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INTRODUCTION.

The present publication contains the results of the seismometrical observations made at the Central Meteorological Observatory, Tôkyô, and the report on the general aspect of the seismic activity in Japan during the year 1929.

Geographical coordinates of the Central Meteorological Observatory :—

Longitude :	139° 46' E
Latitude :	35° 41' N
Height from the mean sea level :	21 m.
Geological nature of the ground :	Diluvium.

Instruments which are in use at the observatory :—

Magnification, V .	Damping coefficient, ν .
Coefficient of friction, ϵ . (mm/sec ² .)	Proper period, T_0 (sec).

Wiechert's horizontal seismograph with the mass 200 kg.

	EW comp.	NS comp.
V	88	75
ν	4.5	4.5
ϵ	0.01	0.01
T_0	^s 4.3	^s 4.5

Wiechert's vertical seismograph with the mass 80 kg.

V ; 50.	ν ; 4.7.	ϵ ; 0.01,	T_0 ; ^s 4.1.
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Fürst Galitzin's horizontal seismograph with photographic registration apparatus.

	EW comp.	NS comp.
V	1000	1000
ν	7.0	7.0
T_0	^s 17.0	^s 17.0
T_g	^s 15.0	^s 14.3

T_g ; Proper period of the galvanometer.

Fürst Galitzin's vertical seismograph with photographic registration apparatus.

V	500
ν	7.0
T_0	$\frac{10.0}{s}$
T_g	$\frac{12.0}{s}$

Mainka's horizontal seismographs with the mass 450 kg.

	EW comp.	NS comp.
V	100	105
ν	8.0	8.0
ϵ	0.01	0.01
T_0	$\frac{9.4}{s}$	$\frac{11.0}{s}$

Omori's horizontal seismograph with magnetic damping device. (improved by this observatory).

	EW comp.	NS comp.
V	20	20
ν	2.2	2.1
ϵ	0.02	0.02
T_0	$\frac{16.}{s}$	$\frac{16.}{s}$

Omori's portable seismometer.

	EW comp.	NS comp.
V	50	50
ϵ	0.01	0.01
T_0	$\frac{3.5}{s}$	$\frac{3.5}{s}$

C.M.O. seismograph of low magnification.

	EW comp.	NS comp.	V comp.
V	2.	2.	2.
ν	2.5	2.5	2.5
ϵ	0.04	0.04	0.04
T_0	$\frac{3.5}{s}$	$\frac{3.5}{s}$	$\frac{3.5}{s}$

Scales of the seismic intensity :— The intensity of the shock is estimated according to the scales 0 to 6. Our scales, the Cancani's scales and the absolute intensity are shown in the following table.

	No felt	Slight		Moderate	Rather strong	Strong	Very strong		Disastrous			
Our scales	0	1		2	3	4	5		6			
Cancani's scales	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Acceleration (mm/sec ²)	<2.5	2.5 5.0	5 10	10 25	25 50	50 100	100 250	250 500	500 1000	1000 2500	2500 5000	>5000

Methods for the determination of the epicenters :— Following methods are used to determine the epicentre of an earthquake from the results of the microseismic observations made at a number of meteorological stations in this country :—

1. By the direction of the initial motion
2. By the empirical formula which is applicable to near earthquakes,
 $\Delta = 7.42 t$

where Δ is the epicentral distance and t the duration of the preliminary tremors S—P.

3. By the isochronous lines which are constructed to fit the results of the observations made at the meteorological stations in this country.
4. By the iso-PS lines.

Methods for the time keeping :— The standard clocks and the chronometers used for the time keeping are as follows :

1. Clemens Riefler's astronomical clock No. 482, München.
2. Dent standard clock No. 3072, London.
3. Chronometer No. 128, Nardin.
4. Marine chronometer No. 460 Werke. G.M.B.H. Hamburg.
5. Chronometer No. 835. W. Bröcking, Hamburg.

The timing is controlled by above mentioned chronometers which is rated twice a day, i.e. at 11^h a.m. and 9^h p.m. by comparison with the wireless time signals issued by the Tôkyô Astronomical Observatory.

In the present report, the time is referred to the Greenwich mean time.

Symbols and Notations :—

1. Phases

P (undae primae); Normal first phase (longitudinal waves).

PR_n; Longitudinal waves n -times reflected at the earth's surface.

S (undae secundae); Normal second phase (transverse waves).

SR_n; Transverse waves n -times reflected at the earth's surface.

PS, PPS; Waves which suffer a change or changes from longitudinal to transverse oscillation, on reflection at the earth's surface.

L (undae longae); Long waves at the beginning of the surface waves.
Q (undae quartae); Shorter and more regular waves in the surface phase.

M (undae Maximae); Largest motion in the surface phase, usually in the group here defined as Q.

C (Coda); Tail or end portion.

F (Finis); End of the discernible movements.

2. Nature of the motion.

i (impetus); the sudden commencement of a phase.

e (emersio); The gradual or indistinct commencement.

3. Period and Amplitude.

T; Period; Duration of one complete oscillation.

A; Amplitude of the true displacement of the ground from the position of rest.

A_E ; E-W component of A.

A_N ; N-S component of A.

A_Z ; Vertical component of A.

Displacements to the north, east and upwards are regarded as being positive.

4. Character of the earthquake.

d (terrae motus domesticus); Local shock.

v (terrae motus vicinus); Near shock.

r (terrae motus remotus); Distant shock.

u (terrae motus ultimus); Very distant shock.

The felt earthquakes are also classified according to the width of the felt area or the length of the major radius of the felt area.

Remarkable earthquake; Major radius of the felt area is greater than 300 km.

Moderate earthquake; Major radius less than 300 km and greater than 200 km.

Earthquake of small felt area; Major radius less than 200 km and greater than 100 km.

Local earthquake; Major radius less than 100 km.

In the cases of remarkable earthquakes, some of the results of the microseismic observations made at the meteorological stations in this country are given in the present report. The position of the stations are given on a map of the annexed plate.

General Survey of the Seismic Activity of Japan during the Year 1929.

During this year, 4646 earthquakes were recorded by the seismographs installed at the meteorological stations in this country. At the Central Meteorological Observatory, Tokyo, 415 earthquakes were recorded during the year. The following table shows the number of the earthquakes classifying by the intensity, recorded at Tôkyô.

Number of the earthquakes experienced at Tokyo, in the year 1929.

Number of		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Felt earthquakes classified by intensity	Slight I	5	2	6	0	0	7	2	1	5	3	3	1	35
	Moderate II	1	0	1	2	0	0	2	0	0	0	1	1	8
	Rather Strong III	0	0	0	2	0	2	0	0	0	0	1	0	5
	Strong IV	0	0	0	0	0	0	0	0	0	0	0	0	0
	Very strong V	0	0	0	0	0	0	0	1	0	0	0	0	1
Felt earthquakes in total.		6	2	7	4	0	9	5	1	5	3	5	2	49
Unfelt earthquakes		14	33	75	21	31	33	37	28	21	33	21	19	366
Total.		20	35	82	25	31	42	42	29	26	36	26	21	415

The total number of the earthquakes recorded at the stations in this country during this year was greater than that in the preceding year by 115.

In this year, no severe destructive earthquake was experienced in this country, except one that occurred at the coast of Hyûga-nada on 22nd May, which caused a slight damage in the epicentral region.

The following table shows the total number of felt and unfelt earthquakes occurred during this and preceding year.

	1928	1929	Difference
Number of unfelt earthquakes	3081	3203	(+) 122
Number of felt earthquakes	1450	1443	(-) 7
Total number of earthquakes	4531	4646	(+) 115

The localities where the seismic activity was remarkable in this year were the Outer Earthquake Zone which runs along the Pacific coast from southern off the Hokkaido in the north to Kasimanada in the south, Kii-strait, Bay of Tôkyô, valleys of some rivers in the Kwantô district, middle part of Honsyû, northern part of Kyûsyû and neighbourhood of Taiwan (Formosa).

