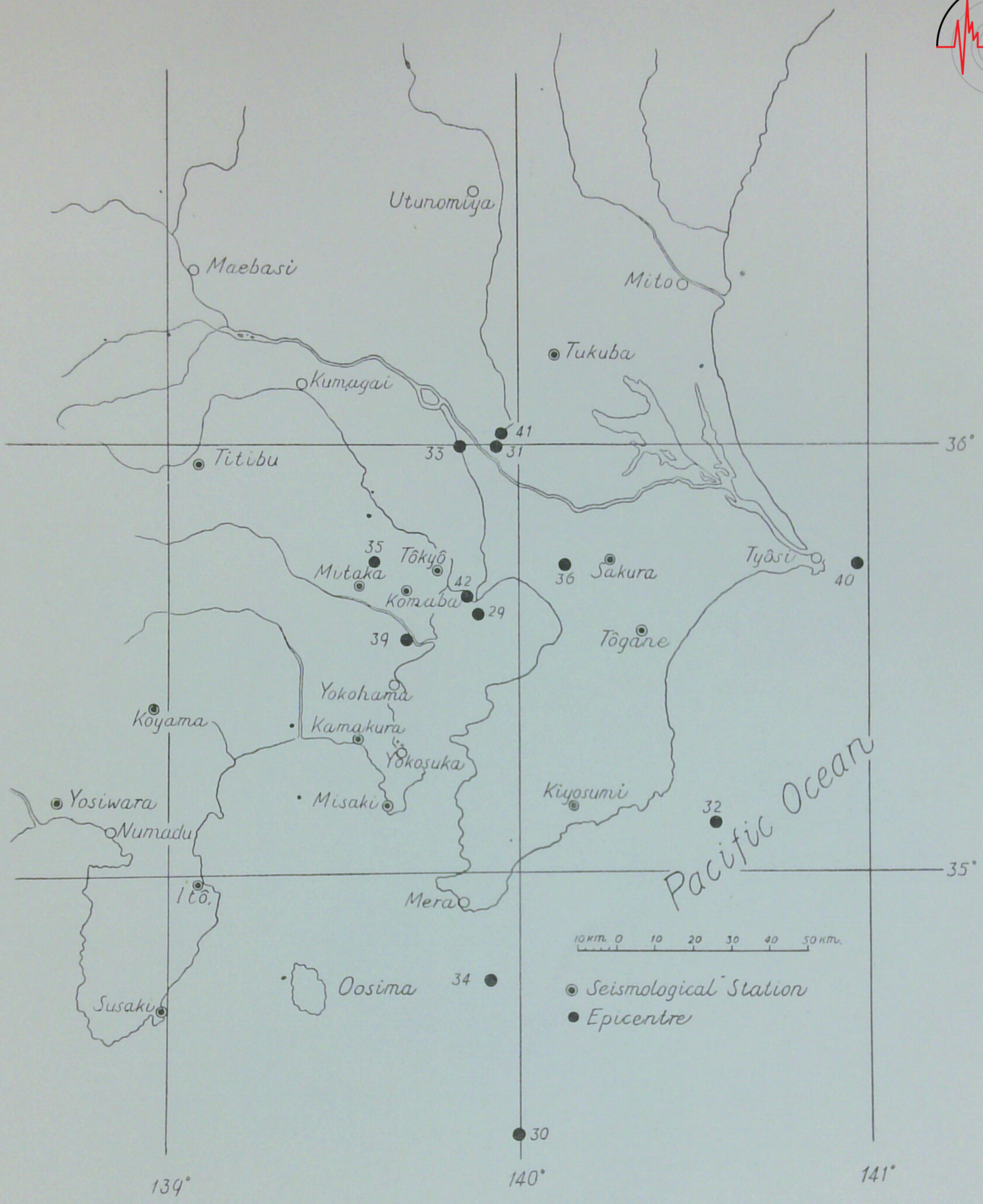
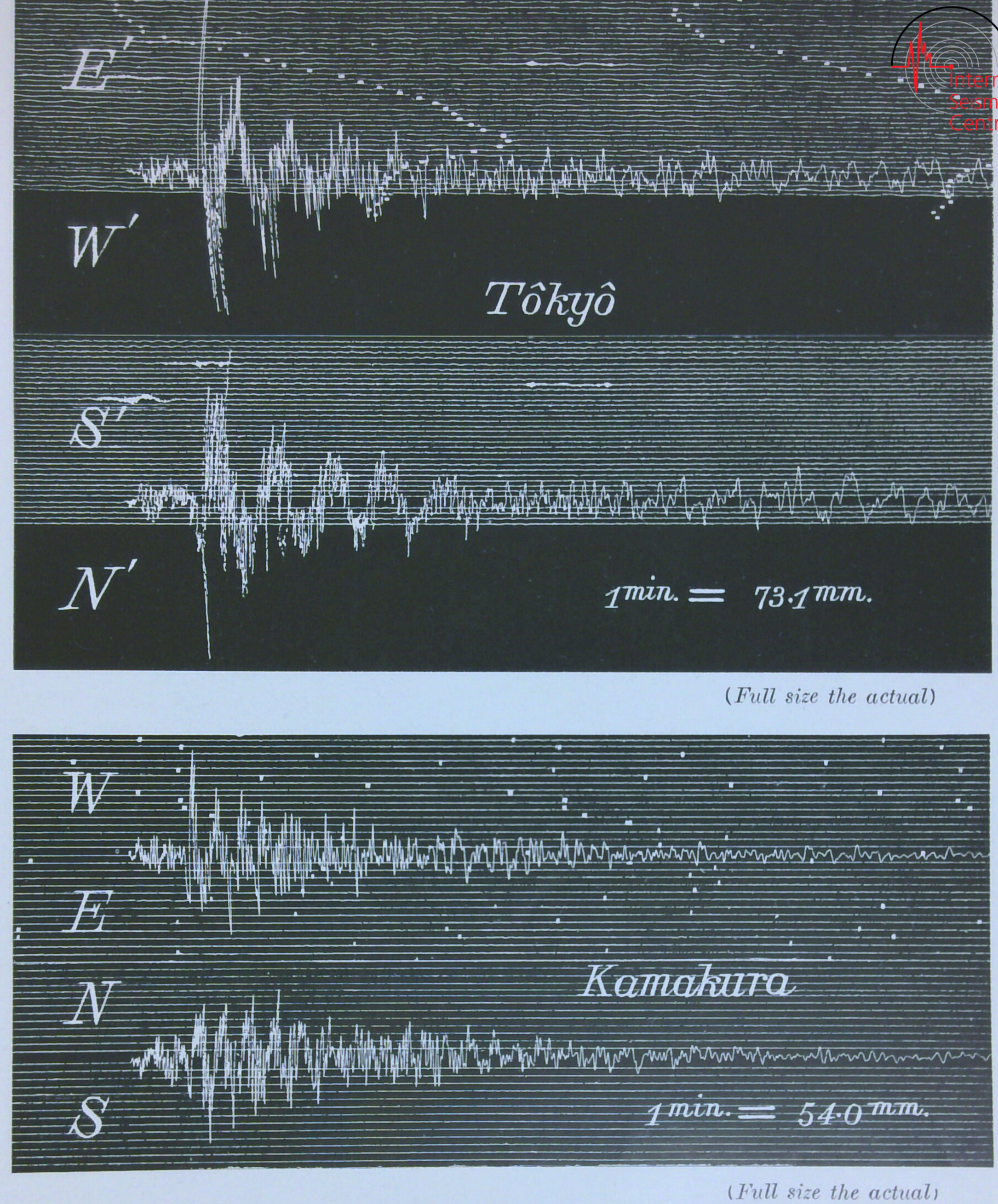


Fig. 1 Distribution of the epicentres of the Tôkyô sensible earthquakes within a distance of 160km. from Tôkyô for the period July 1—September 30, 1933.

(Figures attached to each dot correspond to the earthquake number in List I.)



