No. 1. January, 1936.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium

CONSTANTS OF THE GALITZIN-WILIP

	T_0	D	T_1	ι
N-S	12.4	100.5	12.6	11.5
E-W	11.8	100.5	11.9	11.4
Z	11.6	100.5	9.0	14.8

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg.
January 1, 1936.

	T_0	V	ε	$\frac{r}{T_0^2}$
N-S	4.0	210	2.6	0.055
E-W	5.1	188	2.9	0.035

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Jan.				
No. 5 2nd	iPNEZ	17 06 45	145	
	SNEZ	07 03		
	F	14		
6 2nd	iPNEZ	17 31 59	2355	Compression.
	SNE	35 50		In vicinity of 1°S; 134°E by Riverview,
	F	18 45		Manila, Chiufeng.
7 2nd	iPZ	22 40 02	3350	Compression.
	SNE	44 56		Approx. 1°S; 97°E by Phu-Lien, Manila,
	LNE	48 38ca		Hong Kong, Chiufeng.
	MN	51 ca		
3rd	F	0 47		
10 6th	ePNEZ	3 25 47	810	Registered at Butuan.
	iSNEZ	27 15		
	F	5 10		
16 9th	PNE	23 19 03	2390	
	SN	22 53		
	LN	25 12		
	F	56		
20 11th	iPNEZ	18 25 22	95	
	SNE	34		
	F	33		
22 12th	PNEZ	9 04 09	2890	
	SNE	08 34		
	F	25		
24 13th	PNE	4 44 32	1700	
	SNE	47 28		
	LNE	48 52		
	F	5 15		
25 13th	PNE	18 18 28	4265?	
	S?NE	24 20		
	LE	29 35ca		
	F	19 20		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 Jan.				
27	iPNZ	5 57 26	3910	Dilatation.
14th	SNE	6 02 56		Probably east of Japan by Chiufeng,
	LN	07 30ca		Nanking, Manila.
	MN	10 05ca		
	F	8 25		
28	PNEZ	12 22 40	2700	
14th	SNE	26 51		
	MNE	32 05ca		
	F	13 30		
29	iPZ	14 31 19	18380	Dilatation.
14th	iPE	20		Region of 28°S; 53°W by U.S.C.G.S.
	iN	26		
	F	16 48		
30	PNEZ	17 50 54	6555	Compression.
14th	SNE	59 05		
	LN	18 06 [illegible]ca		20°S; 170°E by Riverview, Adelaide,
	[illegible]	[illegible]		Manila, Nanking, Chiufeng, Hong Kong.
	F	19 46		
33	iPEZ	14 53 48	6755	Dilatation(?).
15th	iPN	50		In vicinity of New Caledonia by River-
	iSNE	15 02 06		view, Manila, Nanking, Chiufeng.
	LNE	12 41		
	F	16 40		
34	iPEZ	16 48 40	6490	
15th	SNE	56 42		
	F	17 48		
36	iPZ	18 41 44	2365	Dilatation.
16th	iSNE	45 33		
	LNE	47 40		
	F	19 20		
37	PNE	23 12 12	450	
16th	SE	13 07		
	F	24		
41	iPNEZ	16 58 51	1290	Compression from Southeast. Felt in
20th	SNE	17 01 03		eastern and southern Mindanao.
	F	19 16		Epicenter probably in Philippine Deep.
				S from the Wiechert and Horizontal Pen-
				dulums.
				Baguio, 1490 Km.
47	iPNEZ	21 06 29	200	Compression. Deep focus.
22nd	SNE	55		Felt in Manila and at Candelaria, Zambales.
	F	19		Baguio, 250 Km.
50	iPZ	17 32 09	125	Dilatation.
23rd	SNE	25		
	F	38		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Jan,				
51	PNEZ	16 52 54	3210	
24th	SNE	57 40		
	L?NE	17 01 ca		
	F	30		
53	P?NEZ	19 38 06	4220?	
27th	S?NEZ	43 55		
	MNE	51 42		
	F	20 30		
56	PNEZ	23 53 39	620	Felt at Basco with intensity IV.
29th	SNE	54 49		
30th	F	0 24		
59	PNEZ	11 14 33	1900	
31st	SNEZ	17 45		
	LNE	19 ca		
	MN	21 ca		
	F	55		

Thirty-five insignificant or undecipherable disturbances on the following days of January: 1st(3), 2nd, 3rd(2), 6th, 7th(2), 8th, 9th, 10th(3), 11th, 12th, 13th, 15th(2), 16th, 17th, 18th, 19th, 21st(3), 22nd(2), 23rd(2), 27th, 28th, 29th, and 31st(2).

M A N I L A , P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_o	D	T_1	μ
N-S	12.4	100.5	12.6	11.5
E-W	11.8	100.5	11.9	11.4
Z	11.6	100.5	9.0	14.8

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. February 1, 1936.

	T_o	V	ε	$\frac{r}{T_o^2}$
N-S	4.0	204	2.5	0.058
E-W	4.2	269	2.7	0.054

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Feb.				
66 4th	P?NEZ	12 32 48	4390?	Disturbed by microseisms.
	S?NE	38 48		
	MNEZ	47 ca		
	F	13 20		
67 4th	PNEZ	21 31 36	680	Felt at Gandara, Samar.
	SEZ	32 52		Disturbed by microseisms.
	F	50		
68 6th	iP̄NEZ	2 48 58	140	Felt in Manila by some persons.
	S̄ NE	49 16		P̄ in minute gap. S̄ from the Wiechert.
	F	3 02		
69 6th	P?NE	4 10 15	3345?	
	SNE	15 09		
	ME	21 40ca		
	F	5 20		
70 6th	PNE	17 17 38	200	
	S̄NE	18 04		
	F	23		
71 6th	PEZ	20 54 51	1600	
	SE	57 38		
	LN	59 ca		
	F	21 35		
74 7th	iPNEZ	9 02 04	3255	Compression. In vicinity of 32°N; 102°E by Zikawei, Hong Kong, Manila.
	iSNE	06 53		Heavy damage at Lanchow, Kansu.
	MNE	12 40ca		Data after P from the Wiechert.
	F	11 30		
75 8th	PEZ	12 04 00	600	
	SEZ	05 08		
76 8th	PE	12 18 00	2865	No. 75 still recording.
	SE	22 23		
	LNE	25 ca		
	F	13 50		

No. 5. February, 1936.

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks
1936 Feb.						
77	P?NEZ	4	36	37	3635?	Disturbed by microseisms.
9th	SNE		41	50		
	LN		45	30ca		
	MN		49	ca		
	F	5	25			
79	PNEZ	15	19	14	720	
10th	SNE		20	34		
	F		40			
80	iPEZ	18	15	49	2470	Dilatation.
10th	SNE		19	44		
	LNE		22	ca		
	F	19	40			
81	iPEZ	9	38	44	1465	Dilatation.
12th	iSNEZ		41	16		Deeper than normal.
	F	10	36			N.E.I.
84	iPZ	23	11	10	2700	Deep focus.
14th	iSNZ		15	21		The E-W cylinder stopped at 16:59.
15th	F	0	10			
86	iPE	12	51	57	2635	Compression from SE.
15th	iPZ			58		Prob. 6^{o}S; 132^{o}E by U.S.C.G.S.
	iPN			59		Baguio, 2725 Km.
	iSNE		56	04		Data after P from the Wiechert.
	LNE		58	30ca		
	MNE	13	01	20		
	F	15	10			
87	iPEZ	12	32	40	145	
16th	SNEZ			58		
	F		41			
88	PNEZ	14	26	42	5265	Probably in Solomon Islands by Manila, Nanking, Chiufeng.
16th	S?NE		33	42		
	ME		34	ca		
	F	15	30			
91	PNEZ	14	39	54	4145	
18th	SNE		45	39		
	LNE		50	35ca		
	MNE		54	ca		
	F	15	40			

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Feb.				
95	PNEZ	8 18 46	3120	
19th	SN	23 26		
	F	9 06		
98	PNE	23 36 36	1467	Felt at Glan, Cotabato.
20th	SNE	39 08		
21st	F	0 02		
99	ePNEZ	1 13 14	2855	Japan.
21st	iSNE	17 36		Damage in Osaka.
	LNE	20 40ca		
	ME	22 40ca		
	F	2 20		
100	PEZ	6 26 08	2865	Aftershock of No. 99.
21st	SE	30 31		The N-S record defective.
	LEZ	33 14		
	MEZ	35 18		
	F	7 55		
102	PEZ	17 03 24	3180	In the Timor Sea by Manila, Hong Kong, Nanking.
21st	iE	05 42		
	SE	08 17		
	LE	10 30ca		
	F	19 10		
107	PNEZ	15 43 33	8200	Compression.
22nd	SNE	53 14		
	F	19 08		
108	PNEZ	19 34 27	7980	
22nd	SNEZ	43 55		
	LNE	56 45		
	MNE	20 03 20ca		
	F	22 30		
109	PNEZ	12 28 39	1710	
23rd	SNE	31 36		
	LNE	33 ca		
	MNE	34 50ca		
	F	13 30		
111	PNEZ	18 49 31	1800	
23rd	SNEZ	52 35		
	F	19 20		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Feb.				
112 24th	PNEZ	7 06 25	2610	
	SNEZ	10 30		
	MNE	15 10ca		
	F	45		
117 26th	PNEZ	2 47 02	4355?	
	S?NE	53 00		
	LNE	58 25ca		
	ME	3 01 39		
	F	30		
120 26th	iPNEZ	14 24 54	185	Compression from ESE.
	iSNE	25 17		Felt in Manila and southeast Luzon.
	F	43		
121 27th	iPZ	10 09 03	2420	Dilatation from SE.
	iPNE	04		Probably western New Guinea by Manila,
	iSNE	13 03		Hong Kong, Phu-Lien, Nanking, Chiufeng.
	LE	15 53		Data after P from the Wiechert.
	F	13 00		
126 28th	iPEZ	16 20 16	2655	Dilatation.
	ePN	16		
	iNE	19		
	iSNE	24 22		
	LN	26 42		
	MNE	28 55ca		
	F	17 52		
130 29th	PNEZ	20 35 07	2755	
	SNE	39 23		
	LNE	42 30		
	F	21 25		

Thirty-eight insignificant or undecipherable disturbances on the following days of February: 1st(4), 3rd(2), 7th(2), 9th, 12th, 14th, 15th, 17th(2), 18th(2), 19th, 20th(2), 21st(3), 22nd(2), 23rd, 24th(2), 25th(2), 26th(2), 27th(2), 28th(4), and 29th.

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

φ=14° 34' 42" N. λ=120° 58' 41" E.   h=3 m.   Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_0	D	T_1	ι
N-S	12.4	100.5	12.6	11.5
E-W	11.8	100.5	11.9	11.4
Z	11.6	100.5	9.0	14.8

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg.
March 1, 1936

	T_0	V	ε	$\frac{r}{T_0^2}$
N-S	4.0	203	2.4	0.065
E-W	4.2	247	2.8	0.050

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 March						
132 1st	iPEZ	10	29	01	3735	South end of Sakhalin Island by Chiufeng.
	iSNEZ		34	20		
	iE		38	13		
	iE		46	39		
	iN		47	36		
	F	12	35			
133 2nd	iPZ	3	25	48	3810	Compression.
	ePNE			48		Off Hakodate, Japan, by Zikawei, Manila,
	iSNEZ		31	12		Phulien.
	LNE		35	ca		
	MNE		38	30ca		
	F	5	40			
141 4th	iPZ	6	34	47	2600	Compression.
	iPE			48		Deep focus.
	ePN			48		
	iSNE		38	51		
	LE		43	30		
	F	7	15			
144 5th	iPNEZ	23	10	22	930	Felt in NE Mindanao.
	SNEZ		12	01		Probably 8° 20'N; 126° 55'E.
	LN		13	05ca		Butuan, 160 Km.
6th	F	0	45			
145 6th	iPZ	6	00	23	200	Felt in Manila and at Botolan, Zambales.
	ePNE			23		15° 57'N; 119° 42'E by Baguio and Manila.
	iSNEZ			49		
	F		20			
146 6th	PNEZ	14	37	01	3755?	P in minute gap.
	S?NE		42	22		
	L?NE		46	37		
	F	15	38			
148 8th	PNEZ	0	30	11	1180	Probably east of Formosa.
	SNEZ		32	13		
	F	1	15			
149 8th	PNEZ	1	29	04	560	Compression.
	SNE		30	09		Felt in San Pablo, Isabela.
	iZ			30		
	F	2	08			

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 March						
150	iPZ	9	37	26	1380	Recorded in Guam. Phases not discernible.
8th	PNE			28		
	SNE		39	49		
	F	10	15			
152	PNEZ	20	42	40	3810	
10th	SNE		48	04		
	LNE		53	ca		
	F	21	50			
154	PNEZ	11	03	10	2320	
11th	SNE		06	56		
	F		30			
156	PE	1	23	02	440	Felt at Viga, Catanduanes.
13th	SNE			56		
	F	2	20			
164	PNEZ	19	32	36	510	Disturbed by microseisms.
15th	SNE		33	36		
	F		50			
168	PNZ	19	55	08	3360	
17th	SE	20	00	03		
	LNE		04	30ca		
	MNE		07	15		
	F	21	20			
170	iPEZ	11	58	02	6745	Dilatation.
18th	iN			07		
	SNEZ		06	19		
	LN		15	00ca		
	F	13	00			
171	PNZ	13	46	54	3345	
18th	SN		51	48		
	LN		54	10		
	MN		56	40		
	F	14	43			
173	PNEZ	19	12	30	210	16° 20'N; 119° 57'E by Baguio and Manila.
18th	SNEZ			57		Felt at Aritao, N. Vizcaya.
	F		22			
174	PNE	22	29	50	2710	
18th	SNEZ		34	02		
	F	23	05			
177	P?NEZ	2	11	24	3455?	No. 176 still recording.
21st	SN		16	26		
	LNE		19	ca		
	F		56			
180	PNEZ	23	18	10	470	Felt at San Remigio, Antique.
21st	SNE		19	06		
	F		40			
181	iPEZ	12	24	01	4890	Compression from SE.
22nd	iN			07		
	iE		27	01		
	iSNE		30	30		
	LNE		36	25ca		
	MNE		40	40		
	F	14	20			

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 [Ma]rch				
182 23rd	ePNEZ SNE F	22 27 45 28 42 42	480	From the north. Recorded slightly in Baguio.
183 24th	PNEZ SNEZ F	17 20 07 22 10 18 18	1190	
185 24th	PNEZ SNEZ F	21 56 15 57 30 23 20	670	Compression. Probable epicenter, 11° 15' N; 126° 05'E as on May 24, 1935. Felt in northeast Mindanao. Compression from north at Butuan.
190 29th	PNZ SN F	6 09 16 13 26 53	2670	E-W cylinder stopped from 0:12 to 9:45.
192 31st	iPZ ePN SN F	3 37 46 46 41 38 4 30	2435	Compression. E-W driving clock being cleaned.
193 31st	PNE SNE F	7 08 10 22 In next	90	15° 35'N; 121° 10'E by Manila and Baguio. Deeper than normal. Felt at Bongabon, Nueva Ecija.
194 31st	PNE SNE F	7 08 29 09 15 14	360	Z driving clock being cleaned.

Thirty-six insignificant or undecipherable disturbances on the following days of March: 1st, 2nd, 3rd(6), 4th, 5th, 7th, 10th, 11th(2), 13th(5), 14th(2), 17th(3), 18th(2), 21st(4), 24th(2), 25th, 27th, 28th, and 29th.

No. 11. April, 1936.

M A N I L A , P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

φ=14° 34' 32" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_o	D	T_1	l
N-S	12.4	100.5	12.6	11.5
E-W	11.8	100.5	11.9	11.4
Z	11.6	100.5	9.0	14.8

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg.
April 2, 1936.

