

No. 43.

1937.

Geodætisk Institut

Proviantgaarden, Copenhagen, Denmark.

Bulletin
of the seismological station

KØBENHAVN

$\varphi = 55^{\circ}41' \text{ N.}$ $\lambda = 12^{\circ}27' \text{ E.}$ $h = 13 \text{ m.}$

Lithologic foundation: chalk.

No. 43. July—Sept. 1937.

Instruments:

Galitzin-Wilip seismographs.

Constants:

Component	<i>l</i>	<i>A</i> ₁	<i>T</i> ₁	μ^2	<i>T</i>	<i>k</i>
	cm	cm	sec		sec	
<i>N</i>	12.5	100	12.61	0.0	12.7	103
<i>E</i>	12.5	100	12.65	0.1	12.9	103
<i>Z</i>	14.5	100	11.55	0.1	10	95

Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	<i>T</i>	ν	ϱ	<i>V</i>
	sec		mm	
<i>N</i>	9.6	4.6	0.3	220
<i>E</i>	9.6	4.5	0.4	195
<i>Z</i>	5.6	4	0.1	155

Milne-Shaw seismographs, *E* component, with the approximate constants $T = 12^s$ $\nu = 20$ $V = 300$.

N component, $T = \text{ca. } 17^s$.

Benioff vertical seismograph, $T_1 = \frac{1}{4}^s$ $T = 1^s$.

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No.	Date	Hour	Forerunners				L	Un-defined	△	Remarks
			P	S						
	1937 July		m s	m s	h m s	m s	h m	h m	°	
1	1	6					.7			
2	1	9					69			
3	1	12	2 15	i 12 36	2 43	13 24	.5		83	Preceding movement disturbed. P+. West of Sumatra. Coral Sea.
4*	2*	2			56 29	59 1*	99			
5	2	22					.1			
6	3	4					.8			
7	3	16					.0			
8	3	17					11			
9*	4*	6			14 50	18 8	48			Coral Sea.
10	4	7			0 43		33			» » Superposed on preceding [shock.
11	4	7			47 46	49 15	83			Coral Sea. Superposed on preceding [shock.
12	5	0					21			
13	5	2					.3			
14	5	23			i 57 57					Read on Benioff Z.
15	6	7					2			
16	8	13			15.3		.6			No Galitzin records.
17	9	17			45 3	46 4				e _E 51 ^m 20 ^s , 52 ^m 12 ^s , 53 ^m .5.
18	10	21			1 16	7.7	33			PS 10 ^m .1. SS 16 ^m .0. Celebes.
19	11	13	51 51	62 4			1.4		82	East of Japan.
20	11	17			43 15		1.1			Disturbed.
21	12	0			25 1*		.6			
22	12	12					24			
23	14	22	40 34	50 45	50 55		60		81	P+. East of Japan.
24	15	19	i 14 19	23 10					67	P+. Sea of Okhotsk. Deep focus.
25	16	10		41 0*			1.0			East of Japan. Small preceding [movement.
26	17	17					18			
27	17	19			3.3		.3			
28	18	1			21.8		.6			
29	19	3			13 53	23.5	.9			
30	19	9					1.7			Preceding movement disturbed.
31*	19*	19	48 11	i 58 54	48 54	i 58 26				Ecuador. Deep focus.
32	20	7	4 30	7 0*			8		13	Yugoslavia.
33	21	0					.6			Faint.
34	21	16					.7			
35	22	13			32.9		.7			
36*	22*	17	i 19 31	27 30	21 42	31 33			58	Alaska.
37	23	0					.4			
38	23	7		29 40			.8			Alaska.
39	23	20	54 1*	58 34			62		26	Afghanistan.
40	25	13	23 33				.7			Alaska.
41*	26*	3	59 41	i 70 8	60 3	i 69 55			85	Mexico. Deep focus.
42	26	8								Disturbed.
43	26	18			5 19	6 5				e _N 9 ^m .7.
44*	26*	20	8 22	18 7	11 20	18 35	.5		77	Japan.
45	30	14			17 9		1.3			Disturbed.
46	31	11					.5			»