The monthly frequency of the earthquakes, classified according to the width of the felt area, occurred throughout this country during the year are given in the following table.

Number of the earthquakes experienced in Japan, during the year 1929.

Number of		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Felt earthquakes classified by the width of felt area	Remarkable	2	1	1	2	1	3	1	0	0	1	0	0	12
	Moderate	1	2	3	2	2	3	1	4	0	1	1	0	20
	Small felt area	4	7	7	3	5	5	3	7	5	6	2	6	60
	Local	208	105	129	101	77	95	80	99	159	132	77	87	1349
Felt earthquakes in total		215	115	140	108	85	108	85	110	164	140	80	93	1443
Unfelt earthquakes		213	292	272	234	279	308	236	264	270	295	195	345	3203
Total		428	407	412	342	364	416	321	374	434	435	275	438	4646

The following table contains all the felt earthquakes occurred in this country and its neighbourhood during this year :—

District		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Neighbourhood of Hokkaidô	Tisima Is.	1	1	1	0	1	4	0	0	1	0	0	0	9
	Pacific	9	10	9	8	13	6	8	17	9	8	6	4	107
	Inland	5	0	1	0	0	6	0	3	3	8	5	1	32
	Japan sea	0	0	0	1	1	0	0	0	0	0	0	0	2
Northeastern part of Honsyû	Pacific	3	4	10	6	5	8	1	5	5	2	1	3	53
	Inland	0	3	4	1	2	5	3	1	1	2	4	3	29
	Japan sea	0	0	0	0	0	0	0	0	0	2	0	0	2
Kwantô District	Pacific	9	8	22	6	6	9	7	7	4	12	6	7	103
	Inland	11	7	9	14	7	9	5	7	15	10	12	13	119
	Bay of Sagami	6	2	2	2	0	4	4	7	3	1	0	2	33

District		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Middle part of Honsyû	Japan sea side	0	1	1	1	3	0	0	2	0	3	2	0	13
	Inland	5	7	4	1	2	6	2	8	4	3	2	0	44
	Pacific	0	0	0	1	0	0	0	0	1	0	0	1	3
Kinki District	Kii strait	39	34	39	43	18	20	32	27	27	24	24	28	355
	North Tango district	3	4	2	0	0	4	6	3	3	1	3	4	33
	Inland	2	2	1	6	1	2	1	2	3	2	1	2	25
Neighbour- hood of Tyûgoku and Sikoku	Japan sea side	0	2	2	4	4	2	1	1	0	1	0	1	18
	North Tazima	0	0	0	0	1	0	0	0	0	0	0	0	1
	Sanyô district	0	1	3	3	1	0	0	9	1	1	2	2	23
	Seto Inland sea	2	0	1	1	1	4	1	0	0	2	1	1	14
	Sikoku	0	0	5	1	1	0	1	0	3	1	1	0	13
	Pacific	0	0	0	0	0	0	0	0	0	0	0	0	0
Kyûsyû	Northern Part	107	26	22	1	5	9	0	3	2	10	2	8	195
	Southern Part	3	0	1	3	9	4	6	1	3	2	3	5	40
Okinawa Islands		3	0	1	1	2	4	6	2	2	5	2	2	30
Taiwan (Formosa)		6	3	0	4	2	2	1	5	74	40	3	5	145
Tyôsen (Korea)		1	0	0	0	0	0	0	0	0	0	0	1	2
Karahuto (Saghalien)		0	0	0	0	0	0	0	0	0	0	0	0	0
The others		0	0	0	0	0	0	0	0	0	0	0	0	0
Total number		215	115	140	108	85	108	85	110	164	140	80	93	1443

List of the Shocks observed at the Central Meteorological
Observatory, Tokyo, during the Year 1929.

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, epicentre and remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
January.												
1	2	P S M _N M _E F	22	34 " 52 " 55 " 53 37 52	27		± 53					Felt slightly, Eern off to the Cape of Sioya. (Hukusima prefecture) 142. ^o 7 E, 41. ^o 5 N. <i>v.</i>
2	4	P S M _N M _E F	20	45 37 " 52 " 52 " 53 48 10	37		+120		0.6			Felt slightly, Bay of Sagami. <i>d.</i>
3	8	P S M _N M _E F	18	07 39 " 55 08 12 08 08 14 50	39		-90		2.8			Felt slightly, Kasimanada. <i>d.</i>
4	11	P S M _N M _E F	20	29 56 30 05 30 05 30 05 33 51	56		+25		0.2			Felt slightly, Near Mt. Tukuba. <i>d.</i>
5	13	P S F	0	07 16 10 38 3 37 —	16					E10 N21 D14		Felt slightly at Ne- muro and Kusiro. Epicentre; in the Sea of Okhotsk 154 ^o E. 58 ^o N.
6	21	P S M _E F	2	22 16 " 27 " 28 28 36	16							Felt slightly, Lower valley of the River Sakawa. <i>d.</i>

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
February.												
7	1	P F	17	23 48	35.5 —						Distant earthquake, <i>r.</i>	
8	3	P S M_E M_N F	19	08 " " " 11	34.8 44.3 45.7 44.3 21	± 38	—45	2.2 0.8			Felt slightly, Near Inbanuma, Ibaraki Prefecture. <i>d.</i>	
9	8	P S M_E M_N F	8	26 " " " 28	37.5 57.2 57.5 58.2 42	± 36	—44	1.7 —			Felt slightly, Nern part of Mt. Asama. <i>d.</i>	
10	22	P S M_N M_E F	4	00 01 06	50.3 14.3 15.8 23.3 23	± 44	± 37	0.6 0.6			Mouth of the River Uketo, Iwaki pre- fecture, 141. ^o 3 E, 37. ^o 5 N. <i>v.</i>	
11	27	P S M_E M_N F	9	35 55 57 56 42	26 55 57 56 —	± 45	± 40	1.2 0.8			Eern off the Ha- tidyô Is. 141. ^o 2 E, 33. ^o 1 N. <i>d.</i>	
March.												
12	7	iP iS F	1	42 48 5	08.4 15.6 —				E 14.8 N 12.5 D 22.5		Distant earthquake. <i>r.</i>	
13	9	e L? F	11	13 26 12	09 31 —						Distant earthquake. <i>r.</i>	
14	11	e F	13	24 25	20.6 50						Near Cape Erimo. <i>d.</i>	

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
15	14	eP	14	16	47.7	+50	+40				Eern off the cape of Siriya. <i>d.</i>	
		iS		18	03.7							
		M _E		20	05							
		M _N		19	36							
		F		26	18							
16	15	eP	1	58	09.1	-91	+62				Eern off to Miyako. 143°.7 E, 39°.7 N. <i>d.</i>	
		iS		59	20.4							
		M _E		2	01							45
		M _N		02	20							
		M _V		00	55							
		F		15	—							
17	17	eP	12	17	17.0						Eern off the cape of Otiisi, 148°.2 E, 42°.3 N.	
		eS		19	29.4							
		F		24	—							
18	18	eP	11	31	46.0						The bay of Koizumi, 141°.5 E 38°.9 N	
		S?		"	59.2							
		F		34	16							
19	20	iP	13	08	38.1	±53	+40				Felt slightly, Uraga channel. <i>d.</i>	
		iS		"	46.2							
		M _E		"	46							
		M _N		"	46							
		F		10	—							
20	22	eP	3	22	18						Distant earthquake. <i>r.</i>	
		F		34	—							
21	23	e	20	15	52						Distant earthquake. <i>r.</i>	
		F		36	—							
22	27	eP	11	37	36.0	+53	+53				Felt slightly, Off the coast of Ka- tuura, Tiba Prefec- ture. <i>d.</i>	
		iS		"	47.8							
		M _E		38	06							
		M _N		37	58							
		F		44	06							
23	27	eP	15	48	13.4	56	±39				Felt slightly, Off the coast of Kuz- yûkuri. <i>d.</i>	
		iS		"	24.5							
		M _E		"	"							
		M _N		"	"							
		F		54	—							