	T_o	V	ε	$\frac{r}{T_o^2}$
N-S	4.0	214	2.5	0.069
E-W	4.3	257	2.8	0.054

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 April						
195 1st	iPEZ	2	12	12	1465	Compression. Felt at Jolo with int. IV.
	SNE		14	44		Felt at Canton, Hong Kong according to Nanking.
	LNE		15	40ca		S and L from Horizontal Pendulums.
	F	7	00	ca		N-S driving clock being repaired.
						3°N; 124°E; 0=2:09:24 by U.S.C.G.S.
197 1st	PNE	5	29	08	1465	Aftershock of No. 195.
	SNE		31	36		From the Wiechert.
	F		49			
198 1st	PNEZ	9	37	20	1465	Aftershock of No. 195.
	SNZ		39	52		
	F		58			
199 1st	PNE	11	56	50	1465	Aftershock of No. 195.
	SE		59	22		
	F	12	16			
203 1st	iPZ	20	13	55	1465	Compression. Aftershock of No. 195.
	PNE			56		Felt at Jolo with intensity III.
	iSNE		16	41		Phases after P from the Wiechert.
	LNE		17	40		
	MNE		18	40		
	F	24	00	ca		
204 2nd	PNEZ	0	39	42	1465	Aftershock of No. 195.
	SNEZ		42	14		
	F	1	20			
205 2nd	iPNEZ	6	23	54	3090	Compression?
	SNE		28	32		
	LNE		31	27		
	ME		34	ca		
	F	8	30			
206 2nd	PNEZ	12	06	07	1465	Dilatation. Aftershock of No. 195.
	SNEZ		08	39		
	MNE		11	25ca		
	F	13	15			

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 April						
208	$\overline{\text{P}}$NEZ	19	32	34	150	Baguio, 120 Km.
3rd	$\overline{\text{S}}$NE			53		
	F		39			
213	PNEZ	14	00	38	1410	
5th	SNE		03	04		
	F		21			
214	PNEZ	14	33	16	2490?	
5th	S?NE		37	13		
	F		52			
215	PNEZ	21	32	47	1880	
5th	SNEZ		35	58		
	F		57			
216	PE	0	03	54	1465	Z component defective.
6th	iSNE		06	26		
	F		45			
217	PNE	12	49	14	1900?	
6th	S?NE		52	26		
	F	13	13			
223	PNEZ	12	31	02	590	
8th	SNE		32	09		
	F		53			
224	P?NEZ	13	32	46	1415?	
8th	SNEZ		35	13		
	F		55			
226	PNEZ	16	11	12	5880	Compression.
9th	iSNEZ		18	38		
	LN		29	ca		
	MNE		34	ca		
	F	18	15			
228	PNEZ	0	07	14	1620	
10th	SNEZ		10	02		
	F		55			
232	$\overline{\text{P}}$NEZ	16	34	07	140	
10th	$\overline{\text{S}}$NEZ			25		
	F		40			
233	PNEZ	16	56	00	1245	Compression from SE.
10th	SNE		58	16		Felt at Santa Cruz, Davao,
	LNE		58	54		Butuan, 400 Km.
	iE	17	02	00		
	F	18	20			
234	P?NE	20	06	22	5600?	
10th	S?E		13	32		
	F	21	02			

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 April				
235	iPNEZ	23 39 23	595	Compression from SE. Felt throughout Samar and SE Luzon.
11th	iSEZ	40 30		12° 05'N; 125° 50'E by Manila, Baguio, Butuan, Hong Kong.
~~12th~~ 11th	F	1 10		S from the Horizontal Pendulums.
236	PNEZ	2 41 11	2000	Dilatation.
12th	SNEZ	44 32		
	LNE	46 25ca		
	ME	48 ca		
	F	4 00		
237	iPNEZ	20 55 08	2120	Compression.
12th	iSNEZ	58 39		10°N; 140°E by Riverview, Manila, Guam, Nanking, Hong Kong, Chiufeng, Taihoku.
13th	F	0 00		
238	iPZ	0 32 37	2100	Compression from SE.
13th	ePNE	37		Butuan, 1355 Km.
	iSNEZ	36 06		
	LNE	38 ca		
	ME	40 ca		
	F	1 45		
239	PNEZ	7 43 34	2033	Dilatation.
13th	iSNEZ	46 58		
	F	8 45		
244	iPEZ	15 38 50	2420	Compression from SE.
14th	ePN	50		
	SNEZ	42 42		
	LE	44 45ca		
	F	16 04		
245	PNEZ	3 13 42	365	Very small in Baguio.
15th	SNEZ	14 37		
	F	24		
246	PNEZ	6 11 26	165	
15th	SNE	47		
	F	In next		
247	PNEZ	6 15 06	520	
15th	SNEZ	16 28		
	F	37		
249	iPNEZ	18 59 46	2280	Compression.
15th	SNE	19 03 29		
	LNE	05 30ca		
	F	In next		
250	PNEZ	20 07 46	3080	
15th	SNEZ	12 23		
	F	21 10		
251	iPEZ	1 02 10	3065	Compression.
16th	ePN	10		
	SNE	06 46		
	F	2 40		

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 April				
252 16th	ePNEZ	5 42 38	2610	
	SNE	46 43		
	F	6 08		
253 16th	P̄NEZ	7 05 08	165	
	S̄NEZ	29		
	F	22		
254 16th	PNEZ	14 06 06	1190	Near 24°N; 124°E by Taihoku, Manila, Chiufeng.
	SNE	08 10		
	F	15 10		
255 16th	P̄NEZ	16 09 10	150	
	S̄NEZ	29		
	F	13		
256 16th	PNEZ	18 04 02	1990	
	SNEZ	07 22		
	F	19 10		
257 16th	PNEZ	20 15 25	1755	
	SNE	18 26		
	F	21 30		
259 17th	PNEZ	17 44 42	1690	
	iE	46 09		
	SNE	47 36		
	LN	49 ca		
	F	18 34		
263 19th	iPNEZ	5 15 04	4720	Compression from SE.
	SNE	21 18		8°S; 156°E; 0=5:07:14 by U.S.C.G.S.
	iE	22 19		Data after P from the Wiechert.
	LNE	26 20ca		
	F	8 40		
264 19th	PNEZ	9 09 50	3600	Dilatation.
	SNE	15 01		Data after P from the Wiechert.
	LNE	18 30ca		
	F	10 20		
270 21st	PNE	1 45 27	2180	
	SN	49 02		
	F	2 15		
272 23rd	PNEZ	9 21 11	2010	
	SNEZ	24 33		
	LN	26 ca		
	F	45		
274 23rd	iPZ	23 02 38	2210	
	iSNE	06 16		
	F	In next		
275 23rd 24th	P?NZ	23 24 22	6540?	48°N; 178°W; 0=23:14:23 by U.S.C.G.S.
	S?N	32 00		
	F	0 55		

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 April				
276 24th	PNEZ	12 47 18	2900	
	SNE	51 43		
	LE	54 45ca		
	F	13 40		
278 25th	iPZ	4 37 52	620	Dilatation.
	PNE	53		Felt in southern Negros and in Panay.
	SNEZ	39 02		Approximately 9° 15' N; 122° 40' E.
	F	6 04		
279 26th	PNEZ	5 10 31	4645	
	SNE	16 46		
	F	46		
280 26th	iPZ	7 18 50	1625	Compression.
	PNE	47		
	SNE	21 38		
	LNE	23 15ca		
	F	8 31		
281 26th	PNEZ	8 50 15	3390?	
	S?NE	55 12		
	LN	58 35		
	F	10 05		
282 26th	PNEZ	22 05 40	1020	
	SNE	07 28		
	F	45		
283 27th	iPZ	0 04 00	2735	Dilatation.
	ePNE	04 40		Szechwan Province, West China.
	iSNEZ	08 14		
	iLNE	11 ca		
	F	In next		
284 27th	iPZ	1 38 15	2735	Aftershock of No. 283.
	ePNE	15		
	SNE	42 30		
	F	2 25		
285 27th	PNEZ	3 41 22	2835	Aftershock of No. 283.
	SN	45 42		
	F	4 20		
286 27th	PNEZ	5 51 11	2680	Aftershock of No. 283.
	SNEZ	55 22		
	F	6 23		
289 28th	P?NEZ	1 17 55	2820?	
	SNE	22 15		
	F	37		
291 28th	PNEZ	5 47 23	4600	Compression.
	SNEZ	53 36		
	LNE	59 30ca		
	F	7 35		

No. 16. April, 1936.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.—Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 April						
292	P̄NEZ	8	45	07	125	
28th	S̄NEZ			23		
	F		56			
293	iPNEZ	13	40	37	2390	Dilatation from E.
28th	iSNEZ		44	27		Deeper than normal.
	F	15	10			Felt at Darwin, Australia.
294	iPEZ	16	24	31	2865	
28th	ePN			31		
	SNE		28	54		
	F	17	45			
295	iPEZ	18	32	14	2535	Compression.
28th	ePN			14		Aftershock of No. 283 according to Nan-
	SNEZ		36	14		king and Chiufeng.
	MNE		41	30ca		
	F	19	20			
296	iPZ	8	26	04	7155	Compression.
29th	PE			06		
	PN			07		
	SNE		34	46		
	F	9	50			
297	PNEZ	16	52	15	3420	
29th	SNE		57	15		
	MN	17	03	35ca		
	F		48			
299	iPZ	20	32	23	1300	Dilatation? N. E. I.
29th	PNE			23		Butuan, 500 Km.
	SNEZ		34	39		
	MNE		37	25ca		
	F	21	20			

Forty-one insignificant or undecipherable disturbances on the following days of April: 1st(4), 3rd, 4th(2), 5th(2), 6th, 7th(4), 9th(2), 10th(3), 13th, 14th(3), 15th, 17th, 18th(3), 19th(2), 20th(3), 23rd(2), 24th, 27th(2), 28th, 29th, and 30th.

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

Ø=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_o	D	T_1	ι
N-S	12.4	100.5	12.6	11.5
E-W	11.8	100.5	11.9	11.4
Z	11.6	100.5	9.0	14.8

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. May 1, 1936.

	T_o	V	ε	$\frac{r}{T_o^2}$
N-S	4.0	206	2.5	0.066
E-W	4.0	275	2.8	0.065

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 May				
308	PNEZ	14 41 15	620	
2nd	SNEZ	42 25		
	F	15 03		
309	PN	15 25 35	600	
2nd	SNE	26 43		
	F	40		
317	P?EZ	15 27 10	2710?	
4th	S?NE	31 31		
	LNE	34 ca		
	MN	36 30ca		
	F	16 20		
321	iPZ	19 49 45	3780	6.5°S; 148°E by Manila, Hong Kong, Chiu-feng, Nanking.
5th	ePE	47		
	S?NEZ	55 07		
	L?NE	57 35ca		
	F	21 25		
322	$\overline{\mathrm{P}}$Z	3 06 29	160	
6th	$\overline{\mathrm{P}}$E	31		
	$\overline{\mathrm{S}}$NEZ	49		
	F	13		
323	i$\overline{\mathrm{P}}$Z	21 12 48	135	Dilatation from SSW.
6th	i$\overline{\mathrm{P}}$NE	49		Felt in Manila with intensity II.
	i$\overline{\mathrm{S}}$NE	13 05		Felt by fishermen in their boats on Lake Taal.
	F	40		$\overline{\mathrm{S}}$ from the Wiechert.
326	iPZ	9 15 51	1510	Compression from the southeast.
8th	ePN	51		Deeper than normal.
	iPE	52		In region of 5°N; 130°E.
	iSNEZ	18 27		
	F	10 35		
328	PNEZ	15 29 12	2530	Deep focus. Felt at Chengtu, Szechuan Province, China.
8th	SNEZ	33 12		Distance subject to corection for depth focus.
	F	16 27		
334	PZ	6 01 49	3380?	
10th	S?NE	06 45		
	LNE	10 35ca		
	ME	13 10ca		
	F	48		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 May						
335 10th	PNEZ	15	10	09	1480	
	SNE		12	42		
	LNE		14	20ca		
	MN		15	45ca		
	F		50			
341 11th	iPEZ	17	34	36	4400	Compression. Region of 4°S; 154°E by Riverview and Manila.
	SNE		40	37		
	iN		43	31		
	LEZ		45	45		
	MN		49	40ca		
	F	20	02			
349 16th	iPNEZ	7	09	33	2535	Dilatation from WNW. In western China. Felt at Chungching.
	iSNEZ		13	33		
	LNE		15	50ca		
	MNE		18	ca		
350 16th	PNEZ	8	55	33	1090	No. 349 still recording.
	SNEZ		57	28		
	F	9	20			
352 17th	PZ	10	36	10	3510?	
	PNE			11		
	S?NE		41	15		
	F	11	35			
354 18th	iPZ	20	23	28	2265	
	iPE			29		
	ePN			29		
	SNE		27	10		
	LE		29	ca		
	F	21	05			
356 19th	iPZ	7	26	44	1515	From SE. Same region as No. 326.
	ePNE			44		
	iSNEZ		29	19		
	F	8	27			
359 19th	iPZ	20	55	14	2745	Compression from SE. 1°N; 141°E by Manila and Riverview.
	ePNE			14		
	iSN		59	29		
360 19th	PNEZ	21	23	10	2810	Aftershock of No. 359. No. 359 still recording.
	SNE		27	29		
	MNEZ		30	30ca		
	F	23	32			
362 20th	i$\overline{P}$NEZ	0	16	36	175	Compression from SE. Deeper than normal. Felt in Manila and Ambulong with intensity II. $\overline{S}$ from the Wiechert.
	iSNE			58		
	F	1	02			
364 20th	iPZ	3	13	32	5080	Dilatation. Probably 8°S; 160°E by U.S.C.G.S.
	ePNE			32		
	iSNE		20	13		
	F	6	45			
366 21st	iPZ	2	57	15	3770	
	ePNE			15		
	SNE	3	02	37		
	MN		09	40ca		
	F		53			

M A N I L A , P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 May						
370 21st	P?NEZ	14	27	51	830?	
	S?N		29	21		
	F		49			
373 21st	PEZ	20	03	05	2110	
	SNE		11	43		
	F		32			
375 22nd	PNEZ	6	50	24	2635	
	SNE		54	31		
	F	7	14			
378 22nd	PNEZ	15	25	45	2620	Compression.
	iZ		26	11		Deep focus.
	SNE		29	51		
	F		55			
379 22nd	ePNEZ	23	31	09	6755	20°S; 170°E by Riverview, Manila, Chiu-feng and Nanking.
	SNE		39	27		
	LN		48	00ca		
23rd	F	0	41			
380 23rd	PNEZ	5	23	21	280	
	SNE		24	01		
	F		35			
381 23rd	PNEZ	15	48	43	2335	Deep focus.
	SNE		52	30		
	F	16	13			
383 23rd	PNEZ	18	05	35	160	
	SNE			55		
	F		11			
385 23rd	PNEZ	19	16	40	3490	
	SNE		[illegible]	44		
	LNE		25	20ca		
	F	20	05			
386 24th	P?NE	12	38	36	4280?	
	SNE		44	29		
	F	13	12			
388 25th	iPZ	3	03	57	3265	
	ePE			57		
	SNE		13	47		
	LE		17	15ca		
	ME		20	ca		
	F	4	50			
389 25th	PNEZ	13	36	06	2845	
	SNE		40	27		
	LNE		43	10ca		
	F	14	42			
390 26th	PNEZ	15	28	18	320	Baguio, 180 Km.
	iSN		29	00		
	F		48			
393 27th	iPZ	2	41	06	195	
	ePNE			07		
	SNE			31		
	F		49			

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 May						
395	iPZ	6	26	29	4100	Compression. Deeper than normal.
27th	PNE			31		In Himalaya mountains by Zikawei and Manila.
	iZE		28	03		
	iSNE		32	12		29°N; 84°E by U.S.C.G.S.
	F	10	15			
397	PNEZ	12	30	15	845	22°N; 119° 50'E by Taihoku, Hong Kong, Manila, Chiufeng.
28th	SNE		31	46		
	F	13	40			
398	P'NEZ	19	08	12	14300	10°N; 104°W by U.S.C.G.S.
28th	PPZ		10	17		
	SKPNE		11	32		
	PSNEZ		20	28		
	LNEZ		48	00		
	F	21	40			
401	eP?NEZ	6	07	23	3625?	Disturbed by microseisms.
30th	S?NE		12	36		
	F	7	00			
404	iPNEZ	3	04	34	210	Compression. Deeper than normal.
31st	iSNEZ		05	01		Probably in province of Nueva Vizcaya.
	F		26			Baguio, 110 Km.