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			P	S						
47*	1937 July 31*	20	<i>m s</i>	<i>m s</i>	<i>h m s</i>	<i>m s</i>	<i>h m</i>	<i>h m</i>	°	China.
48*	Aug. 1*	10	<i>i</i> 46 48	55 49	49 25	58.8	68		69	China.
49	2	10	52 4	61 5	54 41	62 5	73		69	Italy.
50	2	15	27 47	31.2			33		19	Kurile Islands.
			57 2	66 13	57 25		80		70	
51	3	18					13			
52	3	22					.7			
53	3	23					.8			
54	4	14					.6			
55	4	23	47 31	57 33	47 49	57 54	1.3		80	$P+$. e_E 58 ^m 48 ^s , North of Sumatra.
56*	5*	15			2.6	4 1	.6			
57	7	21					.6			
58	7	23					.5			
59	8	5	<i>i</i> 7 36		23		25			Tien-Shan.
60	8	11					.0			
61	8	16					.2			
62	9	13					.4			
63	9	15					.4			Some preceding movement.
64	9	20					.1			Faint.
65	10	16					.8			
66*	11*	1	<i>i</i> 8 54		11 7	13 19				Off Java. Deep focus.
67	12	1					.3			
68	13	1					.2			Faint.
69	13	12			8		1.1			
70	15	4	39 45	50 4			69		83	$P+$. Luzon.
71	15	11	<i>i</i> 46 55				1.1			Burma.
72	17	13	<i>i</i> 22 22	32 39			53		83	$P+$. Pacific Ocean.
73	18	5					.9			Small preceding movement.
74	18	9					.2			
75	18	15		25.7			35			Atlantic Ocean.
76*	20*	6	51 26		54.7	62 1*				Indian Ocean.
77	20	12	12 12	22 41	15.8		35		85	$P+$. Luzon. L_R 44 ^m , very large.
78	21	23	14 29	24 50			45		83	$P-$. East of Japan.
79	22	2			37.2		1.1			
80	22	11	42 1				1.0			Atlantic Ocean.
81	23	3					.5			
82	23	17			.0		.9			
83	24	18			47 24	50 23	99			51 ^m 7 ^s . Tonga Islands region.
84	24	23			14 21		23			
85	25	22					.7			
86	26	16					.5			Faint.
87	26	19	<i>i</i> 6 12	16.4			33		82	Japan.
88	26	23			54 53		60			
89	27	14					.9			
90	29	7					.9			Faint.
91	29	18					.6			
92	31	2			50 34	51 37	1.6			e 48 ^m 11 ^s , small, not quite certain.
93	31	14	25 56	34 43	35 57	39.0	48		77	$P-$. e_N 42 ^m .0. Burma.

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No.	Date	Hour	Forerunners				L	Un-defined	△	Remarks
			P	S						
	1937 Sept.		<i>m s</i>	<i>m s</i>	<i>h m s</i>	<i>m s</i>	<i>h m</i>	<i>h m</i>	°	
94*	1*	8			<i>i</i> 58 36	62 37				Northeast of New Zealand.
95	1	18					.5			
96*	1*	22			1 5		.9			Northeast of New Zealand.
97*	3*	18	<i>i</i> 59 31	<i>i</i> 68 47			79		75	Aleutian Islands.
98	3	23					.2			
99	4	6			33.9	36 41	1.2			<i>e</i> _N 37 ^m 36 ^s .
100	5	21					.8			Faint.
101*	8*	0			59.6	65 13	1.4			South Atlantic.
102	9	17			<i>i</i> 40 31					Read on Benioff Z.
103	10	0					.2			Faint.
104	14	2					.5			»
105	15	0					.8			
106*	15*	12			46 35	48 42	82			Solomon Islands region.
107	16	0	1 33		4.9	11 55	25			SS 17 ^m .7. SSS 21 ^m .9. Off Guatemala.
108	16	16			<i>i</i> 30 58	33 40				On Benioff Z only.
109	17	9			60.3		1.4			Forerunners disturbed.
110	17	12						26		Faint.
111	19	16					33			
112	20	7			20 17	27 22	45			
113	20	15					.8			
114	21	8			7.9		.4			
115	21	9			58.2	64 18	1.5			<i>e</i> 66 ^m 44 ^s .
116	21	21					.6			
117	22	3			35.2		.9			
118*	23*	13			24 53	26 21	58			Solomon Islands.
119	25	4	35 22	40.2			41		28	Atlantic Ocean.
120*	27*	9	9 5	20 41	19 41	20 7				Java.
121	27	12					.1			
122	27	20					44			
123	28	6	33.6		44.2	45.4	1.0			Guatemala.
124	28	13			35.5	41 34	69			
125	28	18			42.9		63			Guatemala.
126	29	12					8			
127	30	21			53 42	54 20	1.0			

