

No. 38.

1936.

# 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. 38. April—June 1936.

**Instruments:**

Galitzin-Wilip seismographs.

**Constants:**

Component	$l$	$A_1$	$T_1$		$\mu^2$	$T$	$k$
	cm	cm	sec			sec	
N	12.5	100	12.61		-0.11	12.2	104
E	12.5	100	12.65		0.08	12.1	104
Z	14.5	100	11.55	$1/4-22/4$	0.1	10	100

After  $22/4$  Z was often readjusted and the constants varied somewhat.

Wiechert 1000 kg. ~~vertical~~ seismograph.

Wiechert 1300 kg. ~~horizontal~~ seismograph.

**Constants:**

Component	$T$	$\nu$	$\rho$	$V$
	sec		mm	
N	9.6	4.2	0.7	215
E	9.6	4.0	0.8	195
Z	5.4	4.1	0.2	165

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

Wood-Anderson torsion seismometer, E component,  $T = 2^s.7$ .

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No.	Date	Hour	Forerunners				L	Un-defined	△	Remarks				
			P		S									
	1936		<i>m</i>	<i>s</i>	<i>h</i>	<i>m</i>	<i>s</i>	<i>m</i>	<i>s</i>	<i>h</i>	<i>m</i>	°		
1*	April 1*	2	<i>i</i> 23	9			27	10	<i>i</i> 33	49		52		Pacific Ocean.
2*	1*	20	24	41			29.1		<i>i</i> 35	21		1.0		Pacific Ocean.
3	2	6					36	58	46.7			1.2		SS 53 <sup>m</sup> .7. Pacific Ocean.
4	2	13										.0		
5	7	2										.9		Faint.
6	8	4			24.0							25		Greece.
7	9	1										.3		
8	9	16				70						.8		Preceding movement masked by [microseisms.
9	10	17												
10	10	20											30	
11	12	0				1.5			2.2			28		<i>e</i> 2 <sup>m</sup> .7; 3 <sup>m</sup> .6. East of Philippines.
12	12	3										.5		
13	12	17										.8		
14*	12*	21	5	0*		9	12		15	33		.6		Marianne Islands.
15	13	1										.4		
16	13	4										.0		Faint.
17	13	8										.7		
18	14	15											52	
19	14	17										.7		
20	15	7										.0		Faint.
21	15	16				10	38					13		
22	15	19				20.4		21.4				.8		
23	16	1				.4						.8		
24	16	10										.3		
25	16	14										10		Small preceding movement.
26	16	14										.8		
27	16	17										.1		Faint.
28	16	20										.9		
29	17	18										.7		Faint.
30	17	22			29	24						.6		Persia.
31	18	0										.9		
32	18	1										.9		
33*	19*	5	23			27	55		37	40		1.0		Solomon Islands.
34	19	9	15	52	25	17	30.5		34.0			.7	73	<i>P</i> —, Andaman Islands.
35	21	2										.3		
36	21	2			28	52						.6		Persia.
37	22	10	9	4	17	24						.4	61	Disturbed. No <i>G.</i> records. Atlantic Ocean.
38	23	23	25	58*	35	34	30.6					.8	75	South of Aleutian Islands. Deep focus.
39	24	13										.8		Faint. No <i>G.</i> records.
40	25	5										.5		
41	26	9				.2						.7		Disturbed.
42	27	0	10	2	19	3	23.8		26.5			.5	69	China.
43	27	1	<i>i</i> 44	20									68	<i>P</i> +
44	27	4										.2		
45	27	6										.3		
46	27	6			53.6		59.0					1.2		Gulf of Honduras.
47	27	13										.6		Faint.
48	28	1										45		Faint.