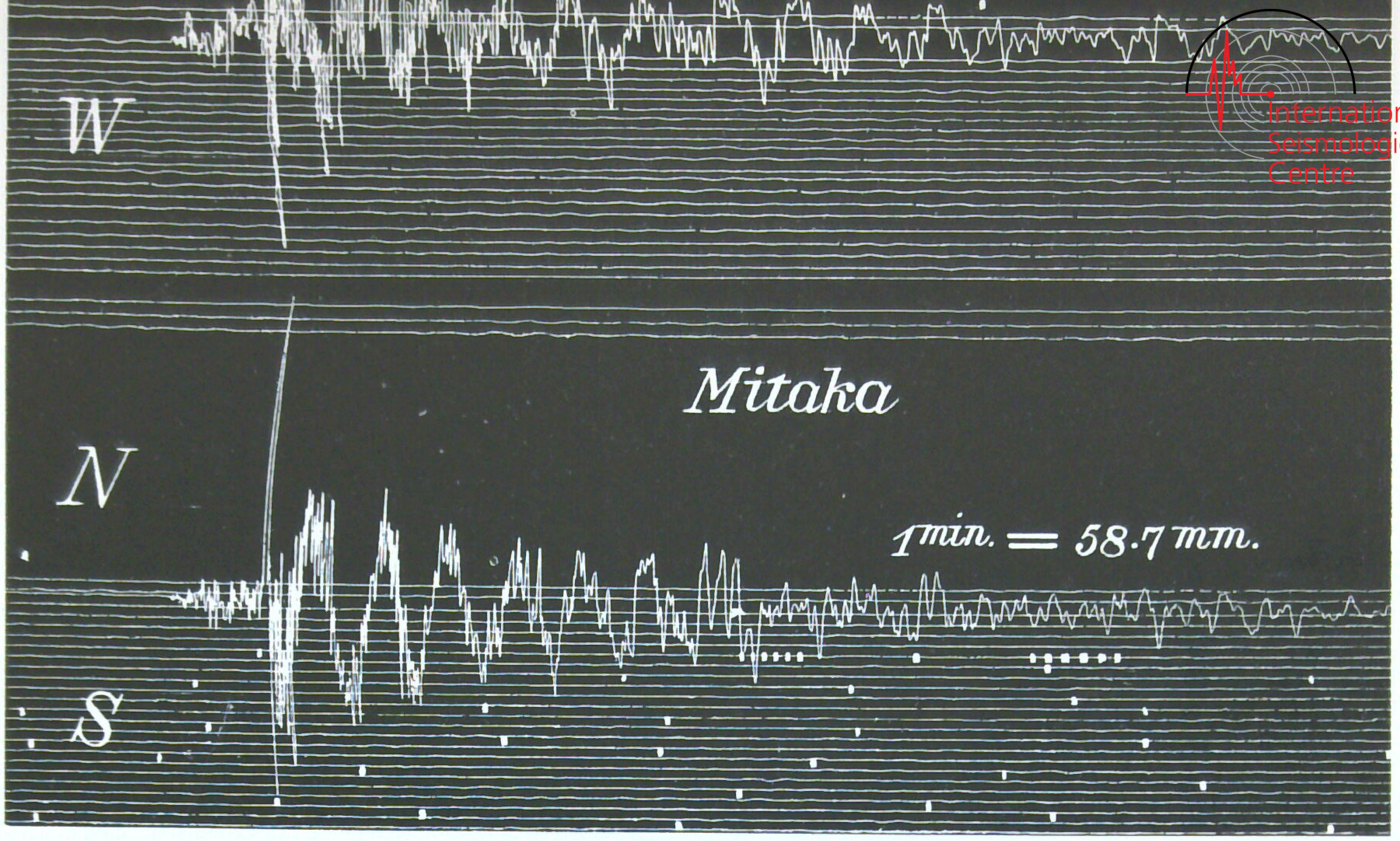
(*Full size the actual*)

(地震報告、一九三三、第三號、圖版)

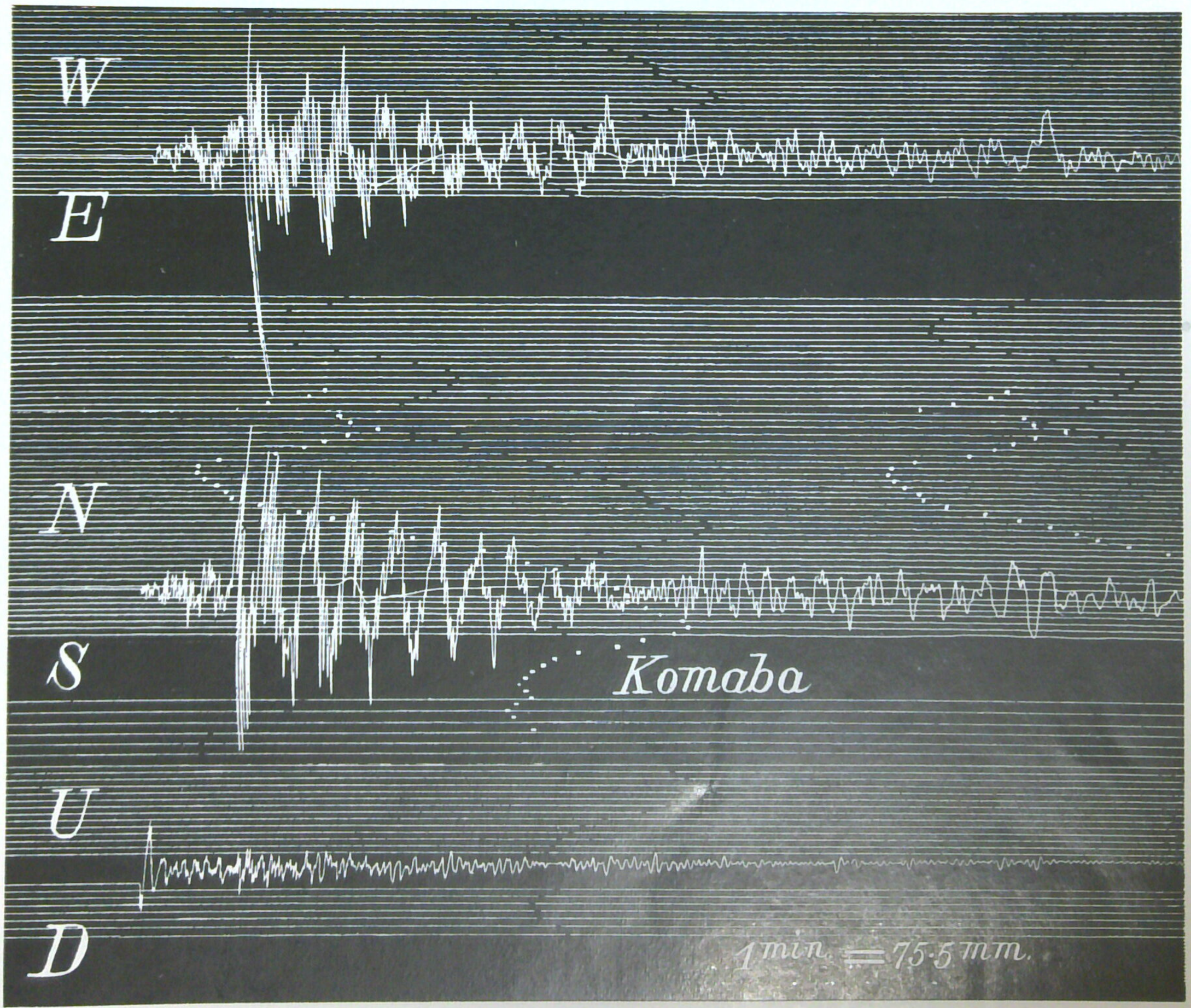
Fig. 2. Seismograms of the earthquake of July 6, 1933. (Eqk. No. 29.)

Instrumental constants :

Tôkyô	Kamakura
N′=N13°W, E′=N77°E.	V(N.S., E.W.)=50.
V(N.′S.′, E.′W.′)=50.	T(„ „)=7s.
T(„ „)=7s.	ε(„ „)=1·5.
ε(„ „)=1·5.	