Sixty-four insignificant or undecipherable disturbances on the following days of May: 1st(5), 2nd(4), 3rd(2), 4th(4), 5th(2), 6th, 7th, 8th(2), 9th(4), 11th(6), 12th, 13th(2), 14th(2), [illegible] 16th(2), 17th, 19th(4), 20th(2), 21st(5), 22nd(3), 23rd(2), 24th, 25th, 26th, 27th, 28th(2), 29th, and 30th(2).

(non inséré dans le Bull. International)

No. 21. June, 1936.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_0	D	T_1	l
N-S	12.4	100.5	12.6	11.5
E-W	11.8	100.5	11.9	11.4
Z	11.6	[illegible]	[illegible]	[illegible]

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. June 2, 1936.

	T_0	V	ε	$\frac{r}{T_0^2}$
N-S	4.1	203	2.5	0.067
E-W	4.3	255	3.0	0.062

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 June				
405	PNEZ	11 32 05	3245?	
1st	S?E	36 53		
	MN	40 40ca		
	F	12 03		
406	P?NEZ	13 29 33	935?	Disturbed by microseisms.
2nd	S?NE	31 12		
	MNE	34 25ca		
	F	14 00		
407	PNE	18 17 45	420	
2nd	SNE	18 49		
	F	32		
410	eEZ	9 37 13		Disturbed by microseisms.
3rd	ENE	42 20		40°N; 126°W by U.S.C.G.S.
	F	11 05		
415	PZ	13 15 33	3390	N component defective. Disturbed by microseisms.
4th	SE	20 30		
	F	14 00		
417	iPZ	14 40 53	1865	Compression from SE.
5th	iPNE	55		In vicinity of 7°N; 135°E by Butuan, Manila, Hong Kong Riverview.
	iSNE	44 07		
	F	16 02		
421	PNE	18 26 36	300	Felt in Legaspi with intensity III.
7th	SNE	27 20		
	F	35		
423	iPZ	16 42 05	3570	Compression.
9th	iPE	06		In vicinity of 3°S; 95°E by Manila, Hong Kong, Chiufeng.
	SNE	47 20		
	LNE	51 40ca		
	MNE	54 ca		
	F	18 05		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 June				
424 10th	PNEZ	3 46 25	4480	
	SNE	52 30		
	ME	4 03 40ca		
	F	40		
425 10th	iPEZ	8 29 42	3680	Dilatation.
	iZ	30 19		6°S; 144°E by Riverview, Manila, Taihoku, Chiufeng, Zikawei.
	iN	27		
	iSNE	34 58		
	F	11 30		
429 11th	PNE	13 01 30	1845	
	SNE	04 39		
	LNE	06 15ca		
	MN	08 ca		
	F	55		
431 11th	PNEZ	19 17 16	1635	
	SNEZ	20 06		
	MNE	23 ca		
	F	40		
436 13th	PNEZ	8 57 43	3190	
	SEZ	9 02 28		
	F	40		
437 13th	iPZ	12 20 55	2890	
	PN	58		
	PE	21 00		
	SNE	25 20		
	F	13 15		
438 13th	PNEZ	21 39 24	630	In the region of the Batan Islands.
	SNEZ	40 35		
	F	22 05		
443 15th	PNEZ	3 34 31	960	In the Philippine Deep, near 8° 15'N; 127°E by Butuan and Manila.
	SNEZ	36 10		Felt at Cantilan, Surigao.
	F	4 14		
444 15th	iPNEZ	10 05 26	150	Dilatation.
	iSNEZ	45		Felt in Manila, intensity II.
	F	35		15°N; 122° 20'E by Manila and Baguio.
446 15th	PNEZ	22 00 36	280	
	SNEZ	01 16		
	F	09		
447 16th	PNEZ	0 44 47	6870?	
	S?NE	53 12		
	MNE	1 09 ca		
	F	55		

MANILA OBSERVATORY

SPECIAL BULLETIN OF PRINCIPAL EARTHQUAKES

JULY, 1936

4th	PNEZ	9 03 08	
	SNEZ	07 28	
5th	iPNEZ	18 57 47	Compression from SE.
	SNE	19 00 09	Felt in eastern and southern Mindanao and Sulu.
6th	PNEZ	18 24 52	
	SNE	28 52	
11th	iPZ	22 24 33	Dilatation.
	SNE	28 04	
12th	iPZ	2 53 42	Compression.
	SNE	3 03 13	
13th	iPZ	11 32 20	Compression.
	SKKS	43 46	Chile 26°S; 71°W tentative.
15th	PNEZ	11 55 45	
	S?NE	12 00 18	
26th	iP: EZ	7 57 01	Compression.
	iSKKS	8 08 37	Phase at 8:06:27 extraordinarily large.
28th	PNEZ	8 24 19	
	S?EZ	29 43	
28th	PZ	7 58 31	
	SNE	8 03 40	

M A N I L A ,   P .   I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 June				
448 16th	PZ	23 13 44	1350?	
	S?N	16 04		
	F	30		
452 19th	PEZ	12 45 28	720	
	iSNEZ	46 47		
	F	13 50		
453 19th	PNEZ	14 19 32	350	
	SNE	20 24		
	F	25		
454 19th	PNEZ	16 40 19	2936	
	SN	44 47		
	LN	47 30ca		
	F	17 40		
456 20th	PNEZ	4 49 45	2235	Deep focus.
	SNEZ	53 25		
	LN	55 10ca		
	MNE	57 20ca		
	F	5 50		
459 21st	iPZ	10 04 21	175	Dilatation from NE.
	eSNE	22		Felt in Manila, intensity II.
	SNEZ	43		Felt in northern part of province of Nueva Ecija.
	F	14		16° 05'N; 121° 30'E by Baguio and Manila.
461 22nd	PNEZ	16 26 56	190	
	SNEZ	27 20		
	F	38		
462 22nd	PNEZ	19 45 52		
	SN	48 55		
	F	20 30		
464 23rd	PNEZ	1 29 55	2710	Deep focus.
	iSNEZ	34 07		Dilatation.
	F	52		
465 23rd	PNEZ	3 37 30	150	
	SNE	49		
	F	42		
468 23rd	iPZ	23 20 09	160	Compression.
	eSNE	09		
	SNEZ	29		
	F	38		
469 25th	PNEZ	16 56 27	3880	32°N; 145°E by Manila, Chiufeng, Taihoku, Hong Kong.
	SNZ	17 01 55		
	F	27		
470 27th	iPNEZ	5 23 25	135	
	SNE	42		
	F	31		

No. 24. June, 1936.

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 June				
471 27th	PNEZ	21 20 32	4440	
	SNE	26 35		
	LNE	32 20ca		
	MN	35 35ca		
	F	22 20		
472 28th	PNEZ	8 18 54	3460	Dilatation (?).
	SNE	20 52		In region of 43°N; 144°E by Manila,
	LNE	24 30		Chiufeng, Taihoku, Hong Kong.
	MNE	27 00ca		
	F	10 14		
475 29th	iPZ	14 38 43	5230	Compression.
	ePNE	44		In vicinity of 37°N; 78°E by Chiufeng,
	iSNEZ	45 33		Hong Kong, Manila.
	LNEZ	51 ca		
	MNE	56 50ca		
	F	15 40		
476 30th	iPNEZ	15 15 25	5410	Compression.
	iSNEZ	22 24		Kamchatka, according to Chiufeng.
	LNE	30 ca		Data after P from the Wiechert and G-W
	MNE	34 ca		Vertical.
	F	17 50		
477 30th	PNEZ	19 44 00	5410	
	SNE	51 10		
	LNE	56 30ca		
	F	21 04		

Thirty-six insignificant or undecipherable disturbances on the following days of June: 3rd(6), 5th, 6th(2), 7th, 8th, 10th, 11th(4), 12th(3), 14th(4), 15th, 17th(2), 18th, 19th, 20th, 21st, 22nd(2), 23rd(2), 28th, and 29th.

No. 25. July, 1936.

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

Cf. Theoretical Seismology, Sohon, S.J.

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg.
July 3, 1936.

	T_0	V	ε	$\frac{r}{T_0^2}$
N-S	4.1	205	2.5	0.065
E-W	4.2	243	3.0	0.068

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 July				
478	PEZ	5 14 52	595	
2nd	SNEZ	16 00		
	F	52		
483	PNEZ	9 02 08	2570	
4th	SNEZ	06 11		
	F	45		
486	iPNEZ	18 57 47	1365	Compression from SE.
5th	SNE	19 00 09		Felt in southern and eastern Mindanao, Sulu and Palau.
	F	20 50		3° 20' N; 126° 20' E; H=18:54:48 by Manila Palau, Hong Kong, Chiufeng.
				Data after P from Wiechert & Horizontal.
487	iPZ	1 58 17	1365	Compression.
6th	ePNE	17		Felt in southeastern Mindanao and in Palau.
	SNEZ	2 00 39		Same epicenter as No. 486.
	F	3 08		
488	PNEZ	18 24 52	1955	Approx. 1°S; 127°E by Palau, Manila, Nanking, Chiufeng.
6th	SNE	28 10		
	LNE	31 10ca		
	F	19 35		
493	iPNEZ	19 35 15	720	Dilatation from SE.
10th	SNEZ	36 35		
	F	20 49		
496	iPZ	22 24 33	2120	Dilatation.
11th	ePNE	33		
	SNE	28 04		
	F	23 10		
497	iPZ	2 53 42	8045	Compression.
12th	PNE	42		
	SNE	3 03 13		
	LNE	17 ca		
	F	4 07		

No. 26. July, 1936.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 July						
498	i$\overline{P}$Z	15	14	26	145	Dilatation.
12th	$\overline{P}$NE			28		
	$\overline{S}$NE			44		
	F		27			
500	iPZ	11	32	20	18280	Compression.
13th	iPE			23		Chile. 24°S; 72°W; O=11;12.3 by U.S.C.G.S.
	iPN			25		Data after P from the Wiechert and Horizontals.
	SKKS		43	46		
	F	15	40			
501	PNEZ	0	26	36	430	
14th	SNE		27	28		
	F		37			
503	P?NEZ	2	00	28	5200?	
15th	SNEZ		07	16		
	F		30			
504	PNEZ	7	05	04	1410	
15th	SNEZ		07	30		
	F		21			
506	PNEZ	11	55	45	3020?	
15th	S?NE	12	00	18		
	F		45			
507	PNE	5	42	14	500	Felt at Kabankalan, Negros Occidental.
16th	SNEZ		43	13		
	F		55			
509	$\overline{P}$NEZ	19	29	00	125	Felt at Moncada, Tarlac.
16th	$\overline{S}$NE			16		
	F		35			
511					1090	P lost in microseisms.
20th	SNE	23	59	20		Felt strongly in Sintiku Prefecture.
21st	F	0	25			24°.4N; 120°.8E according to Taihoku.
520	iP: EZ	7	57	01	18280	Compression. Phase at 8:06:27 is extraordinarily large.
26th	iZ		58	00		24°S; 72°W; O=7:36:54 by U.S.C.G.S.
	iE	8	06	27		
	iSKKS		08	37		
	F	10	45			
523	PNEZ	5	24	19	3455	Probably in New Guinea.
28th	iE		25	56		
	SEZ		29	21		
	LE		34	30ca		
	MEZ		37	ca		
	F	7	30			

No. 27. July, 1936.

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 July				
524	PZ	7 58 31	3135	Probably in New Guinea.
28th	PNE	32		
	SNE	8 03 12		
	LNE	07 40		
	F	9 48		
526	iPZ	6 16 33	185	Dilatation.
30th	ePNE	33		
	iSNE	50		
	F	21		
527	PNEZ	0 45 26	305	Felt in towns north of Mayon Volcano.
31st	SNE	46 07		
	F	1 00		
528	P?NE	4 07 22	960?	Felt at Davao with intensity II.
31st	S?E	09 04		Disturbed by microseisms.
	F	30		

Twenty-eight insignificant or undecipherable disturbances on the following days of July: 2nd(2), 3rd, 4th, 5th(2), 10th, 11th(2), 12th, 14th, 15th, 16th, 19th, 23rd(4), 24th(2), 25th(2), 27th(2), and 28th.

M A N I L A , P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

φ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. August 2, 1936.

	T_o	V	ε	$\frac{r}{T_o^2}$
N-S	4.1	207	2.5	0.068
E-W	4.3	231	2.9	0.059

Cf. Theoretical Seismology, Sohon, S.J.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 August				
529 1st	PNEZ	6 29 45	2880	Deep focus.
	SNE	34 09		Destructive in Kansu, China, according to Nanking.
	LNE	37 ca.		
	F	7 33		
532 3rd	PNEZ	10 10 57?	1145	In region of 24° 30'N; 123° 30'E by Taihoku and Manila.
	SNE	12 56		
	F	38		
533 3rd	$\overline{P}$NEZ	17 49 36	175	
	$\overline{S}$NE	58		
	F	55		
534 4th	iPEZ	14 10 50	520	Compression from N.
	ePN	51		Felt in the Batanes Islands and in northern Luzon.
	iSNEZ	11 54		19° 10'N; 120° 30'E by Manila, Taihoku, Hong Kong, Chiufeng.
	F	16 02		Baguio, 310 Km.
535 4th	$\overline{P}$NEZ	20 08 48	165	
	$\overline{S}$NEZ	09 09		
	F	22		
536 5th	PNEZ	14 15 37	860	Felt at Cantilan, Surigao.
	SNE	17 10		9° 10'N; 126° 35'E by Manila and Butuan.
	F	43		
543 9th	iPNEZ	16 08 20	530	Dilatation.
	iSNE	09 21		Felt at Bangui, Ilocos Norte.
	F	17 30		19°N; 119° 10'E by Manila, Hong Kong, Nanking, Chiufeng.
546 13th	iPNEZ	20 04 39	980	Felt in northern and eastern Mindanao and in southern Leyte.
	iSNE	06 23		8°N; 127°E; H=20:02:36.
	F	22 30		At Manila, compression from SE. S from the Wiechert.
				At Butuan, dilatation from E.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 August				
550 14th	PNE	22 37 02	1330	Felt in southern and eastern Mindanao.
	SNE	39 20		From the Wiechert.
	LNE	40 06		Butuan, 560 Km.
	F	23 40		
554 17th	P?NEZ	14 07 35	4135?	Disturbed by microseisms.
	SNE	13 20		
	LN	18 ca		
	F	16 10		
556 17th	iPNEZ	17 56 36	1145	
	iSNE	58 43		
	F	19 35		
557 18th	PZ	2 03 50	1320	Disturbed by microseisms.
	SNE	06 13		
	F	3 06		
560 18th 19th	iPNEZ	23 56 07	150	Compression from SE. S from the Wiechert.
	SNE	26		Felt in southern Luzon, Marinduque and northern Mindoro.
	F	0 35		In Tayabas Bay by Manila and Baguio.
562 19th	PNEZ	9 06 50	190	
	SNE	07 14		
	F	14		
564 21st	PNEZ	3 14 48	145	
	SNEZ	15 06		
	F	25		
565 21st	PNEZ	6 02 08	135	
	SNEZ	25		
	F	11		
566 21st	PNEZ	8 47 44	1000	
	SNE	49 30		
	F	9 22		
568 22nd	iPNEZ	6 53 26	1155	Compression from NE. Felt all over Formosa,
	iSNE	55 26		22° 25' N; 121° 35' E by Manila, Hong Kong, Zikawei, PhuLien. H=6:51:36, h=75 Km.
	F	10 30		(22°.2N; 121°.2E by Taihoku).
569 22nd	PNEZ	11 10 52	1155	Aftershock of No. 568.
	SNE	12 52		
	F	13 00		
571 22nd	PNEZ	14 23 39	250	
	SNE	24 14		
	F	36		

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 August				
576	iPZ	21 17 56	2870	Compression from the west-southwest.
23rd	iPNE	57		Data after P from the Wiechert.
	SNE	22 26		Baguio, 3035 Km.
	LNE	24 34		
	F	23 05		
579	iPZ	6 46 40	3610?	
28th	ePNE	40		
	S?N	51 52		
	F	7 35		
581	PNEZ	17 00 21	3155	
30th	SN	05 04		
	F	39		
582	PEZ	21 37 33	5300	
30th	SNE	44 35		
	F	22 08		

Therty-two insignificant or undecipherable disturbances on the following days of August: 1st, 2nd, 6th(2), 7th(2), 8th, 9th, 10th, 11th, 14th(3), 15th(2), 16th, 17th, 18th(2), 19th(2), 21st, 22nd(2), 23rd(3), 24th(2), 30th, and 31st(2).