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No.	Date	Hour	Forerunners				L	Un-defined	△	Remarks	
			P	S							
	1936		m s	m s	h m s	m s	h m	h m	°		
49	April 28	6			0.5	17.3	.6			No G. records.	
50	28	14						.5			
51	28	17					.3			China. Disturbed.	
52	28	18	38 19				1.1		21		
53	28	23	20 5	23.9							
54	29	9					.5				
55	29	17			16.6			33			
56	30	11					.6				
57	May 1	18					.3				Faint.
58	3	2					.9			»	
59	3	3					.7			»	
60	4	4					.7				
61	4	8					.8			Faint.	
62	4	19					.1				
63	5	20			12.9	19.5	.7				
64	6	4			2 25	3 35					
65	6	19						28			
66	7	2				7.6		15			
67	7	21			.7		.8				
68	8	1					.6				
69	8	9			34 6	36.7					Preceding movement disturbed.
70	8	15	35 18		44 17		1.0				China. P quite small.
71	8	17			40 50	42.1				East of New Guinea. No G. records. Faint.	
72	9	6					.5				
73	9	7					.9				
74	10	6					.5				
75	11	10					.1				
76*	11*	17			46 17	47.8	1.4				
77	11	21					.5				
78	13	11					.9				
79	14	6					.3				
80	14	17					.5				
81	16	7	i 16 40	25 37	19 4	30.3		38	68		P+. No G.Z record. China.
82	17	11					.6			Rumania. P quite small, uncertain.	
83	17	15							34		
84	17	17	41 5		43.8			46			
85	19	0					.7				
86*	19*	7			42.5	46 4					
87	19	16			40.2			47			
88	19	16							50		
89*	19*	21			8 59	15 2*					
90	19	21			41.0						Superposed on preceding shock.
91	19	21	43 19		54 0						Superposed on preceding shock. Indian Ocean.
92	20	0			39 15	40 15	1.0			Indian Ocean.	
93*	20*	3			24.3	26 19	1.0			Solomon Islands.	
94	21	3					.9				

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No.	Date	Hour	Forerunners				L	Un-defined	△	Remarks				
			P		S									
			m	s	m	s	m	s	m	s				
	1936													
	May													
95	22	0					40.8		42.8		1.1			
96	22	23				40	40		43	43	1.4			
97	23	20									.2			
98	25	3					32.3		38	23	1.0			
99	25	14									.4			
100	26	13					10.2				1.2			
101	26	18										15		
102*	27*	6	i 28	56	i 36	46	31	4*	40	33	47		56	Faint. Himalaya.
103	28	0									1.2			
104	28	12												
105*	28*	19					5.8		13.1		30			Faint preceding movement. Pacific Ocean off Mexico.
106	30	7					33				46			
107	30	15					58							Small. Faint.
108	31	3										57		
	June													
109	1	11					i 40	27	43	3*				P'—; large on Z. e 47 <sup>m</sup> .0. Deep focus.
110	2	14									.2			
111	3	3	7	9	16.6		17.2				.5		73	Kurile Islands.
112	3	9	27	14	37	11					48		79	No G. records. Pacific off California. Superposed on preceding shock.
113	3	10					36.1							
114	4	13									51			
115	5	14					56.3		61	29	88			No G.E and Z records. e 62 <sup>m</sup> 51 <sup>s</sup> . [SS 69 <sup>m</sup> .8.
116	6	7									.7			
117	6	16					37	27			45			
118	7	4	2	47	6	11					7		19	P—. Greenland Sea.
119	7	4	42	20	45	40					47		18	P—. Greenland Sea.
120	7	11									33			
121	7	18									8			
122	8	9									.4			
123	9	0									.6			
124	9	16	49	19			59	44	59	57	1.3			P—. Sumatra.
125	10	3									28			
126	10	3	37	43	44	33					.9			P quite small, uncertain. Baluchistan. New Guinea.
127*	10*	8					41	50	43	12	1.2			
128	10	15									.1			
129	10	17					26.6				.6			
130	10	19					2.4		7	7	10			
131	11	9					59				1.2			
132	11	13									.9			
133	12	16									.7			
134	13	0	i 37	56	42	11					46		24	P—. Mediterranean Sea. Faint.
135	13	9									.9			
136	13	22									.4			
137	14	2	38	35	47.4		47	41	48.2		1.0		66	P+. Kamchatka.
138	14	6									37			
139	14	10	8	39							14			Greenland Sea.
140	14	17	6	52	11	18					14		25	Asia Minor.