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
24	27	iP	16	32	36.1	± 199	± 189	± 139	3.4	W 2.4 N 2.7 U 22.2		Felt moderately. Off the coast of Ka- tuura. <i>d.</i>
		iS			48.7							
		M_E			20							
		M_N			07							
		M_U			54							
		F			06							
25	27	eP	21	19	31.9	± 37	± 19	0.5			Felt slightly. Off the coast of Kuzyûkuri. <i>d.</i>	
		iS			41.6							
		M_E			42							
		M_N			42							
		F			—							
26	27	eP	21	38	36.1	$+100$	-89	-33	0.7 0.8 0.5		Felt slightly. Off the coast of Ku- zyûkuri.	
		iS			45.6							
		M_E			53							
		M_N			46							
		M_U			47							
		F			20							
27	31	e	5	41	20						Distant earthquake. <i>r.</i>	
		F			56							
April.												
28	8	eP	10	22	25.1							Distant earthquake. <i>r.</i>
		S?			46.1							
		F			—							
29	10	eP	6	06	19.6							Distant earthquake. <i>r.</i>
		eS			46.6							
		F			—							
30	14	P	12	14	38.2	120	-120	± 48	8	W 1 S 4 U 8		Felt moderately. Valley of the river Omoi, Totigi Pre- fecture. <i>d.</i>
		S			47.1							
		M_N			50.3							
		M_E			47.2							
		M_U			48.8							
		F			58							

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks				
			h	m	s	A_N μ	A_E μ	A_Z μ								
31	16	P	0	53	22.6	± 80	± 1700	70	2.7	E 25		Felt rather strongly. Off the coast of Kasima-nada. (141°.3 E, 36°.6 N) <i>d.</i>				
		S			38.4								2.5	2.8	N 19	
		M_N			54 08											U 37
		M_E			00.6											
		M_U			55 01.0											
		F			1 08 —											
32	17	P	18	34	37.4	± 85	± 75	± 40	2.0	E 7		Felt Moderately. Off the coast of Ka- sima-nada. (140°.9E, 36°.3 N).				
		S			54.0								1.8	2.0	N 5	
		M_N			54.3											D 16
		M_E			58.0											
		M_U			57.											
		F			54 30											
33	23	P	14	16	08.0	± 800	± 700	± 370	W 19	S 34		Felt rather strongly. Valley of the river Kokai. (140°.0 E, 36°1 N).				
		S			15.8								U 97			
		M_N			16.2											
		M_E			16.8											
		M_U			19.8											
		E			40 10											
May.																
34	1	P	15	48	19							Distant earthquake. <i>r.</i> Persia.				
		S			56 55											
		L			16 11 26											
		F			50 —											
35	7	P	21	18	24							NE-ern off the Cape of Sioya. (141°.7 E, 37°.3 N). <i>v.</i>				
		S			49											
		F			23 —											
36	20	eP	5	00	03							Asia Turkey. <i>u.</i>				
		S			05 28											
		F			6 30 —											
37	21	eP	16	37	29.7	355	± 75	4.5	5.0	5.0		Hyûga-nada. (131°.8 E, 31°.8 N) <i>v.</i>				
		S			39 30											
		M_U			40 48.7											
		M_N			42 08.7											
		M_E			08.7											
		F			17 17 —											

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A _N μ	A _E μ	A _Z μ				
38	31	P	0	11	50.0	-13	15	0.5	0.5		WSW-ern off the cape of Erimo. (142.°5 E, 41.°9 N) v.	
		S		12	55.0							
		L		13	27.5							
		M _E		16	17.5							
		M _N		16	37.0							
F	47	—										
June.												
39	2	eP	14	19	21.4	-37	23				Felt slightly, Middle part of the Bay of Tôkyô. d.	
		iS			28.9							
		M _N										
		M _E										
		F			21							10
40	2	iP	21	39	34.7	-1250	725	±125	W 18 S 20 D 150		Felt rather strongly. Mouth of the Bay of Ise. (137.°2 E, 34.°5 N) v.	
		iS		40	18.6							
		M _N										
		M _E										
		M _U										
		F		59	—							
41	4	eP	3	39	43.2	112	-175	25			Felt slightly, Lower valley of the River Sagami.	
		iS			48.0							
		M _N										
		M _E										
		M _U										
		F			44							—
42	4	eP	15	21	57.8	±25	±17	2.9 2.3			Distant Earthquake.	
		iS		26	34.0							
		M _N		27	43.4							
		M _E			10.6							
		F		42	—							
43	8	iP	9	24	24.7	87	135				Felt slightly, Lower valley of the River Ara-Kawa.	
		iS			29.3							
		M _N										
		M _E										
		F			26							20

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
44	9	eP	9	11	14.9						SE-ern off the Etorô island. (150.°0 E, 44.°0 N) v.	
		eS		14	36.9							
		M_N		20	30.3	140			8.5			
		M_E		22	11.1		111		9.9			
		F	10	43	20							
45	13	eP	0	15	30.6						SE-ern off the Etorô island. (150.°2 E, 44.°4 N)	
		iS		18	18.4							
		M_N		38	07	± 175			9.6			
		M_E		40	27		± 150		9.6			
		F	2	16	—							
46	13	eP	9	30	33.8						Philippine. v.	
		eS		32	04.9							
		M_U		32	11.4			± 36	4.1			
		M_N			38.3	-250			9.4			
		M_E		40	40.3		175		9.4			
		F	11	03	—							
47	13	iP	20	23	45.9					E 5.7	Felt slightly, ENE-ern off the cape of Sioya. (141.°3 E, 37.°1 N)	
		iS		24	09.6					N 5.4		
		M_N			11.4	-260						
		M_U			11.4			± 82				
		M_E			31.7		-195					
		F		39	—							
48	13	eP	23	08	—						Distant earthquake. r.	
		eS		13	20							
		F		14	—							
49	16	eP	22	59	54.0						New Zealand? u.	
		S	23	11	22							
		M_N		31	12	± 3000			17			
		M_E			32		± 3000		17			
		F	24	33	—							
50	20	iP	18	18	24.5						Felt slightly, Bay of Tôkyô.	
		iS			29.5							
		M_N			"	± 13						
		M_E			"		± 20					
		F		19	24							

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A _N μ	A _E μ	A _R μ				
51	23	iP	18	43	40.5	-27	29				Felt slightly, Valley of the River Ara-kawa.	
		iS			45.1							
		M _N			"							
		M _E			"							
		F			44 50							
52	24	iP	2	04	162	-139	67	1.4	U 11.4	Felt slightly, ENE-ern off the Cape of Sioya. (141.4°E, 37.°1N) <i>v.</i>		
		iS		5 18.7								
		M _U		31.7								
		M _E		38.7								
		M _N		51.5								
		F		23 —								
53	26	iP	16	49	1200	-735	-540	2.0	W 5.5 S 2.3 U 4.4	Felt rather strongly. NE-ern off the Cape of Inuboe. <i>d.</i>		
		iS		55.1								
		M _N		50 03.2								
		M _E		03.2								
		M _Z		53 22.7								
		F		17 21 —								
54	27	eP	13	07	56	56		4.6		Distant earthquake.		
		eS		11 50.3								
		M _N		52.6								
		M _E		"								
		F		15 00								
July.												
55	3	P	20	03	27						Upper valley of the River Arita. (135.°5E, 34.°1N).	
		eS		04 37.8								
		F		10 57								
56	5	P	14	25	48						Distant earthquake. <i>u.</i>	
		eS		35 02								
		F		15 35								
57	6	P	18	10	49.4						Felt slightly, Nern part of the Bay of Tôkyô. <i>d.</i>	
		S		54.2								
		F		13 20								
58	7	P	21	29	59.5						Distant earthquake. <i>r.</i>	
		S		35 44.5								
		F		24 55								