(*Full size the actual*)

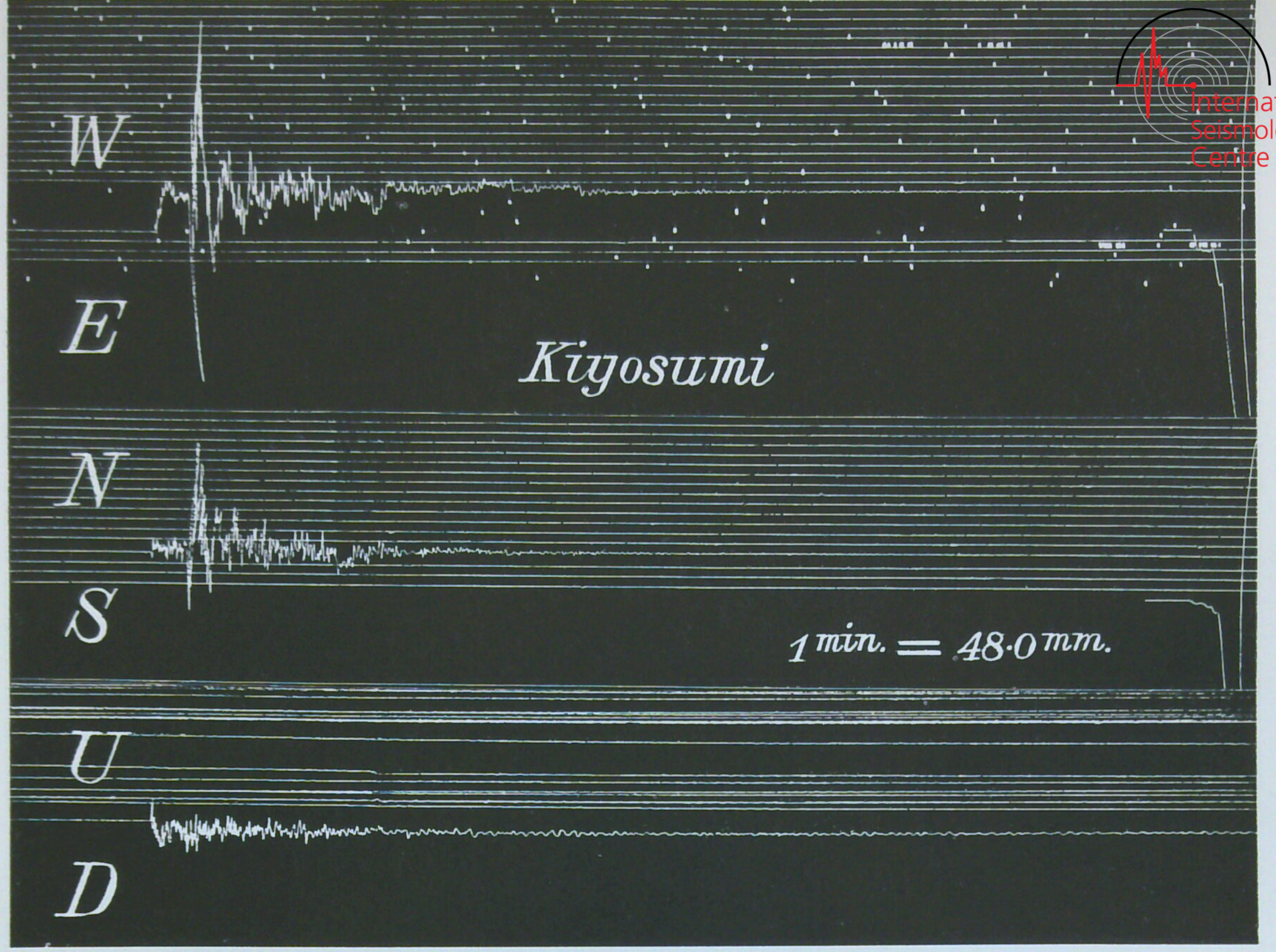


(*Full size the actual*)

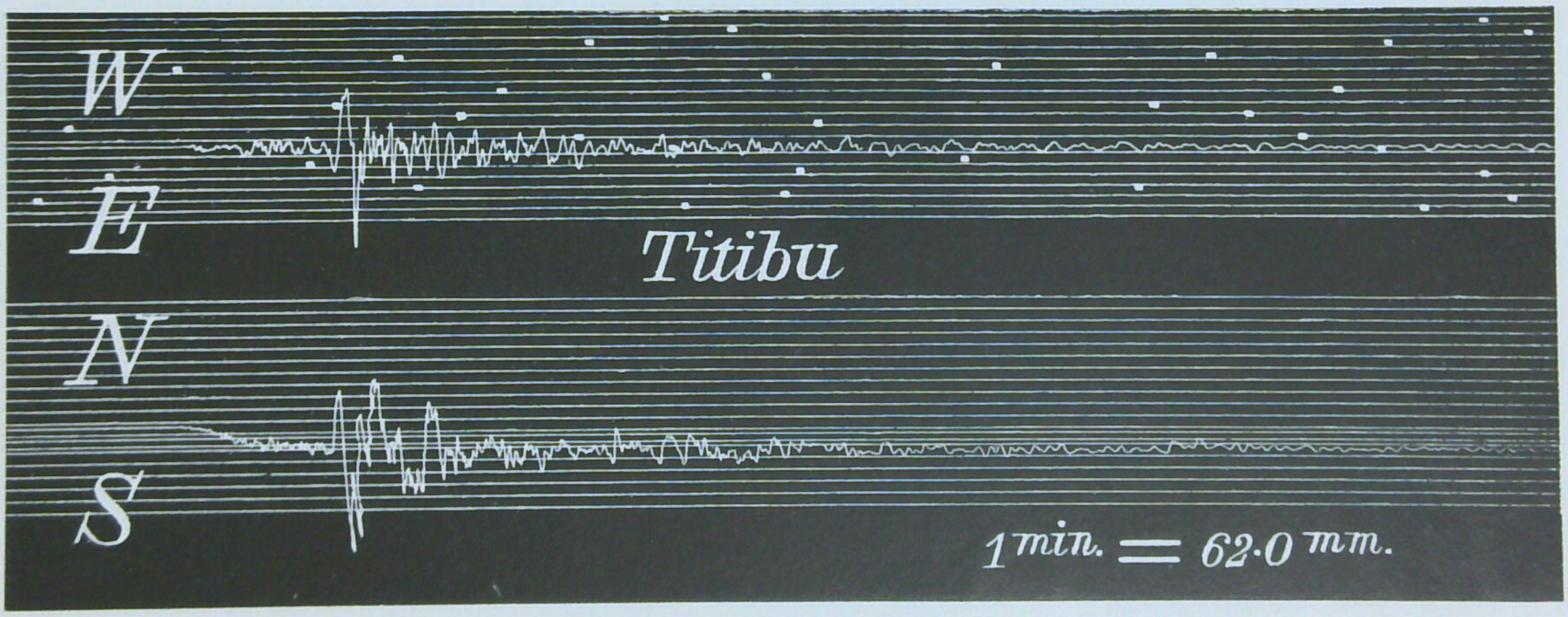
Fig. 3. Seismograms of the earthquake of July 6, 1933. (Eqk. No. 29.)

Instrumental constants:

（地震報告、一九三三、第三號、圖版）



(*Full size the actual*)