M A N I L A O B S E R V A T O R Y

SPECIAL BULLETIN OF PRINCIPAL EARTHQUAKES

S E P T E M B E R , 1 9 3 6

4th	iPZ	8	15	01	
	iSNEZ		19	47	
5th	iPZ	21	50	50	
	iSNEZ		54	35	
6th	iPZ	17	51	01	
	SNE	18	00	32	
9th	iPZ	2	49	45	Compression from SE.
	iSNEZ		53	25	Deep focus.
12th	PNEZ	18	01	27	
	SNE		03	59	
18th	PNEZ	18	43	57	
	S?NEZ		48	40	
19th	iPNEZ	1	07	16	Compression from W.
	iSNEZ		12	04	
19th	ePNEZ	6	36	13	
	SNE		41	15	

No. 31. September, 1936.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. September 2, 1936.

	T_0	V	ε	$\frac{r}{T_0^2}$
N-S	4.1	206	2.4	0.064
E-W	4.3	249	2.1	0.075

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Sept.				
591 4th	iPZ	8 15 01	3210	Japan.
	ePNE	01		
	iSNEZ	19 47		
	LN	24 ca		
	F	10 10		
592 5th	iPZ	21 50 30	2580	
	ePNE	30		
	iSNEZ	54 33		
	F	22 45		
595 6th	iPZ	17 51 01	8045	
	ePNE	01		
	SNE	18 00 32		
	LN	14 12		
	F	19 20		
596 7th	P?EZ	12 36 24	2755?	Disturbed by microseisms.
	SNE	40 40		
	LNE	43 15		
	F	13 20		
599 9th	iPZ	2 49 45	2245	Compression from SE. Deep focus.
	ePNE	45		
	iSNEZ	53 25		
	F	3 47		
606 12th	PNEZ	18 01 27	1155	Felt widely in Formosa, 24°.4N; 120°.8E according to Taihoku.
	SNE	03 36		
	LNE	05 ca		
	F	19 20		
611 15th	PNZ	13 13 17	510	Felt at Bangui, northern Luzon.
	SNEZ	14 17		
	F	45		

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Sept.				
612 15th	P?E	14 01 51	2890?	
	SNE	06 16		
	LNE	09 50		
	F	40		
615 17th	P̄NEZ	2 54 36	140	
	S̄NEZ	54		
	F	59		
617 17th	PNEZ	17 26 30	3780	
	SNE	31 52		
	LNE	36 08		
	F	18 23		
619 18th	PEZ	9 53 57	690	Felt at Butuan with feeble intensity also at Cantilan.
	SNEZ	55 14		
	F	10 54		
621 18th	PNEZ	18 43 57	3160?	
	S?NEZ	48 40		
	F	21 10		
622 19th	iPNEZ	1 07 16	3245	Compression from W.
	iSNEZ	12 04		L from the Wiechert.
	LNE	15 30ca		
	F	5 05		
623 19th	ePNEZ	6 36 13	3455	
	SNE	41 15		
	F	8 20		
624 19th	P̄NEZ	8 36 27	165	
	S̄NE	48		
	F	53		
631 21st	PNZ	16 39 54	3635?	
	S?N	45 07		
	LE	50 06		
	F	17 30		
635 23rd	PNZ	22 26 07	200	
	S̄NE	32		
	F	32		
638 24th	P?EZ	8 34 45	3735?	Disturbed by microseisms.
	SN	40 04		
	LNE	44 20ca		
	F	9 13		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Sept.				
639	iPZ	19 25 16	2360	
24th	ePNE	16		
	SNE	29 04		
	F	20 15		
640	PNEZ	20 56 56	2610	Felt in Szechwan, China, according to Nanking.
24th	SNE	21 01 01		
	F	30		
642	PPEZ	13 10 40	10500	43°.5N; 128°.2W; 0=12:53:6 by U.S.C.G.S. Disturbed by microseisms.
25th	PS(?)	18 32		
	eNE	33 00ca		
	L NE	37 30ca		
	F	14 52		

Forty-four insignificant or undecipherable disturbances on the following days of September: 1st(2), 2nd, 3rd(3), 6th(2), 7th, 8th, 10th(3), 11th(3), 12th, 13th, 14th(3), 16th(2), 17th, 18th(2), 19th(2), 20th(3), 21st, 23rd(4), 24th, 25th(2), 26th(3), 27th, and 29th(2).

No. 34. October, 1936.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg.
October 3, 1936.

	T_o	V	ε	$\frac{r}{T_o^2}$
N-S	4.0	214	2.4	0.080
E-W	4.1	285	2.9	0.067

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 October				
650	PNEZ	2 51 34	460	Baguio, 280 Km.
2nd	SNEZ	52 29		
	F	3 10		
653	iPNEZ	21 53 22	1625	Dilatation from SE.
3rd	iSNEZ	56 10		
	iLNE	57 35ca		
4th	F	0 05		
654	PEZ	0 05 00	9390	Compression.
5th	SNE	15 33		N Component stopped at 21:35.
	F	1 05		
655	PNEZ	6 10 04	595	Dilatation. In the vicinity of 9° 20'N; 122°E.
5th	SNE	11 12		
	F	8 20		Felt in SE Panay and S Negros.
656	iPNEZ	9 47 43	1755	Compression from SE.
5th	SNE	50 44		Data after P from the Wiechert.
	F	12 40		Butuan, 810 Km.
				1°N; 127°E according to U.S.C.G.S.
				3°N; 126°.4E, h=100, H=9:44:34 by J.S.A.
658	PNEZ	20 22 13	2780?	
5th	S?NE	26 30		
	F	21 00		
664	PNEZ	3 10 30	1100?	S from the Wiechert. Disturbed by strong microseisms.
10th	S?NE	12 30		
	F	4 20		Felt at Davao with intensity II.

M A N I L A , P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks
1936						
Oct.						
665	PNEZ	6	13	50	160	Felt at Atimonan and Boac with feeble intensity.
10th	SNE		14	10		S from the Wiechert. Disturbed by strong microseisms.
	F		26			
667	PNEZ	6	35	59	1535	Disturbed by microseisms.
13th	SNE		38	38		
	F	7	08			
669	iPZ	12	03	49	4690	Compression.
16th	ePNE			50		Solomon Islands by Riverview and Manila.
	SNE		10	07		
	LNE		16	30ca		
	F	13	02			
670	iPNEZ	12	08	23	1900	Dilatation. In Maluco by Riverview and Manila.
19th	SNE		11	41		Disturbed by microseisms.
	F	13	15			
672	PNEZ	7	54	11	1210	
22nd	SNE		56	17		
	F	8	12			
676	PNEZ	4	15	17	1235	
23rd	SNE		17	25		
	F		42			
677	iPNZ	6	36	17	8290	61°.1N; 149°.2W; O=6:24:21 by U.S.C.G.S.
23rd	iSNE		46	00		
	L?NE		58	ca		
	F	9	40			
681	PEZ	16	08	07	3045	
24th	SNE		12	42		
	LNE		14	25		
	F	17	05			
684	PNEZ	15	36	13	3035	
25th	SNE		40	47		
	LNE		42	51		
	F	16	17			

No. 36. October, 1936.

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 Oct.				
685	ePNEZ	9 38 17	3430	
26th	SNE	43 17		
	LE	46 50ca		
	F	10 30		
686	PNEZ	19 37 36	2355	Deep focus.
26th	SNE	41 58		
	F	21 23		
687	PNEZ	23 29 15	1155	Felt in Davao with intensity II,
26th	SNE	31 15		
27th	F	0 27		
689	PNEZ	18 44 00	~~[illegible]~~ 2820	Dilatation.
29th	SNE	48 20		Felt very strongly in Guam. Some damage to buildings.
	F	21 35		
692	PNEZ	9 07 13	975	
30th	SNE	08 57		
	F	37		
694	PN EZ	11 43 47	1135	Felt at Davao with intensity II.
30th	SNE	45 45		Felt at Kabankalan, Or. Negros (?).
	F	12 15		
695	PNEZ	17 19 21	3100	
30th	SNZ	24 00		
	F	18 20		

Twenty-five insignificant er undecipherable disturbances on the days of October: 2nd, 3rd, 5th(2), 7th(2), 8th, 9th, 11th, 16th, 22nd(3), 23rd(3), 24th, 25th(2), 29th(2), 30th(2), and 31st(2), No. 37. November, 1936.

M A N I L A , P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.9	0	400
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. November 1, 1936

	T_o	V	ε	$\frac{I}{T_o^2}$
N-S	4.0	211	2.4	0.092
E-W	4.3	245	3.0	0.066

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 Nov.				
701 1st	P?NEZ	17 15 34	3022?	
	SN	20 07		
	F	18 30		
702 2nd	PEZ	4 59 24	175	
	SNE	46		
	F	5 03		
703 2nd	iPNZ	15 05 49	4700	Compression.
	ePE	49		
	SNE	12 06		
	F	18 25		
704 2nd	iPNEZ	20 52 03	3065	Japan. Compression. S from the Wiechert
	SNE	56 54		Baguio, 2855.
3rd	F	0 45		37.5N; 142° E by U.S.C.G.S.
706 3rd	PNEZ	20 16 19	560	Felt in northern Luzon.
	SNE	17 24		
	F	40		
707 4th	P?NEZ	7 30 48	4020?	Disturbed by microseisms.
	SNE	36 25		
	LE	41 ca		
	MNE	44 ca		
	F	8 26		
708 4th	PNEZ	9 20 49	4980	
	SNE	27 24		
	F	55		
709 4th	iPZ	13 49 55	2610	Compression.
	ePNE	55		Deep focus.
	iSNE	54 00		
	F	14 45		
710 5th	P?NE	7 41 49	2180?	Disturbed by microseisms.
	SNE	45 24		
	F	8 40		

MANILA, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY. Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Nov.				
711 6th	PNZ	12 18 32	440	Disturbed by microseisms. S from the Wiechert.
	SNE	19 26		Baguio, 260 ±
	F	35		
713 12th	iPZ	2 21 01	3345?	Disturbed by microseisms.
	ePNE	01		
	S?NE	25 55		
	F	3 10		
714 12th	iPZ	8 33 30	2665	Dilatation. Felt in Guam. Deeper than normal.
	SE	37 49		
	F	9 23		
716 13th	iPNEZ	12 40 44	6220	Compression from NE.
	iSNE	48 32		57°N; 163°E; O=12:31:30 by U.S.C.G.S.
	iN	49 54		
	iLN	58 15		
	F	15 50		
717 14th	PNEZ	2 04 06	255	Baguio, 190 Km.
	SNE	42		
	F	12		
722 15th	PNEZ	22 00 40	6900	
	SE	09 06		
	F	23 20		
724 16th	iPZ	23 35 40	2390	
	ePN	40		
	SNE	39 30		
17th	F	0 55		
727 19th	PNEZ	21 29 46	2280	Disturbed by microseisms.
	SNE	33 29		
	F	23 40		
728 20th	PNEZ	3 00 19	430	Felt at Virac with intensity IV and at Naga with II.
	SNE	01 11		
	F	07		
732 24th	PNEZ	22 41 10	245	Probably off east coast of northern Luzon by Baguio and Manila.
	SNE	44		
	F	23 05		
733 25th	P?NEZ	6 53 46	850?	Disturbed by microseisms. Felt at Cantilan, Surigao.
	SNE	55 18		
	F	7 20		
734 25th	PEZ	11 50 50	4235	Disturbed by microseisms.
	SNE	56 40		
	F	12 26		
735 26th	PEZ	8 27 44	2620	Disturbed by microseisms.
	SNE	31 50		
	F	9 15		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 Nov.				
737	PNEZ	10 07 56	295	Trace in Baguio.
27th	SNE	08 36		
	F	24		
740	PNEZ	8 36 50	6465?	Disturbed by microseisms.
29th	S?NE	44 50		
	F	9 30		
743	PNEZ	22 52 02	960?	Disturbed by microseisms.
29th	S?NE	53 44		
	F	23 56		
744	iPNEZ	2 51 59	90	Dilatation from SE. Deeper than normal.
30th	iSNEZ	52 11		Felt in Manila with intensity II.
	F	3 10		
746	PNEZ	23 49 50	200	Compression.
30th	SNE	50 15		Probably near Baguio by Manila and
Dec. 1	F	1 30		Baguio.

Twenty-two insignificant or undecipherable disturbances on the following days of November: 1st(3), 3rd, 11th, 12th, 14th(3), 15th(2), 18th, 19th, 21st, 22nd(2), 26th, 28th(2), 29th(2), and 30th.

No. 40. December, 1936

MANILA, P. I.

ϕ=14° 34' 42" N. λ=120° 58' 41" E. h=3 m. Alluvium.

CONSTANTS OF THE GALITZIN-WILIP

	T_1	T	μ^2	V_s
N-S	12.6	12.[illegible]	0	460
E-W	11.8	11.9	.08	229
Z	11.6	9.0		

CONSTANTS OF THE WIECHERT INVERTED PENDULUM. M=955 Kg. December 1, 1936.

	T_o	V	ε	$\frac{r}{T_o^2}$
N-S	4.0	203	2.4	0.074
E-W	4.4	254	2.8	0.064

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks
1936 Dec.				
747	iPNEZ	6 13 08	1800	Deep focus.
1st	iSNE	16 12		
	F	7 24		
750	PNEZ	19 18 20	470	Felt in northern and northwest Luzon.
2nd	SNE	19 16		Disturbed by microseisms.
	F	26		
751	PNEZ	6 08 11	280	Felt at Narvacan, Ilocos Sur.
3rd	SNE	49		Disturbed by microseisms.
	F	20		16° 55' N; 119° 55' E by Baguio & Manila.
755	PNEZ	6 09 36	1780	
6th	SNE	12 38		
	F	51		
756	ePNEZ	16 28 21	460	Felt at Aparri and Lallo.
7th	iSNEZ	29 16		Baguio, 230 Km. Probably slightly deeper than normal.
	F	53		
759	iPNEZ	10 25 56	580	Compression. Felt strongly at Ormoc, Leyte. Also at Hinundayan, Leyte.
8th	SNE	26 02		Butuan, 240 Km. Center probably in Ormoc Bay.
	F	12 20		
761	PNEZ	13 59 56	2210	Dilatation.
8th	SNEZ	14 03 34		
	F	50		
762	PNE	17 47 34	2500?	
8th	S?N	51 32		
	F	18 22		
766	PNE	21 19 57	195	
11th	SNE	20 22		
	F	34		
767	PNEZ	8 03 36	1320	Compression.
12th	SN	05 53		
	F	9 10		
768	PNEZ	11 02 31	390	
13th	SNEZ	03 19		
	F	16		

No. 41. December, 1936.