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
59	14	P	9	40	47						Distant earthquake. <i>r.</i>	
		S		44	07							
		F	11	07								
60	15	P	8	05	23.6					E 3	Felt moderately. Off the mouth of the River Rokugô. <i>d.</i>	
		S			29.5					S 8		
		M_N			29.7	210						D 11
		M_E			29.7		± 110					
		F		09	34							
61	17	P	10	49	33					W 7	Felt moderately, Valley of the River Kinu. <i>d.</i>	
		S			41					S 23		
		M_N			42	± 400						U 71
		M_E			44		± 700					
		F		56	—							
62	26	P	22	48	27.0					E 69	Felt very strongly, Neighbourhood of Mt. Tanzawa. (139.°2E, 35.°5 N) <i>d.</i>	
		S			34					N 60		
		M_U		49	08			± 2000	6.0			U 77
		M_N			09	± 6500			2.1			
		M_E			23		-18000		4.6			
		F	23	18	—							
63	28	P	17	33	22					E 8	Felt slightly, After shock of the Mt. Tanzawa earth- quake. <i>d.</i>	
		S			31					N 5		
		M_N		34	06.5	± 26						U 11
		M_E			08		± 20					
		F		44	10							
August.												
64	16	P	13	21	52						Felt slightly, Upper valley of the River Kinu. (140.°2 E, 36.°5N) <i>d.</i>	
		S			22	06						
		M_N				55	+260					
		M_E				57		+270				
		F		29	—							
65	28	P	18	52	46						Sern off the cape of Erimo. (143.°1E, 41.°0N)	
		eS			53	46						
		M_E			56	16		-350				
		M_N			57	06	+300					
		F	19	42	—							

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
September.												
66	2	P S M _E M _N F	15	39	44.8 53.7 55.8 58.5 44 50	+43	-40		0.3 0.3	U	Felt slightly, the middle valley of the River Tone (neighbourhood of Sekiyado). <i>d.</i>	
67	17	P S M _N M _E F	16	09	08.9 37.7 46.4 03.7 17 49	+29	± 57		4.3 4.3		Felt slightly, Mt. Asama. <i>d.</i>	
68	19	P S M _N M _E F	18	10	20.9 31.1 32.6 32.6 13 40	-64	-50				Felt slightly, Neighbourhood of Mt. Oomure. <i>d.</i>	
69	26	P S M _N M _E F	15	17	30.5 37.9 37.9 37.9 20 11	+136	+136				Felt slightly. Lower valley of the River Yôrô, Tiba Prefecture. <i>d.</i>	
70	29	P S M _N M _E F	19	41	40.3 50.2 52.0 52.0 45 27	+100	+143		0.3 0.3		Felt slightly, Sern part of the Coast of Kuzyûkuri.	
October.												
71	5	iP iS F	17	05	01.7 06 22.7 15 —						Sea of Okhotsk. <i>v.</i>	
72	5	eP iS M _N M _E	19	03	11.6 04 56.1 05 59.8 06 16.8	± 38	-36		2.8 2.8		Sern off the cape of Otiisi. Felt area 169600 sq. Km.	

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks
			h	m	s	A_N μ	A_E μ	A_Z μ				
		M _Z		05	30.4			± 18	3.3		<i>v.</i>	
		F		15	—							
73	16	eP	20	41	20						Philippine.	
		S		46	40						<i>v.</i>	
		F	21	04	—							
74	20	eP	11	31	38.9						Felt slightly,	
		iS			47.1						Mouth of the River	
		M _N			48.0	-65					Edo.	
		M _E			"		-119				<i>d.</i>	
		F		34	50							
75	22	eP	13	59	45.2						East Indian archi-	
		eS	14	02	42.2						pelago.	
		F		10	15						<i>r.</i>	
76	23	iP	17	48	36.4						Felt slightly,	
		iS			50.3						Off the Cape of Inu-	
		M _N			"	-34					bô.	
		M _E			"		74				<i>d.</i>	
		F		57	—							
77	31	eP	13	03	25.2						Felt slightly,	
		iS			33.3						Mouth of the River	
		M _N			33.7	-78			0.8		Rokugô.	
		M _E			"		-118		0.9		<i>d.</i>	
		F		06	45							
November.												
78	2	P	15	12	05.6						Felt slightly,	
		S			12.2						Valley of the River	
		F		14	46						Kokai.	
											<i>d.</i>	
79	5	eP	11	44	06.2						Neighbourhood of	
		S		50	04						the Philippine	
		F	12	20	—						Islands.	
											<i>r.</i>	
80	5	P	23	32	58.0						Felt slightly,	
		S		33	27.5						Neighbourhood of	
		M _N			39.2	-500			0.6		Hatidyô Island.	
		M _E			34.5		600		0.8		<i>d.</i>	
		F		45	—							

No.	Date	Phase	G.M.T.			Amplitude			Period s	First motion μ	Δ Km	Intensity, Epicentre and Remarks		
			h	m	s	A_N μ	A_E μ	A_Z μ						
81	9	P	22	55	55.9						Felt slightly, Valley of the River Kokai. <i>d.</i>			
		S		56	04.2									
		F		57	51									
82	15	P	18	56	21.5						East Indian archi- pelago. <i>r.</i>			
		S	19	01	02.5									
		F	21	16										
83	17	P	3	49	37.7						East Indian archi- pelago. <i>r.</i>			
		S		56	10.8									
		F	5	25	40									
84	19	P	16	31	33.6						Felt rather strongly. Valley of the River Edo. <i>d.</i>			
		S			42.9									
		M_N			43.2							± 700		
		M_E			43.4							± 1000		
		F		36	—									
85	20	P	5	55	42.4						Neighbourhood of the mouth of the River Arita. Felt area 70000sq.Km. <i>v.</i>			
		S		56	37.6									
		M_N		57	46							130	3.5	
		M_E		56	55								80	3.2
		F		6	06							44		
86	26	P	13	09	08.0						Felt moderately, Upper valley of the River Kinu. <i>d.</i>			
		S			16.5									
		M_N			19.2							-210	0.5	S 10 E 4 U 22
		M_E			17.0							± 170	1.1	
		F		14	38									
December.														
87	3	P	20	04	54.2						Felt slightly, Lower valley of the River Edo. <i>d.</i>			
		S			59.3									
		M_N			"							± 190		
		M_E			"							± 140		
88	17	F	11	06	—						Eern part of Kam- chatka. <i>r.</i>			
		P		04	40									
		S		11	23									
		M_N		13	02							2000	11	
		M_E		11	41								2300	11.5
89	26	F	13	30	—						Felt moderately, Lower valley of the River Edo.			
		P		14	21							23.2		
		S										27.2		
		M										"	± 400	
		F		23	—									

List of Remarkable Earthquakes, 1929.

No.	Time of Occurrence				Epicenter		
					λ	φ	
1	Jan.	10 th	22 h	52 m	143.0° E	42.2° N	30 km N by Wern off the Cape of Erimo.
2		13 th	0	5	154.	58.	NEern part of the Sea of Okhotsk.
3	Feb.	27 th	9	34	141.2	33.1	120 km Eern off the Is. Hatidyô.
4	Mar.	17 th	12	15	148.2	43.3	250 km ESEern off the Cape of Otiisi.
5	Apr.	16 th	0	53	141.3	36.6	In Kasimanada.
6		17 th	18	34	140.9	36.3	In Kasimanada
7	May	21 st	16	35	131.8	31.8	In Hyûganada.
8	June	2 nd	21	39	137.2	34.5	In Bay of Ise. Deep earthquake.
9		9 th	9	09	150.0	44.0	SEern off the Is. Etorô.
10		13 th	0	13	150.2	44.4	SEern off the Is. Etorô.
11	July	26 th	22	48	139.1	35.2	Mt. Tanzawa.
12	Oct.	5 th	19	01	145.1	42.3	80 km Sern off the Cape of Otiisi.