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NOTES

- No. 4. July 2. 2^h. Coral Sea; $\Delta = \text{ca. } 130^\circ$. P' 56^m29^s clearly marked on Z . PP 59^m1^s. PKS 60^m0^s, large and clearly marked on N and E . Later phases small, not clearly marked. e 72^m.1. SS 76^m.5. L 99^m.
- No. 9. July 4. 6^h. Coral Sea; $\Delta = \text{ca. } 130^\circ$. P'_Z 14^m50^s. PP 17^m.0, e_E 17^m15^s. e_Z 17^m54^s. PKS 18^m8^s. e_E 20^m11^s. e_{NE} 21^m15^s. e_N 22^m38^s. SS 34^m.3.
- No. 31. July 19. 19^h. Ecuador; $\Delta = 92^\circ$. Depth about 170 km. iP_Z 48^m11^s, condensation. $pP_{E,Z}$ 48^m54^s, large. $e_{E,Z}$ 51^m17^s. PP 51^m49^s. pPP 52^m27^s. $iSKS$ 58^m26^s and iS 58^m54^s large. pS 59^m40^s; $e_N(SP)$ 60^m10^s. sPS_Z 61^m9^s. L small.
- No. 36. July 22. 17^h. Alaska. iP 19^m31^s (+ 2.9, x, - 3.4; - 2.9, x, + 4.8). (P_eP) 19^m58^s. PP_Z 21^m42^s; 58^s. PPP 23^m8^s. S preceded by movement of long period, e_E 26^m.8, e_N 27^m.0, e_{S_N} 27^m30^s, e_{S_E} 27^m40^s, e_E 27^m47^s. S followed by large oscillations. SS_N 31^m33^s, increasing oscillations. e_E 34^m.0, SSS or L_Q ? L_R 37^m.
- No. 41. July 26. 3^h. Mexico. Depth about 80 km. iP 59^m42^s (+ 0.8, - 2.0, - 5.3; - 1.1, + 2.9, + 8.7), preceded by a small pulse on Z , 59^m41^s. pP 60^m3^s. PP 62^m52^s; (pPP) 63^m19^s; (sPP) 63^m40^s. e_N 64^m26^s, e_E 65^m21^s; 67^m.3. e_E 69^m12^s. e_N 69^m45^s. $iSKS$ 69^m55^s. iS 70^m8^s, very large. SP_Z 70^m55^s; $PS_{N,E}$ 71^m4^s. $e_{N,Z}$ 71^m46^s. e_N 73^m.6; 74^m.7. SS 75^m24^s, very large on E . L not large, the beginning uncertain.
- No. 44. July 26. 20^h. Japan. iP_Z 8^m22^s, condensation, small. $i_{N,E,Z}$ 8^m29^s, large. e_Z 8^m49^s. PP 11^m20^s, 37^s. PPP 13^m.1. e 14^m.5. i_NeES 18^m7^s. i_{NE} 18^m35^s, large, e_Z 19^m.0. SS 22^m.5. SSS_N 26^m.4.
- No. 47. July 31. 20^h. China. Forerunners small. iP_Z 46^m48^s; PP 49^m25^s. S 55^m49^s e_E 58^m.8. e_N 63^m.5. eL 68^m, of long period. iL_N 73^m0^s, iL_E 73^m10^s, very large.
- No. 48. Aug. 1. 10^h. China. Forerunners small. iP_Z 52^m4^s; PP 54^m41^s. e 60^m55^s; S 61^m5^s. e_E 62^m5^s. e_N 68^m.8. eL 73^m. iL_N 78^m16^s; iL_E 78^m20^s, large.
- No. 56. Aug. 5. 15^h. $\Delta = \text{ca. } 120^\circ$. Focus probably deeper than normal. P' 2^m.6. e_Z 3^m27^s. PP 4^m1^s. e 4^m42^s. PS 13^m53^s; $e_{N,E}$ 14^m30^s. SS 21^m.0.