M A N I L A, P. I.

SEISMOLOGICAL BULLETIN OF THE OBSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h.	m.	s.	Dist. Km.	Remarks.
1936 Dec.						
770	iPNEZ	16	15	09	775?	Compression.
13th	S?NE		16	34		
	F	17	03			
771	iPEZ	21	36	01	2680	Compression.
13th	ePN			01		Felt in Guam with intensity VII.
	iSNE		40	11		
	LNE		42	ca		
	F	23	45			
772	iP̄NEZ	4	04	03	150	Dilatation from SW. Probably 14° 16' N; 119° 47' E by Manila and Baguio as on April 10, 1932;
14th	iSE			21		Felt in southwestern Luzon.
	F	5	30			S from the Horizintal Pendulums.
775	PNEZ	13	41	37	370	Felt at Aroroy, Masbate.
15th	SNE		42	24		
	F	14	02			
777	iP̄NEZ	3	25	10	120	Compression from SW.
18th	iSNE			25		Felt in Manila and in Cavite Province.
	F		36			S from the Horizontal Pendulums.
779	PNEZ	18	35	09	3390	
20th	SNE		40	06		
	F	19	20			
780	iPNEZ	3	41	34	320	Compression. Felt at Vigan and Narvacan. Epicenter in China Sea. Deeper than normal.
21st	iSNE		42	16		
	F	4	00			
781	PNEZ	19	19	18	6090	
21st	SNE		26	56		
	F	20	40			
783	PNEZ	10	09	42	[illegible] 2230?	Disturbed by microseisms.
24th	S?NE		13	21		
	F	11	07			
784	PNEZ	13	22	47	3820?	Disturbed by microseisms.
24th	S?NE		28	12		
	F	14	55			
786	P̄NEZ	19	28	54	210	Disturbed by microseisms.
24th	S̄NEZ		29	21		[illegible] 150 Km.
	F	20	00			
788	PNEZ	15	26	02	430	Felt in southeastern Luzon.
26th	iSN			54		
	F	16	25			
790	iPZ	23	04	06	8890	Compression.
26th	SNE		14	12		

M A N I L A , P . I .

SEISMOLOGICAL BULLETIN OF THE ONSERVATORY.--Continued.

No. and Date	Phase.	Greenwich Time h. m. s.	Dist. Km.	Remarks.
1936 Dec.				
791 27th	ePEZ	0 20 09	3100	#790 still recording. No record on N Component.
	SE	25 00		
	F	1 40		Japan.
798 28th	PNEZ	17 26 58	1920	
	SNE	30 12		
	F	18 03		
800 29th	iPNEZ	14 55 04	3800	Compression from SE. 7°S; 147°E by Riverview and Manila.
	SNE	15 00 31		
	F	18 30		
803 30th	PNEZ	4 13 22	2300	
	SNE	17 06		
	F	5 15		
804 30th	PNEZ	8 34 16	2210	
	SNE	37 54		
	F	9 00		

Thirty-one insignificant or undecipherable disturbances on the following days of December: 1st(2), 5th(3), 7th(2), 8th, 10th(2), 11th, 13th, 14th, 15th, 17th, 19th, 22nd, 24th, 25th, 26th, 27th(5), 28th, 29th(2), 30th, and 31st(2).

SEISMOLOGICAL BULLETIN FOR 1936
JULY-DECEMBER

INTRODUCTION

SEISMIC STATIONS

The following is the list and data of stations equipped with seismographs.

Name	Islands	North latitude	East longitude	Elevation	Equipment	Substructure
		° ′	° ′	m.		
Manila	Luzon	14 35	120 59	3.0	Galitzin-Wilip, 3 components. Wiechert Inverted Pendulum, mass 955 kg. Two horizontal pendulums, mass 118 kg. each.	Alluvian and pyroclastics to unknown depth.
Baguio	do	16 25	120 35	1,512	Vicentini, 3 components. Wiechert Inverted Pendulum, mass 200 kg.	Limestone.
Ambulong	do	14 05	121 03	10.5	Vicentini, 3 components	Soil underlaid by tuff.
Butuan	Mindanao	8 56	125 32	2.0	Wiechert Inverted Pendulum, mass 200 kg.	Alluvium.
Agaña	Guam	13 28	144 45	5.0	do	Coral.

All meteorological stations, official and coöperative, have instructions to report all perceptible earthquakes.

SEISMIC RECORDS

The instrumental record is that obtained from the seismographs in the Manila Observatory. It is that of the Galitzin-Wilip instruments except when stated otherwise.

The time of occurrence given in the macroseismic records is that indicated by the seismographs of the Manila Observatory whenever the disturbance has been recorded by them. This fact is denoted by an asterisk in the macroseismic record. Otherwise the time is that given by the meteorological observer who reports the earthquake. Greenwich Mean time is given and insular time is added in brackets.

Intensity is given according to the Rossi-Forel scale as adapted by Rev. W. C. Repetti, S. J., Chief of the Seismic Division, for use in the Philippine Islands.

ROSSI-FOREL SCALE OF EARTHQUAKE INTENSITIES (Adapted)

I. *Microseismic shock.*—Felt only by an experienced observer under favorable conditions.

II. *Extremely feeble shock.*—Felt by a small number of persons at rest.

III. *Very feeble shock.*—Felt by several persons at rest. Duration and direction may be perceptible. Sometimes dizziness or nausea experienced.

IV. *Feeble shock.*—Felt generally indoors; outdoors by a few. Hanging objects swing slightly. Creaking of frames of houses.

V. *Shock of moderate intensity.*—Felt generally by everyone. Hanging objects swing freely Overturn of tall vases and unstable objects. Light sleepers awakened.

VI. *Fairly strong shock.*—General awakening of those asleep. Some frightened persons leave their houses. Stopping of pendulum clocks. Oscillation of hanging lamps. Slight damage in very old or poorly built structures.

VII. *Strong shock.*—Overturn of movable objects. General alarm, all run outdoors. Damage *slight* in well-built houses, *considerable* in old or poorly built structures, old walls, etc. Some landslides from hills and steep banks. Cracks in road surfaces.

VIII. *Very strong shock.*—People panicky. Trees shaken strongly. Changes in flow of springs and wells. Sand and mud ejected from fissures in soft ground. Small landslides. Slides in river banks.

IX. *Extremely strong shock.*—Panic general. Partial or total destruction of some buildings. Fissures in ground. Landslides and rock falls.

SYMBOLS AND ABBREVIATIONS

P	Normal first preliminary tremors; longitudinal waves which have passed below the continental layer.
$\overline{P}$	Upper first preliminary tremors whose path lies wholly in the continental layer.
P′	Longitudinal waves that have traversed the earth's core.
PPn	Longitudinal waves reflected "n" times at the earth's surface.
PcP	Longitudinal waves reflected from the outer surface of the earth's core.
S	Normal second preliminary tremors; transverse waves that have passed below the continental layer.
$\overline{S}$	Second preliminary tremors whose path lies entirely in the continental layer.
PS	Waves transformed from longitudinal to transverse oscillations or vice versa through one reflection at the earth's crust.
SS	Normal transverse waves reflected "n" times at the earth's surface.
ScS	Normal transverse waves reflected from the outer surface of the earth's core.
SKP	Waves which start with transverse vibrations but on refraction into the core are changed to longitudinal, or starting as longitudinal are refracted out as transverse.
L	Long waves of irregular form at the beginning of the surface or main phase.
M	Shorter and more regular waves of large amplitude in the surface group which travel more slowly than the L waves.
Mn	Individual waves of relatively large amplitude in the surface phase and usually in the M group.
F	Finis. End discernible movement.
i	Impetus. Impulsive and sharply defined beginning of a phase.
e	Emersio. Poorly defined emergency of aphase.
m	Maximum wave in any phase.
T	Period of waves.
O	Time of earthquake at the epicenter.
H	Time of earthquake at focus.
h	Focal depth.
Δ	Arcual distance from station to epicenter.
To	Free or undamped period of the seismograph.
V	Static magnification.
ϵ	Ratio of successive damped amplitudes.
r	Friction constant.
J. S. A.	Jesuit Seismological Association. Central Office at St. Louis University, St. Louis, Missouri, U. S. A.
U. S. C. G. S.	United States Coast and Geodetic Survey, Washington, D. C., U. S. A.
C. M. O.	Central Meteorological Observatory, Tokyo, Japan.

CONSTANTS OF THE WIECHERT INVERTED PENDULUM

1936	N–S component				E–W component			
	T_o	V	ϵ	$\frac{r}{T_o^2}$	T_o	V	ϵ	$\frac{r}{T_o^2}$
July	4.1	205	2.5	0.065	4.2	243	3.0	0.068
August	4.1	207	2.5	0.068	4.3	231	2.9	0.059
September	4.1	206	2.4	0.064	4.3	249	2.1	0.075
October	4.0	214	2.4	0.090	4.1	285	2.9	0.067
November	4.0	211	2.4	0.082	4.3	245	3.0	0.066
December	4.0	203	2.4	0.074	4.4	254	2.8	0.064

CONSTANTS OF THE GALITZIN-WILIP SEISMOMETERS

PERMANENT CONSTANTS			
	N-S	E-W	Z
Galvanometer periods	12.3s.	11.8s.	11.0s.
Galvanometers to drums	100.5 cm.	100.5 cm.	100.5 cm.
Telescope to seismographs	500 cm.	492 cm.	450 cm.
Reduced pendulum lengths	11.52 cm.	11.40 cm.	14.82 cm.
TEMPORARY CONSTANTS			
Seismograph period, T^1	12.59	11.90	9.0
Coefficient of damping			
Transmission factor, k			

SEISMOLOGICAL BULLETIN FOR 1936

JULY, 1936

MACROSEISMIC RECORD

3, $9^h\ 03^m$ [3, 5:03 P. M.] **San Ildefonso, Ilocos Sur.** Slight earthquake.

3, $12^h\ 38^m$ [3, 8:38 P. M.] **Tacloban, Leyte.** Earthquake of intensity III and forty seconds duration.

4, $18^h\ 32^m$ [5, 2:32 A. M.] **Compostela, Davao.** Light earthquake.

4, $19^h\ 50^m$ [5, 3:50 A. M.] **Kabacan, Cotabato.** Light earthquake.

5, $14^h\ 29^m\ 48^s$* [5, 10:29:48 P. M.] **Bulan, Sorsogon.** Moderate earthquake.

5, $18^h\ 57^m\ 47^s$* [6, 2:57:47 A. M.] **Mindanao.** Earthquake felt strongly in the provinces of Davao and Cotabato and moderately in Surigao, Agusan, Zamboanga, and Jolo. The epicenter was at 3° 20′ N; 126° 20′ E, in the Netherlands East Indies. An aftershock was felt in the provinces of Davao and Cotabato at 9:58 A. M.

10, $19^h\ 24^m\ 46^s$* [11, 3:24:46 A. M.] **Glan, Cotabato.** Moderate earthquake.

15, $16^h\ 31^m$ [16, 0:31 A. M.] **Ormoc, Leyte.** Oscillatory earthquake of intensity III, and duration 38 seconds.

16, $5^h\ 42^m\ 14^s$* [16, 1:42:14 P. M.] **Kabankalan, Negros Occidental.** Light earthquake.

16, $19^h\ 29^m\ 00^s$* [17, 3:29:00 A. M.] **Moncada, Tarlac.** Moderate earthquake.

22, $16^h\ 54^m\ 37^s$* [23, 2:54:37 A. M.] **Agaña, Guam.** Earthquake recorded and perceived.

23, $7^h\ 19^m$ (?) [23, 3:19 P. M. (?)] **Glan, Cotabato.** Strong earthquake with vertical motion followed by horizontal.

23, $7^h\ 59^m\ 01^s$* [23, 5:59:01 P. M.] **Agaña, Guam.** Earthquake recorded and felt.

23, $13^h\ 28^m\ 25^s$* [23, 9:28:25 P. M.] **SE Luzon.** Moderate earthquake felt at Legaspi and Bulan.

26, $13^h\ 00^m$ [26, 9:00 P. M.] **Cantilan, Surigao.** Slight earthquake.

29, $0^h\ 35^m$ [29, 8:35 A. M.] **Legaspi, Albay.** Oscillatory earthquake of intensity III and six seconds duration.

30, $8^h\ 45^m$ [30, 4:45 P. M.] **Tigaon, Camarines Sur.** Strong earthquake.

31, $0^h\ 45^m\ 26^s$* [31, 8:45:26 A. M.] **Albay, Luzon.** Earthquake felt strongly at Malinao and Tabaco and moderately at Polangui.

31, $4^h\ 07^m\ 22^s$* [31, 12:07:22 P. M.] **Davao, Davao.** Earthquake of intensity II.

INSTRUMENTAL RECORD

No.	Date	Phase	Time h.	m.	s.	Δ Km.	Remarks
478	2	PEZ	5	14	52	595	
		SNEZ		16	00		
		F		52			
483	4	PNEZ	9	02	08	3,120	5° S: 101° E by Manila and Ksara.
		SNEZ		07	00		
		F		45			
486	5	iPNEZ	18	57	47	1,365	Compression from SE. Felt in southern and eastern Mindanao, Sulu and Palau. 3° 20′ N: 126° 20′ E; H=18:54:48 by Manila, Palau, Hong Kong, Chiufeng. Data after P from Wiechert and Horizontal.
		SNE	19	00	09		
		F	20	50			
487	6	iPZ	1	58	17	1,365	Compression. Felt in southeastern Mindanao and in Palau. Same epicenter as No. 486.
		ePNE			17		
		SNEZ	2	00	39		
		F	3	08			
488	6	PNEZ	18	24	52	1,955	Approximately 1° S: 127° E by Palau, Manila, Nanking, Chiufeng.
		SNE		28	10		
		LNE		31	10ca		
		F	19	35			
493	10	iPNEZ	19	35	15	720	Dilatation from SE.
		SNEZ		36	35		
		F	20	49			
496	11	iPZ	22	24	33	2,120	Dilatation.
		ePNE			33		
		SNE		28	04		
		F	23	10			
497	12	iPZ	2	53	42	8,045	Compression. Probably in region of Tonga Islands by Wellington and Manila.
		PNE			42		
		SNE	3	03	13		
		LNE		17	ca		
		F	4	07			
498	12	iPZ	15	14	26	145	Dilatation.
		PNE			28		
		SNE			44		
		F		27			
500	13	iPZ	11	32	20	18,280	Compression. Chile. 24° S: 72° W; 0=11:12.3 by U. S. C. G. S. 23° S: 70.2° E; H= 11:12:29; h=60, J. S. A. Data after P from the Wiechert and Horizontals.
		iPE			23		
		iPN			25		
		SKKS		43	46		
		F	15	40			
501	14	PNEZ	0	26	36	430	
		SNE		27	28		
		F		37			
503	15	P?NEZ	2	00	28	5,200?	
		SNEZ		07	16		
		F		30			
504	15	PNEZ	7	05	04	1,410	
		SNEZ		07	30		
		F		21			
506	15	PNEZ	11	55	45	3,020?	
		S?NE	12	00	18		
		F		45			
507	16	PNE	5	42	14	500	Felt at Kabankalan, Negros Occidental.
		SNEZ		43	13		
		F		55			
509	16	PNEZ	19	29	00	125	Felt at Moncada, Tarlac.
		SNE			16		
		F		35			
511	20	SNE	23	59	20	1,090	P lost in microseisms. Felt strongly in Sintiku Prefecture. 24.4° N: 120.8° E according to Taihoku.
	21	F	0	25			
520	26	iPNEZ	7	57	01	18,280	Compression. Phase at 8:06:27 is extraordinarily large. 24° S: 72° W; 0=7:36:54 by U. S. C. G. S. 22.8° S: 70.8° W; H=7:37:08; h=40 km., J. S. A.
		iZ		58	00		
		iE	8	06	27		
		iSKKS		08	37		
		F	10	45			
523	28	PNEZ	5	24	19	3,455	Probably in New Guinea. 5° S: 140° E according to Wellington.
		iE		25	56		
		SEZ		29	21		
		LE		34	30ca		
		MEZ		37	ca		
		F	7	30			

INSTRUMENTAL RECORD—Continued

No.	Date	Phase	Time			△	Remarks
			h.	*m.*	*s.*	*Km.*	
524	28	Pz	7	58	31	3,135	Probably in New Guinea.
		PNE			32		
		SNE	8	03	12		
		LNE		07	40		
		F	9	48			
526	30	iPz	6	16	33	135	Dilatation.
		ePNE			33		
		iSNE			50		
		F		21			
527	31	PNEZ	0	45	26	305	Felt in towns north of Mayon Volcano.
		SNE		46	07		
		F	1	00			
528	31	P?NE	4	07	22	960?	Felt at Davao with intensity II. Disturbed by microseisms.
		S?E		09	04		
		F		30			

Twenty-eight insignificant or undecipherable disturbances on the following days of July: 2nd(2), 3rd, 4th, 5th(2), 10th, 11th(2), 12th, 14th, 15th, 16th, 19th, 23rd(4), 24th(2), 25th(2), 27th(2), and 28th.