List of Moderate Earthquakes, 1929.

No.	Time of Occurrence				Epicenter		
					λ	φ	
1	Jan.	2 nd	6 h	03 m	142.7E	41.5N	SWern off to the Cape of Erimo.
2	Feb.	9 th	12	27	130.8	32.9	Near Kumamoto, in Kyûsyû.
3		22 nd	4	00	141.3	37.5	At the mouth of the River Uketo, in Iwaki.
4	Mar.	11 th	13	21	143.4	43.1	Neighbourhood of the Cape of Erimo.
5		15 th	1	57	143.7	39.7	Eern off Miyako.
6		18 th	11	30	141.5	38.9	Near the Bay of Koizumi, in Miyagi Prefecture.
7		31 st	20	18	142.9	38.0	SEern off Kinkwazan, in Miyagi Prefecture.
8	Apr.	23 nd	14	16	140.0	36.1	In the valley of the River Kokai, in Ibaraki Prefecture.
9	May	7 th	21	18	141.7	37.3	NEern off the Cape of Sioya.
10		31 st	0	10	142.5	41.9	WSWern off the Cape of Erimo.
11	June	1 st	17	59	129.8	26.0	SEern off the Is. Okinawa.
12		13 th	20	23	141.3	37.1	ENEern off the Cape of Sioya.
13		24 th	2	04	141.4	37.1	ENEern off the Cape of Sioya.
14	July	3 nd	20	12	135.5	34.1	In the upper valley of the River Arita in Wakayama Prefecture.
15	Aug.	8 th	13	33	130.3	33.5	Near Kanayama at the boundary of Hukuoka and Saga Prefectures.
16		16 th	13	21	140.2	36.5	In the upper valley of the River Kinu.
17		19 th	2	43	122.4	24.4	Off the Bay of Suô, in Formosa.
18		28 th	18	52	143.1	41.0	Sern off the Cape of Erimo.
19	Oct.	9 th	19	45	131.1	32.9	Near Mt. Aso.
20	Nov.	20 th	5	54	135.1	34.1	At the mouth of the River Arita.

Notes on the remarkable Earthquakes in the Year 1929.

1. Earthquake occurred at about 22 h 52 m, on Jan. 10, 1929.

This earthquake was felt in the southern coastal region of Hokkaidô and in the northeastern part of the Tôhoku district. The epicenter lies at about $143^{\circ}.0$ E and $42^{\circ}.2$ N, about 30 km north by western off the Cape of Erimo.

The seismic intensities observed at the meteorological stations are as follows :

Seismic Intensity	{	Moderate ; Obihiro, Kusiuro.
		Slight ; Muroran, Sapporo, Aomori, Hakodate, Morioka, Nemuro.

Some of the seismometrical data reported from the meteorological stations are given in the following table :—

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Muroran	h m s 22 51 57.7	μ	μ 124	μ	s	s 0.5	s	μ -0.7	μ 8.0	μ	m s 19.3
Obihiro	52 18.0							33.	34.		11.0
Kusiuro	18.3	- 150	\pm 160		2.8	2.8		-6.	6.		15.8
Sapporo	26.5	- 88	101		2.6	2.2		s	66.	-14.3	19.0
Aomori	34.6	- 226	312		2.3	—					24.2
Morioka	42.2	74	147		0.7	0.8		-8.0	5.3		32.2
Nemuro	46.5							2.	—		22.7
Akita	58.0		34			2.0					32.5
Hokusima	53 08.8							1.7	-1.5	2.4	54.4
Kumagaya	45.5	\pm 9	\pm 9		1.0	1.0					1 04.0

2. Earthquake occurred at about 0 h 05 m, on Jan. 13, 1929.

This earthquake was registered by the seismographs of almost all the stations in this country, and was felt at Nemuro and Kusiuro in Hokkaidô. The epicenter lies at about 154° E and 58° N, in the northeastern part of the Sea of Okhotsk.

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Ootomari	h m s 0 05 18.9	μ -1325	μ	μ	s 10.3	s	s	μ 60.	μ 73.	μ	m s 1 36.7
Kusiro	36.3	306	216		3.5	3.5		-12.	4.		
Sapporo	58.2	-272	-313	-211	12.1	8.3	8.0	4.0	9.1	-1.0	4 03.4
Sendai	06 38.1	740	880		27.6	27.2		160.	95.		3 01.9
Hokusima	49.2	71	- 86		3.7	4.4					3 11.3
Kakioka	07 08.0	\pm 93	- 99	- 88	3.0	4.0	4.8	n	e		2 42.0
Kumagaya	16.1	282	-277	257	4.7	5.1	4.3	20.7	10.1	-8.4	3 17.4
Numadu	27.1		\pm 795					1.1	0.7		3 31.3
Nagoya	36.9	204	-250		4.0	3.7					3 35.9
Toyooka	42.8	-168	-126		5.8	10.6					3 52.3
Oosaka	48.8		1800			16.2					3 58.9
Hamada	08 01.7	260	880		11.9	17.0					3 59.3
Titizima	24.3	\pm 117	\pm 92		—	9.5					9 03.0
Nagasaki	29.6	-136	- 65	48	11.3	3.3	4.2	-3.0	-1.3	1.4	4 15.5
Dairen	53.0		\pm 400			16.2					10 23.0

3. Earthquake occurred at about 9 h 34 m, on Feb. 27. 1929.

This earthquake was felt in Hatidyô Is. and in also a part of the Miura peninsula and Tôhoku district. It is to be remarked that the felt area were distributed here and there, though the depth of the hypocenter seems to be not especially deep.

The epicenter lies at about 141.°2E and 33.°1N, about 120 km eastern off the Island Hatizyô.

Seismic Intensity { Slight; Hatidyôzima, Yokosuka, Hokusima.

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Hatidyô	h m s 9 34 57.0	μ 182	μ 326	μ	s 2.7	s 2.7	s	μ	μ	μ	m s 12.0

5. Earthquake occurred at about 0 h 53 m, on Apr. 16, 1929.

This earthquake was felt in the whole part of Kwantô, and the eastern part of Tôhoku districts and also in the eastern part of the central district of Japan.

Seismic Intensity	{	Rather strong; Onahama. Mito, Tyôsi, Kakioka, Tôkyo, Hukusima, Aidu.
		Moderate; Utunomiya, Kumagaya, Yokohama, Maebasi, Sendai.

The epicenter of the earthquake lies in Kasima-nada, about 80 km to the East of Mito, $141^{\circ}.3$ E and $36^{\circ}.6$ N.

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS	
		Amplitude			Period			N	E	U		
		N	E	U	N	E	U					
Onahama	h m s 0 53 00.8	μ	μ	μ	s	s	s	μ	μ	μ	m	s
Mito	09.		>2000									7.4
Tyôsi	12.1	900	- 990	235				6	-6	-5		9.4
Kakioka	12.8	± 1000	± 1000					84	305	-126		10.5
Hukusima	22.6	< ± 1600	> ± 1300	-459	0.9	1.2	0.7	-60	-22	-43.7		18.6
Yokohama	25.3	± 380	± 400	± 300								21.9
Sendai	35.3	720	1035		2.3	2.6		-22	7			21.3
Numadu	37.5	± 339	± 370		1.4	1.4						28.0
Nagano	38.3	387	292	140	2.5	2.9	2.2	-15	30	-33		31.5
Akita	54.1	- 296	282	-137	3.2	4.0	3.2					38.2
Nagoya	56.3	392	281	± 94	2.9	3.5	1.7	s	w			47.8
Kyôto	54 11.1	86	61		2.7	2.2					1	02.2
Kôbe	16.3	- 72	76	49	2.3	3.2					1	15.9
Sapporo	43.5	± 29	- 34		3.0	2.2					1	07.0
Miyazaki	55 10.8	± 4	± 4	± 3	7.0	7.0	7.0				2	00.5

6. Earthquake occurred at about 18 h 34 m, on Apr. 17, 1929.

This earthquake was felt in the whole Kwantô district, the eastern part of the Central district and the eastern part of the Tôhoku district.