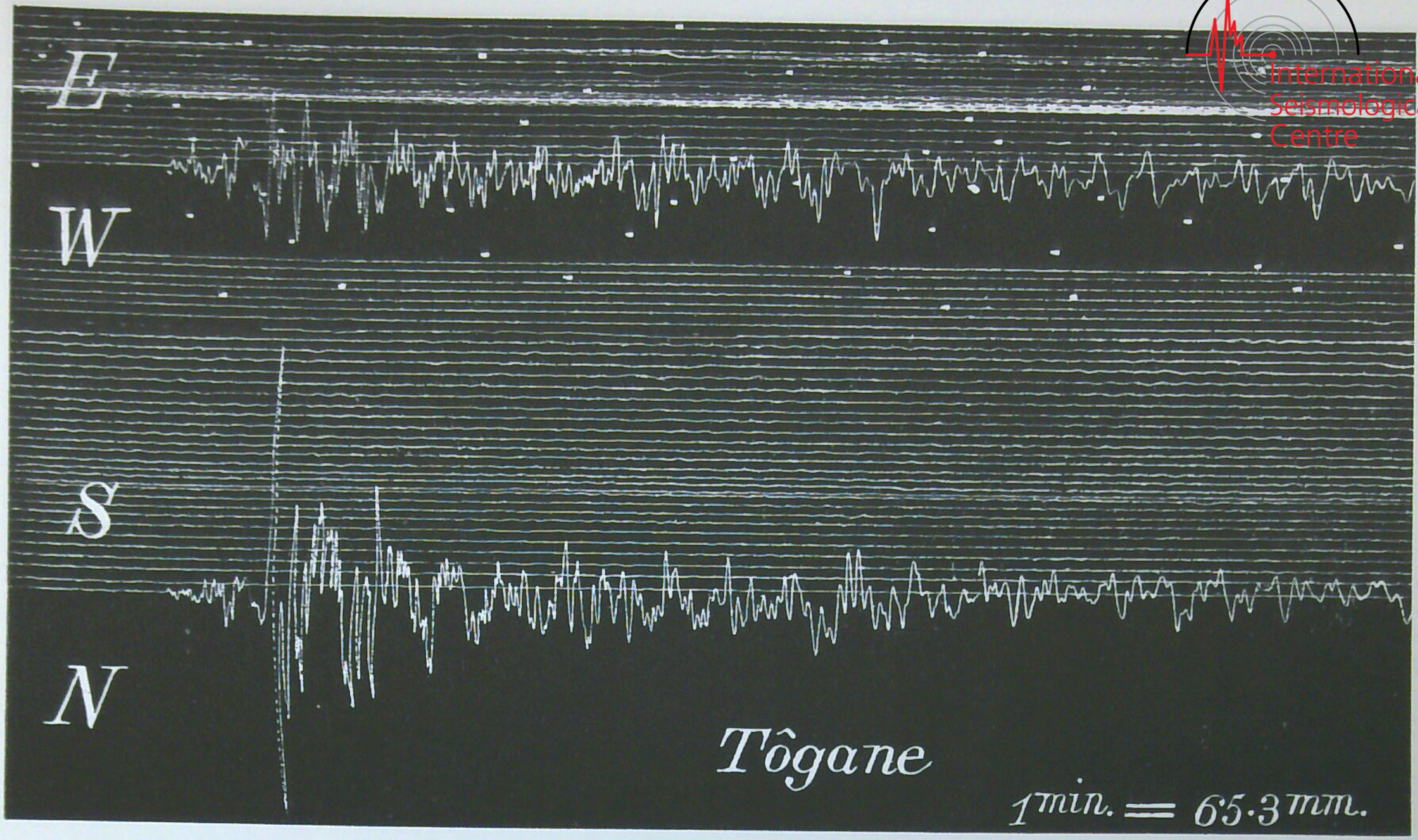
(*Full size the actual*)

(地震報告、一九三三、第三號、圖版)

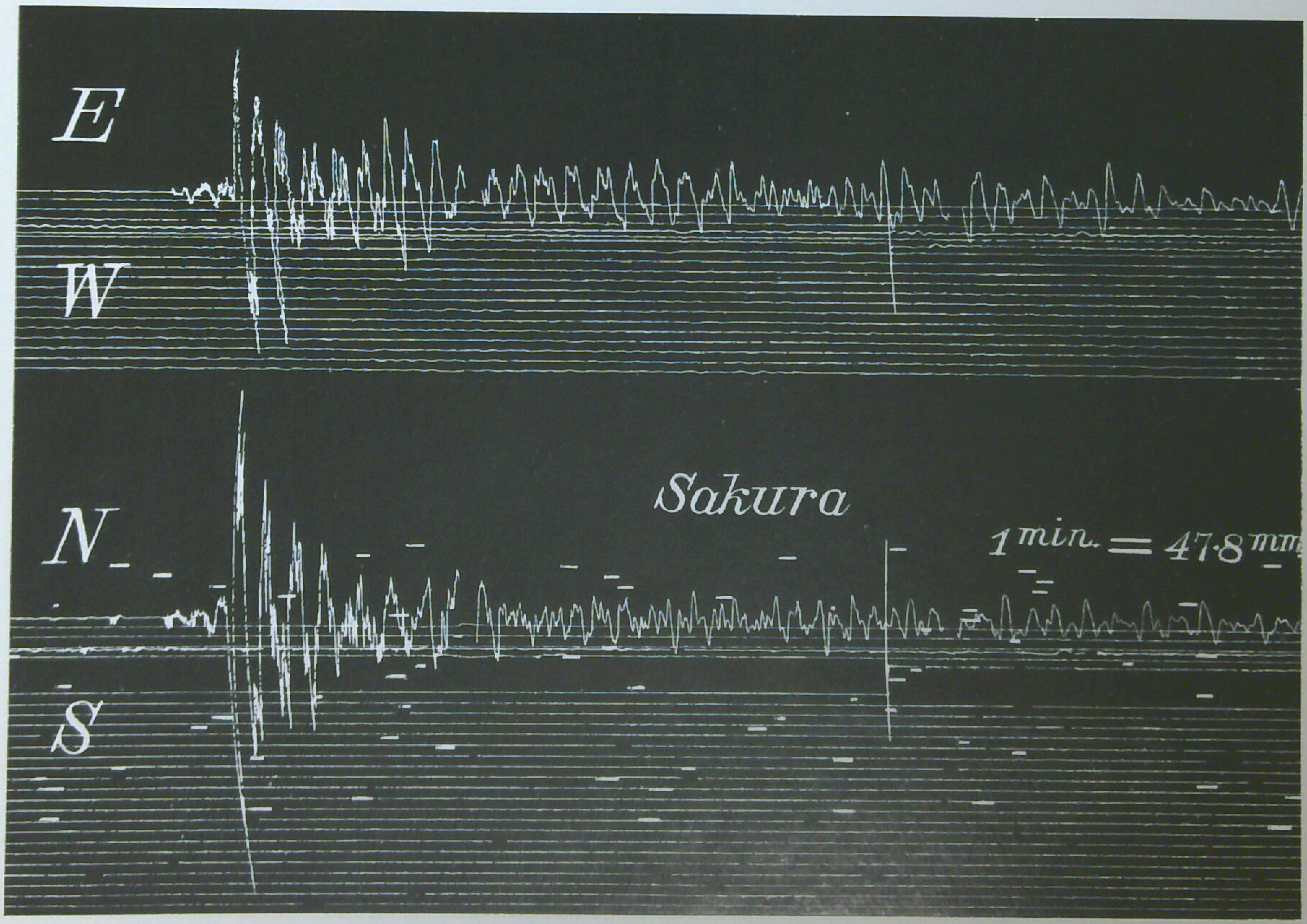
Fig. 4. Seismograms of the earthquake of July 6, 1933. (Eqk. No. 29.)

Instrumental constants :

Kiyosumi	Titibu
V(N.S., E.W.)=50, V(vert.)=28	V(N.S., E.W.)=50.
T(N.S., E.W., vert.)=7s.	T(„ „)=7s.
ε(N.S.)=1·9, ε(E.W.)=1·6,	ε(„ „)=1·3.
ε(vert.)=1·2	



(Full size the actual)