AUGUST, 1936

MACROSEISMIC RECORD

3, 5^h 47^m 40^s [3, 3:47:40 P. M.] **Agaña, Guam.** Earthquake recorded and felt.

3, 23^h 31^m [4, 7:31 A. M.] **Davao, Davao.** Light earthquake.

4, 14^h 10^m 50^s* [4, 10:10:50 P. M.] **N. Luzon.** Strong earthquake felt throughout northern Luzon and Batan Islands. The epicenter was in the China Sea at 19° 10′ N: 120° 30′ E.

5, 14^h 15^m 37^s* [5, 10:15:37 P. M.] **Cantilan, Surigao.** Moderate earthquake.

9, 16^h 8^m 20^s* [10, 0:08:20 A. M.] **Bangui, Ilocos Norte.** Strong earthquake.

13, 15^h 50^m [13, 11:50 P. M.] **Gandara, Samar.** Light earthquake of long duration.

13, 20^h 04^m 39^s* [14, 4:04:39 A. M.] **Leyte and Mindanao.** Felt strongly at Surigao and Butuan in Mindanao and Hinundayan, Leyte. Felt moderately in the Provinces of Davao and Oriental Misamis. An aftershock at 4:05 was felt in Cantilan and Surigao.

14, 6^h 00^m [14, 2:00 P. M.] **Borongan, Samar.** Earthquake of intensity II.

14, 22^h 37^m 02^s* [15, 6:37:02 A. M.] **Mindanao.** Light earthquake in eastern and southern Mindanao. The epicenter was in the Netherlands East Indies.

16, 5^h 45^m [16, 1:45 P. M.] **Jolo.** Oscillatory earthquake of intensity IV and five seconds duration.

16, 6^h 59^m [16, 2:59 P. M.] **Butuan, Agusan.** Feeble oscillatory earthquake.

18, 23^h 56^m 07^s* [19, 7:56:07 A. M.] **S. Luzon, Mindoro and Marinduque.** Light earthquake felt in the Province of Batangas, at Naujan, Mindoro, and Boac, Marinduque. The epicenter was in Tayabas Bay.

19, 2^h 04^m [19, 10:04 A. M.] **Cantilan, Surigao.** Light earthquake.

21, 6^h 48^m [21, 2:48 P. M.] **Zamboanguita, Negros Oriental.** Light earthquake.

21, 8^h 47^m [21, 4:47 P. M.] **Butuan, Agusan.** Feeble oscillatory earthquake.

21, 20^h 05^m [22, 4:05 A. M.] **Malinao, Albay.** Moderate earthquake.

29, 19^h 28^m 23^s [30, 5:28:23 A. M.] **Agaña, Guam.** Earthquake recorded and felt. Another shock at 7:38 P. M. on the 31st.

31, 15^h 42^m 17^s [Sept. 1, 1:42:17 A. M.] **Agaña, Guam.** Earthquake recorded and felt.

INSTRUMENTAL RECORD

No.	Date	Phase	Time h.	Time m.	Time s.	Δ Km.	Remarks
529	1	PNEZ	6	29	45	2,880	Deep focus. Destructive in Kansu, China, according to Nanking.
		SNE		34	09		
		LNE		37	ca		
		F	7	33			
532	3	PNEZ	10	10	57?	1,145	In region of 24° 30′ N: 123° 30′ E by Taihoku and Manila.
		SNE		12	56		
		F		38			
533	3	PNEZ	17	49	36	175	
		SNE			58		
		F		55			
534	4	iPEZ	14	10	50	520	Compression from N. Felt in the Batanes Islands and in northern Luzon. 19° 10′ N: 120° 30′ E by Manila, Taihoku, Hong Kong, Chiufeng. Baguio, 310 Km.
		ePN			51		
		iSNEZ		11	54		
		F	16	02			
535	4	PNEZ	20	08	48	165	
		SNEZ		09	09		
		F		22			
536	5	PNEZ	14	15	37	860	Felt at Cantilan, Surigao. 9° 10′ N: 126° 35′ E by Manila and Butuan.
		SNE		17	10		
		F		43			
543	9	iPNEZ	16	08	20	520	Dilatation. Felt at Bangui, Ilocos Norte. 19° N: 119° 10′ E by Manila, Hong Kong, Nanking, Chiufeng.
		iSNE		09	21		
		F	17	30			
546	13	iPNEZ	20	04	39	980	Felt in northern and eastern Mindanao and in southern Leyte. 8° N: 127° E; H= 20:02:36. At Manila, compression from SE. S from the Wiechert. At Butuan, dilatation from E.
		iSNE		06	23		
		F	22	30			
550	14	PNE	22	37	02	1,330	Felt in southern and eastern Mindanao. From the Wiechert. Butuan, 560 Km.
		SNE		39	20		
		LNE		40	06		
		F	23	40			
554	17	P?NEZ	14	07	35	4,135?	Disturbed by microseisms.
		SNE		13	20		
		LN		18	ca		
		F	16	10			
556	17	iPNEZ	17	56	36	1,145	
		iSNE		58	43		
		F	19	35			
557	18	Pz	2	03	50	1,320	Disturbed by microseisms.
		SNE		06	13		
		F	3	06			
560	18	iPNEZ	23	56	07	150	Compression from SE. S from the Wiechert. Felt in southern Luzon, Marinduque and northern Mindoro. In Tayabas Bay by Manila and Baguio.
		SNE			26		
		F	0	35			
562	19	PNEZ	9	06	50	190	
		SNE		07	14		
		F		14			
564	21	PNEZ	3	14	48	145	
		SNEZ		15	06		
		F		25			
565	21	PNEZ	6	02	08	135	
		SNEZ			25		
		F		11			
566	21	PNEZ	8	47	44	1,000	
		SNE		49	30		
		F	9	22			
568	22	iPNEZ	6	53	26	1,155	Compression from NE. Felt all over Formosa. 22 25′ N: 121 35° E by Manila, Hong Kong, Zikawei, Phulien. H=6:51:36, h=75 Km. 22.2° N: 121.2° E by Taihoku.
		iSNE		55	26		
		F	10	30			
569	22	PNEZ	11	10	52	1,155	Aftershock of No. 568.
		SNE		12	52		
		F	13	00			
571	22	PNEZ	14	23	39	250	
		SNE		24	14		
		F		36			

INSTRUMENTAL RECORD—Continued

No.	Date	Phase	Time			Δ	Remarks
			h.	m.	s.	Km.	
576	23	iPz	21	17	56	2,870	Compression. Data after P from the Wiechert. Baguio, 3,035 Km. 5.8° N: 95.4° E, J. S. A. h=90; H=21:12:19. 5.2° N: 95° E according to Batavia. Destructive in Sumatra.
		iPNE			57	----------	
		SNE		22	26	----------	
		LNE		24	34	----------	
		F	23	05		----------	
579	28	iPz	6	46	40	3,610?	
		ePNE			40	----------	
		S?N		51	52	----------	
		F	7	35		----------	
581	30	PNEZ	17	00	21	3,155	
		SN		05	04	----------	
		F		39		----------	
582	30	PEZ	21	37	33	5,300	
		SNE		44	35	----------	
		F	22	08		----------	

Thirty-two insignificant or undecipherable disturbances on the following days of August: 1st, 2nd, 6th(2), 7th(2), 8th, 9th, 10th, 11th, 14th(3), 15th(2), 16th, 17th, 18th(2), 19th(2), 21st, 22nd(2), 23rd(3), 24th(2), 30th, and 31st(2).

SEPTEMBER, 1936

MACROSEISMIC RECORD

2, $13^h\ 00^m$ [2, 9:00 P. M.] **San Ildefonso, Ilocos Sur.** Light earthquake.

3, $11^h\ 20^m$ [3, 7:20 P. M.] **Narvacan, Ilocos Sur.** Light earthquake.

6, $12^h\ 10^m$ [6, 8:10 P. M.] **Cotabato, Cotabato.** Very light earthquake.

9, $13^h\ 50^m$ [9, 9:50 P. M.] **Janiuay, Iloilo.** A very short light shock.

15, $13^h\ 13^m\ 17^{s}$* [15, 9:13:17 P. M.] **Bangar, Ilocos Norte.** Moderate earthquake.

18, $9^h\ 53^m\ 57^{s}$* [18, 5:53:57 P. M.] **NE Mindanao.** Light shock reported from Butuan and Cantilan.

19, $9^h\ 49^m$ [19, 5:49 P. M.] **Cantilan, Surigao.** Strong earthquake.

21, $11^h\ 31^m\ 36^s$ [21, 9:31:36 P. M.] **Agaña, Guam.** Earthquake recorded and felt.

21, $22^h\ 20^m$ [22, 6:20 A. M.] **Lallo, Cagayan.** Moderate earthquake.

23, $22^h\ 26^m\ 07^{s}$* [24, 6:26:07 A. M.] **Lubuagan, Mountain.** Light earthquake.

25, $9^h\ 15^m$ [25, 5:15 P. M.] **Basco, Batanes.** Earthquake of intensity II and six seconds duration.

26, $3^h\ 03^m\ 47^s$ [26, 1:03:47 P. M.] **Agaña, Guam.** Earthquake recorded and felt.

27, $5^h\ 00^m$ [27, 1:00 P. M.] **Lallo, Cagayan.** Light earthquake.

INSTRUMENTAL RECORD

No.	Date	Phase	Time h.	m.	s.	△ Km.	Remarks
591	4	iPz	8	15	01	3,210	Japan.
		ePNE			01		
		iSNEZ		19	47		
		LN		24	ca		
		F	10	10			
592	5	iPz	21	50	30	2,580	
		ePNE			30		
		iSNEZ		54	33		
		F	22	45			
595	6	iPz	17	51	01	8,045	
		ePNE			01		
		SNE	18	00	32		
		LN		14	12		
		F	19	20			
596	7	P?EZ	12	36	24	2,755?	Disturbed by microseisms.
		SNE		40	40		
		LNE		43	15		
		F	13	20			
599	9	iPz	2	49	45	2,245	Compression from SE. Deep focus. Felt at Sorong, New Guinea.
		ePNE			45		
		iSNEZ		53	25		
		F	3	47			
606	12	PNEZ	18	01	27	1,155	Felt widely in Formosa. 24.4° N: 120.8° E according to Taihoku.
		SNE		03	36		
		LNE		05	ca		
		F	19	20			
611	15	PNZ	13	13	17	510	Felt at Bangui, northern Luzon.
		SNEZ		14	17		
		F		45			
612	15	P?E	14	01	51	2,890?	
		SNE		06	16		
		LNE		09	50		
		F		40			
615	17	P̄NEZ	2	54	36	140	
		S̄NEZ			54		
		F		59			
617	17	PNEZ	17	26	30	3,780	
		SNE		31	52		
		LNE		36	08		
		F	18	23			
619	18	PEZ	9	53	57	690	Felt at Butuan with feeble intensity; also at Cantilan.
		SNEZ		55	14		
		F	10	54			
621	18	PNEZ	18	43	57	3,160?	
		S?NEZ		48	40		
		F	21	10			
622	19	iPNEZ	1	07	16	3,245	Compression from SW. L from the Wiechert. 3.6° N: 97.3° E (Batavia). 4.3° N: 97.8° E; H=01:01:58, J. S. A.
		iSNEZ		12	04		
		LNE		15	30ca		
		F	5	05			
623	19	ePNEZ	6	36	13	3,455	Aftershock of No. 622.
		SNE		41	15		
		F	8	20			
624	19	P̄NEZ	8	36	27	165	
		S̄NE			48		
		F		53			
631	21	PNZ	16	39	54	3,635?	
		S?N		45	07		
		LE		50	06		
		F	17	30			
635	23	P̄NZ	22	26	07	200	
		S̄NE			32		
		F		32			
638	24	P?EZ	8	34	45	3,735?	Disturbed by microseisms.
		SN		40	04		
		LNE		44	20ca		
		F	9	13			
639	24	iPz	19	25	16	2,360	
		ePNE			16		
		SNE		29	04		
		F	20	15			

INSTRUMENTAL RECORD—Continued

No.	Date	Phase	Time	Δ	Remarks
			h. m. s.	Km.	
640	24	PNEZ	20 56 56	2,610	Felt in Szechwan, China, according to Nanking.
		SNE	21 01 01	----------	
		F	30	----------	
642	25	PPEZ	13 10 40	10,500	43.5° N: 128.2° W: 0=12:53:06 by U. S. C. G. S. 42.5° N: 131° W; H=12:53:30; h=80, J. S. A.
		PS(?)	18 32	----------	
		eNE	33 00ca	----------	
		LNE	37 30ca	----------	
		F	14 52	----------	

Forty-four insignificant or undecipherable disturbances on the following days of September: 1st(2), 2nd, 3rd(3), 6th(2), 7th, 8th, 10th(3), 11th(3), 12th, 13th, 14th(2), 16th(2), 17th, 18th(2), 19th(2), 20th(3), 21st, 23rd(4), 24th, 25th(2), 26th(3), 27th, and 29th(2).

OCTOBER, 1936

MACROSEISMIC RECORD

1, 10^h 35^m [1, 6:35 P. M.] **Guiuan, Samar.** Oscillatory earthquake of twelve seconds duration.

3, 6^h 00^m [3, 2:00 P. M.] **San Vicente, Ilocos Sur.** Light earthquake.

5, 6^h 10^m 04^{s*} [5, 2:10:04 P. M.] **W. Visayas.** Earthquake felt over all of Panay and Negros. Felt strongest at Tolong, Negros. The epicenter was in the sea, off the SW coast of Negros, near 9° 20′ N: 122° E.

7, 18^h 11^m 16^{s*} [8, 2:11:16 A. M.] **Ormoc, Leyte.** Oscillatory earthquake of fifteen seconds duration and intensity II. Ten seconds later there was a second shock of intensity IV.

8, 0^h 14^m 02^{s*} [8, 10:14:02 A. M.] **Agaña, Guam.** Earthquake recorded and felt.