The epicenter lies in Kasima-nada, about 40 km to the south of Onahama, at about $140^{\circ}.9E$ and $36^{\circ}.3N$.

Seismic Intensity	{	Strong ;	Hukusima.
		Rather Strong ;	Onahama, Kakioka, Utunomiya, Aidu, Kumagaya.
		Moderate ;	Tyôsi, Sendai, Yokohama, Tôkyô Isinomaki.
		Slight :	Kôhu, Maebasi, Oiwake, Numadu, Morioka, Yamagata.

Station	Time of Occurrence	Maximum Motion						First Moton			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Mito	h m s 18 34 20.0	μ -3425	μ 3575	μ	s	s	s	μ	μ	μ	m s 7.7
Kakioka	24.7	\pm 750	\pm 500	-500				53	91	-50	9.9
Tyôsi	25.7	- 210	325								11.7
Sendai	34.0	364	427	\pm 203	1.3	1.4	1.1	-31.8	2.2	-28.2	18.8
Tôkyô	37.4	\pm 85	\pm 75	\pm 40	2.0	1.8	2.0	5.	7.	-16.	15.6
Mera	43.3	107	- 190	44		6.0					25.8
Nagano	47.4	- 145	- 132	-104	2.4	2.6	2.2	- 7.1	18.3	-13.3	37.3
Morioka	57.8	- 177	270		0.8	0.8		- 1.	0.		33.5
Gihu	58.8	- 138	- 93		2.2	2.2					42.5
Akita	35 02.1	196	210	131	3.1	4.0	3.0				36.2
Hikone	13.6	103	146	65	1.8	1.6	2.3	- 4.	- 8.	15	47.6
Kôbe	25.2	- 44	- 33	- 16	2.9	3.2	3.3				1 15.0
Sapporo	51.3	\pm 13	26		2.6	2.5					1 01.0
Hamada	36 06.5										1 31.8
Miyazaki	25.0										1 51.1

7. Earthquake occurred at about 16 h 35 m, on May 21, 1929.

This earthquake was felt in almost all the part of Kyûsyû, and a greater part of Sikoku and in the San'in and Sanyô districts. Slight damage was experienced at the epicentral region. The epicenter lies at about $131^{\circ}.8E$ and $31^{\circ}.8N$, in Hyûganada, about 35 km ESE to Miyazaki.

Seismic Intensity {
 Very Strong ; Miyazaki.
 Strong ; Ooita.
 Rather Strong ; Kagosima, Kumamoto, Uwazima,
 Saga, Unzendake.
 Moderate ; Kure, Matuyama, Hiroshima, Sakai.
 Slight ; Hukuoka, Niihama, Kôti, Simono-
 seki, Tadotu, Miyadu, Toyooka.

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Miyazaki	h m s 16 35 37.0	μ -31500	μ -24000	μ 8000	s 1.6	s 1.6	s 1.2	μ -270	μ 300	μ -550	m s 8.4
Kagosima	54.1		>1700								17.2
Ooita	55.4	19000	14567	16133	1.3	1.3	0.8				22.7
Nagasaki	59.4	-2000	-2565	-1190	2.0	1.9	3.3	8.0	-11.7	9.6	25.2
Kôti	36 06.3	\pm 1175	2125	300	18.0	18.6	3.2	s	w	d	26.0
Matuyama	15.0	-612	241	675	1.0	1.0	1.0	1.9		-3.8	35.0
Siomisaki	19.5							-202	213	131	53.0
Sumoto	30.1	-557	-346	-368	3.1	3.7	2.7				55.0
Kôbe	34.5	-930	-685	-372	2.9	3.1	3.5				1 09.8
Oosaka	38.3	2955	2725		14.0	12.5					56.0
Gihu	49.4	450	-380		3.3	3.3		-40	-50		1 43.2
Naha	37 13.0										1 32.6
Numadu	14.2	\pm 129	\pm 298		3.3	3.3					1 31.7
Zinsen	18.4	- 10	- 6	- 6	3.9	3.9	3.9	n	w	u	1 54.0
Nagano	23.1	590	-525	-239	5.2	6.9	2.6				1 59.3
Yokohama	25.7	\pm 406	375	110	8.3	8.5	6.0				1 42
Tôkyô	29.7	355	-320	\pm 75	5.0	5.0	4.5	s	w		1 59.0
Hokusima	49.6	\pm 1708	-1108		23.2	19.6					1 55.8
Sendai	58.6	975	-552	\pm 342	24.3	15.3	16.2	- 7.5	-7.5	-8.9	2 39.0
Titizima	38 00.3	52	\pm 59		13.7	16.5		-38.9	27.8	23.5	2 06.2
Morioka	13.2	-740						- 2.4	-2.4		2 04.8
Taihoku	35.8		463			16.8					2 04.6
Sapporo	48.3	38	37	- 23	13.2	14.1	14.8				2 43.4
Ootomari	28.9	325	275		19.6	13.4					3 09.3

8. Earthquake occurred at about 21 h 39 m, on June 2nd, 1929.

The earthquake was felt in the greater part of the Kwantô and in the south-eastern part of the Tôhoku districts, besides some parts of the Sikoku, Tyûgoku districts and Central part of Honsyû, which are nearer to the epicenter than the former ones. Thus the phenomenon of the so-called "anomalous felt area" was markedly observed. The epicenter lies at about 137°.2 E and 34°.5 N, at the mouth of the Bay of Ise. The depth of the hypocenter is estimated to be extraordinarily deep, i.e. about 300 km.

Seismic Intensity	}	Rather Strong ;	Yokohama, Kumagaya, Tôkyô, Tukubasan, Tyôsi, Yokosuka, Hukusima, Onahama.
		Moderate ;	Mito, Kakioka, Utunomiya, Aidu, Sendai, Miyako.
		Slight ;	Miyadu, Yagi, Hikone, Waka- yama, Takayama, Tokusima, Matuyama, Toyooka, Mera, Mae- basi, Simonoseki, Midusawa, Akita, Morioka, Titizima, Obihiro, Kusiro, Oiwake.

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Tu	h m s 21 39 10.5	μ 1535	μ 2338	μ	s 2.5	s 2.3	s	μ 82.5	μ 110.0	μ	m s 35.0
Siomisaki	14.4	556	-640	450				-109.	-103.	450.	39.6
Sumoto	23.0	154	-316	171	3.6	4.0	4.0	-56	-200	438	39.5
Nagoya	24.1	758	950	± 218	1.7	1.6		12.5	- 6.0		36.0
Gihu	25.2	-365	-1085		3.3	3.3		74	- 24.	450	32.0
Kôbe	25.5	-460	-512			2.8		8	- 1		40.5
Kyôto	26.1	221	498		1.4	1.4		94	155	295	37.5
Hikone	26.4	>600	>-550	265	1.4	1.2	3.4	214	- 45	265	39.3
Numadu	27.8	3290	5460	414	2.7	2.7	2.7	-31.7	- 94.0	-258	38.3
Toyooka	29.6	548	-323		4.3	3.1		128	106.		43.6
Mera	30.3	-216	-288	99				-20	- 47	-136	41.3
Yokohama	32.2	-1230	1570	290	0.6	0.6		25	- 32	-290	43.0