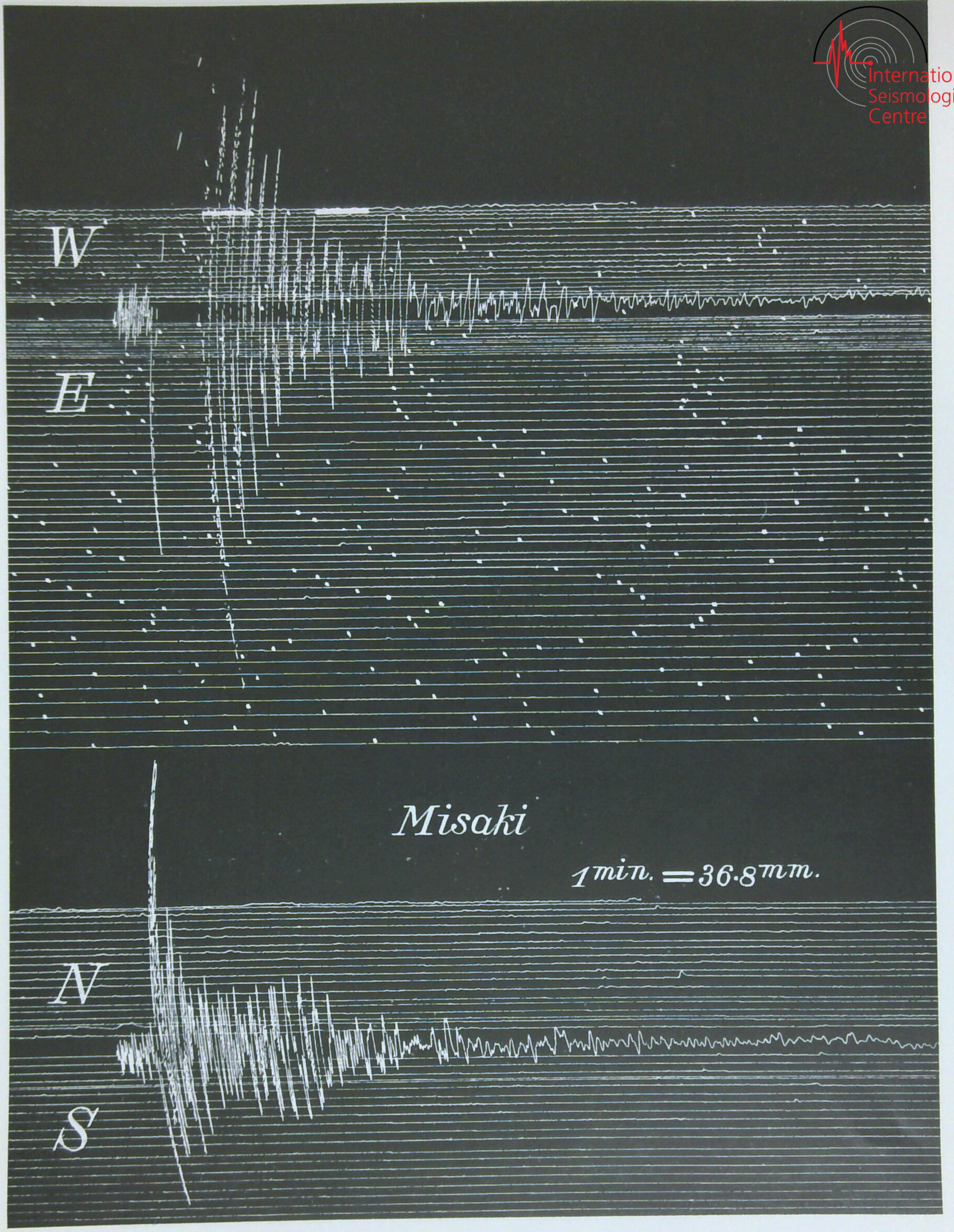
(Full size the actual)

（地震報告、一九三三、第三號、圖版）

Fig. 5. Seismograms of the earthquake of July 6, 1933. (Eqk. No. 29.)

Instrumental constants :

Tôgane	Sakura
V(N.S., E.W.)=50.	V(N.S., E.W.)=50.
T(,, ,,)=7s.	T(,, ,,)=7s.
ε(,, ,,)=1·5	ε(N.S.)=1·6, ε(E.W.)=1·3



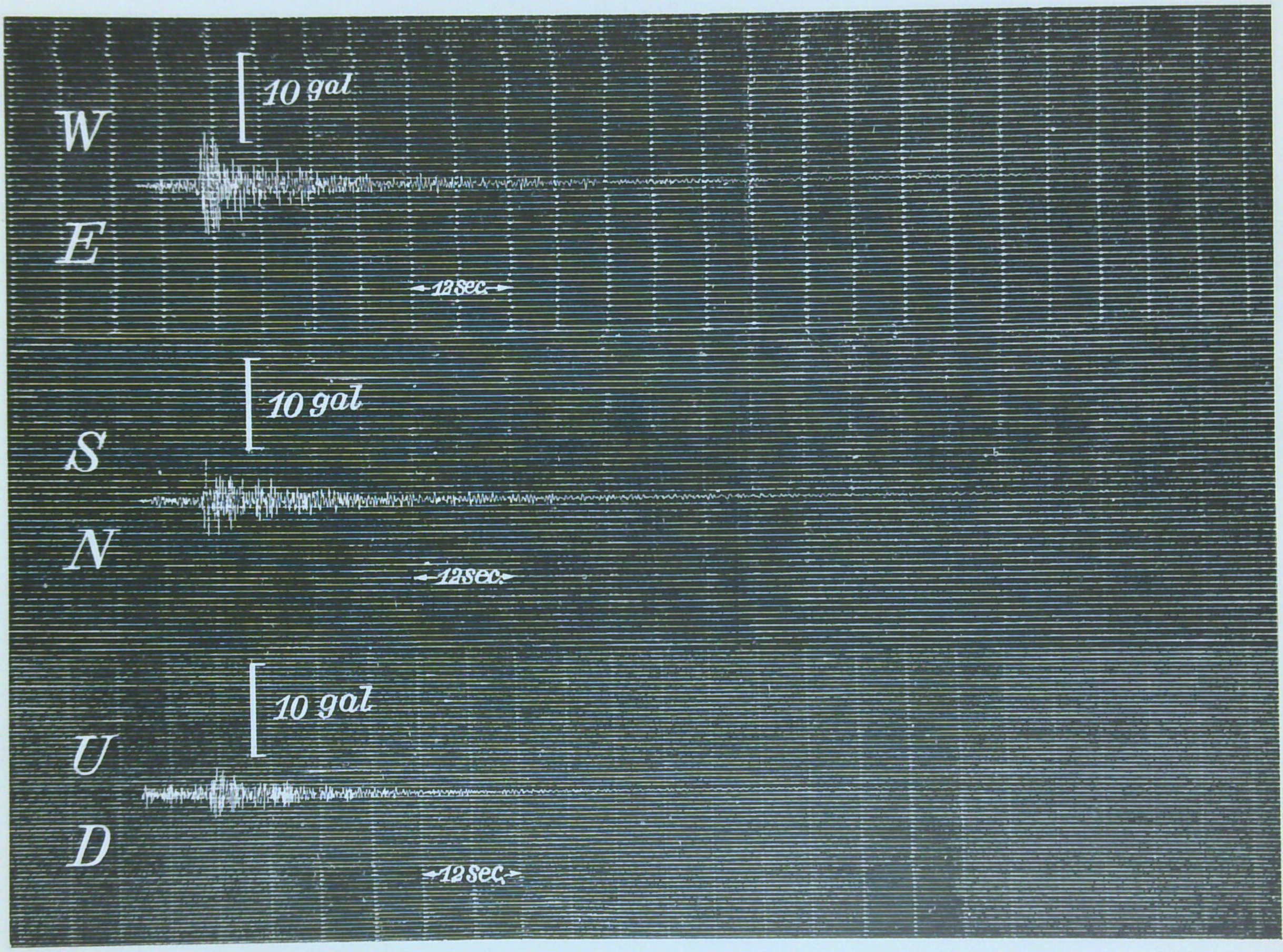
(*Full size the actual*)

Fig. 6. Seismograms of the earthquake of July 6, 1933. (Eqk. No. 29.)

Instrumental constants :

V(N.S., E.W.)=120.
T(„ „)=4s.
ε(„ „)=1·5

（地震報告、一九三三、第三號、圖版）



(地震報告、一九三三、第三號、圖版)

(*Full size the actual.*)

Fig. 7. Ishimoto acceleration seismograph diagrams of the earthquake of July 6, 1933, obtained at Hongô (Tôkyô).

Seismometrical Report.

(Earthquake Research Institute, Tôkyô, Japan.)

(Part 4, 1933.)

(October 1—December 31, 1933.)

(1) Sensible earthquakes in Tôkyô for the period October 1—December 31, 1933.

List I.

Time = Central standard time of Japan. (Mean solar time of the meridian 135°E.)

Notation :

Prel. tr. = Preliminary tremor.
N. S. = North-South component.
E. W. = East-West component.
2A = Range of motion.
T = Period of earthquake motion.
λ = Longitude.
φ = Latitude.

Intensity : 0 (insensible), I (slight), II (rather weak), III (weak), IV (rather strong), V (strong), VI (violent).