8, 15^h 49^m [8, 11:49 P. M.] **San Mariano, Isabela.** Moderate earthquake. Repeated at 1:26 A. M. on the 9th.

8, 21^h 05^m 47^s [9, 7:05:47 A. M.] **Agaña, Guam.** Earthquake recorded and felt.

9, 5^h 24^m 21^{s*} [9, 1:24:21 P. M.] **Ormoc, Leyte.** Oscillatory earthquake of twenty seconds duration and intensity II.

10, 3^h 10^m 30^{s*} [10, 11:10:30 A. M.] **Davao, Mindanao.** Light earthquake felt at Davao and Compostela.

10, 6^h 13^m 50^{s*} [10, 2:13:50 P. M.] **Luzon, Mindoro and Marinduque.** Earthquake felt strongly at Naujan and feebly at Boac and Atimonan.

10, 6^h 26^m [10, 2:26 P. M.] **Davao, Davao.** Very light earthquake.

12, 20^h 34^m [13, 4:34 A. M.] **Butuan, Agusan.** Feeble earthquake reported by one person.

18, 7^h 40^m [18, 3:40 P. M.] **Bangui, Ilocos Norte.** Moderate earthquake.

21, 21^h 57^m [22, 5:57 A. M.] **Davao, Davao.** Light earthquake felt in the Penal Colony.

2, 4^h 05^m 25^{s*} [22, 12:05:25 P. M.] **Maasin, Leyte.** Earthquake of four seconds duration and intensity II.

23, 4^h 50^m [23, 12:50 P. M.] **Cotabato, Cotabato.** Earthquake of intensity III.

25, 0^h 06^m [25, 8:06 A. M.] **Maasin, Leyte.** Earthquake of three seconds duration and intensity II.

26, 23^h 29^m 15^{s*} [27, 7:29:15 A. M.] **Davao, Davao.** Earthquake of intensity II.

27, 11^h 15^m [27, 7:15 P. M.] **Pontevedra, Negros Occidental.** Slight earthquake.

27, 18^h 42^m [28, 2:42 A. M.] **Jolo, Sulu.** Earthquake of six seconds duration and intensity III.

29, 18^h 44^m 00^{s*} [30, 4:44:00 A. M.] **Agaña, Guam.** Very strong earthquake felt over all of the island of Guam. See especial account at end of this report.

30, 11^h 43^m 47^{s*} [30, 7:43:47 P. M.] **Kabankalan, Negros Occidental.** Light earthquake.

30, 19^h 39^m [31, 3:39 A. M.] **Davao, Davao.** Earthquake of intensity II.

INSTRUMENTAL RECORD

No.	Date	Phase	Time h.	Time m.	Time s.	Δ Km.	Remarks
650	2	PNEZ	2	51	34	460	Baguio, 280 Km.
		SNEZ		52	29		
		F	3	10			
653	3	iPNEZ	21	53	22	1,625	Dilatation from SE.
		iSNEZ		56	10		
		iLNE		57	35ca		
	4	F	0	05			
654	5	PEZ	0	05	00	9,390	Compression. N Component stopped at 21:35.
		SNE		15	33		
		F	1	05			
655	5	PNEZ	6	10	04	595	Dilatation. In the vicinity of 9° 20′ N: 122° E. Felt in SE Panay and S Negros.
		SNE		11	12		
		F	8	20			
656	5	iPNEZ	9	47	43	1,755	Compression from SE. Data after P from the Wiechert. Butuan, 810 Km. 1° N: 127° E according to U. S. C. G. S. 3° N: 126.4° E; h=100; H=9:44:34 by J. S. A.
		SNE		50	44		
		F	12	40			
658	5	PNEZ	20	22	13	2,780?	
		S?NE		26	30		
		F	21	00			
664	10	PNEZ	3	10	30	1,100?	S from the Wiechert. Disturbed by strong microseisms. Felt at Davao with intensity II.
		S?NE		12	30		
		F	4	20			
665	10	PNEZ	6	13	50	160	Felt feebly at Atimonan and Boac. S from the Wiechert. Disturbed by strong microseisms. Strong at Naujan, Mindoro.
		SNE		14	10		
		F		26			
667	13	PNEZ	6	35	59	1,535	Disturbed by microseisms.
		SNE		38	38		
		F	7	08			
669	16	iPz	12	03	49	4,690	Compression. Solomon Islands by Riverview and Manila.
		ePNE			50		
		SNE		10	07		
		LNE		16	30ca		
		F	13	02			
670	19	iPNEZ	12	08	23	1,900	Dilatation. In Maluco by Riverview and Manila. Disturbed by microseisms.
		SNE		11	41		
		F	13	15			
672	22	PNEZ	7	54	11	1,210	
		SNE		56	17		
		F	8	12			
676	23	PNEZ	4	15	17	1,235	
		SNE		17	25		
		F		42			
677	23	iPNz	6	36	17	8,290	61.1° N: 149.2° W: 0=6:24:21 by U. S. C. G. S. 60.8° N: 149.4° W; H=6:24:27, J. S. A.
		iSNE		46	00		
		L?NE		58	ca		
		F	9	40			
681	24	PEZ	16	08	07	3,045	
		SNE		12	42		
		LNE		14	25		
		F	17	05			
684	25	PNEZ	15	36	13	3,035	
		SNE		40	47		
		LNE		42	51		
		F	16	17			
685	26	ePNEZ	9	38	17	3,430	
		SNE		43	17		
		LE		46	50ca		
		F	10	30			
686	26	PNEZ	19	37	36	2,855	Deep focus.
		SNE		41	58		
		F	21	23			
687	26	PNEZ	23	29	15	1,155	Felt in Davao with intensity II.
		SNE		31	15		
	27	F	0	27			
689	29	PNEZ	18	44	00	2,820	Dilatation. Felt very strongly in Guam. Some damage to buildings.
		SNE		48	20		
		F	21	35			
692	30	PNEZ	9	07	13	975	
		SNE		08	57		
		F		37			

INSTRUMENTAL RECORD—Continued

No.	Date	Phase	Time	△	Remarks
			h. m. s.	*Km.*	
694	30	PNEZ SNE F	11 43 47 45 45 12 15	1,135	Felt at Davao with intensity II.
695	30	PNEZ SNZ F	17 19 21 24 00 18 20	3,100	

Twenty-five insignificant or undecipherable disturbances on the following days of October: 2nd, 3rd, 5th(2), 7th(2), 8th, 9th, 11th, 16th, 22nd(3), 23rd(3), 24th, 25th(2), 29th(2), and 31st(2).

NOVEMBER, 1936

MACROSEISMIC RECORD

3, 20^h 16^m 19^{s*} [4, 4:16:19 A. M.] **N. Luzon.** Moderate earthquake felt at Lallo, Cagayan and at Bangui, Ilocos Norte.

15, 23^h 53^m 59^{s*} [16, 7:53:59 A. M.] **Mindanao.** Light earthquake felt at Butuan, Agusan, and at Cantilan, Surigao.

16, 6^h 30^m [16, 2:30 P. M.] **Badajoz, Romblon.** Moderate earthquake.

17, 5^h 14^m [17, 1:14 P. M.] **Virac, Catanduanes.** Oscillatory earthquake of five seconds duration and intensity V.

17, 17^h 30^m [18, 1:30 A. M.] **Aritao, Nueva Vizcaya.** Light earthquake with a repetition at 11:50 A. M.

18, 14^h 24^m 51^{s*} [18, 10:24:51 P. M.] **Ormoc, Leyte.** Oscillatory earthquake of thirty seconds duration and intensity VI. An aftershock at 5:50 A. M. on the 19th and still another at 6:10 A. M.

19, 22^h 00^m [20, 6:00 A. M.] **Samar.** Earthquake felt strongly at Tinambacan and moderately at Calbayog.

20, 3^h 00^m 19^{s*} [20, 11:00:19 A. M.] **SE. Luzon.** Earthquake of 10 seconds duration and intensity IV at Virac. Intensity II at Naga. One aftershock at Virac six seconds after the first.

25, 6^h 53^m 46^{s*} [25, 2:53:46 P. M.] **NE. Mindanao.** Light earthquake felt at Cantilan, Surigao, and Butuan, Agusan.

27, 20^h 10^m [28, 4:10 A. M.] **Cagayan, Misamis Oriental.** Earthquake of intensity III.

29, 6^h 00^m [29, 2:00 P. M.] **Cantilan, Surigao.** Light earthquake.

30, 2^h 51^m 59^{s*} [30, 10:51:59 A. M.] **W. Luzon.** Earthquake of intensity II felt in Manila. Felt lightly at San Antonio, Zambales.

INSTRUMENTAL RECORD

No.	Date	Phase	Time h.	m.	s.	△ Km.	Remarks
701	1	P?NEZ	17	15	34	3,022?	
		SN		20	07		
		F	18	30			
702	2	$\overline{\text{P}}$EZ	4	59	24	175	
		$\overline{\text{S}}$NE			46		
		F	5	03			
703	2	iPNZ	15	05	49	4,700	Compression.
		ePE			49		
		SNE		12	06		
		F	18	25			
704	2	iPNEZ	20	52	06	3,065	Japan. Compression. S from the Wiechert. Baguio, 2855. 37.5° N: 142° E by U. S. C. G. S.
		SNE		56	54		
	3	F	0	45			
706	3	PNEZ	20	16	19	560	Felt in Northern Luzon.
		SNE		17	24		
		F		40			
707	4	P?NEZ	7	30	48	4,020?	Disturbed by microseisms.
		SNE		36	26		
		LE		41	ca		
		MNE		44	ca		
		F	8	26			
708	4	PNEZ	9	20	49	4,980	
		SNE		27	24		
		F		55			
709	4	iPz	13	49	55	2,610	Compression. Deep focus.
		ePNE			55		
		iSNE		54	00		
		F	14	45			
710	5	P?NE	7	41	49	2,180?	Disturbed by microseisms.
		SNE		45	24		
		F	8	40			
711	6	PNZ	12	18	32	440	Disturbed by microseisms. S from the Wiechert. Baguio, 260±.
		SNE		19	26		
		F		35			
713	12	iPz	2	21	01	3,345?	Disturbed by microseisms.
		ePNE			01		
		S?NE		25	55		
		F	3	10			
714	12	iPz	8	33	30	2,665	Dilatation. Felt in Guam. Deeper than normal.
		SE		37	49		
		F	9	23			
716	13	iPNEZ	12	40	44	6,220	Compression from SE. 57° N: 163° E; 0=12:31:30 by U. S. C. G. S.
		iSNE		48	32		
		iN		49	54		
		iLN		58	15		
		F	15	50			
717	14	PNEZ	2	04	06	255	Baguio, 190 Km.
		$\overline{\text{S}}$NE			42		
		F		12			
722	15	PNEZ	22	00	40	6,900	
		SE		09	06		
		F	23	20			
724	16	iPz	23	35	40	2,390	
		ePN			40		
		SNE		39	30		
	17	F	0	55			
727	19	PNEZ	21	29	46		Disturbed by microseisms. 14° N: 91° W by U. S. C. G. S.
		iSNE		33	29		
		F	23	40			
728	20	PNEZ	3	00	19	430	Felt at Virac with intensity IV and at Naga with II.
		SNE		01	11		
		F		07			
732	24	PNEZ	22	41	10	245	Probably off east coast of northern Luzon by Baguio and Manila.
		$\overline{\text{S}}$NE			44		
		F	23	05			
733	25	P?NEZ	6	53	46	850?	Disturbed by microseisms. Felt at Cantilan, Surigao.
		SNE		55	18		
		F	7	20			

INSTRUMENTAL RECORD—Continued

No.	Date	Phase	Time	Δ	Remarks
			h. m. s.	Km.	
734	25	PEZ	11 50 50	4,235	Disturbed by microseisms.
		SNE	56 40		
		F	12 26		
735	26	PEZ	8 27 44	2,620	Do.
		SNE	31 50		
		F	9 15		
737	27	PNEZ	10 07 56	295	Trace in Baguio.
		SNE	08 36		
		F	24		
740	29	PNEZ	8 36 50	6,465?	Disturbed by microseisms. 26° S: 167° E by Wellington.
		S?NE	44 50		
		F	9 30		
743	29	PNEZ	22 52 02	960	Disturbed by microseisms.
		SNE	53 44		
		F	23 56		
744	30	i$\overline{\mathrm{P}}$NEZ	2 51 59	90	Dilatation from SE. Deeper than normal. Felt in Manila with intensity II.
		i$\overline{\mathrm{S}}$NEZ	52 41		
		F	3 10		
746	30	PNEZ	23 49 50	200	Compression. Probably near Baguio by Manila and Baguio.
		SNE	50 15		
	Dec. 1	F	1 30		

Twenty-two insignificant or undecipherable disturbances on the following days of November: 1st(3), 3rd, 11th, 12th, 14th(3), 15th(2), 18th, 19th, 21st, 22nd(2), 26th, 28th(2), 29th(2), and 30th.

DECEMBER, 1936

MACROSEISMIC RECORD

2, 19^h 18^m 20^s* [3, 3:18:20 A. M.] **N. Luzon.** Earthquake felt strongly at Lallo, Cagayan, and moderately in Ilocos Norte and Isabela provinces.

3, 6^h 08^m 11^s* [3, 2:08:11 P. M.] **N. Luzon.** Moderate earthquake felt at Bontoc, Sagada and Mt. Data in the Mountain Province. Felt slightly at Narvacan, Ilocos Sur.

3, 18^h 03^m [4, 2:03 A. M.] **Baler, Tayabas.** Earthquake of nine seconds duration and intensity V. It was preceded by a rumbling sound.

3, 19^h 16^m [4, 3:16 A. M.] **Aparri, Cagayan.** Light earthquake of eight seconds duration.

4, 6^h 09^m [4, 2:09 P. M.] **Baguio, Mountain.** Light earthquake.

5, 3^h 29^m 24^s* [5, 11:29:24 A. M.] **Cabalian, Leyte.** Strong earthquake.

7, 16^h 28^m 21^s* [8, 0:28:21 A. M.] **N. Luzon.** Earthquake felt strongly at Lallo and lightly at Aparri, Cagayan.

8, 10^h 25^m 56^s* [8, 6:25:56 P. M.] **Leyte, Cebu, and N. Mindanao.** Earthquake felt very strongly at Ormoc causing a panic among the people. Felt as far as Cantilan and Surigao to the east and Cebu to the west. The center was probably in Ormoc Bay.

11, 3^h 41^m [11, 11:41 A. M.] **Baguio, Mountain.** Light earthquake.

13, 21^h 36^m 01^s* [14, 7:36:01 A. M.] **Agaña, Guam.** Earthquake of intensity VII.

14, 4^h 04^m 03^s* [14, 12:04:03 P. M.] **Luzon.** The center of the earthquake was in the China Sea off the mouth of Manila Bay. Felt throughout the provinces of southern and western Luzon. Several shocks felt on Corregidor Island.

14, 2^h 19^m 32^s [14, 12:19:32 P. M.] **Agaña, Guam.** Earthquake of intensity III. Aftershocks at 3:50 P. M. and 6:42 P. M. on the 15th.

15, 13^h 41^m 37^s* [15, 9:41:37 P. M.] **Aroroy, Masbate.** Moderate earthquake.

18, 3^h 25^m 10^s* [18, 11:25:10 A. M.] **Luzon.** Earthquake of moderate intensity felt in Manila and in Cavite Province.

20, 18^h 35^m 09^s* [21, 2:35:09 A. M.] **Butuan, Agusan.** Earthquake of short duration.

21, 3^h 41^m 34^s* [21, 11:41:34 A. M.] **N. Luzon.** Moderate earthquake felt in Ilocos Sur and at Lubuagan and Mt. Data in the Mountain Province. Epicenter in the China Sea.