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No.	Date	Hour	Forerunners				L	Un-defined	△	Remarks
			P	S						
	1936									
	June		<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>	°	
141	15	8					22			
142	16	0			53	56	1.7		No G.Z record.	
143	16	15					.9			
144	16	19					.7		Faint.	
145	18	15	6 40				.5		Himalaya.	
146	19	16	45 32	54 18	55 30		1.2	66	P and S quite small. Burma.	
147	20	5					.4		Faint.	
148	20	6	38.6	43.7			47		Atlantic Ocean.	
149	20	7					39			
150	20	8		36.5			41		Atlantic Ocean.	
151	20	14	7 48	11 40			14	22	P+.	
152	20	20					2			
153	21	7					.4		Faint.	
154	22	0					.3		No G. records.	
155	22	19	37 14	45 36	46 13	49.4	52	62	No G.Z record. Atlantic Ocean.	
156	23	0					.1			
157	23	17			40 28		46			
158	23	18			54 37		60			
159	24	4	12 15	18.5				41	P quite small. Turkestan.	
160	25	17		i 12 58			.6		Japan.	
161	27	3	i 27 41	31 58			33	24	P+. Off Iceland.	
162	27	21	25 4	34 34			.8	74	Japan.	
163	28	8		33.1			.9		East of Japan. P about 22 <sup>m</sup> .8, not	
164	28	18					.1		[certain.]	
165*	29*	14	37 51	44 0*	39 5	39 40		40	Afghanistan.	
166*	30*	15	i 17 55	i 26 59	20 31	31 36	37	52	Off Kamchatka.	
167	30	19	33 35	39 37	35 6	35.6		39	P—. PS 39 <sup>m</sup> 46 <sup>s</sup> . SS 42 <sup>m</sup> .3 Afghanistan.	