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
43	Tôkyô	Oct. 1	23 35 37·6	23·7	30	360	3·5	220	2·37		141·38	36·41		I
	Komaba		23 35 40·4	20·0	14	270	2·40	150	2·60					
	Mitaka		23 35 42·0	24·8	20	470	4·15	294	4·15					
	Tukuba		23 35 33·1	17·1	4·5	50	1·03	70	0·85					I
	Kamakura		23 35 43·6	26·3	8	228	3·00	452	3·00					
	Misaki			27·2	10	473	3·08	317	3·08					
	Kiyosumi		23 35 37·2	26·7	10	210	2·98	106	2·98					
	Titibu			27·0	10			56	1·65					
	Tôgane			20·0	15	1100	4·30	660	3·21					
	Itô			32·5	10	80	3·15	70	4·07					
	Koyama			32·1	9	267	3·00	400	3·50					
	Susaki		23 35 51·5	39·8	8	16	2·4	28	2·0					

(to be continued.)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
44	Tôkyô	Oct. 2	12 33 49·2	13·4	7	44	0·64	50	0·64		140.72	36·40	50	I
	Komaba		12 33 49·2	15·2	6	60	0·8	60	0·64					
	Mitaka		12 33 49·0	16·3	7	32	0·89	46	0·89					
	Tukuba		12 33 39·6	8·4	2·7	75		11	0·76					II
	Kamakura		12 33 52·1	21·3	5	38	0·44	36	0·88					
	Misaki			22·0	6	21	0·53	21	0·53					
	Kiyosumi		12 33 54·4	21·3	7	20	1·31	14	1·31					
	Titibu			17·8	5			18	0·74					
	Tôgane			12·2	6	20	0·54	46	0·64					
	Koyama			2·38	3	40	0·74	68	0·74					
45	Tôkyô	3	7 43 03·4	9·1	1·5	30	0·24	20	0·24		139·95	36·15	50	I
	Komaba		7 43 04·6	8·8	1·5	30	0·24	20	0·24					
	Mitaka		7 43 04·4	9·2	1·5	12	0.35	15	0·35					
	Tukuba		7 43 01·1	5·7	1	22		18	0·15					II
	Kamakura		7 43 10·9	13·0	1	8	0·25	8	0·25					
	Misaki			14·8	2	4	0·79	5	0·79					
	Kiyosumi		7 43 10·0	14·3	1	4	0·57	4	0·57					
	Titibu			8·2	1			4	0·47					
	Tôgane			11·5	1	6	0·58	4	0·58					
46	Tôkyô	4	3 39 22·8	21·3	30	3100	4·50	2800	4·05	S24°E, u	138·89	37·11	30	I
	Komaba		3 39 24.1	21·2	20	2000	4·00							I
	Mitaka		3 39 21·0	22·2	20	4450	6·00	2840	6·70					I
	Tukuba		3 39 17·2	20·3	5									I
	Kamakura		3 39 27·4	28·0	13	2500	7·60	1400	3·50					
	Kiyosumi		3 39 34·7	29·7	25	1220	4·83	886	4·83					
	Titibu			18·4	15	820	4·08	1540	6·50					
	Tôgane			25·7	25	2640	4·85	1350	4·33					
	Sakura			23·8	25	1060	2·6	1156	2·67					
	Itô			32·7	20	660	5·55	500	4·03	S slight E				
	Koyama			26·7	15	2370	3·92	2030	3·70	S slight E				
	Yosiwara			29·5	20	2060	3·33	1720	3·88					
	Asama			10·9										
	Susaki		3 39 36·2	36·0	15	440	5·00	380	3·4					
47	Tôkyô	9	21 06 44·9	10·6	10	720	0·36	430	0·36	S7°W, d	138·91	35·40	5	II
	Komaba		21 06 44·0	9·2	12	1070	0·40	1020	0·44					II
	Mitaka		21 06 42·3	8·3	10	535	0·35	930	0·35					II
	Tukuba		21 06 53·5	15.0	2·5	48	0·53	45	0·53					
	Kamakura		21 06 41·0	7·1	6·5	1500	0·50	4200	0·50					III
	Misaki			8·0	10	508	0·57	965	0·57	N 51°5 W				II
	Kiyosumi		21 06 49·6	12·6	9	196	3·23	160	2·74					II
	Titibu			8·2	5	100	0·36	240	0·36					
	Tôgane			16·3	10	130	1·02	90	1·22	N 83° E				
	Itô			6·6	6	762	0·32	900	0·32	N 81° W				II
	Koyama			3·2						N 41·°5 W				III
	Yosiwara			6·7	9	2720	0·48	1890	0·48	S 34° W				II
	Susaki		21 06 46·6	9·5	4·5	160	1·55	110	2·50	S 41° E				
48	Tôkyô	9	21 08 21·0		1			95	0·29	[illegible]	After shock of No. 47			I
	Komaba		21 08 16·0		1	240	3·20	200	4·00	[illegible]				
	Mitaka		21 08 26·3	8·0	0·5	100	0·36	90	0·36	[illegible]				

(*to be continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s				km	
	Kamakura	Oct. 9	21 08 26·0		0·5	60	0·58	64	0·58					
	Misaki				1	48	0·51	45	0·51					
	Titibu				1	10	0·32	12	0·37					
	Itô			5·4	0·5	40	0·20	32	0·20					
	Yosiwara			6·3	1·5	140	0·28	220	0·28					
49	Tôkyô	14	19 45 10·3	8·8	1·5	28	0·32	25	0·32		140° 47	35°·41	20	I
	Komaba		19 45 12·1	8·9	2	30	0·4	22	0·32					
	Mitaka		19 45 10·8	10·5	1·5	13	0·23	20	0 23					
	Tukuba		19 45 11·7	9·0	1	2	0·15	2	0·17					
	Kamakura		19 45 13·1	10·7	1·5	14	0·39	18	0·39					
	Misaki			10·3	2	18	0·32	18	0·32					
	Kiyosumi		19 45 07·2	11·4	2	8	0·62	12	0·62					
	Titibu			14·0	1·5	4	0·51	3	0·51					
	Tôgane			6·7	2	18	0·28	9	0·28					
	Koyama			14·2	1	20	0·32	24	0·32					
50	Tôkyô	16	1 28 10·6	9·0	3	64	0·63	74	0·63		140·11	35·59	60	I
	Komaba		1 28 11·0	9·6	3	84	0·24	132	0·32					
	Mitaka		1 28 11·5	10·3	2	54	0·48	45	0·48					
	Tukuba		1 28 12·0	9·6	1	10	0·10	9	0·15					
	Kamakura		1 28 12·6	9·3	1·5	50	0·40	52	0·53					
	Misaki			11·4	2·5	27	0·59	33	0·59					
	Kiyosumi		1 28 11·7	10·1	2	8	0·58	16	0·58					
	Titibu			12·3	1·5	16	0·51	16	0·63					
	Tôgane			8·7	2			20	0·34					
	Itô			13·6	1·5	28	0·41	24	0·41					
	Koyama			10·9	2·5	48	0·23	44	0·23					
	Yosiwara			17·2	1·5	32	0·36	32	0·36					
51	Tôkyô	2[illegible]	4 30 10·8	8·2	2	13	0·40	17	0·48		139·52	35·25	30	I
	Komaba		4 30 10·5	7·6	2	20	0·40	34	0·40					
	Mitaka		4 30 08·3	8·4	2	24	0·44	34	0·44					
	Tukuba		4 30 17·2	14·8	1	2	0 33	4	0·43					
	Kamakura		4 30 04·0	3·9	2	98	0·71	50	0·48					II
	Misaki			4·5	3	64	0·53							I
	Kiyosumi		4 30 06·1	8·1	2	12	0·92	6	0·92					
	Titibu			12·6	1·5	6	0·53	4	0·53					
	Tôgane			8·6	2	4	0·37	4	0·42					
	Koyama			6·6	1	104	0·26	80	0·26					
	Yosiwara			9·7	1	30	0·35	68	0·35					
52	Tôkyô	Nov. 1	17 22 10·5	15·5	15	390	1·06	320	1·30		140·80	35·57	30	I
	Komaba		17 22 10·2	14·8	8	340	3·84	230	2·80					
	Mitaka		17 22 12·6	16·2	15	204	2·20	320	2·78					
	Tukuba		17 22 07·3	10·3	4									I
	Kamakura		17 22 14·8	17·3	7	310	0·86	250	1·11					
	Misaki			15·3	9	146	2·77	321	2·77					
	Kiyosumi		17 22 11·9	10·1	12	160	1·20	130	1.16					
	Titibu			21·3	7	80	1·55	110	1·93					
	Tôgane			8·3	12	1020	1·48	1350	1·48					II
	Itô			20.2	7	80	4·30	140	3·90					
	Koyama			19·5	6	200	2·87	412	4·80					