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Kumagaya	h m s 34.1	μ -515	μ -452	μ -113	s 0.8	s 0.8	s 3.5	μ -6.0	μ -6.6	μ -147.4	m s 41.2
Tôkyô	34.7	-1250	725	\pm 125				-20	-18	-150	43.9
Nagano	35.1	-690	1390	1350	1.9	6.6	2.6	-31.7	-1.7	-48.9	45.9
Kakioka	38.2	\pm 260	\pm 165					-6.0	-6.2		56.2
Tyôsi	38.6	\pm 1100	-770		0.2	0.2		-21	-50	-53	44.4
Hamada	47.9	526	-727	-381	6.6	6.6	6.6	11.8	-39.4	62.6	57.1
Hokusima	51.7	-1650	600	209	0.9	1.5	1.0	-6.9	-5.1	-5.6	57.8
Miyazaki	59.9	380	-1260	480	2.5	3.2	7.5	-4	-10	-1	59.5
Nagasaki	40 09.4	-523	461	-284	5.2	4.9	7.0	1.4	2.6	-2.5	1 10.1
Akita	11.1	-378	-194	134	4.1	0.8	2.6	-9.4	-7.9	-2.2	1 10.4
Morioka	12.2	200	\pm 178		0.9	0.9		-2.1	-0.8		1 19.6
Titizima	27.5	\pm 170	\pm 128								1 16.4
Zinsen	46.2	-90	34	\pm 50	1.8	1.8	2.0	-16	44	-45	1 46
Sapporo	52.8	-39	82		2.7	2.5		s			1 43.5
Naha	41 10.1		\pm 917								2 24.8
Dairen	28.0	100	-25		8.8	4.0		12.5	-1.0		2 27.4
Taihoku	42 02.8	72	79		5.4	4.5					1 44.5
Isigaki-zima	42 08.0	105	\pm 92		3.4	3.4		24	13	-33	2 35

9. Earthquake occurred at about 9 h 09 m, on June 9 th, 1929.

The earthquake was registered very remarkably by the seismographs of almost all the stations in this country, though it was only slightly felt in Kusiro and Obihiro. The epicenter lies at about $150^{\circ}.0E$ and $44^{\circ}.0N$, i.e. about 200 km SEern off the Island Etoroo.

Seismic Intensity; Slight; Obihiro, Kusiro.

Station	Time of Occurrence	Maximum Motion						First Motion			Duration of PS
		Amplitude			Period			N	E	U	
		N	E	U	N	E	U				
Kusiro	h m s 9 09 33.2	μ -230	μ ± 212	μ	s 3.4	s 3.4	s	μ -5	μ -2.	μ	m s 1 05
Asahigawa	41	280	206		4.9	4.9			0.5		1 29
Muroran	48.0	27			2.2			-4.0	-6.6		1 35
Haboro	49.8	± 474	± 610		7.3	6.1					1 55.4
Sapporo	52.3	-219	-255		2.1	2.1					
Morioka	10 16.5										1 45.5
Sendai	32.3	± 185	± 175		14.6	13.5		-27	53		2 00
Hokusima	39.5	22	-13		1.0	1.2					2 10
Kakioka	45.1										2 12.5
Tôkyô	11 14.9	140	111		8.5	9.9					3 22.0
Yokohama	25.6	± 53	± 50		9.0	9.0					4 56
Toyooka	43.2	-25	-17		12.2	13.2					3 15.2
Siomisaki	54.4	± 5	± 8	± 6							3 23.5
Hamada	12 09.2	± 132	± 40	-64	19.6	14.4	15.5				3 24.5
Miyazaki	33.7	± 16	± 13	± 6	20.0	20.0	20				4 03
Titizima	36.6	± 28	± 35		10.2	10.2					4 16.4
Nagasaki	42.0	18	16		4.1	4.9					3 56.3

10. Earthquake occurred at about 0 h 13 m, on June 13th, 1929.

The earthquake was registered by almost all the stations in this country, though it was only felt slightly in Kusiro. The epicenter lies at about $150^{\circ}.2$ E and $44^{\circ}.4$ N, i.e. about 200 km SEern off the Island Etoroo.

Station	Time of Occurrence			Maximum Motion						First Motion			Duration of PS	
				Amplitude			Period			N	E	U		
				N	E	U	N	E	U					
Muroran	h	m	s	μ	μ	μ	s	s	s	μ	μ	μ	m	s
	0	13	56.8	-230			1.4			-5.3	-5.3		1	36.1
Asahigawa			59.0	290	280		6.7	3.3		-0.5	1.0		1	24.0
Haboro		14	08.0	± 924	± 761		5.9	5.9					1	25.0
Sapporo			10.2	-277	383	158	3.0	4.0	5.5	S	W	U	1	38.0
Aomori			30.0		664			2.7					1	42.0
Hokusima			56.4	± 250	± 143		14.7	13.6					1	53.2
Kakioka		15	15.8										2	10.9
Kumagaya			26.4	60	83	± 77	9.0	9.4	13.4				2	34.4
Tôkyo			30.6	± 175	± 150		9.6	9.6					2	37.8
Nagoya			56.5										3	09.0
Toyooka		16	01.3	-88	-46		14.2	16.3						
Sumoto			12.2	± 21	± 25	10	15.5	15.5	15.4	N	E	U	3	33.6
Hamada			26.3	-280	231		17.3	18.8					3	33.1
Hukuoka			49.4	120	-683		17.3	19.2					5	21.2
Miyazaki			58.9	-31	± 34	25	18.0	17.0	17.0				3	52.8
Nagasaki		17	00.9	7		2	1.1		1.1				4	01.6

11. Earthquake occurred at about 22 h 48 m, on July 26th, 1929.

The earthquake was felt strongly all over the Kwantô district and in the southern half of the Tôhoku and in the Central and Hokuriku districts and in the eastern part of the Kinki district.

The epicenter was located at about $139^{\circ}.1$ E and $35^{\circ}.2$ N, i.e. neighbourhood of Mt. Tanzawa, about 40 km West by North from Yokohama. Slight damage was experienced in the epicentral region and in Tôkyô and Yokohama.

Seismic Intensity	{	Very Strong ;	Yokosuka, Yokohama, Tôkyô.
		Strong ;	Kôhu, Numadu.
		Rather Strong ;	Kumagaya, Mera, Kakioka.
		Moderate ;	Oiwake, Maebasi, Utunomiya, Hamamatu, Matumoto, Nagano.
		Slight ;	Mito, Tyôsi, Aidu, Hokusima, Nagaturo, Hikone, Yagi, Sakai.

Station	Time of Occurrence			Maximum Motion						First Motion			Duration of PS	
				Amplitude			Period			N	E	U		
				N	E	U	N	E	U					
Kôhu	h	m	s	μ	μ	μ	s	s	s	μ	μ	μ	m	s
	22	48	24.2	- 4750			3.3			200	-125			6.7
Yokohama			25.2	-15150	-37500	10500	2.0	2.0		-81	575	400		5.8
Tôkyô			27.0	\pm 6500	-18000	\pm 2000	2.1	4.6	6.0	60	69	77		7.0
Kumagaya			28.6	- 2248	- 2870	- 1250	1.2	1.0	1.0	-18.3	-48.3	-105		10.0
Mera			30.8	> 397	> 608	> 295				17	-26	69		11.7
Kakioka			34.1	> 550	> 550	556				-37.0	-41.7	-22.2		12.9
Hamamatu			37	1700	1700					10	8			18
Tyôsi			39.8	\pm 1850	\pm 3125	\pm 925	1.1	1.6	2.9	- 2	- 2	-28		19.1
Nagano			40.3	1125	895	900	2.4	1.9	1.6	48.3	18.3	74.0		18.7
Nagoya			47.5	\pm 1400	2150					- 8	-23			26.0
Hatidyô-zima			53.5	300			3.1							14
Hukusima			55.5	384	360	113	1.0	2.1	1.1	- 2.4	W	2.0		32.0
Hikone			57.6	820	- 1410	- 381	2.0	1.9	1.6	11	-10	9		37.7
Siomisaki	49	02.4		79	145	- 65	3.4	3.4	2.3	- 1	- 1	1		52.0
Oosaka			03.9		1775	\pm 444		4.7	2.0					51.1
Kôbe			07.3	\pm 483	\pm 634	\pm 260		1.9	1.7					53.2
Sumoto			11.9	156	- 125	79	2.9	2.4	4.4	- 1	- 1	- 1.5		42.1
Akita			23.2	- 367	253	208	3.7	3.6	4.2				1	11.2
Morioka			25.2	- 165	177		7.3	8.1		- 8.3	- 1.2		1	11.0
Hamada			45.3	- 141	- 69	- 80	6.4	6.0	5.6				1	16.8
Miyazaki	50	04.9		35	- 29	20	4.5	5.0	5.0	1	1	- 3	1	42.8
Sapporo			14.0	24	31		2.4	3.3					1	30.0
Nagasaki			20.8	- 42	39	14	3.6	3.6	9.0				1	46.7
Huzan			40										1	53
Otomari	51	01.9		108			16.7						2	38.4
Naha			39.6		\pm 155	7		4.2	3.8	1	1	1	2	46.8