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NOTES

- No. 1. April 1. 2<sup>h</sup>. Pacific Ocean east of Philippine Islands;  $\Delta = \text{ca. } 100^\circ$ . No Galitzin Z record.  $iP$  23<sup>m</sup>9<sup>s</sup>, condensation;  $e$  23<sup>m</sup>23<sup>s</sup>.  $e$  26<sup>m</sup>48<sup>s</sup>;  $PP$  27<sup>m</sup>10<sup>s</sup>.  $PPP$  29<sup>m</sup>21<sup>s</sup>; 29<sup>m</sup>43<sup>s</sup>.  $e_N$  31<sup>m</sup>16<sup>s</sup>;  $e_{N,E}$  31<sup>m</sup>54<sup>s</sup>.  $e_E$  32<sup>m</sup>.4.  $iSKS$  33<sup>m</sup>49<sup>s</sup>.  $SKKS$  34<sup>m</sup>30<sup>s</sup>.  $S$  35<sup>m</sup>9<sup>s</sup>.  $PS$  36<sup>m</sup>0<sup>s</sup>;  $PPS$  36<sup>m</sup>.9.  $SS$  41<sup>m</sup>.3.
- No. 2. April 1. 20<sup>h</sup>. Pacific Ocean east of Mindanao;  $\Delta = \text{ca. } 100^\circ$ .  $P_Z$  24<sup>m</sup>41<sup>s</sup>.  $PP$  29<sup>m</sup>.1.  $i_E$   $SKS$  35<sup>m</sup>21<sup>s</sup>;  $e_E$  36<sup>m</sup>16<sup>s</sup>.  $PS$  37<sup>m</sup>38<sup>s</sup>. Later phases not clearly marked.  $L$  not large.
- No. 14. April 12. 21<sup>h</sup>. Marianne Islands;  $\Delta = \text{ca. } 100^\circ$ .  $P_Z$  5<sup>m</sup>0<sup>s</sup>, in time-mark.  $e_Z$  8<sup>m</sup>51<sup>s</sup>, small.  $PP$  9<sup>m</sup>12<sup>s</sup>;  $PPP$  11<sup>m</sup>23<sup>s</sup>.  $e$  14<sup>m</sup>.5.  $SKS$  15<sup>m</sup>33<sup>s</sup>.  $PS$  18<sup>m</sup>.2 followed by large oscillations.  $SS$  24<sup>m</sup>.0;  $SSS$  27<sup>m</sup>.6.
- No. 33. April 19. 5<sup>h</sup>. Solomon Islands;  $\Delta = \text{ca. } 125^\circ$ .  $P$  quite small, uncertain.  $P'$  26<sup>m</sup>16<sup>s</sup> small.  $PP$  27<sup>m</sup>55<sup>s</sup> large, followed by large oscillations;  $e$  28<sup>m</sup>46<sup>s</sup>; 29<sup>m</sup>24<sup>s</sup>. Continued, rather strong oscillatory movement;  $e_E$  34<sup>m</sup>.0.  $PS_N$  37<sup>m</sup>40<sup>s</sup>;  $e_E$  37<sup>m</sup>.9 large.  $SS$  44<sup>m</sup>;  $SSS$  49<sup>m</sup>.5.
- No. 76. May 11. 17<sup>h</sup>. East of New Guinea;  $\Delta = \text{ca. } 120^\circ$ .  $P'$  46<sup>m</sup>17<sup>s</sup> small.  $e$  47<sup>m</sup>.2;  $PP$  47<sup>m</sup>.8.  $e$   $SKS$  53<sup>m</sup>.3;  $e_E$  53<sup>m</sup>34<sup>s</sup>.  $SKKS$  54<sup>m</sup>57<sup>s</sup>.  $PS$  57<sup>m</sup>.7;  $PPS$  59<sup>m</sup>.0.  $SS$  63<sup>m</sup>.9.  $SSS$  68<sup>m</sup>.5.
- No. 86. May 19. 7<sup>h</sup>. Deep focus. No Galitzin Z record.  $e_E$  39<sup>m</sup>.5 small, uncertain.  $e_E$  42<sup>m</sup>.5.  $e_N$  46<sup>m</sup>4<sup>s</sup>.  $e_E$  47<sup>m</sup>.6.  $e_E$  51<sup>m</sup>.5.  $L$  small.