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre			
				Prel. tr.	Total.	N.S.		E. W.			λ (E)	φ (N)	Depth	Intensity
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s					
	Yosiwara	Nov. 1		23·7	6	240	3·27	380	3.27					
	Susaki		17 22 22·2	26·3	6	20	1·4	28	1·4					
53	Tôkyô	1	19 34 36·6	14·7	9	44	0·47	27	0·47		140°·97	35°·23	20	I
	Komaba		19 34 35·8	15·6	4	20	0·64	18	0·64					
	Mitaka		19 34 37·6	14·1	4	12	0·78	8	0·78					
	Tukuba		19 34 30·7	8·7	1	8	0·56	6	0·64					
	Kamakura		19 34 37·8	17·3	3	18	0·50	16	0·50					
	Misaki			15·1	5	13	0·87	22	0·87					
	Kiyosumi		19 34 31·3	8·9	4	21	1.44							
	Tôgane			8·6	5	116	1·06	106	1·06					
54	Tôkyô	2	3 14 23·0	8·2	2	46	0·40	86	0·40		139·59	36·10	30	I
	Komaba		3 14 21·1	6·8	3	40	0·4	128	0·4					
	Mitaka		3 14 21·4	6·9	3	44	0·23	28	0·23					
	Kamakura		3 14 16·5	3·0	1·5	240	0·65	414	0·65					II
	Misaki			3·6	3	44	0·62	34	0·50					I
	Kiyosumi		3 14 23·0	10·0	2	10	0·75	7	0.75					
	Tôgane			9·7	2	14	0·92	8	0·92					
	Itô			7·6	1·5	75	0·56	64	0·56					
	Koyama			8·2	2	88	0·39	180	0·39					
	Yosiwara			10·7	1·5	16	0·37	32	0·37					
55	Tôkyô	8	1 59 21·0	10·7	6	170	0·64	108	0·64		140·58	35·36	30	I
	Komaba		1 59 21·7	11·2	7	170	0·4	170	0·56					I
	Mitaka		1 59 25·5	12·6	5	166	0·90	82	0·90					
	Tukuba		2 00 22·1	11·9	2·5	33	0·55	18	0·48					
	Kamakura		1 59 24·2	12·0	7	180	0·59	112	0·69					
	Misaki			11·9	5	125	0·88	212	0·88					
	Kiyosumi		1 59 15·2	6·5	5	404	0·86	476	0·98					II
	Tôgane			5·5	7	600	0·66	734	0·66					II
	Sakura			6·5	7	500	0·99	180	0·99					II
	Itô			15·4	3	104	0·65	68	0·65					
	Koyama			18·2	5	152	1·25	200	1·04					
	Yosiwara			20·2	5	80	2·08	200	2·68					
56	Tôkyô	19	15 11 04·0	9·1	5	88	0·48	63	0·48		140·00	35·96	60	I
	Komaba		15 11 03·6	9·2	2	50	0·48							
	Mitaka		15 11 05·0	9·4	3·5	20	0·56	16	0·67					
	Tukuba		15 11 03·5	8·4	1	8	0·21	6	0·23					I
	Kamakura		15 11 06·7	10·9	2	12	0·31	14	0·51					
	Kiyosumi		15 11 07·7	15·0	3	6	0·74	8	0·74					
	Titibu			12·2	3	4	0·74	4	0·74					
	Tôgane			10·4	4	50	1·46	54	1·46					
57	Tôkyô	20	10 35 50·0	11·9	4	58	0·24	56	0·18		141·00	36·10	30	I
	Komaba		10 35 49·4	15·2	4	30	0·24	50	0·24					
	Mitaka		10 35 50·8	15·2	3	12	0·36	20	0·36					
	Tukuba		10 35 41·9	8·8	2	56	0.18	32	0·18					II
	Kamakura		10 35 56·2	15·2	2·5	18	0·41	6	0·41					
	Misaki			21·3	4	9	0·76	17	0·76					
	Kiyosumi		10 35 50·3	16·3	3	7	0·91	8	0·73					
	Tôgane			11·2	5	44	0·49	36	0·49					

(*to be continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N. S.		E. W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s		°	°	km	
58	Tôkyô	Nov. 27	16 50 26·6	16·7	5	61	0·44	46	0·44		141·00	36·43	40	I
	Komaba		16 50 29·2	17·6	4	30	0·81	60	0·40					
	Mitaka		16 50 31·5	17·9	4	25	0·57	32	0·68					
	Tukuba		16 50 20·6	9·3	3	9	0·41	12	0·38					I
	Kamakura		16 50 37·0	20·7	5	25	0·68	74	1·10					
	Misaki			24·7	5	27	0·78	37	0·78					
	Kiyosumi		16 50 30·3	22·3	5	16	1·20	12	1·20					
	Titibu			22·7	4	16	0·57	18	0·57					
59	Tôkyô	Dec. 3	5 38 15·0	9·1	2	20	0·20	16	0·20		140·46	35·48	30	I
	Komaba		5 38 15·0	8·1	2	50	0·33	20	0·33					
	Mitaka		5 38 15·3	10·7	2	14	0·23	22	0·23					
	Kamakura		5 38 12·2	8·2	1	15	0·27	6	0·18					
	Kiyosumi		5 38 09·9	7·0	2	4	0·32	4	0·32					
	Tôgane			5·0	2	64	0·18	42	0·18					I
60	Tôkyô	4	4 28 32·6	9·5	4	50	0·50	28	0·50		140·00	36·12	60	I
	Komaba		4 28 34·5	9·7	3	30	0·24	34	0·24					
	Mitaka		4 28 35·2	11·0	2	12	0·44	36	0·48					
	Tukuba		4 28 28·6	7·0	1·3	48	0·21	48	0·21					II
	Kamakura		4 28 38·0	11·9	2	16	0·35	24	0·58					
	Misaki			14·9	3	5	0·89	7	0·89					
	Kiyosumi		4 28 36·6	15·2	3	4	0·78	4	0·58					
	Titibu			12·8	2	8	0·38	8	0·38					
	Tôgane			12·4	3	32	0·72	12	0·72					
	Koyama			13·0	3	24	0·67	28	0·71					
61	Tôkyô	7	4 21 10·8	21·3	10	68	0·72	46	0·72		141·22	36·85	50	I
	Komaba		4 21 12·3	21·1	7	40	0·33	40	0·33					
	Mitaka		4 21 14·6	22·0	5	50	1·22	44	1·58					
	Tukuba		4 22 01·3	14·1	3	30	0·27	18	0·35					II
	Kamakura		4 21 21·0	28·4	5	40	0·64	40	0·97					
	Misaki			27·6	6	24	1·00	31	1·00					
	Kiyosumi		6 21 10·4	26·7	6	8	0·94	10	1·10					
	Titibu			25·6	4	34	0·98	38	0·98					
	Tôgane			23·7	6	36	1·00	34	0·98					
	Itô			31·8	2·5	28	0·61	32	0·61					
	Koyama			31·5	5	72	1·00	100	1·06					
62	Tôkyô	8	3 35 36·6	12·4	16	352	0·75	283	0·66	N47° E,u	139·00	35·09	30	II
	Komaba		3 35 36·5	11·2	14	620	1·20	570	1·60					II
	Mitaka		3 35 34·5	12·2	15	400	1·14	530	1·14					II
	Tukuba		3 35 43·5	17·0	2·7	37	0·67	41	0·81					
	Kamakura		3 35 22·2	6·8	8	620	0·65	1030	0·65	S45° W,d				II
	Misaki			7·4	16	679	0·87							II
	Kiyosumi		3 35 39·2	13·1	6	364	2·83	234	2·83					
	Titibu			11·5	4	156	0·46	172	0·46					
	Tôgane			15·1	10	340	2·63	156	2·20					
	Itô			3·6	15	2170	0·56	1360	0·56	S15° E				III
	Koyama			3·6	10	4200	0·35	5040	0·35	S				III
	Susaki		3 35 31·7	7·5	7·5	180	1·42	256	1·34	N38° E				I
63	Tôkyô	12	2 02 41·7	13·7	5	52	0·49	33	0·49		140·69	36·33	40	I