22, 17^h 00^m [23, 1:00 A. M.] **Barcelona, Sorsogon.** Moderate earthquake.

26, 4^h 00^m [26, 12:00 P. M.] **Tabaco, Albay.** Strong earthquake.

26, 13^h 34^m [26, 9:34 P. M.] **Catbalogan, Samar.** Oscillatory earthquake of five seconds duration and intensity III.

26, 15^h 26^m 02^s* [26, 11:26:02 P. M.] **SE. Luzon.** Earthquake felt with intensity V at Virac and Legaspi. Twelve seconds later there was an aftershock at Virac. Twelve minutes later there was an aftershock at Legaspi. Other aftershocks were felt at Legaspi at 0:26 A. M. and 0:29 A. M. on the 27th.

28, 9^h 00^m [28, 5:00 P. M.] **Butuan, Agusan.** Perceptible earthquake of five seconds duration.

INSTRUMENTAL RECORD

No.	Date	Phase	Time h.	m.	s.	Δ Km.	Remarks
747	1	iPNEZ	6	13	08	1,800	Deep focus.
		iSNE		16	12		
		F	7	24			
750	2	PNEZ	19	18	20	470	Felt in northern and northwest Luzon. Disturbed by microseisms.
		SNE		19	16		
		F		26			
751	3	PNEZ	6	08	11	280	Felt at Narvacan, Ilocos Sur. Disturbed by microseisms. 16° 55′ N: 119° 55′ E by Baguio and Manila.
		SNE			49		
		F		20			
755	6	PNEZ	6	09	36	1,780	
		SNE		12	38		
		F		51			
756	7	ePNEZ	16	28	21	460	Felt at Aparri and Lallo. Baguio, 230 Km. Probably slightly deeper than normal.
		iSNEZ		29	16		
		F		53			
759	8	iPNEZ	10	25	56	580	Compression. Felt strongly at Ormoc, Leyte. Also at Hinundayan, Leyte. Butuan, 240 Km. Center probably in Ormoc Bay.
		SNE		26	02		
		F	12	20			
761	8	PNEZ	13	59	56	2,210	Dilatation.
		SNEZ	14	03	34		
		F		50			
762	8	PNE	17	47	34	2,500?	
		S?N		51	32		
		F	18	22			
766	11	$\bar{P}$NE	21	19	57	195	
		$\bar{S}$NE		20	22		
		F		34			
767	12	PNEZ	8	03	36	1,320	Compression.
		SN		05	53		
		F	9	10			
768	13	PNEZ	11	02	31	390	
		SNEZ		03	19		
		F		16			
770	13	iPNEZ	16	15	09	775?	Do.
		S?NE		16	34		
		F	17	03			
771	13	iPEZ	21	36	01	2,680	Compression. Felt in Guam with intensity VII.
		ePN			01		
		iSNE		40	11		
		LNE		42	ca		
		F	23	45			
772	14	i$\bar{P}$NEZ	4	04	03	150	Dilatation from SW. Probably 14° 16′ N: 119° 47′ E by Manila and Baguio as on April 10, 1932. Felt in southwestern Luzon. $\bar{S}$ from the Horizontal Pendulums.
		iSE			21		
		F	5	30			
775	15	PNEZ	13	41	37	370	Felt at Aroroy, Masbate.
		SNE		42	24		
		F	14	02			
777	18	i$\bar{P}$NEZ	3	25	10	120	Compression from SW. Felt in Manila and in Cavite Province. $\bar{S}$ from the Horizontal Pendulums.
		i$\bar{S}$NE			25		
		F		36			
779	20	PNEZ	18	35	09	3,390	
		SNE		40	06		
		F	19	20			
780	21	iPNEZ	3	41	34	320	Compression. Felt at Vigan and Narvacan. Epicenter in China Sea. Deeper than normal.
		iSNE		42	16		
		F	4	00			
781	21	PNEZ	19	19	18	6,090	53.1° N: 132.2° W, U. S. C. G. S.
		SNE		26	56		
		F	20	40			
783	24	PNEZ	10	09	42	2,230?	Disturbed by microseisms.
		S?NE		13	21		
		F	11	07			
784	24	PNEZ	13	22	47	3,820?	Do.
		S?NE		28	12		
		F	14	55			

INSTRUMENTAL RECORD—Continued

No.	Date	Phase	Time h. m. s	△ Km.	Remarks
786	24	PNEZ SNEZ F	19 28 54 29 21 20 00	210	Disturbed by microseisms. Baguio, 150 Km.
788	26	PNEZ iSN F	15 26 02 54 16 25	430	Felt in southeastern Luzon.
790	26	iPz SNE	23 04 06 14 12	8,890	Compression.
791	27	ePEZ SE F	0 20 09 25 00 1 40	3,100	No. 790 still recording. No record on N Component. Japan.
798	28	PNEZ SNE F	17 26 58 30 12 18 03	1,920	
800	29	iPNEZ SNE F	14 55 04 15 00 31 18 30	3,800	Compression from SE. 7° S: 147° E by Riverview and Manila.
803	30	PNEZ SNE F	4 13 22 17 06 5 15	2,300	
804	30	PNEZ SNE F	8 34 16 37 54 9 00	2,210	

Thirty-one insignificant or undecipherable disturbances on the following days of December: 1st(2), 5th(3), 7th(2), 8th, 10th(2), 11th, 13th, 14th, 15th, 17th, 19th, 22nd, 24th, 25th, 26th, 27th(5), 28th, 29th(2), 30th, and 31st(2).

THE GUAM EARTHQUAKE OF OCTOBER 30, 1936

On October 30, 1936, at 4:39 A. M., 150^{m} meridian time, the island of Guam was severely shaken by an earthquake which was the strongest since 1902. The seismograms of the preceding days did not show any forerunners of the shock.

THE MAIN SHOCK.—The shock began abruptly, was perceived as a twisting motion and lasted for about one minute. Mr. Rowley, who had been the seismic observer in Guam for twenty years, judged the first shock to have been of intensity VIII of the Rossi-Forel scale. He enumerated the effects as follows: the earthquake was felt by everyone on the island: the church bell is said to have rung: the church tower clock stopped: plaster fell, walls cracked and some tile fell: glasses, dishes, etc. were broken: electric fans were thrown from shelves: the electric light service was deranged for a time. The report of the Governor to the Navy Department in Washington stated that two persons were slightly injured. Some parts of the seismograph, a Weichert Inverted Pendulum, 200 kg., were broken and the pendulum was thrown off balance.

RECORDED AFTERSHOCKS.—For a period of about one hour and half one pen remained on the paper and, in spite of the disabled condition of the instrument, forty one disturbances of various intensities, mostly very small, were recorded. The observer, Mr. Aflague, then removed the record to replace the broken parts. At 3:34 P. M. the seismograph again began to function, but it was not yet in perfect balance. The daily distribution of recorded aftershocks was as follows:

October 30, 4:39 a. m. to 6:00 a. m.	41
October 30, 3:34 p. m. to midnight	21
October 31,	58
November 1,	44
November 2,	58
November 3, 0^{h} a. m. to 6:13 a. m.	11
November 3–4, 7:00 a. m. to 7:00 a. m.	14
November 4–5, 7:00 a. m. to 7:00 a. m.	13
November 5–6, 7:00 a. m. to 7:00 a. m.	10
November 6–7, 7:00 a. m. to 7:00 a. m.	7
November 7–8, 7:00 a. m. to 7:00 a. m.	11
November 8–9, 7:00 a. m. to 7:00 a. m.	9
November 9–10, 7:00 a. m. to 7:00 a. m.	4
November 10–11, 7:00 a. m. to 7:00 a. m.	13
November 11–12, 7:00 a. m. to 7:00 a. m.	6
November 12–13, 7:00 a. m. to 7:00 a. m.	74
November 13–14, 7:00 a. m. to 7:00 a. m.	19
November 14–15, 7:00 a. m. to 7:00 a. m.	15
November 15–16, 7:00 a. m. to 7:00 a. m.	4
November 16–17, 7:00 a. m. to 7:00 a. m.	11
November 17–18, 7:00 a. m. to 7:00 a. m.	1
November 18–19, 7:00 a. m. to 7:00 a. m.	4
November 19–20, 7:00 a. m. to 7:00 a. m.	3
November 20–21, 7:00 a. m. to 7:00 a. m.	4
November 21–22, 7:00 a. m. to 7:00 a. m.	3
November 22–23, 7:00 a. m. to 7:00 a. m.	2
November 23–24, 7:00 a. m. to 7:00 a. m.	8
November 25–26, 7:00 a. m. to 7:00 a. m.	2
November 26–27, 7:00 a. m. to 7:00 a. m.	4
Total	474

This list does not differentiate between strong and weak shocks. It includes all from the first and strongest shock down to the smallest. On November 12 at 6:28 P. M. there was an aftershock of intensity VI and this prolonged the series of smaller disturbances.

PERCEPTIBLE AFTERSHOCKS.—On November 13 the Manila Observatory received a radio report from Guam which stated that a total of 307 shocks had been felt since the first shock on October 30. The heavy aftershock on November 12 was followed by 51 perceptible shocks in twenty-four hours. Slight additional damage was caused to buildings.

THE EPICENTER.—The epicenter has been placed, at least tentatively, at 12° 45′ N: 145° 30′ E and the time at focus at 18^h 38^m 36^s, Greenwich Mean Time, October 29th. This determination is based on the fact that most, if not all, of the strong shocks in Guam have originated in the Nero Deep. Furthermore, the distance of the October 30th shock from Guam, based on the S–P interval of several aftershocks, was about 50 kilometers. This distance places the epicenter on the NW side of the Nero Deep. Only a few seismic reports have been received, at the time of writing, from foreign observatories. The results, together with Manila data, are as follows:

Observatory	Distance	Time	P-O
Manila	23° 51′	18 44 00	0
Taihoku	25° 45′	18 44 14	— 4
Zikawei	28° 50′	18 44 34	—14
Nanking	31° 12′	18 45 01	— 8
Hong Kong	31° 18′	18 45 08	— 2
Chiufeng	37° 36′	18 45 48	—14
Phu-lien	37° 58′	18 46 07	+ 3
Riverview	46° 51′	18 47 32	+17
Pasadena	89° 8′	18 51 37	— 2
Ksara	98° 36′	18 52 26	0
Strasbourg	108° 12′	18 57 23	PP. — 9

The negative residuals of Zikawei, Chiufeng, Nanking, and Strasbourg may be indications of a focal depth greater than normal. The only evidence for this at Manila is the distinct S-phase on one component of the Wiechert Inverted Pendulum.

NUMBER OF EARTHQUAKES FELT IN THE PHILIPPINES, FROM 1903 TO 1936

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903	12	5	8	8	15	13	9	24	10	12	17	8	141
1904	22	10	10	9	6	8	11	5	11	15	4	6	117
1905	14	8	12	11	10	8	12	10	11	16	8	12	132
1906	13	6	5	12	6	11	9	9	9	11	5	7	103
1907	13	7	10	14	22	17	14	16	5	5	15	7	145
1908	17	6	11	6	13	9	5	11	8	10	15	11	122
1909	11	8	9	13	12	5	12	12	14	10	5	9	120
1910	13	13	14	12	23	18	22	8	12	21	23	17	196
1911	12	14	21	13	17	15	13	27	29	19	16	18	214
1912	14	21	28	16	15	18	22	15	15	14	12	12	202
1913	9	18	25	5	15	15	12	13	11	7	8	10	148
1914	15	17	12	10	5	11	14	12	13	10	13	14	146
1915	11	14	12	11	14	15	18	12	12	14	12	14	159
1916	13	15	12	7	8	8	15	18	20	15	7	5	143
1917	6	11	13	12	11	11	7	12	12	17	21	13	146
1918	12	17	8	12	19	11	16	14	11	13	20	14	167
1919	12	11	16	8	8	16	17	15	13	11	11	13	151
1920	19	11	12	7	15	10	8	18	8	18	12	9	147
1921	9	7	10	7	20	16	16	13	17	19	15	15	164
1922	15	12	16	13	21	15	13	14	11	14	17	11	172
1923	6	9	20	17	10	6	18	10	19	16	25	14	170
1924	11	12	15	14	15	8	13	14	15	13	7	12	149
1925	17	18	15	18	15	20	13	10	18	24	18	18	204
1926	23	16	11	13	13	4	13	12	7	18	10	18	158
1927	16	14	7	14	11	22	12	8	10	9	20	10	153
1928	11	14	11	15	7	15	6	9	5	5	7	9	114
1929	18	12	12	18	18	9	25	11	14	12	23	15	187
1930	10	13	11	9	10	8	10	15	17	14	9	7	133
1931	18	16	24	20	22	17	22	13	12	19	11	19	213
1932	17	17	18	19	19	16	8	37	16	15	12	20	214
1933	15	32	15	13	13	13	6	19	16	7	11	8	168
1934	12	8	5	16	14	8	14	13	12	18	14	15	149
1935	14	11	11	9	20	11	11	10	26	42	28	18	211
1936	13	11	18	13	4	6	18	16	11	22	16	23	171

NUMBER OF SEISMIC DISTURBANCES RECORDED AT MANILA, FROM 1903 TO 1936

Year	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.	Total
1903	21	20	13	15	16	6	16	16	8	13	9	14	167
1904	15	19	11	19	17	35	25	18	16	26	18	18	237
1905	30	23	18	22	22	29	28	9	24	26	14	29	274
1906	30	17	22	27	13	35	11	14	14	86	21	26	316
1907	16	12	21	32	35	17	19	15	21	14	43	14	259
1908	16	14	23	15	20	12	14	15	9	108	25	24	295
1909	21	24	24	22	25	14	26	15	20	6	13	7	217
1910	20	17	20	17	17	21	19	11	12	18	15	29	216
1911	16	19	30	22	24	30	31	35	30	28	28	22	315
1912	27	16	30	24	23	35	27	35	20	20	31	34	322
1913	44	20	37	61	42	25	22	41	36	24	13	6	371
1914	22	35	30	48	25	23	24	20	22	26	32	22	329
1915	27	19	21	32	38	33	28	28	30	24	27	31	338
1916	37	46	43	38	37	28	31	28	31	39	22	17	397
1917	31	27	27	35	47	34	39	33	27	43	38	25	406
1918	62	35	32	30	22	37	64	68	45	34	48	53	530
1919	37	31	42	44	47	45	42	23	48	20	24	17	420
1920	30	35	17	25	48	40	30	34	32	47	15	19	372
1921	19	23	37	20	80	35	42	25	40	19	24	27	391
1922	41	25	20	41	50	33	33	46	39	32	24	37	421
1923	16	42	34	31	49	20	38	35	46	30	53	22	416
1924	24	31	27	48	74	26	33	30	59	24	20	23	419
1925	36	27	34	28	77	43	26	22	35	38	97	35	498
1926	30	20	32	23	29	41	27	52	34	38	29	22	377
1927	27	28	24	36	39	36	36	32	16	33	32	13	352
1928	24	25	31	27	29	97	18	34	33	22	33	35	408
1929	67	41	46	35	39	74	51	43	32	28	45	47	548
1930	32	39	61	54	93	58	29	48	67	85	39	39	644
1931	77	74	86	63	76	70	97	37	62	65	51	49	807
1932	49	56	44	71	55	66	60	61	109	93	52	60	776
1933	71	78	84	63	83	85	75	94	69	44	40	48	834
1934	52	93	56	68	78	81	77	78	52	34	93	94	856
1935	71	90	75	80	138	100	82	71	67	93	45	77	989
1936	61	70	63	106	104	73	51	56	65	48	49	60	806

1903. Installation of Vicentini Seismograph.
1907. Installation of Horizontal Pendulums.
1911. Installation of Weichert 1,000 Kg. Inverted pendulum.
1930. Installation of Galitzin-Wilip Seismographs. Three components.