- No. 66. Aug. 11. 1^h. Off Java; $\Delta = \text{ca. } 105^\circ$. Depth about 600 km. iP 8^m55^s, condensation. pP 11^m7^s. i_Z 12^m22^s. $e_{E,Z}$ 13^m5^s. PP 13^m19^s, 25^s. pPP 15^m16^s; PPP 16^m14^s. $e_{E,Z}$ 17^m23^s. SKS 18^m29^s, large on E . $e_{N,E}$ 19^m17^s. S_N 19^m48^s. e_E 20^m.1. iSP 21^m27^s and SPP 22^m28^s, large. sS 23^m.8. $isSP$ 25^m28^s, large on E . SS 27^m26^s; SSS 30^m.5. e_N 38^m.0.
- No. 76. Aug. 20. 6^h. Indian Ocean; $\Delta = \text{ca. } 95^\circ$. P 51^m26^s, condensation. e_Z 54^m.7. SKS 62^m1^s; S 62^m37^s. PS 63^m59^s (in time-break). SS 69^m.0. L small, the beginning uncertain.
- No. 94. Sept. 1. 8^h. Northeast of New Zealand; $\Delta = \text{ca. } 155^\circ$. PKP , condensation; on Benioff Z three distinct pulses 58^m36^s, 46^s, 58^s. Galitzin records disturbed.
- No. 96. Sept. 1. 22^h. Probably a repetition of no. 94. PKP , read on Benioff Z , 1^m5^s, 15^s, 27^s.
- No. 97. Sept. 3. 18^h. Aleutian Islands. Depth about 160 km. iP_Z 59^m31^s, dilatation, small. i 59^m33^s, larger. $i_{N,E,Z}$ 59^m48^s, large. $i(GZ)$ 60^m2^s; $i(BZ)$ 60^m12^s; $i(GZ)$ 60^m28^s. e_N 62^m.3, 62^m.9. $e_{N,Z}$ 64^m.4; $e_{N,E,Z}$ 64^m52^s, e_Z 65^m42^s; e_N 65^m52^s. iS_{NE} 68^m47^s. e_E 69^m2^s, e_N 69^m24^s, $e_{E,Z}$ 69^m42^s, very large. L_E 79^m, L_N 83^m, not large.
- No. 101. Sept. 8. 0^h. South Atlantic; $\Delta = \text{ca. } 115^\circ$. Focus deeper than normal. Masked by rather strong, irregular microseismic movement. e_Z 59^m.6; e_Z 60^m46^s. $e_{N,E}$ 62^m.1. $e_{N,E}$ 65^m13^s; e_N 65^m59^s; e_{NE} 66^m32^s. $PS_{N,E,Z}$ 69^m9^s, large. e_E 74^m.0; SS 75^m.1. SSS 79^m.9. L not large.
- No. 106. Sept. 15. 12^h. Solomon Islands region; $\Delta = \text{ca. } 130^\circ$. P'_Z 46^m35^s. $e_{N,Z}$ 48^m29^s; PP 48^m42^s; $e_{E,Z}$ 48^m58^s. $PKS_{N,E}$ 49^m57^s. e_E 54^m.7. PS 58^m.7. SS 66^m.
- No. 118. Sept. 23. 13^h. Solomon Islands; $\Delta = \text{ca. } 125^\circ$. P'_Z 24^m53^s, 25^m6^s. PP 26^m21^s, 30^s, large. PPP_N 29^m31^s. $e_{E,Z}$ 31^m.0; SKS 32^m.1; $SKKS$ 33^m26^s. $e_{E,Z}$ 36^m.0. PS 36^m.5; PPS 37^m.6, 37^m53^s. e_Z 41^m.0. SS 42^m.6, 43^m.3. SSS 46^m.4, 47^m.4.
- No. 120. Sept. 27. 9^h. Java; $\Delta = \text{ca. } 105^\circ$. Deeper than normal. P_Z 9^m5^s, small. e_Z 9^m19^s, 33^s, 56^s. PP 13^m13^s. e 13^m38^s, 52^s. $iSKS_E$ 19^m41^s, large. $SKKS_E$ 20^m7^s; S_N 20^m41^s. PS 22^m2; e 23^m.9. SS 27^m.4. L not large.