12. Earthquake occurred at about 19 h 01 m, on Oct. 5th, 1929.

The earthquake was felt in the southern half of Hokkaidô. The epicenter lies

at about $145^{\circ}.1$ E and $42^{\circ}.3$ N, i.e. about 80 km southern off to the cape of Otiisi.

Seismic Intensity { Rather Strong; Kusiro, Nemuro.
Moderate; Aomori.
Slight; Morioka, Urakawa, Obihiro.

Station	Time of Occurrence			Maximum Motion						First Motion			Duration of PS
				Amplitude			Period			N	E	U	
				N	E	U	N	E	U				
Kusiro	h	m	s	μ	μ	μ	s	s	s	μ	μ	μ	s
	19	01	34.5	1500	— 1100		1.8	1.8			2		24.5
Obihiro			35								w		46
Asahigawa			38	379	189		4.9	3.2		5	20		38
Sapporo			53.7	— 209	250	— 59	2.2	3.0	3.6	25.0	26.4	— 38.7	41.7
Muroran	02		02.5							— 8.0	6.7		50.0
Hakodate			15.4	380	210		2.1	1.8		n			56.0
Morioka			17.4	105	200		1.0	0.9		— 1.4	— 1.2		1 05.0
Akita			26.2	— 85	— 130		1.8	2.6					1 10.7
Sendai			33.7	— 100	— 181	36	2.8	2.3	2.2	— 6.0	4.0	2.7	1 15.2
Hokusima			44.9	— 60	53	34	1.4	1.8	1.1				1 22.9
Kakioka	03		01.3	\pm 28	— 41		0.8	0.5					1 39.2
Tôkyô			11.6	\pm 38	— 36	\pm 18	2.8	2.8	3.3				1 44.5
Nagano			19.0										1 41.0
Nagoya			29.6	\pm 43			3.2						2 29.1
Sumoto			49.9	\pm 2	\pm 2	\pm 1	2.4	3.3	3.4				2 39.1

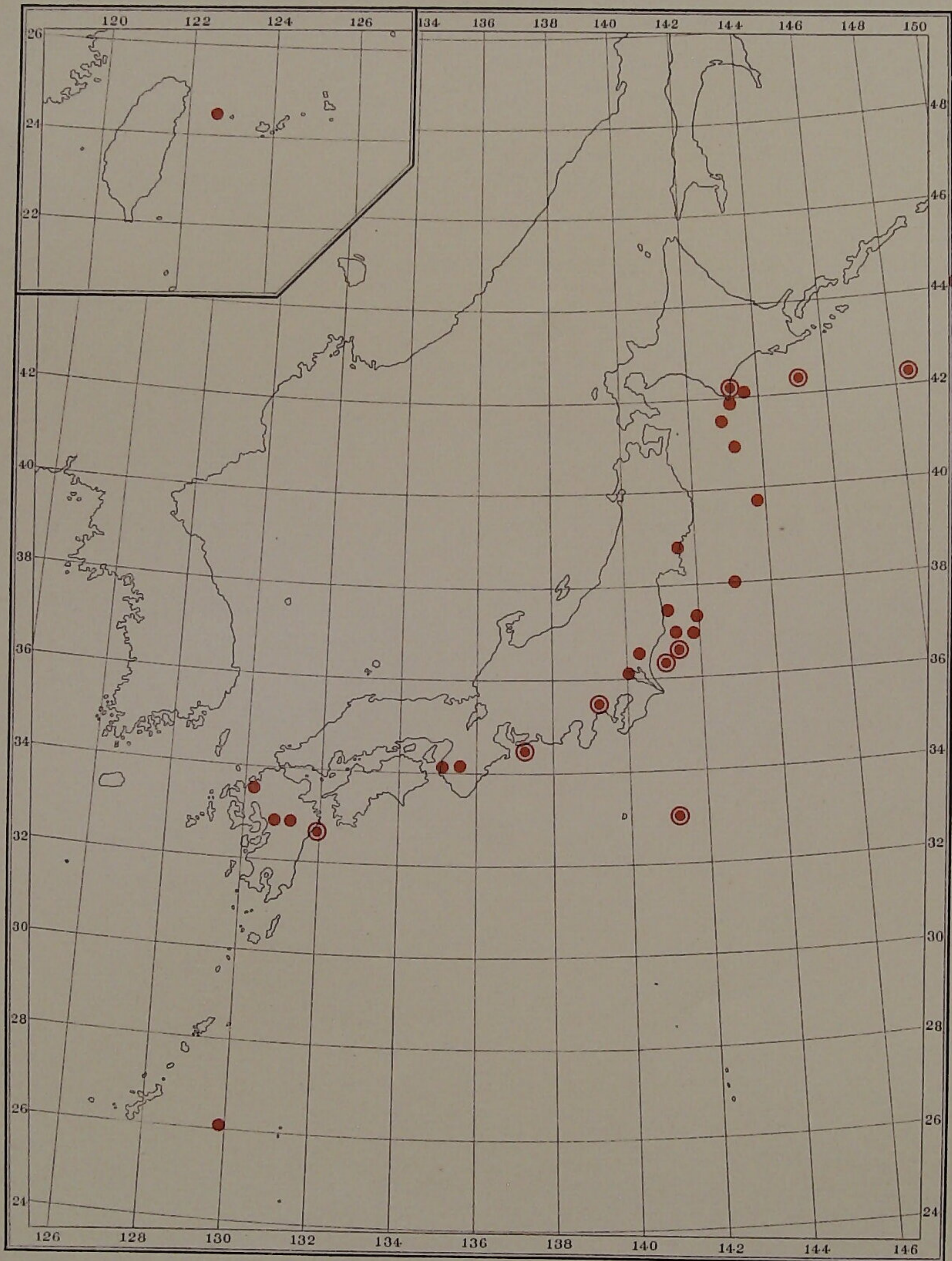
List of volcanic activities in the Year 1929.

Name of Volcano	Date	Remarks
Komagadake in Hokkaidô. 140°.7 E 42°.1 N	June 16th 15 h 26 m	Great eruption. The activity became vigorous since 1 h on 17th. Great damage due to the flow of the hot mud, and ashes and stones ejected from the crater; the latter substances lay on the ground as thick as 1.5 meter.
Mt. Asama 138°.5 E 36°.4 N	Sept. 17th 16 h 8 m	Eruption. The sound was heard over very wide area. Ashes fell in the region along the valley of the River Tone.

MAP OF JAPAN
SHOWING THE
METEOROLOGICAL AND SEISMOLOGICAL STATIONS



Distribution of Epicenters of Remarkable and Moderate Earthquakes during the Year 1929.



- ⊙ Epicenter of Remarkable Earthquake.
- Epicenter of Moderate Earthquake.

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