- No. 89. May 19. 21<sup>h</sup>. Molucca Islands;  $\Delta = \text{ca. } 110^\circ$ . No Galitzin Z record.  $PP_Z$  8<sup>m</sup>59<sup>s</sup>,  $e$  9<sup>m</sup>8<sup>s</sup>.  $SKS$  15<sup>m</sup>2<sup>s</sup>;  $SKKS$  15<sup>m</sup>57<sup>s</sup>;  $S_n$  16<sup>m</sup>32<sup>s</sup>.  $PS$  18<sup>m</sup>.0.  $SS$  24<sup>m</sup>.3;  $SSS$  28<sup>m</sup>.2. Forerunners of an other shock superposed on  $L$ .
- No. 93. May 20. 3<sup>h</sup>. Solomon Islands;  $\Delta = \text{ca. } 130^\circ$ . No Galitzin Z record.  $P_Z$  24<sup>m</sup>.3.  $PP$  26<sup>m</sup>19<sup>s</sup>. Continued irregular movement, phases not clearly marked.  $e_N$  40<sup>m</sup>45<sup>s</sup>.  $SS$  43<sup>m</sup>.4.
- No. 102. May 27. 6<sup>h</sup>. Himalaya.  $iP$  ( $x, -2.8, +3.6$ ).  $P_c P_Z$  30<sup>m</sup>2<sup>s</sup>.  $PP$  31<sup>m</sup>4<sup>s</sup>;  $PPP$  32<sup>m</sup>16<sup>s</sup>.  $P_c S$  34<sup>m</sup>0<sup>s</sup>,  $iS$  36<sup>m</sup>46<sup>s</sup>.  $e_N$  38<sup>m</sup>.2.  $iS_c S$  38<sup>m</sup>46<sup>s</sup> unusually clearly marked.  $SS_E$  40<sup>m</sup>33<sup>s</sup>;  $SSS_N$  42<sup>m</sup>.2.  $L_Q$  47<sup>m</sup>;  $L_R$  50<sup>m</sup>.
- No. 105. May 28. 19<sup>h</sup>. Pacific Ocean off Mexico;  $\Delta = \text{ca. } 100^\circ$ .  $PP$  5<sup>m</sup>.8. ( $SKKS$ ) 13<sup>m</sup>.1.  $e_N$  13<sup>m</sup>.8. ( $PS$ ) 14<sup>m</sup>.8; ( $PPS$ ) 15<sup>m</sup>.2.  $SS$  20<sup>m</sup>.2.  $L_Q$  30<sup>m</sup>.  $L_R$  34<sup>m</sup>.
- No. 127. June 10. 8<sup>h</sup>. New Guinea;  $\Delta = \text{ca. } 120^\circ$ . Deep focus. No Galitzin records. Wiechert  $H$  disturbed.  $e_Z$  41<sup>m</sup>50<sup>s</sup> quite small.  $P'$  43<sup>m</sup>12<sup>s</sup>.  $PP$  43<sup>m</sup>48<sup>s</sup>.  $SKS$  49<sup>m</sup>50<sup>s</sup>.  $PS$  54<sup>m</sup>1<sup>s</sup> (in time mark).  $e$  59<sup>m</sup>.2; 60<sup>m</sup>.3.
- No. 165. June 29. 14<sup>h</sup>. Afghanistan. Deep focus.  $P$  37<sup>m</sup>51<sup>s</sup>, condensation.  $i$  37<sup>m</sup>53<sup>s</sup> large.  $e_N$  38<sup>m</sup>17<sup>s</sup>.  $e$  39<sup>m</sup>5<sup>s</sup> and  $PP$  39<sup>m</sup>40<sup>s</sup> large on  $E$  and  $Z$ .  $e_N$  39<sup>m</sup>.5.  $e_{E,Z}$  40<sup>m</sup>16<sup>s</sup>.  $e_{E,Z}$  40<sup>m</sup>42<sup>s</sup> large.  $S$  44<sup>m</sup>0<sup>s</sup>, not large.  $e_E$  44<sup>m</sup>56<sup>s</sup>; 45<sup>m</sup>25<sup>s</sup>.  $e_N$  45<sup>m</sup>.6.  $SS$  47<sup>m</sup>.4, very large on  $E$ .  $L$  small.
- No. 166. June 30. 15<sup>h</sup>. Off Kamchatka. Very strong record.  $P$  ( $-4.5, -2.0, +8.6$ ).  $i_Z$  18<sup>m</sup>8<sup>s</sup> very large.  $PP$  20<sup>m</sup>31<sup>s</sup>.  $PPP$  22<sup>m</sup>15<sup>s</sup>.  $iS$  26<sup>m</sup>59<sup>s</sup> very large on  $E$ ;  $i_N$  27<sup>m</sup>18<sup>s</sup> large on  $N$ .  $e_E$  28<sup>m</sup>24<sup>s</sup>.  $e_E$  31<sup>m</sup>.0.  $SS$  31<sup>m</sup>36<sup>s</sup> very large on  $N$ .  $SSS_N$  35<sup>m</sup>.1.  $e_Z$  45<sup>m</sup>52<sup>s</sup>.