(*to be continued.*)

List I. (*continued.*)

No.	Station	Date	Time of occurrence	Duration		Maximum motion				Direction of initial motion	Epicentre		Depth	Intensity
				Prel. tr.	Total.	N.S.		E.W.			λ (E)	φ (N)		
						2A	T	2A	T					
			h m s	s	m	μ	s	μ	s					
	Komaba	Dec. 12	2 02 43·3	15·2	5	26	0·24	30	0·24					
	Mitaka		2 02 44·4	15·0	4	12	0·48	21	0·48					
	Tukuba		2 02 33·8	8·0	1·4	34	0·22	39	0·22					II
	Kamakura		2 02 51·7	20·5	2	10	0·52	12	0·52					
	Misaki			24.0	5	7	0·56	8	0·56					
	Kiyosumi		2 02 44·9	18·1	4	4	1·05	4	1·05					
	Titibu			17·2	3	10	0·20	14	0·20					
	Tôgane			13·0	4	8	0·90	16	0·90					

(2) *Important distant earthquakes as observed in Tôkyô (Hongô).*

List II.

Date	Phase	Time of occurrence (G. M. T.)	Amplitude 2A	Period	Probable epicentre
1933		h m s			
Nov. 20	*P*	23 32 43.3			
	S	23 41 53·7			Δ = 7720km.
	L	23 55 58·0	mm.	s	
21	M_1	0 02 55·0	(N.S.) 0·475	24·0	λ = 68°W (U.S.C.
			(E.W.) 0·530	28·0	φ = 73°N G.S.)
	M_2	0 07 16·0	(N.S.) 0·550	17·5	
			(E.W.) 0·820	18·0	
	F	1·2	(N.S.) 0·750	17·0	
			(E.W.) 0·520	15·0	

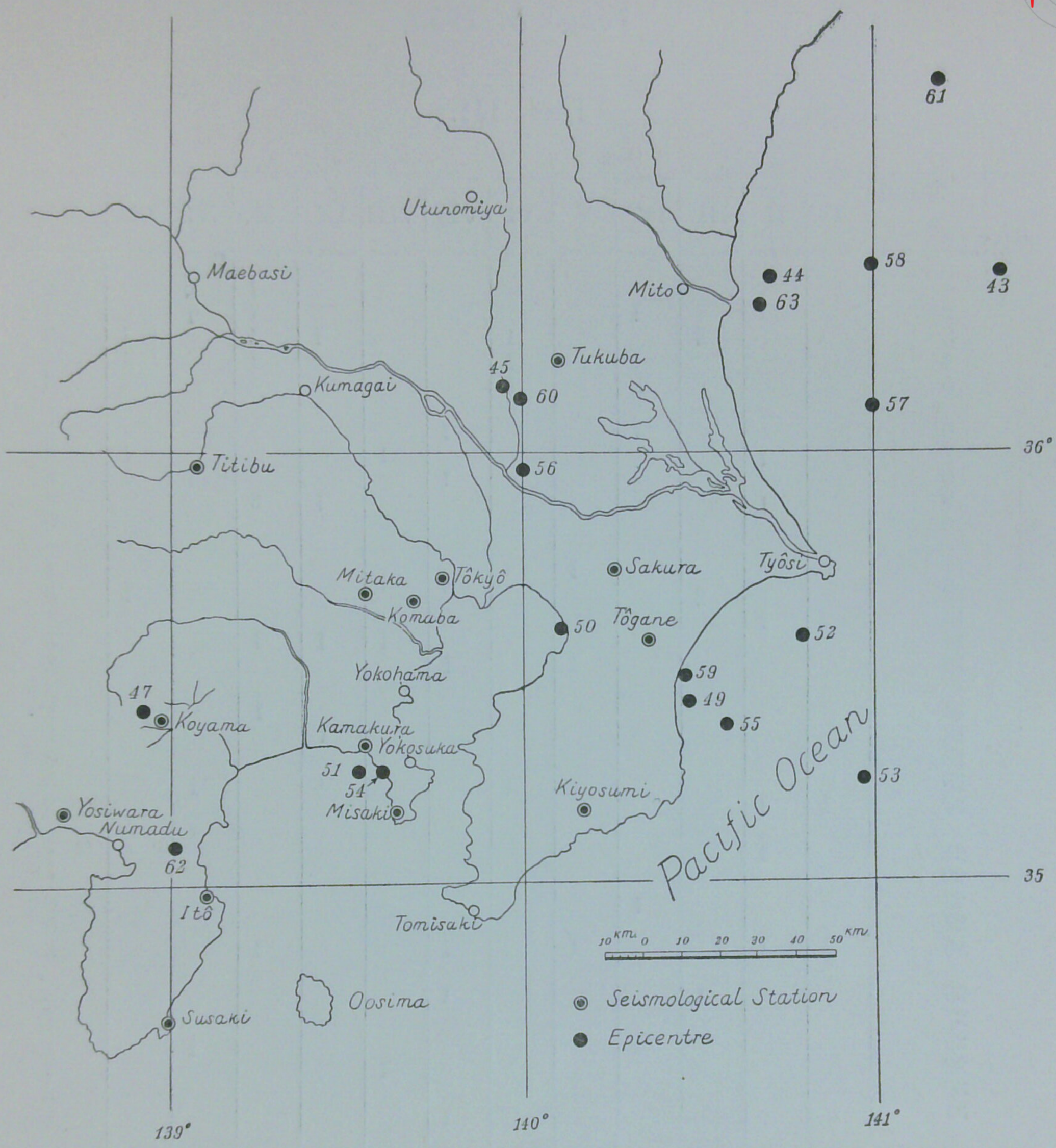


Fig. 1. Distribution of the epicentres of the "Tôkyô" sensible earthquakes within a distance of 160 km. from Tôkyô for the period Oct. 1–December 31, 1933. (Figures attached to each dot are the earthquake numers in List I.)

(3) *Daily frequencies of the earthquakes felt in Tôkyô in 1933.*

List III.

Day \ Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Sum
1										1	2		3
2		1		1						1	1		4
3			2			1			1	1		1	6
4				1		1				1		1	4
5				2		1							3
6				1			1						1
7		1						1				1	4
8							1				1	1	3
9		1							1	2			4
10													0
11					1								1
12			2									1	3
13		1											1
14								1	1	1			3
15					1		1						2
16										1			1
17									1				1
18													0
19						1			1		1		3
20	1	1											3
21		1									1		1
22													1
23				1									0
24													0
25	1	1			1		1			1			5
26			1				1						2
27													1
28				1							1		1
29								1					1
30													0
31							1						1
Sum	2	7	5	7	3	4	6	3	5	9	7	5	63

(4) *Observation of the earthquakes at the Volcano Asama.*

Observations of earthquakes originating in the Volcano Asama and environs were continued from August 1932 to date. A temporary seismological station was established by the Institute at Mine-no-Tyaya, 3 km. east of Kamayama, the central cone.

Owing to instrumental difficulties, our earlier observations were not so satisfactory, but with the elimination of these troubles, the observations are now functioning satisfactorily.

The number of volcanic earthquakes that were observed are given in List IV.

List. IV.

Day \ Month	I	II	III	IV	V	VI	VII	VIII	XI	X	XI	XII
1							1					
2												
3			1									
4							1					
5												
6												
7				1								
8						2						
9		2					1					
10		1										
11					1		2					
12						1						
13							2					
14							1					
15								1				
16												
17	4											3
18				1		1						
19						1					1	
20			1	6			1	1				
21		2		2								
22	2											
23							1	1				
24	1		1								1	
25												
26												
27				1		1					1	
28												
29	2											
30												
31												
Sum	9	5	3	11	1	6	10	3	0	0	3	3